



Rio de Flag

Environmental Impact Statement

Final

prepared 

U.S. Army Corps of Engineers
Los Angeles District
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prepared

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Final Environmental Impact Statement (EIS)
Rio de Flag
Coconino County, Arizona

Abstract: This Final Environmental Impact Statement (EIS) addresses alternative means of providing flood protection in Flagstaff, Arizona. The Federal lead agency responsible for implementing the National Environmental Policy Act (NEPA) for this proposed action is the U.S. Army Corps of Engineers, Los Angeles District (USACOE). The initial Draft EIS was circulated for a 45-day public review period in compliance with NEPA from November 19, 1999 to January 4, 2000. The public comment period was later extended to March 31, 2000. In response to public comments and subsequent to a more detailed internal review of the project alternatives, the USACOE decided to revise the recommended plan and recirculate the Draft EIS for public comment. The public comment period for the revised Draft EIS started on June 30, 2000 and ended on August 14, 2000.

Five alternatives (including the No Action Alternative) have been carried forward for detailed environmental evaluation in this Final EIS. The first alternative (Alternative 6a) includes a detention basin along the Clay Avenue Wash and channel modifications along the Rio de Flag and Clay Avenue Wash alignments. Alternative 6a also includes flood control features at Thorpe Park (floodwalls, small embankments, road elevation) and bridge modifications upstream of Thorpe Park. The second alternative (Alternative 6b) includes the same project components as Alternative 6a with the exception of a two-block-long covered channel segment along the downtown reach of the Rio de Flag. The third alternative (Alternative 7) includes two additional detention basins (Cheshire Park and Thorpe Park) in conjunction with the bridge modifications, channel modifications, and Clay Avenue Wash detention basin described for Alternative 6b. The fourth alternative (Alternative D) would involve the construction of two large berms in the Continental Estates area to protect specific structures from flood flows, with no upstream flood control measures. The No Action Alternative involves no flood protection measures along the Rio de Flag or Clay Avenue Wash. Only one of these five alternatives will be selected for implementation.

Each alternative would result in environmental impacts. Mitigation measures and environmental commitments to reduce or avoid impacts have been identified. Consideration of the impacts versus the associated flood protection benefits resulted in the selection of Alternative 6b, the environmentally preferred alternative, as the USACOE's preferred alternative (also referred to as the "recommended plan").

Part I of this Final EIS includes the Final EIS text and Appendices. Part II includes the comment letters received on the revised Draft EIS and corresponding USACOE responses.

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PART I

FINAL EIS & APPENDICES

The text of the public review Draft EIS has been revised and updated in response to public and agency comments. Although these changes are not extensive, it is important to identify which sections of the document have been revised. Accordingly, this Final EIS includes an annotated “R” in the margin of the text where the document has been substantially revised. Minor changes such as changing the word “Draft” to “Final” are not identified due to the extensive nature of these revisions. A sample “R” is provided in the margin of this paragraph. (For Electronic Format Revisions are in Blue Text)

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EXECUTIVE SUMMARY

This document is a Final Environmental Impact Statement (EIS) addressing alternative means of providing flood protection in Flagstaff, Arizona. (The City of Flagstaff is located in southern Coconino County in north central Arizona, approximately 150 miles north of Phoenix.) The initial Draft EIS was circulated for a 45-day public review period in compliance with the National Environmental Policy Act (NEPA) from November 19, 1999 to January 4, 2000. This public comment period was later extended to January 18, 2000 and finally to March 31, 2000. In response to public comments and subsequent to a more detailed internal review of the project alternatives, the U.S. Army Corps of Engineers (USACOE) decided to revise the proposed action and alternatives and recirculate the Draft EIS.

BACKGROUND

The Rio de Flag is an ephemeral stream and tributary of the San Francisco Wash, which feeds into the Little Colorado River. (An ephemeral stream is one that lacks a year-round baseflow, flowing only after rain or snow melt.) Sinclair Wash and Clay Avenue Wash, which are also ephemeral, are the major tributaries to the Rio de Flag within the study area. Flooding in the Rio de Flag is related to snow melt on the San Francisco Peaks in the spring and runoff from torrential summer storms.

Originating on the southwestern slopes of the San Francisco Mountains north of Flagstaff, the Rio de Flag flows over various types of terrain: the wide, flat valleys of the Fort Valley region; the steep, narrow canyons north of Flagstaff; and the wide, flat-bottomed canyons southeast of Flagstaff. The total drainage area of the Rio de Flag watershed is approximately 116 square miles, and the total drainage area above the Flagstaff city limits is roughly 50 square miles. The elevation of the drainage area as a whole ranges from approximately 12,356 feet to 6,800 feet (USACOE 1997).

Based on historical records, flooding within the City of Flagstaff may occur during any season of the year. Eighteen floods have been recorded along the Rio de Flag since 1888, and the last major floods (estimated 25-year events) in Flagstaff occurred in 1938 and 1993. Following the 1993 flood, the City of Flagstaff claims to FEMA amounted to just over \$200,000.

Significant development occurred within the Rio de Flag floodplains until adoption of Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps and associated development

restrictions in 1983. Years of unregulated development in the floodplain have left only a narrow and shallow low-flow channel throughout much of the downtown area.

Today residential, commercial, and industrial development is extensive along the floodplain of Rio de Flag through most of the city. A number of these structures are highly susceptible to flood-related damages in the event of a large storm. Under current conditions, structures valued at approximately \$385 million will continue to be subject to potential flood damage. Nearly half of the 100-year floodplain along the Rio de Flag is zoned as residential areas, whereas approximately one quarter is zoned as commercial. The historic downtown area and the south side of the city center are almost entirely within the floodplain of the Rio de Flag, the 100-year overflow zone of Clay Avenue Wash, or both, where flood depths range from 3 to 8 feet. The north campus of Northern Arizona University also lies within the 100-year floodplain. The railroad tracks which traverse east/west through the City of Flagstaff would also be affected by flooding, with portions of the tracks' embankment projected to be completely inundated during a 100-year event.

Development, especially in the historic downtown and south-side areas, has significantly affected the river channel in several ways:

- sections of the Rio de Flag and its tributaries were filled in, realigned, or both
- buildings were constructed adjacent to, or in some cases directly over, the channel
- roads crossings were built with culverts inadequately sized (too small) to carry storm flows.

Problems and opportunities related to the flooding of the Rio de Flag have been identified, defined, and assessed through public meetings, coordination with local and regional agencies, field reconnaissance, and interpretation of prior studies and reports.

PURPOSE AND NEED

The purpose of the proposed action is to provide improved flood protection in Flagstaff. This increased level of flood protection would reduce public and private flood inundation damages to residential, commercial, industrial, and historic property, and to bridges and road crossings within the study area. Aside from its primary objective of providing increased flood protection, the proposed action would also reduce transportation-related damages and could provide a more natural

greenbelt/parkway setting through the use of native vegetation and grasses in selected reaches of the Rio de Flag channel. The proposed improvement in flood protection for the City of Flagstaff is needed for the reasons previously described under “Background.”

ALTERNATIVES

A total of four alternatives were analyzed in the initial Rio de Flag Draft EIS (October 1999), including Alternatives 1, 5, D, and the No Action Alternative. Based on public comments and a detailed internal review of the project alternatives, Alternatives 1 and 5 were removed from consideration. As a result of the USACOE’s plan development process, three new flood protection alternatives were developed which are addressed in detail in this EIS. (In order to maintain consistency, these alternatives are designated with numbers or letters as they appear in other related USACOE reports.) Alternative D and the No Action Alternative were also carried forward from the initial Draft EIS analysis and are included in this document. The five alternatives analyzed in this revised EIS (Alternatives 6a, 6b, 7, D, and No Action) are summarized below and are described in detail in Section 2.0, Alternatives. Only one (or none) of these alternatives will be selected and implemented by the USACOE and the City of Flagstaff. As noted below, Alternative 6b is the USACOE’s preferred alternative.

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

This alternative would involve: (1) bridge modifications upstream of Thorpe Park along the Rio de Flag; (2) flood protection structures and road modifications at Thorpe Park; (3) channel modifications along Clay Avenue Wash and the downtown portion of the Rio de Flag; and (4) a detention basin along the Clay Avenue Wash, just west of the city limits. These features are described below.

- **Bridge Modifications.** Three bridges would be modified along the Rio de Flag, including the Meade Lane, Anderson Road, and Beal Road bridges. Wingwalls would be constructed upstream of the Meade Lane bridge and the existing bridge would remain in place. The Anderson and Beal road bridges, however, would be demolished and replaced.
- **Thorpe Park Modifications.** A combination of berms and floodwalls would be constructed along the eastern side of the Rio de Flag through Thorpe Park. The walls would be constructed using reinforced concrete covered with basalt fieldstone as an esthetic treatment. The combined berm

and floodwall height would not exceed 5 feet. In order to minimize flooding of North Thorpe Road and adjacent properties, an approximately 350-foot section of the road would be rebuilt at a higher elevation. In addition, small embankments would be constructed on either side of the Rio de Flag just downstream of the existing weir. These embankments would be designed to direct floodwaters into the channel and would not result in upstream detention.

- **Rio de Flag Channel Modifications.** The Rio de Flag channel modifications would consist of two basic components: (1) expanding the existing channel from North Bonito Street downstream to just south of Route 66, and (2) creating a new channel starting south of Route 66, continuing roughly parallel to the railroad tracks through downtown (immediately south of the tracks), and joining a remnant portion of the historic Rio de Flag channel approximately 1,700 feet upstream of Butler Street. Under this alternative, the downtown reach would be an open channel configuration with buried riprap sideslopes and no covered channel segments (aside from the road and railroad crossings). Three homes would be acquired and removed along the western bank of the Rio de Flag near Cherry Avenue. This private property would be acquired by the City of Flagstaff as part of this project, pursuant to applicable Federal and state laws, including the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601).
- **Clay Avenue Wash Channel Modifications.** The Clay Avenue Wash channel modifications would generally entail either (1) expanding and lining the existing channel with concrete or riprap or (2) diverting the channel underground through developed areas.
- **Clay Avenue Wash Detention Basin.** The Clay Avenue Wash detention basin would be located to the west/southwest of downtown Flagstaff, just west of the city limits and north of Route 66. The proposed site encompasses mostly privately-owned property including undeveloped land and a rural residence and its associated agricultural buildings. This private property would be acquired by the City of Flagstaff pursuant to applicable Federal and state laws. The basin area also includes some state-owned land.

Grading and site work would consist of three relatively small embankments tied into high ground, with the site's natural topography serving to contain detained flood flows within the basin. Each of these embankments are described below; no other flood control measures (e.g., floodwalls) or grading would be required at the site. The capacity of the Clay Avenue Wash detention basin would be approximately 295 acre-feet (96 million gallons). When filled to capacity, water contained within the basin would cover approximately 71 acres. Water would be discharged from the basin over a period of up to 60 hours, depending on the amount of rainfall and snow melt. By

extending the period during which runoff and snow melt flow through the downstream channels, the amount of flow within the channels at any one time is reduced. This, in turn, lowers the potential for flooding adjacent to those channels.

- *Northeast Embankment.* The embankment constructed at the northeast edge of the detention basin would contain the outlet structure and spillway. The outlet structure would consist of a single 42-inch diameter corrugated metal pipe, with a capacity of approximately 165 cubic feet per second (cfs). In addition, a smaller “bleed off” pipe or irrigation gate valve would be installed at the channel invert to eliminate long-term ponding. The top of the embankment would be approximately 21 feet above ground level.
- *Northwest Embankment.* An embankment would be constructed just south of the Burlington Northern & Santa Fe (BNSF) railroad tracks along the northern boundary of the detention basin. This embankment would be approximately 1,225 feet in length and 50 feet in width. The top of the embankment would be no more than 10 feet above ground level.
- *Southeast Embankment.* This embankment would be adjacent to the Hidden Hollow Mobile Home park, and it would be specifically constructed to protect the mobile home park from flooding. This embankment would not contain an outlet structure or spillway, and it would be approximately 12 feet tall at its highest point. It would extend approximately 475 feet along the northern edge and 500 feet along the western edge of the mobile home park.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b is the USACOE’s preferred alternative (also known as the “Recommended Plan”). This alternative would provide 100-year flood protection in downtown Flagstaff and would also reduce flooding further downstream. The components of Alternative 6b are essentially the same as those described for Alternative 6a; however, this alternative includes a two-block-long covered channel segment along the downtown reach of the Rio de Flag. The covered channel would extend from Dale Street downstream to Birch Avenue. The underground channel would eliminate the need to acquire and demolish any homes along the downtown reach of the Rio de Flag.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The Clay Avenue detention basin and the Clay Avenue Wash and Rio de Flag channel modifications would be the same as for Alternative 6b. Alternative 7 also includes upstream detention basins along the Rio de Flag at Thorpe Park and Cheshire Park, respectively. These two basins are described below.

- **Cheshire Park Detention Basin.** The proposed Cheshire Park detention basin site is located in northern Flagstaff east of Fremont Boulevard and south of Highway 180. Under this alternative, Cheshire Park and several acres of ponderosa pine forest would be eliminated and replaced with a large basin. The Narrows dam, a small check dam southeast of the park, would be removed and replaced with a larger outlet structure. The basin would encompass approximately 5 acres of land, including approximately 0.5 acres of land currently owned by the Museum of Northern Arizona. Land acquisition would be undertaken pursuant to Federal and State laws.

The Cheshire Park detention basin would be an off-line basin. As such, a split-flow channel would be constructed along the west side of the proposed detention basin to convey normal flows along the Rio de Flag. A split-flow weir would divert flows in excess of 1,500 cfs over the weir and into the detention basin. The capacity of the basin would be 30 to 35 acre-feet (9.8 million to 11.4 million gallons) and the maximum water storage elevation would be approximately 7,084 feet above mean sea level. The basin would drain completely within 24 to 48 hours. The downstream face of the weir would be constructed of riprap. Following construction, the basin sideslopes would be revegetated pursuant to a native plant species revegetation plan currently being developed by the USACOE in consultation with the Arboretum at Flagstaff.

The upstream portion of the basin would have 10:1 sideslopes and the downstream portion would have 3:1 sideslopes. If feasible Cheshire Park would be reconstructed within the footprint of the proposed basin, and the park would be expanded to include passive recreational features throughout the basin. If it is not feasible to reconstruct Cheshire Park within the basin, a replacement park would be built elsewhere within the same neighborhood.

- **Thorpe Park Detention Basin.** The Thorpe Park detention basin would encompass approximately 23 acres of Thorpe Park in northwest Flagstaff. The total volume of the detention basin would be approximately 80 acre-feet (26 million gallons). A substantial portion of the park

would be excavated by approximately two feet, and a bypass channel would be constructed along the eastern boundary of the park. The basin would entail the following key components:

- *Basin Excavation.* Approximately 23 acres of Thorpe Park would be excavated by two feet in order to achieve the required storage capacity of the basin. All facilities affected by excavation activities would be replaced in a manner to minimize or avoid future flood damages. This includes the two Little League fields, three softball fields, concession stands, restrooms, a small parking lot just south of North Thorpe Road, and other park infrastructure (lighting standards, picnic tables, benches, plaques, etc.). Frances Short Pond would also be affected.
- *Bypass Channel.* A bypass channel would be constructed along the eastern side of the park near the current alignment of the Rio de Flag. The invert (channel bottom) would be excavated to 24 feet in width and the channel sideslopes would be constructed at a 3:1 slope. A combination berm and floodwall would also be constructed along the eastern side of the channel. Similar to Alternative 6a, the berm and floodwall would extend along the western property line of approximately 14 residences and the Flagstaff Junior High School. The combined height of the berm and floodwall would not exceed 5 feet, and the floodwall would be constructed using basalt fieldstone as an esthetic treatment. The bypass channel and floodwall would terminate at the proposed embankment (described below), and normal flows would continue through the embankment via an arch culvert.
- *North Thorpe Road Modification.* As with Alternatives 6a and 6b, an approximately 350-foot section of North Thorpe Road would be rebuilt at a higher elevation. The road would be closed for two weeks while pavement is removed, fill added, and the road repaved.
- *Embankment.* An embankment consisting of a berm, spillway, and outlet structure would be constructed immediately south (downstream) of the existing weir at Frances Short Pond. The historic weir would not be affected although it would no longer be used as an access road. At the outlet location, the embankment would have a height of approximately 12 feet, as measured from the base of the downstream side. Following construction, the embankment would be landscaped pursuant to a native species revegetation plan currently being developed by the USACOE in consultation with the Arboretum at Flagstaff.
- *Access Road Relocation.* The access road that currently leads to Flagstaff Junior High School would be relocated from its current alignment along the weir to a new alignment across the top of the embankment. Construction would require the closure of the road for approximately two

months. To avoid access-related impacts to the school, these construction activities would be undertaken during the summer.

- *Park Facility Replacement.* Over 350 trees (including nearly 280 ponderosa pines) and numerous park facilities would be removed under this alternative. All park facilities affected by construction activities would be replaced in their pre-construction condition. Structures (e.g. concession stand, restrooms) would be floodproofed in order to minimize or avoid damage during major flood events. Also, trees would be replanted in areas affected by project construction. Frances Short Pond would remain in its current location; however, excavation of the surrounding land by two feet would result in a wider pond and an increase in the amount of shallow water around the banks.

The embankment would define much of the detention basin's southern limits, and the berm and floodwalls would form the basin's eastern boundary. To the west and north, the spread of detained floodwaters would be contained within the excavated portion of the basin. At full capacity, the embankment and floodwalls would contain water within the excavated area at approximately 6,934 feet above mean sea level. The basin would be sized to completely drain within 48 to 60 hours for the 100-year event, 36 hours for the 50-year event, and less than 24 hours for other more frequent events.

Alternative D: Localized Non-Structural Flood Proofing Alternative

The Localized Non-Structural Flood Proofing Alternative would consist of two berms located in the vicinity of Continental Estates (a primarily residential community in eastern Flagstaff). These localized berms, described below, would protect specific structures from flood flows. Unlike the previously described alternatives, this alternative does not include the use of detention basins or channel modifications, and it would not provide any flood control protection for the areas upstream of Continental Estates (e.g., downtown Flagstaff). The berms would be constructed primarily on public land. If selected, this alternative would be modified in the final design phase in order to minimize or completely avoid private property acquisition.

- **North Berm.** The northernmost berm would be located southeast of the intersection of Country Club Drive and Interstate Highway 40 (I-40). The berm would extend approximately 3,530 feet along the east side of a residential area accessible via Cortland Boulevard. The berm would range in height from 14 to 23 feet, as measured from the base of the slopes, and the width would vary

from 72 to 98 feet along the base of the structure. Upon completion of construction, the berm would be landscaped in accordance with a native plant revegetation plan currently being developed by the USACOE in consultation with the Arboretum at Flagstaff. The north berm would completely avoid any grave sites at the Peaceful Valley Memorial Park (cemetery).

- **South Berm.** This berm would be located approximately 2,000 feet south of the north berm. The structure would be very similar in appearance and construction to the north berm; however, the dimensions would be slightly different. The south berm would range in height from 13 to 26 feet, and it would range between 72 and 114 feet wide at the base. Beginning at its westernmost end, the berm would be built near the western edge of several residential properties located on Fairview Drive and cross Country Club Drive just north of the residential area. To the east of Country Club Drive, the berm would parallel Oakmont Drive through the Continental Little League Fields and cross Oakmont Drive just east of Walnut Hills Drive. The berm would continue along the northeast side of several residences on Laurel Loop and Willow Loop, after which it would head east and tie into an existing hillside near Oakmont Drive. The total length of the south berm would be approximately 7,600 feet. As with the north berm, it would be vegetated with grasses, wild flowers, and shrubs.

No Action Alternative

Under the No Action Alternative, no flood protection measures would be implemented along the Rio de Flag or Clay Avenue Wash in the Flagstaff area. In the absence of future flood control improvements, continued growth in the Rio de Flag watershed would be expected to exacerbate the current flooding problem.

IMPACT SUMMARY

The potential environmental impacts of these five alternatives were evaluated in detail in this EIS (see Section 4.0). Table ES-1 provides a matrix comparison of the alternatives' respective impacts. Impacts have been categorized as one of the following:

- significant, unmitigable (impacts cannot be reduced below the level of significance)
- significant, mitigable (impacts would be reduced to less than significant levels)

- not significant
- beneficial.

In some cases, the No Action Alternative would have no impact on a given resource. Also, in some cases, one component of an alternative would have an adverse impact while another component of the alternative would provide beneficial effects. In these cases, both effects are noted. It should also be noted that the USACOE is seeking an exemption from Clean Water Act Section 401 certification for this project. Accordingly, a 404(r) evaluation has been prepared (see Appendix F).

Table ES-1. Impact Summary Matrix

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Topography/ Geography	<p>Short-term erosion impacts associated with construction of the various flood protection features (channel modifications, floodwalls, bridge modifications, detention basin, etc.) would be mitigated to less than significant levels. Other topography/ geography impacts would be less than significant.</p> <p><i>Significant, Mitigable</i></p>	<p>Impacts would be the same as those described for Alternative 6a. Short-term impacts from erosion would be reduced to less than significant levels.</p> <p><i>Significant, Mitigable</i></p>	<p>Impacts would be similar to those described for Alternatives 6a and 6b; however, this alternative would involve greater quantities of earthwork. Short-term impacts from erosion would be reduced to less than significant levels.</p> <p><i>Significant, Mitigable</i></p>	<p>Unlike Alternatives 6a, 6b, and 7, Alternative D would not entail construction in stream channels and would not have potentially significant erosion impacts. No significant topography/geography impacts would result, and no mitigation is required.</p> <p><i>Not Significant</i></p>	<p>Under the No Action Alternative, there would be no change to topography/geography resources.</p> <p><i>No Impact</i></p>
Water Quality/ Hydrology	<p>Alternative 6a would result in potentially significant water quality impacts from sedimentation or the accidental release of fuels or solvents during construction. Mitigation measures would be required to reduce impacts to a less than significant level.</p> <p><i>Significant, Mitigable</i></p>	<p>Impacts would be the same as those described for Alternative 6a. Short-term water quality impacts would be mitigated to less than significant levels.</p> <p><i>Significant, Mitigable</i></p>	<p>This alternative would alter the low flow hydrology of the Rio de Flag and the size and depth of Frances Short Pond. The effect of these changes on hydrology would be less than significant. As described for Alternatives 6a and 6b, Alternative 7 would result in potentially significant short-term water quality impacts.</p> <p><i>Significant, Mitigable</i></p>	<p>Berm construction could result in significant water quality impacts from the accidental release of fuels or solvents during construction.</p> <p><i>Significant, Mitigable</i></p>	<p>The No Action Alternative would not affect water resources.</p> <p><i>No Impact</i></p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Biological Resources	<p>Alternative 6a would result in potentially significant impacts from the disturbance or removal of riparian/ wetland vegetation and the potential introduction of nonnative weed species from imported fill material. These impacts would be mitigated to less than significant levels.</p> <p>No significant impacts to any federally listed threatened, endangered, or proposed threatened or endangered species would result from Alternative 6a.</p>	<p>Alternative 6b would result in the same biological resource impacts as Alternative 6a. In addition, this alternative would convert approximately 2 blocks of earthen channel to an underground concrete-lined arch. Mitigation measures are provided to reduce these impacts to a less than significant level.</p>	<p>Alternative 7 would result in the same biological resource impacts as Alternative 6b. In addition, Alternative 7 would result in potentially significant impacts to riparian/wetland vegetation at Cheshire Park and Thorpe Park (including impacts to Frances Short Pond). These impacts would be mitigated to less than significant levels.</p>	<p>No loss of sensitive habitat and no impacts to threatened or endangered species would occur under this alternative.</p>	<p>There would be no impacts to biological resources because there would be no construction activities that would affect those resources.</p>
	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Not Significant</i>	<i>No Impact</i>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Cultural Resources	<p>Three homes would be removed along the Rio de Flag under Alternative 6a. These homes are located in the Flagstaff Townsite Historic District but are not listed as contributing elements to the District. At the Clay Avenue Wash detention basin, three ranch buildings constructed in 1935, 1944, and 1954, respectively, are within the 100-year ponding limit. These would need to be evaluated for National Register of Historic Places (National Register) eligibility. If eligible, mitigation would be required. Six unevaluated historic archaeological sites in the 100-year ponding limit of this basin would not be significantly affected.</p> <p>Mitigation would be followed pursuant to a programmatic agreement being developed between the USACOE, the Arizona State Historic Preservation Officer, and the Advisory Council on Historic Preservation.</p>	<p>The three homes in the Flagstaff Townsite Historic District would not be removed under this alternative. Impacts to cultural resources would otherwise be the same as those described for Alternative 6a.</p>	<p>Two historic structures at the Thorpe Park detention basin site would need to be evaluated for National Register eligibility and moved from the embankment footprint.</p> <p>Alternative 7 would include the cultural resource impacts and mitigation listed for Alternative 6a. No additional cultural resource impacts are anticipated as a result of the Cheshire Park and Thorpe Park basins. Should archaeological resources be encountered during construction, they would be mitigated as described in the programmatic agreement being developed between the USACOE, the Arizona State Historic Preservation Officer, and the Advisory Council on Historic Preservation.</p>	<p>No cultural resources are anticipated within the area of disturbance for berm construction; accordingly, no impacts are anticipated. This assessment would be verified by a survey prior to construction.</p>	<p>The No Action Alternative would not directly impact cultural resources because it would not entail construction activities.</p> <p>Continued flooding could result in potentially significant effects to several potentially National Register-eligible structures in the City of Flagstaff. Mitigation for these impacts would normally be to protect the structures from flooding. However, implementing a flood control project would not be considered mitigation for the No Action Alternative; instead, the provision of flood protection is represented by project Alternatives 6a, 6b, and 7. Therefore, no mitigation measures are provided.</p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Land/Water Use	<p>The flood protection features associated with Alternative 6a (channel modifications, floodwalls, detention basin, etc.) would not cause significant existing land use impacts and would not conflict with adopted land use plans or planning guidance.</p> <p>The impacts to residents of homes that would be purchased and demolished, including three houses along the Rio de Flag, a ranch house at the Clay Avenue Wash detention basin site, and 15 mobile homes at the Trailers Ho mobile home park (along Clay Avenue Wash) are addressed under Socioeconomics.</p>	<p>Three less homes would be affected under this alternative. Impacts to existing and planned land use would be essentially the same as those described for Alternative 6a.</p>	<p>In addition to the land uses impacted under Alternative 6b, Alternative 7 would affect existing recreational facilities at Cheshire Park and Thorpe Park. Cheshire Park would be replaced either on site or at a nearby location and Thorpe Park would remain in use following construction. The loss of park use during construction is addressed separately under Recreation, below. Because the parks would be replaced or returned to park use following construction, land use impacts would be less than significant.</p>	<p>The construction of berms along the edges of residential properties and a golf course would not result in significant land use impacts.</p>	<p>There would be no construction and no direct effects to existing or planned land uses. The potential beneficial effects of flood protection provided by the previous alternatives would not be realized under the No Action Alternative.</p>
	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>No Impact</i>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Recreation	<p>Alternative 6a would result in potentially significant short-term recreation impacts from temporary closures of trail sections within the Flagstaff Urban Trails System (FUTS). Mitigation measures are provided to reduce these impacts to less than significant levels.</p> <p><i>Significant, Mitigable</i></p> <p>The channel modifications would provide an extension of the FUTS system, including a north/south crossing under the railroad tracks.</p> <p><i>Beneficial</i></p>	<p>This alternative would result in temporary impacts to the FUTS, as described for Alternative 6a. Impacts would be mitigated to a less than significant level.</p> <p><i>Significant, Mitigable</i></p> <p>The channel modifications would provide an extension of the FUTS system, including a north/south crossing under the railroad tracks.</p> <p><i>Beneficial</i></p>	<p>Alternative 7 would result in significant unavoidable short- and long-term impacts to recreational users, including: the four-month closure of Cheshire Park, the twelve-month closure of Thorpe Park facilities, and the long-term loss of approximately 350 mature trees at Thorpe Park.</p> <p><i>Significant, Unmitigable</i></p> <p>Other impacts at Cheshire and Thorpe parks and along the FUTS would be mitigated to less than significant levels, including: temporary closures of trail sections within the FUTS, partial excavation of ballfields, impacts to Frances Short Pond, and impacts to recreational facilities from flooding.</p> <p><i>Significant, Mitigable</i></p>	<p>Construction of the south berm would interfere with the use of the Continental Estates Little League Fields.</p> <p><i>Significant, Mitigable</i></p> <p>A portion of the south berm would be constructed near a golf course, but this would not significantly affect the use of the course during or after construction. No other recreational impacts would occur.</p> <p><i>Not Significant</i></p>	<p>The No Action Alternative would not affect existing or planned recreational facilities.</p> <p><i>No Impact</i></p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Socioeconomics	<p>Alternative 6a would involve the acquisition of 3 homes along the Rio de Flag downtown reach, a ranch house, and 15 mobile homes along the Clay Avenue Wash. The property owners would be compensated in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. While this ensures adequate financial compensation, including relocation expenses, it cannot substantially mitigate the loss of social ties, upheaval, and sense of loss that may be experienced by the individuals to be relocated. Therefore, while the economic effects of displacement would be reduced, the significant social impacts would be unmitigable.</p> <p><i>Significant, Unmitigable</i></p> <p>Construction would generate short-term beneficial economic impacts.</p> <p><i>Beneficial</i></p>	<p>Alternative 6b would involve the acquisition of a ranch house and 15 mobile homes along the Clay Avenue Wash. As described for Alternative 6a, the economic effects of displacement would be reduced, whereas the significant social impacts would be unmitigable.</p> <p><i>Significant, Unmitigable</i></p> <p>Construction would generate short-term beneficial economic impacts.</p> <p><i>Beneficial</i></p>	<p>Alternative 7 would involve the acquisition of a ranch house and 15 mobile homes along the Clay Avenue Wash. As described for Alternatives 6a and 6b, the economic effects of displacement would be reduced, whereas the significant social impacts would be unmitigable.</p> <p><i>Significant, Unmitigable</i></p> <p>Construction would generate short-term beneficial economic impacts.</p> <p><i>Beneficial</i></p>	<p>The construction of the berms would have a minor beneficial socioeconomic impact due to the creation of short-term construction jobs and the associated increase in personal income levels.</p> <p>Alternative D would not require the acquisition of private property (including residences).</p> <p><i>Beneficial</i></p>	<p>The No Action Alternative would not cause socioeconomic impacts; however, it would not prevent or minimize future flooding along the Rio de Flag. As a result, damages to residential, commercial, institutional, and industrial property would be expected in the future as a result of flooding.</p> <p><i>No Impact</i></p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Transportation	<p>Alternative 6a would result in construction traffic from bridge modifications (10 truck trips per day for 5 days), Thorpe Park modifications (35 truck trips per day for 6 months), channel modifications (26 truck trips per hour for 6 months) and detention basin construction (46 truck trips per day for 3 weeks). The effect of this traffic on the local roadway network would be mitigated to a less than significant level.</p> <p>Channel modifications would also require 18 road closures during construction, each lasting up to one week. Sections of Mike's Pike would be closed over a period of six weeks. Other roads would be restricted to two lanes for short periods of time during construction. These short-term impacts would be mitigated to less than significant levels, primarily through the use of detours.</p>	<p>Although Alternative 6b would result in slightly fewer truck trips for the channel modifications component, traffic impacts would essentially be the same as Alternative 6a. Impacts would be mitigated to less than significant levels.</p>	<p>Construction-related traffic would result in potentially significant impacts on the local roadway network, including bridge modifications (10 truck trips per day for 5 days), Cheshire Park detention basin (26 truck trips per day for 4 months), Thorpe Park detention basin (73 truck trips per day for 8 weeks), Clay Avenue Wash detention basin (46 truck trips per day for 3 weeks), and channel modifications (26 truck trips per hour for 6 months). Mitigation measures would reduce these impacts to a less than significant level.</p> <p>Road closures (including an approximately two-month closure of the Flagstaff Junior High access road) would result in significant impacts. Mitigation measures are provided to reduce impacts from road closures to less than significant levels.</p>	<p>Alternative D would generate an average of 42 trips per hour for the duration of the six month construction period (12 per hour for the north berm and 30 per hour for the south berm). This traffic would utilize Country Club Rd., one of two primary access points to the Continental Estates area in eastern Flagstaff.</p> <p>The construction traffic would represent a significant impact due to the importance of Country Club Rd. for access to/from the Continental Estates area. This impact would be mitigated to less than significant levels by limiting construction traffic to non-peak hours (i.e., between morning and afternoon commutes).</p> <p>Temporary construction in the roadway at Country Club Dr. and Oakmont Dr. would be</p>	<p>The No Action Alternative would not generate traffic or close roads. During floods, roads in the downtown Flagstaff area and in low lying portions of Continental Estates may become impassable. Additionally, major floods could affect the Burlington, Northern & Sante Fe railroad tracks that traverse Flagstaff.</p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Noise	<p>In compliance with the City of Flagstaff Noise Ordinance, construction activity would not be conducted between the hours of 12:00 a.m. and 6:00 a.m. Monday through Friday or between 1:00 a.m. and 7:00 a.m. on Saturday or Sunday.</p> <p>Because channel modifications would occur in close proximity to sensitive receptors, including the Flagstaff City Library and City Hall, construction-related impacts would be significant. Non-blasting impacts would be mitigated to less than significant levels. If blasting is required in the channel sections adjacent to the library, noise impacts would not be mitigable; however, this is not anticipated.</p>	<p>Noise impacts would be essentially the same as those described for Alternative 6a. Non-blasting noise impacts would be mitigated to less than significant levels. If required, noise impacts from blasting would be significant and unavoidable.</p>	<p>Noise impacts would be similar to those described for Alternative 6a; however, this alternative would involve more intensive construction activities at Thorpe Park and construction of a detention basin at Cheshire Park. As with alternatives 6a and 6b, non-blasting noise impacts would be mitigated to less than significant levels. If required, noise impacts from blasting would be significant and unavoidable.</p>	<p>Construction would comply with the Flagstaff Noise Ordinance.</p> <p>Noise levels at residences near the potential flood control berms are expected to be less than significant.</p>	<p>The No Action Alternative would not generate noise.</p>
	<i>Significant, Mitigable (non-blasting)</i>	<i>Significant, Mitigable (non-blasting)</i>	<i>Significant, Mitigable (non-blasting)</i>		
	<i>Significant, Unmitigable (blasting)</i>	<i>Significant, Unmitigable (blasting)</i>	<i>Significant, Unmitigable (blasting)</i>	<i>Not Significant</i>	<i>No Impact</i>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Air Quality	<p>Construction would generate pollutants through vehicle emissions. Additionally, grading and hauling soil would generate dust.</p> <p>These short-term emissions would not exceed state or Federal air quality standards. Voluntary mitigation has been identified to reduce the nuisance factor associated with dust generation.</p> <p><i>Not Significant</i></p>	<p>Air quality impacts would be the same as those described for Alternative 6a.</p> <p><i>Not Significant</i></p>	<p>Air quality impacts would be greater than those described for Alternatives 6a and 6b; however, short-term emissions would not exceed state or Federal air quality standards. Voluntary mitigation has been identified to reduce the nuisance factor associated with dust generation.</p> <p><i>Not Significant</i></p>	<p>Construction would generate pollutants through vehicle emissions. Additionally, grading and hauling soil would generate dust.</p> <p>These short-term emissions would not exceed state or Federal air quality standards. Voluntary mitigation has been identified to reduce the nuisance factor associated with dust generation.</p> <p><i>Not Significant</i></p>	<p>To No Action Alternative would not generate air pollutants.</p> <p><i>No Impact</i></p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Esthetics	<p>This alternative would result in significant unavoidable esthetic impacts from the removal of mature trees lining the channel. Mitigation measures are provided to reduce these impacts, but not to a less than significant level. Such measures include 1:1 tree replacement during the post-construction and landscaping phase of the project.</p> <p align="center"><i>Significant, Unmitigable</i></p>	<p>The covered channel segment along the downtown reach of the Rio de Flag would incrementally increase the significant esthetic impacts of this alternative in comparison to Alternative 6a. As with Alternative 6a, mitigation measures are provided to reduce these impacts, but not to less than significant levels. Such measures include 1:1 tree replacement during the post-construction and landscaping phase of the project.</p> <p align="center"><i>Significant, Unmitigable</i></p>	<p>The significant unavoidable esthetic impacts described for Alternative 6b would occur under Alternative 7. This alternative would also result in significant unavoidable impacts at Thorpe Park and Cheshire Park from the removal of mature trees. Mitigation measures include 1:1 tree replacement during the post-construction and landscaping phase of the project.</p> <p align="center"><i>Significant, Unmitigable</i></p>	<p>The south berm would partially or completely obstruct views from numerous adjacent residences. This would constitute a significant, unmitigated esthetic impact.</p> <p align="center"><i>Significant, Unmitigable</i></p>	<p>The No Action Alternative would not result in any changes to the existing visual setting, and it would not result in esthetic impacts.</p> <p align="center"><i>No Impact</i></p>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Hazardous and Toxic Materials	<p>Several potential hazardous or toxic material sites are known to occur near the proposed channel modification alignments.</p> <p>For known or suspected hazardous materials sites, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic waste be identified during construction. These measures are anticipated to avoid significant hazardous and toxic materials impacts.</p>	<p>Impacts would be the same as described for Alternative 6a. Mitigation measures are provided to reduce impacts related to hazardous and toxic materials to less than significant levels.</p>	<p>No hazardous or toxic materials are anticipated at the Thorpe Park or Cheshire Park detention basin sites. As with Alternatives 6a and 6b, several potential hazardous or toxic material sites are known to occur near the proposed channel modification alignments. Mitigation measures are provided to reduce these impacts to less than significant levels.</p>	<p>No hazardous or toxic materials are anticipated at either berm site. Should such materials be encountered, they would be handled pursuant to field screening procedures and preliminary response plans developed by the USACOE.</p>	<p>This alternative would not require construction activity, and it would therefore not result in the potential to encounter hazardous or toxic materials.</p>
	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Not Significant</i>	<i>No Impact</i>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Safety	<p>As discussed above, Alternative 6a would result in several temporary road closures. Impacts to emergency service provider access associated with these closures would be avoided through prior notification of the Flagstaff City Fire Department.</p> <p>The potential hazards associated with drainage channels, especially the covered concrete channels, would be mitigated through the use of an extensive public involvement program, warning signs, and fences or barricades in some locations.</p> <p>The on-going public information program would focus on teaching children the hazards of entering or playing in drainage channels.</p>	<p>Impacts regarding safety would be the same as described for Alternative 6a. Implementation of the Alternative 6a mitigation measures would reduce impacts to a less than significant level.</p>	<p>Alternative 7 would result in the same type of safety impacts as described for Alternatives 6a and 6b. Implementation of the Alternative 6a mitigation measures would reduce impacts to a less than significant level.</p>	<p>This alternative would not require road closures and would not otherwise generate significant safety hazards.</p>	<p>The No Action Alternative would not generate safety hazards; however, it would also not reduce any hazards associated with flooding.</p>
	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Significant, Mitigable</i>	<i>Not Significant</i>	<i>No Impact</i>

Table ES-1. Impact Summary Matrix (continued)

Resource	Alternative 6a	Alternative 6b	Alternative 7	Alternative D	No Action Alternative
Cumulative Impacts	Alternative 6a would not incrementally contribute to a significant cumulative impact.	Alternative 6b would not incrementally contribute to a significant cumulative impact.	Alternative 7 would not incrementally contribute to a significant cumulative impact.	Alternative D would not incrementally contribute to a significant cumulative impact.	The No Action Alternative would not incrementally contribute to a significant cumulative impact.
	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>Not Significant</i>	<i>No Impact</i>

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1.0 INTRODUCTION/PURPOSE AND NEED

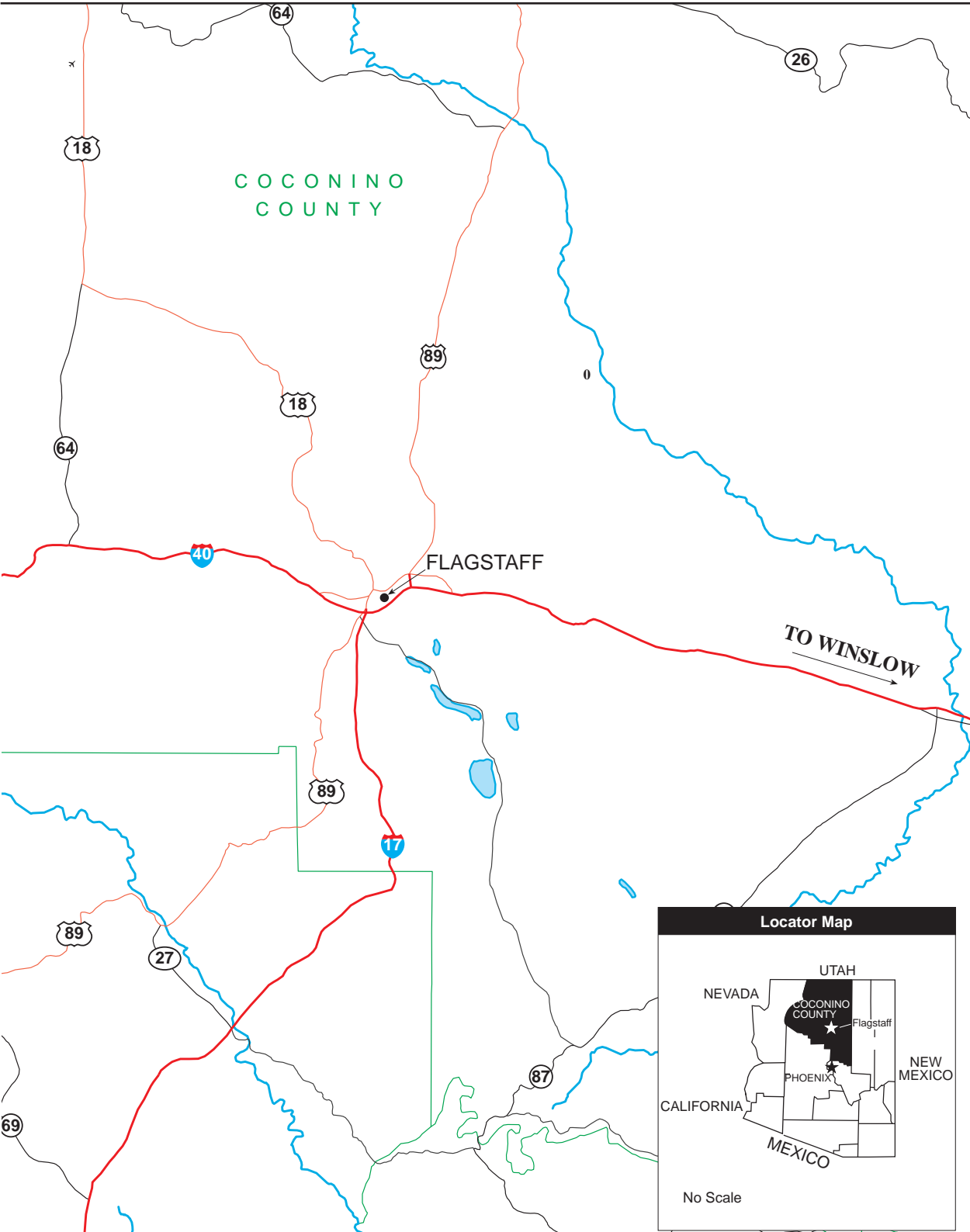
1.1 INTRODUCTION

This document is a Final Environmental Impact Statement (EIS) addressing alternative means of providing flood protection in Flagstaff, Arizona. The initial Draft EIS was circulated for a 45-day public review period in compliance with the National Environmental Policy Act (NEPA) from November 19, 1999 to January 4, 2000. This public comment period was later extended to January 18, 2000 and finally to March 31, 2000. In response to public comments and subsequent to a more detailed internal review of the project alternatives, the U.S. Army Corps of Engineers (USACOE) decided to revise the recommended plan and recirculate the Draft EIS. The revised Draft EIS was circulated for public review from June 30, 2000 to August 14, 2000.

Comments received in response to the initial Draft EIS are included in Appendix A. These comments were considered during the preparation of the revised EIS and, based on these comments, changes and additional information were incorporated into the EIS as applicable. Written responses to the initial Draft EIS comments are not provided; however, written responses to comments received on the revised Draft EIS are included in Part II of this Final EIS.

This introductory chapter describes the project location, discusses the purpose and need of the proposed action, and briefly describes the study authority, agency use of the document, and related studies. Subsequent chapters describe project alternatives (Chapter 2), baseline conditions of the study area (Chapter 3), environmental consequences of the alternatives (Chapter 4), regulatory setting (Chapter 5), and the public participation process (Chapter 6).

The City of Flagstaff is located in southern Coconino County in north central Arizona (see Figure 1-1). The region has a population exceeding 60,000. The study area (see Figure 1-2) was defined through coordination between the USACOE and the City of Flagstaff, with input from the Flood Control District of Coconino County and the State of Arizona. The City of Flagstaff identified Rio de Flag and Clay Avenue Wash as the primary drainages contributing to flooding of major damage centers and problem areas. Located generally within the City of Flagstaff and Coconino County, Arizona, the study area for flood damages is approximately 15 square miles. It encompasses Rio de Flag upstream from the city limits to the Route 66 crossing just downstream of the Continental Estates housing development. Other “areas of potential effect”



Source: Cartesia 1995



0 15 Miles

0 30,000 Meters

Figure 1-1
Regional Location Map

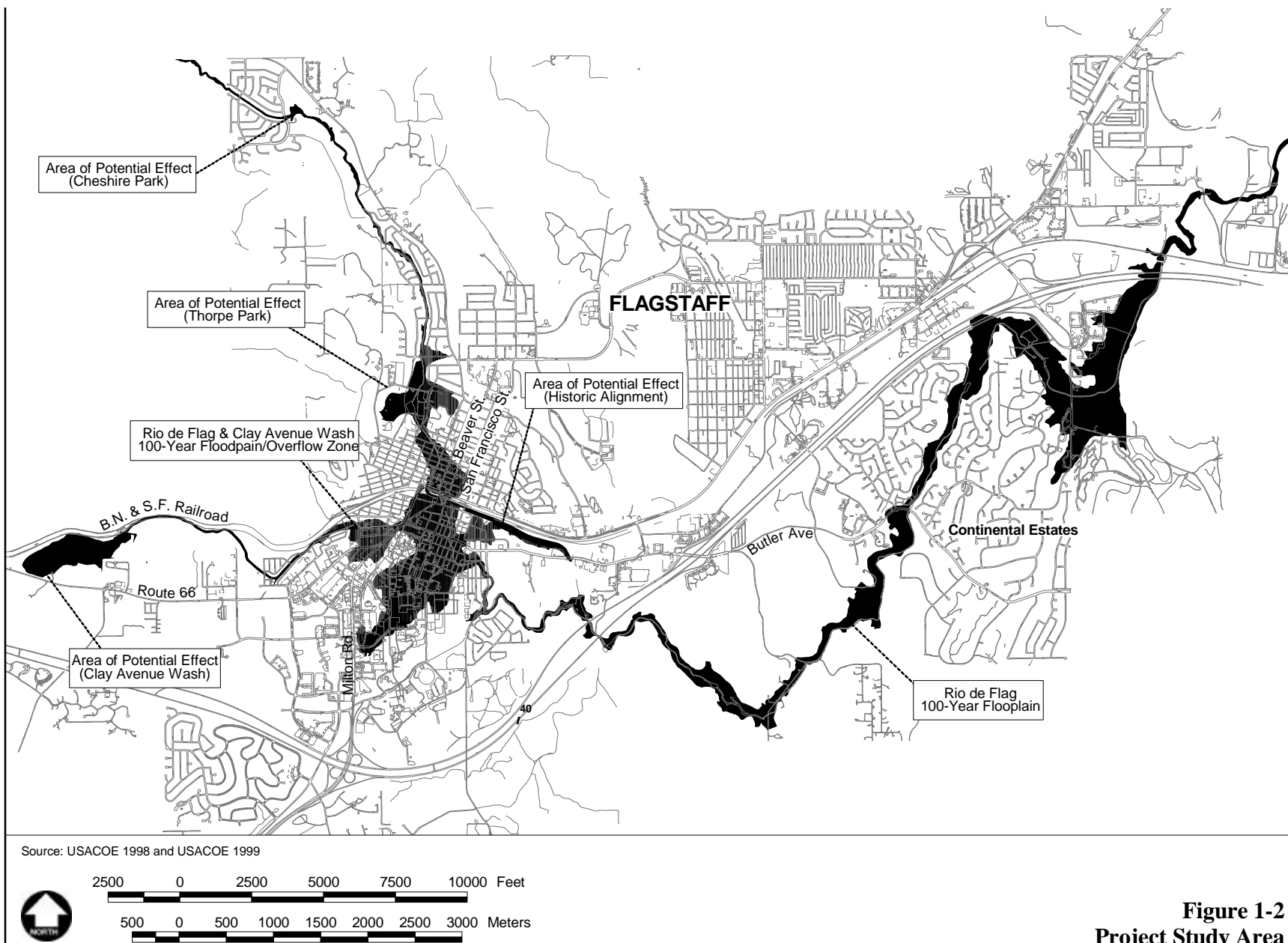


Figure 1-2
Project Study Area

included within the study area are three potential detention basin sites, portions of the Clay Avenue Wash, and the historic Rio de Flag alignment through downtown Flagstaff.

The Rio de Flag is an ephemeral stream and a tributary of the San Francisco Wash. (An ephemeral stream is one that lacks a year-round baseflow, flowing only after rain or snow melt.) Sinclair Wash and Clay Avenue Wash, which are also ephemeral, are the major tributaries to the Rio de Flag within the study area. Flooding in the Rio de Flag is related to snow melt on the San Francisco Peaks in the spring and runoff from torrential summer storms.

Based on historical records, flooding within the City of Flagstaff may occur during any season of the year. Floods have been recorded along the Rio de Flag in 1888, 1896, 1903, 1916, 1920, 1923, 1937, 1938, 1950, 1963, 1966, 1973, 1979, 1983, 1988, 1990, 1993, and 1995. The last major floods (estimated 25-year events) in Flagstaff occurred in 1938 (in terms of discharge) and in 1993 (in terms of volume). This corresponds to the height of the approximate 60-year interval between the peaks of wet cycles in northern Arizona. Since then, minor floods (estimated at less than 25-year events) have occurred. There is some evidence that Arizona has recently entered into another wet cycle (USACOE 1997). Structures valued at nearly \$385 million are currently at risk of flood damages in the event of a 100-year flood.

1.2 LOCATION

The City of Flagstaff is located in southern Coconino County approximately 150 miles north of Phoenix (see Figure 1-1). Flagstaff is surrounded by the Coconino National Forest, an area that contains a large number of natural, scenic, and recreation attractions. Flagstaff is the Coconino County seat and serves as a center for employment, culture, and trading for northern Arizona.

Major transportation routes in the study area include Route 66 and Interstate Highway 40 (I-40). Both of these highways run generally east-west and parallel the Burlington Northern & Santa Fe (BNSF) Railroad (formerly known as the Atchison, Topeka, and Santa Fe Railroad) tracks. Throughout much of the study area, the Rio de Flag is paralleled by trails that are part of the Flagstaff Urban Trails System (FUTS).

The Rio de Flag is a tributary of the San Francisco Wash, which feeds into the Little Colorado River. Originating on the southwestern slopes of the San Francisco Mountains north of Flagstaff, the Rio de

Flag flows over various types of terrain: the wide, flat valleys of the Fort Valley region; the steep, narrow canyons north of Flagstaff; and the wide, flat-bottomed canyons southeast of Flagstaff. The total drainage area of the Rio de Flag watershed is approximately 116 square miles. The total drainage area above the Flagstaff city limits is roughly 50 square miles. The elevation of the drainage area as a whole ranges from approximately 12,356 feet to 6,800 feet (USACOE 1997).

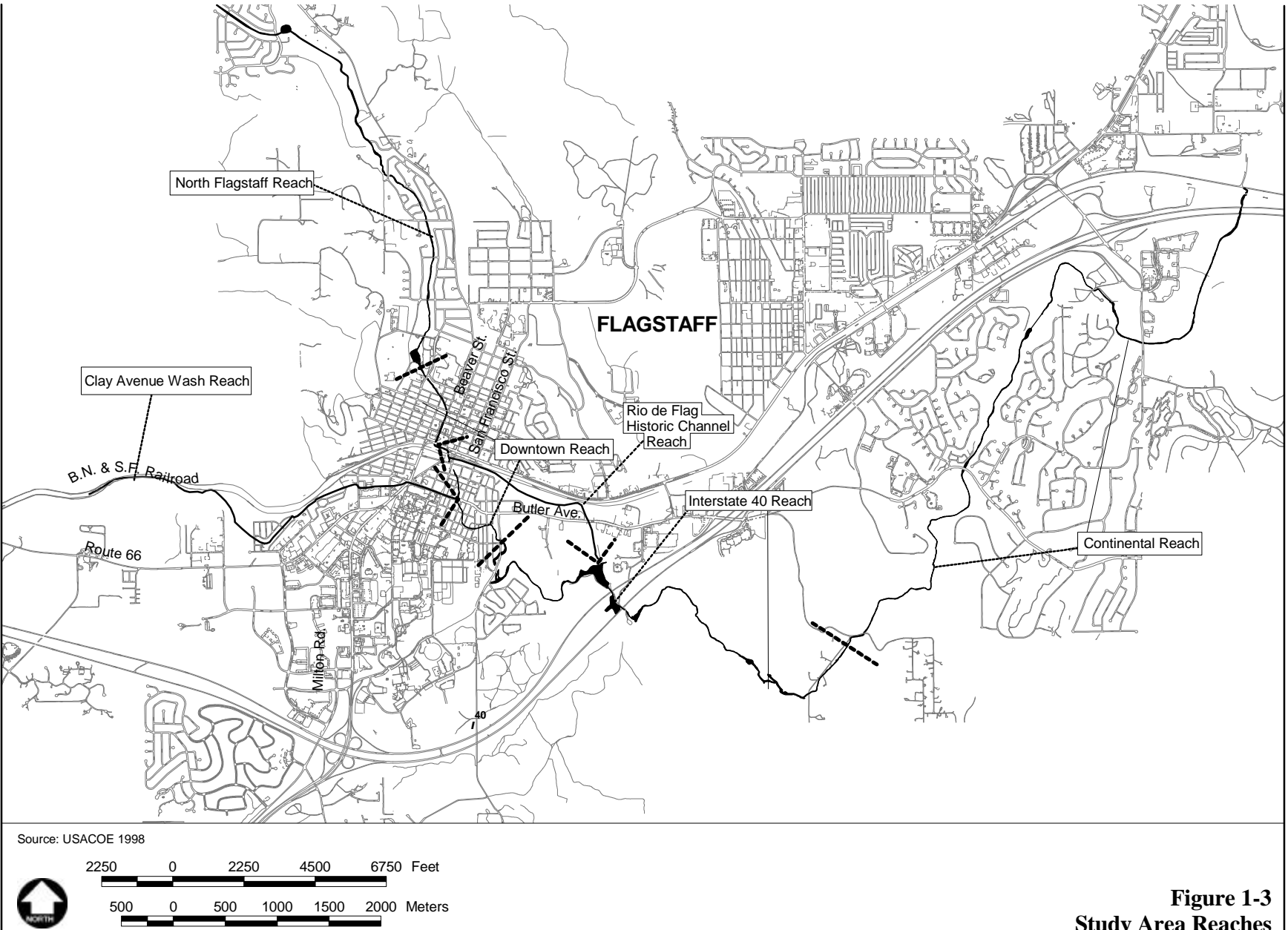
Sinclair Wash and Clay Avenue Wash originate southwest of Flagstaff on the slopes of Woody Mountain. Sinclair Wash flows northeast to its confluence with Rio de Flag just south of the O'leary Road/Lone Tree Road intersection. This study does not address baseline conditions or potential flood control for Sinclair Wash, although the contribution of Sinclair Wash flows into the Rio de Flag have been included in discharge calculations for the Rio de Flag downstream of its confluence with Sinclair Wash.

Clay Avenue Wash flows west from Observatory Mesa, joining the Rio de Flag (via an underground culvert) near the intersection of Butler and San Francisco Streets. Other smaller tributaries to Rio de Flag within the city limits are Penstock Avenue Wash, Peaceful Valley Wash, Country Club Wash, Fanning Drive Wash, Switzer Canyon Wash, Spruce Avenue Wash, West Street Wash, Bow and Arrow Wash, and Peak View Wash.

The study area has been divided into six distinct reaches in this EIS. These reaches represent an attempt to generally group together areas with similar environmental resources, land use, and/or floodplain characteristics for the purpose of NEPA analysis. As such, the reaches established for the environmental analysis do not necessarily correspond to those defined for the purpose of hydraulic analysis. Table 1-1 (on Page 1-8) compares the reaches identified for hydraulic and environmental purposes during the Rio de Flag Feasibility Study. The reaches used in this EIS are displayed on Figure 1-3 and described in the following sections.

North Flagstaff Reach

The North Flagstaff Reach begins at the northern limit of the study area, just upstream of Thorpe Park, and extends southward to Dale Avenue. The Rio de Flag is shallow and narrow along this reach, flowing into Frances Short Pond at Thorpe Park (see Figure 1-4). Flooding in this area would cause inconvenience to local residents but little property damage.





Facing downstream (south) in the Rio de Flag channel at Thorpe Park, just upstream of N. Thorpe Road.



Looking upstream (north) at Rio de Flag channel from bridge at Sitgreaves Street near intersection with Dale Avenue.

Figure 1-4
Photographs of North Flagstaff Reach

Table 1-1. Study Area Reaches

	Hydraulic Reach	Environmental Reach
upstream	Rio de Flag Upper Reach	North Flagstaff Reach
		Downstream Reach
	Rio de Flag Historic Channel Reach	Rio de Flag Historic Channel Reach
downstream	Rio de Flag Lower Reach	I-40 Reach
		Continental Estates Reach
upstream	Clay Avenue Wash Upper Reach	Clay Avenue Wash Reach
downstream	Clay Avenue Wash Lower Reach	

Downtown Reach

The Downtown Reach extends from Dale Avenue to Elden Street west of Northern Arizona University. Significant flooding would occur during a 100-year event due to the limited size of the existing channel and road culverts. This area is extensively developed with existing buildings in the FEMA-defined 100-year floodplain. The channel is generally narrow, and vegetation consists of natural grass lining the bottom, and shrubs and trees on the vertical slopes of the banks (see Figure 1-5).

Rio de Flag Historic Channel Reach

Prior to the development of downtown Flagstaff and the railroads, the Rio de Flag followed a different alignment through the downtown area. While the existing Rio de Flag channel heads almost due south downstream from Cherry Street, the (pre-development) Rio de Flag channel headed in a southeasterly direction to what is now the intersection of Aspen and Sitgreaves streets. From there, the channel headed generally south towards the current intersection of Beaver Street and Phoenix Avenue. South of Phoenix Avenue, the channel curved and headed in a generally east/southeast direction south of the railroad tracks until entering a canyon that ultimately joined the Rio de Flag with Sinclair Wash (Jackson 1999). The historic and the existing Rio de Flag channel alignments currently rejoin near the I-40 wetlands.



Facing downstream (south) along the Rio de Flag near the intersection of Cherry Avenue and Kendrick Street.



Looking downstream along the Rio de Flag from the intersection of Birch Avenue and Kendrick Street.

Figure 1-5
Photographs of Downtown Reach

Although the downtown portion of the Rio de Flag channel has been filled and developed, a remnant portion of this historic channel remains. This section of remnant channel is clearly visible where it crosses under Butler Avenue, approximately 1.1 miles east of the Lumber Street intersection with Butler Avenue. The remnant channel begins approximately 1,700 to 2,000 feet upstream (north and west) from where it crosses under Butler Avenue.

As used in this EIS, the term “Historic Rio de Flag Channel Reach” refers to an alignment approximating the historic channel location that

- extends east from Beaver Street, parallel to and south of the railroad tracks;
- connects with the remnant channel east of downtown Flagstaff, approximately 1,700 feet upstream of Butler Avenue; and
- follows the remnant channel downstream to the I-40 wetlands, where the remnant channel joins the existing Rio de Flag Channel (see Figure 1-3).

It is acknowledged that this is not the true historic alignment of the Rio de Flag—trying to reconstruct a channel along that alignment would require the destruction of numerous houses and buildings throughout downtown Flagstaff. The term “Historic Rio de Flag Channel Reach” is used because this reach follows the alignment necessary to connect to the historic channel and more closely approximates the historic channel of the Rio de Flag than does the current channel. Figure 1-6 shows the Historic Rio de Flag Channel Reach in two locations: (1) parallel to the railroad tracks in downtown Flagstaff, where a new channel would need to be excavated, and (2) immediately upstream from Butler Avenue, where the remnant channel still exists.

Clay Avenue Wash Reach

The Clay Avenue Wash Reach encompasses the 100-year overflow zone for Clay Avenue Wash from just west of the city limits to the wash’s confluence with the Rio de Flag. At the western limits of the study area, Clay Avenue Wash flows through relatively undeveloped ponderosa pine forest and grassy montane meadows. The wash does not have a well-defined channel in this western area. Further east, where Clay Avenue Wash traverses residential communities, the wash varies from a well-defined channel approximately 10 feet in width to a much narrower and shallow grass-lined channel (see Figure 1-7). In some areas, flows have been diverted to city streets, or streets have been constructed directly in the historic channel alignment, or the channel has been diverted into an underground culvert.



Historic channel alignment is to the south (right) of the railroad tracks. Historic channel is buried south of the tracks.



Remnant Rio de Flag channel just north of Butler Avenue.

Figure 1-6
Photographs of Rio de Flag Historic Channel Reach



Historic channel alignment is to the south (right) of the railroad tracks. Historic channel is buried south of the tracks.



Remnant Rio de Flag channel just north of Butler Avenue.

Figure 1-6
Photographs of Rio de Flag Historic Channel Reach



Looking upstream (west) along the Clay Avenue Wash, just north of the Chateau Royale Mobile homes.



Looking upstream at the Clay Avenue Wash as it runs along the center of McCracken Drive.

Figure 1-7
Photographs of Clay Avenue Wash Reach



Interstate-40 wetlands.



Facing downstream along the Rio de Flag in the Continental Estates, just west of Coburn Drive.

Figure 1-8
Photographs of Interstate-40 and Continental Estates Reaches

The 100-year flood overflow zone along the Clay Avenue Wash Reach encompasses roughly 100 residences (primarily mobile homes/manufactured estates), as well as dozens of commercial buildings.

I-40 Reach

The I-40 reach extends from Elden Street east and northeast to the Continental Estates. Flooding would be less significant here because the area is largely undeveloped. The channel deepens as it approaches the interstate where it flows through a wetlands area, known locally as the “I-40 wetlands.” The wetlands lie in a flat area surrounded by high, steep slopes, and they serve as a buffer for storm flows (see Figure 1-8, top photograph).

Continental Estates Reach

The Continental Estates Reach is the easternmost of the five reaches in the study area. It begins in the middle of the southwestern boundary of Continental Estates and continues generally northeast through the subdivision, where it exits the study area through an approximately 42-inch-diameter corrugated metal pipe culvert under Route 66. The area around Continental Estates currently serves as a detention basin for the river. A portion of the normal river flow goes through a natural geologic drain (sinkhole). When the capacity of the sinkhole is reached, water flows through the surface course of the Rio de Flag, passing through a culvert under Route 66. This culvert conveys a flow of only 210 cubic feet per second (cfs). As a result of this flow restriction, the area immediately upstream of the culvert can fill with water up to 20 feet deep in a 100-year event. Development along the fringe of the floodplain in this area would be affected by infrequent flood events. The area is currently a designated floodway, and since 1983 the City has prohibited development within designated floodways (USACOE 1997). Figure 1-8 (bottom photograph) depicts the Rio de Flag immediately west of County Club Road in the Continental Estates Reach.

Detention Basins

There are three potential detention basin sites in the study area. They are located (1) at Cheshire Park and the Narrows Dam, just upstream from the Museum of Northern Arizona and immediately east of Fremont Boulevard, (2) at Thorpe Park in the North Flagstaff Reach, and (3) just west of the Flagstaff City limits near Route 66, upstream from the Clay Avenue Wash Reach. Figures 1-9 and 1-10 provide photographs of the potential detention basin sites.



View of Cheshire Park facing north from southeast corner of park.



View of the Thorpe Park Little League Fields from N. Thorpe Road.

Figure 1-9
Photographs of Cheshire Park and Thorpe Park



View of Frances Short Pond facing south towards the historic weir.



View from Route 66 facing east towards the proposed Clay Avenue Wash Detention Basin Area.

Figure 1-10
Photographs of Proposed Thorpe Park and
Clay Avenue Wash Detention Basins

1.3 PURPOSE OF AND NEED FOR THE PROPOSED ACTION

Between the founding of Flagstaff around 1881 and the City's adoption of FEMA Flood Insurance Rate Maps in 1983, significant development has taken place within the floodplain of the Rio de Flag and its tributaries. Much of the building within the floodplain occurred in the 1920s and 1930s. Development, especially in the historic downtown and south-side areas, has significantly affected the river channel in several ways:

- sections of the Rio de Flag have been filled in, realigned, or both
- buildings have been constructed immediately adjacent to, or in some cases directly over, the channel
- road crossings have been built with culverts inadequately sized (too small) to carry storm flows.

Flood depths in the historic downtown area and in the south side of the city average over four feet and can reach nearly eight feet during a 100-year event. The city center contains large areas of residential development and numerous historic structures that are located within the 100-, 50-, and 25-year floodplains. Many of these structures are on the National Register of Historic Places (see Section 3.4, Cultural Resources).

Problems and opportunities related to the flooding of the Rio de Flag have been identified, defined, and assessed through public meetings (see Appendix B), coordination with local and regional agencies (see Appendix C), field reconnaissance, and interpretation of prior studies and reports. An initial screening of problems and opportunities included flooding and flood control, environmental restoration, recreation, and related land and water resources planning. The alternatives described in Section 2.2 have been designed to address these issues by increasing flood protection along various study area reaches (depending on the alternative).

1.3.1 Need for Improved Flood Control Along the Rio de Flag and Clay Avenue Wash

As described previously, significant development has occurred within the Rio de Flag floodplains until adoption of FEMA Flood Insurance Rate Maps and associated development restrictions in 1983. Years of unregulated development in the floodplain have left only a narrow and shallow low-flow channel throughout much of the downtown area. Today residential, commercial, and industrial development is extensive along the floodplain of Rio de Flag through most of the city. A number of

these structures are highly susceptible to flood-related damages in the event of a large storm. Under current conditions, structures valued at approximately \$385 million will continue to be subject to potential flood damage from a 100-year event. Nearly half of the 100-year floodplain along the Rio de Flag is zoned as residential areas, and approximately one quarter is zoned as commercial. The historic downtown area and the south side of the city center are almost entirely within the floodplain of the Rio de Flag, the 100-year overflow zone of Clay Avenue Wash, or both, where flood depths could range from three to eight feet. The north campus of Northern Arizona University also lies within the 100-year floodplain. Zoning classifications for lands within the 100-year floodplain of the Rio de Flag are shown in Table 1-2

Table 1-2. Percentage of Each Zoning Classification Within the 100-year Floodplain for the Rio de Flag

Zoning Classification	Acres	Percentage of 100-year Floodplain
Residential	401.3	48.7%
Commercial	202.5	24.6%
Public Land	192.0	23.3%
County Land	22.0	2.7%
Industrial	6.8	0.8%
Total	824.5	100%

Source: City of Flagstaff Planning Department 1998

The railroad tracks which traverse east/west through the City of Flagstaff would also be affected by flooding, with portions of the tracks' embankment projected to be completely inundated during a 100-year event. Major floods would cause the city and county to incur considerable costs for emergency response and repair operations. During the 1993 flood, which corresponded to approximately a 25-year event, the City of Flagstaff claims to FEMA amounted to just over \$200,000. Also, during a 25-year or greater event, most of the streets on the north and south sides of the tracks in the downtown area become impassable.

1.3.2 Purpose of the Proposed Action

The purpose of the proposed action is to provide improved flood protection in Flagstaff. This increased level of flood protection would reduce public and private flood inundation damages to residential, commercial, industrial, and historic property, to railroads, and to bridges and road crossings within the study area. Aside from its primary objective of providing increased flood protection, the proposed action would also reduce transportation-related damages and could provide a more natural

greenbelt/parkway setting through the use of native vegetation and grasses in selected reaches of the channel.

1.4 STUDY AUTHORITY

This study has been conducted under the authority given in House Resolution 2425, dated May 17, 1994.

1.5 AGENCY USE OF DOCUMENT

The USACOE has prepared this EIS to document the potential impacts associated with various alternative methods of improving flood control along the Rio de Flag and Clay Avenue Wash in Flagstaff, Arizona. This document has been circulated for public review and comment in accordance with the procedures of NEPA. The public, public agencies, and interested organizations were provided with a 45-day public review period to comment on the adequacy of the environmental analyses and mitigation, the range and merits of the project alternatives, and validity and accuracy of the data, assumptions, and methodologies included in the revised Draft EIS.

The USACOE has reviewed all comments received during the revised Draft EIS public review period and prepared responses to each substantive comment (refer to Part II of this Final EIS). These responses elaborate and clarify information in the revised draft document. In some cases, the revised Draft EIS text has been modified to address public or agency comments. Any text that has been substantially revised is identified in blue text on the page. This Final EIS will be released for a 30-day public review period, although comments received will not be given written responses.

As the lead Federal agency for the Rio de Flag Feasibility Study, the USACOE will issue a Record of Decision (ROD) after the EIS has been finalized and the 30-day public review period is completed. The ROD will indicate the alternative selected for implementation, summarize the reasons for that decision, and serve as notification that appropriate procedures and consultations have been executed. Once the ROD has been issued, the selected alternative can proceed to implementation (e.g., final engineering design, project construction, and operation). NEPA compliance requirements are further described in Section 5.1 of this document.

1.6 RELATED STUDIES

The following prior studies and reports contain reference information used in preparation of this report:

- U.S. Army Corps of Engineers, *Rio de Flag and Clay Avenue Wash Overflow Analysis and Summary Report*, November 25, 1998
- City of Flagstaff, *County Club Drive Flood Limits - February 19-21, 1993 Map*, 1996
- Federal Emergency Management Agency, *Flood Insurance Study*, September 1995
- City of Flagstaff, *Rio de Flag Alternative Flood Study*, September 1994
- URS Consultants, *Rio de Flag Alternative Flood Study*, July 13, 1991
- U.S. Geological Survey, *Flood Hydrology Near Flagstaff, Arizona*, June 1998
- Arizona Department of Water Resources, *Pre-Reconnaissance Flood Control Study of Rio de Flag Wash*, February 1998
- Arizona Department of Water Resources, *City of Flagstaff, Rio de Flag Project (Back-up Analysis)*, September 1998
- Arizona Department of Water Resources, *Water Resources of Southern Coconino County, Arizona*, 1986.
- Arizona Engineering Company, *Runoff in the City of Flagstaff: Drainage System for Various Return Period and Storm Duration*, February 1979
- National Oceanic and Atmospheric Administration, *Climate of Flagstaff, Arizona*, August 1974
- Water Resource Associates, Inc., *Flood Hydrology and Solutions to Flood Hazard Problems- Continental Country Club Project*, May 1974
- National Weather Service, *Precipitation, Frequency Atlas of Western U.S. Volume VIII, Arizona*, 1973
- U.S. Army Corps of Engineers, *Rio de Flag and Sinclair Wash*, April 1978
- U.S. Army Corps of Engineers, Los Angeles District, *Flood Plain Information, Rio de Flag and Sinclair Wash, Vicinity of Flagstaff, Coconino County, Arizona*, 1975
- U.S. Army Corps of Engineers, *Runoff from Snowmelt*, EM 1110-2-1406, January 1960

Supporting appendices are contained in several of the above documents, including technical reports on hydrology, hydraulics, geotechnical, economics, and environmental conditions.

2.0 ALTERNATIVES

This section describes the plan formulation process (i.e., the process of developing potential flood control alternatives) for the Rio de Flag Feasibility Study. The discussion of the plan formulation process is followed by descriptions of the five alternatives evaluated in detail in this EIS and a summary of those alternatives initially considered but not carried forward for detailed environmental evaluation.

2.1 PLAN FORMULATION PROCESS

A plan formulation process was used to develop, evaluate, and compare an array of candidate plans that have been considered for flood control improvements along the Rio de Flag. The general USACOE plan formulation process consists of the following major steps:

- Description and specification of flooding and water resource-related problems and opportunities in the study area.
- Identification of planning objectives and constraints within the study area.
- Formulation of preliminary alternative plans.
- Evaluation and comparison of alternative plans.
- Evaluation of Federal interest for a cost-shared flood control solution.

The Federal objective in water and related land resources project planning is to contribute to national economic development (NED) consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements. Water and related land resources project plans are formulated to alleviate problems and take advantage of opportunities to contribute to this objective. Contributions to the NED are increases in the net value of the national output of goods and services, expressed in monetary units. In addition to the Federal objectives, specific planning objectives were identified for this project through coordination with local and regional agencies, the public involvement process, site assessment, and review of prior studies and reports.

Following the process described above, the formulation process for the Rio de Flag Feasibility study consisted of successive iterations of solutions to the defined flood problem developed within the limitations imposed by the project constraints. Solutions to the flooding problem were formulated to

meet the Federal and specific planning objectives of the study and address opportunities where possible. After each iteration, solutions were evaluated against the following feasibility criteria:

- **Technical Feasibility** - Solutions must be technically capable of performing the intended function, have the ability to address the problem, and conform the USACOE technical standards, regulations, and policies.
- **Environmental Feasibility** - Solutions must comply with all applicable environmental laws. (This environmental feasibility screening eliminated those measures that were clearly infeasible from an environmental standpoint; however, it was not used as a substitute for evaluating a full range of alternatives in this EIS.)
- **Economic Feasibility** - Solutions must be economically justifiable in that the economic benefits must exceed the economic costs, in accordance with all applicable regulations, policies, and procedures.
- **Public Acceptability** - Solutions must be publically acceptable as evidenced by a cost-sharing local sponsor and further documented through an open public involvement process that incorporates the public's input into the formulation of the solutions and the evaluation of solutions.

Initially, specific measures were developed to satisfy the four feasibility criteria. Measures are specific stand alone features, either structural or non-structural, to address the defined problem(s). There are numerous specific measures that can be utilized to provide flood protection depending upon site location, hydrology, environmental conditions and a host of other factors. In determining the set of measures to be evaluated for this study, specific consideration was given to public input and suggestions, USACOE experience with similar flooding situations, technical considerations based upon the specifics of the area and the problem, and environmental considerations for minimizing impacts.

Each measure was then evaluated in terms of the four feasibility criteria. All criteria had to be adequately met since any one criteria can serve as a screen to eliminate a measure from additional consideration. Following the evaluation of measures, those satisfying the feasibility criteria were carried forward for additional development and evaluation while those that fail were eliminated from further consideration. Those measures that passed the initial evaluation were then expanded upon or combined to form a preliminary set of alternatives. A total of nine preliminary alternatives was developed from the

set of feasible measures. This preliminary set of alternatives was then subjected to a more rigorous evaluation in terms of the feasibility criteria. In comparing the preliminary alternatives, the without project (No Action) condition served as the basis against which each alternative was evaluated.

Out of the nine preliminary alternatives, three were identified that best satisfied the four criteria. These three were then carried forward in the initial Draft EIS (October 1999) and, in addition to the No Action Alternative, they comprised the final array of alternatives for that document. The initial EIS was released for public and agency comment in compliance with the requirements of the National Environmental Policy Act, as amended, in November 1999. Prior to and concurrently with the release of the 1999 Draft EIS, an independent technical review of all aspects of the plan was conducted by the U.S. Army Corps of Engineers. Based upon public and agency review and independent technical review, it was determined that there was a need to re-evaluate the alternatives and either verify or change the selection of the recommended plan, as necessary. As a result of this re-evaluation, a revised final array of five alternatives was selected (Alternative 6a, 6b, 7, D and the No Action Alternative). Only one of these five alternatives will be selected for implementation. This final array of alternatives has been subjected to a high degree of evaluation, including detailed environmental analysis in this EIS, detailed cost estimation and design of project features, and specific real estate evaluations based upon project boundaries. The results of these evaluations form the basis for selecting the proposed action or recommended plan in the feasibility report. The recommended plan is described below in Section 2.2.2.

Flood protection measures that were not carried forward for analysis following the initial screening are described in Section 2.3.1. Alternatives developed from management measures that satisfied the feasibility criteria, but that were not selected for the final array of alternatives, are discussed in Section 2.3.2.

2.2 DESCRIPTION OF ALTERNATIVES

This EIS evaluates five alternatives at an equal level of detail. Each alternative is a stand-alone alternative, and only one of the five will be selected for implementation. In order to maintain continuity with previous studies, these alternatives (except for the No Action Alternative) are designated with numbers or letters as they appear in other related USACOE reports. Each of the five is discussed briefly below, while sections 2.2.1 through 2.2.5 provide detailed descriptions of each alternative in

terms of modification to bridges, parks, roads, embankments, etc. The detailed descriptions focus on three areas: project components, construction requirements, and operations and maintenance.

- **Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)** – Channel modifications would occur along Clay Avenue Wash and the downtown reach of the Rio de Flag. The downtown reach of the Rio de Flag would be an open channel configuration transitioning to a covered channel and greenbelt channel south of Route 66. Modifications at Thorpe Park would include a floodwall along the east side of the Rio de Flag, elevation of North Thorpe Road and construction of two small embankments. A detention basin would be constructed along Clay Avenue Wash immediately west of the Flagstaff city limits.
- **Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)** – All of the components described for Alternative 6a would be constructed (detention basin along Clay Avenue Wash, bridge modifications, modifications at Thorpe Park, and channel modifications along the Rio de Flag and Clay Avenue Wash); however, the downtown reach of the Rio de Flag would include a covered channel segment extending for approximately two blocks between Dale and Birch Avenues (see Section 2.2.2). This is the USACOE’s “recommended plan” (which is also referred to as the preferred alternative).
- **Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)** – Detention basins would be constructed at three locations: (1) along the Rio de Flag at Cheshire Park; (2) along the Rio de Flag at Thorpe Park; and (3) along Clay Avenue Wash immediately west of the Flagstaff city limits (see Section 2.2.3). Also, channel modifications would occur along Clay Avenue Wash and the downtown reach of the Rio de Flag as described under Alternative 6b (see Section 2.2.2).
- **Alternative D: Localized Non-Structural Flood Proofing Alternative** – Localized berms would be constructed around specific areas along the periphery of the Rio de Flag floodplain in the vicinity of Continental Estates (see Section 2.2.4).
- **No Action Alternative** – Under this alternative the existing channels and swales would remain in their current condition (see Section 2.2.5).

A summary comparison of the five alternatives is provided in Table 2-1. The recreational features associated with each alternative are described in detail in Appendix D of this EIS.

Table 2-1. Comparison of Alternatives¹

<div>Location</div> <div>Alternative</div>	Rio de Flag ²						Clay Avenue Wash ³	
	Cheshire Park	Cheshire Park to Thorpe Park	Thorpe Park	Thorpe Park to Route 66	Route 66 to Butler Avenue	Continental Estates	West of City limits	Chateau Drive to Phoenix Ave.
Alternative 6a	No change	Wingwalls (Meade Ln.) Bridge replacement (Anderson Rd. and Beal Rd.)	Floodwalls (5' max) Elevate Thorpe Rd. Small Embankments	Soil and riprap channel	Riprap channel Covered channel Greenbelt channel Gabion structures	No change	Detention basin	Gabion structures Riprap channel Covered channel Concrete Channel
Alternative 6b	No change	Wingwalls (Meade Ln.) Bridge replacement (Anderson Rd. and Beal Rd.)	Floodwalls (5' max) Elevate Thorpe Rd. Small Embankments	Soil and riprap channel with 2 blocks of covered channel	Riprap channel Covered channel Greenbelt channel Gabion structures	No change	Detention basin	Gabion structures Riprap channel Covered channel Concrete Channel
Alternative 7	Detention basin	Wingwalls (Meade Ln.) Bridge replacement (Anderson Rd. and Beal Rd.)	Detention basin Floodwalls (5' max) Elevate Thorpe Rd. Large Embankment	Soil and riprap channel with 2 blocks of covered channel	Riprap channel Covered channel Greenbelt channel Gabion structures	No change	Detention basin	Gabion structures Riprap channel Covered channel Concrete Channel
Alternative D	No change	No change	No change	No change	No change	Bems	No change	No change
No Action	No change	No change	No change	No change	No change	No change	No change	No change

1 The five alternatives are described in detail in Sections 2.2.1 through 2.2.5. This summary table only describes the basic components of each alternative.

2 The portion of the Rio de Flag from Butler Ave. to the Continental Estates is not included in this table because none of the alternatives would affect this segment of the channel.

3 The portion of the Clay Ave. Wash between the western City limits and Chateau Dr. is not included in this table because none of the alternatives would affect this segment of the wash.

2.2.1 Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Alternative 6a would provide 100-year flood protection along the Rio de Flag's downtown and historic channel alignment reaches and would also reduce flooding along the Clay Avenue Wash, I-40, and Continental reaches. The major components of this alternative are summarized in Table 2-1 and illustrated on Figure 2-1. The various flood control features from upstream to downstream for the Rio de Flag and Clay Avenue Wash channels are described below. Alternative 6a is not the preferred alternative.

Project Components

Rio de Flag

Flood control features along the Rio de Flag would consist of three basic components: (1) bridge modifications upstream of Thorpe Park; (2) flood control structures and road modifications in Thorpe Park; and (3) channel modifications downstream of Thorpe Park. These features are described below.

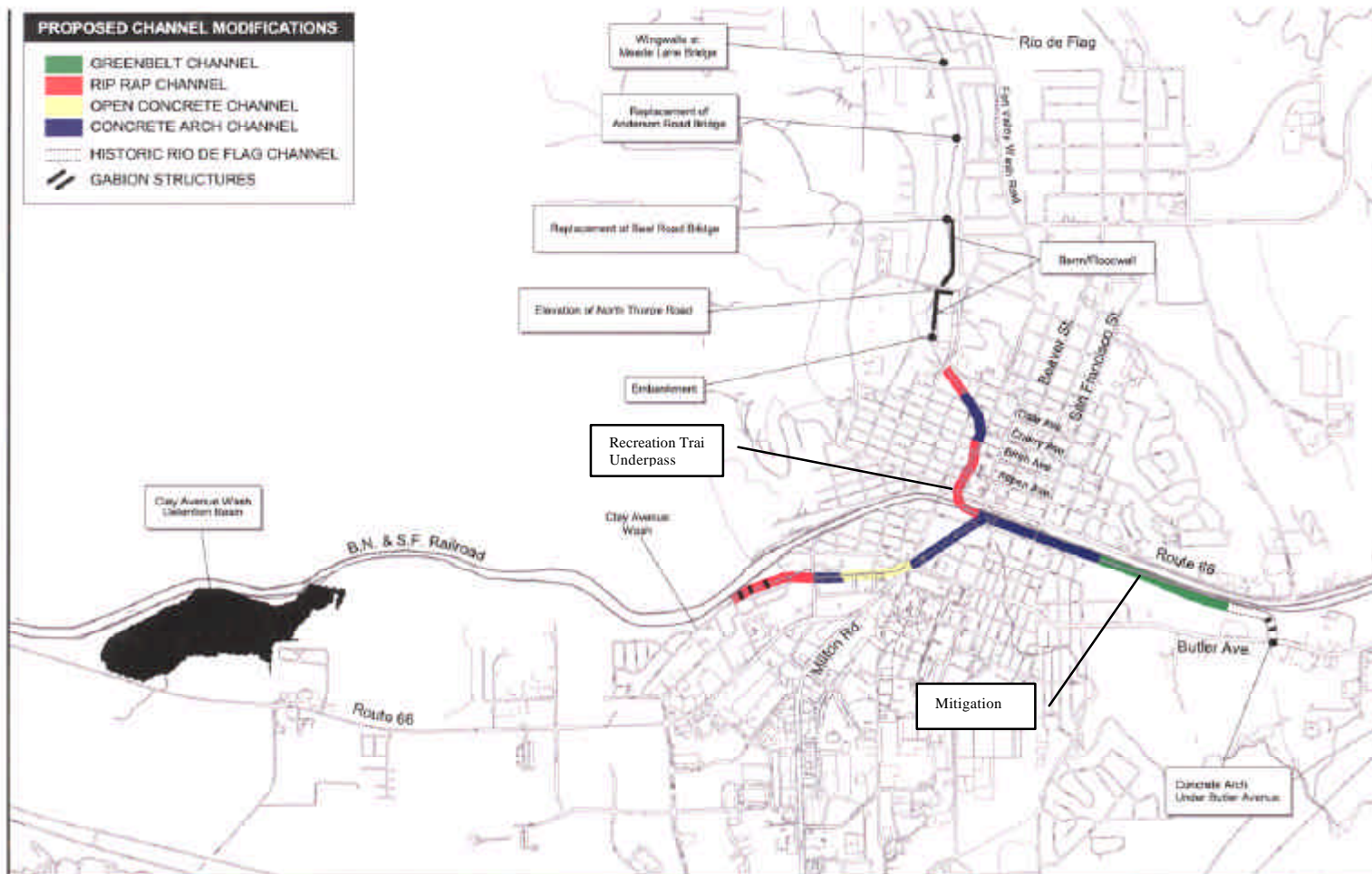
Bridge Modifications

As discussed above, three bridges would be modified along the Rio de Flag, including the Meade Lane, Anderson Road, and Beal Road bridges. Wingwalls¹ would be constructed upstream of the Meade Lane bridge and the existing bridge would remain in place. The Anderson Road and Beal Road bridges, however, would be demolished and replaced. The Anderson and Beal bridge crossings would each be closed for approximately two to four weeks during construction. The bridges would not be closed simultaneously.

1 Wingwalls are angled concrete walls placed on both sides of a channel to direct the flow of water under or through a given structure. In this case, the wingwalls would be placed upstream of the Meade Lane bridge to direct flows under the bridge and protect the structural supports on either side.

PROPOSED CHANNEL MODIFICATIONS

- █ GREENBELT CHANNEL
- █ RIP RAP CHANNEL
- █ OPEN CONCRETE CHANNEL
- █ CONCRETE ARCH CHANNEL
- ▤ HISTORIC RIO DE FLAG CHANNEL
- ▤ GABION STRUCTURES



Source: UBACOE 1996



**Rio de Flag Project Features
Plate 1 (Enclosure 1)**

Thorpe Park Modifications

- *Floodwalls.* A combination of berms and floodwalls would be constructed along the eastern side of the Rio de Flag through Thorpe Park (see Figure 2-2). The top elevation of the walls would range between 6,936 and 6,942 feet above mean sea level and the combined height of the berms and walls would not exceed five feet. The walls would be constructed approximately three feet west of the property lines of Flagstaff Junior High School and 14 residential properties that front on North Navajo Drive. The floodwalls would be constructed using reinforced concrete covered with basalt fieldstone (malpais basalt) as an esthetic treatment. The stones would be placed on the outside of the walls to form a mosaic veneer, characteristic of other recent stonework in the city (including the Flagstaff public library). The floodwall footings would be designed to avoid existing groundwater wells in the area.
- *North Thorpe Road Modification.* In order to minimize flooding of North Thorpe Road and adjacent properties, an approximately 350-foot section of the road would be rebuilt at a higher elevation. This would require the use of retaining walls up to five feet in height along the side of the elevated road. This retaining wall would also incorporate a mosaic veneer of basalt fieldstone. North Thorpe Road would be closed for two weeks while pavement is removed, fill added, and the road repaved. This road closure would also occur during the summer to avoid access impacts to the nearby school. The existing culvert at the Rio de Flag crossing under Thorpe Road would be replaced.
- *Embankments.* Small embankments would be constructed on either side of the Rio de Flag just downstream of the existing weir. These embankments are designed to direct floodwaters into the channel and would not result in upstream detention. As shown in Figure 2-2, the eastern embankment would tie-in to the natural topography at an elevation of 6,939 feet above mean sea level. The western embankment would be located just south of the historic weir. The hard surfaces of each embankment would be constructed with an esthetic rock treatment similar to that described for the proposed floodwalls. The weir would remain in place and would not be affected by project construction.

Rio de Flag Channel Modifications

Under Alternative 6a, channel modifications would occur along the Rio de Flag through the downtown reach from Bonito Road downstream to Butler Avenue (see Figure 2-1). These modifications are described below.

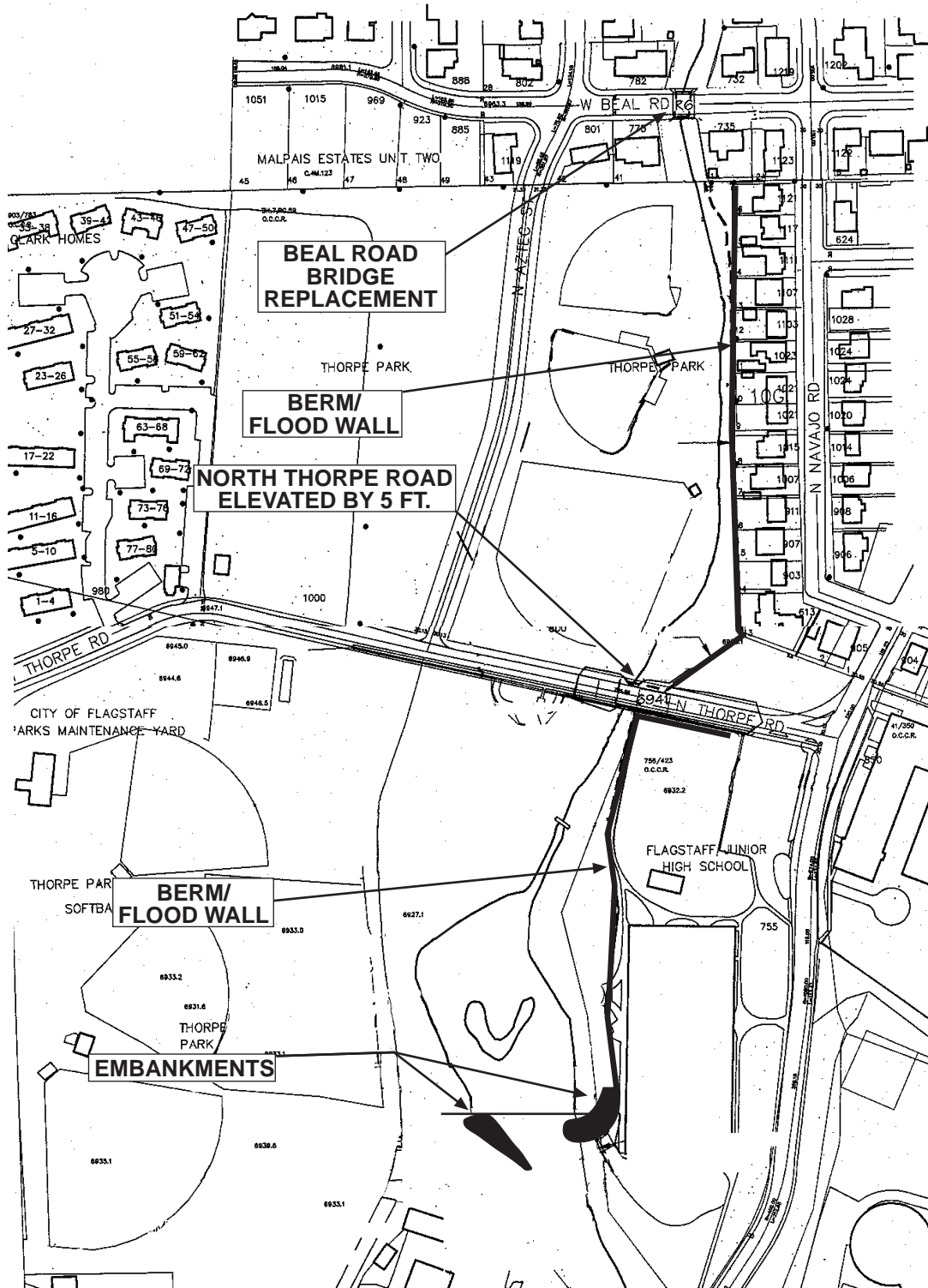


Figure 2-2
Alternative 6a Thorpe Park Modifications

0 250 Feet



Approximate Scale

- A trapezoidal channel with a soft earthen bottom and 2:1 riprap lined slopes would be constructed through most of the downtown reach. (Slopes are described in terms of horizontal to vertical [H:V] ratios; accordingly, a 2:1 side slope will extend two feet horizontally from the channel bottom for every one foot of vertical rise.) This segment of riprap-lined channel would extend from Bonito Street downstream to Route 66. This segment would have a channel bottom width of approximately 24 feet and depth of approximately 7.9 feet. The riprap would be covered with soil, allowing the establishment of some vegetation. A trail would be constructed along the channel.
- Due to right-of-way requirements for this segment, three homes on the west side of the channel would be acquired and demolished, including: (1) one residence on the east side of Sitgreaves Street between Dale and Birch avenues; (2) one residence on the north side of Cherry Avenue between Sitgreaves and Kendrick streets; and (3) one residence on the south side of Cherry Avenue between Sitgreaves and Kendrick streets. The addresses of these homes are 314 Sitgreaves Street, 311 W. Cherry Street, and 314 W. Cherry Street. These private properties would be acquired by the City of Flagstaff, pursuant to applicable Federal and state laws, including the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601). (Refer to Section 5.17 for more information on relocation procedures and process.)
- At the Route 66 crossing, two underground culverts would be constructed: (1) a 24-foot by 9-foot concrete arch for drainage conveyance, and (2) a parallel 12-foot by 8-foot arch for bicycle/pedestrian access (which would be a continuation of the Flagstaff Urban Trail System [FUTS] trail). The portion of the project south of Route 66 would entail the construction of a new channel and adjacent recreational trail. The first segment of this new channel would curve into an east/southeast heading, forming an alignment parallel to and south of the railroad tracks. This channel segment would be similar to, but slightly larger than, the riprap-lined channel described above, with a depth of approximately 8.2 feet. The riprap-lined channel and recreation trail would extend from just south of Route 66 to a point approximately 170 feet west of South Beaver Street.
- At approximately 170 feet west of South Beaver Street, the Rio de Flag channel would be joined by an underground (covered) concrete channel conveying flows from Clay Avenue Wash. Both channels would converge and transition into an arch-shaped underground concrete channel that would run parallel to the railroad tracks through downtown. The underground channel would be approximately 28 feet wide at the base and approximately 12 feet tall at its center. This section of underground channel would extend east/southeast through downtown Flagstaff for approximately 1,900 feet. The existing downtown reach south of Route 66 would no longer carry storm flows and

other runoff from upstream portions of the Rio de Flag because that water would be directed into this new underground arch.

- At a point approximately 250 feet south/southeast of the North Elden Street/Route 66 interchange, the underground concrete channel would transition into an open greenbelt channel. The term “greenbelt” is used because this section of Rio de Flag would include several features favoring the establishment of vegetation in and along the channel, including a 56-foot-wide earthen channel bottom and shallow 4:1 earthen side slopes. The channel would not be lined with riprap or concrete. This segment would extend east and south from the underground channel, joining an existing remnant section of the historic Rio de Flag channel approximately 1,700 feet upstream of Butler Avenue.
- Gabion grade control structures¹ would be constructed approximately 150 feet and 400 feet upstream of Butler Avenue. These two structures would reduce the elevation of the channel by roughly 12.5 feet over a distance of approximately 250 feet. The channel flows would proceed under Butler Avenue through a 24-foot-wide and 8.5-foot-high concrete arch that would replace the existing culverts. Wingwalls would be constructed near the entrance of the concrete arch and a 50-foot-long riprap blanket would be constructed at the downstream end of the arch. Traffic on Butler Avenue would be disrupted during construction. Construction would occur in segments, allowing at least one lane of through traffic in each direction at all times.

In general, fences would not be erected along the riprap-lined channel segments. Where fences could be effectively integrated into existing development and would be needed (such as along residential properties), they would be provided. Vehicular barriers would be provided where a riprap channel is located along a street, and pedestrian barriers would be placed where warranted. Warning signs would be posted at major access points (such as gates) and periodic maintenance inspections and police patrols for vagrants/campers would be implemented along the modified channel.

¹ A “gabion” is a wire basket or cage filled with stone and placed as, or as part of, a bank-protection structure. A “grade control structure” is a structure, such as a gabion, placed in a creek channel to provide a change in the channel grade with the intent of controlling channel erosion or lowering the elevation of the channel bottom.

Clay Avenue Wash

Detention Basin

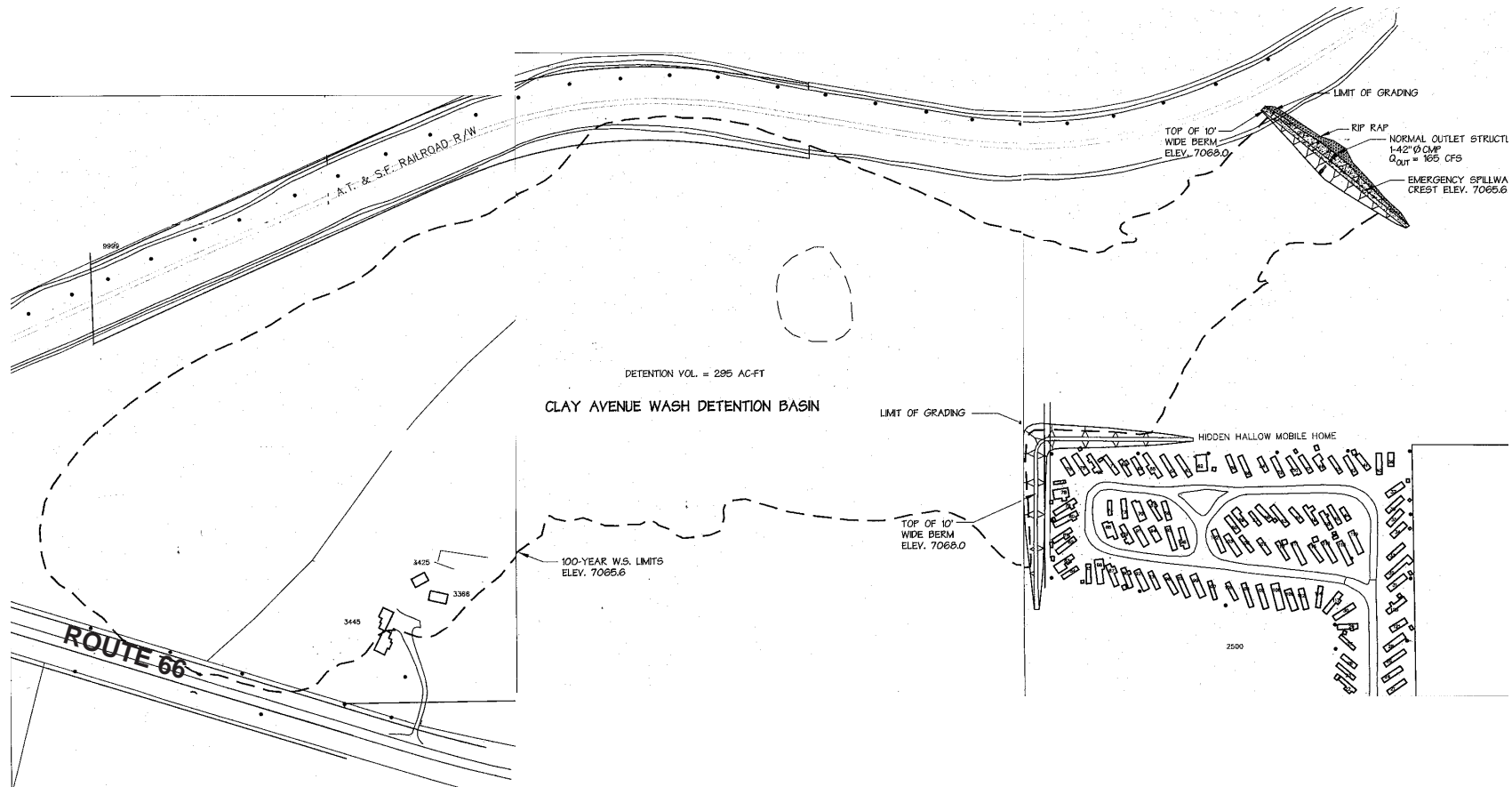
Detention basins provide flood protection by temporarily storing runoff and snow melt upstream from areas that are likely to flood during periods of high flow. The detained water, which may have otherwise exceeded the capacity of downstream channels and flooded surrounding areas, is released slowly from the detention basin.

Under Alternative 6a, an “on-line” detention basin would be constructed along the Clay Avenue Wash to the west/southwest of downtown Flagstaff, just west of the city limits and north of Route 66 (see Figure 2-3). Water would pass through the detention basin unrestricted during periods of relatively low flow. During periods of higher flow, however, the influx of water into the basin would exceed the discharge capacity of the basin’s outlet structures, and the detention basin would begin to fill. Only after the rate of water entering the basin drops below the capacity of the outlet structure would basin water level begin to drop. Water would be discharged from the Clay Avenue Wash detention basin over a period of up to 60 hours, depending on the amount of rainfall and snow melt. By extending the period during which runoff and snow melt flow through the downstream channel, the amount of flow within the channel at any one time is reduced. This, in turn, lowers the potential for flooding adjacent to the downstream Clay Avenue Wash and Rio de Flag channels.

During large flood events, the basins may reach capacity. If a detention basin reaches capacity and water continues to flow into the basin in excess of the basin’s outlet structure capacity, the basin ceases to provide flood protection to downstream areas. Figure 2-4 provides a schematic representation of “on-line” detention basin operations.

The proposed detention basin site encompasses mostly privately-owned property including undeveloped land and a rural residence and its associated agricultural buildings. This private property would be acquired by the City of Flagstaff pursuant to applicable Federal and state laws. The proposed detention basin site also includes some state-owned land.

Grading and site work would consist of three embankments tied into high ground, with the site’s natural topography serving to contain detained flood flows within the basin (see Figure 2-3). Each of these

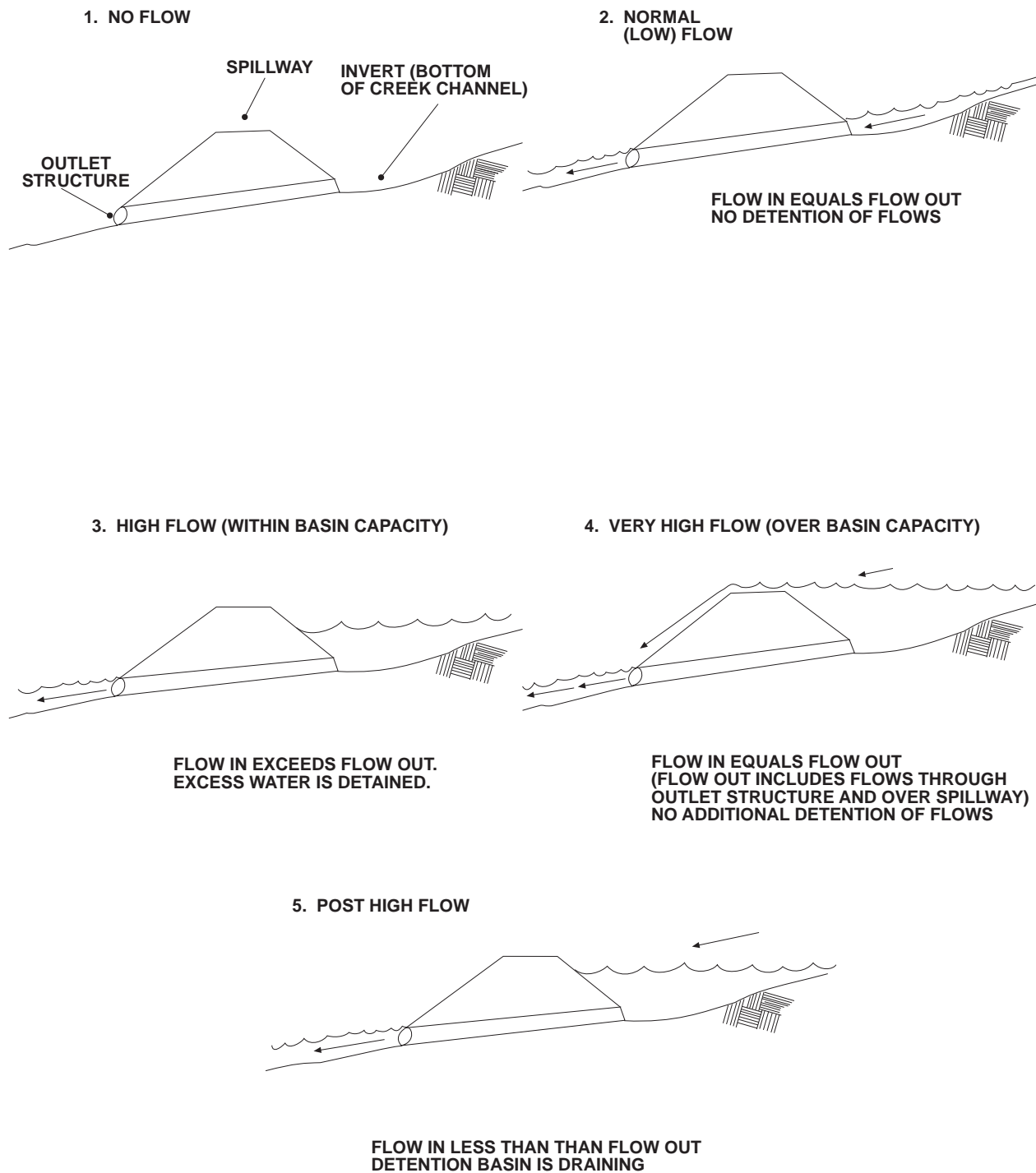


Source: U.S. Army Corps of Engineers 1999



0 500 Feet
 Approximate Scale

Figure 2-3
Clay Avenue Wash Detention Basin



(NOT TO SCALE)

Figure 2-4

Schematic Diagram of On-Line Detention Basin Operation

embankments are described below; no other flood control measures (e.g., floodwalls) or grading would be required at the site. The capacity of the Clay Avenue Wash detention basin would be approximately 295 acre-feet (96 million gallons). When filled to capacity, water contained within the basin would cover approximately 71 acres. The 100-year water surface elevation of the basin would be 7,065.6 feet above mean sea level. The basin would be sized to completely drain within 48 to 60 hours for the 100-year event, 36 hours for the 50-year event, and less than 24 hours for other more frequent events.

- *Northeast Embankment.* The embankment constructed at the northeast edge of the detention basin would contain the outlet structure and spillway. The outlet structure would consist of a single 42-inch-diameter corrugated metal pipe, with a capacity of approximately 165 cfs. In addition, a smaller “bleed off” pipe or irrigation gate valve would be installed at the channel invert to eliminate long-term ponding. The spillway and top of embankment would be at elevations of 7,065.6 and 7,072.3 feet above mean sea level, respectively. The top of the embankment would be approximately 21 feet above ground level. A cross section of the northeast embankment is shown at the top of Figure 2-5.
- *Northwest Embankment.* An embankment would be constructed just south of the Burlington Northern & Santa Fe (BNSF) railroad tracks along the northern boundary of the detention basin. This embankment would be approximately 1,225 feet in length and 50 feet in width. The top of the embankment would be no more than 10 feet above ground level. The elevation of the embankment would be at 7,068 feet above mean sea level. The embankment is shown on Figure 2-3.
- *Southeast Embankment.* This embankment would be adjacent to the Hidden Hollow Mobile Home park, and it would be specifically constructed to protect the mobile home park from flooding. This embankment would not contain an outlet structure or spillway, and it would be approximately 12 feet tall at its highest point (Figure 2-5). It would extend approximately 475 feet along the northern edge and 500 feet along the western edge of the mobile home park. The top elevation of the embankment would be 7,072.3 feet above mean sea level.

Channel Modifications

The Clay Avenue Wash channel modifications would generally entail either (1) expanding and lining the existing channel with concrete or riprap or (2) diverting the channel underground through developed areas. The channel modifications are described below and illustrated on Figure 2-1.

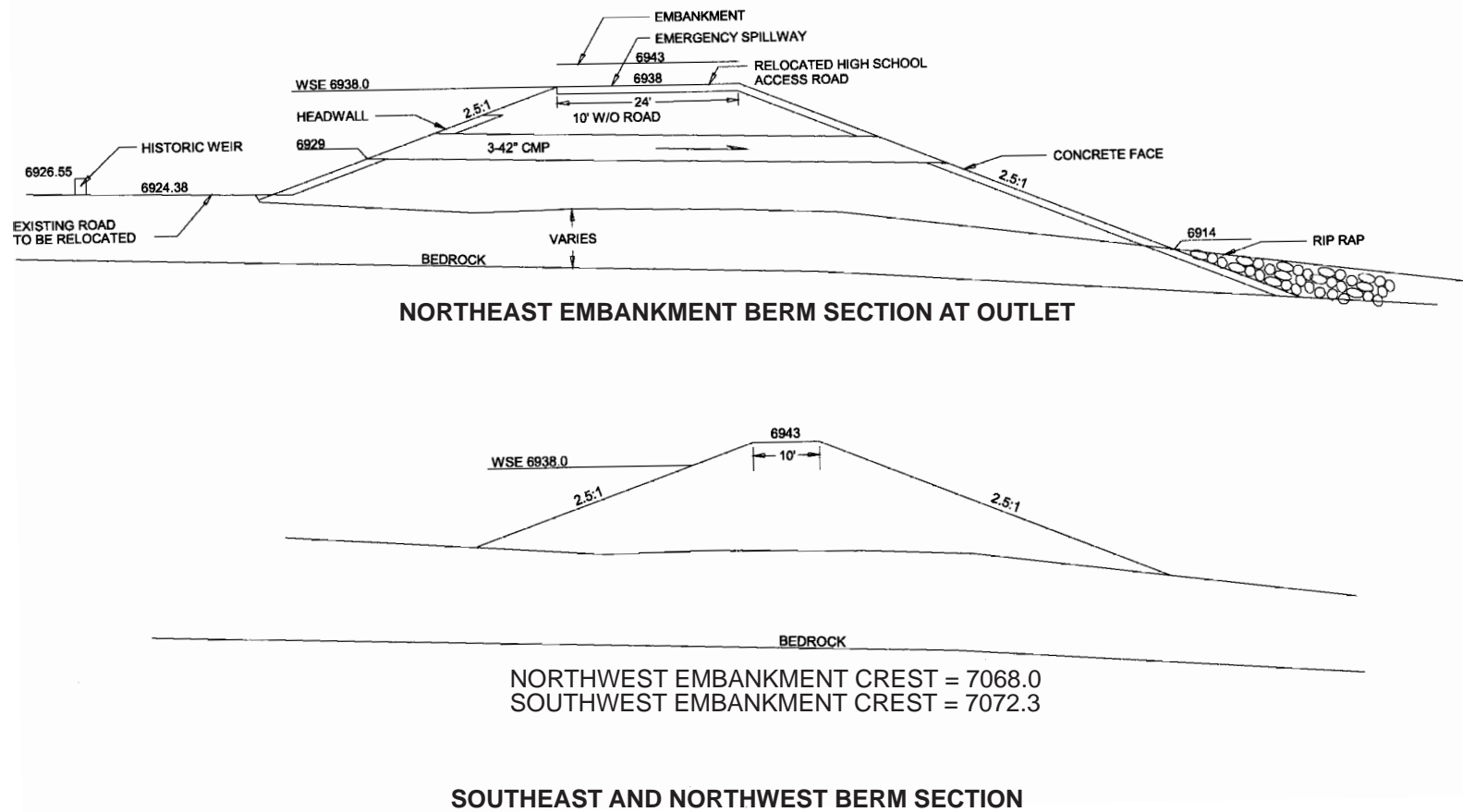


Figure 2-5
Cross Section of Clay Avenue Wash
Detention Basin Embankments

- The Clay Avenue Wash channel modifications would start immediately north of the Chateau Royal mobile home park (also referred to as the Chateau Royal Apartments) in western Flagstaff. This segment of the channel would be modified into a trapezoidal channel with a soft earthen bottom and 2:1 riprap-lined side slopes. Three gabion grade control structures would be located in the first 500 feet of the riprap channel. This riprap-lined segment of the Clay Avenue Wash channel would extend east to Blackbird Roost.
- The eastern section of this channel segment would traverse the “Trailers Ho” mobile home park at 703 South Blackbird Roost, and it would require the relocation of up to 15 mobile homes from this park to an offsite location. The affected tenants and landlord of the Trailers Ho mobile home park would be compensated for this action in accordance with applicable Federal and state laws.
- From Blackbird Roost east to the edge of the parking lot at McCracken Place, Clay Avenue Wash would be diverted into an arch-shaped underground concrete channel. This segment of the wash currently follows a cul-de-sac and driveway which extend east from Blackbird Roost into an adjacent apartment building complex (see Figure 1-7 in Section 1.2, bottom photograph). The underground concrete channel would be approximately 24 feet wide at the base and approximately 5.5 feet tall at its center.
- The covered underground channel would open up into an un-covered concrete-lined box channel at the southern edge of the McCracken Place parking lot. This segment of box channel would be approximately 18 feet wide and 8.3 feet deep and safety fencing would be constructed along both sides of the channel. The open box concrete channel would extend east (downstream) to South Milton Road/Route 66.
- Downstream from South Milton Road/Route 66, Clay Avenue Wash would transition back to a covered, underground concrete channel. This underground channel would be similar to the one constructed east of Blackbird Roost (see above). The underground channel would generally follow the alignment of Mike’s Pike, terminating approximately 250 feet northeast of Mike’s Pike at a confluence with the Rio de Flag channel. This route would require construction within the intersection of Clay Avenue, South Milton Road/Route 66, and Mike’s Pike.

Construction Requirements

Construction of the Alternative 6a project components would require approximately 6 to 12 months. Typical equipment to be used during the construction period would include loaders, scrapers, dozers,

trucks, blades, roller compactors, concrete mixers, water trucks, and backhoes. The specific construction requirements for each project component are described below.

Rio de Flag

Bridge Replacement

As described in Table 2-2, the Anderson Road and Beal Road bridges would be closed for approximately two to four weeks each during construction of the bridge modifications. These bridges would not be closed simultaneously, nor would construction overlap with the closure of North Thorpe Road described below. Approximately 460 cubic yards (46 truck loads) of concrete would be imported to the Anderson and Beal Road bridges and approximately 30 cubic yards (three truck loads) would be delivered to the Meade Lane bridge during construction. The Meade Lane bridge would not be closed during construction.

Thorpe Park Modifications

Construction of the floodwall and embankments and elevation of North Thorpe Road would last approximately six months. Approximately 615 cubic yards of concrete and 615 cubic yards of stone would be imported to construct the floodwall and approximately 300 cubic yards of riprap and 500 cubic yards of fill material would be delivered for construction of the two embankments. This would generate approximately 35 truck trips per day for the first two months of the six-month construction period.

As shown on Table 2-2, North Thorpe Road would be closed for approximately two weeks in order to elevate the road bed. Construction staging would occur at disturbed open space areas in the park.

Rio de Flag Channel Modifications

The Rio de Flag channel modifications would require 6 to 12 months to construct and would primarily involve open trench construction. The majority of the excavation would extend downward into sandstone or basalt bedrock. The sandstone is friable and weathered and is generally rippable with heavy equipment, whereas the basalt is hard and not always rippable. (“Friable” means soil or rock crumbles easily, and “rippable” means that rock can be broken by

Table 2-2: Alternative 6a - Road Crossing Construction Requirements

Component/Road	Construction Effects
<i>Bridge Modifications</i>	
Meade Lane	Road closure would not be required.
Anderson Road	Road closed at Rio de Flag bridge for approximately 2 to 4 weeks
Beal Road	Road closed at Rio de Flag bridge for approximately 2 to 4 weeks
<i>Thorpe Park Modifications</i>	
North Thorpe Road	Road closed for approximately 2 weeks
<i>Rio de Flag Channel Modifications</i>	
North Bonito Street	Road closed at Rio de Flag crossing for 5 to 7 days during construction
West Dale Avenue	Road closed at Rio de Flag crossing for 5 to 7 days during construction
West Cherry Avenue	Road closed at Rio de Flag crossing for 5 to 7 days during construction
West Birch Avenue	Road closed at Rio de Flag crossing for 5 to 7 days during construction
West Aspen Avenue	Road closed at Rio de Flag crossing for 5 to 7 days during construction
Route 66	Open during 2 week construction period (reduced lanes)
Main Railroad Tracks	Each track closed for up to 24 hours at Rio de Flag under-crossing (one track would always remain open)
Beaver Street	Closed for 7 days during construction. Converted to two-way street during 1 week closure of San Francisco Street
San Francisco Street	Closed for 7 days during construction. Converted to two-way street during 1 week closure of Beaver Street
Railroad Spurs	Closed for 5 to 7 days
Butler Avenue	Open during 2 week construction period (reduced lanes)
<i>Clay Avenue Wash Channel Modifications</i>	
West Chateau Drive	Road closed at Clay Avenue Wash crossing for 7 days during construction
South Blackbird Roost	Road closed for 7 days during construction of culvert
Blackbird Roost Court	Road closed for 7 days during construction of culvert
South Malpais Lane	Road closed at Clay Avenue Wash crossing for 7 days during construction
South Milton Road	Road closed at Clay Avenue Wash crossing for 7 days during construction
Milton Road/Clay Avenue/Butler Road/Route 66/Mike's Pike/Butler Avenue	This intersection (called the "5-points intersection") would remain open during construction, although some lanes would be closed to accommodate the open trench construction
Mike's Pike	The culvert would be constructed in sections, as to maintain access during the six-week construction process. Detours would be required and would change daily
Mike's Pike/Phoenix Avenue Intersection	Road closed for 7 days during construction of culvert

mechanical equipment.) In areas that are not sufficiently rippable, blasting may be required (especially in some of the deeper sections near the confluence of the Clay Avenue Wash and Rio de Flag).

Blasting activities would comply with all applicable construction and safety requirements, and the need for blasting would be minimized or eliminated during the project design phase.

At the Bonito Street and Dale, Cherry, Birch, and Aspen Avenue road crossings, construction of underground culverts would necessitate road closures of approximately five to seven days each. At the Route 66 crossing, the two culverts would be poured by halves to maintain through traffic (to a total closure time of five to seven days per half). At the Beaver Street and San Francisco Street crossings (one-way south and one-way north, respectively), construction would require about one week each, and construction at these two crossings would not be undertaken concurrently. In order to minimize impacts on traffic at Beaver and San Francisco Streets, each of these one-way roads would become a two-way road during construction at the other. Construction of the underground culvert at the railroad crossing (approximately 700 feet west of Beaver Street) would conform to the following method of construction: (1) remove track and excavate; (2) lower in prefabricated units by crane from flatbed train car on the adjacent (un-removed) track; and (3) re-cover and replace track. It is anticipated that this work could be accomplished within 24 hours per track. One of the two tracks at this crossing would always remain open. Construction of the covered arch at Butler Avenue would be undertaken in segments in order to maintain at least one lane of through traffic in each direction at all times.

The channel modifications would involve the import of approximately 8,907 cubic yards of concrete and 9,100 cubic yards of riprap. Roughly 176,252 cubic yards of soil and 89,409 cubic yards of rock would be excavated, some of which would be used for construction of the detention basin. Excess material would be delivered to disposal site(s) within six miles of the proposed channel modifications. Assuming that roughly 10 percent of the excavated material is re-used on site, the Rio de Flag channel modifications would generate approximately 20 truck trips per hour on the local roadway network (six month “worst-case” scenario).

Clay Avenue Wash

Clay Avenue Wash Detention Basin

The Clay Avenue Wash detention basin would require approximately six months to complete and would be undertaken concurrently with the other project components. Approximately 14,947 cubic

yards of fill material would be imported to the site for construction of the embankments. In addition, approximately 770 cubic yards of riprap and 732 cubic yards of concrete would be delivered to the site during construction.

The grading phase for the Clay Avenue Wash detention basin would last approximately three weeks and would generate approximately 46 round-trip truck trips per day. Construction staging would take place primarily within the basin, and, if needed, adjacent to the existing subdivision construction staging area just downstream. The use of the privately owned land adjacent to the existing subdivision downstream from the detention basin site would be contingent upon reaching an agreement with the respective subdivision owner/developer.

Clay Avenue Wash Channel Modifications

The Clay Avenue Wash channel modifications would be completed within the overall 6- to 12-month schedule described for the Rio de Flag channel modifications. Construction would result in the temporary (approximately one week) closures of Chateau Drive, Blackbird Roost, and Malpais Lane, respectively. Only short segments of these roads would be closed during the construction of the underground culvert. Along Mike's Pike, trenching would occupy nearly the full width of the road. Construction would occur in a series of segments that progress along Mike's Pike, with approximately 350 feet of trench open at any given time. The arched underground channel would be constructed by pouring concrete into a form built with the trench and backfilling the trench as soon as the concrete sets. Approximately 50 feet of concrete channel would be poured per day with a seven day cycle of excavation, forming, pouring, curing, and backfill. The underground channel would be constructed in sections, as to maintain access during the 6-week construction process. Detours would be required and would change daily; however, access would be maintained to all businesses and residences during the construction period.

As with the Rio de Flag modifications, an open trench method of construction would be used along the majority of the Clay Avenue Wash Reach. The channel modifications would involve the import of approximately 2,700 cubic yards of concrete and 2,100 cubic yards of riprap. Roughly 50,100 cubic yards of soil and 17,200 cubic yards of rock would be excavated, some of which would be used for construction of the detention basin. Excess material would be delivered to disposal site(s) within six miles of the proposed channel modifications. Assuming that roughly 10 percent of the excavated material is re-used on site, the Clay Avenue Wash channel modifications would generate approximately

6 truck trips per hour on the local roadway network (based on a 6 month construction period, a longer construction period would reduce the number of daily trips).

As with the Rio de Flag channel modifications, blasting may be required in some areas where basalt is encountered. Steps will be taken to minimize or eliminate the need for blasting during the project design phase.

Operations and Maintenance

Alternative 6a would require inspection, maintenance, and repair of the flood control structures. The scope of these activities would include the modified sections of the Rio de Flag and Clay Avenue Wash channels, the Thorpe Park floodwalls and embankments, and the Clay Avenue Wash detention basin. The City of Flagstaff would need to implement a long-term public information program regarding the hazards associated with drainages, especially the previously described covered concrete channels.

The Clay Avenue Wash detention basin would be designed and constructed to operate with minimal operational requirements. Based on its design, the basin would detain peak flows and then discharge them over a period of up to 60 hours. No human intervention (e.g., opening or closing valves and spillway gates) would be required to operate the detention basin; however, periodic inspection, maintenance, and repair would be conducted by the City of Flagstaff. The level of effort required to inspect, maintain, and repair the detention basin would not be extensive and would include tasks such as ensuring that the embankments do not erode following storms and removing debris and sediment buildup in the outlet structure. The traffic generated by these activities would be minimal, averaging a few trips per month.

2.2.2 Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b is the USACOE's preferred alternative (also known as the "recommended plan"). This alternative would provide 100-year flood protection along the Rio de Flag's downtown reach and would also reduce flooding along the Clay Avenue Wash, I-40, and Continental reaches. The preferred alternative includes all of the project components described for Alternative 6a (bridge modifications, floodwalls and embankment at Thorpe Park, elevation of North Thorpe Road, Clay Avenue Wash detention basin, and Clay Avenue Wash modifications); however, this alternative

includes a covered channel segment extending for approximately two blocks along the Rio de Flag between Dale Avenue and Birch Avenue (see Figure 2-6). Because all of the other project components are the same, only the description of the Rio de Flag modifications is provided below. Refer to Section 2.2.1 for a description of the shared project components listed above.

As described above, the channel modifications through downtown would be slightly different than Alternative 6a, in that the channel would be covered for a short segment instead of open. A 24-foot-wide by 9-foot-deep concrete arch would begin just upstream of Dale Avenue and continue for approximately two blocks to Birch Avenue. The channel would transition back to an open 2:1 slope riprap channel just south of Birch Avenue and continue downstream as described for Alternative 6a. A recreational trail would continue along the entire downtown reach, including the covered channel segment.

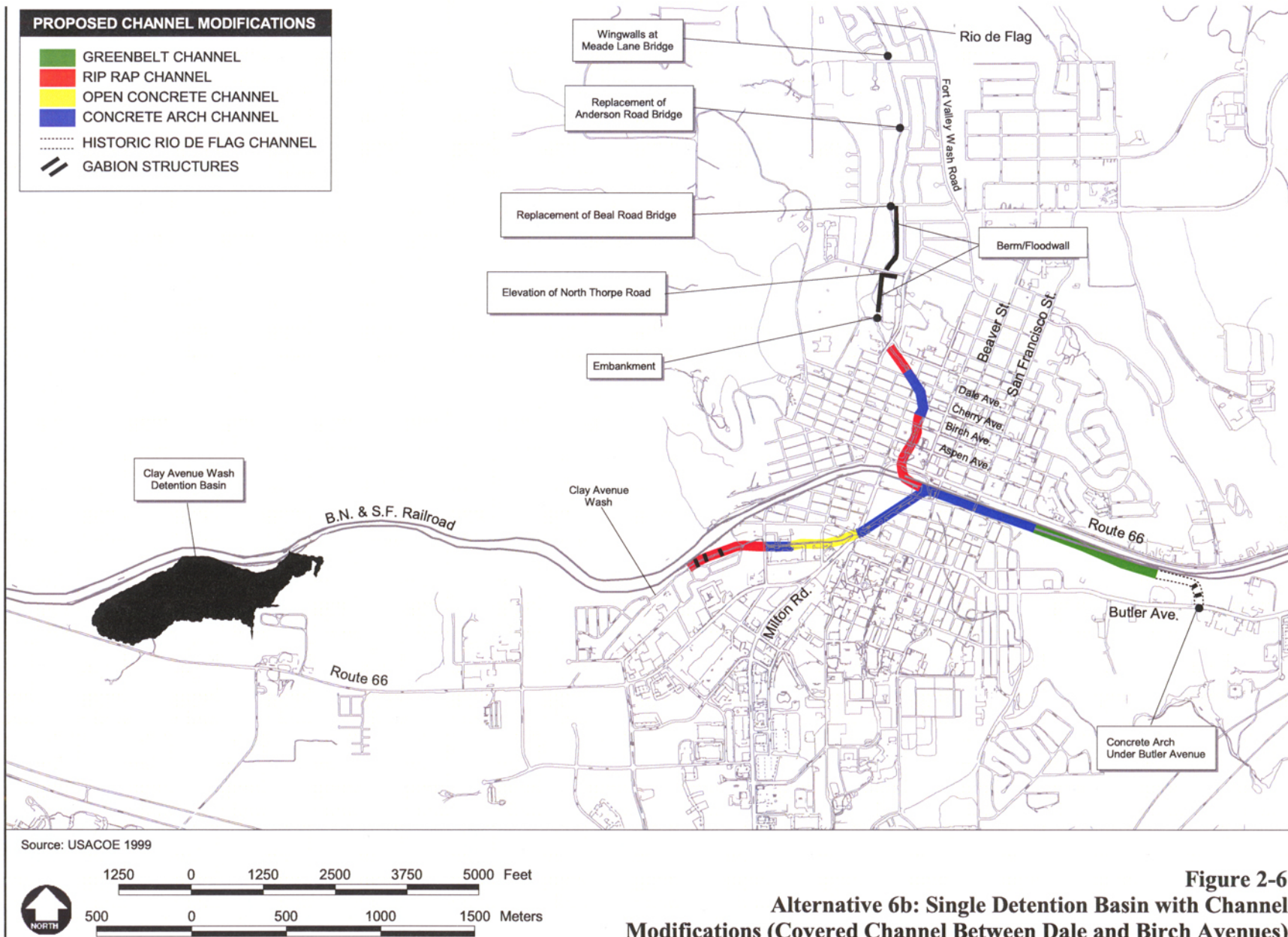
The Rio de Flag channel modifications between Bonito Street and Butler Avenue would require approximately 8,557 cubic yards of concrete and 8,190 cubic yards of riprap to be imported to the site. Approximately 175,041 cubic yards of soil and 86,210 cubic yards of rock would be excavated, 90 percent of which would be disposed of at sites within six miles of the point of origin. Similar to Alternative 6a, this alternative would generate approximately 20 truck-trips per hour under the 6-month “worst-case” scenario. The construction requirements for the other project components are described in Section 2.2.1.

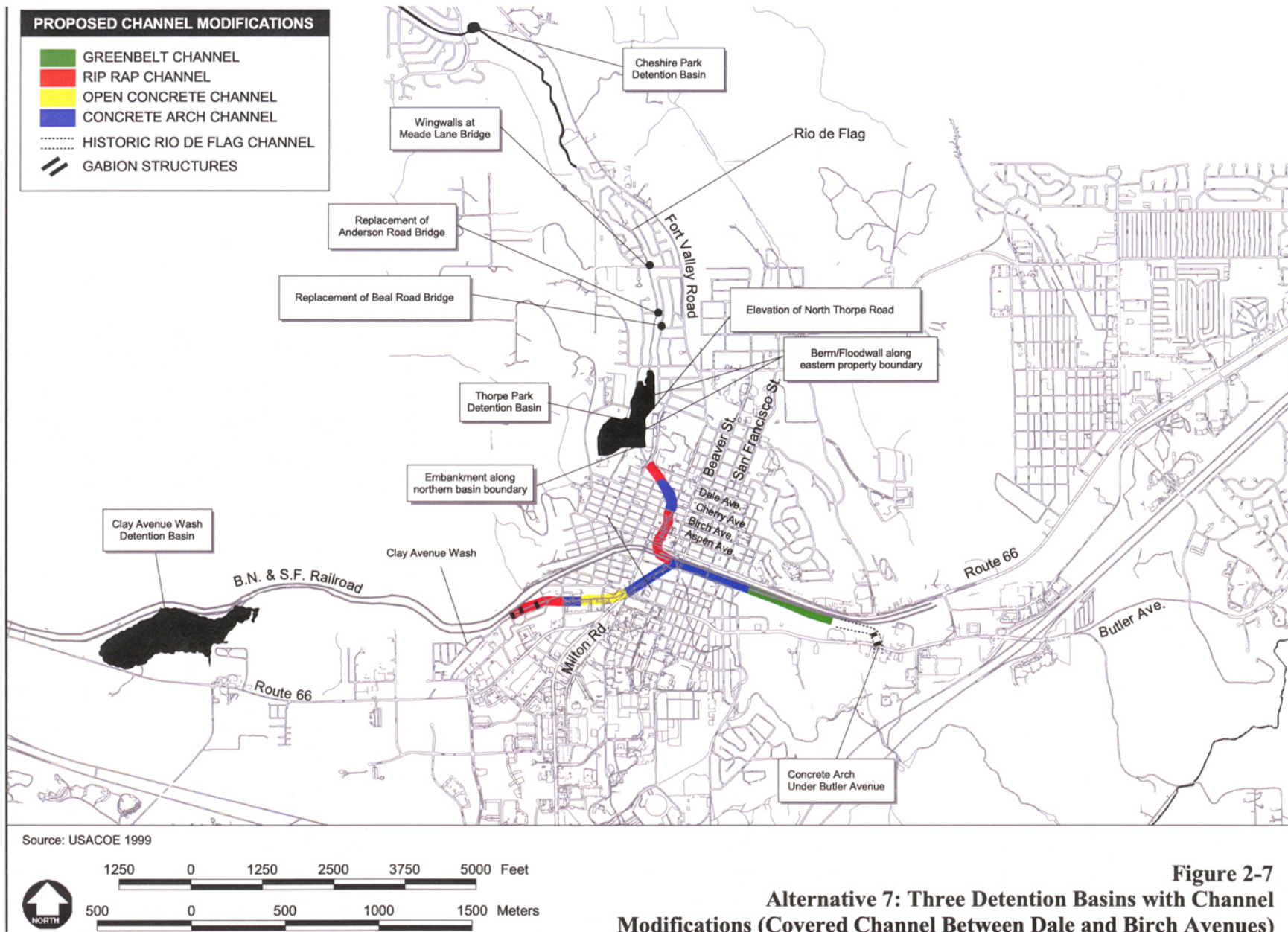
2.2.3 Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Project Components

This alternative would use detention basins and channel modifications along the Rio de Flag and Clay Avenue Wash to provide increased flood protection for the downstream reaches (see Figure 2-7). The detention basins along the Rio de Flag are described below; however, the remaining project components are the same as those described under Alternative 6b. The following previously described project components would be constructed under Alternative 7:

- Bridge modifications at Meade Lane and bridge replacement at Anderson Road and Beal Road (refer to Section 2.2.1);





- Rio de Flag Channel modifications (refer to Section 2.2.2)¹
- Clay Avenue Wash detention basin (refer to Section 2.2.1); and
- Clay Avenue Wash Channel Modifications (refer to Section 2.2.1).

The proposed Cheshire Park and Thorpe Park detention basins are depicted on Figure 2-7 and described below.

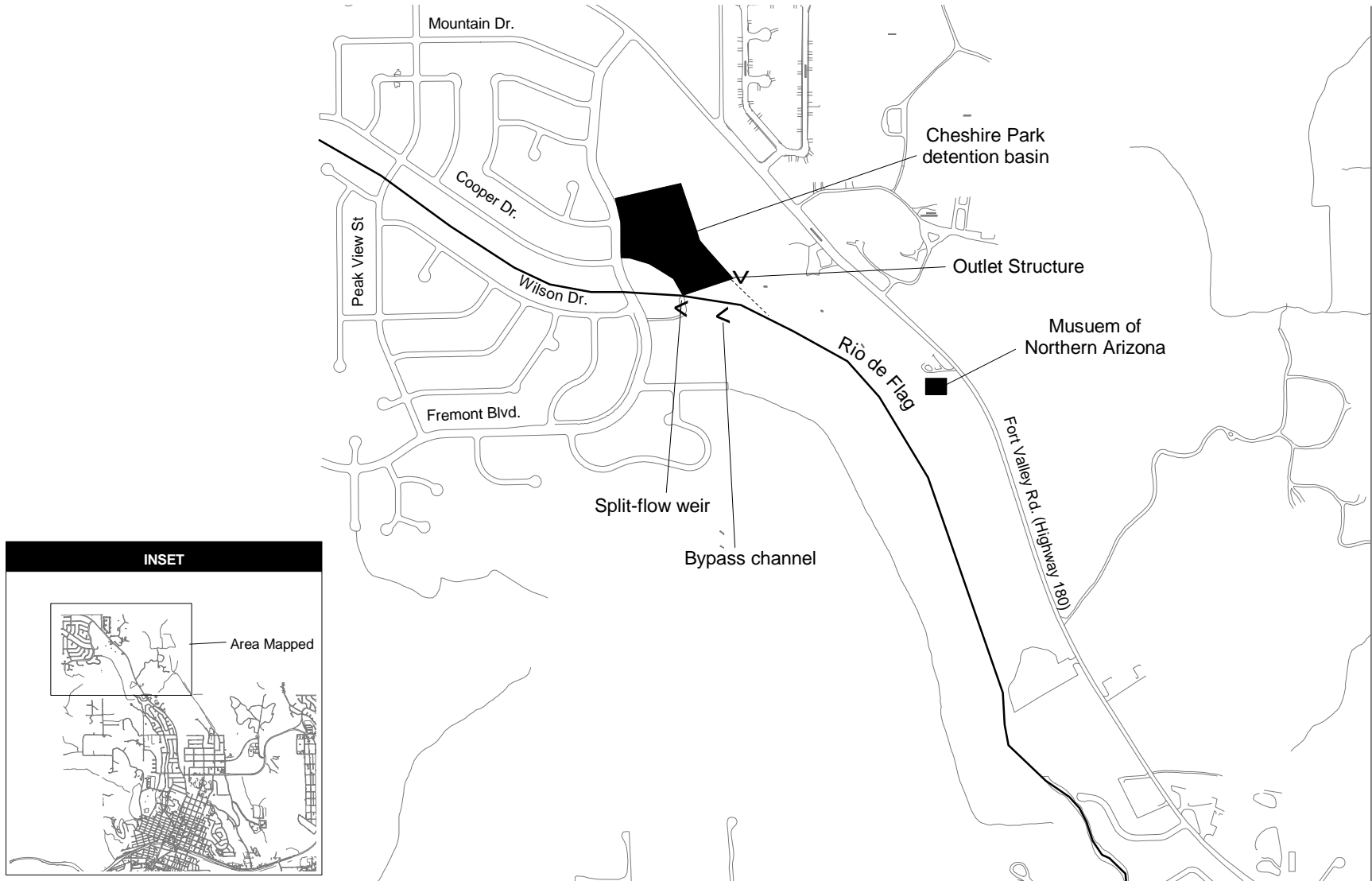
The Cheshire Park and Thorpe Park basin would be “off-line” detention basins. Accordingly, these basins would be located near, but not within, the Rio de Flag channel. For off-line basins, flows do not enter the basin until discharge rates in the main channel exceed a certain threshold. When this discharge rate is achieved, flows are diverted into an adjacent or off-line basin where they are stored and released over time. This stored water reduces the peak flow in the main channel and therefore reduces the potential for downstream flooding. The Cheshire Park and Thorpe Park detention basins are described below.

Cheshire Park Detention Basin

The proposed Cheshire Park detention basin site is located in northern Flagstaff east of Fremont Boulevard and south of Highway 180. Under this alternative, Cheshire Park and several acres of ponderosa pine forest would be replaced with a large basin as shown on Figure 2-8. The Narrows Dam, a small check dam southeast of the park, would be removed and replaced with a larger outlet structure. The basin would encompass approximately 5.0 acres of land, including approximately 0.5 acre of private land currently owned by the Museum of Northern Arizona. Land acquisition would be undertaken pursuant to Federal and state laws.

The Cheshire Park detention basin would be an off-line basin. As such, a split-flow channel would be constructed along the west side of the proposed detention basin to convey normal flows along the Rio de Flag. A split-flow weir (approximately 95 feet long and 2 feet tall) would divert flows in excess of 1,500 cfs over the weir and into the detention basin. The capacity of the basin would be 30 to 35 acre-

1 In comparison to Alternative 6b, Alternative 7 would actually use a slightly smaller underground concrete arch through the two-block-long section of covered channel in the downtown Flagstaff Reach. This change would negligibly reduce the amount of rock excavation needed, and it would also nominally reduce the amount of concrete necessary to form the arch. These minor differences would not noticeably affect impacts associated with project construction or operation and are not further discussed.



Source: City of Flagstaff 1999



Figure 2-8
Cheshire Park Detention Basin

feet (9.8 to 11.4 million gallons) and the maximum water storage elevation would be approximately 7,084 feet above mean sea level. The basin would drain completely within 24 to 48 hours.

The downstream face of the weir would be constructed of riprap. Following construction, the basin sideslopes would be revegetated pursuant to a native plant species revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff (see Appendix J).

As shown on Figure 2-8, the upstream portion of the basin would have 10:1 sideslopes and the downstream portion would have 3:1 sideslopes. These contours might be altered into a series of terraces to allow Cheshire Park to be reconstructed within the footprint of the proposed basin. The reconstructed park would include replacements for all of the existing facilities, such as the tennis and basketball courts, picnic tables, and all play equipment. The park would also be expanded to include passive recreational features throughout the basin such as trails and picnic areas. If it is not feasible to replace the park within the detention basin, a new park would be constructed nearby within the same neighborhood.

Thorpe Park Detention Basin

The Thorpe Park detention basin would encompass approximately 23 acres of Thorpe Park in northwest Flagstaff (see Figure 2-9). The total volume of the detention basin would be approximately 80 acre-feet (2.6 million gallons). A substantial portion of the park would be excavated by approximately two feet, and a bypass channel would be constructed along the eastern boundary of the park. The basin would entail the following key components:

- *Basin Excavation.* Approximately 23 acres of Thorpe Park would be excavated by two feet in order to achieve the required storage capacity of the basin (see Figure 2-9). All facilities affected by excavation activities would be floodproofed prior to or during their on-site replacement so that they would not be damaged by occasional inundation of the detention basin. This includes the two Little League fields, three softball fields, concession stands, restrooms, Frances Short Pond, park monuments, a small parking lot just south of North Thorpe Road, and other park infrastructure (lighting standards, picnic tables, benches, plaques, etc.). The excavation activities would also result in the removal of approximately 190 trees, including approximately 130 mature ponderosa pines.
- *Bypass Channel.* A bypass channel would be constructed along the eastern side of the park near the current alignment of the Rio de Flag. The invert (channel bottom) would be



Source: City of Flagstaff



300 0 300 Feet

Figure 2-9
Thorpe Park Detention Basin

excavated to 24 feet in width and the channel sideslopes would be constructed at a 3:1 slope. A berm/floodwall would also be constructed along the eastern side of the channel. Similar to Alternative 6a, the berm and floodwall would extend along the western property line of approximately 14 residences and the Flagstaff Junior High School. The combined height of the berm and floodwall would not exceed five feet, and it would be constructed using basalt fieldstone as an esthetic treatment. The bypass channel and floodwall would terminate at the proposed embankment (described below), and normal flows would continue through the embankment via an arch culvert. Excavation of the bypass channel would result in the removal of approximately 90 ponderosa pines and other vegetation, including mature riparian habitat.

- *North Thorpe Road Modification.* As with Alternatives 6a and 6b, an approximately 350-foot section of North Thorpe Road would be rebuilt at a higher elevation. The road would be closed for two weeks while pavement is removed, fill added, and the road repaved. This road closure would occur during the summer to avoid access impacts to the nearby school. The existing culvert at the Rio de Flag crossing under Thorpe Road would remain in place.
- *Embankment.* An embankment consisting of a berm, spillway, and outlet structure would be constructed immediately south (downstream) of the existing weir at Frances Short Pond (see Figure 2-9). At the outlet location, the embankment would have a height of approximately 29 feet, as measured from the base of the downstream side. The spillway at the top of the embankment would be at approximately 6,938 feet above mean sea level. The top height of the embankment would be 6,943 feet above mean sea level. Figure 2-10 shows a typical cross-section of the embankment

The outlet structure would consist of one 48-inch-diameter corrugated metal pipe. A smaller “bleed off” pipe or irrigation gate valve would be installed at the channel invert to eliminate long-term ponding behind the detention basin. Approximately 80 trees would be removed in order to construct the embankment, including 65 ponderosa pines. Following construction, the embankment would be vegetated pursuant to a native species revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff (see Appendix J).

- *Access Road Relocation.* The access road that currently leads to Flagstaff Junior High School would be relocated from its current alignment along the weir to a new alignment across the top of the embankment (see Figure 2-10). Construction would require the closure of the road for approximately two months. To avoid access-related impacts to the school, these construction activities would be undertaken during the summer.

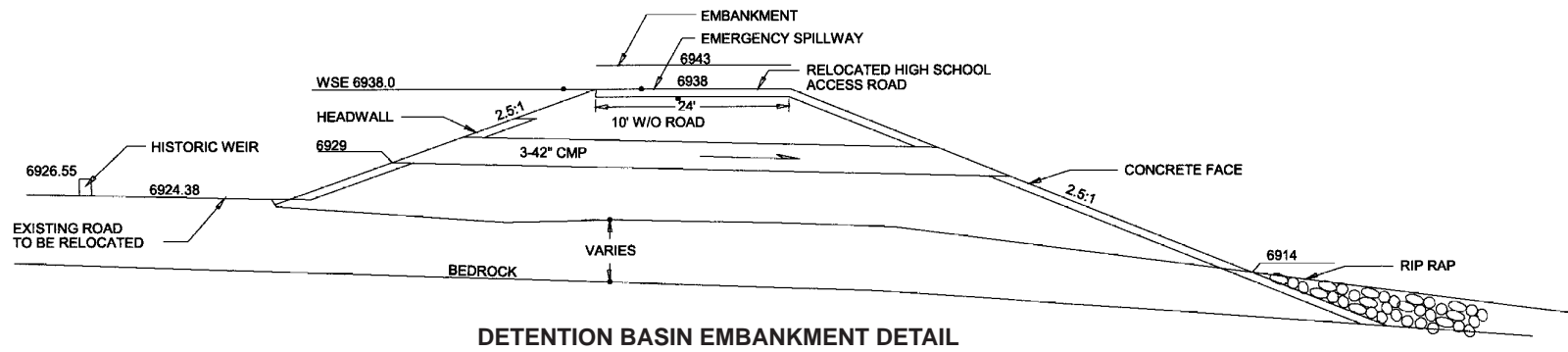
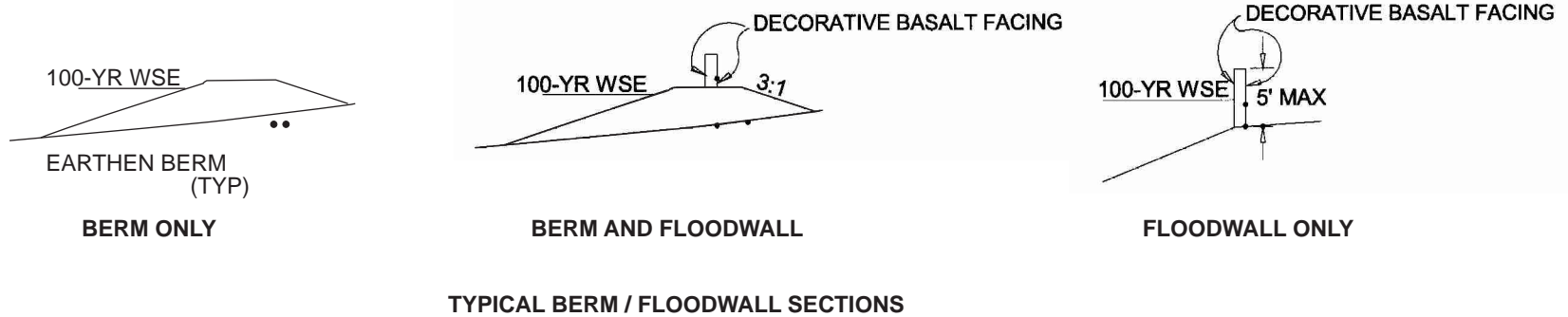


Figure 2-10
Alternative 7 Cross Section of Thorpe Park
Detention Basin Embankment and Floodwalls

- *Park Facility Replacement.* All park facilities affected by construction activities would be replaced in their pre-construction condition. Structures (e.g. concession stand, restrooms, etc.) would be floodproofed in order to minimize or avoid damage during major flood events. Also, trees would be replanted at a 1:1 ratio in areas affected by project construction. Frances Short Pond would remain in its current location; however, excavation of the surrounding land by two feet would result in a shallower and wider pond.

The locations of these detention basin components are shown on Figure 2-9. The embankment would define much of the detention basin's southern limits, and the berm and floodwalls would form the basin's eastern boundary. To the west and north, the spread of detained floodwaters would be contained within the excavated portion of the basin. At full capacity, the embankment and floodwalls would contain water within the excavated area at approximately 6,938 feet above mean sea level. During these periods, however, most of the park would become unusable—three of the softball diamonds and two Little League fields would be completely flooded. The basin would be sized to completely drain within 48 to 60 hours for the 100-year event, 36 hours for the 50-year event, and less than 24 hours for other more frequent events.

Under Alternative 7, Frances Short Pond would not be hydrologically connected to the Rio de Flag, except during large flooding events; however, the water level of the pond would be maintained by pumping water into the system. The pond would be flushed and cleaned on a regular basis.

Construction Requirements

Cheshire Park Detention Basin

Construction of the Cheshire Park Detention Basin would affect approximately five acres of primarily undeveloped land in northern Flagstaff. Excavation of the basin would result in 21,780 cubic yards of excess soil and 26,806 cubic yards of excess rock. Approximately 7,260 cubic yards of fill material would be re-used on site; therefore, roughly 14,520 cubic yards of soil and 26,806 cubic yards of rock would be disposed of off site. This material would be delivered to disposal sites within six miles of the detention basin. Excavation of the basin would require approximately four months to complete and would generate approximately 26 truck-trips (round trip) per day. Construction staging would occur within the disturbed basin area.

Thorpe Park Detention Basin

The Thorpe Park detention basin and bypass channel would require up to 9 months to construct (including one to two months for excavation, 0.5 to one month for site preparation and construction of the key wall, one to two months for fill, and three to four months for finish). It is projected that construction would result in the excavation of approximately 68,000 cubic yards of soil. The amount of soil that would be hauled off site would amount to approximately 58,000 cubic yards because roughly 10,000 cubic yards of excavated material would be utilized for construction of the embankment. Off-site disposal of fill material would occur at sites within six miles of Thorpe Park. Approximately 21,000 cubic yards of riprap, 1,215 cubic yards of concrete, and 615 cubic yards of stone would be imported to the site. The riprap and stone would be imported from local quarries (located within a four- to six-mile radius of the construction site).

The major excavation and grading activities would take place during the first eight weeks of construction. Based on a five-day workweek and the use of trucks with 20 cubic yards hauling capacity, it is projected that the grading phase would require approximately 73 round-trip truck trips per day (using 10 trucks) to remove the excess excavated material. Construction staging would take place primarily within the basin, and, if needed, at a city-owned inert material landfill approximately 3.5 miles from the site (on Woody Mountain Road). Construction staging would occur within the area of excavation. The recreation facilities affected by the project would be closed for approximately 12 months.

Operations and Maintenance

As with the Clay Avenue Wash detention basin, these detention basins would be designed and constructed to operate with minimal operational requirements. Periodic inspection, maintenance, and repair would be conducted by the City of Flagstaff. The level of effort required to inspect, maintain, and repair the detention basins would not be extensive and would include tasks such as ensuring that the embankments do not erode following storms and removing debris and sediment buildup in the outlet structures. In the event that water detained at Thorpe Park adversely affects recreational facilities, the city would return the park to pre-flood conditions. This effort would likely be limited to sediment removal and clean up. The traffic generated by these activities would be minimal, averaging a few trips per month.

2.2.4 Alternative D: Localized Non-Structural Flood Proofing

Project Components

The Localized Non-Structural Flood Proofing Alternative would consist of two berms located in the vicinity of Continental Estates. The conceptual locations of the berms are shown in Figure 2-11 and described below. These localized berms would protect specific structures from flood flows. Unlike the previously described alternatives, this alternative does not include the use of detention basins or channel modifications, and it would not provide any flood control protection for the Downtown, Clay Avenue Wash, or I-40 reaches. Construction of the berms would occur primarily on publicly-owned land and would not require the relocation of any structures; however, some private property may be purchased. Acquisition of private property would be undertaken in accordance with all Federal and state laws.

North Berm

The northernmost berm would be located southeast of the intersection of Country Club Drive and I-40. The berm would extend approximately 3,530 feet along the east side of a residential area accessible via Cortland Boulevard. The berm would range in height from 14 to 23 feet, as measured from the base of the 2:1 slopes. The top elevation of the levee would be at 6,780 feet above mean sea level. Figure 2-11 shows the approximate location of the existing 6,780-foot contour—the area between this contour and the berm is the area that would be protected from flooding. The width would vary from 72 to 98 feet along the base of the structure. The north berm would completely avoid any grave sites at the Peaceful Valley Memorial Park (cemetery). As with the previous alternatives, the berm would be landscaped pursuant to the native plant species revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff (see Appendix J).

South Berm

This berm would be located approximately 2,000 feet south of the north berm. The structure would be very similar in appearance and construction to north berm; however, the dimensions would be slightly different. The top elevation would remain at 6,780 feet. Because the base elevation of the berm would vary, the berm would range in height from 13 to 26 feet. The berm would also range between 72 and 114 feet wide at the base. Beginning at its westernmost end, the berm would traverse the western edge of several residences located on Fairview Drive and cross Country Club Drive just north of the



Source: City of Flagstaff 1998



1000 0 1000 2000 Feet

Figure 2-11
Berm Locations at Continental Estates

residential area. To the east of Country Club Drive, the berm would parallel Oakmont Drive through the Continental Little League Fields and cross Oakmont Drive just east of Walnut Hills Drive. The berm would continue along the northeast side of several residences on Laurel Loop and Willow Loop after which it would head east and tie in to existing topographical features near Oakmont Drive. The total length of the south berm would be approximately 7,600 linear feet. Similar to the north berm, the area between the south berm and the existing 6,780-foot contour represents the area that would be protected from flood events by the berm. The south berm would also be landscaped pursuant to the native plant species revegetation plan developed by the USACOE and Flagstaff Arboretum (see Appendix J).

Construction Requirements

Construction of the north and south berms would involve extensive excavation and fill over the course of the six-month construction period. The north berm would require approximately 47,120 cubic yards of excavation and approximately 144,780 cubic yards of fill. Assuming that all of the fill material is reused for construction of the berms, this would generate approximately 12 truck trips per hour (for six months) to import the balance of fill material. Construction of the south berm would result in roughly 107,090 cubic yards of excavated material, require approximately 358,080 cubic yards of fill, and generate an average of 30 truck trips per hour on the local roadway network. A combined total of approximately 42 truck trips per hour (on average) would therefore be required under this alternative for the duration of the six-month construction period.

Operations and Maintenance

The operational requirements associated with Alternative D are similar to those described for the previous alternatives. Periodic inspection, maintenance, and repair would be conducted by the City of Flagstaff. The level of effort required to inspect, maintain, and repair the berms would not be extensive and would include tasks such as ensuring that the structures do not erode following major storms. The traffic generated by these activities would be minimal, averaging a few trips per month.

2.2.5 No Action Alternative

Under the No Action Alternative, no flood protection measures would be implemented along the Rio de Flag or Clay Avenue Wash in the Flagstaff area. The City of Flagstaff is experiencing steady growth

of around two percent annually, and this is forecasted to continue due to the availability of privately owned developable land and the desirability of the Flagstaff area as a place to live. This future growth, development, and population increase will result in a greater areal extent of impervious surfaces which, in turn, increases runoff during precipitation events. (Impervious surfaces are surfaces that prevent the infiltration of water—rooftops and paved areas such as streets and parking lots are examples of impervious surfaces.) In the absence of future flood control improvements, this continued growth in the Rio de Flag watershed would be expected to exacerbate the current flooding problem.

Under the No Action Alternative, the City of Flagstaff would continue to be subject to significant economic, social, and environmental damages from severe floods. Approximately 1,500 existing structures, worth about \$385 million, could be subject to about \$93 million worth of damage from a 100-year flood event. In addition to structural damage throughout a large portion of the city, historic resources would be affected, the Burlington Northern & Santa Fe railroad could be severely damaged or its operations significantly disrupted, and public infrastructure and services would remain at risk. Transportation problems would occur, with a large portion of the city and Continental Estates area inaccessible for several days. A significant portion of the campus of Northern Arizona University is within the floodplain, and during severe flood events could incur schedule disruptions (e.g. closings) and physical damage to facilities and historic buildings on campus. Numerous residential, commercial, and industrial properties in the area also would remain at risk.

2.3 MEASURES AND ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD FOR DETAILED ENVIRONMENTAL EVALUATION

This section describes the flood control measures (2.3.1) and specific alternatives (2.3.2) that were considered by the USACOE but not carried forward for detailed environmental analysis in this Final EIS. The plan formulation process that led to these flood control solutions is described in Section 2.1.

2.3.1 Measures Not Carried Forward

Relocation of Existing Structures

Relocation involves either (1) moving a structure out of the floodplain or (2) demolishing the structure and either building or finding a replacement in another location. In the downtown area, relocation was determined to be infeasible given that the floodplain encompasses nearly one-half of the town

(approximately 1,500 structures). In the Continental Estates area, relocation was similarly determined by the USACOE to be impracticable and economically unjustified based on property acquisition requirements.

Floodproofing for Individual Structures/Groups of Structures

Implementation of non-structural measures such as floodproofing existing structures was evaluated. Floodproofing offers the opportunity to provide flood protection on an individual, structure-by-structure basis. Each structure or reasonable group of structures would either be surrounded by a floodwall or elevated in-place. Elevation of structures would be accomplished by raising them on piers, foundation walls, or fill material. Floodwalls or levees surrounding structures would consist of either a concrete or masonry wall, or soil material built-up and compacted around the structure. Walls surrounding structures would still require closures that would allow doors, windows, and driveways to be used while preventing water from entering the building. These closures typically would be manually operated based on flood forecasting and prediction that would alert the operator.

The Rio de Flag and Clay Avenue Wash floodplains contains approximately 1,487 structures including 1,241 residences and 246 business/commercial/public/industrial structures. The sheer density of the structures requires more costly means of floodproofing, such as concrete floodwalls immediately adjacent to the structures rather than soil levees or berms. To determine the costs associated with this alternative, the USACOE utilized conservative estimates for floodproofing, including approximately \$25,000 per residence and approximately \$40,000 for business/commercial/public structures, for a subtotal of approximately \$40,865,000. In addition, the cost of floodproofing at NAU is approximately \$25,000,000.

In the Continental Estates area, floodproofing of individual structures was also evaluated. The area is currently a designated floodway and development is required to be elevated above the 100-year water surface without causing a significant increase to that water surface. However, there are approximately 20 structures which were constructed within the current 100-year floodplain prior to FEMA designation, and there are approximately 100 structures located around the 100-year floodplain fringe which may suffer damage from a less frequent (i.e. 500-year) event. Most of these homes are higher than average value structures, generally between \$200,000 and \$3,000,000. Individual floodproofing would be costly. As with the downtown area, floodproofing in the Continental Estates area has been determined by the USACOE to be economically unjustified. (Note that floodproofing individual

structures is different than the use of berms to protect large groups of structures, as is described for Alternative D.)

Aside from the cost, a significant percentage of floodproofed homes and businesses would still suffer flood damages due to the potentially incomplete nature of the solution. The enclosures of the windows, doors, and driveways require human action in order to fully implement the solution, and this would have to occur in a relatively short amount of time. Based on the size of the floodplain within the city, it is infeasible to expect that a complete response to a flood threat would take place on the part of the property owners.

Due to the excessive costs and lack of practicality, individual floodproofing measures were not carried forward for detailed environmental analysis.

Flood Warning System

A flood warning system could provide advance notice of high flood stage situations and enable people to move themselves, their vehicles, and some high value property out of the flood zone; however, this approach does little to nothing to protect structures (e.g., buildings). It was determined that a warning system by itself would not provide significant increases in warning times and this measure was not carried forward for detailed environmental analysis.

2.3.2 Alternatives Not Carried Forward

As described in Section 2.1, the USACOE implemented a plan formulation process, through which nine preliminary alternatives were developed. These included five alternatives focused on the downtown Flagstaff area (Alternatives 1 through 5) and four alternatives that would provide flood protection in the Continental Estates area (Alternatives A through D). As a result of the screening process described in Section 2.1 and further engineering/design analysis, four project alternatives were carried forward for detailed environmental evaluation in this EIS. (A fifth alternative, No Action, is also evaluated in this EIS.) These alternatives include Alternatives 6a, 6b, 7 and Alternative D. The alternatives that were not carried forward for detailed analysis (1 through 5 and A through C) are summarized below.

Alternative 1 (Full Detention)

This alternative would have involved the construction of detention basins at Thorpe Park and along the Clay Avenue Wash with no channel modifications. The basin at Clay Avenue Wash would have been identical to the basin described in Section 2.2.2. The basin at Thorpe Park would have utilized a large embankment to the south, floodwalls along the east side of the park and natural topography to the west and north to detain floodwaters. Engineering evaluations conducted subsequent to the release of the initial Draft EIS indicated that the level of flood protection provided by the Thorpe Park detention basin was not adequate along the downtown reach and that a detention basin-only alternative would not be feasible. Thus, although this alternative was carried forward for evaluation in the initial Draft EIS, this alternative was subsequently eliminated from further consideration.

Alternative 2 (Thorpe Park Detention Basin, Channelization on the Rio de Flag and Clay Avenue Wash)

This alternative would have involved the construction of a detention basin and floodwalls at Thorpe Park (no basin would have been constructed along the Clay Avenue Wash). Alternative 2 would have also included the construction of channel modifications along the Rio de Flag and Clay Avenue Wash providing flood protection to the downtown area. The modifications to the Rio de Flag would have been similar to those described for Alternative 6a (see Section 2.2.3); however, under this alternative they would have begun further upstream at Birch Street. In addition, the new Rio de Flag channel would have had an earthen-bottom with a natural rock revetment through the majority of the reach. The Clay Avenue Wash modifications would have also started further upstream than those described for Alternative 6a and would have utilized open concrete channels in areas proposed for riprap under Alternative 6a. The Clay Avenue Wash modifications would have begun just upstream of the Railroad Springs development. The greenbelt channel along the Rio de Flag would have been included in this alternative.

This alternative would have reduced the overall discharge from Thorpe Park and would have increased channel capacity throughout the downtown area. The residual flooding from a 500-year flood event with a 100-year level of protection in place, for example, would have resulted in flooding that approximates the 25- to 50-year floodplain in the without-project condition. For the Continental Estates area, the reduced discharge from Thorpe Park would have been offset by the efficiency of the channelization such that the net effect would have been a minimal reduction in peak water surface

elevations. This alternative was marginally economically justified, but had high real estate and environmental consequences. Alternative 2 would have provided almost the same level of protection as Alternatives 6b; however, it would have been more costly to construct, and it would not have provided significant benefits to the Continental Estates area. Alternative 2 was therefore not carried forward for detailed environmental analysis.

Alternative 3 (Clay Avenue Wash Detention Basin, Channelization on Rio de Flag)

Alternative 3 would have included a detention basin at Clay Avenue Wash and channel modifications similar to those described under Alternative 2. Thus, this alternative would have been similar to Alternative 2 in that it would have used a detention basin to reduce flow volumes and it would have increased channel capacity throughout the downtown area (providing a level of flood protection similar to Alternative 2). This alternative would have been economically justified, but it would have also had high real estate and environmental consequences. Alternative 3 would have provided the same level of protection as Alternatives 6b, but at higher costs and with fewer net benefits. In addition, Alternative 3 would not have provided significant benefits to the Continental Estates area. For these reasons, Alternative 3 was not carried forward for detailed environmental analysis.

Alternative 4 (Channel Modifications with No Detention)

Alternative 4 would have included full channelization without detention basins. This would have included the construction of channel modifications along the Rio de Flag and Clay Avenue Wash to provide flood protection to the downtown area. The Rio de Flag and Clay Avenue Wash channel modifications would be the same as those described under Alternative 2.

Under this alternative, residual flooding in the downstream area would have been reduced compared to Alternatives 1, 2, and 3. Channelization, however, would have modified flood flow routing and timing such that the peak discharges entering the Continental Estates area would have increased. Without detention basins or some other means of significant attenuation, higher peak flows would have been conveyed to the Continental Estates area, and associated increases in water surface elevations would have occurred. An approximately one-foot increase in water surface elevation over and above the without-project condition in the Continental Lake area would have occurred with implementation of this alternative. Alternative 4 would have induced downstream damages and would not have been economically justified; therefore, it was eliminated from further evaluation.

Alternative 5 (Full Detention with Channel Modifications)

Alternative 5 included the detention basins described for Alternative 1 and the channel modifications described for Alternative 2. Although this alternative was carried forward for evaluation in the initial Draft EIS, subsequent engineering and design evaluations indicated that this alternative was not feasible; therefore, it was eliminated from further consideration.

Alternative A (Excavation of Continental Lake)

This alternative would have involved excavation within Continental Lake downstream of Country Club Drive, with the purpose of increasing storage capacity and reducing flood damages. There were two configurations of this alternative. The first configuration would have required the construction of a large stand-alone detention basin, which would have operated in the absence of any upstream flood control measures. The second configuration would have included a smaller detention basin to be used in conjunction with upstream flood protection alternatives.

In order to achieve adequate storage capacity in the Continental Estates area, a stand-alone detention basin would have required a substantial volume of excavation. Due to the high costs of the required excavation and the limited benefits available in the Continental Estates area, this alternative was determined to be unjustified. When considered with the upstream alternatives, a smaller detention basin would also not have provided sufficient incremental benefits to be justified. For these reasons, this alternative was not carried forward for detailed environmental analysis.

Alternative B (Improving Route 66/Railroad Undercrossing Outlet Structure)

This alternative would have involved upgrading or improving the culverts which carry Rio de Flag flows under State Route 66 and the BNSF railroad tracks. The culverts would have been expanded from their current capacity of 90 cfs to a capacity of 210 cfs. (The projected inflow into the Continental Estates area during a 100-year event is approximately 4,200 cfs.) The culvert improvements could have been accomplished at relatively low cost. However, due to the duration of flooding in this area, the large volume of water detained upstream of the existing culverts, and the large areal extent of the ponded water, the hydraulic impact of increasing the outflow to 210 cfs would have been negligible. Peak water surface elevations would have been only minimally reduced; hence, the benefits of this alternative would have also been minimal. Increasing outflows above 210 cfs could have induced

property damages downstream because the FEMA-mapped 100-year flood plain for the Rio de Flag downstream of these culverts is based on a maximum culvert capacity of 210 cfs. Purchase of downstream property to avoid these damages was determined to be prohibitively costly. Based on the factors, Alternative B was not carried forward for detailed environmental analysis in this EIS.

Alternative C (Detention Basin Upstream of Continental Estates)

This Alternative would have included the construction of a detention basin or series of localized detention basins immediately upstream of the Continental Estates area to reduce peak flows and flood damages. Alternative C would have also included the Thorpe Park and Clay Avenue Wash detention basins to reduce inflow into the Continental Estates area.

Alternatives 6a, 6b and 7, which are carried forward for analysis in this Final EIS, each include at least one detention basin and each would provide benefits to the Continental Estates area. The volume and capacity of additional smaller detention areas immediately upstream from Continental Estates would have been insufficient to provide significant benefits over and above the benefit provided by the large upstream detention basin(s). In addition, no feasible location was identified for an additional large detention facility near Continental Estates. For these reasons, Alternative C was eliminated from additional consideration.

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3.0 BASELINE CONDITIONS

This section describes the existing setting of those areas and environmental resources that could be affected by the alternatives described in Section 2.2.

3.1 TOPOGRAPHY/GEOGRAPHY

3.1.1 Topography and Landform

The Rio de Flag flows generally southeast from its headwaters on the western slopes of the San Francisco Peaks (peak elevation of 12,633 feet). It enters the City of Flagstaff from the north, following the course of a south-southeast-trending valley between two flat-topped, volcanic highlands: Observatory Mesa (7,500 feet) to the west and Switzer Mesa¹ (7,200 feet) to the east (see Figure 3-1). On the south side of the city, the stream channel arcs to the east, then northeast, widely skirting the base of Switzer Mesa and Mount Elden (9,300 feet). Within the study area, the valley of the Rio de Flag gently slopes from approximately 7,000 feet in the northwest to approximately 6,800 feet in the northeast. In the North Flagstaff and Downtown Reaches, where the direction of flow is generally north to south, the drainage is narrow and artificially channelized with steep sides. In portions of downtown Flagstaff, notably under Route 66 and the railroad tracks, the stream flows through concrete underground culverts.

Downstream of its confluence with Sinclair Wash, in the I-40 and Continental Reaches, the Rio de Flag flows east and northeast through natural, low, steep-sided hills that open up beyond the Continental residential area to become a wide valley bounded by low cinder hills. In this open portion of the study area, the ceiling of a cavity under the Rio de Flag floodplain has collapsed, creating a geologic drain for surface runoff.² After leaving the boundaries of the study area at I-40, the Rio de Flag continues to flow northeast through open valleys bounded by Mount Elden to the north and Wildcat Hill to the south.

Clay Avenue Wash, created by runoff from Observatory Mesa, runs westward (from 7,200 feet to 6,900 feet in elevation) through a narrow channel along the railroad tracks until it reaches Milton Road, where it partially submerges until it joins the Rio de Flag.

¹ Switzer Mesa is also called “MacMillan Mesa.”

² This geologic drain is known locally and appears on U.S. Geological Survey maps as the “Bottomless Pits.”

3.1.2 Geologic Structure

The course of the Rio de Flag channel in the study area is controlled by faults, except in the portion of the Downtown Reach south of the railroad tracks, where the course has been altered by human intervention. This fault control is most apparent in the I-40 and Continental Reaches, where the channel often changes direction. The channel at times follows the pervasive, northwest-trending joints and faults of the region, and at times the less pervasive northeast-trending joints and faults.

Rocks exposed in the study area are predominantly igneous of Quaternary age and much older sedimentary rocks—primarily limestone of Late Permian age (Kaibab Formation) and mudstone/sandstone of Triassic age (Moenkopi Formation). North of Route 66 and the railroad tracks, bedrock generally consists of basaltic or silicic lava flows intermixed with or covered by cinder deposits. South of the tracks, limestone of the Kaibab Formation is exposed along the north bank of the Rio de Flag channel. Virtually all rock types exposed at the surface in the study area contribute to rapid infiltration of surface water flow because of their porosity and fracture characteristics. Volcanic cinders, in particular, are highly permeable. The calcareous sedimentary rocks enhance infiltration only where they are fractured. The fractures, over time, can expand into extensive solution channels and cavities, which then absorb much of the surface runoff. However, this enhancement of infiltration of surface water is countered to some degree by the makeup of local soils.

3.1.3 Soils

Surface soils in the Rio de Flag area vary with the underlying parent material. Local soil surveys indicate that thoroughly wetted permeabilities range from 2 to 10 inches per hour on the steep flanks of the San Francisco Peaks and Mount Elden, and from 0.8 to 2.4 inches per hour in the lower volcanic slopes and in alluvial valleys. West and southwest of Flagstaff, where some clay and silt is found in subsoil, the range is 0.2 to 0.8 inches per hour. A range of 0.3 to 0.8 inch per hour is characteristic for the region of exposed limestone south of I-40. Permeability of frozen ground during winter is near zero.

Soils at the Cheshire Park detention basin site consist primarily of alluvium (recent silts, sands, and gravels) that have been eroded and deposited at the site. From the Thorpe Park area to the crossing under Route 66 and the railroad tracks, the Rio de Flag is underlain mostly by Clover Springs loam with lesser amounts of Lynx loam. From the crossing to the geologic drain beyond the Continental residential area, the reaches where most flooding occurs, the Rio de Flag channel is underlain by Lynx

loam. At the geologic drain and under Big Fill Lake, Jacques clay loam is present (U.S. Soil Conservation Service 1975 and 1972). Soils on lands outside or adjacent to the Rio de Flag channel fall into several classifications. From the northern boundary of the study area to the crossing under Route 66 and the railroad tracks, soils on both sides the stream are of the Broliar Series. South of the crossing, three types of soils dominate: Tortugas Series soils, which develop on limestone bedrock; Daze Series soils, found on limestone and calcareous sandstone; and Broliar Series soils, which develop on basalt (U.S. Soil Conservation Service 1975).

3.1.4 Deposited Sediments

Sediment deposits along the Rio de Flag are primarily Quaternary alluvium typical of modern floodplains (Reynolds 1988). Sediments in the upper reaches are derived from volcanic rocks such as basalts and rhyolite. The sources are from the San Francisco Peaks, A-1 Mountain, and Mount Elden.

3.1.5 Faulting and Seismicity

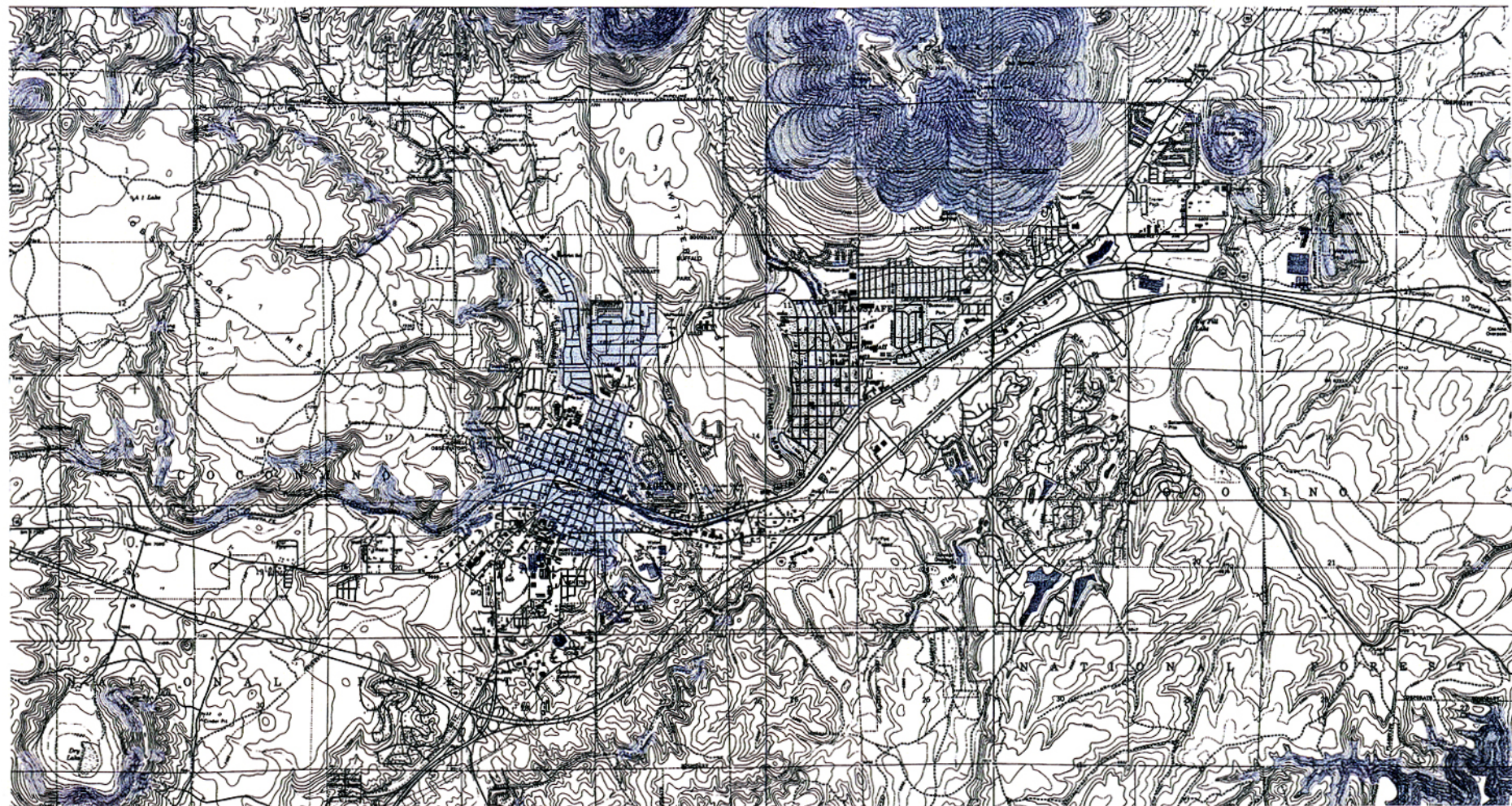
As described in Section 3.1.2, a number of small faults within the study area affect the course of the Rio de Flag. Despite the presence of these minor faults, the Rio de Flag does not intersect any known major fault zones within the immediate study area (i.e., areas where construction is being considered). Less extensive bedrock-hosted faults could be present in Kaibab Formation rocks in the study area, none of which are recognized as active. Outside of the immediate study area, the Rio de Flag flows near the active Lake Mary fault near its intersection with I-40.

Based on historic occurrences, the Flagstaff area is subject to small-to-moderate earthquakes, with some risk of larger, more damaging earthquakes. Four moderate sized earthquakes, centered from two to eight miles north of the city, were experienced between 1892 and 1959. These ground movements were related to the San Francisco volcanic field (located north of the city), which ranged in magnitude from 4.3 to 6.3 on the Richter scale. Past studies conclude that the Greater Flagstaff area could experience a maximum peak acceleration of approximately 1.5 g in response to seismic events, with a 2 to 10 percent probability of exceedance in 50 years (USACOE 1995 and USGS 1997). (One “g” equals the acceleration of the earth’s gravity.)

Recent investigations also indicate a maximum credible earthquake of a 6.9 Richter magnitude on the “Belmont Fault” over five miles west of downtown Flagstaff (Bausch and Brumbaugh 1997, Pearthree et al. 1996).

3.1.6 Minerals

The project study area does not encompass known mineral resources of commercial value. The nearest historic mining locations are two stone quarries, one at the south end of Switzer Mesa about 0.1 mile north of the railroad lines and the other roughly 0.3 mile east of Switzer Canyon. These quarries are located approximately one mile east of the proposed greenbelt corridor.



Source: USGS Flagstaff East and Flagstaff West 7.5 Topographic Quadrangle Maps



4000 0 4000 Feet
1200 0 1200 Meters

Figure 3-1
Topography

3.2 WATER QUALITY/HYDROLOGY

3.2.1 Surface Water

Hydrology

The Rio de Flag and Clay Avenue Wash can each be classified as an ephemeral stream. Currently, no stream gauges are operating in the Rio de Flag basin, but between 1956 and 1960, and again between 1970 and 1982, the U.S. Geological Survey (USGS) maintained two gauges on the waterway. One gauge was upstream of much of the city development, and one was downstream at I-40, below the point where a former waste treatment facility (Plant Number One) discharged effluent into the channel. The peak discharges recorded at both gauges during those 18 years were extremely small, but they differed substantially. At the upstream gauge

- The greatest flow was 240 cfs
- Ten years had a peak discharge of 11 cfs or less
- Four years had zero discharge
- The median discharge was 10 cfs.

At the downstream gauge

- Maximum discharge was 1,421 cfs
- Five years had less than 100 cfs
- Two years (when flow was recorded at the upstream gauge) had zero discharge
- The median discharge was 134 cfs

Three localized permanent water resources exist along the Rio de Flag in the study area: (1) Cheshire pond, a small water source created by the Narrows dam at Cheshire Park detention basin site; (2) a duck pond (Frances Short Pond) at Thorpe Park; and (3) effluent from the Rio de Flag Water Reclamation Plant, which creates a wetland where the Rio de Flag crosses west-bound I-40 ("I-40 wetlands"). Effluent discharge from the Rio de Flag Water Reclamation Plant averages approximately 1.7 million gallons per day (pers. comm, W. Case, Plant Technician, May 1998).

Water Quality

Water quality data for the study area is limited due to the small number of perennial surface water features, as described above. Water quality within Frances Short Pond reflects that, for much of the year, the pond is stagnant and accumulates waterfowl feces.

The surface waters downstream from the wastewater reclamation plant to San Francisco Wash are classified in the Arizona Administrative Code as “effluent dependent waters.” That is, without relatively continual discharges from the treatment plant, this segment of the Rio de Flag would be limited to ephemeral flows, similar to portions of the channel further upstream. The effluent discharges are treated to Arizona Department of Environmental Quality (ADEQ) irrigation water standards (City of Flagstaff 1990). The applicable standards for the surface waters below the discharge are contained in the Arizona Administrative Code Title 18, Chapter 11, Supp. 96-3, “Water Quality Standards.” Appendix B to this section of the Arizona Administrative Code, “List of Surface Waters and Designated Uses,” designates the beneficial uses for flows downstream from the wastewater reclamation plant as “Aquatic and Wildlife Habitat (effluent dependent water)” and “Partial Body Contact.”

The treated effluent contains relatively high nutrient levels (nitrates and phosphates), as evidenced by substantial algal growth present in the I-40 wetlands near the point of discharge. This is not unusual for treated effluent flows because it is difficult to remove nutrients from treated wastewater discharges. Furthermore, nutrients are generally a benefit to irrigation customers, as the presence of nutrients in the irrigation water reduces the need for fertilizer applications.

For ephemeral water bodies (such as those portions of the Rio de Flag and Clay Avenue Wash that do not have perennial flows), the Arizona Administrative Code states that “Aquatic and Wildlife (ephemeral)” and “Partial Body Contact” water quality standards shall apply (R18-11-105).

3.2.2 Groundwater

Little groundwater quality data is available for the project study area. Accordingly, a discussion of groundwater quality is not provided in this subsection. Instead, the following baseline conditions description focuses on the locations, yields, and current uses of groundwater resources in and around Flagstaff.

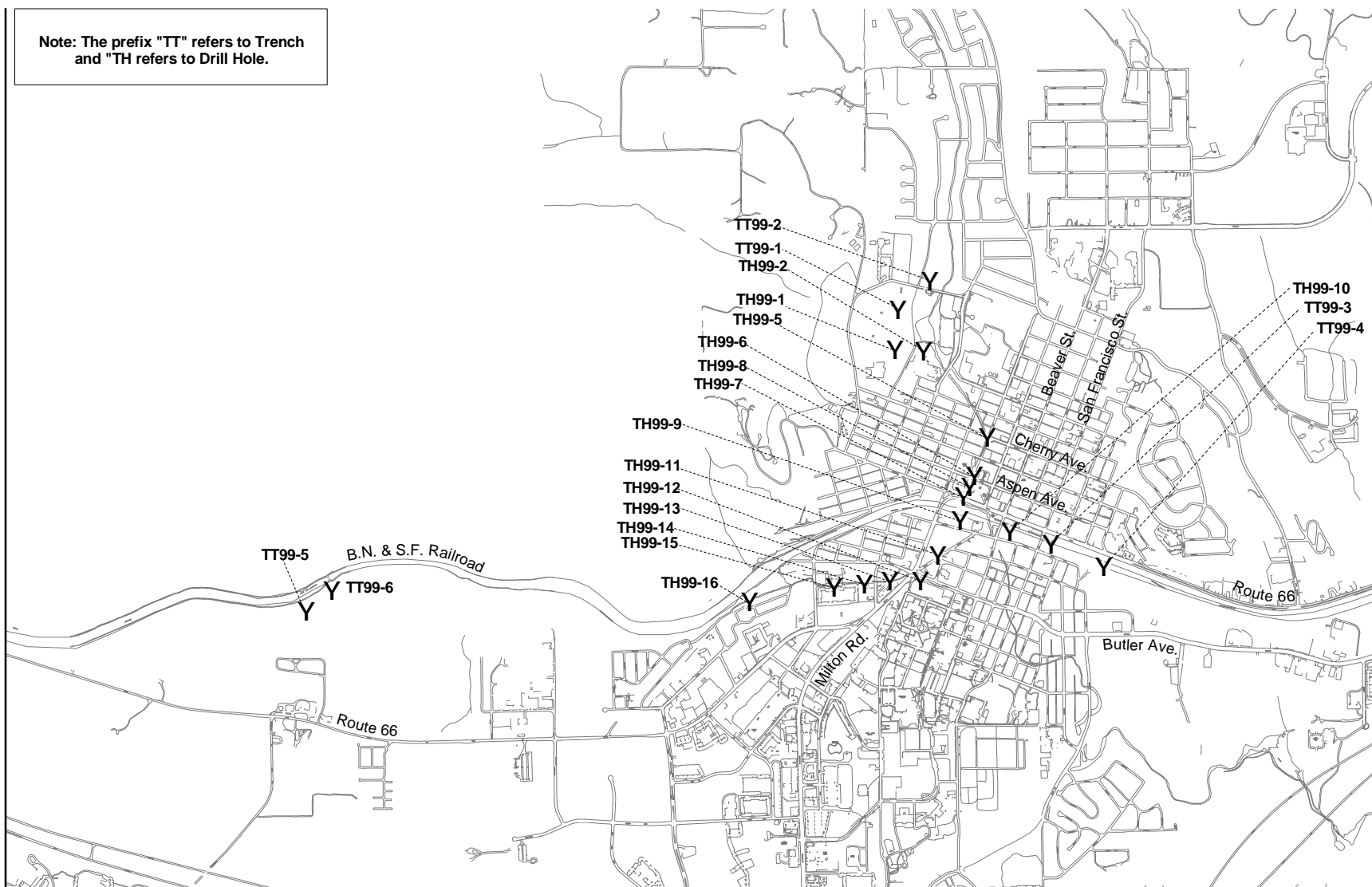
Depth to the main aquifer in the vicinity of Flagstaff (Coconino aquifer) ranges from as much as 2,500 feet in the north to 1,100 to 1,200 feet in the southwest (the city's Woody Mountain Wellfield), and as little as 300 feet in the Lake Mary area south of town (McGavok et al. 1986, McGavok 1968, and Brown and Caldwell 1978). The groundwater divide, located about eight miles southwest of Flagstaff is indicative of a major groundwater recharge zone. Beneath Flagstaff, groundwater flow from that divide moves northeast (McGavok *et al.* 1986). Water storage in the Coconino aquifer is high, but well yields are low due to the low permeability of the rocks that comprise the aquifer, except where they are significantly fractured (McGavok *et al.* 1986). Well yields are typically 200 to 800 gallons per minute in the Coconino aquifer (John Carollo Engineers and Harshbarger & Associates 1973).

Much more shallow and localized aquifers, called "perched aquifers," occur in the study area where lower permeability geologic materials impede the downward flow of water and prevent the water from reaching the main aquifer below. Local wells and springs that result from perched aquifers are ephemeral. In the Flagstaff area, perched aquifers can be encountered in alluvium where it overlies bedrock of low permeability, in volcanic rock, in the relatively unfractured Moenkopi Formation, and in chert and siltstone lenses in limestones of the Kaibab Formation (John Carollo Engineers and Harshbarger & Associates 1973).

The USACOE conducted 20 test borings (e.g., core samples) and trenches at the potential Thorpe Park and Clay Avenue detention basin sites and channel alignments in May and June, 1999. These test borings and trenches indicate that perched groundwater conditions are highly variable within the study area. Figure 3-2 shows the locations of the test excavations, and Table 3-1 indicates the depth to groundwater (if encountered). As shown on the table, three test locations within the potential footprint of the Thorpe Park detention basin site (TT99-1, TT99-2, and TH99-1) showed no indication of groundwater, with excavation depths ranging from 2 to 25 feet. Immediately downstream from the existing Frances Short Pond weir (site TH99-2), however, groundwater nearly saturated a zone at approximately 21 feet below the surface, near the bottom of a basalt layer.

Groundwater was not encountered at the potential Clay Avenue Wash detention basin site; however, the test excavations at this site were relatively shallow (less than 5.0 feet deep) because the boring equipment could not penetrate the basalt layer found approximately 4.5 to 4.75 feet below the surface.

Note: The prefix "TT" refers to Trench
and "TH" refers to Drill Hole.



Source: USACOE 1999



1250 0 1250 2500 3750 5000 Feet

500 0 500 1000 1500 2000 Meters

Figure 3-2
Trench and Boring Excavation Sites

Table 3-1. Depth to Groundwater at Test Excavation Locations

Location/ Test Site ¹	Depth to Groundwater ²	Location/ Test Site	Depth to Groundwater ³
Thorpe Park Detention Basin (TBD)		Clay Avenue Wash Detention Basin (CBD)	
TT99-1	Not found (2 feet)	TT99-5	Not found (4.75 feet)
TT99-2	Not found (3.5 feet)	TT99-6	Not found (4.5 feet)
TH99-1	Not found (25 feet)	Rio de Flag Channel (Rio)	
TH99-2	21 feet ³	TH99-5	11 feet
Clay Avenue Wash Channel (CAW)		TH99-6	Not found (4 feet)
TH99-16	Not found (9.5 feet)	TH99-7	Approx. 11 feet
TH99-15	Approx. 9.5 feet	TH99-8	18.5 feet
TH99-14	1.7 feet	TH99-9	8 feet
TH99-13	3.8 feet	TH99-10	Not found (20.3 feet)
TH99-12	Not found (15 feet)	TT99-3	Not found (10 feet)
TH99-11	10.75 feet	TT99-4	Not found (13.5 feet)

Source: USACOE 1999

¹ The prefix "TT" refers to test trench and "TH" refers to test (drill) hole.² Where groundwater was not found, the depth of the test boring is provided in parentheses.³ Test boring was nearly saturated at the bottom of the basalt layer, which extended to approximately 21 feet below the surface.

Along the potential alignment for modifications and new channel creation for the Rio de Flag, eight test sites indicate that the depth to groundwater ranges from as little as 8 feet to more than 20 feet. Along the potential Clay Avenue Wash channel modifications alignment, groundwater was encountered as shallow as 1.7 feet (site TH99-14).

Wells in perched aquifers in volcanic rock about 10 miles west of Flagstaff intersected water at depths of 21 to 27 feet (McGavok 1968), and these wells may give an indication of recharge rates for perched water aquifers within the study area. Based on these wells, it appears that the recharge of perched zones is rapid, with topographic ridges and high permeability features such as volcanic cones as the main conduits of recharge. Flow within the perched aquifers is usually controlled by the topography (EBASCO Environmental 1990).

The geologic drain in the Continental Reach has acted as a sump for years with a large capacity to remove excess flow from the Rio de Flag (Bills 1995). It is generally agreed, although poorly documented, that any Rio de Flag surface flow entering the geologic drain eventually reaches Walnut Creek and Walnut Canyon National Monument via southward flow through fractures and possibly shallow, perched aquifers in the Kaibab Formation.

3.3 BIOLOGICAL RESOURCES

Biological resources of the project study area are described in terms of vegetation communities, wildlife and wildlife use, threatened and endangered plant and wildlife species, and functions of wetlands and “waters of the United States.”

3.3.1 Vegetation Communities

Vegetation communities within the study area were mapped in August 1998 and April 2000 using 1:1,200-scale (1"=100') aerial photographs and described according to Brown (1994). Six vegetation types were identified in the study area: (1) Petran Montane Conifer Woodland, (2) Montane Meadow Grassland, (3) Ponderosa Pine Forest, (4) Wetland, (5) Mixed Riparian, (6) Disturbed/Urban. Elements of these communities are commonly intermixed throughout the study area. For example, cattail (*Typha* sp.), a common wetland species, occurs in portions of the heavily urbanized Downtown Flagstaff Reach of the Rio de Flag. These six vegetation types and their characteristics dominant plant species are summarized below. Dominant plant species were identified based on total canopy cover. Nonnative plants are marked with an asterisk (*).

The distribution of these six communities within the project study area is depicted in Figure 3-3, and each community is described below:

- **Petran Montane Conifer Woodland** is dominated by ponderosa pine (*Pinus ponderosa*) with some Gambel oak (*Quercus gambelii*) and aspen (*Populus tremuloides*) intermixed in patches. The sparse understory vegetation is composed of wild rose (*Rosa* sp.) and a mix of bluegrass (*Poa* sp.), grama (*Bouteloua* sp.), and agropyron (*Agropyron* sp.). Prior to the settlement of Flagstaff and subsequent modifications to the Rio de Flag, it is likely that this was the dominant vegetation community in the lands adjacent to the study area. This vegetation community is present along the edges of the Rio de Flag floodplain and in small patches as found near Cheshire Park and just downstream from Thorpe Park.
- **Montane Meadow Grassland** is present at the site of the potential Cheshire Park and Clay Avenue Wash detention basins, and at the potential flood control berm sites in the Continental Estates area. Dominant grasses are bluegrass, grama, and agropyron. Other grasses include bentgrass (*Agrostis* sp.), smooth brome* (*Bromus inermis*), and downy brome* (*Bromus tectorum*). Perennials observed include primrose (*Oenothera* sp.), dogbane

(*Apocynum* sp.), field bind-weed* (*Convolvulus arvensis*), fleabane (*Erigeron* sp.), Cranesbill(*Geranium richardsonii*), toad-flax* (*Linieria dalmatica*), and a few unidentified composites. Other perennials not observed during the site visits, but likely to occur, are lupine (*Lupinus* spp.), penstemon (*Penstemon* spp.), and goldenrod (*Solidago*). Within the poorly defined drainage channel at the Clay Avenue Wash site, the montane meadow vegetation exhibits mesic characteristics. (That is, this vegetation exhibits signs that it has adapted to an environment having a balanced supply of water, presumably from periodic flows within Clay Avenue Wash). While this mesic vegetation exhibits some characteristics of mixed riparian vegetation (described below), it does not include such riparian species as willows (*Salix* sp.) Additionally, this mesic vegetation would probably not qualify as wetlands pursuant to Section 404 of the Clean Water Act.

- **Ponderosa Pine Forest** is also present at the site of the potential Clay Avenue Wash detention basin. Forests dominated by ponderosa pine are abundant in the project vicinity and are a major forest type encompassing thousands of acres throughout western North America. Within the boundaries of the potential Clay Avenue Wash detention basin site, there appear to be few or no old-growth trees.
- **Wetland** habitats along the Rio de Flag occupy large and small areas where there is permanent water from either an artificial discharge of water or artificial impoundments. Specifically, wetlands occur at the Narrows dam near Cheshire Park, Frances Short Pond in Thorpe Park, and adjacent to I-40 on both the north and south sides of the highway. Dominant emergent vegetation in this habitat type is composed of cattail and rushes (*Juncus* sp). Other common plants include horsetail (*Equisetum* sp.), sedges (*Carex* sp.), dock (*rumex*), and grasses such as bentgrass and bluegrass. There is open water bounded by the dense vegetation above. There is one island in Frances Short Pond that is nearly completely covered with rushes and cattail.
- **Mixed Riparian** vegetation is highly variable and largely consists of scattered willows (*Salix* sp.), which are associated only with the Rio de Flag and not Clay Avenue Wash, mixed with plant species found in the surrounding uplands. Therefore, dominant plant species by cover vary in habitat type as the Rio de Flag passes through various upland communities. Plants are typically larger and found at higher densities. For example, in reaches where surrounding land use is mixed residential and commercial (e.g., the North Flagstaff Downtown and Clay Avenue Wash reaches), weedy plants and grasses such as white sweet clover* (*Melilotus alba*), canary grass* (*Phalaris canariensis*), and orchard grass* (*Dactylis glomerata*) are typical. Trees may include willow,

poplar* (*poplar* sp.), and aspen. The mixed riparian habitat near the Narrows dam is dominated by a dense stand of coyote willow (*salix exigua*). Arizona rose (*Rosa arizonica*) is also common in this upstream area.

- **Disturbed/Urban habitats** include areas associated with the following land uses: residential and commercial development, construction of sewer lines within the river channel and urban bike trails, agriculture livestock grazing, golf courses, recreational use of off-road vehicles, and modifications of the original channels. Trees in this habitat type include poplar*, willow, and domestic fruit trees such as apple*, cherry*, and plum*. Weedy plants are common and typically include sunflower, gum-weed (*Grindelia* sp.), ragweed (*Ambrosia* sp.), white sweet clover*, toad-flax* (*Linerria dalmatica*), and field bind weed*. Other noxious weeds that are known to occur in disturbed/urban habitats in the Flagstaff area include yellow star thistle* (*Centaurea solstitialis*), Russian knapweed* (*Centaurea repens*), and poison hemlock* (*Conium maculatum*). These species may occur in areas where fill material would be obtained. Grasses in disturbed/urban habitats include agropyron, bentgrass, orchard grass*, and canary grass*.

3.3.2 Wildlife and Wildlife Utilization

Wildlife habitat quality in the study area largely reflects the extent of human disturbances. From the upstream extent of the study area to the confluence of Sinclair Wash, wildlife habitat is limited by surrounding mixed residential and commercial developments (this includes the Thorpe Park and Cheshire Park/Narrows dam areas). While no mammals were observed (other than domestic cats and dogs) in this section, small to medium mammals likely to occur are coyote (*Canis latrans*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), skunks (*Mephitis* sp.), Nuttall's cottontail (*Sylvilagus nuttallii*), least chipmunk (*Eutamias minimus*), and Abert's squirrel (*Sciurus aberti*).

The portions of the study area with the highest potential for wildlife utilization are: (1) below the confluence of the Rio de Flag and Sinclair Wash, downstream to Herold Ranch Road and (2) the potential Clay Avenue Wash detention basin site. One reason for this is that there is less disturbance in the form of development up to the edge of the channel and less disturbance in the river channel/detention basin site. Also, the presence of perennial water from the Flagstaff wastewater treatment facility below the confluence of the Rio de Flag and Sinclair Wash may encourage wildlife use. Each of these areas is discussed separately, followed by discussions of the Narrows dam, Frances Short Pond, and the I-40 wetlands.

Below the Confluence of the Rio de Flag and Sinclair Wash

Mammals observed or detected through sign (e.g., droppings) include elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), gray fox (*Urocyon cinereoargenteus*), squirrels (Sciuridae), whitetail prairie dog (*Cynomys gunnisoni*), skunks (*Mephitis* sp.), raccoon (*Procyon lotor*) and coyote (*Canis latrans*). While not directly observed, black bear (*Ursus americanus*) may occur occasionally. Birds observed in this section include lesser goldfinch (*Carduelis psaltria*), Stellar's jay (*Cyanocitta stellari*), mountain chickadee (*Parus gambeli*), common raven (*Corvus corax*), and lesser scaup (*Aythya affinis*). Other species observed were bullfrog, (*Rana catesbeiana*), short-horned lizard (*Phrynosoma douglassii*), and garter snake (*Thamnophis* sp.). Flathead minnow (*Pimephales promelas*) was the only fish species observed in the wetland; however, extensive sampling was not conducted.

From Herold Ranch Road to the downstream end of the study area, wildlife habitat quality progressively declines from excellent to poor. Discharges from the wastewater treatment facility infiltrate the soils and surface flow disappears. Additionally, disturbances from past agricultural activities, channelization, housing development, and construction of a golf course further reduce the overall quality of wildlife habitat. However, all of the species listed above may occur in this section, albeit more sporadically and at lower densities (with the exception of white-tailed prairie dog).

Potential Clay Avenue Wash Detention Basin Site

Based on the presence of montane meadow grassland and ponderosa pine forest habitats at this site, a variety of bird and mammal species, including elk and deer would be expected to use this area.

Narrows Dam

Wildlife use of the area surrounding the Narrows dam is expected to be low to moderate given the urbanized nature of the park and the surrounding area. Wildlife that occur in the area are expected to be typical of species found in the urban/Petran Montane Conifer Woodland interface. No mammals were observed during a site visit. However, mammals expected to occur on a sporadic to regular basis include coyote, raccoon, skunks, Nuttall's cottontail, least chipmunk, Abert's squirrel, mule deer, and gray fox. Birds observed in the study area include common raven, Stellar's jay, unidentified woodpecker (*Picoides* sp.), American robin (*Turdus migratorius*), mountain chickadee, pine sisken

(*Carduelis pinus*), lesser goldfinch, house sparrow (*Passer domesticus*), and European starling(*Sturnus vulgaris*). Numerous other bird species would also be expected to occur. Due to the continuing urbanization of the surrounding area, wildlife use by larger mammals is expected to decline in the long term.

Frances Short Pond

During the site visit, Frances Short Pond appeared very turbid from recent stormwater runoff. Rushes and cattails lining the shore and forming a small island provide cover for nesting birds. Mallards (*Anus platyrhynchos*) and red-winged blackbirds (*Agelaius phoeniceus*) were observed. Wildlife utilization of the pond may be limited by its small size and urban setting. Aside from providing habitat for some waterfowl and other marsh-birds, the pond is unlikely to provide a significant refuge for wildlife. Three species of sport fish are stocked annually in the Frances Short Pond for a fishing derby held every spring for Flagstaff Middle School: catfish (*Ictalurus* sp.), bluegill (*Lepomis macrochirus*), and red ear sunfish (*Lepomis microlophus*) (pers. comm., M. Carlson, Flagstaff School District).

I-40 Wetlands

At the I-40 wetlands, wildlife appears diverse and abundant. Deer, coyote sign, gray fox, and a variety of small mammals were observed in the vicinity of the ponds. In this portion of the study area, habitat for mammals appears excellent; there is a large quantity of forage, and adjacent woodlands provide cover. However, poor water quality (i.e., high nutrient levels) may affect the wildlife value of the I-40 wetlands habitat. A surface algae bloom observed during the site visit may indicate a eutrophication problem. This may limit the use of these wetlands by waterfowl. Only one lesser scaup (*Aythya affinis*) and one mallard were observed in the open water. Furthermore, given the algae bloom, the dissolved oxygen content may drop dramatically at night, limiting aquatic invertebrates and fish species.

3.3.3 Threatened and Endangered Species (Federally Listed Species)

The U.S. Fish and Wildlife Service (USFWS) lists 16 threatened and endangered species for Coconino County (Table 3-2; see also correspondence from the USFWS dated February 5, 1999 and included in Appendix C of this EIS). Additionally, one proposed endangered species is also present in the county.

Table 3-2. Listed and Proposed Species for Coconino County, Arizona

Species Common Name (Scientific Name)	Status ¹	Known Distribution and Habitat Needs	Likelihood in Study Area
Plants			
Brady pincushion cactus (<i>Pediocactus bradyi</i>)	LE	3,850 to 4,500 feet on benches and terraces in Navajo desert near Marble Gorge in Kaibab Formation limestone chips over Moenkopi shale and sandstone	Highly unlikely. Area is outside species' known range. Elevation is too high, plant community is not suitable, and site contains no suitable substrate.
Navajo sedge (<i>Carex specuicola</i>)	LT	Silty soils at shady seeps and springs, seep springs on vertical cliffs	Highly unlikely. Area is outside species' known range.
San Francisco Peaks groundsel (<i>Senecio Francescanus</i>)	LT	Alpine tundra above 10,900 feet on San Francisco Peaks.	Highly unlikely. Area is outside species' known range; no suitable habitat is present. Site is below known elevation range of species.
Sentry milk-vetch (<i>Astragalus cremnophylax</i> var. <i>cremnophylax</i>)	LE	Pinyon-juniper-cliffrose on a white layer of Kaibab limestone in unshaded openings. Elevations > 4,000 feet.	Highly unlikely. Area is outside species known range.
Siler pincushion cactus (<i>Pediocactus sileri</i>)	LT	2,800 to 5,400 feet in gypsiferous clay and sandy soils of Moenkopi formation in desert scrub transitional areas.	Highly unlikely. Area is outside species known range and no suitable habitat is present. Site is above known elevation range of species.
Welsh's milkweed (<i>Asclepias welshii</i>)	LT	Open stabilized desert scrub dunes and lee side of active dunes; critical habitat is in Utah.	Highly unlikely. Area is outside species known range and no suitable habitat is present.
Parish alkali grass (<i>Puccinellia parishii</i>)	PE	Moist saline soils at saline seeps and associated wetlands, 3,000 to 6,000 feet.	Highly unlikely. Site is above known range.
Wildlife			
Kanab ambersnail (<i>Oxyloma haydeni kanabensis</i>)	LE	Travertine seeps and springs in Grand Canyon National Park at 2,900 feet.	Highly unlikely. Area is outside species known range and no suitable habitat is present.
Black-footed ferret (<i>Mustela nigripes</i>)	LE	Grassland plains in prairie dog towns.	Highly unlikely. There are no known populations of black-footed ferrets in Arizona.

Species Common Name (Scientific Name)	Status ¹	Known Distribution and Habitat Needs	Likelihood in Study Area
Little Colorado spinedace (<i>Lepidomeda vittata</i>)	LT	Moderate to small streams in pools and riffles with water flowing over gravel and silt. East Clear Creek, Chevelon Creek, and Nutrioso Creek.	Highly unlikely. Area outside of known range.
Humpback chub (<i>Gila cypha</i>)	LE	Large, warm, turbid rivers, especially canyon areas with deep, fast water.	Highly unlikely. Habitats in area do not resemble those known to be used by the species.
Razorback sucker (<i>Xyrauchen texanus</i>)	LE	Riverine and lacustrine areas, generally not in fast moving water, and may use backwaters.	Highly unlikely based on lack of suitable habitat.
American peregrine falcon (<i>Falco peregrinus anatum</i>)	LE	Cliffs and steep terrain, usually near water or woodlands with abundant prey. 3,500 to 9,000 feet.	Possible but not likely. Area lacks nesting features.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	LT	Large trees or cliffs near water with abundant prey (fish).	Highly unlikely. The majority of the area is too urbanized.
California condor (<i>Gymnops californianus</i>)	LE	High desert canyon lands and plateaus.	Highly unlikely. In Arizona, The species is only known from the Vermillion Cliffs, approximately 100 miles north of Flagstaff.
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	LT	Canyons and dense forests above 4,100 feet.	Unlikely. Site is too urbanized..
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	LE	Cottonwood/willow and tamarisk vegetation communities along rivers and streams	Highly unlikely. Site has no dense stands of cottonwood/willow or tamarisk.

¹DEFINITIONS: LE=Listed Endangered, LT= Listed Threatened, PE= Proposed Endangered

Source: USFWS 1999

Of these 17 species, none is likely to occur within the study area. Thirteen of the 17 species are not expected to occur in the study area because their known ranges are located well outside of the study area and/or the study area does not contain habitats similar to those known to support these species: black-footed ferret (*Mustela nigripes*), California condor (*Gymnops californianus*), humpback chub (*Gila cypha*), Little Colorado spinedace (*lepidomeda vittata*), razorback sucker (*Xyrauchen*

texanus), Kanab ambersnail (*Oxyloma haydeni kanabensis*), Navajo sedge (*Carex specuicola*), Parish alkali grass (*Puccinellia parishii*), San Francisco Peaks groundsel (*Senecio Francescanus*), Sentry milk-vetch (*Astragalus cremnophylax cremnophylax*), Brady pincushion cactus (*Pediocactus bradyi*), Siler pincushion cactus (*Pediocactus sileri*), and Welsh's milkweed (*Asclepias welshii*). The four other federally listed species, bald eagle (*Haliaeetus leucocephalus vittata*), American peregrine falcon (*Falco peregrinus anatum*), Mexican spotted owl (*Strix occidentalis lucida*), and southwestern willow flycatcher (*Empidonax traillii extimus*) are not expected to occur for the reasons described below.

Bald Eagle. The bald eagle is currently listed as threatened; however, on July 6, 1999, the USFWS filed a proposed rule to delist the bald eagle. The final ruling is anticipated to be made in July 2000. Bald eagles occur throughout much of North America, with the greatest numbers found in Canada and Alaska. There are approximately 40 known bald eagle breeding areas in Arizona, primarily along the Salt and Verde Rivers in the central part of the state, although there are a few outlying pairs in other locations (Glinski 1998). None of these breeding areas or pairs are located within the study area.

The year-round population of bald eagles in Arizona is augmented in the winter by the arrival of several hundred eagles from outside the state, and wintering eagles are often seen at lakes southeast of Flagstaff (Grubb et al. 1989). Although bald eagles may traverse the study area, they are highly unlikely to use it for foraging or nesting. This assessment reflects the lack of suitable foraging habitat (primarily lakes and flowing rivers) and the proximity of urban uses to potential nesting sites (e.g, tall conifers) within the study area.

American Peregrine Falcon is listed as endangered by the USFWS. Probably the most important breeding habitat characteristic of this species is the presence of tall cliffs (typically over 150 feet but sometimes as low as 60 feet), which serve both as nesting and perching sites (Johnsgard 1990). Although nests sometimes occur some distance from water (Monson and Phillips 1981), a source of water is usually close to the nest site, probably in association with an adequate prey base of small to medium-sized birds. In Arizona, breeding activity was documented at 206 locations in 1995 (Garrison and Spencer 1996).

Peregrine falcons occasionally may visit the study area to forage; however, there are no known peregrine nest sites within the study area and no cliffs that are suitable for nesting. The closest known

territory is near Mount Elden (Ward and Siemens 1995) located less than five miles north of the eastern portion of the study area.

Southwestern Willow Flycatcher is listed as endangered by the USFWS. In Arizona, willow flycatchers arrive in May and begin to nest in late May (Phillips and Monson 1964) in riparian vegetation along streams, rivers, or other wetlands (Johnson et al. 1987). The following definition of survey habitat was provided by Arizona Partners in Flight (1996): "...suitable survey habitat for the southwestern willow flycatcher is characterized by patches of native riparian shrubs or trees including willow (*Salix* sp.), cottonwood (*Populus* sp.), box elder (*Acer negundo*), ash (*Fraxinus* sp.), or mixtures of these species; pure stands of tamarisk; or mixtures of native species and tamarisk characterized by high stem density or high foliage volume in the lowest stratum and/or mid-stratum. Tamarisk stands, particularly taller stands, may have a relatively open understory with a single stratum of foliage confined to the canopy. Patches may have either a single stratum and relatively low canopy (minimum canopy height of 12 feet) characteristic of an early- to mid-serial stage, or have several vegetation strata including a relatively tall canopy of cottonwood or willow (e.g. 50 feet). Riparian patches may be highly irregular in shape, but should have a minimum depth of 30 feet." The closest known breeding habitat is in the Verde Valley approximately 50 miles south of the study area (pers. comm., H. Yard).

It is unlikely that the southwestern willow flycatcher occurs within the study area. Habitat along the Rio de Flag does not resemble habitat known to be used by southwestern willow flycatcher for breeding. Willow patches are less than 30 feet across, trees are less than 12 feet high, and stem density is low. Furthermore, the cottonwood trees present are less than (40 feet) tall and are sparsely distributed, providing little or no canopy cover.

Mexican Spotted Owl is listed by the USFWS as threatened. Mexican spotted owls "primarily breed in old growth mixed conifer forest located on steep slopes, especially deep shady ravines" (AGFD 1992). Nest sites are usually in cavities in coniferous trees or on abandoned platform nests of other species and are occupied for several consecutive years. Other key habitat features include areas with lots of snags, downed logs, and dense canopy. This nocturnal owl is intolerant of moderately high temperatures and in summer tends to roost on north-facing slopes with a dense overhead canopy. The most common prey are woodrats; however, birds, rabbits, and insects are also taken. The nearest known Mexican spotted owl territory is located in Shultz Pass approximately 10 miles north of the study area.

It is unlikely that Mexican spotted owl occurs in the study area; there are no steep north-facing slope or cool shady ravines, and the canopy is generally low and open.

Although no longer a sensitive species, Arizona leather flower (*Clematis arizonica*) occurs in the study area. This species was formerly a USFWS candidate species until a recent floristic review of the genus *Clematis* revealed that there was no clear difference between *C. hirstussima* var. *arizonica* and *C. h.* var. *hirstussima*. Therefore, the USFWS removed Arizona leather flower from the list of candidate species because “it no longer meets the definition of ‘species’” (Federal Register, 9 January 1998 [Volume 63, Number 6]).

3.3.4 Wildlife Species of Concern in Arizona (WSCA)

The southwestern willow flycatcher and mexican spotted owl are listed by the Arizona Game and Fish Department (AGFD) as WSCAs. Refer to the discussion above for specific information regarding these two species. In addition, the northern goshawk (*accipiter gentilis*) is also an AGFD-Listed WSCA with the potential to occur in the Flagstaff area.

Northern Goshawk. Recent attempts to have northern goshawk listed as a federally threatened species have been rejected by USFWS based on lack of evidence indicating a decline in numbers or significant loss of habitat. Typically, this species nests in mature stands of conifers in pine-oak and oak habitat (AGFD 1996). Threats to habitat includes timber harvesting, especially of large trees, and wildfire. Northern goshawk occurs locally in the pine-oak woodlands surrounding the study area (USACOE 1997).

It is likely that northern goshawk forage regularly in the study area; however, it is unlikely that this species breeds in the study area. The Rio de Flag does not pass through any notably large stands of conifers. However, northern goshawk may breed in undisturbed woodlands immediately adjacent to the study area in areas surrounded by Petran Montane Coniferous Forest.

3.3.5 Functions of Wetlands and “Waters of the United States”

Functions of wetlands and “waters of the United States” are defined as the normal or characteristic activities that take place in wetland ecosystems or simply the things that wetlands do. The variety of

functions extends from the simple, the reduction of nitrate to gaseous nitrogen, to the complex, the maintenance of ecological integrity. Functions of wetlands and “waters of the United States” that directly or indirectly benefit the public interest (as defined by 33 CFR, Section 320.4(b)(2)) include those:

- which serve significant natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species;
- that are set aside for study of the aquatic environment or as sanctuaries or refuges;
- that the destruction or alteration of which, would detrimentally affect natural drainage characteristics, sedimentation patterns, flushing characteristics, or other environmental characteristics;
- which are significant in shielding other areas from wave action, erosion, or storm damage;
- which serve as valuable storage areas for storm and flood waters;
- which are ground water discharge areas that maintain baseflows important to aquatic resources and those which are prime natural recharge areas;
- which serve significant water purification functions; and
- which are unique in nature or scarce in quantity to the region or local area.

The Rio de Flag riparian system throughout the majority of the project area is repeatedly and heavily disturbed, and development has encroached into much of the floodplain area. Accordingly, the baseline conditions for wetlands along the Rio de Flag within the project area provide few, if any, of the functions noted above. The relative degree to which the current functioning of the wetlands along the creek would be affected by the proposed project alternatives however is discussed in Section 4.3 (Biological Resources).

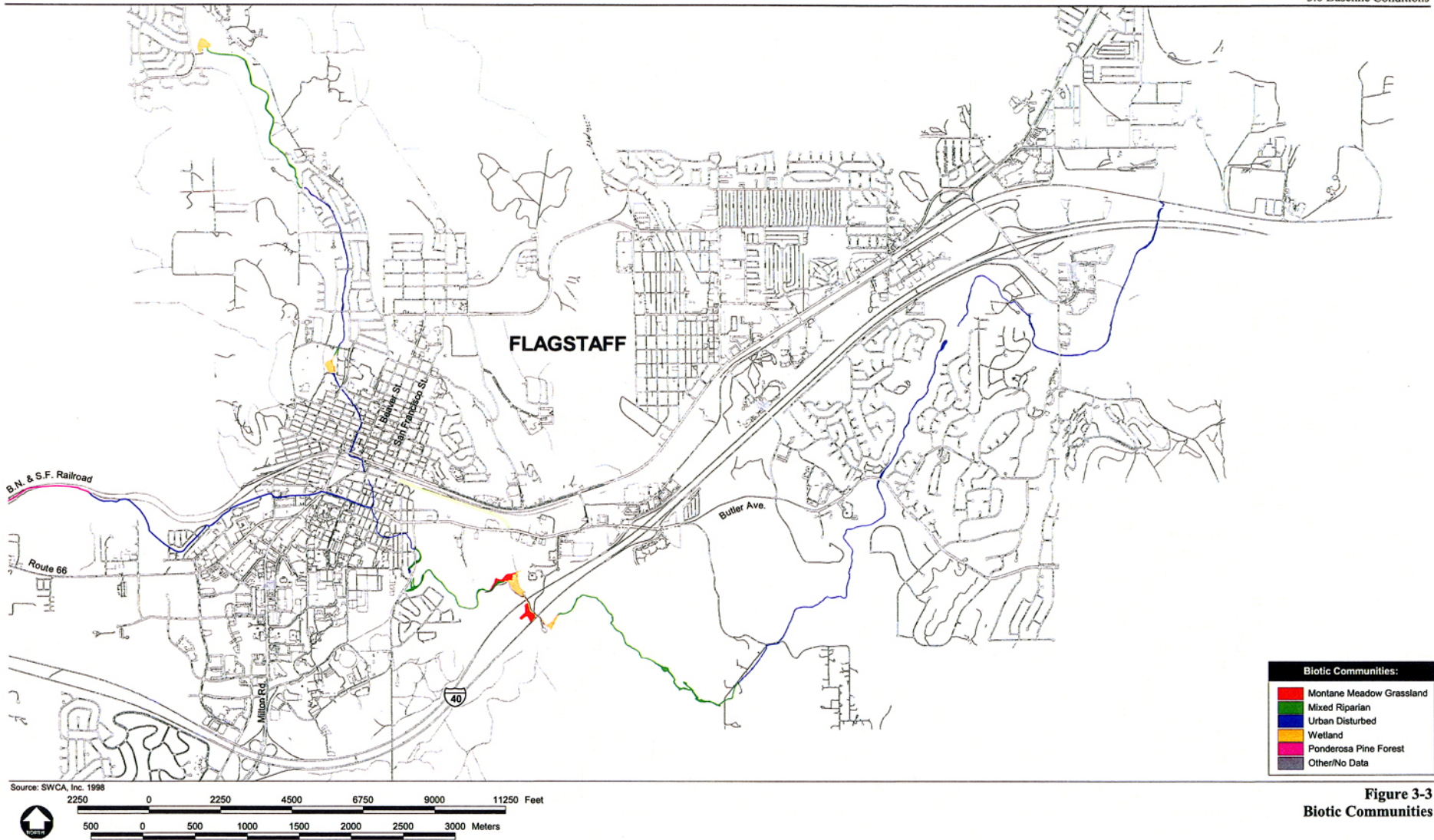


Figure 3-3
Biotic Communities

3.4 CULTURAL RESOURCES

“Cultural resource” is a term that refers to the imprint of human occupation left on the landscape. This imprint is manifested in the form of prehistoric and historic archeological sites, and historic buildings, structures, and objects. Archeological sites consist of artifacts, plant and faunal remains, trash deposits, and many types of features. Artifacts reflect anything that was manufactured or modified by human hands. Features can include structural remains, fire pits, and storage areas. Prehistoric archeological sites are loci of human activity occurring before European contact, which was first made in the southwest with the Spanish entrada in A.D. 1540. Prehistoric artifacts include: flaked stone tools such as projectile points, knives, scrapers, and chopping tools; ground stone implements like manos and metates; plain and decorated ceramics; and features or facilities that include subterranean and above ground architectural units, hearths, granaries and storage cists, and trash deposits known as middens.

Historic archeological sites reflect occupation after the advent of written records. Material remains on historic archeological sites include: refuse dumps, structure foundations, roads, privies, or any other physical evidence of historic occupation. Refuse consists of food waste, bottles, ceramic dinnerware, and cans. In a number of historic archeological situations privies are important because they often served as secondary trash deposits. There is usually a strong interplay between historic archeological sites and written records. The archeological data is frequently used to verify or supplement historic records. Historic structures include: commercial and residential buildings, industrial facilities, bridges, and roadways.

There are two principal methods of locating cultural resources. Before a project is started, a records and literature search is conducted at any number of repositories of archeological site records. The search may show that an archeological or historical survey had been conducted and some cultural resources were identified. That information may be enough to proceed with the significance evaluation stage of the project. If a conclusion was reached that (1) no previous survey had been done or (2) a previous survey was either out of date or inadequate, the project cultural resources expert, either a historian or archeologist, will carry out a survey to determine if any cultural resources are within the proposed study area boundaries.

After a cultural resource(s) has been identified during a survey, or record and literature search, the Federal agency overseeing the undertaking embarks on a process to determine whether the cultural resource is eligible for listing in the National Register of Historic Places (National Register). This

process is mandated by Section 106 of the National Historic Preservation Act. The Federal regulation that guides the process is 36 C.F.R. 800. For a cultural resource to be determined eligible for listing in the National Register, it must meet certain criteria. The resource has to be at least 50 years old or exhibit exceptional importance.

After meeting the age requirement cultural resources are evaluated according to four criteria; a, b, c, and d. The National Register criteria for evaluation as defined in 36 C.F.R. 60.4 are:

[T]he quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield, information important in prehistory or history.

After a cultural resource has been determined eligible for listing in the National Register it is accorded the same level of protection as any other property that is listed and becomes formally known as a “historic property,” regardless of age.

3.4.1 Area of Potential Effects

The study area or area of potential effects (APE) for the proposed action is composed of the Rio de Flag floodplain within the City of Flagstaff, potential detention basin sites, potential new alignment for the Rio de Flag through downtown Flagstaff, and the potential berm sites located along the Rio de Flag floodplain periphery in the Continental Estates area.

3.4.2 Records and Literature Search

A search of existing historic information was initiated by a visit with Dr. David Wilcox, Archaeologist at the Museum of Northern Arizona. A letter was sent to the State Historic Preservation Officer (SHPO) requesting information regarding historic resources within the APE for the proposed project. On

March 24, 1997, the SHPO provided list of the National Register listed properties and Historic Districts in Flagstaff. Telephone consultation was conducted with Ms. Susan Wilcox of the Arizona Historical Society, Northern Arizona Division. Ms. Wilcox also provided maps of the various historic districts and loaned the final report for the Southside/Oldtown Districts. Copies of the various Historic District inventory reports were obtained from the files of the City of Flagstaff Planning Division and the Flagstaff Public Library. The National Register of Historic Places Internet Web site (<http://www.cr.nps.gov/nr/nrhome.html>) was consulted to verify listings.

3.4.3 Flagstaff Prehistoric Chronology

Paleo-Indian and Archaic

Cultural resources span a continuum of approximately 11,000 years in Arizona. The Paleo-Indian tradition is well documented primarily in southern Arizona. There are no known Paleo-Indian sites and barely any known Archaic sites near the Flagstaff area. In 1994, two sites were excavated that had either archaic or Basketmaker II components (Bradley and Neff 1994). Archaic projectile points have been found in isolated occurrences in the Flagstaff area and close to the Grand Canyon, but no sites have been excavated. As is often the case in southwestern archeology, there is little emphasis on the archaic. Consequently there is no developed archaic chronology for Flagstaff (Dave Wilcox, personal communication, 1997). There is an archaic presence in Verde Valley, however, that is not very well understood (Greenwald 1989). The Dry Creek phase described by Breternitz (1960) was roughly dated from 2000 B.C. to 1 A.D.

Sinagua Culture

The history of archeological research in the Flagstaff region is almost as interesting as the subjects of the research—the Sinagua. The levels of research in Flagstaff archeology have equated to intellectual trends in American archeology in general (Downum 1988). Research has primarily centered on the Sinagua culture as noted in the previous paragraph.

“Sinagua,” which is Spanish for “without water,” typifies the culture in regions near Flagstaff. The Sinagua were a ceramic-producing, agricultural culture. Their cultural sequence is broken down into two parts divided by the eruption of the Sunset Crater volcano (Downum 1988). The pre-eruptive

period encompasses three phases and lasted from about A.D. 500 until the first eruption in 1064. The post-eruptive period lasted until termination of the culture, about A.D. 1400.

The Sinagua culture is divided into two regions: the Northern Sinagua, located south and east of the San Francisco Peaks, and the Southern Sinagua, who were found in the Verde Valley (Pilles 1996). The Northern Sinagua are the aspect found in the Flagstaff/Sunset Crater area. Prior to 1939, the Pecos Classification was the basis for Sinagua chronology. A chronology for the Sinagua based on a long, comprehensive list of culture traits (Plog 1989) was developed by Harold S. Colton (Colton 1939). The phases for the Southern and Northern Sinagua have been modified and refined since 1939, most recently in 1988 (Pilles). Even though Colton based his chronological system on an extensive list of culture traits, the cornerstone of his argument was ceramics and architecture (Plog:1989:265).

Spatial definitions of the Sinagua after Colton have not been without their own set of problems. The Southwestern volume of the *Smithsonian Handbook of North American Indians* has two contradictory chapters placing the Sinagua in two different cultural provinces. Schroeder (1979) has the Flagstaff area as part of his Hakataya Tradition, while Plog (1979) shows Flagstaff well within the Western Anasazi province. To complicate the issue further, Reid (1989) shows the entire Sinagua culture in the northern periphery of the Mogollon region. There is still no general consensus on a definition of "Sinagua." Sinagua origins are still questionable. Pilles (1987) speculated that they came from the southeast and moved slowly to the San Francisco Peaks region.

The Sinagua are surrounded by the three main prehistoric southwestern cultures and are located a substantial distance from the core area of those cultures. Their geographic location, at the periphery of the Hohokam, Mogollon, and Anasazi culture areas, suggest that they may be composite group with shared traits from the three main cultures. In any case, they had a distinct culture which ran its course between A.D. 650 and 1400. Archaeological evidence indicates that, following abandonment of the region in 1400, the Sinagua may have moved to Homolovi area sites and become integrated with the ancestral Hopi (Pilles 1987), eventually migrating to the Hopi Mesas.

Development of an accurate system of dates has been somewhat problematic. The problems lies within the lack of ceramic design variability over long periods of time. Because there had been a lack of variability in Sinagua ceramic styles, Sinagua phase dates are usually obtained from intrusive ceramics (Pilles 1996). For example, in the Northern Sinagua locality, the Elden phase is characterized by early to middle Pueblo III (PIII) period Anasazi ceramics. Flagstaff and Walnut Black-on-white pottery

types dominate the PIII assemblages. Table 3-3 shows the chronological relationships between the Sinagua phases and their neighboring cultures, the Anasazi and the Hohokam. The phases and dates noted in Table 3-3 reflect the cultural sequence that is most commonly used. An alternative chronology was suggested by Plog (1989:276). Plog's chronology is focused on three periods of hiatus (A, B, and C) that he considered important enough to incorporate into a revised system; however, his chronology has not been routinely used (Carla Van West, personal communication, 1998). Pilles' table shows that the Sinagua are chronologically defined by phases. There is not a broad based system of culture development, as there is with the Hohokam, Anasazi, and Mogollon. Consequently, Pilles (1996) has published a sequence to place the phases in a developmental structure.

Pilles grouped the Cinder Park and Sunset Phases in the Early Sinagua category. The combined temporal placement of the two phases is A.D. 650 to A.D. 900. The Cinder Park Phase reflects the period that agriculturists settled in the Flagstaff and Verde Valley regions. Not many sites from this phase have been found in the Flagstaff area. Plog (1989) suggested that the Cinder Park Phase is of questionable value. However, at the time Plog wrote his chapter, there apparently was only a single Cinder Park date. The population increased slightly during the Sunset Phase between A.D. 700 and A.D. 900. Originally, this population increase was attributed to Hohokam migrations into the area. Although there was a Hohokam presence in the area, this view has been modified to place more emphasis on local growth. Sunset Phase settlements are usually located in the ponderosa pine-pinyon-juniper periphery north and northeast of Flagstaff. Sites are found primarily in the Cinder Hills vicinity, with other sites in or near Juniper Terrace, Deadman Wash, and Baker Ranch. The Cinder Hills sites are mostly covered with ash from the Sunset Crater eruption. Sites from this phase typically mirror Anasazi sites from the Winslow area. They consist of a central communal area surrounded by an arc of three or more pithouses.

The Middle Period Sinagua lasted from A.D. 900 to 1150. During this period the Sunset Crater volcano erupted between the A.D. 1064 and 1066. Northern Sinagua culture history in this temporal range includes the Rio de Flag, Angell-Winona, and Padre Phases. This 250-year period was typified by substantial population increase. The Northern Sinagua populations were centered around the fringe of the San Francisco Peaks. This phenomenon was possibly due to increased moisture levels during a period that was drier overall. The villages increased in size and seem to have developed a formalized socio/political structure. Usually a small site of three or more pit houses would be centered around a larger village. Researchers have hypothesized that the larger villages served a communal function. They

**Table 3-3. Sinagua Chronological Phases
Compared with Anasazi and Hohokam Phases**
Source: Pilles 1996

Date	Hohokam	Northern Sinagua	Southern Sinagua	Kayenta Anasazi (Kleida Valley)	Date
1400					1400
1300	Civaco	Clear Creek	Tuzigoot	PUEBLO IV	1300
1200	Soho	Turkey Hill		TSEGI PHASE	
1100		Elden	Honank	PUEBLO III	1200
1000	Sanian	Padre		LATE P.I.	1100
		Angell-Wimona			
900	Sacaton	Rio de Flag	Camp Verde	EARLY PII	1000
800	Santa Cruz	Sunset	Cloverleaf	PUEBLO I	900
700					800
600	Gila Butte	Cinder Park	Hackberry	BASKET MAKER III	700
500					600
400	Snaketown		Squaw Peak	BASKET MAKER II	500
300					400
200	Sweetwater		?		300
100					200
AD BC	Listrella		Dry Creek		100
					AD BC

typically have a community room-pithouse or ballcourt. The presence of ballcourts implies influence from external sources and a propensity towards cultural evolution (Pilles 1987).

Architectural styles were also evolving. Masonry-lined construction became prevalent in pithouses, field houses, and surface rooms. Seasonal agricultural field houses were precursors of the later large pueblos. The houses in the Northern Sinagua region were large, circular, and sub-square pit houses with ramp entries. This was in contrast to the southern sites which were shallower pithouses that occasionally showed Hohokam traits. Sinagua agricultural practices were expanded to facilitate growing crops on a wide variety of soils types. Planting was done on alluvial parks and at the mouths of washes where they entered the alluvial parks. They also built terraces to act as check dams catching water and soil runoff at higher elevations. In addition to planting crops, the Sinagua also maintained a mixture of natural plants in their fields.

During the Elden phase, the Sinagua population reached its highest point. The Elden phase, named after Elden Pueblo, is contemporaneous with the neighboring Anasazi Pueblo III cultural stage. Both cultures floresced in the time period from A.D. 1150 until 1300. Northern Sinagua occupation during the Elden phase was focused in Flagstaff and Wupatki. In the Flagstaff area, the population moved down to lower elevations. Technology and socio/political organization peaked during the Elden Phase. Elden Pueblo near Flagstaff is one of the largest and most famous sites from this period (Pilles 1987). Interestingly, pithouse architecture persisted beyond A.D. 1100.

Complexities of Sinagua organizational systems are seen through site size, village layouts, unique artifact types, and varied mortuary practices. A settlement hierarchy shows different levels of organizational importance. There is a small number of important sites known as “chief” villages. Included in this category are Wupatki, Ridge ruin, and Juniper Terrace. Two sites that date from an earlier time period are Winona Villagea and Three Courts Pueblo. The unifying features of these sites are: all have ball courts, are located on historic trade routes, are on hilltops, and have an unusually large range of exotic artifacts and tradeware ceramics. Pilles (1987) speculated that these sites were centers for religious, political, and social leadership.

The Sinagua universe started a decline in the late thirteenth century that paralleled a changing environment. Climatic conditions became cooler and drier with precipitation cycles shifting to the winter and early spring. Population centers shifted to sites near springs. Areas of population concentration included : Mount Elden, Doney Park, Anderson Mesa, Wupatki, and Ridge Ruin. Signs

of possible hostilities are seen in the construction sites that may have been built to serve as a fort. These sites were built on hilltops and cinder cones, and other vantage points at the mouths of steep-walled canyons. Even with the absence of demonstrable proof of warfare, these sites are usually interpreted as places of refuge. An alternative interpretation has lately been proffered, that the hilltop sites were used as territorial markers.

The terminal period for the Sinagua was between A.D. 1300 and 1400. During this timeframe, the Sinagua tradition evolved into the Hopi culture. The last remnants of definable Sinagua culture are found at Wupatki, Anderson Mesa, Grapevine, and six large pueblos at Kinnikinick, the Pollock site, and Nuvakwewtaqa. The most important of the remaining cultural centers were the three pueblos of Nuvakwewtaqa in Chavez Pass.

The great pueblos were abandoned by 1400. Archaeological evidence shows direct links to the Hopi. The population from Anderson Mesa probably moved first to Homolovi on their way to the Hopi Mesas. There is a direct link between Nuvakwewtaqa and the Hopi. Rockart images such Kokopelli, the Shalako Kachina, and Pöqangwhoa are recognized. Some of the same images are also found on pottery designs. Ruins at Wupatki, Nuvakwewtaqa, and Elden Pueblo are known as being ancestral to the Hopi. The San Francisco Peaks are the home of the Kachinas and figure heavily in Hopi religious activities.

3.4.4 Flagstaff History

There is no known Spanish presence in the Flagstaff area. Apparently, there was no activity in the area between the cessation of the Sinagua tradition in A.D. 1400, and the early military expeditions of Captain Lorenzo Sitgreaves in 1851 and Lieutenant Amiel Weeks Whipple in 1853 (Downum 1988). The Superintendent of Indian Affairs for California, Edward F. Beale, was in the area in 1857. He was instructed by the War Department to build a wagon road that would link the Arkansas River with California. Then, in 1857, Lieutenant Joseph C. Ives was in the Flagstaff area while exploring the eastern tributaries of the Colorado River.

Flagstaff history really begins in the 1870s (Granger 1982). Edward Whipple settled near Flagstaff Spring in 1871, where he ran a saloon, and F. F. McMillen settled north of Flagstaff's present location, on Antelope Spring. A number of stories abound of how Flagstaff was named. Variations include Beale's men raising a flagstaff in 1859, another claims that emigrants raised it in May 1876 to

celebrate the centenary of the signing of the Declaration of Independence. Antelope Spring experienced a few name changes. In the early 1880s, it changed from Antelope Spring to Flagstaff Spring, finally becoming known as “Old Town Spring” or simply “Old Town” after the community burned down in 1884. Old Town had quite a rowdy reputation. The town that replaced it a few hundred yards east of Old Town was named with some lack of creativity, “New Town.” Perhaps the name was to indicate that this new community would be more staid than its lawless predecessor (Ashworth 1991). Flagstaff finally became the town’s official name when the post office was built at the new location in 1884.

For some time after Flagstaff was founded it remained a rough, unsophisticated town. Lawlessness pervaded the community and gambling and wide open saloons were prevalent. Part of Flagstaff’s problem was its attraction to some of the more disreputable citizens that had emigrated from Dodge City, Kansas. In spite of this raw frontier beginning, the ideals of hardworking, church-going folk in town prevailed so that Flagstaff became somewhat more genteel.

Critical to Flagstaff’s growth was the transcontinental railroad (Ashworth 1991). Much of the lumbering and mill work in town owes its existence to the railroad. The lumber mills served to provide the railroad with rail ties. Along with its mail delivery function, the train also brought newspapers from larger cities, such as Los Angeles and Kansas City. The Atlantic and Pacific Railroad did help bring civilization to Flagstaff by ferrying civilized easterners to town during promotional summer jaunts to the Pacific Coast.

Flagstaff was in a state of cultural flux in the late 1880s. Sanitation was basic, unpaved streets became quagmires in wet weather, and bicycles, the new fad, were being sold. Flagstaff’s first Catholic church was built in 1888 in Brannen’s Addition where it functioned until 1916. The Bank Hotel on Santa Fe Avenue touted its virtues as a top-of-the-line hotel, complete with an attached dining room where guests feasted on the finest foods available.

The 1890s brought important economic improvements to Flagstaff (Woodward Architectural Group 1993). In 1890, two banks were founded, the Arizona Bank and the Bank of Flagstaff. An electric plant was built, and the first telephone system was installed that same year. A hallmark of the early 1890s was the division of Yavapai County into two counties, which yielded the 47,000-square kilometer (18,000-square mile) Coconino County. The nascent Coconino County adopted Flagstaff for the county seat in 1891, and a total of 1,418 voters registered. Soon after, environmental and

economic problems beset Flagstaff. Two dry years caused a shortage of grass, which in turn precipitated a shortage of cattle feed. The feed shortage resulted in a 50 percent loss of the cattle herds. This event occurred during a nationwide economic crisis that began in 1893.

Flagstaff incorporated on May 26, 1894, by order of the Coconino County Board of Supervisors. The first town elections were held in May 1895. By the turn of the century, Flagstaff had a healthy economy and a population of almost 2,000 people. The mainstays of the economy were lumber, sheep, and freight transport.

The original community, Old Town, was dubbed Flagstaff Townsite after being known briefly as the School Addition. Emphasis in the Old Town District within the Flagstaff Townsite changed from commercial to residential between 1894 and 1935. The population consisted mostly of Hispanics who had immigrated from New Mexico. Hispanics and Basques moved into the area to work as contract sheep herders. Sheep ranching was an important industry in northern Arizona through the 1950s. The Hispanic population accounted for over 90 percent of the Flagstaff area sheep ranchers. Basque sheep herders rose from a minority of 25 percent to being the majority of sheep herders today.

Flagstaff had become a town of many ethnic and economically centered neighborhoods in the years following World War I. Upper middle class Anglos resided in the northern part of the Railroad Addition. Working class Anglo families lived on the west end of the original Flagstaff Townsite. New Mexican Hispanics lived on both sides of the railroad tracks in Old Town with Mexican immigrants living on the south side of the Railroad Addition. By 1920, a small but noticeable enclave of Basques lived in Flagstaff, near Benton Avenue and Humphreys Street. African-Americans moved in during the 1920s and 1930s, living in the southern part of Brannen's Addition down south Elden, O'Leary, and South Fontaine Streets.

3.4.5 Cultural Resources Within the Area of Potential Effects

Cheshire Park Detention Basin Site

The western end of Cheshire Park has a set of tennis courts. The courts are surrounded with intentionally placed boulders which are native to the area. At the southeastern end of the APE the Narrows dam defines the terminus of the proposed detention basin. The dam is an approximately 50-foot-long by 15-foot-high semi-circular poured concrete check dam with an 18-inch diameter circular

centrally located outlet near its base. The design of the dam is purely functional and it is entirely devoid of ornamentation. At one time, two-inch galvanized pipes were placed in the top of the dam at regular intervals but these have been removed. The original function of the dam is highly speculative. No records or construction plans exist to explain who built it or why. A longtime neighbor, Mrs. Miriam Pederson, recalls it being built in the 1940s by Mr. Cheshire. Two potential scenarios exist for its purpose, but neither involve flood control. It was most likely built as an impoundment structure.

Much of the area north and west of the Narrows dam is undisturbed. A narrow foot trail runs diagonally through the property running northeast to the southwest. A utility pole has been recently placed in the ground near the trail. A small chert side scraper was found near the utility pole with a few pieces of chert debitage. There is no way to formally ascribe the debitage to prehistoric activity because it (1) in the patch of vehicle tracks associated with installation of the pole, a (2) student flint knappers from the Harold S. Colton Research Center have apparently been leaving evidence of their activities throughout the area. The scraper was recorded as an isolated find. A small site, AZ:I:3112 (MNA) had been recorded by the Museum of Northern Arizona in 1977. However, the site was only a 10 feet by 10 feet cleared area where a cabin may have once stood. There was no physical evidence of anything structural. The Cheshire Park geological setting is comprised almost solely basalt bedrock. This largely precludes the potential for subsurface archeological deposits.

The Narrows dam does not appear to be eligible for listing in the National Register of Historic Places. The archeological materials from the area east of the dam are insufficient to make any meaningful statements, and are thus, considered to be ineligible as well.

Thorpe Park Detention Basin Site

The proposed Thorpe Park detention basin site has been completely developed for recreation. Three artifacts (mano, biface frag, and groundstone axe) found in the area of the northernmost softball field suggest a prehistoric archeology site that may have been graded away during its construction.

Two small historic buildings are located on the western side of the access road/City Park Dam. One is a log cabin and the other is small building constructed from river cobbles. Boy Scouts moved the log cabin, built in 1895, to that location in 1978 from the Veit Ranch on the San Francisco Peaks. The cabin was moved in pieces for educational use by the Flagstaff Middle School. The cobble stone building was built by the city when City Park was completed in 1923. It is now used for storage of

maintenance equipment. These structures have not been evaluated for Section 106 (National Register) eligibility.

Clay Avenue Wash Detention Basin Site

Seven cultural resource sites have been identified within the potential Clay Avenue Wash detention basin site. The first of these is the ranch house and two associated buildings (together considered one cultural resource “site”), which records indicate were built in 1935, 1944, and 1954 respectively.

At the point where the channel opens into the easternmost end of the potential detention basin site lies the former Atlantic and Pacific railroad alignment with abandoned railroad bridge abutments. The bridge, built in 1883 from the local Coconino Sandstone, was abandoned in 1937 when the Atchison, Topeka, and Santa Fe Railroad purchased the tracks and realigned them 165 feet north. Continuing west, there are two historic trash scatters composed primarily of cans, barrels, and miscellaneous rusted automobile parts. Between the two trash scatters is a historic trail remnant with a trail marker comprised of a rock pile. There are two additional historic resources on the private property portion of the detention basin. One is the obliterated remains of a small 1930-1940s-era cabin, and another is a small trash scatter.

A request for a determination of eligibility for the railroad bridge was submitted to the Arizona SHPO in a letter dated July 23, 1999. SHPO responded with a concurrence of our determination on September 15, 1999. None of the other resources have been evaluated for National Register eligibility and, with the possible exception of the ranch buildings, these sites are not expected to be eligible for the National Register.

Rio de Flag Channel

No cultural resources have been identified during surveys of this portion of the project’s APE. However, two historic resources are within the southern extent of the Railroad Addition Historic District Extension are very close to the proposed alignment: the historic Flagstaff Lumber Company Warehouse at 23 South San Francisco Street and the Northern Motor Company building on the corner of San Francisco and Phoenix streets. (See “Historic Properties within the 100-Year Floodplain” regarding these properties.)

The reach of the Rio de Flag Channel between Thorpe and Cheshire Parks has not been surveyed. Information regarding the historical [potential of the wingwall at Meade Lane and the Anderson Road and Beal Road bridges are not known at this time. A cultural resources survey of these three locations may need to be completed.

Clay Avenue Wash Channel

This portion of the project's APE was surveyed by the USACOE for cultural resources none were detected. There are, however, eight National Register listed properties are on the periphery of the Mikes Pike right-of-way. They are:

- C&M (Double circle) Garage
- E. T. McGonigle house/B&M auto camp
- Gavin/Hensing rental house
- Mary A. Gavin's rental houses at 31 through 35 South Mike's Pike
- an unnamed house at 17 S. Mikes Pike.

An additional building, the Flagstaff Steam Laundry is at the southwest corner of Mikes' Pike and Phoenix Ave at 210 W. Phoenix Ave. These historic buildings are all listed as contributors to the Southside/Oldtown Historic District. (See "Historic Properties within the 100-Year Floodplain" regarding these properties.)

Potential Berm Locations at Continental Estates

These sites have not been surveyed; however, no cultural resources sites are expected to be intact at the potential berm sites because the area was recently developed.

Historic Properties within the 100-year Floodplain

The largest concentration of cultural resources in the study area consists of the historic structures located within the floodplain. Historic building surveys have been going on since the early 1980s with over 1,000 buildings either listed on the National Register. There are approximately 350 buildings in the Southside/Old Town Historic District (SOHD) alone.

Currently there are five listed National Register Districts in Flagstaff. A sixth, the SOHD, is nearing submittal. As of February 1998, final changes were being made to the proposed District nomination forms (pers. comm., Susan Wilcox, 1998). Properties that are within the 100-year floodplain fall within the boundaries of the Railroad Addition, Flagstaff Townsite, SOHD, and Multiple Resource Area (MRA). The MRA was set up to include buildings that are individually listed on the National Register but lack the characteristics that would include them in a specific district.

Railroad Addition Historic District

The original Railroad Addition Historic District was listed on the National Register on January 18, 1983. Its boundaries have been extended twice since. On June 17, 1986, the southern boundary was extended from the railroad tracks south about 1.5 blocks. The western boundary is Beaver Street, and the eastern boundary is San Francisco Street. The southern boundary is a line that splits the block between Phoenix Avenue and Cottage Avenue. A final addition was made in September 1997 that incorporated the address at 122 East Route 66. The Railroad Addition is Flagstaff's central business district. Table 3-4 lists historic properties from this district that fall within the 100-year or 500-year floodplains of the Rio de Flag.

Flagstaff Townsite Historic District

The Flagstaff Townsite Historic District was listed on the National Register on April 30, 1986. This District was developed primarily in the years between 1888 and 1935. District boundaries are confined to Toltec Street on the west, Railroad Avenue (Santa Fe Street) on the south, Sitgreaves and Humphries on the east, and Cherry Street on the north. Table 3-5 lists historic properties from this District that fall within the 100-year or 500-year floodplains of the Rio de Flag.

Multiple Resource Area (MRA)

Six individually eligible properties in the MRA fall within the 100-year floodplain in the Rio de Flag study area. Some of them may have been reassigned into the Southside/Oldtown District (per. comm., Susan Wilcox, 1998). The National Register nomination forms for the Southside/Oldtown District were submitted for evaluation in March 1998 and confirmation of listing is not yet available. Table 3-6 lists these individually eligible MRA properties.

**Table 3-4. Historic Properties within the 100-year and 500-year
Floodplains in the Railroad Addition Historic District**

Street	Property Name	Address	District Relationship
San Francisco Street	Babbit Office Building	6-10 N. San Francisco	Contributor
	Hawks Building	14 N. San Francisco	Contributor
	Herman Building	16-18 N. San Francisco	Contributor
Santa Fe Avenue	Santa Fe Passenger Depot	Railroad ROW	Contributor
	Santa Fe Freight Depot	Railroad ROW	Contributor
	Aubineau Building	2 E. Santa Fe	Contributor
	Navajo-Hopi Trading Company	10 E. Santa Fe	Contributor
	Vail Building	24 E. Santa Fe	Contributor
Aspen Avenue	Pollock block	5-11 E. Aspen	Contributor
	New Babbit B August 24, 1999 lock	15-17 E. Aspen	Contributor
	Babbit Bros. Store	12-24 E. Aspen	Contributor
Leroux Street	Dr. Raymond's Office	9 N. Leroux	Contributor
	Loy Building	15 N. Leroux	Contributor
	Longley Building	18-18 ½ N. Leroux	Contributor
	Telephone Exchange	19 N. Leroux	Contributor
	Mayflower Building	20 N. Leroux	Contributor
	Weatherford Hotel	21-23 N. Leroux	Contributor and individual listing

**Table 3-5. Historic Properties within the 100-year and 500-year
Floodplains in the Flagstaff Townsite Historic District**

Street	Property Name	Address	District Relationship
Humphries Street	House	309 N. Humphries	Contributor
Cherry Avenue	House	205 W. Cherry	Contributor
	Multiple houses	207-211 W. Cherry	Contributor
	House	213 W. Cherry	Contributor
	House	216 W. Cherry	Contributor
	House	219 W. Cherry	Contributor
	House	223 W. Cherry	Contributor
	House	315 W. Cherry	Contributor
	W. A. Mayflower House	320 W. Cherry	Contributor
	Duplex	402-406 W. Cherry	Contributor
Birch Avenue	House	220 W. Birch	Contributor
	House	310 W. Birch	Contributor
	Will Marlar House	314 W. Birch	Contributor
	House	324 W. birch	Contributor
Kendrick Street	W. H. Switzer House	305 N. Kendrick	Contributor
Sitgreaves Street	Duplex	214-216 N Sitgreaves	Contributor
	Duplex	215-219 N. Sitgreaves	Contributor
	Duplex	220-224 N. Sitgreaves	Contributor

**Table 3-6. Historic Properties within the 100-year and 500-year
Floodplains in the Multiple Resource Area**

Street	Property Name	Address	District Relationship
Mike's Pike	C&M Garage	204 Mikes Pikes	Individual & contributor to the Southside District
San Francisco Street	Southside Market	217 S. San Francisco	Individual
Leroux Avenue	Hugh E. Campbell House	215 N. Leroux	Individual
Cherry Street	House	15 E. Cherry	Individual
Beaver Street	House	310 S. Beaver	Individual

Southside/Oldtown Historic Districts

These two districts are distinct from each other but are usually lumped together because of their close proximity. The Southside District is directly south of the Railroad Addition. Historic properties on Phoenix Avenue, South San Francisco Street, and Beaver Street were formerly listed in the Railroad Addition but have been reassigned to the Southside District because of a better thematic fit. District boundaries are within Mike's Pike and Beaver Street on the west; Franklin Avenue, Ellery Avenue, and the Rio de Flag channel on the south; Elden Street and Lone Pine Road on the east; and Phoenix Avenue to the north. The Southside District is primarily residential in character (Woodward Architectural Group 1993) with commercial businesses on Phoenix Avenue.

Of prime interest is the ethnically diverse population that lived in Flagstaff from about 1900 to the 1940s. The Southside/Old Historic District is comprised of Flagstaff's largest historic Hispanic and African-American neighborhoods.

Table 3-7 lists historic properties from these two districts that fall within the 100-year or 500-year floodplains of the Rio de Flag.

Table 3-7. Historic Properties within the 100-year and 500-year Floodplains in the Southside/Oldtown Historic District

Street	Property Name	Address	District Relationship
Phoenix Avenue	Flagstaff Steam Laundry	210 W. Phoenix	Contributor
	Du Beau Hotel	19 W. Phoenix	Contributor
	Hicks Hotel	9 W. Phoenix	Contributor
	Hicks boarding House	7 W. Phoenix	Contributor
	Coconino	15-19 E. Phoenix	Contributor
	Downtowner Motel	Corner of Phoenix & San Francisco	Contributor
San Francisco Street	Downtowner Motel	19 S. San Francisco	Contributor
	Flagstaff Lumber	23 S. San Francisco	Contributor
	J. D. Halstead Lumber	23 S. San Francisco	Contributor
Beaver Street	Arizona Central Commercial Company	24 S. Beaver	Contributor
Clay Avenue	AL&T Co. Employee House	813 W. Clay	Contributor
	AL&T Co. Employee House	812 W. Clay	Contributor
Mikes Pike	Double Circle Garage	204 S. Mikes Pike	Contributor
	E.T. McGonigle House/ B&M Auto Camp	100 S. Mikes Pike	Contributor
	Gavin/Hensing Rental House	37 S. Mikes Pike	Contributor
	Mary A. Gavin Rental House	35 S. Mikes Pike	Contributor
	Mary A. Gavin Rental House	31-33 S. Mikes Pike	Contributor
	House	17 S. Mikes Pike	Contributor

3.5 LAND/WATER USE

3.5.1 Jurisdictions

With the exception of the potential Clay Avenue Wash detention basin site, the study area is located entirely within the city limits of Flagstaff, Arizona. The potential Clay Avenue Wash detention basin site extends to the west of the city limits onto unincorporated Coconino County land. This unincorporated land is located within the Metropolitan Planning Organization boundary of the City of Flagstaff and some of the site is owned by the State Trust for Public Lands.

3.5.2 Historical Overview

Early development in Flagstaff (1880 to 1939) occurred along the Rio de Flag and adjoining floodplain. Flagstaff developed around the lumber mill, which supplied ties and other wood products for the Santa Fe Railroad (then the Atlantic and Pacific Railroad). The railroad depot became the hub for the development of Flagstaff, extending outward along the Rio de Flag. In contrast to the surrounding highlands, sedimentary deposits from the wash made the floodplain area relatively flat and, thus, more suitable for development. These conditions allowed settlers to establish stable building foundations and grow vegetable gardens and provided ample forage for livestock (Cline 1976).

Throughout the next two decades, development continued north and south of downtown along the Rio de Flag. More recent development (1960 to 1995) has occurred southwest and east of the downtown area, along Route 66 and I-40. To accommodate Flagstaff's growing population (see Section 3.7), the amount of developed land within the city's limits has nearly doubled in the past 20 years. In 1974, approximately 5.6 square miles in the city limits were developed. By 1995, approximately 10.9 square miles had been developed.

Surface runoff from the Rio de Flag has never been sufficient or reliable enough to be a substantial source of water for Flagstaff. In 1932, 26 shallow wells were drilled on the city-owned Clark Ranch (present-day Mountain View subdivision) producing about 70,000 gallons per day (Cline 1994). Shallow subsurface flow along the Rio de Flag provides only a minor localized water source.

Although unreliable as a source of potable water, surface flow from the Rio de Flag has been used for a number of other purposes. In 1924, the city built a rock and concrete dam on the Rio de Flag behind

the present-day Flagstaff Middle School to form City Park Lake (now known as “Frances Short Pond”). In 1950, aging sewer lines were replaced and extended an additional 0.5 mile down the Rio de Flag, where a water reclamation plant was built in 1956. The reclamation plant (also known as Plant Number One) was built 0.5 mile south of I-40, just west of Continental Estates. Within a decade, Plant Number One was becoming overburdened and there were increasing complaints regarding discharge of incompletely treated sewage into the Rio de Flag. A new treatment plant on the Rio de Flag at Wildcat Hill began operation in 1971 (Cline 1994).

3.5.3 Existing Land and Water Uses

Zoning

Nearly half of the 100-year floodplain along the Rio de Flag is zoned as residential areas. Areas zoned as commercial account for nearly a quarter of the 100-year floodplain. Less than one percent of the floodplain is zoned as industrial. The number of acres in each classification and the percentage of each classification as part of the total are shown in Table 1-1 in Section 1.3.1.

Land Use

The floodplain of the Rio de Flag is intensely developed through most of the city center (see Figure 3-4). Land use in the area consists of single-family and multiple-family dwellings, recreation areas, schools, light industry, railroad and utilities easements, and retail business structures. Some residential and business buildings in the city center are over 100 years old. Recreation facilities in the vicinity include parks, the Continental Country Club golf course, ball fields, picnic areas, a fishing pond, and bike/jogging trails. Table 3-8 shows the percentage of each land use within the 100-year Rio de Flag floodplain.

Water Use

The Rio de Flag and Clay Avenue Wash provide limited water use opportunities because they tend to carry flows through the study area only following storm events. The three perennial water sources within the study area are the pond at the Narrows dam near Cheshire Park, Frances Short Pond at Thorpe Park, and the I-40 wetlands.

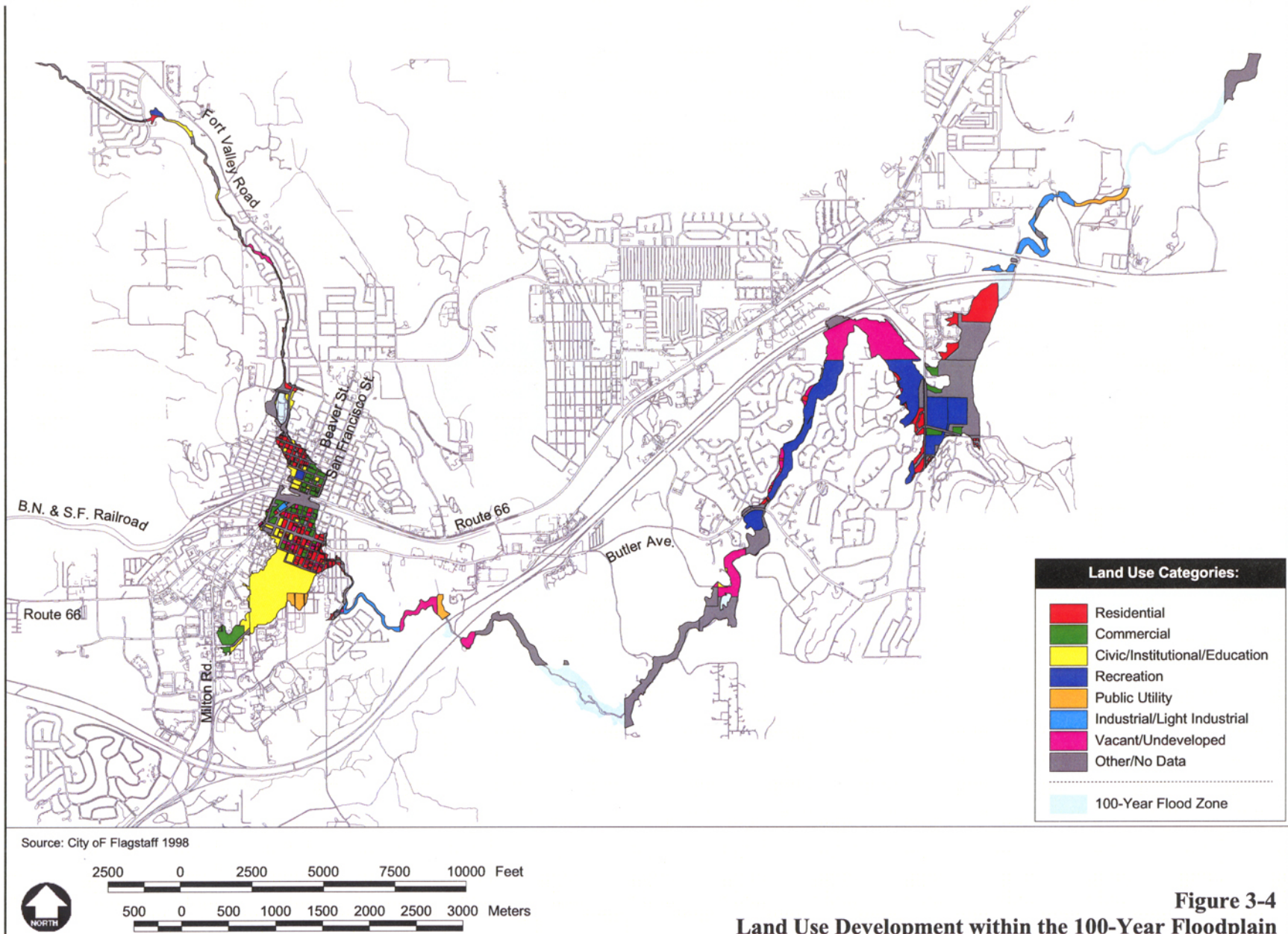


Figure 3-4
Land Use Development within the 100-Year Floodplain

Table 3-8. Land Uses within the Rio de Flag 100-year floodplain

Land Use	Areal Extent (Acres)	Percentage of 100-year Floodplain
Residential	87.4	10.4%
Commercial	42.3	5.0%
Civic/Institutional/Education	106.0	12.6%
Recreation	136.1	16.2%
Public Utility	17.9	2.1%
Industrial/Light Industrial	29.7	3.5%
Vacant/Undeveloped	107.8	12.8%
Other/No Data	313.9	37.3%
Total	841.1	100.0%

Source: Unpublished City of Flagstaff Geographical Information System (GIS) data

Based on its small size, there are few water used associated with the pond behind the Narrows dam neat Cheshire Park. Frances Short Pond provides limited recreational activities, such as fishing, and it is an important visual element of the park. The I-40 wetlands are designated for Partial Body Contact use, which can include activities such as boating (as opposed to Full Body Contact activities, such as swimming).

Land Use Regulations and Policies

City of Flagstaff Resolution Number 1468 of 1987

This resolution is the City of Flagstaff *Growth Management Guide 2000* (City of Flagstaff 1987). The Growth Management Guide (GMG 2000) serves as the “general plan” for the City of Flagstaff and is intended to be a guide to the growth and development of the city. It is a public statement of the long range goals of the community, expressed by land use maps and statements of policy that describe how, when, why, and where to develop, rehabilitate or preserve the city. The GMG 2000 indicates where residential, commercial, and industrial development should occur and proposes general locations for community resources such as schools and parks. It also includes recommendations for transportation facilities, the extension of public utilities (sewer and water), and for phasing of development. The following excerpt is taken from the GMG 2000 and provide a concise overview of its general purpose:

The Guide is first, a physical plan. It is not a plan for economic development, or delivery of social services, although it may incorporate aspects of such concerns.

Secondly, the Guide is long range. It covers a period of 20 years or more and expresses current policies that will shape the future from the day of official adoption. However, the Guide does not preclude future decision making by prescribing the future in detail. The policies of the Guide say, in effect, “when the City is faced with a certain situation, it will probably act this way for these reasons.”

The policy approach has the advantage of stating a position in advance of a controversial proposal. The policies should be made to reflect changing conditions or unforeseen circumstances. Deviations from the Guide and its policies will require a rationale as convincing as the one in the Guide.

Thirdly, the Guide is comprehensive. It encompasses all geographical parts of the community and all functional elements which bear on physical development such as water and sewer facilities, parks, schools, fire stations, streets, and drainage.

The policies and land use designations of this Guide are intended to apply only within the area under the jurisdiction of the Guide, that is, within the corporate limits of the City of Flagstaff. In cases where the corporate limits are projected to expand, or growth in nearby County areas is anticipated, close coordination with the Coconino County’s general planning process will be necessary.

The GMG 2000 includes land use designations for the City of Flagstaff. The potential Cheshire Park and Thorpe Park detention basin sites are designated as “Park.” The potential Clay Avenue Wash detention basin site is outside the city limits, and is therefore not addressed in the GMG 2000.

The Rio de Flag channel is designated as “Open Space/Greenbelt” along its North Flagstaff, Interstate 40, and Continental reaches. For the Downtown Reach of the Rio de Flag, however, the channel does not have a specific land use designation. Rather, through this reach, the channel traverses areas designated for residential or commercial use. The potential new alignment for the Rio de Flag (i.e., the alignment that roughly approximates the location of the Rio de Flag’s historic channel) traverses land designated as “Commercial” and “Heavy Industrial.” Similar to the Downtown Reach of the Rio de Flag, the Clay Avenue Wash Reach traverses a series of commercial and residential land use designations.

The potential berm sites in the Continental Estates area are generally located near the boundaries between (A) areas designated as “Open Space/Greenbelt” (a category that includes undeveloped lands and the golf course) and (B) areas designated for residential or commercial uses.

City of Flagstaff Ordinance Number 1886 of 1995

This city ordinance amends the floodplain regulations set by Ordinance Number 1675 of 1990 by incorporating revised regulations for the National Flood Insurance Program and Arizona revised statutes³. The purpose of this ordinance is to “promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas” (City of Flagstaff Ordinance Number 1886). This ordinance supersedes any conflicting provisions.

City of Flagstaff Land Development Code of 1991

This document outlines regulations passed by the City of Flagstaff “to protect and promote the public health, safety, convenience, and general welfare of the citizens of the city; to provide for the orderly growth and development of the city; to classify, regulate, and segregate the uses of lands and buildings; to regulate the height and bulk of buildings, and to regulate the density of population” (City of Flagstaff Land Development Code of 1991).

Flagstaff 2020 Program

In 1996, the City of Flagstaff commenced a “community visioning project” designed to involve the city’s residents in a wide-ranging discussion about the future of the city. This 18-month strategic planning effort, entitled the “Flagstaff 2020 Program,” was guided and funded by a consortium of public- and private-sector groups, including the City of Flagstaff and Coconino County. Following a series of public meetings, surveys, focus groups, and other means of input, a final vision document was prepared and released in June 1997. The *Flagstaff 2020 Vision* identified the following seven “target areas” of concern, and provided goals and strategies for each:

- Managing growth
- Protecting the environment

³ In accordance with the Flood Disaster Protection Act of 1973 (PL 93-234), as amended, and the National Flood Insurance Act of 1968 (PL 90-448), as amended.

- Fostering human development
- Improving housing and livability
- Promoting health and safety
- Creating economic opportunity
- Strengthening and sustaining community

Action planning teams were established for each of the above target areas to guide and assist the community in achieving the strategic elements of the vision. Although the 2020 Plan is not official policy adopted by the city, it reflects the concerns and goals of the city and its residents and is designed to help shape the future of the city in the coming years.

Flagstaff Area Open Spaces and Greenways Plan

The Open Spaces and Greenways Plan began as part of the update of the City of Flagstaff's Growth Management Guide 2000. The GMG 2000 had identified many possible benefits that the City of Flagstaff and surrounding communities could realize from developing an Open Spaces and Greenways Plan. With these benefits in mind, the City of Flagstaff invited land management agencies and local citizens to take part in an open spaces and greenways committee to develop the Open Space Greenways Plan.

The goals and objectives of this plan were decided by the community and representatives of the land management agencies through a three-year planning process. The primary goal of the Open Spaces and Greenways Plan is to maintain Flagstaff's quality of life by finding ways to balance development with the retention of open spaces and natural areas. A key principal in the recommendations is that residents in the greater Flagstaff communities be able to reach open spaces in no more than 15 minutes from their neighborhoods. The plan identifies open space categories and landscape districts for the Greater Flagstaff area and provides general, as well as specific, recommendations to achieve the plan's goals.

In 1997, the agencies involved in preparing the plan signed a Memorandum of Understanding (MOU). Through the MOU, the agencies (including the City of Flagstaff and the County of Coconino) committed to using the Open Spaces and Greenways Plan in their future planning.

3.6 RECREATION

3.6.1 Regional Recreational Opportunities and Facilities

The natural environment surrounding Flagstaff draws both residents and tourists to the area. Approximately 384 square miles of the 525 square miles that comprise the Flagstaff area are managed by Coconino National Forest, which is one of the largest ponderosa pine forests in the world. These forests provide critical habitat for elk, deer, antelope, bear, and other wildlife. The San Francisco Peaks, including Mount Humphreys, are located north of the city. Walnut Canyon National Monument is located south of the city and is home to prehistoric archaeological cliff dwellings. Grand Canyon National Park (which attracts nearly five million visitors annually) and Glen Canyon National Recreational Area, located outside the limits of greater Flagstaff, are the region's two largest tourist attractions.

3.6.2 Local Recreational Opportunities and Facilities

Due to its 7,000 foot elevation, Flagstaff experiences heavy snowfall during the winter and mild temperatures during the summer. This allows for a diversity of recreational uses including snow skiing in the winter and horseback riding, hiking, and other recreation in the summer. The City of Flagstaff operates and maintains 29 parks and 6 recreation centers, which include an ice rink, therapeutic recreation center, adult center, and general recreation centers (see Figure 3-5). A handful of parks, including the Tuthill County Park, are managed by the Coconino County Department of Parks and Recreation.

Recreational resources directly within the study area include Thorpe Park and segments of the Flagstaff Urban Trails System (FUTS).

Parks

Cheshire Park

Cheshire Park is adjacent to North Fremont Boulevard approximately 0.25 mile south of U.S. Highway 180. Cheshire Park is a community park primarily serving the residential neighborhoods to the north and east. Park facilities include a children's play area, a basketball court, two tennis courts, three picnic tables, two barbeque pits, portable toilets, several benches, and a grass play area. There is also a parking lot with six spaces.

Thorpe Park

Thorpe Park is a large city park located approximately 0.5 mile northwest of downtown Flagstaff. The park is comprised of several areas, including the Thorpe Park Playground, Multi-Purpose Field, Softball Complex, and the Flagstaff Little League Complex. The park is open year-round and is the primary adult softball venue in the city. The facility is maintained by the City Department of Parks and Recreation.

The Thorpe Park Playground is located at Santa Fe and Toltec Street and contains playground equipment, lighted tennis courts, a picnic ramada, individual picnic areas, horseshoe pits, a sand volleyball court, and an outdoor basketball court. The Thorpe Park Softball Complex is located north of Thorpe Road and has four adult softball fields, a concession stand, an announcer's booth, and an enclosed playground area. More than 2,500 adults play on softball teams during the summer softball season, most of which is played at the this facility (City of Flagstaff 1999). The organized softball seasons take place in April and July, and last for approximately eight weeks. In addition to regular season games, softball tournaments are held year-round at the park. Just north of the Softball Complex are two tennis courts and a handball court. The Flagstaff Little League Complex is located north of Thorpe Road and east of Aztec Street and includes one senior league field, one minor league field, one major league field, a concession stand, and three announcers' booths.

Continental Estates Little League Field

The Continental Estates Little League Field is located just north of Oakmont Drive in the Continental Estates area. The recreational complex supports one major league field, one minor league field, one T-ball field, a concession stand, and an announcer's booth.

Flagstaff Urban Trails System

The City of Flagstaff has developed a number of trails throughout the city and has plans to develop several more. The Flagstaff Urban Trails System (FUTS) is a network of soft surface trails designed for recreation and nonmotorized transportation including, biking, hiking, jogging, cross-county skiing, and educational activities, as well as pedestrian and bike commuting. The trail system is approximately 50 percent complete with over 16 miles of existing trails. When complete, the 33-mile trail will link all parts of the city to the rural recreational trail system in the surrounding forest (City of Flagstaff 1999).

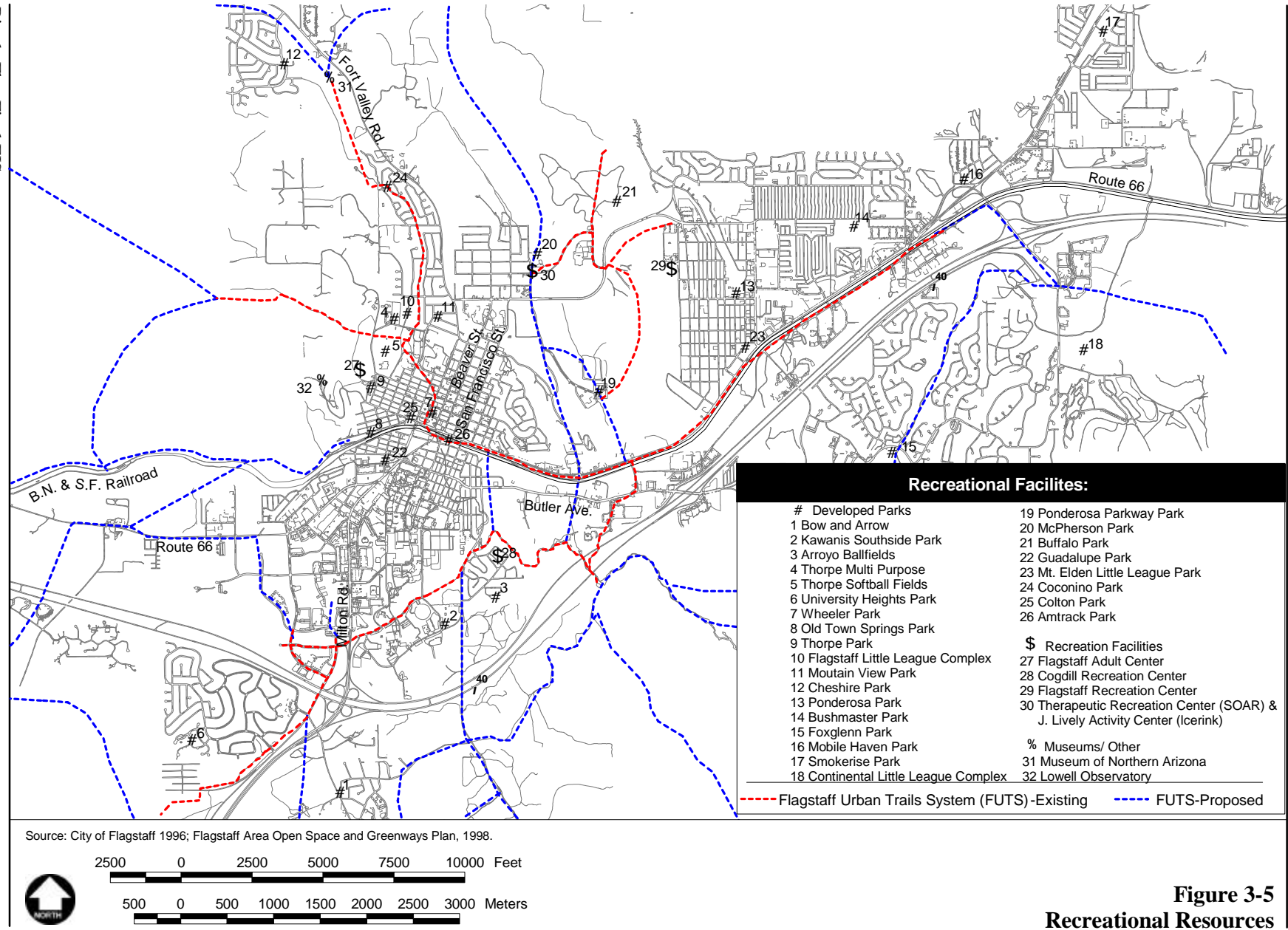


Figure 3-5
Recreational Resources

The following is an excerpt from the Flagstaff Urban Trails System program description:

The Flagstaff Urban Trails System (FUTS) is being developed as a citywide interconnecting network of non-motorized transportation corridors and linear recreation areas. Various off-street trails are proposed to interconnect employment areas, activity centers, neighborhoods, schools and parks throughout the city. FUTS offers and provides for an alternative means of transportation, informal exercise and recreational opportunities. Anticipated uses of such a system include bicycling, hiking, jogging, cross-country skiing, educational activities, as well as pedestrian and bike commuting. FUTS promotes year-round full season opportunities for a diversity of uses.

Interconnection with the Arizona State Trail, Coconino National Forest trail system, and the Flagstaff Bikeways System creates an attractive regional recreational opportunity for visitors and residents alike. An extensive and easily accessible trail network will allow access to forest wilderness areas, canyons, cultural centers, national monuments, the Arboretum, the University, schools, residential and shopping areas, and downtown Flagstaff. The natural greenbelt setting in which the Flagstaff Urban Trails System is primarily located secures open space and greenbelt land use, promotes enjoying the environment, and provides a diverse exposure to various native wildlife and plant life. The benefits are economic, social and environmental.

The City already owns or has easements for a considerable amount of land required to place the framework of a trails system. Acquisition of additional right-of-way to secure these trail routes is an essential, continuing effort for the FUTS program. Utilization of major drainageways, utility easements, floodplains, scenic areas, high-slope areas, and developable land provides appropriate locations for the trails.

Figure 3-5 shows the locations of existing FUTS trails within Flagstaff.

3.7 SOCIOECONOMICS

3.7.1 Population and Demographics

The City of Flagstaff experienced a moderate population growth rate of 3.1 percent from 1970 to 1995. In that time, Flagstaff's population doubled from 26,117 to 52,701 (U.S. Census Bureau 1995). Although Flagstaff's rate of population growth is expected to decline, by 2050 the population is likely to have doubled again, approaching 113,684 (Arizona Department of Economic Security 1997).

Minority and Low-Income Populations

On February 11, 1994, Executive Order 12898, "Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations" was published in the *Federal Register* (59 F.R. 7629). The Executive Order requires Federal agencies to identify and address disproportionately high human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations.

Three low-income neighborhoods have been identified within the study area: Southside, Old Town, and Pine Knoll (see Figure 3-6). As shown in Table 3-9, the majority of residents in these neighborhoods were in the low- or moderate-income categories as of 1990. Table 3-9 also identifies that in 1990, the median household income in these neighborhoods was considerably less than the median household income for Flagstaff as a whole. As of 1995, these three neighborhoods also had a higher proportion of minorities than Flagstaff as a whole (see Table 3-10).

Table 3-9. Low-Income Concentrations in Southside, Old Town, and Pine Knoll Neighborhoods, 1990

Neighborhood	Percent of Residents with Low or Moderate Incomes	Median Household Income
Southside	80.7 %	\$10,981
Old Town	65.6%	\$19,349
Pine Knoll	87.3%	\$15,296
Flagstaff as a whole	38.4%	\$28,382

Source: The City of Flagstaff's Affordable Housing Plan 1996 based on data from the 1990 U.S. Census

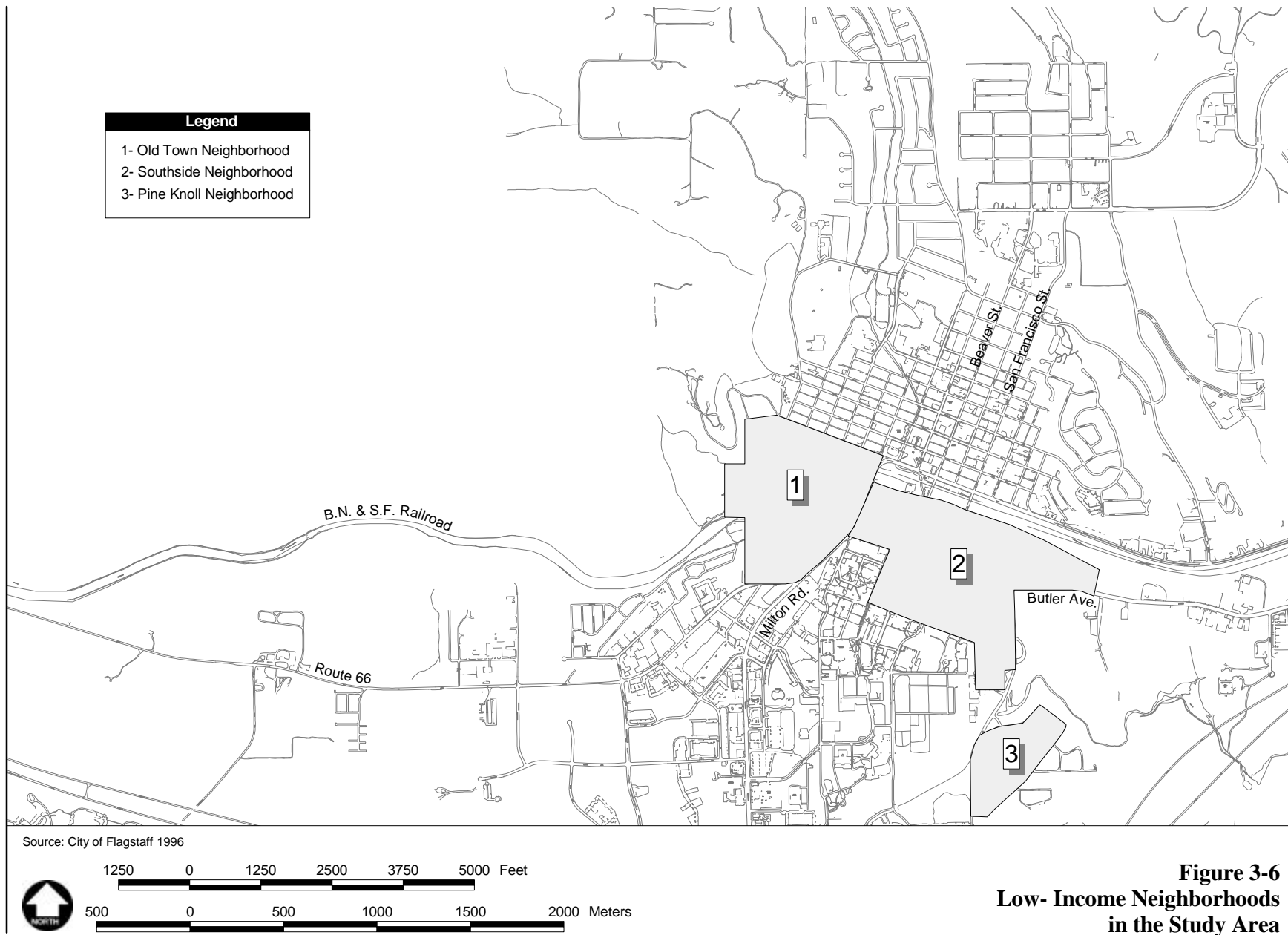


Table 3-10. Minority Concentrations in Southside, Old Town, and Pine Knoll Neighborhoods, 1995

Race-Origin	Southside	Old Town	Pine Knoll	Flagstaff
White	72.2%	66.7%	52.5%	79.1%
African American	7.2%	4.7%	21.2%	2.0%
Native American	5.0%	12.7%	24.0%	8.9%
Asian	1.5%	2.7%	1.1%	1.7%
Other	14.0%	13.2%	1.2%	8.3%
Total	99.9%	100.0%	100.0%	100.0%
Hispanic ¹	24.6%	22.6%	21.7%	15.4%

Source: The City of Flagstaff's Affordable Housing Plan 1996 based on data from the 1995 Special Census.

¹ In a separate question, these individuals who had already identified themselves as belonging to one of the aforementioned groups identified themselves as being of Hispanic origin.

Property along the Rio de Flag Floodplain

In addition to having a large concentration of low-income people and minorities, Southside and Old Town have a large concentration of old and dilapidated housing stock. A field survey conducted in May 1994 indicated that an average of 24 percent of the housing structures in these areas showed visual signs of decline (City of Flagstaff 1996b). However, because these neighborhoods are located in the Rio de Flag floodplain, any renovations that equal or exceed 50 percent of a structure's market value must comply with FEMA, state, and local floodplain regulations. These regulations are often infeasible, limit use of the structure, and can be very costly, thereby restricting renovation in the low-income neighborhoods (pers. comm., J. Aronson, Flagstaff Historic Preservation Commission, 1998). Other concerns for property owners include costly flood insurance for structures in the floodplain and the fact that property in the floodplain is susceptible to damage during flooding. Under current conditions, a 100-year flood would cause significant damage throughout the floodplain.

3.7.2 Local Economy

The economy of Flagstaff is marked by low-income jobs, high cost of living, and relatively high unemployment. In 1990, the average per capita income in Flagstaff was \$11,517, which was approximately 14.4 percent lower than the state's average (U.S. Census Bureau 1990). Based on a 1997 third quarter survey by the American Chamber of Commerce Researchers Association, Flagstaff's cost of living was 12 percent higher than the national average.

In 1997, the labor force of Flagstaff was 29,991 people. The average unemployment rate in Flagstaff for 1997 was 6.6 percent—higher than the state average of 4.6 percent. The city has a service-and trade-dominated economy which accounted for nearly 50 percent and 30 percent, respectively, of the work force in 1990 (U.S. Census Bureau 1990). Tourism is Flagstaff's primary industry, due largely to the city's proximity to Grand Canyon National Park. Although tourism is a significant source of employment in the Flagstaff area, this sector tends to produce jobs at the lower end of the wage scale. Tourism is expected to continue as the major employer in the Flagstaff area as visitation to the region continues to increase (City of Flagstaff 1996a). Flagstaff is also a regional retail center for northern Arizona.

3.8 TRANSPORTATION

3.8.1 Motorized Transportation

Major transportation routes in the study area are Route 66 and I-40, both running generally east-west, parallel to the railroad. Automobile traffic on north-south routes is hindered by at-grade railroad crossings. As a result, Milton Road, the only north-south route without an at-grade crossing, is typically congested. There are no direct north-south routes through the city (City of Flagstaff 1997). Several solutions have been considered by the city to alleviate these traffic concerns, including the enhancement of the city's trail system, development of perimeter parking, and development of pedestrian over- and under-passes.

Traffic studies conducted in 1987 indicate that approximately 45 percent of the traffic on seven major city roads were passing through the community while 55 percent had origins or destinations in the area. Most of the through traffic (about 40 percent) was traveling east/west on I-40 (City of Flagstaff 1999).

3.8.2 Railroads

The Burlington Northern & Santa Fe Railroad (formerly the Atchison Topeka & Santa Fe Railroad) traverses east/west through the city of Flagstaff, roughly parallel to Route 66. The double-track route bisects the city and passes just south of Route 66 in the downtown area. Currently, there are approximately 75 trains per day of up to 1.5 miles in length traversing the floodplain an average of once every 20 minutes. Several small spurs extend from the main line, some of which have been abandoned, others which service commercial and industrial uses near the city center.

3.8.3 Nonmotorized/Pedestrian Transportation

The city currently has approximately 4.2 miles of separate bike paths and 15.4 miles of on-street centerline bike paths (City of Flagstaff 1999). With the exception of Route 66, none on the state highways include bikeways. Bicycle riding is permitted on all city sidewalks unless specifically posted otherwise.

3.9 NOISE

Noise is generally defined as unwanted or annoying sound, and it is typically associated with human activity that interferes with or disrupts normal activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, and the individual. Therefore, the “A-weighted” noise scale, which weighs the frequencies to which humans are sensitive, is used for measurements. Noise levels using “A-weighted” measurements are sometimes written dB(A) or dBA. Figure 3-7 illustrates the ranges and responses from various sound levels and sound sources.

3.9.1 Existing Noise Sources

The loudest and most consistent noise within the study area comes from trains, which pass through town every 20 minutes (on average). Trains typically generate noise levels ranging from 80 to 85 dBA at 100 feet from the centerline to 85 to 90 dBA at 50 feet¹. Other noise is generated from traffic along Route 66, I-40, and other city streets within the study area. Construction noise is also intermittently generated within the study area.

3.9.2 Sensitive Noise Receptors

Human noise-sensitive receptors are generally considered to be persons who occupy areas where noise is an important attribute of the environment. These areas often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, education facilities, and libraries. Refer to Section 3.5 for a discussion of land use patterns within the study area.

Noise-sensitive receptors may also include wildlife, including certain songbirds. Biological resources are addressed in Section 3.3.

¹ Railroad noise levels vary based on the type and length of train, cargo loads, railway alignment, train speed, and other factors. The range of noise levels provided above are based on a freight train traveling approximately 35 mph under normal straight-rail conditions.

Sound Source	Sound Level (dBA)*	Response
Civil defense siren (at 100 feet)	140	
Carrier deck jet operation	130	Painfully loud
Jet takeoff (at 200 feet)	120	Threshold of feeling and pain
Riveting machine (at 1 foot)	110	
Rock music concert	100	Very loud
Pile driver (at 50 feet)	90	
Ambulance siren (at 100 feet)	80	
Heavy truck (at 50 feet)	70	Moderately loud
Pneumatic drill (at 50 feet)	60	
Garbage disposal in home	50	
Freeway traffic (at 50 feet)	40	Quiet
Vacuum cleaner (at 10 feet)	30	
Air conditioning unit (at 20 feet)	20	
Speech in normal voice (at 15 feet)	10	
Residence-typical movement of people, no TV or radio	0	Threshold of hearing
Soft whisper (at 5 feet)		
Recording studio		

* Typical A-weighted sound levels in decibels. "A" weighting approximates the frequency response of the human ear.

Figure 3-7
Weighted Sound Levels and Human Response

3.9.3 Flagstaff Noise Ordinance

The City of Flagstaff adopted *Ordinance No. 1511, Noise Control Regulations* in August 1987. Section 6-8-2 of the Ordinance defines restrictions related to nuisance noise, which states that between the hours of 12:00 A.M. and 6:00 A.M. on Monday through Friday or between one (1) A.M. and seven (7) A.M. on Saturday or Sunday:

...it shall be unlawful for any person, while outdoors or within a residential unit, to make or permit to be made any noise which is clearly audible within a residential unit other than that from which the noise may have originated.

Sections 6-8-3 and 6-8-4 of the Noise Ordinance describe the General Exceptions and Enforcement Procedures for the regulations outlined in Section 6-8-2. Specifically, Section 6-8-3(1) exempts noise created by public safety work from the prohibitions stated in the ordinance. Public safety work is defined by the city as “work immediately necessary to restore property to a safe condition, or work required to protect persons or property from potential danger or damage, including snowplowing or work by a public or private utility when restoring utility services” (City of Flagstaff 1987b).

3.10 AIR QUALITY

3.10.1 Meteorology and Climate

The semiarid climate of northern Arizona plays a significant role in the flow cycle of the Rio de Flag. Although the Rio de Flag is the major water course in the Flagstaff area, sustained flows in the channel are generally short-lived. Flooding in the Rio de Flag is related to snow melt on the San Francisco Peaks in the spring and runoff from torrential summer storms.

The average annual precipitation for the Rio de Flag drainage area ranges from about 20 inches in Flagstaff (elevation 6,879 feet) to about 35 inches in the San Francisco Peaks (elevation 8,000 to 12,633 feet), with a basin average of about 25 inches. The precipitation is distributed fairly evenly between summer and winter, with the summer precipitation ranging from 8 to 14 inches, and averaging about 10 inches. Most of the winter precipitation falls as snow (approximately 85 percent). While significant precipitation falls during the winter months, the wettest months of the year occur during the “summer monsoon” period during July and August, when thunderstorms are widespread across Arizona.

Annual temperature extremes in the Flagstaff area can range from zero to 90 degrees Fahrenheit (°F). The yearly average high and low temperatures are 61°F and 30°F, respectively. The prevailing winds are from the southwest with an average speed of 8 to 9 miles per hour.

3.10.2 Air Quality Setting

Within the vicinity of Flagstaff there are several mandatory Class I areas as designated by the Clean Air Act Amendments of 1977. Class I areas have special national or regional value from a natural, scenic, recreational, or historic perspective. Mandatory Class I areas include national wilderness areas larger than 5,000 acres and national parks larger than 6,000 acres. Air quality in mandatory Class I areas must be maintained in its natural state. Mandatory Class I areas in the vicinity of Flagstaff include Grand Canyon National Park (approximately 80 miles northwest of Flagstaff), Sycamore Wilderness Area (approximately 30 miles southwest of Flagstaff), and Petrified Forest National Park (approximately 160 miles east of Flagstaff) (EPA 1990).

Flagstaff is located on the western border of Arizona's Airshed 3, which extends east to the New Mexico border between Springerville (181 miles east of Flagstaff) and Canyon de Chelly National Monument (U.S. Environmental Protection Agency 1990). Airshed 3 is a Class II area, which has much less stringent air quality standards than Class I areas (pers. comm., P. Lahm, U.S. Forest Service, 1998).

3.10.3 Existing Air Quality

Flagstaff is an attainment area, meaning that pollutant levels do not exceed National Ambient Air Quality Standards (NAAQS) defined by the Clean Air Act (40 CFR 50). Within the Flagstaff area, the ADEQ maintains two monitoring sites for particulate matter 10 microns or smaller in diameter (PM₁₀) (ADEQ 1997). Particulate matter is usually created by forest fires (including prescribed burns), automobile exhaust, wood-burning stoves and fireplaces, and dust. The 1996 PM₁₀ concentrations at these two monitoring locations are listed in Table 3-11.

Table 3-11. PM₁₀ Data for Flagstaff

Site Location	Annual Average	NAAQS Annual	24-Hour Average Maximum	NAAQS 24 Hour Average
5701 E. Railroad St.	14 ug/m ³	50 ug/m ³	42 ug/m ³	150 ug/m ³
Thorpe Park	16 ug/m ³	50 ug/m ³	31 ug/m ³	150 ug/m ³
Flagstaff Junior High	15 ug/m ³	N/A	32 ug/m ³	N/A

Source: ADEQ 1997, 1999

Note: Sampling was conducted at the Railroad Street and Thorpe Park locations in 1996 and at the Flagstaff Junior High School in 1997.

3.10.4 Sensitive Receptors

Land uses that are considered sensitive receptors for general air pollution concerns include residences, schools, playgrounds, child care centers, and long-term health care facilities. Refer to Figure 3-4 in Section 3.5, Land and Water Use, regarding the distribution of land uses within the project study area.

3.11 ESTHETICS

This section describes the visual character of the Rio de Flag study area, including its general appearance and typical views. The description is followed by a discussion of viewers that may be sensitive to visual change in the study area. (See also Figures 1-4 through 1-9, which contain photographs of the study area.)

3.11.1 Visual Character

The visual character of the project study area reflects the varied nature of its components, which include the Rio de Flag and Clay Avenue Wash channels, residential and commercial neighborhoods in downtown Flagstaff, Thorpe Park, and the undeveloped potential Clay Avenue Wash detention basin site.

Rio de Flag Channel

In the upstream portions of the North Flagstaff Reach, the channel retains a natural appearance, although residential and other development encroach to the channel edges, particularly on the east. Further downstream in the North Flagstaff and Downtown Flagstaff reaches, the channel appears in a more degraded state (e.g., debris in the channel, little native vegetation, culverts under roads, and sporadic placement of bank stabilization/erosion control features). Along one portion of these reaches, near City Hall, the channel has been modified into a grassy swale.

The I-40 Reach reflects a more natural appearing channel, with native vegetation and less development. Parts of this reach pass through a meadow which, although privately owned, has not been developed. A FUTS trail parallels the Rio de Flag through much of this reach. In the Continental Reach, the channel once again loses its natural appearance, and reflects urban modifications—sections of this reach are lined with riprap, close to residential development, lacking native vegetation, and/or converted to grassy swales within a golf course setting.

Clay Avenue Wash Channel

At the upstream end of the channel (i.e., the site of the potential detention basin), Clay Avenue Wash lacks a well defined channel. The visual character of this area is dominated by the surrounding

ponderosa pine forest. Further downstream (east), the wash enters residentially and commercially developed areas. In these developed areas, the channel has been modified in some locations to provide some flood control, whereas in other locations it is routed onto city streets. Ultimately, it disappears into a culvert at the western edge of Milton Road. Overall, the channel has a relatively low esthetic value through much of this reach.

Downtown Flagstaff

Much of downtown Flagstaff is within the study area because it is encompassed by the Rio de Flag 100-year floodplain, the Clay Avenue Wash 100-year overflow zone, or both. Downtown Flagstaff includes a number of attractive buildings, many of which are historic (see Section 3.4, Cultural Resources). Downtown Flagstaff also provides a number of vistas to the highly scenic surrounding landscape. The overall attractiveness of this area contributes to Flagstaff's status as a tourist destination.

Thorpe Park

Thorpe Park is dominated visually by Frances Short Pond and the ballfields. The ballfields are well maintained, and surrounding urban uses are visible in this area (e.g., a high-school, maintenance facilities, and residences). Accordingly, the overall character of the park is more urban than natural; however, the park does serve as a visual transition between the more developed neighborhoods of downtown Flagstaff and the undeveloped National Forest lands to the west.

Cheshire Park Detention Basin Site

Cheshire Park's dominant visual feature is the park itself, including the grass field, the children's play equipment, and game courts. The line of trees behind the park and mountains in the background add to the visual effect of the park. Based on the site's topography and the screening effect of the trees, the Narrows dam and associated pond are not prominent visual features. Rather, views to the dam are generally limited to immediately adjacent residences and to park visitors who leave the developed park area.

Potential Clay Avenue Wash Detention Basin Site

The potential detention basin site has three prominent visual features: (1) ponderosa pine forest, (2) grassy meadows, and (3) a farmhouse with associated outbuildings. Much of this site is enclosed with barbed wire fencing. The detention basin site, which can be easily viewed from Route 66, is relatively attractive; however, it is not generally distinguishable from other agricultural areas or other stands of ponderosa pine forest.

Potential Berm Locations at Continental Estates

The potential berm sites are generally located between undeveloped or golf course areas and residential or commercial land uses. As with much of the Continental Estates area, the berms are located in areas where evidence of human activity is apparent, but where there is still a high scenic value resulting from natural features (e.g., pine covered hills, large areas of undeveloped land) or grassy golf course fairways.

3.11.2 Policies and Development Standards

Scenic Views

The value which the local community places on their natural environment is reflected in the following excerpt from the *Flagstaff 2020 Program*,

Nature is precious to people who live here and they devote considerable energy and attention to enjoying, protecting and enhancing it. Local citizens consider the spectacular scenery and landforms surrounding them to be irreplaceable gifts that must be preserved for future generations.

Open Spaces and Greenways

The Greater Flagstaff Open Spaces and Greenways Coalition oversees the implementation of the region's Open Spaces and Greenways Plan, which designate open spaces and greenways for permanent protection. One of the plan's goals is to link neighborhoods, commercial centers, and open spaces in a pedestrian/bicycle circulation system. Location of access points to this system will allow most residents to reach them in about a 15-minute walk. The Rio de Flag is considered as potentially

being one of these greenways, providing a nearly continuous public corridor through the community where natural vegetation has been restored (City of Flagstaff 1997).

One of the policies stated in the Flagstaff Growth Management Guide 2000 requires the city to “develop plans and programs which carefully manage development on hillsides, ridge lines, and drainage courses in order to reduce adverse impacts and to protect the scenic quality, vegetation, and wildlife values of those areas” (City of Flagstaff 1987a). To achieve this, the Growth Management Guide encourages a “non-structural approach” to flood control which seeks to incorporate such features into the city’s Open Space/Greenbelt System.

Development Standards and Design

The community is establishing strong development standards designed to direct growth skillfully and ensure the community's continued livability.

A Growth Management Alliance (GMA) is being formed to establish a simplified uniform development code for the city and county for lands within the Regional Urban Growth Boundary (RUGB). Within the RUGB, developers will pay development impact fees. These fees will help cover the cost of basic services needed for new developments, including roads and utilities. New residential developments will set aside land and/or funds for future neighborhood amenities, including schools and parks. New developments also will provide walkways, bicycle paths, transit stops, and space for other nearby amenities.

The Flagstaff Area Regional Planning Group is an informal group of city, county, and metro planning organizations who coordinate planning efforts in the Flagstaff area. The city has design and development standards to help protect views of the natural environment, including lighting standards to preserve views of the night sky. “Intimacy” in design will be encouraged to promote interaction between people, neighborhoods, and the community. Design that revives historic American neighborhood qualities—front porches, sidewalks, and street trees—are also encouraged (City of Flagstaff 1997).

Environmental Urban Design

To shape development and redevelopment in a way that preserves community integrity, character, and livability, citizens wish to promote good urban design and growth management. Clustered residential development, generally concentrated in or near the city core, with greenways and strategically located community focal points, is one of the city's goals (City of Flagstaff 1997).

3.12 HAZARDOUS AND TOXIC MATERIALS

Hazardous materials and wastes include substances that pose a potential hazard to human health or the environment. A number of properties may cause a substance to be hazardous, including toxicity, ignitability, corrosivity, or reactivity. Hazardous materials can be released into the environment by either point or nonpoint sources. Point sources release contaminants from a specific site. Nonpoint sources release contaminants in a diffused fashion; for example, as runoff from urban or agricultural areas into a river.

3.12.1 Database Search

A comprehensive database¹ search of all potential sources of point source contamination within a two-mile radius of the intersection of Beaver Street and Butler Avenue was conducted for this project (Environmental Data Resources, Inc. 1997). From this search it was determined that, within 500 feet of the existing channel of the Rio de Flag, the only potential sources of hazardous waste contamination include six underground storage tanks (USTs)².

3.12.2 Field Investigations

In addition to the database search, field investigations have been undertaken by the USACOE to determine the extent of potential hazardous waste contamination within the study area. Based on the preliminary laboratory analysis, there are five areas where contamination has been or is expected to be encountered.

- **Greyhound Bus Station UST.** The Greyhound Bus Station is located at 399 S. Malpais Lane, immediately south of the Clay Avenue Wash channel. Between 1974 and 1994, two 10,000-gallon diesel USTs were located on-site. Both tanks were removed in April 1994, at which time slight amounts of hydrocarbon contamination were detected in the soil above the tanks. Based on laboratory analysis of the excavated tank pit material, it was concluded that hydrocarbons released

¹ This database search complies with the guidelines suggested by the American Society of Testing Materials (ASTM).

² Note that there may be potential point sources of hazardous waste contamination within 500 feet of the Rio de Flag that occur outside the radius of this search. For example, in the Continental area.

into the tank pit were likely from fuel overspills during the life of the tank. The levels of contamination were considerably below the residential and non-residential Arizona soil remediation levels (SRLs). Further USACOE sampling (1999) identified some hydrocarbon contamination in the underlying groundwater.

- **City Fire Station UST.** City Fire Station No. 1 is located approximately 8 feet north of the Clay Avenue Wash Channel. A 3,000 gallon diesel UST was located on-site from 1980 to 1996 when it was removed. As with the Greyhound UST, post-removal soil analysis revealed levels much lower than the Arizona SRLs. Supplemental investigations conducted by the USACOE identified hydrocarbon contamination in the groundwater at the site.
- **Mobile Station (Mike's Pike).** Reports of contamination under the Mobile Station at Mike's Pike were investigated by the USACOE in 1999, and it was determined that hydrocarbon contamination was present underneath Mike's Pike in the proposed underground channel alignment.
- **City Hall.** Based on previous reports of oily film found in a utility installation ditch, the USACOE conducted soil sampling near the Flagstaff City Hall. The results of this sampling indicated that some soil-borne contaminations were present near the Rio de Flag channel adjacent to the City Hall. The origin of this contamination is unknown; however, it is possible that it may be creosote from contaminated trash in the fill along the re-graded wash invert.
- **Five Points Intersection.** Soil gas vapors have been reported under the Five-Points intersection (Milton Road/Route 66/Clay Avenue/Butler Avenue/Mike's Pike). Although investigations conducted by the USACOE in 1999 were inconclusive, hydrocarbon contamination in the soil and possibly in perched groundwater is expected under the intersection.

3.13 SAFETY

The safety risks associated with the existing study area are typical of almost any urban environment, such as the risks of pedestrian or vehicular accidents. The Rio de Flag and Clay Avenue Wash channels are relatively shallow through most of the study area and they do not pose a significant risk to the public. Rather than describe all potential safety risks within an urban environment such as Flagstaff, the safety baseline condition is described in terms of emergency service providers (e.g., fire stations) that could be affected by project construction.

The City of Flagstaff Fire Department consists of over 75 firefighters working out of six stations in Flagstaff (see Figure 3-8). The Fire Department, which provides fire protection, emergency medical service, hazardous materials response, wildland fire protection, and rescue operations for the City of Flagstaff, also serves other parts of Coconino County through service contracts. In addition to emergency scene operations, the City of Flagstaff Fire Department conducts Emergency Management Planning, Wildland Urban Interface involving wildland fire safety and forest health, construction plans review, and on-site code and standard compliance through fire and life safety inspections.

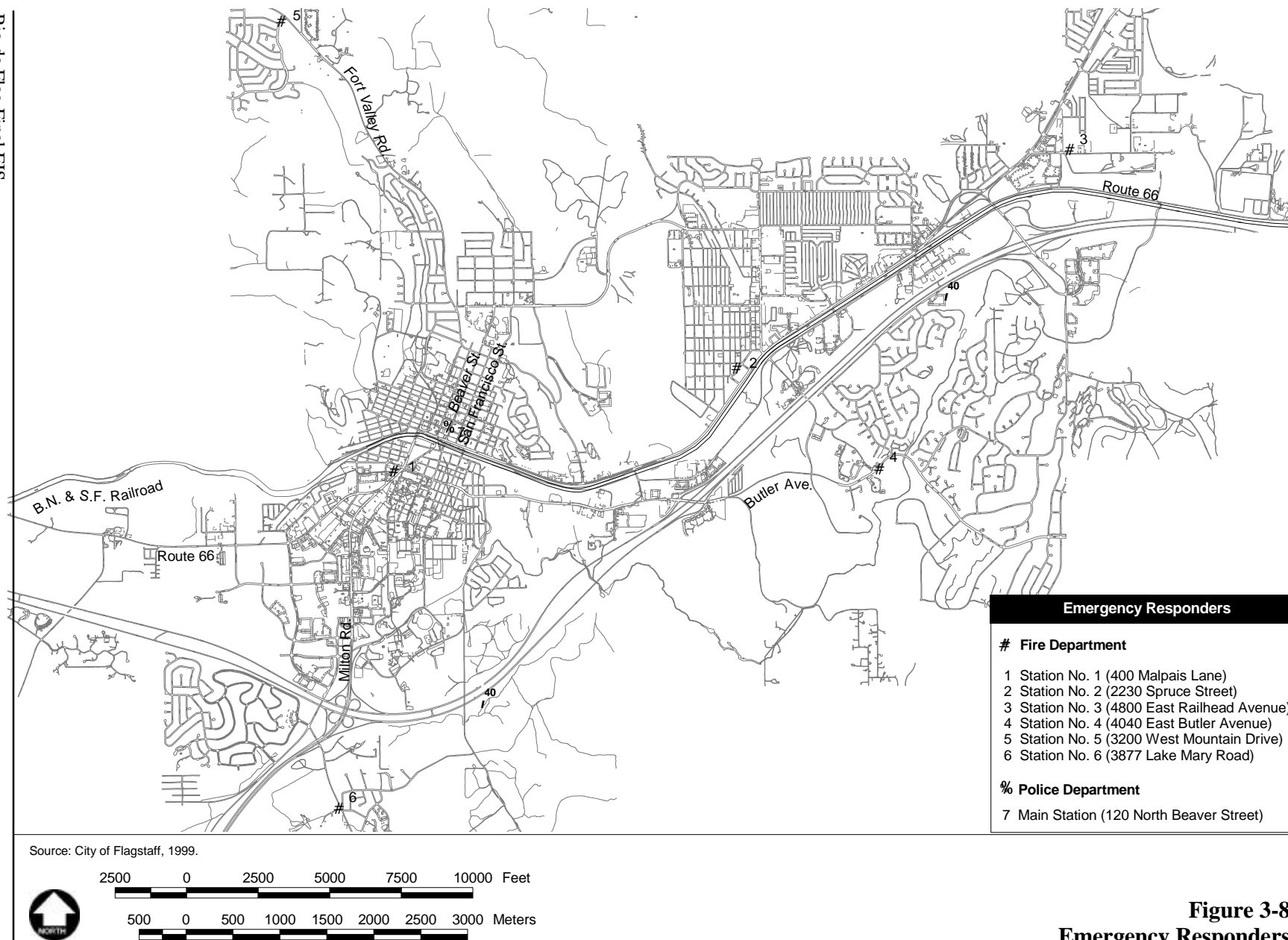


Figure 3-8
Emergency Responders

4.0 ENVIRONMENTAL CONSEQUENCES

This section addresses the environmental consequences of Alternatives 6a, 6b, 7, D, and the No Action Alternative. Environmental consequences are addressed in terms of the 13 environmental resource and issue areas described in Chapter 3. For each resource or issue area, this section states the significance criteria used in the impact evaluation, describes the environmental consequences that would be expected to occur under each alternative, and discusses mitigation measures if those impacts would exceed the stated significance thresholds. Environmental Justice (as defined by Executive Order 12898) is addressed in Section 4.7, Socioeconomics. Cumulative impacts are addressed in Section 4.14 and other mandatory NEPA sections are discussed in Sections 4.15 and 4.16. Environmental commitments for the Recommended Plan (Alternative 6b) are summarized in Section 4.17.

4.1 TOPOGRAPHY/GEOGRAPHY

4.1.1 Significance Criteria

This analysis addresses the potential for an alternative to result in topographic alteration due to grading, excavation, and/or disposal of material. Significant impacts on topography/geology would result from:

- adverse effects on unique geologic features
- disturbance of a geologic feature of unusual scientific value for study or interpretation
- rendering known mineral resources inaccessible
- triggering or accelerating geologic processes such as landsliding or erosion
- substantial alteration of topography.

4.1.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Topography

Bridge Modifications

Bridge modifications would occur at Meade Drive, Anderson Road, and Beal Road. The bridges on Anderson Road and Beal Road would be completely replaced, and modifications to the bridge on Mead Drive would involve the installation of wing walls which direct flood flows. These modifications would not substantially alter topography, and there would be no significant impact.

Thorpe Park Modifications

South of Beal Road along Thorpe Park, 2,000 linear feet of berms and floodwalls would be constructed at a combined maximum height of five feet. Just downstream from the southern floodwall, two small embankments would be used to direct stream flows. In addition to the floodwalls and embankments, Thorpe Road would be elevated five feet to be above the floodwall and avoid the normal channel flows. These modifications would not have a significant impact to the existing topography.

Channel Modifications

The construction of the modified Rio de Flag and Clay Avenue Wash alignments would not significantly alter the local topography. The majority of the channel alignments would remain the same, although in many areas the modified channel would be slightly wider and deeper than the existing channel. In some locations, the channels would transition to covered channels which would have little demonstrable effects on the local topography. The only location where channel modifications would not follow the existing alignment is where the Rio de Flag crosses the railroad tracks and the new channel would follow on approximation of the Rio de Flag's historic alignment. This new channel would not significantly alter the existing topography, as it would join into an existing remnant of the historic channel

north of Butler Avenue. Based on these factors, impacts on topography from the channel modifications would be less than significant.

Clay Avenue Wash Detention Basin

The Clay Avenue Wash detention basin would require the construction of three berms to detain flood waters during peak flows along the Clay Avenue Wash. As shown on Figure 2-3, the berms would be located at (1) the northwest corner of the Hidden Hollow Mobile Home area, (2) immediately south of the BNSF railroad embankment, and (3) approximately 700 feet north of the northeast corner of the mobile home park. The berm located adjacent to the mobile homes would be a maximum of 12 feet tall with a crest elevation of 7,072.3 feet above mean sea level. The northwest berm would have a crest elevation of 7,068 feet above mean sea level and would stand up to 10 feet in height. The northeast berm, which would include the outlet structure, would be no taller than 21 feet. The spillway and crest elevations of the northeast berm would be 7,065.6 and 7,072.3 feet above mean sea level, respectively. The berms would “tie-in” to the natural topography.

The topographical alterations required to construct the detention basin would be limited to the erection of the berms described above, neither of which would be considered a substantial alteration of topography.

Faulting/Seismicity

Based on historic occurrences, the Flagstaff area is subject to small-to-moderate earthquakes, with some risk of larger, more damaging earthquakes. The Clay Avenue detention basin would be designed and constructed according to applicable seismic safety standards. Given the site-specific geotechnical design parameters that would be incorporated into the proposed embankments, the detention basin would not cause (or incur) significant impacts with regard to faulting or seismicity.

Landsliding/Erosion

Construction of the proposed Clay Avenue detention basin embankments could result in impacts relating to localized erosion and soil stability. These potential impacts, however, would be reduced to below the level of significance through the implementation of specific design guidelines and construction

specifications. The proposed detention basin embankments would be designed and constructed so that they would not trigger or accelerate geologic processes such as erosion.

Short-term erosion impacts would be reduced below the level of significance through the incorporation of the mitigation measures described in Section 4.2.3 (Water Resources Mitigation).

Unique Geologic Features

The earth resources in the basin area are not uncommon in the regional geologic setting. In the study area, there are no unique geologic features or geologic features of unusual scientific value for study or interpretation; therefore, no adverse effects would occur to such resources.

Mineral Resources

As described in Section 3.1.6, there are no known mineral resources of commercial value in the study area. Accordingly, the implementation of Alternative 6a would not prohibit or permanently restrict access to significant mineral resources.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative includes all of the components described for Alternative 6a; however, Alternative 6b includes a two-block-long covered channel segment extending from Dale Avenue downstream to Birch Avenue. The environmental effects of the bridge modifications and the Clay Avenue Wash channel modifications and detention basin would be the same as described for Alternative 6a. As described for that alternative, no significant impacts would occur with respect to topography/geography as a result of these project components.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The Clay Avenue detention basin and the Clay Avenue Wash and Rio de Flag channel modifications would be the same as for Alternative 6b. Alternative 7 also includes upstream detention basins along

the Rio de Flag at Thorpe Park and Cheshire Park, respectively. The topography/geography impacts associated with the Thorpe Park and Cheshire Park detention basins are discussed below.

Topography

Thorpe Park

Construction of the Thorpe Park Detention basin would require approximately 10,000 cubic yards of imported fill material to erect the proposed embankment. The embankment would be located just south of the existing weir at Francis Short Pond and would stand roughly 29 feet in height (as viewed from the foot of the downstream slope). The base of the headwall would remain at the existing ground surface elevation of 6,924 feet above mean sea level, whereas the top elevation of the embankment (crest elevation) would be at 6,943 feet. The embankment would “tie in” to the hillside immediately west of the Flagstaff Junior High School and extend west towards the softball complex. The raised structure would angle toward the southwest for approximately 600 feet where it would terminate near the northeast corner of the Arizona Armory National Guard property (see Figure 2-9). The minor changes in surface contours would not be considered a substantial alteration of topography. No prominent topographic features (i.e., hilltops, ridges, canyons, rock outcrops) would be destroyed, permanently covered, or adversely modified.

Cheshire Park

The Cheshire Park detention basin would be constructed between Fremont Boulevard and the existing dam. Under this alternative the dam would be removed and a larger detention basin would be excavated. A bypass channel and outlet structure would also be constructed as part of this detention basin. Construction of the detention basin at the park would require the clearing of approximately five acres of land and the excavation of 21,780 cubic yards of soil. This would not cause a substantial change to any prominent topographical features of the area, and it would not be considered a significant topography impact.

Faulting/Seismicity

As described in Alternative 6a, the Flagstaff area is more susceptible to small-to-moderate earthquakes rather than large damaging ones. The detention basins associated with the two parks would be

designed and constructed according to seismic safety standards; accordingly, the detention basins would not cause (or incur) a significant impact due to seismic activity.

Landsliding/Erosion

The detention basins at Thorpe and Cheshire Parks could result in localized soil and slope stability; however, through specific design and construction guidelines these potential impacts would be reduced to less than significant levels.

Unique Geologic Features

There are no known unique geologic features or geologic features of unusual scientific value for study or interpretation at the Cheshire Park or Thorpe Park detention basin sites. Therefore, impacts to unique geologic features would not occur under this alternative.

Mineral Resources

As described in Alternative 6a, there are no known mineral resources of commercial value in the study area. Therefore, construction of the Thorpe Park and Cheshire Park detention basins would not have a significant impact on the mineral resources in the area.

Alternative D: Localized Non-Structural Flood Proofing

As described for Alternative 7, the design of the proposed berms and embankments are based on site-specific geologic investigations undertaken by the USACOE. The design parameters derived from this information reduce impacts regarding faulting, seismicity, landsliding and erosion below the level of significance. In addition, there are no known unique geologic features, geologic feature of unusual scientific value for study or interpretation, or significant mineral resources located within the footprints of the two proposed berms. Impacts on topography/geography would be less than significant under this alternative.

No Action Alternative

The No Action Alternative would not generate impacts with respect to topography/geography.

4.1.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Potentially significant impacts from erosion would be mitigated to less than significant levels as described in Section 4.2, Water Quality/Hydrology. No other significant impacts to topography/geography would result from Alternative 6a; therefore, no additional mitigation measures are provided.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Potentially significant impacts from erosion would be mitigated to less than significant levels as described in Section 4.2. No other significant impacts to topography/geography would result from Alternative 6b; therefore, no additional mitigation measures are provided.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Potentially significant impacts from erosion would be mitigated to less than significant levels as described in Section 4.2. No other significant impacts to topography/geography would result from Alternative 7; therefore, no additional mitigation measures are provided.

Alternative D: Localized Non-Structural Flood Proofing

No significant impacts on topography/geography would result from Alternative D; therefore, no mitigation measures are provided.

No Action Alternative

No impacts to topography/geography would result from the No Action Alternative; therefore, no mitigation measures are provided.

4.2 WATER QUALITY/HYDROLOGY

4.2.1 Significance Criteria

This evaluation describes impacts to surface water and groundwater. Impacts are considered significant if an alternative would cause an exceedance of a water quality standard or the water quality objectives contained in the appropriate state water quality control plan. As described in Section 3.2, the applicable state water quality standards for the study area are contained in the Arizona Administrative Code, Title 18, Chapter 11, “Water Quality Standards.”

4.2.2 Impact Assessment

For any of the project alternatives, the greatest potential for water quality impacts involves turbidity and sedimentation associated with construction and restoration activities. There is also a potential for water quality impacts caused by accidental spills of fuels or solvents during construction. The potential for operation-related water quality impacts (i.e., impacts associated with the inspection, maintenance, and repair of the respective flood control facilities or the temporary detention of water in basins) is nominal and is not further addressed in this section.

These flood control alternatives would generally occur in ephemeral portions of the Rio de Flag and Clay Avenue Wash. As stated in Section 3.2, “Aquatic and Wildlife (ephemeral)” and “Partial Body Contact” water quality standards apply to ephemeral water bodies (Ariz. Admin. Code §R18-11-105). Based on these designated uses, the applicable surface water standards for turbidity are a maximum of 50 nephelometric turbidity units¹ (NTU). Fuel or solvent discharges into surface waters are prohibited by the “Narrative Water Quality Standards” contained in the Arizona Administrative Code (§R18-11-108).

1 Turbidity is measured by determining how much light is scattered (refracted) by particles suspended within a water column. The instrument commonly used to measure turbidity is called a nephelometer. A light detector is setup to the side of a (source) light beam; more light reaches the detector if there are numerous small particles refracting the source beam than if there are few. The units of turbidity from a calibrated nephelometer are called nephelometric turbidity units (NTU).

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

This alternative would entail construction in the Rio de Flag and Clay Avenue Wash channels. At Thorpe Park, construction that could affect the Rio de Flag would include the proposed floodwalls along the eastern bank of the channel, elevation of North Thorpe Road, and construction of two small embankments.

Construction activity has the potential to cause soil erosion and thereby sedimentation and turbidity. Removal of existing vegetation along the eastern bank of the Rio de Flag during construction of the berm and floodwall would increase the erodibility of soils through removal of soil-stabilizing root mass and new exposure of unprotected soils to rainfall and stream flows. In the event that heavy rainfall were to occur while this situation existed, significant erosion-related turbidity and sedimentation impacts would occur. Flagstaff experiences an annual average of 19.8 inches of precipitation, with monthly averages higher than 1 inch for all months except May and June. Accordingly, it is probable that there will be some rain events during detention basin construction. After this riparian vegetation has been restored (see Biological Resources, Mitigation, Section 4.3.3), the potential for erosion-related turbidity impacts would be less than significant.

High stream flows in the Rio de Flag or Clay Avenue Wash could result in erosion and sedimentation impacts during construction of the embankments at Thorpe Park and the downstream channel modifications. Water quality impacts could also occur following construction but prior to establishment of vegetative cover. Once the vegetation has a chance to establish on the embankments and channel sideslopes, the potential for erosion-related turbidity impacts would be less than significant. Mitigation measures are provided to reduce short-term impacts from erosion and sedimentation to less than significant levels.

Fuel and solvent spills or leaks from construction equipment could enter the Rio de Flag or Clay Avenue Wash either directly, in the case of large spills, or indirectly through storm water runoff, resulting in a significant impact to water quality. A fuel or solvent spill could also affect groundwater quality, depending on the volume of the spill.

These potentially significant construction-related impacts would be mitigated to less than significant levels through the measures described in Section 4.2.3.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative includes all of the project components described for Alternative 6a, with the exception that it includes a covered channel segment for approximately two blocks along the downtown reach of Rio de Flag. Impacts would essentially be the same as those described for Alternative 6a, given that the two-block-long covered channel segment would not noticeably alter hydrology or water quality along this reach. Accordingly, potentially significant water quality impacts during construction would be mitigated to less than significant levels.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The Clay Avenue detention basin, and the Clay Avenue Wash and Rio de Flag channel modifications for Alternative 7 would be the same as Alternative 6b. Along with these modifications, two additional detention basins would be constructed along Rio de Flag at Cheshire and Thorpe Parks. The hydrology and water quality impacts associated with these two components are described below.

Hydrology

The addition of the Cheshire Park and Thorpe Park detention basins would alter hydrologic conditions along the Rio de Flag. Currently, normal flows along the upstream portion of the Rio de Flag (north of Cheshire Park) are detained at the Narrows dam and released through a small outlet structure. (In large events, this on-line detention basin becomes full and flows overtop the checkdam.) Flows continue along the Rio de Flag into Thorpe Park where water enters the Frances Short Pond. When the capacity of the pond pass is exceeded, water flows over the historic weir and into the downtown reach of the Rio de Flag channel.

Under Alternative 7, the Narrows dam would be replaced with an off-line detention basin. A bypass channel would be constructed to the west of the detention basin to convey normal flows. When flows exceed approximately 1,500 cubic feet per second (cfs), water would begin to fill the detention basin through a split-flow weir. When the capacity of the basin is exceeded, water would flow through the basin's outlet structure into the Rio de Flag and join the flows from the bypass channel. Further south, normal flows would traverse the eastern boundary of Thorpe Park through a bypass channel and would

not enter the Frances Short Pond. The Thorpe Park bypass channel would pass to the east of the pond and through an embankment south of the historic weir. Because water would no longer be collected at the Frances Short Pond, the downtown reach of the Rio de Flag would experience more frequent flows. This change in low-flow hydrology would more closely resemble natural conditions; therefore, impacts on hydrology would not be significant.

During major flood events, the two detention basins would fill, thus reducing peak discharge along the Rio de Flag. This alteration of hydrologic conditions would not be significant, because the basins would hold water for no more than 60 hours.

Water Quality

The Thorpe Park and Cheshire Park detention basins and bypass channels would result in construction-related water quality impacts. Significant erosional impacts would occur if heavy rainfall were to take place during the excavation in or adjacent to the channel. Because there would be an increase in the amount of construction in and around the channel, there would also be a corresponding increase in the potential for construction equipment to spill fuel or solvents. These potential impacts would be mitigated to less than significant levels through the measures described in 4.2.3.

As discussed above, Frances Short Pond would be cut-off from the Rio de Flag. By lowering the surrounding ground level by two feet and maintaining the original water surface elevation of the pond, water would be spread out over a greater area. Accordingly, the area of shallow water would be greatly increased. This would likely result in an increase in wetland vegetation growth along the outer banks and an increase in temperature of the pond. In order to maintain the water level of the pond and adequate water quality, water would be pumped into the system. The pond would be flushed on an annual or semi-annual basis and trash would be removed. Assuming that (1) the water that is pumped into the pond is free of contaminants and (2) the pond is flushed and cleaned on a regular basis, impacts to water quality would be less than significant.

Alternative D: Localized Non-Structural Flood Proofing

Alternative D would entail the construction of berms along the periphery of the floodplain. Because the berms would not be adjacent to the Rio de Flag, the potential for sediment entering the channel as a result of berm erosion is relatively low. Additionally, the berms would be vegetated subsequent to

construction. Based on these factors, erosion and turbidity impacts to surface waters would be less than significant. Fuel or solvent spills, which could be carried into the channel by runoff or infiltrate into groundwater, could result in a significant water quality impact.

No Action Alternative

Under the No Action Alternative, there would be no construction and therefore no potential for construction-related water quality impacts.

4.2.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

The following measures would reduce potential water quality impacts to a less than significant level:

- Construction in and along the Rio de Flag and Clay Avenue Wash will cease if and while substantial rain events are predicted or are occurring in the project vicinity. Exposed bare ground will be covered with seed-free loose straw or erosion control matting prior to these events to protect the soil from erosion while construction activities have ceased.
- Bare ground on the construction site will be covered with seed-free loose straw or erosion control matting during the post-construction period prior to establishment of vegetative cover or during periods of prolonged inactivity once the soil surface has been disturbed and bare ground exposed.
- Embankments will be planted with native vegetation as specified in the native species revegetation plan developed by the USACOE and the Flagstaff Arboretum (see Appendix J).
- The Rio de Flag and Clay Avenue Wash channels upstream of construction activity will be dammed temporarily to prevent water from entering the reach under construction should a storm occur. A diversion pipe will be installed in the dam to convey any water around the construction area for discharge downstream of the construction activity.

- Equipment will be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The USACOE and/or the City of Flagstaff will develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements. Construction supervisors and workers will be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers will be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment will only be operated within dewatered areas of the creek.
- Fuels, solvents, and lubricants will be stored in a bermed area so that potential spills and/or leaks will be contained. Soil contamination resulting from spills and/or leaks will be remediated as required by state and/or Federal law. Storage areas will be constructed so that containers will not be subjected to damage by construction equipment.

As mitigated, water quality impacts would be less than significant.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be identical to the measures identified for Alternative 6a. As mitigated, impacts would be less than significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be identical to the measures identified for Alternative 6a. As mitigated, impacts would be less than significant.

Alternative D: Localized Non-Structural Flood Proofing

The Localized Non-Structural Flood Proofing Alternative would not result in significant erosion and turbidity impacts; however, significant impacts could result if a fuel or solvent spill occurs during construction. These potential impacts would be mitigated to less than significant levels through the last

two measures identified for Alternative 6a. These are the measures addressing (1) a spill contingency plan and (2) the storage of hazardous materials at the construction site.

No Action Alternative

Under the No Action Alternative there would be no water quality impacts and no need for mitigation.

4.3 BIOLOGICAL RESOURCES

Impacts to biological resources are described in terms of impacts to vegetation communities, wildlife and wildlife use, threatened and endangered species, and functions of wetlands and “waters of the United States” as described in Section 3.3.

4.3.1 Significance Criteria

The impacts of each alternative are discussed in terms of both short- and long-term impacts to biological resources of the study area. Impacts are considered significant if:

- the population of a threatened, endangered, or candidate species is directly affected or if its habitat is lost or disturbed
- there is a net loss in the habitat value of a sensitive biological habitat or area of special biological significance
- the movement or migration of fish or wildlife is impeded
- there is a substantial loss in the population or habitat of any native fish, wildlife or vegetation (substantial loss defined as any change in a population which is detectable over natural variability for a period of five years or longer).

4.3.2 Impact Assessment

No significant impacts to any federally listed threatened, endangered, or proposed threatened or endangered species are expected to occur under any of the alternatives. Furthermore, no significant impacts to the movements or migrations of fish or wildlife, and no significant loss in the population or habitat of any native fish, wildlife, or vegetation is anticipated under any of the alternatives.

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

It is highly unlikely that there would be impacts to threatened, endangered, or proposed threatened or endangered species or their habitats under this alternative because no such species are known to occur in or near Clay Avenue Wash and the downtown reach of the Rio de Flag. Furthermore, the vegetation communities along these reaches do not resemble those known to be used for breeding by any

threatened and endangered species. Impacts to vegetation are described below in terms of the project components.

Bridge Modifications

The bridge modifications at Anderson Road, Beal Road, and Meade Lane would occur in areas of urban/disturbed habitat where the Rio de Flag channel does not contain wetland or other sensitive vegetation communities. Accordingly, the biological resource impacts associated with these [bridge modifications would not be significant. The bridge modifications would not impact any “waters of the Unites States.”](#)

Thorpe Park

Vegetation would be physically removed or crushed beneath construction equipment during the installation of the floodwalls, the elevation of Thorpe Road, and the construction of the two embankments at Thorpe Park. Floodwall construction upstream (north) of Thorpe Road and the elevation of Thorpe Road would affect the Rio de Flag channel, resulting in a temporary impact to approximately 0.3 acre of mixed riparian vegetation. Construction of the floodwall downstream (south) of Thorpe Road and construction of the embankments would not affect wetland or riparian vegetation in the Rio de Flag channel, although it would require the permanent removal of several ponderosa pine trees, including some over 60 feet in height. No old-growth ponderosa pines are associated with this site.

Impacts to wildlife and wildlife use at Thorpe Park would be insignificant for the following reasons: (1) Thorpe Park is in an urban setting with high levels of human activity; (2) current levels of human activity limit wildlife use of the park; and (3) anticipated impacts to vegetation would be minor relative to the amount of vegetation remaining in and adjacent to the park. The loss of 0.3 acre of riparian vegetation would be significant despite these factors due to the sensitivity of this vegetation community and the protection it is afforded under Section 404 of the Clean Water Act.

[As described in Appendix E, the majority of the wetlands in and along the Rio de Flag are classified as riverine intermittent streambed. The loss of wetland functions within this classification would be mitigated to a less than significant level through wetland creation and restoration \(refer to Appendix E for a discussion of the wetland function variables and mitigation requirements\). Considering the overall](#)

net gain of high value wetland habitat as a result of the mitigation, the project would improve the functions and values of the mitigation areas along the Rio de Flag.

Importing soil to Thorpe Park to construct the embankments and the floodwall berms could introduce nonnative weed species into the Rio de Flag system if weed seeds are included in the imported soil. Because invasive weed species frequently out-compete native plant species in highly disturbed areas, invasive weeds are often present at sites where soil is available for export. This potentially significant impact would be mitigated as described in Section 4.3.3.

Channel Modifications

Downstream of Thorpe Park to Route 66

As indicated in Figure 3-3 (in Section 3.3), this section of the Rio de Flag is classified as “urban disturbed” because the vast majority of it has been heavily modified and it does not support wetland or riparian vegetation. There is, however, approximately 0.6 acre of mixed riparian and wetland habitat between Bonito Street and Dale Street that would be affected by construction of the open, trapezoidal channel. This impact would be considered significant and would require mitigation. Construction-related impacts to the other (non-wetland or riparian) vegetation present within the channel would not constitute a significant biological resources impact. Approximately 80 to 100 trees that line this section of channel would be removed during construction. These trees consist of a variety of species, including many nonnative ornamental species and numerous mature ash (*Fraxinus* sp.). From a biological resources standpoint, the loss of these trees would not be significant because they occur in a highly urbanized setting and provide limited wildlife use. Following construction, the new, wider channel would be planted with native vegetation. The native vegetation would incrementally improve the Rio de Flag’s natural functions and values through downtown Flagstaff; however, the area’s urban setting would continue to limit the biological resources value of this channel reach.

Impacts to wetland functions would be less than significant after mitigation. The replacement of the 0.6 acres of mixed riparian and wetland habitat with 0.9 acres of high quality riparian wetland habitat along the Rio de Flag would improve the functions of wetlands and “waters of the United States” in the project area.

Route 66 to Phoenix Avenue

From south of Route 66 to Phoenix Avenue (where the Rio de Flag enters a box culvert), water would be diverted into a new channel and approximately 590 feet of the present channel would be abandoned. Within the abandoned channel, approximately 540 square feet of hydrophytic plant species such as cattail (*Typha* sp.) and rush (*Juncus* sp.) would be eliminated. (Hydrophytic plants are those that grow in moist ground, and they generally represent wetland or riparian vegetation). The realignment of this channel section would affect a total of approximately 0.3 acre of habitat, including the hydrophytic vegetation listed above. The realigned channel would be vegetated with wetland and riparian habitat to compensate for this loss. No impacts to exotic poplar (*Poplar* sp.) trees (which provide esthetic screening of the Union Pacific Railroad lines) are anticipated in this reach.

Impacts to wetland functions would be less than significant after mitigation. The replacement of the 0.3 acres of mixed riparian and wetland habitat with 0.45 acres of high quality riparian wetland habitat along the Rio de Flag would improve functions of wetlands and “waters of the United States” in the project area.

Upstream of Beaver Street to Butler Avenue (Historic Rio de Flag Channel Alignment)

New channel construction would result in impacts to existing vegetation. These impacts would occur (1) where the channel transitions from an open, riprap-lined channel to an underground, concrete-lined channel (upstream of Beaver Street); (2) where the underground channel is constructed south of, and parallel to, the railroad tracks; and (3) at the downstream limits of the channel modifications, where the greenbelt channel would be constructed.

Construction of the transition from an open channel to an underground channel would affect primarily weedy grasses and forbs. These are not sensitive vegetation species and they do not provide high quality wildlife habitat; accordingly, this impact would not be significant. The construction of the underground channel parallel to the railroad tracks would occur in a disturbed, urban environment with little existing vegetation. As with the area upstream of Beaver Street, the vegetation that is present in this area consists primarily of weedy grasses and forbs.

Downstream of underground channel’s terminus, the greenbelt channel would be constructed. The greenbelt channel would connect to an existing remnant section of the historic Rio de Flag channel. In

order to accommodate the construction of the greenbelt channel, approximately three acres of ponderosa pine and mixed riparian vegetation would be affected. The affected vegetation communities are not considered high quality habitat, in large part due to edge effects from surrounding industrial and other urban uses (e.g., the presence of debris, nonnative weedy species, and ground disturbances) and because the lack of storm flows or other surface water in this section of remnant channel severely restricts the survival of riparian species.

The net effect of the channel modifications in this area would be beneficial due to the establishment of the 56-foot-wide greenbelt channel with shallow side slopes. The greenbelt would be vegetated with native species, and it would receive storm flows from its connection to the existing Rio de Flag channel (via the underground channel parallel to the railroad tracks). This would more than offset the impacts associated with the greenbelt channel's construction.

Sinclair Wash

Under this alternative, flows associated with stormwater runoff in the present Rio de Flag channel near its confluence with Sinclair wash would be reduced as a direct result of flows in the Rio de Flag being diverted into a new channel (i.e., the channel following the approximate historic channel of the Rio de Flag adjacent to the railroad tracks). However, no significant impacts to the riparian vegetation downstream of the point of diversion are anticipated to result for the following reasons: (1) the existing Rio de Flag channel would still receive some storm flows, including flows from Sinclair Wash and local drainages, and (2) this section of the existing Rio de Flag channel is typically dry under present conditions, and vegetation associated with the wash is therefore adapted to long periods with little or no surface flow.

Clay Avenue Wash Detention Basin To Mike's Pike

Channelization of Clay Avenue Wash would occur in areas with disturbed vegetation (or areas lacking vegetation). Between Blackbird Roost and Milton Street, approximately 0.4 acre of disturbed riparian and wetland habitat would be replaced with a concrete-lined channel (including both open and underground channel). This loss of habitat would be considered significant for two reasons: (1) lining a drainage channel with concrete incrementally reduces its natural functions and values, and (2) riparian and wetland habitat are generally protected under Section 404 of the Clean Water Act. [The conversion of 0.4 acres of habitat to a concrete-lined channel would also contribute incrementally to a](#)

loss of the Rio de Flag's natural functions as values. This incremental loss would be mitigated through wetland habitat restoration and creation elsewhere along the Rio de Flag. As mitigated, impacts to biological resources would be less than significant.

Clay Avenue Wash Detention Basin

Approximately 2.5 acres of second-growth ponderosa pine woodland and 1.9 acre of mesic montane meadow vegetation would be removed for the construction of the detention basin's three embankments. No old-growth ponderosa pines are associated with this site. Impacts to the ponderosa pine forest would not be significant due to the relative abundance of this habitat type in the area, because it is not critical habitat for threatened or endangered species, and because its loss would not impede the migration of wildlife. The impacts to the mesic montane meadow vegetation would not be considered significant for similar reasons.

Periodic flooding may temporarily prevent access by wildlife to approximately 71 acres of montane meadow grasslands and ponderosa pine forest (i.e., habitat located within the 100-year ponding limits of the detention basin). Wildlife that may be temporarily impacted through loss of access to forage plants or small mammal prey species include deer, elk, coyote, and fox. Due to the short duration of flooding (less than 60 hours of water storage following the 100-year flood), impacts on these wildlife species are not likely to be significant.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Impacts associated with this alternative would be identical to those described for Alternative 6a, except that approximately two blocks of the Rio de Flag channel would be converted into an underground concrete arch. As a result, approximately 0.4 acre of channel (i.e., channel bottom and side slopes) would be changed from an earthen to a concrete-lined channel. Although the affected channel section does not support wetland or other sensitive habitat, its conversion to a concrete-lined channel would contribute incrementally to a loss of the Rio de Flag's natural functions as values. This incremental loss would be mitigated through wetland habitat restoration and creation elsewhere along the Rio de Flag. As mitigated, impacts to biological resources would be less than significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The biological resource impacts of Alternative 7 would be the same as those occurring under Alternative 6b, with the exception of additional short- and long-term impacts at the potential Cheshire Park and Thorpe Park detention basin sites. It is highly unlikely that there would be significant impacts to threatened, endangered, or proposed threatened or endangered species or their habitats under this alternative. No such species are known to occur in or near the proposed detention basins. Furthermore, the vegetation communities in the basins do not resemble those known to be used for breeding or foraging by any threatened and endangered species. Due to the anticipated short period of basin inundation, the movements of fish and wildlife would not be impeded under this alternative. Impacts to vegetation at the detention basin sites are described below.

Cheshire Park

Long-term impacts would include the physical removal of approximately 1.6 acres of ponderosa pine woodland, 0.8 acres of small riparian willows, 0.3 acres of montane meadow grasslands, and 0.3 acres of wetland vegetation. The loss of riparian willows and wetland vegetation would be considered significant due to the sensitivity of these vegetation communities and the protection they are afforded under Section 404 of the Clean Water Act. Impacts to montane meadow grasslands and ponderosa pine woodland would not be significant because of the low sensitivity of these habitats and because of the relatively small area of impact in comparison to the large amounts of similar habitat in the vicinity of Flagstaff.

Short-term impacts would be limited to displacement of wildlife use resulting from project construction activities. Wildlife that may be temporarily impacted through loss of access to forage plants or small mammal prey species include deer, elk, coyote, fox, and numerous bird species including raptors such as American kestrel, red-tailed hawk, and great-horned owl.

After project construction, use by wildlife of the area would be expected to return, however, not to a level equal to pre-construction conditions. The reduction in wildlife use would be associated with the increased human presence resulting from additional passive recreation features (such as trails and picnic tables) that would be located in the area following detention basin construction. Additionally, it could take several decades for ponderosa pines and other trees planted in the basin to reach maturity. This

loss of use would not be considered significant because the site does not provide habitat for threatened or endangered species and because of the prevalence of similar habitats available in nearby less urbanized areas.

Thorpe Park

The excavation of a detention basin at Thorpe Park and the associated construction of a bypass channel and embankment would result in the temporary elimination of virtually all wetland and riparian habitat along the Rio de Flag at Thorpe Park. A total of approximately 1.2 acres of riparian and wetland habitat would be removed from the Rio de Flag channel during construction. In addition, all of the wetland habitat in and along Frances Short Pond would be affected. The vegetation loss along the Rio de Flag channel would be considered permanent because the existing channel would be realigned to the east; thus, the existing channel vegetation would be cut off from future flows. The impacts to wetland vegetation at Frances Short Pond would be temporary because, following construction, the pond would be wider and shallower at the banks. These conditions would actually encourage the growth of more wetland vegetation than is currently located at the pond. Both the temporary and permanent impacts to wetland and riparian vegetation at Thorpe Park would be considered significant and would require mitigation.

In addition to the loss of wetland vegetation, construction-related impacts to Frances Short Pond would likely include fish kill and loss of potential nesting habitat for several bird species. The fish stocked in the pond are not sensitive native species, and their loss would be offset because the pond would be restocked with fish following construction. The loss of nesting habitat would be mitigated as described in Section 4.3.3.

Construction of the detention basin features would require the removal of approximately 350 trees, including approximately 280 mature ponderosa pines and numerous willows. A large snag (dead tree) designated as a “wildlife tree” by the U.S. Fish and Wildlife Service (USFWS) would also be removed. As described for Alternative 6a, the trees at Thorpe Park provide only limited wildlife value, in large part because of the high level of human activity at the park. As a result, the loss of 350 trees would not constitute a significant biological resource impact. (The human value placed on these trees is reflected in the assessment of recreation impacts in Section 4.6 and the assessment of esthetic impacts in Section 4.11). Because of the wildlife tree’s USFWS designation, its loss would be considered significant

despite the level of human activity at the park. Mitigation is provided to reduce this impact to a less than significant level.

Similar to Alternative 6a, importing fill to Thorpe Park could introduce a source of invasive nonnative weed seeds. This impact would be mitigated as described in Section 4.3.3.

Incorporation of the mitigation measures identified for this alternative would reduce the biological resource impacts to a less than significant level.

Alternative D: Localized Non-Structural Flood Proofing Alternative

No significant impacts to federally listed threatened, endangered, or proposed threatened or endangered species or their habitats would occur under this alternative. Furthermore, there would be no impacts to the movement or migration of fish or wildlife. Under this alternative, there would be no channelization or detention basin construction and thus no long-term impacts to wetland or riparian vegetation as detailed for the previous three alternatives.

Short-term impacts under this alternative would be limited to the Continental Estates area where the levees would be constructed. Disturbances would be limited to disturbed/urban habitats (e.g., golf courses) and to montane meadow grasslands. Because these earthen levees would be landscaped pursuant to the native plant revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff, the net effect of the berms on habitat would be nominal. Additionally, no federally-listed threatened, endangered, or proposed threatened or endangered species regularly utilize these habitats in the proposed berm locations (which are generally near residences or commercial structures). Based on these factors, the biological resource impacts of the berms would be insignificant.

No Action Alternative

Under this Alternative, there would be no impacts to vegetation communities, wildlife and wildlife use, or to federally-listed threatened, endangered, or proposed threatened or endangered species. Furthermore, there would be no loss of habitat value for any federally-listed species and no impediments to the movement of fish or wildlife.

4.3.3 Mitigation Measures

This flood control project requires construction in and around existing drainage features; therefore, complete avoidance of “waters of the United States” and other sensitive habitats would be impossible. In consideration of the project’s hydrologic, economic, environmental, and technical considerations, however, the USACOE has undertaken all possible measures to avoid and minimize impacts to biological resources. For example, the layout of the floodwalls along the east side of Thorpe Park was modified during the plan formulation process for Alternatives 6a and 6b to avoid all but 0.3 acres of riparian and wetland habitat. Additionally, channel modifications along the Clay Avenue Wash and Rio de Flag would result in a only 0.8 acres of permanent impacts to highly disturbed mixed riparian and wetland habitat. Where temporary and permanent impacts to wetlands are unavoidable, compensatory mitigation measures are provided.

Alternative 6a

Mitigation for Alternative 6a would be required for the temporary impacts to wetland and riparian habitat associated with construction of the floodwalls and the elevation of Thorpe Road, the loss of hydrophytic vegetation south of Route 66, and impacts to disturbed wetland habitat within the Clay Avenue Wash channel. These impacts would be mitigated as described below:

- on-site restoration at a 1:1 ratio and off-site habitat creation at a 1:2 ratio for the 0.3 acre of riparian vegetation temporarily affected by the floodwalls and road elevation at Thorpe Park (for 0.45 acre of mitigation total)—the off-site creation of 0.15 acre of habitat will be accomplished prior to construction to compensate for temporal habitat losses
- on-site restoration at a 1:1 ratio and off-site habitat creation at a 1:2 ratio for the temporary impacts to 0.6 acre of wetland and riparian habitat between Bonito Street and Dale Street (for 0.9 acre of mitigation total)—the off-site creation of 0.3 acre of habitat will be accomplished prior to construction to compensate for temporal habitat losses
- creation of habitat at a 1.5:1 ratio for the 0.3 acre of temporary impact between Route 66 and Beaver Street (for 0.45 acre of mitigation total)—at least 0.15 acre of habitat creation will be accomplished off site prior to construction to compensate for temporal habitat losses

- creation of wetland habitat at a 1.5:1 ratio for the 0.4 acre of impact along Clay Avenue Wash (i.e., creation of 0.6 acre of habitat), which reflects that while the impact in this location would be permanent, the affected habitat is highly disturbed and has a correspondingly low resource value.

Thus, the total mitigation for Alternative 6a will be 1.2 acres of on-site restoration at Thorpe Park and in the Rio de Flag Channel, with an additional 1.2 acres of habitat creation. Subject to the timing constraints identified above, and to the extent feasible, the additional habitat creation for the channel modifications downstream of Thorpe Park and along Clay Avenue Wash will be accomplished in the realigned Rio de Flag channel between Route 66 and Beaver Street. If the realigned channel in this area cannot accommodate all of the required wetland and riparian habitat creation, the additional mitigation will be provided in the greenbelt channel or immediately downstream from the greenbelt channel in the remnant historic channel.

In addition, mitigation will be required to minimize the potential for introducing nonnative weed species into the Rio de Flag system. This will be accomplished by maximizing the reuse of soil excavated from the Rio de Flag channel modifications to cover riprap in the channel and to construct berms and embankments. By reusing soil that is already within the system, the potential for introduced weed seeds will be reduced. Where imported soil is necessary, preference will be given to soil from sites with minimal invasive weed species. The native plant revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff contains post-construction monitoring and maintenance requirements for revegetated areas, including exotic species management measures (see Appendix J). Limiting the importation of potentially weedy soil to the Rio de Flag system and fostering the growth of native plant species will minimize the potential for invasive weed species to become established as result of this alternative.

As mitigated, the biological resource impacts of Alternative 6a would be less than significant.

Alternative 6b

The mitigation required for Alternative 6b would be identical to that required for Alternative 6a, with the addition of the following measure to compensate for the conversion of approximately two blocks of earthen channel to an underground concrete-lined arch:

- wetland habitat creation at a ratio of 1.5:1 for the 0.4 acre of impacts (0.6 acre total), which reflects that this will be a permanent conversion of the affected area to concrete-lined channel.

With this addition, the total mitigation for Alternative 6b will be 1.2 acres of on-site restoration at Thorpe Park and in the Rio de Flag Channel, with an additional 1.8 acres of habitat creation. Subject to the timing constraints identified above, and to the extent feasible, the additional habitat creation for the channel modifications downstream of Thorpe Park and along Clay Avenue Wash will be accomplished in the realigned Rio de Flag channel between Route 66 and Beaver Street. If the realigned channel in this area cannot accommodate all of the required wetland and riparian habitat creation, the additional mitigation will be provided in the greenbelt channel or immediately downstream from the greenbelt channel in the remnant historic channel. The mitigation measures identified for Alternative 6a regarding the introduction of nonnative weed species during soil import also apply to Alternative 6b.

As mitigated, the biological resource impacts of Alternative 6b would be less than significant.

Alternative 7

Alternative 7 would require the same mitigation as Alternative 6b for impacts downstream of Thorpe Park and along Clay Avenue Wash. Additional mitigation would be required for impacts to wetland and riparian habitat at Cheshire Park and Thorpe Park, as described below.

- in-kind habitat creation at a 1.5:1 ratio for impacts to approximately 0.8 acre of small riparian willows and approximately 0.3 acre of wetland vegetation at Cheshire Park (for a total of 1.65 acres of habitat creation)
- in-kind habitat creation at a 1.5:1 ratio for approximately 1.2 acres of impacts to wetland and riparian habitat along the Rio de Flag channel at Thorpe Park (for a total of 1.8 acres of habitat creation)
- on-site restoration at a 1:1 ratio for the wetland and riparian habitat impacts to Frances Short Pond

- replacement on-site of the USFWS-designated “wildlife tree” (snag) near its current location at Thorpe Park (because the tree is dead, it could be cemented or anchored to the ground by other means).

In addition, detention basin excavation at Thorpe Park will be started before April 1 or after May 31 to avoid impacts to nesting birds at Frances Short Pond.

Wetland and riparian (including willow) habitat creation will first be accomplished on-site at the new Rio de Flag bypass channel segments created at Cheshire Park and Thorpe Park, respectively. This will include replacing the willows removed during construction with new willows using a pole planting technique. Habitat creation requirements that cannot be accommodated along the Rio de Flag bypass channels at Cheshire or Thorpe Park will be met through wetland and riparian habitat creation at the I-40 wetlands. This will keep the created habitat within the Rio de Flag system and it will also help ensure that the habitat is located in an environment conducive to its long-term survival.

As mitigated, the biological resources impacts of Alternative 7 would be less than significant.

Alternative D: Localized Non-Structural Flood Proofing Alternative

This alternative would not result in significant biological resource impacts and would not require mitigation.

No Action Alternative

This alternative would not result in significant biological resource impacts and would not require mitigation.

4.4 CULTURAL RESOURCES

4.4.1 Significance Criteria

Adverse effects to sites and properties listed on, or eligible for, the National Register of Historic Places (National Register) are evaluated based on the *Criteria of Adverse Effect* as outlined in 36 Code of Federal Regulations (CFR) 800.5 of the regulations implementing Section 106 of the National Historic Preservation Act (NHPA). These regulations were recently amended and became final in June 1999. The *Criteria of Adverse Effect* is as follows:

An adverse effect is found when an undertaking may alter, directly or indirectly, the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative. Adverse effects on historic properties include, but are not limited to:

- (i) Physical destruction of or damage to all or part of the property;
- (ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR part 68) and applicable guidelines;
- (iii) Removal of the property from its historic location;
- (iv) Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;
- (v) Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features;
- (vi) Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; and
- (vii) Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

4.4.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Bridge Modifications

Impacts to the wingwall at Meade Lane and the Anderson Road and Beal Road bridges are not known at this time. A cultural resources survey of these three locations will need to be done if Alternative 6a is selected.

Thorpe Park Modifications

The Thorpe Park location area has been completely developed for recreation. Three artifacts (mano, biface frag, and groundstone axe) found in the area of the northernmost softball field suggest a prehistoric archeology site that may have been graded away during its construction. Otherwise, no potentially eligible cultural resources have been identified in this location.

Channel Modifications

Clay Avenue Wash from the Detention Basin to Mike's Pike

This reach along Clay Avenue Wash was surveyed by the USACOE for cultural resources and was found to be negative. There will be no impacts to historic properties along the channel alignment between the historic railroad bridge at the channel's western terminus and Mike's Pike.

Thorpe Park to Upstream of Beaver Street

This alignment has been surveyed twice, once for the historic building surveys in the 1970s and again in 1998 by the USACOE. Alternative 6a requires removal of three houses that are located at 314 Sitgreaves Street, and 311 and 314 West Cherry Street. They are within the boundaries of the Flagstaff Townsite Historic District but are not listed as contributing elements to the District.

Mike's Pike Alignment

No impacts are expected due to the alignment being comprised of an underground channel within the footprint of the roadway; however, eight National Register-listed properties are on the periphery of the Mike's Pike right-of-way. They are:

- C&M (Double circle) Garage - 204 Mike's Pike
- E. T. McGonigle house/B&M auto camp - 100 S. Mike's Pike
- Gavin/Hensing rental house - 37. S. Mike's Pike
- Mary A. Gavin's rental houses at 31-35 S. Mike's Pike
- an unnamed house at 17 S. Mike's Pike.

An additional building, the Flagstaff Steam Laundry, is at the southwest corner of Mike's Pike and Phoenix Avenue at 210 W. Phoenix Avenue. These historic buildings are all listed as contributors to the Southside/Oldtown Historic District. If construction remains within the specified corridor, these historic properties would not be affected.

Upstream of Beaver Street to Butler Avenue

No impacts are expected in the reach; however, two historic resources within the southern extent of the Railroad Addition Historic District Extension are very close to the proposed alignment. The proposed underground realignment of the channel will narrowly avoid affecting the historic Flagstaff Lumber Company Warehouse at 23 South San Francisco Street and the Northern Motor Company building on the corner of San Francisco and Phoenix streets.

Clay Avenue Wash Detention Basin

The existing ranch house complex at the southwestern side of the detention basin will need to be evaluated for its eligibility for inclusion in the National Register. Three of the buildings were built in 1935, 1944, and 1954 respectively. Current project design indicates potential inundation of the ranch complex during a 100-year event. Also within the basin's 100-year ponding limit are six other unevaluated resources. At the point where the channel opens into the easternmost end of the detention basin lies the former Atlantic and Pacific railroad alignment with abandoned railroad bridge abutments. The bridge, built in 1883 from the local Coconino Sandstone, was abandoned in 1937 when the

Atchison, Topeka, and Santa Fe (A.T. & S.F.) Railroad purchased the tracks and realigned them 50-meters north. Continuing west there are two historic trash scatters composed primarily of cans, barrels, and miscellaneous rusted automobile parts. Between the two trash scatters is a historic trail remnant with a trail marker comprised of a rock pile. There are two additional historic resources on the private property portion of the detention basin. One is the obliterated remains of a small 1930s- to 1940s- era cabin, and the other is a small trash scatter.

A request for a determination of eligibility for the railroad bridge was submitted to the Arizona State Historic Officer (SHPO) in a letter dated July 23, 1999. SHPO responded with a concurrence of the USACOE's determination on September 15, 1999. With the exception of the Railroad Bridge, no other resources have been evaluated for National Register eligibility. They probably are not eligible for the National Register; however, impacts to these historic features would be less than significant even if they are determined to be eligible. Short term inundation would not greatly degrade them any more than natural weathering already has.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative includes all of the components described for Alternative 6a; however, Alternative 6b includes a two-block-long covered channel segment extending from Dale Avenue downstream to Birch Avenue. Alternative 6b would avoid taking the three houses at the Sitgreaves Street and Cherry Avenue locations. The significant culture resource impacts of Alternative 6b would be the same as described for Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative is the same as Alternative 6b except that it also includes the Thorpe Park and Cheshire Park detention basins.

Cheshire Park Detention Basin

At the southeastern end of the APE the Narrows dam defines the terminus of the proposed detention basin. Much of the area north and west of the Narrows dam is undisturbed. A narrow foot trail runs

diagonally through the property running northeast to the southwest. A utility pole has been recently placed in the ground near the trail. A small chert side scraper was found near the utility pole with a few pieces of chert debitage. There is no way to formally ascribe the debitage to prehistoric activity because it (1) was located in the path of vehicle tracks associated with installation of the poles and (2) student flint knappers from the Harold S. Colton research Center have apparently been leaving evidence of their activities throughout the area. The scraper was recorded as an isolated find. A small site, AZ:I:3112 (MNA), had been recorded by the Museum of Northern Arizona in 1977. However, the site was only a 10 feet by 10 feet cleared area where a cabin may have once stood. There was no physical evidence of anything structural. The Cheshire Park geological setting is comprised almost solely basalt bedrock. This largely precludes the potential for subsurface archeological deposits.

The Narrows dam does not appear to be eligible for listing in the National Register of historic Places. The archeological materials from the area east of the dam are insufficient to make any meaningful statements, and are thus, considered to be ineligible as well.

Thorpe Park Detention Basin

The Thorpe Park detention basin location area has been completely developed for recreation. Three artifacts (mano, biface frag, and groundstone axe) found in the area of the northernmost softball field suggest a prehistoric archeology site that may have been graded away during its construction. Otherwise no potentially National Register eligible cultural resources have been found in the baseball field location.

Two small historic buildings are located on the western side of the access road/weir. One is a log cabin and the other is a small building constructed from river cobbles. Boy Scouts moved the log cabin, built in 1895, to that location in 1978 from the Veit Ranch on the San Francisco Peaks. The cabin was moved in pieces for educational use by the Flagstaff Middle School. The cobble stone building was built by the city when City Park (now Thorpe Park) was completed in 1923. It is now used for storage of maintenance equipment. Neither of these structures has been evaluated for National Register eligibility. Both buildings fall within the limits of grading for the embankment.

Alternative D: Localized Non-Structural Flood Proofing

There would be no cultural resource impacts expected for this alternative. This conclusion is derived from the fact that the area is recently developed. However, if this alternative is selected, a cultural resources survey of the affected area would be conducted.

No Action Alternative

Under the No Action Alternative there would be potentially significant effects to several potentially National Register-eligible structures in the City of Flagstaff. Periodic flooding that would continue to occur would damage these structures' structural and historic integrity. It is probable that over time damage would reach a threshold where their characteristics, which would qualify them for the National Register, would no longer have sufficient integrity.

4.4.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

The three houses that would be taken for construction of this alternative are not listed as contributors to the Flagstaff Historic District. There are no other impacts in the open channel segment of the Rio de Flag modifications.

Along Clay Avenue Wash impacts to the railroad bridge from floodwaters would be less serious than when it was built in 1883. Based on its placement on the natural drainage, the bridge abutment will allow the passage of floodwater. It will thereby continue to function as originally intended. However, because an outlet structure is proposed west of the bridge, water flows will be significantly reduced below historic levels. Scheduled release rates will be at lower levels than the without-project condition. The outlet structure is designed to be anchored to the railroad bed approximately 250 feet west of the bridge abutments. The railroad bed was recorded in 1996 as part of the remaining Atlantic and Pacific Railroad Bridge system (AZ:I:14:334). Anchoring the outlet structure into it will constitute an impact, albeit a minor one. Mitigation would be expected to be limited to Historic American Engineering Record (HAER) recordation of the bridge.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation measures for the Clay Avenue Wash Detention Basin would be the same as Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Dale and Birch Avenues)

Mitigation measures for the Clay Avenue Wash Detention Basin would be the same as Alternative 6a. In the absence of National Register eligible cultural resources, Cheshire Park Detention Basin does not require any mitigation. The two unevaluated buildings in Thorpe Park need to be evaluated and if they are determined to be eligible for the National Register mitigation may be required. Mitigation would probably be Historic American Building Survey (HABS) recordation. No mitigation is required along any of the channels. Since impacts to the wingwall at Meade Lane and the Anderson Road and Beal Road bridges are not known at this time, no mitigation measures are recommended.

Alternative D: Localized Non-Structural Flood Proofing

No significant impacts are anticipated under this alternative; therefore, no mitigation is required.

No Action Alternative

Continued flooding could result in potentially significant effects to several potentially National Register-eligible and eligible structures in the City of Flagstaff. Mitigation for these impacts would normally be to protect the structures from flooding. However, implementing a flood control project would not be considered mitigation for the No Action Alternative; instead, the provision of flood protection is represented by project Alternatives 6a, 6b, and 7. Therefore, no mitigation measures are provided.

4.5 LAND/WATER USE

4.5.1 Significance Criteria

The analysis of land use impacts addresses: (1) the compatibility of the alternatives with existing and planned land uses in and around the study area and (2) the conformance of the alternatives with local land use plans. Impacts are considered significant if the alternative results in permanent physical impacts related to either land use compatibility or conformance with adopted plans.

4.5.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Existing Land Use

Existing land use impacts are addressed with regard to how this alternative will affect those land uses in and around the proposed flood control structures. As discussed in the Section 2.2.1, Alternative 6a would improve flood protection along the Rio de Flag and Clay Avenue Wash. This increased flood protection would be considered a beneficial impact to existing land uses, particularly in the downtown area. Impacts associated with the displacement of residents by flood control facilities are addressed separately in Socioeconomics (Section 4.7).

Bridge Modifications

The construction of wingwalls at the Meade Lane bridge and the replacement of the Anderson Road and Beal Road bridges would have a negligible effect on existing land uses.

Thorpe Park Modifications

Under Alternative 6a, the structural modifications at Thorpe Park would include floodwalls along the eastern park boundary, two small embankments south of the existing weir, and elevation of North Thorpe Road by approximately five feet. The historic weir at Frances Short Pond would not be replaced or modified. The proposed flood control features would be compatible with existing land

uses, including the residences to the east of the park. The floodwalls would replace existing fences along the adjacent property boundaries and would not exceed five feet in height; therefore, impacts to existing land uses would be less than significant.

The effect of the project components on traffic circulation and visual resources (including views from the neighboring residences) is described in Section 4.8 and 4.11, respectively.

Channel Modifications

Thorpe Park to Upstream of Beaver Street. Under Alternative 6a, an open, buried riprap channel would be constructed from Bonito Street to just upstream of Beaver Street. Construction of the channel would require private property acquisition in the downtown area including three residences on the west side of the Rio de Flag between Dale Avenue and Cherry Avenue. The modified channel would pass within 30 feet of several other residences between Cherry Avenue and Birch Avenue. Further south, the proposed riprap channel would pass within 20 feet of City Hall and 60 feet of the Flagstaff Public Library.

Construction of this channel segment would result in a negative impact on existing land uses, but it would not be considered a significant land use impact. The acquisition and removal of three homes would result in significant socioeconomic impacts (see Section 4.7); however, the loss of these homes would not significantly alter the overall residential land use pattern of this area and the modified channel would not conflict with the remaining surrounding land uses. The channel would continue under Route 66 and, once the alignment crosses the railroad tracks, it would parallel the tracks north of Phoenix Avenue. The riprap channel would pass through a currently open disturbed lot and would replace the northern half of a city-owned paved parking lot north of Phoenix Road between Beaver Street and Milton Road. As it continues downstream towards Beaver Street, the alignment would displace a small portion of another city parking lot. This portion of the alignment would adversely effect existing land uses because it would change a land use previously dedicated to public parking to a flood control facility. This impact would not be considered significant because the parking spaces removed would be replaced in the immediate vicinity. Transportation impacts resulting from temporary road closures and the loss in parking spaces are discussed in Section 4.8.

Clay Avenue Wash Detention Basin to Mike's Pike. No channel modifications would take place along the Clay Avenue Wash from the proposed detention basin downstream to the west side of the

Chateau Royale Mobile Homes. Channel modifications would begin at the west end of the Chateau Mobile Home Park (just north of Chateau Drive) along the existing wash and would continue downstream to Mike's Pike. Construction would occur just north of the Chateau Mobile Homes Park and would displace up to 15 mobile homes at the adjacent mobile home park further downstream (at the intersection of Blackbirds Roost and Chateau Royale). The channel modifications would continue past the University Roost Apartment complex and would pass between several commercial and institutional uses (e.g., McCracken Place and the Greyhound Bus Station). The channel would pass just south of City Fire Station No. 1 and north of the Motel Canyon Inn before entering the "Five-Points" Intersection. (i.e., the intersection of Route 66, Milton Road, Butler Avenue, Mike's Pike and Clay Avenue).

For this reach, the proposed channel modifications would follow the existing Clay Avenue Wash alignment. Impacts on existing land use would occur in those areas where the proposed channel would occupy a greater area than the existing channel. Although the majority of the channel would be widened with the addition of a service road, impacts to structures would be limited to those occurring at the mobile home park described previously. The remaining portions of this reach would impact existing undeveloped areas or would stay within the confines of the existing channel alignment.

The proposed riprap channel would enter the mobile home park just east of the Chateau Royale Mobile Homes. The channel would displace 12 mobile homes in the northern portion of the mobile home park and would isolate an additional three homes. Although not within the limits of grading, these three mobile homes would be removed because they would be inaccessible and set apart from the remaining homes on the south side of the channel. A total of 15 mobile homes at the mobile home park would therefore be removed under this alternative.

The conversion of 15 mobile homes to a flood control channel would be a negative impact on existing land uses, but would not be considered significant. The loss of the mobile homes would not significantly alter the overall residential land use pattern of this area, and the modified Clay Avenue Wash channel would not conflict with the remaining surrounding land uses. (The impacts to the residents of those mobile homes are considered socioeconomic, not land use, impacts. The significant socioeconomic impacts to those residents are addressed in Section 4.7.)

Mike's Pike Alignment. There are currently twelve commercial/retail facilities and six residential units located along Mike's Pike between Milton Road and Phoenix Avenue. These land uses would not be

significantly impacted because site access would be maintained throughout construction of the underground channel (see Section 4.8, Transportation). Upon construction of the Clay Avenue Wash channel under Mike's Pike, the road would be returned to its pre-construction condition.

Upstream of Beaver Street to Butler Avenue. The channel improvements along this reach would involve the construction of a covered channel that transitions to an open greenbelt channel just north of South Colorado Street. The covered channel would be constructed within the railroad right-of-way immediately north of several commercial/industrial buildings on Phoenix Avenue. The greenbelt channel would extend through a currently undeveloped area and connect with the historic Rio de Flag channel near the Butler Avenue crossing (see Figure 2-1). A covered arch would be constructed at the Butler Avenue crossing, replacing the existing culverts under the road.

Construction of the covered channel may result in temporary inconveniences at some of the adjoining properties (e.g., noise, air quality), but no impacts on existing land use would be expected. Upon completion, the railroad right-of-way would be returned to its pre-construction condition. The greenbelt channel would not conflict with existing land uses because it would replace an undeveloped dirt corridor south the railroad tracks and would be contained within the historic Rio de Flag alignment. Traffic impacts associated with construction of the concrete arch under Butler Avenue are discussed in Section 4.8. Land use impacts would be less than significant.

Clay Avenue Wash Detention Basin

The flood control modifications for the Clay Avenue Wash detention basin include the construction of three embankments (see Figure 2-3). The proposed detention basin is situated in a primarily undeveloped area on the western outskirts of the Flagstaff. The basin area is bordered by the railroad tracks to the immediate north, the Hidden Hollow Mobile Homes and open space to the east, Historic Route 66 to the south, and the Coconino National Forest to the west. In a more regional context, the basin area is surrounded by the Coconino National Forest to the north, south, and west and sparse residential development to the east (mainly mobile home parks).

There are only three structures located within the 100-year water storage limit of the proposed basin. These structures are associated with a small ranch located in the southern portion of the proposed basin, just north of Historic Route 66 (see Figure 2-3). The significant cultural resource and socioeconomic impacts associated with the flooding of this structure are discussed in Sections 4.4 and

4.7, respectively. From a land use standpoint, however, the flooding or demolition of one ranch complex at the outskirts of the city limits would not represent a significant impact. This assessment is based on the fact that the majority of this property would remain its current state (i.e., undeveloped) if the site is used as a detention basin.

The proposed embankments at the Clay Avenue Wash detention basin would be compatible with the existing land uses in the area. The berms would occupy existing open space and would not affect the use of neighboring residential properties; accordingly, no existing land use compatibility impacts would result.

Planned Land Use

Local jurisdictions regularly adopt land use plans and ordinances to guide growth in an orderly and consistent manner. The objective is the creation of a land use pattern that provides for balanced development which reflects proper consideration of the range of economic, environmental, fiscal, social, and other needs. While Federal actions are typically not subject to local jurisdictions' land use plans, these local plans do provide a basis for determining if the respective Federal action(s) would result in planned land use impacts.

The following language from the City's *Growth Management Guide 2000* (GMG 2000) (City of Flagstaff 1987) is important in understanding the planned land use designations described later in this section and in the evaluation of impacts.

The Land Use Plan [of the Growth Management Guide] designates recommended land use patterns. For this reason, the designations are by density ranges or by land use types, not by specific zoning categories...The Land Use Plan functions as the development guide by identifying compatible land uses within a given area. Specific proposals are not automatically compatible with surrounding development simply because they fall within a broad land use designation. Rather, such factors as scale of the proposal, the intensity of the specific use, the probability of alternative development on the site, the proposal's influence on traffic patterns and the physical environment, and its economic and fiscal impact to the local community and the City as a whole must be weighed when a land use decision is to be made.

Implementation of this alternative would provide 100-year flood protection along portions of the Rio de Flag and Clay Avenue Wash and this would represent beneficial effect to the City of Flagstaff. Structures that were previously subjected to severe flood damage would no longer be at risk, and new

developments could be built without accommodating FEMA requirements for the 100-year flows. The majority of these benefits would be realized in social and economic terms, and they would not be considered land use impacts.

Bridge Modifications

The replacement of the Anderson Road and Beal Road bridges and the construction of wingwalls at the Meade Lane bridge would have a negligible effect on planned land uses.

Thorpe Park Modifications

The proposed floodwalls, embankments and road elevation would not significantly affect planned land uses in the vicinity of Thorpe Park. These flood control features would be located on land identified in the GMG 2000 as PLO (Public Lands, Open Space, and Building). The surrounding land uses are predominantly residential. The modification at Thorpe Park would not preclude future development consistent with planned land use designations.

Channel Modifications

Thorpe Park to Upstream of Beaver Street. South of Thorpe Park, channel modifications would begin at Bonito Street and continue downstream past Beaver Street. The channel would be an open channel configuration along the entire reach (excluding road crossings). The modified Rio de Flag would pass through a residential area designated as Medium Density Residential which allows for 6 to 12 units/acre as defined on the City Land Use Plan Map. The open channel configuration would result in the displacement of three houses on the west side of the channel near Cherry Avenue. The portion of the channel passing by the City Hall and library is identified on the Land Use Map as Commercial. The remaining portion of this reach (from Route 66 downstream to Beaver Street) is designated as Commercial.

The proposed channel construction would expand the existing Rio de Flag alignment from Bonito Street to the railroad tracks. The medium density residential area between Bonito Street and Birch Avenue is an established community with minimal space for future medium density development. The removal of three residences in this area would not significantly affect planned land use patterns. The City Hall and

library are major components of the downtown area and would be compatible with the future use of the flood control channel (and recreation trail) extending between them.

South of the tracks, the proposed alignment would diverge from the existing Rio de Flag alignment and head eastward along the railroad right-of-way. The riprap channel and parallel FUTS trail would occupy a dirt lot in an area designated as Commercial. The future use of this channel would be compatible with the surrounding land use designations which would continue to be available for commercial development. The covered channel that begins just west of Beaver Street would not significantly affect planned land use in the area because it would be located underground. The new FUTS trail along the channel access road would represent a beneficial land use impact. This multi-use channel would be consistent with the guidance provided in the Flagstaff Area Open Spaces and Greenways Plan to “provide an open channel for the Rio where possible, enhance its banks, and improve it with trails and other amenities.”

Based on these factors, planned land use impacts along this entire reach would not be significant.

Clay Avenue Wash Detention Basin to Mike’s Pike. Channel modifications along this reach are described in the existing land use section above. The alignment would remain essentially the same as the existing Clay Avenue Wash; however, the addition of a service road would substantially widen the majority of the reach. As with the current alignment, the modified channel would flow through an area designated as Commercial as well as an area designated as High Density Residential near Blackbird Roost. The channel would re-enter the Commercial land use designation east of the University Roost Apartments and continue downstream towards Mike’s Pike.

The areas designated as Commercial surrounding the channel modifications would remain available for commercial development and would also be removed from the 100-year floodplain under this alternative. Additionally, the high density residential area is largely built-out (near the University Roost Apartments and surrounding mobile homes) and would not be affected by the future use of the flood control facilities. Accordingly, impacts to planned land uses within this area would not be significant.

Mike’s Pike Alignment. The Mike’s Pike alignment would not affect planned land uses. Upon completion of the underground culvert, the street would be returned to its pre-construction condition.

Upstream of Beaver Street to Butler Avenue. The introduction of a new flood control channel through this area would not result in impacts regarding planned land use. Although this area is designated primarily as Heavy Industrial, the existence of a flood control channel would not preclude this use in land adjacent to the channel or significantly conflict with planned land uses.

Clay Avenue Wash Detention Basin

The proposed Clay Avenue Wash detention basin is located just outside of the corporate boundary of the City of Flagstaff, but within the Metropolitan Planning Organization boundary of the city. Because the site is located on Coconino County lands, compatibility with GMG 2000 land use policies is not applicable. Impacts related to planned land use in and around the proposed basin are; however, discussed with respect to the Flagstaff Area Open Spaces and Greenways Plan. The Open Spaces and Greenways Plan applies to development within County as well as the City of Flagstaff.

The proposed basin is located within the A-1 Mountain Landscape District of the Open Spaces and Greenways Plan. Specific land use recommendations are provided for this district, including the designation of the proposed detention basin as a “Neighborhoods” area on the Desired Futures Map. Based on the definitions provided in the plan, the future use of the detention basin would be consistent with the functions of a “Neighborhoods” area. “Neighborhoods” are described in the Plan as open spaces that would serve as recreational buffer zones between residential communities. According to the plan, these areas would have “trees, grasses, and rolling landforms...with relatively flat landscapes and ponderosa pine, pinon/juniper vegetation types, native grasses, and small pockets with unique geology or plant diversity.” The basin conforms with the goals, policies, and recommendations provided in the plan. Future preservation of this area as open space would serve as a beneficial land use impact with regard to open space. In addition, beneficial land use impacts would result downstream of the proposed basin by reducing flood damages in the floodplain.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in similar impacts to Alternative 6a; however, this alternative would not result in the removal of any homes along the Rio de Flag in the downtown area. Impacts to existing land uses would therefore be less than those described under Alternative 6a. The effect of this

alternative on existing and planned land uses would be less than significant for the reasons described under Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Existing Land Use

Cheshire Park Detention Basin

The Cheshire Park detention basin site is located in a largely undeveloped area in northern Flagstaff. The basin would occupy approximately 5 acres, including roughly 4.5 acres of city-owned land and 0.5 acre of land owned by the Museum of Northern Arizona. The existing Cheshire Park would be removed and replaced either within the limits of the new detention basin or at a new location within the same neighborhood of Flagstaff. Replacement of the park and implementation of the mitigation measure identified in Section 4.6 (Recreation) for the park would avoid long-term significant land use impacts. Refer to Section 4.6 regarding the recreation impacts associated with loss of park use during construction.

Thorpe Park Detention Basin

The flood control improvements at the Thorpe Park detention basin are described in Section 2.2.1. The modifications include basin excavation and the construction of floodwalls along the eastern boundary of the park and an embankment just south of the existing weir at Frances Short Pond. All detention basin construction activities would be located within the park boundaries.

The recreational amenities contained in the park are described in Section 3.6 and 4.6 of this document. North of Thorpe Road at the Little League fields, the basin area abuts two residences to the north, 14 houses to the east, Thorpe Road to the south, and Aztec Street on the west. At the Softball Complex, the proposed basin is bordered by Flagstaff Junior High School to the east, the Flagstaff Armory and the City Maintenance Yard to the south, and Thorpe Road to the north and west. From a regional perspective, the park is surrounded by low density suburban residential units to the north, medium density suburban residential units and townhouses to the east and south, and the Coconino National Forest to the west.

As described in Section 4.4, Cultural Resources, two historic park structures are located within the limits of grading for the embankment, a log cabin and a small building constructed from river cobbles. Other structures that would be removed during detention basin excavation include three adult softball fields, two ballfields, a concession stand, restrooms, an announcer's booth, lighting standards, and an enclosed playground. All facilities impacted during construction would be replaced to their pre-construction condition and floodproofed, as described in Sections 2.2.3 and 4.6.3. While the loss of park use during construction would constitute a significant recreation impact, it would not be considered a significant land use impact because the post-construction land use would be the same as the current use.

The detention basin would completely drain within 48 to 60 hours for the 100-year event, 36 hours for the 50-year event, and less than 24 hours for other more frequent events. During major flood events, the recreational function of the park would temporarily cease. Mitigation measures are provided in Section 4.6 (Recreation) to ensure that the park's recreational facilities would be returned to their pre-flood condition immediately following a flooding event, thus minimizing any long-term effects on existing land use. Given the infrequent nature of such events and the planned floodproofing of the replaced structures, the temporary future disruptions to recreational uses at Thorpe Park would not result in significant land use impacts (see also Section 4.6 Recreation). In addition, the proposed berms and floodwalls would be compatible with the existing land uses in and around the park and would not be considered a significant impact.

Planned Land Use

Cheshire Park Detention Basin

The proposed Cheshire Park detention basin site is located in a area identified in the GMG 2000 as PLO (Public Lands, Open Space, and Building). Construction of a detention basin is consistent with this zoning designation. Replacement of the Cheshire Park and creation of additional recreational features in the basin (e.g., trails) would also be consistent with the areas planned land use designations. Impacts to planned land uses would be less than significant.

Thorpe Park Detention Basin

The proposed detention basin is located entirely within the existing Thorpe Park. This park is designated on the GMG 2000 Land Use Plan as Park. The surrounding land uses are classified on this map as Low Density Residential, (1-5 Units/Acre) to the north and east; Medium Density Residential, (6-12 Units/Acre), to the west and south; Public/Semi-Public to the south; and Park to the west. The City Zoning Map identifies the park as PLO and the surrounding residential areas as R1, RML, and RMM (Single Family Residential, Multi-Family Residential- Low Density, and Multi-Family Residential-Medium Density, respectively).

The future use of the proposed detention basin would be consistent with the area's land use designation as a park and its zoning classification as Public Lands, Open Space and Building. The park is considered an integral component of the Open Space and Greenbelt System and would remain as such upon completion of the project. The Plan notes that, "...in some wider sections of the Rio de Flag, golf courses, ballparks, or City parks may be suitable and adaptive to large flood events." The Thorpe Park detention basin would be consistent with the stated goals and objectives of the Open Spaces and Greenways Plan, and Thorpe Park would remain a permanent part of the City's Open Space and Greenbelt System .

Surrounding land use designations would not conflict with the future use of the Thorpe Park detention basin. Aside from temporary closures during major flood events, the proposed flood control structures described in Section 2.2.1 for the park would not prohibit future use of the park as a recreational facility. Impacts on the park's recreational resources are described in Section 4.6 (Recreation). No additional land use impacts would result from this component of Alternative 7.

Alternative D: Localized Non-Structural Flood Proofing

This alternative would not require the relocation or purchase of any structures. As described in Section 3.5, the proposed berms are located in area designated as Open Space/Greenbelt in the GMG 2000. The proposed berms would be constructed to the maximum extent feasible on city property. This would help reduce conflicts with existing and planned land uses in the Continental Estates area. Some private property acquisition may be required; however, no structures would be affected under this alternative. Additionally, impacts to private property and to adjacent land uses such as the Peaceful Valley Memorial Park (cemetery) would be minimized during final berm design. For example, the

berms would be designed to ensure that they would not affect any grave sites. The berms would be compatible with the Open Space/Greenbelt land use designation, and they would therefore result in less than significant impacts on planned land use.

No Action Alternative

Under the No Action Alternative, temporary land use impacts would continue to occur during major flooding events, which may disrupt the ongoing operations of local businesses or other commercial facilities (particularly those located in downtown Flagstaff). These impacts would occur relatively infrequently and would not be considered a significant land use impact.

4.5.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Impacts to existing and planned land uses would be less than significant; therefore, no mitigation measures are required.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Impacts to existing and planned land uses would be less than significant; therefore, no mitigation measures are required.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Impacts to existing and planned land uses would be less than significant; therefore, no mitigation measures are required.

Alternative D: Localized Non-Structural Flood Proofing

Impacts to existing and planned land uses would be less than significant; therefore, no mitigation measures are required. This assessment is based on the USACOE's commitment to avoid structures and grave sites and to minimize other intrusions into private property during final project design.

No Action Alternative

Impacts to existing and planned land uses would be less than significant; therefore, no mitigation measures are required.

4.6 RECREATION

4.6.1 Significance Criteria

The evaluation of impacts on recreational facilities and opportunities considers both the short- and long-term effects of each alternative. Impacts are considered significant if the construction or operation of an alternative causes an increased demand that exceeds the resources design capacity (thus reducing its current level of service, limiting recreational opportunities, or threatening the viability of a recreational resource), prohibits recreational access, or causes termination of a recreational use (impacts lasting for less than one month are considered insignificant).

4.6.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

This alternative would result in short-term recreation impacts as a result of construction-related trail closures along the Rio de Flag segments of the Flagstaff Urban Trail System (FUTS); however, the long-term (post-construction) effects of Alternative 6a on recreation would be beneficial because improvements to the FUTS would be incorporated into the channel modifications. The recreational effects of Alternative 6a are described below in terms of its major components: Thorpe Park modifications, channel modifications, and the Clay Avenue Wash detention basin.

Thorpe Park Modifications

The flood protection features at Thorpe Park would be limited to the eastern boundary of the park (berms and floodwalls) and to just south of the weir (embankments). The section of the FUTS trail entering Thorpe Park near the weir would be kept open during construction of the embankments, berms, and floodwalls. Construction activities would not otherwise disrupt recreational activities of Thorpe Park (e.g., Little League, softball, and other athletic activities). Accordingly, the Alternative 6a modifications at Thorpe Park would not cause a significant recreational impact.

Channel Modifications

This alternative would entail construction in the Rio de Flag and Clay Avenue Wash channels. There are no recreational facilities or opportunities located along the Clay Avenue Wash channel; accordingly, construction along that channel would not result in recreation impacts. In contrast to Clay Avenue, much of the downtown reach of the Rio de Flag is paralleled by a FUTS trail segment that would be closed during construction. This short-term impact would be significant; however, it would be easily mitigated by providing short detours along the residential streets in this area (see Section 4.6.3). The long-term effect of the Rio de Flag channel modifications would be beneficial in terms of recreation because an extension of the FUTS trail, including a below-grade crossing of Route 66 and the railroad tracks, would be constructed as part of the project. This would provide better connections between various segments of the FUTS, and it would also reduce delays and safety concerns associated with the current at-grade crossings. All short-term recreation impacts associated with the Rio de Flag channel modifications would be reduced to less than significant levels.

Clay Avenue Wash Detention Basin

The Clay Avenue Wash detention basin would be situated largely on undeveloped state and privately owned lands. There are no designated trails or existing recreational facilities located within the footprint of the proposed detention basin. Construction and operation of the Clay Avenue Wash detention basin would not cause the termination of a recreational use or prohibit recreational access. The detention basin would be used for flood attenuation during major storm events and would not generate a demand for additional recreational facilities within the study area.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative includes all of the components described for Alternative 6a; however, Alternative 6b includes a two-block-long covered channel segment extending from Dale Avenue downstream to Birch Avenue. As with Alternative 6a, trail users would need to detour around the construction area on residential streets while the Rio de Flag channel modifications are underway. Once construction is completed, the FUTS trail along the Rio de Flag would again be available for public use.

For the approximately two-block-long segment of the Rio de Flag where an underground concrete arch would be installed (between Dale Avenue and Birch Avenue), the trail would be reconstructed at ground level after the arch is in place and the area has been backfilled with soil. In general, where trails follow water features, those water features contribute significantly to the recreational experience of trail users. The loss of two blocks of open channel in the downtown Flagstaff Reach would not, however, significantly detract from the recreational experience of this section of FUTS trail. This assessment is based on the relatively short length of trail affected and the urban environment which surrounds this section of the FUTS.

As with Alternative 6a, this alternative would result in a long-term benefit associated with the extension of the current trail and the installation of a below-grade trail crossing at Route 66 and the railroad.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The Rio de Flag channel modifications downstream of Thorpe Park, Clay Avenue Wash channel modifications, and Clay Avenue detention basin would be the same as for Alternative 6b, with identical recreational impacts and mitigation requirements. Alternative 7 also includes upstream detention basins along the Rio de Flag at Thorpe Park and Cheshire Park, and the recreational impacts associated with these two detention basins are discussed below.

Cheshire Park Detention Basin

Construction of this detention basin would entail the removal of Cheshire Park, including all of its facilities, and the construction of a replacement park either on site (within the detention basin) or at another site within the same neighborhood.

The park would be replaced on site if feasible. Under this scenario, the contours of the detention basin would be modified to allow several flat terraces which could support recreational facilities (e.g., tennis courts, play areas, picnic tables, a parking lot). During the approximately four-month detention basin construction period, local residents would not have use of the park. As described in Section 4.6.1, the loss of recreational facilities for more than one month is considered a significant impact. Accordingly, the loss of park facilities for four months would constitute an unavoidable significant impact. Following the completion of construction, park facilities would only be inundated with floodwater on rare

occasions (e.g., during very large storms). Based on the relative infrequency of inundation, and the fact that it would typically occur during rainy weather (when the demand for outdoor recreational facilities would be correspondingly lower than normal), these periodic, temporary losses of park use would not be significant. The effects of periodic flooding on park facilities would be mitigated to less than significant levels as described in Section 4.6.3.

The feasibility of reconstructing Cheshire Park within the detention basin would depend primarily on the ability to terrace the geologic formations that underlie the site. If it is determined during more detailed site testing and engineering design that on-site park replacement is not feasible, the park would be relocated elsewhere. Although a specific site for the new park location has not been identified, it would be constructed within the same general neighborhood.

Under the off-site park replacement scenario, the new park would be as large or larger than the existing Cheshire Park. To the extent practical, existing Cheshire Park facilities such as playground equipment and picnic tables would be relocated to the new park. Replacements for immovable facilities (such as the tennis and basketball courts) would be constructed at the new park site. As described in Section 4.6.3, the proposed new park would be built prior to construction of the Cheshire Park detention basin.

Because it is probable that a park could be reconstructed on site, the impact analyses in this EIS do not address construction of a new park facility. (For example, the biological resource impacts of constructing a new park at a different site are not addressed.) Should Alternative 7 be selected for implementation, and should it be determined that it is infeasible to reconstruct Cheshire Park within the detention basin, a new park site would be identified and evaluated in a Supplemental EIS at that time.

Thorpe Park Detention Basin

The excavation of a detention basin within Thorpe Park would cause significant short- and long-term impacts to recreation. Short-term impacts (up to 12 months) would occur to those park facilities within or immediately adjacent to the limits of excavation. This includes two Little League fields, three softball fields, concession stands, restrooms, a small parking lot just south of North Thorpe Road, and other park infrastructure (lighting standards, picnic tables, benches, monuments, etc.). These facilities would be removed prior to excavation and replaced on site at approximately two feet below their current elevation. The Thorpe Park softball complex is the primary adult softball venue in the city and, while

short-term closures of ball fields could be partially accommodated by using alternate facilities, this approach would not adequately mitigate the 12-month-long loss of these facilities.

The affected recreational facilities would be flood-proofed prior to being replaced on site, minimizing future damage associated with the detention of floodwater in the basin. It is anticipated that the Thorpe Park detention basin would drain completely within 48 to 60 hours following a 100-year event, and it would drain faster after lesser events. Although storm water would only be detained in the basin for a maximum of 60 hours at a time, most facilities, such as the Little League and softball fields, would still require some cleaning and repair following flooding of the detention basin. Because only large runoff events would flood the detention basin, this impact could be mitigated to below significant levels.

Long-term recreation impacts associated with Alternative 7 would include the effects of excavation on the topography of the ballfields, changes to Frances Short Pond, and the loss of mature ponderosa pines and other mature vegetation.

There are three baseball/softball fields that are only partially within the potential detention basin boundary. Excavating only part of these fields could leave some areas within the field of play up to two feet higher than other areas. This impact would be mitigated by revising the preliminary detention basin boundaries to ensure that all Little League and softball fields would either be entirely within or entirely outside the detention basin, thus literally providing a level playing field at each facility (see Section 4.6.3).

The detention basin footprint would alter the hydrology of Frances Short Pond. By lowering the surrounding ground level by two feet and maintaining the original water surface elevation of the pond, water would be spread out over a greater area. Accordingly, the area of shallow water would be greatly increased. From a recreational standpoint this is significant because it could encourage the growth of thick stands of emergent marsh vegetation along the edges of pond, reducing opportunities for fishing. Mitigation for this impact would entail recontouring the pond and rebuilding the pond's clay liner to facilitate better access and improved conditions for aquatic wildlife (fish) near the pond's banks.

There are approximately 350 mature trees at Thorpe Park that would be removed during the detention basin construction process, including over 280 mature ponderosa pines. These trees contribute significantly to the overall enjoyment of Thorpe Park (see also Section 4.11, Esthetics). Although new trees would be planted, it would take several decades for them to mature. Thus, although the look and

feel of Thorpe Park could ultimately be returned to pre-construction conditions, the loss of mature trees for such a long time would constitute an unavoidable significant recreation impact.

Flagstaff Urban Trail System (FUTS)

A portion of the FUTS traverses east/west past the Thorpe Park softball fields and exits the park along the Rio de Flag alignment just south of the existing weir at Frances Short Pond. This trail segment connects the Museum of Northern Arizona and portions of Observatory Mesa to the FUTS trail in downtown Flagstaff (see Figure 3-5). Because the embankment at the south end of the detention basin would block the existing FUTS trail at that location, the trail would need to be re-routed to join with the downstream portion of the trail near Dale Avenue. Realigning the trail would avoid significant long-term recreation impacts; however, since construction activities are anticipated to require over one month, the temporary closure of this trail segment would be considered a significant short-term impact requiring mitigation. Implementation of the recommended measure would reduce this impacts below the level of significance (see Section 4.6.3).

Impacts to the city bikeways are analyzed in Section 4.8, Transportation.

Alternative D: Localized Non-Structural Flood Proofing

Construction of the proposed south berm could potentially affect the users of the Continental Estates Little League fields, and it could also affect the Elden Hills golf course. The berm would be located just south of the ballfields and would traverse through the facility's dirt parking lot between the fields and Oakmont Drive. During construction, access to the fields may be restricted for several weeks. Although none of the construction activities would directly impact the ballfields, recreational activities might be postponed or canceled due to increased levels of dust or noise from construction. In addition, the berm may displace a small number of existing parking spaces in the dirt lot. Measures have been provided to reduce these impacts to a less than significant level (Section 4.6.3).

No additional recreational facilities would be directly affected by this alternative. Although portions of the south berm would be located adjacent to the Elden Hills Golf Course, mitigation has been developed to avoid significantly affecting the course (see Section 4.6.3). A planned segment of the FUTS traverses the Rio de Flag alignment in this area; however, the planned trail would not be affected by the berms.

No Action Alternative

Under this alternative, there would be no direct impacts to recreation because none of the detention basins or channel modifications would be undertaken. The local population would continue to desire outdoor recreation and parks to satisfy their leisure demands. Regional population growth and increased tourism will also prompt higher use the surrounding natural and recreational areas.

4.6.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

The following measure has been provided to minimize recreational impacts on users of the FUTS trail during construction of the channel in the Downstream Reach:

- During construction of the channel between Thorpe Park and the railroad tracks, signs shall be posted on appropriate trail markers identifying alternative routes to re-connect to the FUTS trail. It is anticipated detours would primarily utilize residential streets.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be identical to the measure identified for Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Cheshire Park Detention Basin

On-Site Park Reconstruction

- The preferred scenario would be to reconstruct Cheshire Park on site (if feasible). Because it would not be possible to complete basin excavation and park replacement within one month

(the significance threshold identified in Section 4.6.1), the loss of park use during construction would be considered a significant and unavoidable short-term recreation impact.

- A plan will be prepared to return all facilities in the park to their pre-flood conditions in the event of basin inundation. This plan will identify the primary locations within the water storage area that would be most susceptible to flood damage and provide measures to alleviate these impacts. This plan will be implemented by the City of Flagstaff following any event where detained waters affect recreational equipment, ball courts, or play areas.

Off-Site Park Construction

- If a replacement park needs to be constructed, the loss of park use during construction will be mitigated to less than significant levels by ensuring that the new park is open for public use prior to initiating detention basin construction. Under this approach, the affected neighborhood would only be “parkless” for the amount of time necessary to move mobile facilities (e.g., playground equipment, picnic tables) from the current park to the new park. This equipment transfer would take less than a month, mitigating the short-term impact of park closure to less than significant levels.

Thorpe Park Detention Basin

Construction of the detention basin components would have short- and long-term significant impacts. Mitigation would entail the following measures.

- A plan will be prepared to return all facilities in the park to their pre-flood conditions in the event of basin inundation. This plan will identify the primary locations within the water storage area that would be most susceptible to flood damage and provide measures to alleviate these impacts. This plan will be implemented by the City of Flagstaff following any event where detained waters affect recreational equipment, ball fields, or associated facilities.
- No softball/baseball field shall be partially excavated. In the case that a field is partially within the currently identified limits of excavation, detention basin design will be modified so that all fields will be completely level.

- Frances Short Pond will be recontoured and re-lined to ensure adequate public access to open water areas and to ensure favorable conditions for aquatic wildlife.
- Affected trees will be replaced at a 1:1 ratio. Five years after the initial tree replacement, any of the new trees that have not survived will be replaced at a 1.5:1 ratio.

Flagstaff Urban Trail System (FUTS)

Construction of the berm at Thorpe Park would result in the short-term closure (over one month) of a segment of the FUTS trail. The following measure would re-establish recreational access from downtown Flagstaff to the trails connecting to Observatory Mesa and the Museum of Northern Arizona, thus reducing this impact below the level of significance:

- During construction of the berm at the Thorpe Park detention basin, signs shall be posted on appropriate trail markers and near the construction area identifying alternative routes to re-connect the FUTS trail at Dale Avenue to the Observatory Mesa and Museum of Northern Arizona trails.

Summary of Unavoidable Significant Impacts

While these measures would mitigate some of the recreation impacts associated with Alternative 7, the following impacts would remain significant and unavoidable:

- Four-month loss of use of Cheshire Park (if the park is reconstructed on site)
- Twelve-month loss of use of five ballfields and associated recreational facilities at Thorpe Park
- Long-term (several decades) loss of approximately 350 mature trees at Thorpe Park

Alternative D: Localized Non-Structural Flood Proofing

Alternative D could potentially impact users of the Continental Estates Little League Fields. The following measure would reduce short and long-term impacts to users of this facility to less than significant levels:

- The final plans and specifications for construction of the south berm will include measures to reduce and, if practical, avoid direct and indirect impacts on recreational users of the Little League facilities during construction. Such measures may include restrictions on staging area locations and construction phasing plans to avoid heavy use periods of the little league fields. The plans and specifications shall also ensure that access to the fields is maintained at all times during construction.
- During the final design phase of the project, the design of the south berm shall be refined as to minimize impacts to the Continental Estates Little League Fields. These refinements shall include, but not be limited to, avoiding all structures (including the ballfields), maintaining adequate access to the fields, and minimizing the loss of parking spaces.
- During the final design stage of the project, the design of the south berm shall be refined to ensure that construction does not significantly affect the ability to use the Elden Hills Golf Course, and to ensure that the berm does not cause changes to the topography or layout of the golf course.

No Action Alternative

This alternative would not result in significant recreation impacts; therefore, no mitigation measures are provided.

4.7 SOCIOECONOMICS

4.7.1 Significance Criteria

This section examines the direct and indirect employment impacts, consequential demographic impacts, and estimated changes in the demand for local housing and public services. Impacts are considered significant if the alternative:

- induces growth that exceeds regional or subregional projections
- worsens the population/housing balance
- decreases the job market
- results in a recession of the local economy.

Significant impacts would also occur if residents are displaced from their homes or if an alternative does not comply with the guidance provided in Executive Order 19898, Environmental Justice, or Executive Order 13045, Health and Safety Risks to Children.

4.7.2 Impact Assessment

The potential for the project alternatives to cause significant socioeconomic impacts, pursuant to the significance criteria listed above, stems primarily from (1) the effects of construction activity on the local economy and (2) the effects of property acquisition at the detention basin sites and along the proposed channel alignments. These topics are addressed below with regard to population, housing, employment, and personal income, followed by assessments of Environmental Justice and Health and Safety Risks to Children.

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Population

Alternative 6a would not attract a long-term worker population to the project vicinity. Some direct and indirect project-related jobs would be created from construction of the project components. Although an incremental amount of migration to the region may occur as a result of the project's specific technical

requirements (i.e., the vicinity may gain some specialized construction equipment operators and laborers), this migration would be minimal and temporary

through completion of construction. The majority of the construction-related jobs are expected to be filled by both currently employed and unemployed labor force participants in Coconino County, therefore, construction of the project would not increase the Flagstaff area's population significantly.

Housing

Alternative 6a would result in the displacement of several residences, including: (1) three homes on the west side of the Rio de Flag near Sitgreaves and Cherry streets; (2) one ranch house and associated structures at the Clay Avenue Wash detention basin site; and (3) 15 mobile homes located to the immediate west of the Blackbird Roost/McCracken Drive intersection. The loss of 19 houses within the region would not have a noticeable effect on the local availability of housing. As described above, no long-term increase in population is anticipated. Accordingly, this alternative would not noticeably affect the population/housing balance.

The property owners that would be affected by the acquisition are entitled by law to be justly compensated for their property, based on fair market value as determined by an independent appraiser. Relocation assistance payments and counseling would be provided in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601 (1996)) to ensure adequate relocation and a decent, safe, and sanitary home for displaced residents. All eligible displaces would be entitled to moving expenses.

Eligible homeowners would also be entitled to certain supplemental payments to compensate for increased cost of replacement homes over and above the amount received for their homes, increased interest costs, and certain other expenses. In accordance with the provisions of the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, no residential occupant would be displaced unless replacement housing is available. All benefits and services would be provided equitably to all residential relocates without regard to race, color, religion, age, national origin, and handicap as recorded under Title VI of the 1964 Civil Rights Act (42 U.S.C. § 2000d-1).

Compliance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act will ensure adequate financial compensation for the acquired houses and other property, including

relocation expenses. This program cannot, however, substantially mitigate the loss of social ties, upheaval, and sense of loss that may be experienced by the individuals to be relocated. Therefore, while the economic effects of displacement would be reduced through compliance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, the significant social impacts are considered unmitigable.

Employment

Alternative 6a is expected to create temporary construction jobs within the region. As described in Section 3.7, Flagstaff's unemployment rate is high in comparison to the State of Arizona as a whole, and it tends to be dominated by tourist-related service jobs at the low end of the pay scale. In this environment, the creation of temporary construction jobs would be considered a short-term, beneficial impact.

Income

The increased construction-related employment would have a corresponding short-term beneficial effect on the local economy. Additional personal earnings would be created in the region during the construction phase, resulting in a short-term increase in personal income. The direct employment-related increase in personal income would result in associated short-term increases in spending on goods and services, temporarily benefitting both households and businesses within the local economy. This beneficial impact would not last long after construction is completed, and it would be negligible in comparison to the regional economy. This short-term economic benefit would not lead to increased growth within the region.

Environmental Justice

This section summarizes potential impacts from Alternative 6a with regard to Environmental Justice, as mandated by Executive Order 12898. This Executive Order requires that the relative impacts of Federal actions on minority and low-income populations be addressed to determine if disproportionate shares of high and adverse environmental and human health impacts would affect these groups.

As described previously, Alternative 6a would require the acquisition of 19 residences. Fifteen of these residences are within the Trailers Ho mobile home park which is located along the western edge of the

Old Town neighborhood depicted on Figure 3-6. As described in Section 3.7.1, Population and Demographics, this neighborhood has disproportionately higher levels of low-income and minority residents than the City of Flagstaff as a whole. The other residences that would be acquired under this alternative are the ranch house at the proposed Clay Avenue Wash detention basin site and the three residences along the Rio de Flag in the downtown area; these residences not represent low-income housing. Because 15 of the 19 homes that would be acquired under Alternative 6a are in a predominately low-income and minority neighborhood, this alternative would disproportionately affect minority and low-income families.

The proposed re-alignment of Clay Avenue Wash was not based on the income level or ethnicity of the residents; rather, the re-alignment is required as a result of modifications that occurred to the original Clay Avenue Wash channel when the area was developed. Prior to development, unimpeded flows followed the natural hydraulic grade directly through what is now the Trailers Ho mobile home park. However, Clay Avenue Wash flows currently are diverted from the channel's terminus upstream of the mobile home park onto Chateau Drive and then south along Blackbird Roost until they reach the shallow concrete channel centered in McCracken Drive. (The shallow concrete channel in McCracken Drive and the Trailers Ho mobile home park are visible in Figure 1-7, bottom photograph.) Downstream from McCracken Drive, flows enter a remnant portion of the Clay Avenue Wash channel.

Increasing flood protection through this section of Clay Avenue Wash will require modifications to the existing system. During the development of alternatives, it was determined to be infeasible from a hydraulics standpoint to realign Clay Avenue Wash to circumvent the mobile home park. Avoiding the mobile home park would require the Clay Avenue Wash channel to make a 107-degree turn from Chateau Drive to Blackbird Roost, followed approximately 120 feet further downstream by a 90-degree turn onto McCracken Drive. While this is essentially the same route along which the current flows are diverted (over street surfaces, not in a defined channel), this alignment cannot feasibly handle the flows from larger events. Sharp turns are problematic in channels designed to carry large flows, and two such turns within 120 feet would be infeasible to accommodate in channel design.¹ Providing a wide turning radius at these locations would necessitate removing other structures, such as the University Roost Apartment buildings. These apartments are within the Old Town Neighborhood,

¹ There are several drawbacks to having sharp turns in a drainage channel, one of which is that the turns cause turbulence and significantly reduce water velocities. Reduced velocities cause flows to back up in the channel (much the way cars back up on a highway as they approach a traffic-slowing accident). In order to accommodate the backed-up flow, a much larger upstream channel is required, and upstream flood control structures such as floodwalls or levees may also be needed.

and they also represent low-income housing; accordingly, this approach would not shift the brunt of the impacts away from low-income groups. It should also be noted that Alternative 6a would provide improved flood protection to numerous residences, including minority and low-income households in the Old Town Neighborhood.

Executive Order 12898 and the Council on Environmental Quality's (CEQ's) guidance for implementing Environmental Justice under NEPA (CEQ 1997) call for NEPA compliance documents to analyze impacts that affect minority and low-income populations and to identify mitigation measures, whenever feasible, to address those impacts. As described in the CEQ guidance, however,

Under NEPA, the identification of a disproportionately high and adverse human health or environmental effect on a low-income population, minority population, or Indian Tribe does not preclude a proposed agency action from going forward, nor does it necessarily compel a conclusion that a proposed action is environmentally unsatisfactory. (Chapter III, §B.2)

This EIS analyzes those impacts that would disproportionately affect a low-income group (i.e., the acquisition of mobile homes) and identifies feasible mitigation (compensation in compliance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act). Additionally, the USACOE will work to reduce the number of affected residents during final project design. Based on these factors, the USACOE has complied with Executive Order 12898.

Health and Safety Risks to Children

This alternative would not be expected to result in sources of environmental health and safety risks to children, with the potential exception of safety hazards associated with the covered concrete drainage channels. Despite the inherent dangers associated with playing in a covered concrete channel, these channels may constitute an "attractive nuisance" to children. (For example, it might appear fun to enter a covered channel on one end of downtown and emerge on the other side; however, this type of activity is very dangerous.) The USACOE proposes to mitigate this risk by requiring the City of Flagstaff to implement a public information program, as described below under Mitigation.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in impacts similar to those described for Alternative 6a; however, this alternative would avoid the displacement of the three residences along the Rio de Flag in the downtown area. Similar to Alternative 6a, the effects of this alternative on population housing and income would be less than significant. Potentially significant impacts regarding environmental health and safety risks to children would be reduced to less than significant levels through incorporation of the recommended mitigation measures. Social impacts from the acquisition and removal of 16 residences would be significant and unavoidable and this alternative would disproportionately affect low-income populations.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The socioeconomic impacts associated with this alternative would be similar to those described for Alternative 6b, except that more construction would be required, with a corresponding increase in the short-term beneficial effects for employment, income levels, and the local economy. No additional residences would be affected.

Alternative D: Localized Non-Structural Flood Proofing

This alternative would generate short-term beneficial socioeconomic benefits as a result of construction. Because this alternative would entail substantially fewer construction activities in comparison to Alternatives 6a, 6b, and 7, these effects would be negligible in terms of employment and income. This alternative would not require the acquisition of residences and would not otherwise affect the population/housing balance. Any private property acquisition associated with this alternative would be undertaken in accordance with applicable Federal laws. Because no residences would be affected by the berms, there would be no displacement of residents.

Under this alternative, impacts would occur only within the Continental Estates area. This area does not encompass a disproportionate amount of minority or low-income populations in comparison to the City of Flagstaff as a whole. Accordingly, this alternative would not result in high and adverse environmental or human health impacts that disproportionately affect low-income or minority populations. Similarly, this alternative would not result in health or safety impacts, and would therefore

not cause these types of impacts to occur to children. Overall, the socioeconomic impacts associated with this alternative would be less than significant.

No Action Alternative

The No Action Alternative would not cause socioeconomic impacts; however, it would not prevent or minimize future flooding along the Rio de Flag. As a result, damages to residential, commercial, institutional, and industrial property would be expected in the future as a result of flooding. As described in Section 1.3.1, future flooding may also affect the use of the railroad tracks through Flagstaff. Thus, under the No Action Alternative, flooding could affect the housing balance and local economy, as well as regional economies (i.e., those regions that rely on rail transportation of goods through Flagstaff). See section 1.3.1 for additional discussion of potential future damages associated with flooding along the Rio de Flag and Clay Avenue Wash.

Because the No Action Alternative would not cause impacts (including environmental, human health, or safety impacts), it would not disproportionately affect minority or low income populations, and it would not cause human health or safety impacts to children.

4.7.3 Mitigation Measures

Alternative 6a

This alternative would entail the acquisition of the ranch house, 3 residences along the downtown Rio de Flag reach, and 15 mobile homes along the Clay Avenue Wash channel alignment. The economic impacts of the property acquisition would be mitigated through compliance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, but the social impacts would not be mitigated to less than significant levels.

This alternative also entails the creation of covered channels that may pose a safety risk to children. The USACOE will mitigate this potential effect by requiring the City of Flagstaff to establish and maintain a public information program regarding the potential hazards associated with drainage channels. This requirement is described under the Mitigation section of the Safety impacts analysis (see Section 4.13.3).

Alternative 6b

The mitigation measures for this alternative are the same as those described for Alternative 6a. Although three fewer homes would be displaced, social impacts would remain significant and unmitigable under this alternative.

Alternative 7

The mitigation measures for this alternative are the same as those described for Alternative 6a. Although three fewer homes would be displaced under Alternative 7 in comparison to Alternative 6a, social impacts would remain significant and unmitigable.

Alternative D: Localized Non-Structural Flood Proofing

This alternative would not result in significant socioeconomic impacts, and it would therefore not require socioeconomic mitigation measures.

No Action Alternative

This alternative would not result in socioeconomic impacts, and it would therefore not require socioeconomic mitigation measures. Mitigation to avoid the potential damages associated with future floods would entail the provision of flood control measures. These would not be considered mitigation for the No Action Alternative; rather, they would constitute project alternatives (e.g., Alternatives 6a, 6b, and 7 addressed in this EIS).

4.8 TRANSPORTATION

4.8.1 Significance Criteria

The assessment of the alternatives' impacts on transportation and traffic includes primary impacts in the project vicinity and induced secondary impacts. Impacts from the alternatives are considered significant if:

- expected project related traffic causes or compounds traffic congestion during peak hours
- project-related traffic impedes access to businesses or residences
- construction vehicles are not provided with adequate parking facilities
- project-related road closures substantially alter the circulation patterns of the local roadway or bikeway network
- project-related activities impede railroad operations.

Impacts regarding motorist and pedestrian safety from project generated traffic are analyzed in Section 3.13, Safety.

4.8.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Bridge Modifications

Under Alternative 6a, the Anderson Road and Beal Road bridges would be closed for approximately two to four weeks each during construction; however, the bridges would not be closed simultaneously. Due to the short duration of the bridge closures and the availability of alternative routes to the immediate north and south, temporary alterations in circulation patterns would be less than significant. The effect of these bridge closures on emergency response routes is discussed in Section 4.13.2, Safety

Thorpe Park Modifications

The two-week closure of the North Thorpe Road segment would limit vehicular and bicycle access to an isolated residential area northwest of the park which is only accessible via Curling

Smoke Drive. During the closure of the this segment, vehicles and bicyclists normally accessing Thorpe Road via Hopi Drive or Bonito Street would be required to drive approximately one additional mile to access Thorpe Road from the north or south. Traffic could avoid the street closure via Cherry or Birch Avenue to the south or Beal or Anderson Road to the north. (As discussed in Section 2.2.1, the closure of Anderson Road and Beal Road would not overlap with the closure of North Thorpe Road). Given the minimal distance required to bypass the closed road segments and the temporary nature of the closures, this impact would be less than significant.

Approximately 35 truck trips per day would be generated during the six-month construction period at Thorpe Park. Construction activities and material hauling would temporarily alter circulation patterns and cause minor delays on local roads; however, mitigation measures identified in Section 4.8.3 would reduce the short-term traffic impacts from the Thorpe Park modifications to a less than significant level.

Channel Modifications

Construction-Related Traffic

Rio de Flag. Construction of the Rio de Flag channel modifications would last approximately 6 to 12 months. On-site construction equipment would include backhoes, dump trucks, scrapers, cement trucks, flatbed trucks, truck trailers, pickup trucks, and construction workers' personal vehicles. Approximately 20 truck trips per hour would be generated during the six-month construction period for the channel modifications, the majority of which would take place south of the railroad tracks. The impacts of these trips on the local roadway network (combined with the trips generated from the other project components) would result in potentially significant short-term impacts on transportation. The temporary alterations in circulation patterns or traffic delays during construction would be mitigated to less than significant levels.

Clay Avenue Wash. Impacts from construction-related traffic would be similar to those described for the Rio de Flag channel modifications. Approximately six additional truck trips per hour would be

generated by this project component. Assuming that the project components are all operating at the same time (worst-case scenario), the total truck trip generation of this alternative would be 30 trucks per hour at different locations throughout the city. Because these trips would be spread out across the city, it would be possible to mitigate traffic impacts to less than significant levels.

Construction Staging

During construction of the channel modifications, construction staging would take place primarily on vacant city-owned land. The staging areas would generally be located near the channel in order to minimize the travel distance to and from the construction site. The mitigation measures identified for this alternative would reduce impacts related to construction staging below the level of significance.

Road/Rail Line Closures

Thorpe Park to Upstream of Beaver Street. During construction, several street segments would be temporarily closed including Bonito Street, Dale Avenue, Cherry Avenue, Birch Avenue and Aspen Avenue between Sitgreaves and Humphry Streets. These roadways would be closed for approximately five to seven days each during construction. Mitigation is provided to reduce the short-term impacts of the closure of these roads below the level of significance. The Route 66 under-crossing would be constructed as to maintain two way traffic during the entire two-week construction period. The lane reductions on Route 66 would result in short-term inconveniences that would be less than significant.

Construction of this reach would also require a Rio de Flag under-crossing and a parallel FUTS trail under-crossing at the railroad tracks between Sitgreaves Street and Humphreys Street. The construction of the railroad under-crossings would require that each of the two sets of railroad tracks be closed for 24 hours during construction; however, only one set of tracks would be closed at a time. Because one set of railroad tracks would remain open, and because each set of tracks would only be closed for 24 hours, the railroad operators would not experience a significant transportation impact.

Clay Avenue Wash Detention Basin to Mike's Pike. This reach would require the temporary closure of four street segments, including portions of Chateau Drive, Blackbird Roost, McCracken Drive, and Malpais Lane. As with the previous reach, these road closures could be mitigated to a less than significant level. The Five-Points intersection would remain open during construction, although some

lanes would be closed during the open-trench excavation and installation of the covered channel. Road closures would be mitigated to a less than significant level.

Mike's Pike Alignment. There are currently twelve commercial/retail facilities and six residential units with access along Mike's Pike (between Milton Road and Phoenix Avenue). Construction of the covered channel along this reach would result in impacts on traffic circulation but would not restrict access to these facilities. The construction activities would last approximately six weeks and would take place in the middle of the road alignment. Access would be maintained to all facilities along Mike's Pike; however, some minor detouring or routing may be required during construction. Because it is not a major thoroughfare, limited construction-related traffic along Mike's Pike would not significantly cause or compound traffic congestion during peak hours.

Upstream of Beaver Street to Butler Avenue. During construction of the covered channel at Beaver Street, San Francisco Street would be converted to a two-way street. Conversely, Beaver Street would become a two-way street during construction at San Francisco Street. The roadway modifications would last approximately one week per street, after which the streets would be returned to their pre-construction (one-way) orientations. Since adequate north/south access would be maintained between both sides of the railroad tracks in the downtown area, transportation impacts would be less than significant during construction. To further minimize impacts, mitigation is provided to ensure that the public is informed of these temporary changes.

Construction of the covered channel would necessitate the closure of four railroad spurs for approximately five to seven days each. These spurs are located immediately south of the main tracks between Beaver Street and the Northland Recycling Building. The spurs service several of the commercial and industrial facilities located on Phoenix Avenue, Elden Street, as well as the Northland Recycling facility. The short-term closure of these individual tracks would not be significant due to the brief nature of their closure and their relatively infrequent use.

At Butler Avenue, replacement of the corrugated metal pipe with a concrete arch could disrupt traffic; however, one lane in each direction would be kept open at all times. Accordingly, this would not cause a significant transportation impact.

Permanent Impacts

The permanent transportation impacts associated with Alternative 6a would generally be beneficial. The provision of 100-year flood protection would remove trails, key railroad segments, and numerous streets from the threat of flooding that currently exists in the downtown area. There are, however, some permanent negative transportation impacts associated with this alternative. These impacts are discussed below.

Channel modifications along the Rio de Flag would require the permanent closure of Kendrick Street between Cherry and Birch Avenues. This one-way northbound street would be replaced with an larger channel and a parallel service road. With the exception of access for city maintenance crews, this road segment would be permanently closed to vehicular traffic. However, a recreation trail would be maintained along the outer edge of the channel. The closure of this portion of Kendrick Street result in an adverse impact on transportation, but it would not be considered significant for the following reasons:

- No direct residential access would be eliminated. Street access for the residential structures along this block is achieved via Cherry Avenue and Birch Avenue.
- In its existing condition, Kendrick Street terminates at Birch Avenue and therefore is not utilized as a major north/south arterial. The closure of the previous block would alter some local circulation patterns but would significantly compound traffic congestion during peak hours.
- Sitgreaves and Humphreys Streets would serve as suitable alternate routes to the west and east, respectively.

Just north of Phoenix Avenue and west of Beaver Street, the proposed channel would cross the northern half of a city-owned parking lot and would eliminate approximately 25 parking spaces. This section of the channel would also eliminate a small portion of another nearby lot. This impact would not be considered significant because the parking spaces would be replaced in the immediate vicinity of the existing lots.

Clay Avenue Wash Detention Basin

Construction of the Clay Avenue Wash detention basin would generate on-site vehicular movement associated with the proposed embankment structures. The detention basin at Clay Avenue Wash would

require approximately 120 truck trips per day for approximately 3 weeks (12 trips per hour). Although the Clay Avenue Wash detention basin is located in a more sparsely populated area and is immediately adjacent to highway (Route 66), mitigation measures are also provided for this basin to ensure that short-term construction traffic impacts remain less than significant. The long-term operation-related traffic impacts associated with the Clay Avenue Wash detention basin would be negligible.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in the same traffic impacts as described for Alternative 6a; therefore, implementation of the mitigation measures identified for Alternative 6a would reduce short-term transportation impacts from Alternative 6b to less than significant levels.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Cheshire Park Detention Basin

Construction of the Cheshire Park detention basin would not result in any street closures. In addition, equipment staging would occur within the limits of grading of the basin. Soil and rock excavation would generate approximately 26 truck trips per day for approximately four months. Although the Cheshire Park detention basin site is located in a relatively sparsely populated area and is near a highway (Highway 180), mitigation measures are also provided for this basin to ensure that short-term construction traffic impacts remain less than significant. The long-term operation-related traffic impacts associated with the Cheshire Park detention basin would be negligible.

Thorpe Park Detention Basin

Construction-Related Traffic

As discussed in Section 2.2.1, construction of the detention basin would require approximately 73 round truck trips per day during the three-week grading period. These trucks would haul material to the basin from off-site locations and would involve approximately seven to eight trucks entering and leaving the site every hour. On-site construction equipment would be similar to that described for Alternative 6a.

The roadways surrounding the basin area are smaller roads inherent to rural and small urban areas; therefore, the addition of 73 truck trips per day on the local roadway network could result in significant short-term impacts on transportation. Construction of all the project components simultaneously (worst-case scenario) would generate up to 36 truck trips per hour throughout the city. The potential temporary alterations in circulation patterns or traffic delays during construction would be mitigated to less than significant levels.

Construction Staging

Under this alternative, adequate parking would be provided for construction-related vehicles within the limits of grading. Staging of large construction equipment would occur primarily on site and, if needed, at a city-owned inert landfill approximately 3.5 miles from the basin area. No transportation impacts related to parking of construction vehicles or staging of construction equipment are anticipated.

Road Closures

Construction of the Thorpe Park detention basin would result in short-term impacts on the local roadway and bikeway network. During construction of the detention basin, the following roadway segments would be temporarily closed: (1) a segment of North Thorpe Road between Aztec Street and Hopi Drive and (2) the Flagstaff Junior High School access road. Upstream of the basin, the Anderson Road and Beal Road bridges would be temporarily closed during construction as well. The short-term impacts associated with the North Thorpe Road and upstream bridge closures are described under Alternative 6a.

Flagstaff Junior High School is serviced by two parking lots: (1) a 40-car lot that is only accessible via a road traversing the weir at the Frances Short Pond (the “junior high school access road”), and (2) an 80-car lot at the corner of Thorpe Road and Bonito Street. The junior high school access road would be closed for approximately two months during construction of the proposed detention basin embankment (upon completion, the road would be relocated to the top of the embankment). As discussed in Section 2.2.3, construction would be undertaken in the summer months when school is out of session. Although vehicular access to the 40-car lot would be terminated for a period of two months, this would not significantly impact school parking because of the timing of construction. Since the road would be reopened prior to the first day of school, impacts on transportation would be less than significant.

Operations-Related Traffic

Few vehicle trips would be required to inspect, maintain, and repair the detention basin once it has been completed. These trips would have a negligible traffic impact on local streets.

Alternative D: Localized Non-Structural Flood Proofing

Construction-Related Traffic

As discussed in Section 2.2.3, this alternative would generate an average of approximately 42 construction-related truck trips per hour for the duration of the six-month construction period (12 per hour for the north berm and 30 per hour for the south berm). These trips would be associated with the hauling of imported fill material to the site to construct the earthen berms, which would range in height from 13 to 26 feet. The same type of construction equipment described for Alternative 6a (see above) would be used for this alternative.

Construction trucks would reach the two berm sites by heading south on Country Club Road from either I-40 or U.S. Highway 89. Vehicles on Route 66 can also reach Country Club Drive from the north via a short segment of U.S. Highway 89. Construction trucks would not be allowed to traverse the residential neighborhoods of Continental Estates. (While it would be possible to reach the berm sites from the west via Butler Avenue, this would generate excessive truck traffic through residential neighborhoods. In order to reach the proposed berm locations from Butler Avenue, trucks would have to drive through small residential neighborhoods via Continental Drive or Mt. Pleasant Drive to reach Country Club Drive from the south.) Trucks delivering fill to eastern portions of the south berm may also utilize a section of Oakmont Drive.

The addition of 420 construction-related vehicle trips per day on the local roadway network (Country Club Drive for both berms and Oakmont Drive for the north berm) would be considered a significant short-term impact on transportation. Short-term impacts from construction generated traffic would be reduced to less than significant levels as described in Section 4.8.3.

Construction Staging

During construction of the berms, construction staging would take place primarily on vacant city-owned land. The staging areas would generally be located near the berms in order to minimize the travel distance to and from the construction site. The mitigation measures identified for this alternative would reduce impacts related to construction staging below the level of significance.

Road Closures

The Localized Non-Structural Flood Proofing Alternative would result in temporary road closures at Country Club Drive and Oakmont Drive. The south berm would tie in to the east and west embankments of Country Club Drive just north of Fairview Drive and would require raising a section of Country Club Road. The same would occur further east on Oakmont Drive where the berm would be constructed up to the embankment along both sides of Oakmont Drive just east of Walnut Hills Drive. Impacts associated with these temporary road closures would be mitigated to less than significant levels.

Operation-Related Traffic

Few vehicle trips would be required to inspect, maintain, and repair the levees once they have been completed. These trips would have an insignificant traffic impact on local streets.

No Action Alternative

Under the No Action Alternative, significant transportation impacts would occur during future flood events in study area. During a major flood, there would be the potential for significant disruption of railroad operations resulting in loss of revenue, increased transport costs, and increased repair costs for the embankment and track (see Section 4.7, Socioeconomics).

In addition to the railway system, flooding also significantly affects the local roadway network. During minor flood events, Route 66 through downtown becomes completely impassable. Route 66 is a major vehicular transportation corridor through Flagstaff. During a 25-year or greater event, most of the streets on the north and south sides become impassable. Such floods could detour up to 40,000 vehicle trips per day for up to seven miles. This would not only cause traffic congestion during peak hours, but could also result in a substantial safety hazard to motorists, bicyclists and pedestrians. Mitigation for

these impacts would be to provide improved flood control. This approach would not be considered mitigation per se; rather, it is represented by Alternatives 6a, 6b, and 7, each of which improves flood protection for downtown Flagstaff.

4.8.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

The following measures are provided to reduce transportation impacts associated with Alternative 6a below the level of significance:

- A traffic control plan shall be prepared during the final design stage of the project, and implemented during the construction phase. The plan shall address and outline appropriate vehicular speeds in construction areas; travel routes, detours, or lane/road closures; flag-person requirements; appropriate signage and safety reflectors; coordination with the Arizona Department of Transportation (ADOT); appropriate notification to the public; any utility relocation requirements; the location of staging areas; safety procedures to reduce hazards to motorists, bicyclists, and pedestrians; approach to ensuring access to businesses and residences; and emergency information. The traffic control plan will be reviewed by the city and ADOT. The final version of the plan will be submitted to all appropriate entities.
- A road improvement plan shall be prepared during the final design stage of the project, and implemented during the actual construction phase. The plan shall identify road segments, bridges, and culverts that need to be improved and turnout locations that need to be constructed to accommodate project construction, maintenance, and operational activities. The plan will also identify any damage to existing roadways, caused by construction vehicles, that will need to be repaired.
- Construction of this alternative would result in the closure of several road segments throughout the City. During construction activities, alternate routes and detour signage will be used to ensure motorist safety and minimize commute inconveniences. In addition, it may also be advantageous to request a local radio station to assist in notifying the community of the anticipated roadway closures and major construction dates. Other public notification methods which can be implemented could

include: a roadway hotline number, local newspaper announcements/press release information, television news, city/community bulletins, or web site announcements.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in potentially significant impacts related to transportation; however, implementation of the mitigation measures identified for Alternative 6a would reduce these impacts to less than significant levels.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 7 would result in potentially significant impacts related to transportation; however, implementation of the mitigation measures identified for Alternative 6a would reduce these impacts to less than significant levels.

Alternative D: Localized Non-Structural Flood Proofing

The same measures identified for Alternative 6a would apply to this alternative. In addition, the following measures would be required to reduce transportation impacts associated with Alternative D below the level of significance:

- All construction-related traffic will access the proposed berm locations via Country Club Drive from the north. Construction traffic shall not be allowed on the local roadway network before 8:30 a.m. or after 4:00 p.m. on weekdays. These stipulations will be incorporated into a traffic control plan prepared during final design.
- During construction to raise the elevations of Country Club Road and Oakmont Drive, respectively, on-site detours will be provided to ensure continual access along these roads. Specific detour designs will be included in the project's traffic control plan.

No Action Alternative

The significant transportation impacts associated with the No Action Alternative cannot be mitigated below the level of significance.

4.9 NOISE

4.9.1 Significance Criteria

Noise impacts are analyzed with regard to the construction activities associated with each alternative. Long-term noise effects would be negligible because of the limited level of activity required for the alternatives' operation and maintenance. Accordingly, operation-related noise impacts are not analyzed in this section. Noise impacts have been assessed in consideration of the projected construction schedule, anticipated equipment usage, and existing noise levels. Impacts are considered significant if:

- project-generated noise levels exceed the limits of local noise ordinances or noise regulations promulgated on the Federal or state level
- project traffic-related noise increases the traffic noise to sensitive receptors by more than three dBA
- project-generated noise levels exceed 70 dBA L_{eq} at noise-sensitive biological resource sites
- project-generated noise levels would substantially disrupt sensitive receptors for extended periods of time.

In compliance with the City of Flagstaff Noise Ordinance (No. 1511), no construction activity would be conducted between the hours of 12:00 a.m. (midnight) and 6:00 a.m. Monday through Friday or between 1:00 a.m. and 7:00 a.m. on Saturday or Sunday. Accordingly, none of the alternatives would violate this element of the noise ordinance, which prohibits loud noises during these hours. Construction activities for all alternatives would be limited to 6:00 a.m. through 6:00 p.m. on weekdays and occasionally on weekends between 7:00 a.m. and 5:00 p.m.

4.9.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Bridge Modifications

Noise would be generated during the construction operations required to build wingwalls at the Meade Lane bridge and replace the Anderson Road and Beal Road bridges. The loudest construction noise is typically that of diesel engine-driven construction equipment, which is commonly used for site

preparation, paving, and materials handling. Additional noise would be generated by the demolition of the existing bridges at Anderson Road and Beal Road. Construction noise levels may average 85 to 90 dB L_{eq} at a distance of 50 feet from the equipment during demolition, site preparation, grading, and paving. During other construction operations, noise levels would likely average 65 to 75 dB L_{eq} at a distance of 50 feet. Construction equipment noise is usually considered as a point source, with attenuation at a rate of 6 dB per doubling of distance (e.g., a noise level of 90 dB at 50 feet will be 84 dB at 100 feet, 78 dB at 200 feet, and 65 dB at 400 feet). The nature of construction projects, with equipment moving from one point to another, work breaks, and idle time, is such that long-term noise averages are less than short-term noise levels.

Construction of wingwalls at the Meade Lane bridge would not generate significant levels of noise due to the relatively short construction period (two to four weeks) and the location of the construction activities within the channel invert. The replacement of the Anderson Road and Beal Road bridges would, however, generate greater levels of noise at the neighboring residences. The closest noise receptors to the proposed bridge construction activities are the neighboring residences on Aztec Road and Navajo Road. These sensitive receptors are located adjacent to the Rio de Flag and within 50 to 100 feet of the affected bridges. At these sensitive receptors, noise impacts would result from the nearby construction activities. These noise levels, however, would not be anticipated to exceed 75 dB L_{eq} for more than a few minutes on a few occasions, if at all. For most of the construction period, hourly noise levels in excess of 60 dB L_{eq} would not be expected. In addition, the construction period at each bridge would not be expected to exceed two to four weeks. Based on these factors, the construction noise impacts to local residents would not be significant.

Thorpe Park Modifications

On-Site Construction Noise

Noise would be generated during the construction operations required to build the embankment, floodwalls, and road modifications at Thorpe Park (see Figure 2-2). The closest noise receptors to the proposed construction activities are the adjoining residences on the south side of Beal Road and the west side of Navajo Road as well as the Flagstaff Junior High School. The sensitive receptors are all located adjacent to the park and within 20 to 60 feet of the proposed floodwalls. At these sensitive receptors, noise impacts would result from the nearby construction activities. As with the upstream bridge replacements, however, noise levels would rarely exceed 75 dB L_{eq} . For most of the

construction period, hourly noise levels in excess of 60 dB L_{eq} would not be expected. In addition, construction of the floodwalls would be undertaken in the summer, eliminating potential noise impacts to students from this project component. Based on these factors, the construction noise impacts to local residents and the Flagstaff Junior High School would not be significant.

There are no sensitive biological resource sites in the vicinity of the proposed construction activities.

Roadway Noise

Noise would also be generated by construction vehicles accessing Thorpe Park via local roads. These vehicles would include heavy trucks hauling materials and equipment to the site and automobiles and light trucks used by the construction crews. Since any excavated material would be used on site, roadway noise impacts would be limited to trucks importing materials (i.e., soil and riprap) to the proposed basin area. Temporary noise increases generated by this traffic could potentially increase roadway noise by more than three dB in the residential area, thus noticeably increasing noise levels. It is expected that these impacts would occur infrequently and, because the hauling period is limited to three weeks, impacts would be less than significant.

Channel Modifications

Thorpe Park to Upstream of Beaver Street

Along this reach, construction activities would occur within 30 feet of several residences between Bonito Street and Aspen Avenue along the existing Rio de Flag alignment (not including the three displaced residences on the west side of the channel near Cherry Street). In addition, the limits of grading for the proposed riprap channel are located within 20 feet of City Hall and 60 feet of the Flagstaff Public Library. Construction activities in this area are expected to last several weeks and would involve open-trench construction. Some blasting could be required during channel excavation; however, this is not anticipated.

Construction operations would be audible from City Hall and sensitive land uses such as the adjoining residences and the library. Due to the proximity of the construction activity to these resources, short-term noise impacts would be significant along this reach. At these sensitive receptors, noise levels could exceed 75 dB L_{eq} for extended periods of time. Mitigation measures are provided to reduce these

impacts below the level of significance. Noise impacts downstream of Route 66 would not affect any sensitive noise receptors. No sensitive biological resources would be affected by construction noise.

As with the Thorpe Park modifications, roadway noise from project-generated truck trips could result in a noticeable increase in noise levels. Increases in traffic noise to sensitive receptors by more than three dBA would occur infrequently and therefore would not be significant. Most of the truck trips associated with this reach would occur south of the railroad tracks, away from any sensitive receptors.

In the event of blasting activities near the residences, the library, or City Hall, short-term noise impacts would be significant and unavoidable. Adherence to standard construction practices would reduce noise impacts associated with blasting activities; however, not below the level of significance.

Clay Avenue Wash Detention Basin to Mike's Pike. Channel modifications would take place along the existing Clay Avenue Wash from the west end of the Chateau Mobile Homes eastward to Mike's Pike. Construction operations would occur within 30 feet of twelve mobile homes at the Chateau Mobile Homes Park, 25 feet of several mobile homes at another mobile home park, and 25 feet of twelve apartments at the University Roost apartment complex. Construction would also occur near several institutional and commercial uses (e.g., McCracken Place and the Greyhound Bus Station).

At the sensitive receptors identified above, construction noise impacts would be similar to those described for the previous reach between Thorpe Park and Beaver Street. As described above, these impacts may be significant; however, they could be mitigated below the level of significance. No sensitive biological resources would be affected by these activities. Impacts from blasting would be the same as those described for the previous reach.

Mike's Pike Alignment. Construction noise impacts would be similar to those described for the previous reaches. There are twelve commercial/retail facilities and six residential units located along Mike's Pike (between Milton Road and Phoenix Avenue). Short-term noise levels generated by construction operations would result in potentially significant impacts requiring mitigation.

Upstream of Beaver Street to Butler Avenue. The channel modifications along this reach involve the construction of a covered channel that transitions to an open greenbelt channel just north of South Colorado Street. These flood control improvements would take place within 30 feet of several commercial/industrial land uses that are located just south of the railroad tracks. There are no sensitive

receptors, including biological resources, located within 100 feet of the proposed construction area. Construction operations would be audible at the commercial/industrial facilities but would not be considered significant because these types of land uses are less sensitive to increased noise levels.

Clay Avenue Wash Detention Basin

On-Site Construction Noise

Construction of the Clay Avenue Wash detention basin would be audible from some residences at the Hidden Hollow Mobile Homes (particularly in the northwest corner of the park). Noise impacts from construction activities would be temporary and would comply with the restrictions of the City Noise Ordinance as discussed above. Noise impacts would occur primarily during the construction activities associated with the berm near the northwest corner of the mobile home park. Noise levels at the mobile homes would be similar to noise levels at the residences along Thorpe Park during construction of the floodwall. Also, there are no noise sensitive biological resource sites in the vicinity of the proposed construction activities. Based on these factors, no significant noise impacts would occur from the construction activities associated with the Clay Avenue Wash detention basin.

Roadway Noise

All excavated material would be re-used on-site, thus eliminating a potential source of roadway noise. Approximately 14,947 cubic yards of fill material would be imported to the site for embankment construction. Temporary noise increases generated by this traffic could potentially increase roadway noise by more than three dB in some areas, thus noticeably increasing noise levels. Due to the brief material hauling phase required to import the embankment fill material (approximately 120 truck trips per day for three weeks) and the primarily rural nature of the surrounding area, noise resulting from construction traffic on the local roadways would be less than significant.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in impacts similar to those described for Alternative 6a. The difference between the two alternatives is the two-block-long covered channel segment along the Rio de Flag between Dale Avenue and Birch Avenue. Due to the smaller right-of-way requirements for the covered

channel, no homes would be removed along the downtown reach. Correspondingly, three additional homes would be subject to temporary noise impacts during channel construction. Implementation of the measures identified for Alternative 6a would reduce all non-blasting-related construction impacts to less than significant levels. If blasting is required along the downtown portion of the Rio de Flag, noise impacts would be significant and unavoidable during construction.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Cheshire Park Detention Basin

The Cheshire Park detention basin site is located in a undeveloped area in northern Flagstaff. To the north, sensitive receptors include residences along Fremont Boulevard located across the street from Cheshire Park. The nearest of these residences is located approximately 100 feet from the northern boundary of the proposed detention basin site (see Figure 2-8). To the west, the nearest rural residential unit is located approximately 175 feet from the western boundary of the basin area. To the south of the site, residential properties are located immediately next to the limits of excavation. The closest structure is within 25 feet of the detention basin site. To the east of the site is primarily undeveloped ponderosa pine forest.

Detention basin construction would involve the excavation of soil and rock material and construction of an outlet structure downstream of the existing Narrows dam. The construction activities that would be most audible at the nearby sensitive receptors would result from excavation activities at the northern and western borders of the basin. Due to the proximity of these construction activities to sensitive receptors, short-term noise impacts would be significant for short durations of the construction period. At these sensitive receptors, normal construction noise levels could exceed 75 dB L_{eq} for brief periods of time. It is probable that extensive blasting would be required. Mitigation measures are provided to reduce the non-blasting impacts below the level of significance; however, the impacts associated with blasting could not be mitigated due to the amount of blasting likely to be required and the close proximity of residences to the site. No noise-sensitive biological resources would be affected by construction noise.

Thorpe Park Detention Basin

Construction of the Thorpe Park detention basin would result in noise impacts similar to those described under Alternative 6a, *Thorpe Park Modifications*. Noise would be generated during excavation activities and the construction of the floodwalls, embankment, and road modifications at Thorpe Park (see Figure 2-9). Noise levels at sensitive receptors would generally not be anticipated to exceed 75 dB L_{eq} . For most of the construction period, hourly noise levels in excess of 60 dB L_{eq} would not be expected. In addition, construction of the embankment and junior high school access road would be undertaken in the summer, eliminating potential noise impacts to students from this project component. Based on these factors, the construction noise impacts to local residents and the Flagstaff Junior High School would not be significant. It is not anticipated that blasting would be required at Thorpe Park due to the relatively shallow (two-foot) excavation depth.

There are no noise-sensitive biological resource sites in the vicinity of the proposed construction activities.

Alternative D: Localized Non-Structural Flood Proofing

The construction operations associated with the two proposed berms in the Continental Estates area would cause short-term impacts at nearby residences. The noise levels would be similar to those described for construction of the Thorpe Park Detention Basin (Alternative 7), with hourly noise levels expected to average 60 dB L_{eq} or less. Based on this assessment, the noise impacts to residents would not be significant. As with the previous alternatives, noise impacts would be short-term and would not conflict with the City Noise Ordinance or impact any noise-sensitive biological resources.

No Action Alternative

The No Action Alternative would not result in significant noise-related impacts. The channel modifications and detention basins described above would not be developed, and no construction would occur for flood control improvements.

4.9.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Alternative 6a would result in potentially significant short-term noise impacts requiring mitigation. The following measures would be expected to reduce noise impacts associated with channel construction below the level of significance:

- All construction equipment shall have sound-control devices that are at least as effective as those devices provided on the original equipment. No equipment shall have an unmuffled exhaust.
- All construction equipment shall be located, stored, and maintained as far as possible from adjacent residents, City Hall, and the Flagstaff Public Library.
- No construction staging shall take place within the Rio de Flag Channel between Cherry Avenue and Route 66. Due to the proximity of sensitive noise receptors, all construction equipment in this area will be turned off when not in use.
- Prior to construction, appropriate personnel at the City Hall and Flagstaff Public Library will be notified of the proposed construction activities and schedule. Recommendations will be provided to alleviate construction noise at these locations, including the closure of all windows facing the construction activities (assuming the proper ventilation systems are in place) and the rescheduling or relocation of special events away from the affected areas.

In the event of blasting in the vicinity of the nearby residences, the library or City Hall, noise impacts would be significant and unavoidable.

Mitigation measures provided in Section 4.8 (Transportation) would also alleviate traffic noise impacts associated with this alternative. Notification of the public with regard to planned construction activities would allow for voluntary avoidance of some construction activities.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in potentially significant impacts during construction; however, implementation of Alternative 6a mitigation measures would reduce the short-term (non-blasting) noise impacts associated with this alternative to a less than significant level. If blasting is required, short-term noise impacts would be significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 7 would result in potentially significant impacts during construction; however, implementation of Alternative 6a mitigation measures would reduce the short-term noise impacts associated with this alternative to a less than significant level. If blasting is required, short-term non-blasting noise impacts would be significant.

Alternative D: Localized Non-Structural Flood Proofing

No significant impacts related to noise have been identified for this alternative; therefore, no mitigation measures are required.

No Action Alternative

No noise impacts would occur under the No Action Alternative; therefore, no mitigation measures are required.

4.10 AIR QUALITY

4.10.1 Significance Criteria

This section analyzes potential short- and long-term air quality impacts from each alternative. Short-term impacts are determined based on equipment usage and duration of construction activities with respect to air quality standards. Long-term impacts are assessed based on the with and without project conditions. Impacts are considered significant if the project exceeds state or Federal air quality standards. (There are no local air quality standards for the Flagstaff area.)

4.10.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Alternative 6a would require approximately six months of construction, as described in Section 2.2.1. The air pollutant emissions associated with construction would include dust generated by earth-moving activities (e.g., grading) and exhaust generated by construction equipment and the personal vehicles of the construction crews commuting to and from the work site. Long-term emissions would be minimal—periodic inspection, maintenance, and repair of the detention basin and channel modification sites would result in vehicle emissions and potentially minor grading activities. The pollutant emissions associated with these long-term activities would be negligible.

The Flagstaff area is in attainment with Federal and state air quality standards. Additionally, the City of Flagstaff is within Arizona's Airshed 3, which is a Class II area (and therefore has less stringent air quality standards than Class I areas, as described in Section 3.10). Based on these two factors, there are no emission levels set for proposed actions such as the construction of a detention basin. The USACOE is not required to show that the generation of pollutants would fall below *de minimus* levels as defined in the Clean Air Act, and there is no State Implementation Plan which addresses the Flagstaff area. Based on these factors, the project-related pollutant emission would not exceed Federal or state air quality standards.

Grading associated with detention basin construction would generate dust, as could transporting soil in trucks. Although this would not violate Federal or state air quality standards, it can affect people who

live or work near the construction area. Most dust, especially larger size particles, tends to settle out on horizontal surfaces close to the respective construction site or haul route. This can present a nuisance factor as the dust settles on items such as plants, cars, outdoor furniture, window ledges, and sidewalks.

While the generation of dust would not constitute a significant air quality impact, measures have been identified under Section 4.10.3 that would help reduce the off-site migration of construction-generated dust.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in air quality impacts similar to those described for Alternative 6a. Although impacts would be less than significant, voluntary mitigation measures are provided to minimize the effects of airborne dust generated by the project.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Construction-related and long-term air pollutant emissions associated with this alternative would be similar to those described for Alternative 6a, although Alternative 7 would require a longer construction period (up to 12 months), more construction equipment, and a larger volume of earth moving activity. Based on a conservative emissions model, this alternative would be projected to generate approximately 70 to 75 tons per year of PM_{10} emissions. This one-year generation of PM_{10} would not affect Flagstaff status as an attainment area. Similarly, construction would not affect attainment status with regard to other criteria pollutants. Based on these factors, the air quality impacts of Alternative 7 would not be significant. Voluntary measures addressed under mitigation would help reduce dust-related impacts.

Alternative D: Localized Non-Structural Flood Proofing

This alternative would require less construction activity than Alternative 6a, and it would not result in significant air quality impacts for the reasons described above. Dust generation would affect the houses and other structures near the berms; however, this would not constitute a significant impact. The mitigation measures identified below would help further reduce dust-related impacts associated with this alternative.

No Action Alternative

The No Action Alternative would not require grading or the use of construction equipment, and it would not generate air pollutant emissions. Accordingly, this alternative would not result in air quality impacts.

4.10.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Alternative 6a would not result in significant air quality impacts; accordingly, mitigation is not required for this alternative. The following voluntary measures would, however, help reduce the nuisance factor associated with dust generation at construction sites and along haul routes.

- Water active sites at least twice daily. Frequency should be increased if wind speeds exceed 15 mph.
- Cover inactive storage piles.
- Cover haul trucks securely or maintain at least two feet of freeboard on all haul trucks when transporting materials.
- Prohibit all grading activities during periods of high wind (i.e., winds greater than 30 mph).
- Apply nontoxic chemical soil stabilizers to inactive construction areas (i.e., disturbed lands within construction areas that are unused for at least four consecutive days), or water at least twice daily.
- Apply nontoxic binders (e.g., latex acrylic copolymer) to exposed areas after cut-and-fill operations.
- Install wheel washers for all exiting trucks.
- Sweep streets if visible soil material is carried onto adjacent public roads.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would not result in significant air quality impacts; accordingly, mitigation is not required for this alternative. The voluntary measures described for Alternative 6a would, however, help reduce the nuisance factor associated with dust generation at construction sites and along haul routes.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 7 would not result in significant air quality impacts; accordingly, mitigation is not required for this alternative. The voluntary measures described for Alternative 6a would, however, help reduce the nuisance factor associated with dust generation at construction sites and along haul routes.

Alternative D: Localized Non-Structural Flood Proofing

The Localized Non-Structural Flood Proofing Alternative would not result in significant air quality impacts and would not require mitigation. The voluntary measures described for Alternative 6a would help reduce dust generation and migration off site.

No Action Alternative

The No Action Alternative would not generate air pollutant emissions and would not require mitigation.

4.11 ESTHETICS

4.11.1 Significance Criteria

Criteria

The significance of visual change depends on a variety of factors, including the degree to which the project would be seen by potentially sensitive viewers, viewer attitudes and activities, the distance from which the project would be observed, and the extent to which the project would be consistent with the established visual goals and objectives of the applicable jurisdictions. A number of variables affect the degree of visibility and visual contrast, including the scale and size of facilities, site design, color and texture, and influences of adjacent scenery or land uses.

For this analysis, impacts are considered significant when

- sensitive viewers would experience an overall moderate or strong contrast
- the action would be inconsistent with the visual quality goals and objectives of the *City of Flagstaff Growth Management Guide 2000* (GMG 2000) or the *Flagstaff Area Open Spaces and Greenways Plan*

Methodology

The potential esthetic impacts of the four alternatives were assessed in the field using the visual evaluation methods described below. The first step in this analysis was to define the project viewshed and then identify and describe viewers within that study area. The description includes type of view (e.g. urban or rural), length of view (i.e., nearby or distant), and duration of view (e.g., intermittent, obstructed, or unobstructed). The viewsheds for the Rio de Flag Flood Control Project and visibility for surrounding land uses are described in Section 3.14. Viewers were classified as *sensitive* or *not sensitive*, and sensitive viewers were evaluated for their changes to their view experience.

This evaluation identifies several locations that are considered to represent typical views to the proposed project components. These locations are referred to as “Key Observation Points” (KOPs). The selection of KOPs focuses on areas where members of the public would have views to proposed facilities, especially in areas where potential viewers are considered sensitive to potential changes in their

visual surroundings (e.g., residents and people engaged in outdoor recreation activity). Nine KOPs were selected for evaluation, as shown on Figure 4-1 and listed below.

- **KOP 1** represents a view of Thorpe Park from the east side of Aztec Street in an adjacent residential area
- **KOP 2** shows a view of Frances Short Pond as seen from inside Thorpe Park looking south, with the historic weir visible in the background
- **KOP 3** is a view of the downtown reach of the Rio de Flag channel, as seen looking downstream from the Sitgreaves Street crossing
- **KOP 4** is a view of Kendrick Street from the Cherry Avenue intersection facing downstream (south) towards downtown Flagstaff.
- **KOP 5** represents a view from Birch Avenue facing downstream (south) along the Rio de Flag near the library and City Hall.
- **KOP 6** shows a view from the northern shoulder of Route 66 facing eastward towards the proposed Clay Avenue Wash detention basin site.
- **KOP 7** is located just east of the intersection of McCracken Drive and Blackbird Roost and is oriented facing upstream (west).
- **KOP 8** is a view looking west to Cheshire Park from a nearby residential neighborhood
- **KOP 9** is located in the Continental Estates area and shows a potential flood control berm location.

A field evaluation was undertaken at each of these KOPs to document the visual contrast of the project alternatives based on the degree of changes in line, form, color, and texture that the respective alternatives would create in conjunction with the existing environment. Three levels of contrast were considered: weak, moderate, and strong. *Weak* suggested minor or low visual contrast with the surrounding landscape, while *strong* contrast suggests the facilities would be highly evident or dominate a setting.

In addition to evaluating the potential visual changes at the nine KOPs, this section addresses the potential for flood control facilities to block local residents' views to scenic vistas. Specifically, this esthetics impact analysis also addresses the extent to which:

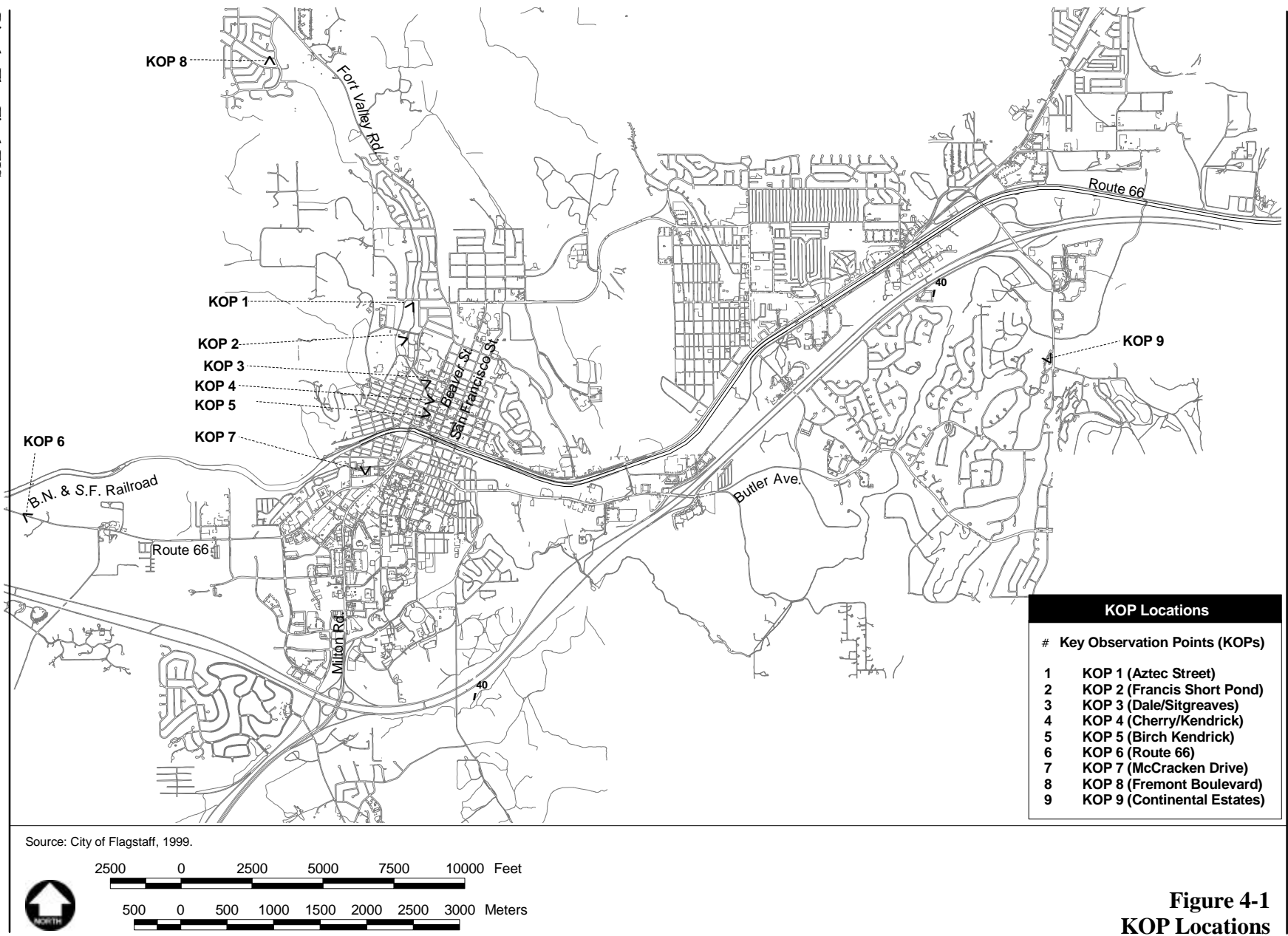


Figure 4-1
KOP Locations

- the Thorpe Park detention basin berms and floodwalls would block views from adjacent residences on Navajo Road
- the southeastern embankment at the Clay Avenue Wash detention basin would block views from adjacent residences within the Hidden Hollow mobile homes park
- the two flood control berms in the Continental Estates area would block views from nearby residents.

These potential effects are described following the assessment of visual changes at KOPs 1, 6, and 9, respectively.

The alternatives were also addressed in terms of consistency with *City of Flagstaff Growth Management Guide* (GMG 2000) and the *Flagstaff Area Open Space and Greenways Plan* policies addressing esthetics and visual resources. These land use plans provide some general design guidance for development within the city. In particular, one of the policies stated in the GMG 2000 requires the city to “develop plans and programs which carefully manage development on hillsides, ridge lines, and drainage courses in order to reduce adverse impacts and to protect the scenic quality, vegetation, and wildlife values of those areas” (City of Flagstaff 1987a). To achieve this, the GMG 2000 encourages a “non-structural approach” to flood control which seeks to incorporate such features into the City’s Open Space/Greenbelt System.

In addition, the Clay Avenue Wash is located in the A-1 Mountain Landscape District of the *Flagstaff Area Open Spaces and Greenways Plan*. For this district, the plan states that:

The southfacing slopes of the Observatory Mesa provide a backdrop and scenic vista for the communities along the historic Route 66 and to people driving this road or riding the train. Conduct vegetation and recreation management so as to meet scenic goals. Where possible work with private property owners to encourage appropriate tree screening and building height.

Consistency with the guidance described above is addressed for each alternative.

4.11.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

KOP 1

KOP 1 is located in a residential area along Aztec Street, just south of Beal Road (Figure 4-2). The photograph shown in Figure 4-2 was taken from the east side of Aztec Street, which overlooks the park from the north. This location was selected as a KOP based on the unobstructed views of the park, ease of public access, and the representative nature of the view. The photograph was taken facing southeast toward the proposed berms and esthetically treated floodwalls.

Alternative 6a would require the construction of floodwalls along the east side of the park and two small embankments just downstream from the existing weir. The berms and floodwalls would range up to a combined height of five feet and would be located west of (behind) 14 residences on Navajo Road. These residences are visible on the left side of the photograph included in Figure 4-2. The portion of the berm and floodwall along the west side of Flagstaff Junior High School would also be up to five feet tall; this section of the berm and floodwall would be obscured at KOP 1 by trees and a backstop (see Figure 4-2). The embankments would not be visible from this observation point.

Thorpe Park is used for many recreational purposes, including Little League and softball activities. As shown in Figure 4-2, the ballfields are well maintained, and surrounding residences are visible in this area. From KOP 1, berms and floodwalls would be visible beyond the ballfields along the eastern park boundary. The appearance of the berms and floodwalls would not conflict with the existing visual character of the area because the berms' landscaped surface and the wall's natural rock veneer would not stand out in this environment. Given that all of the residents along this boundary have five to six foot fences in place, and these fences are made from a variety of visually incongruous materials (e.g., wood, chain link, wire mesh, fiberglass), the introduction of landscaped berms and rock floodwalls would not appear visually incompatible. The visual impact of the berms and floodwalls at KOP 1 would represent a weak visual contrast with the surrounding environment and would not be considered a significant esthetic impact.



KOP 1- View south of Thorpe Park from residential area along Aztec Road (south of Beal Road)

Figure 4-2
Key Observation Point (KOP) 1

Adjacent Residents' Views at Thorpe Park/Navajo Road

Up to 14 residences located on the eastern border of the little league complex would have their west-facing views obstructed by the berms and rock-faced floodwalls; however, the combined height of the berms and walls would be a maximum of five feet. As a result, these residences' back window and back yard views west to Observatory Mesa would not be substantially blocked by the berm/floodwall combination. In addition, the basalt veneer on the wall would be esthetically pleasing to most viewers, and the floodwall would not cause a significant visual impact.

KOP 2

From this KOP within Thorpe Park (Figure 4-3, top photograph), a combined berm/floodwall would be visible to the east (left) of Frances Short Pond, along the side of the hill that leads up to the school. Also visible would be the tops of two embankments located downstream from the historic weir. The berm and floodwall would result in a weak contrast to the existing park environment because the landscaped berm and basalt veneer floodwall would provide a somewhat natural appearance.

It would be hard to discern the embankments from this KOP because only their tops would be visible behind the weir. More noticeable would be the loss of some of the mature ponderosa pines visible in the background of this picture. The majority of the trees visible from this KOP would remain; therefore, the result would only be weak visual contrast with existing conditions.

KOP 3

The view from this KOP (Figure 4-3, bottom photograph) represents both travelers on Sitgreaves Street as well as FUTS trail users. Under Alternative 6a, this section of channel would be widened. As part of channel construction, the house visible to the southwest (right) of the channel in this picture would be acquired and demolished. As can be seen in Figure 4-3, there are several trees located on both sides of the concrete wall that runs along the northeast (left) side of the channel. Trees on the creek-side (right) of the wall would be removed during construction, and construction could also damage the roots of many of the trees to on the other side of the wall, causing additional tree mortality. As a result, the tree-lined appearance of the channel would be modified, and there would be a strong visual contrast to local residents and trail users. Mitigation described in Section 4.11.3 would help reduce the severity of this impact, but not to less than significant levels.



KOP 2- Facing south towards Frances Short Pond and historic weir at Thorpe Park.



KOP 3- Facing downstream along the Rio de Flag from the Sitgreaves Street crossing.

Figure 4-3
Key Observation Points (KOP 2 and KOP 3)

KOP 4

This KOP (Figure 4-4, top photograph) also represents a view looking downstream along the Rio de Flag channel in the downtown reach. At KOP 4, the channel would be widened, resulting in a larger channel with shallower side slopes. This process would include acquiring and demolishing the house visible on the right hand side of the photograph and relocating the trail currently visible in the center of the photograph to one side of the widened channel. Virtually all of the trees along the channel that are visible from this KOP would be removed. The changes to the channel and the loss of mature trees would constitute a strong visual contrast. Mitigation would help reduce this contrast, but not to less than significant levels.

KOP 5

KOP 5 was selected based on its proximity to the downtown area, its public visibility, and its existing condition as an open greenbelt channel. The bottom photograph shown in Figure 4-4 depicts the Rio de Flag facing downstream from Birch Avenue. Upstream of this location, the Rio de Flag occupies an open earthen-bottom channel and is surrounded by medium density residential housing. The Flagstaff Public Library is located to the west of the channel, and City Hall is located to its east (to the right and left of the channel, respectively, as shown in Figure 4-4).

Channel modifications proposed for this area would convert the grass channel to a wider channel with an access road paralleling its east (left) side. The channel would contain buried riprap covered with soil and seeded/planted with vegetation. Although wider, the modified channel would occupy the same general alignment as the existing channel. The replacement of an existing channel with a similar appearing wider channel would cause only a weak contrast to the surrounding environment, and esthetic impacts from KOP 5 would be less than significant.

KOP 6

The proposed Clay Avenue Wash detention basin site is located just north of Route 66 and just west of the city limits, approximately three miles west of downtown Flagstaff. The site is characterized by an open grassy field interspersed with ponderosa pines and bordered by a dense ponderosa pine forest (see Figure 4-5). KOP 6 is located along the northern shoulder of Route 66, facing eastward towards the proposed basin. (A natural gas pipeline monitoring station, enclosed by a wood fence, is visible on



KOP 4- Facing south from intersection of Cherry Avenue and Kendrick Street.



KOP 5- Facing south at intersection of Birch Avenue and Kendrick Street.

Figure 4-4
Key Observation Points (KOP 4 and KOP 5)

the left side of the photograph in Figure 4-5. The natural gas pipeline monitoring station is not part of the proposed detention basin site, which is located to the east [right] of the monitoring station's fenced enclosure.) The potential detention basin site is clearly visible to both east and westbound traffic traveling along Route 66. This location was chosen as a KOP based on the historic and recreational significance of Route 66, the unobstructed views of the proposed basin area, and the guidance provided in the Open Spaces and Greenways Plan.

The Clay Avenue Wash detention basin would require the construction of three berms to detain flood waters during peak flows along the Clay Avenue Wash. As shown on Figure 2-3, the berms would be located at (1) the northwest corner of the Hidden Hollow Mobile Home area, (2) immediately south of the BNSF railroad embankment, and (3) approximately 700 feet north of the northeast corner of the mobile home park. The embankment located adjacent to the mobile homes would be a maximum of 12 feet tall. The northwestern embankment would be no taller than 10 feet, whereas the northeastern embankment would be up to 21 feet tall at its highest point. All three of the embankments would be landscaped with native vegetation.

Aside from the three embankments, the detention basin area would remain in its current open space condition. Virtually all of the ponderosa pine forest that characterizes the majority of the landscape would remain intact, and the proposed embankments would be nearly undetectable at KOP 6. The visual contrast of the flood control structures with the surrounding environment would be weak, and no esthetic impacts would be expected.

Because of the limited visibility of the proposed berms from Route 66, this element would not conflict with the land use planning guidance provided in the Open Spaces and Greenways Plan. Visual impacts from KOP 6 would be less than significant.

Adjacent Residents' Views at Clay Avenue Wash Detention Basin

As shown on Figure 2-3, seventeen residences would be located adjacent to the southeastern embankment. The embankment would have a maximum height of 12 feet, but it would have a somewhat natural appearance because it would be planted with native vegetation. The embankment would be located between the mobile homes and adjacent undeveloped ponderosa pine forest habitat. Although some ponderosa pine trees would be removed during construction, the majority of trees in this area



KOP 6- Facing east at proposed Clay Avenue Wash detention basin (just north of Route 66)

would not be affected. Accordingly, residents would still have views to a landscape dominated by these trees. Because the trees are considerably higher than the potential embankment, the residents' forest views would not be substantially altered.

Accordingly, the visual contrast in this location would be considered weak, and the impact to adjacent residents' views would not be significant.

KOP 7

KOP 7 is located just east of the intersection of McCracken Drive and Blackbird Roost (Figure 4-6, top photograph). This area is comprised of mobile homes, high density residential units, and commercial development. Channel modifications in this area include the construction of a buried riprap (soil- and vegetation-lined) channel that would displace the majority of the mobile homes visible in Figure 4-6. At the driveway of the mobile home park shown in this figure, the buried riprap channel would transition to a covered channel and would continue directly under McCracken Drive, which appears in the foreground of this KOP.

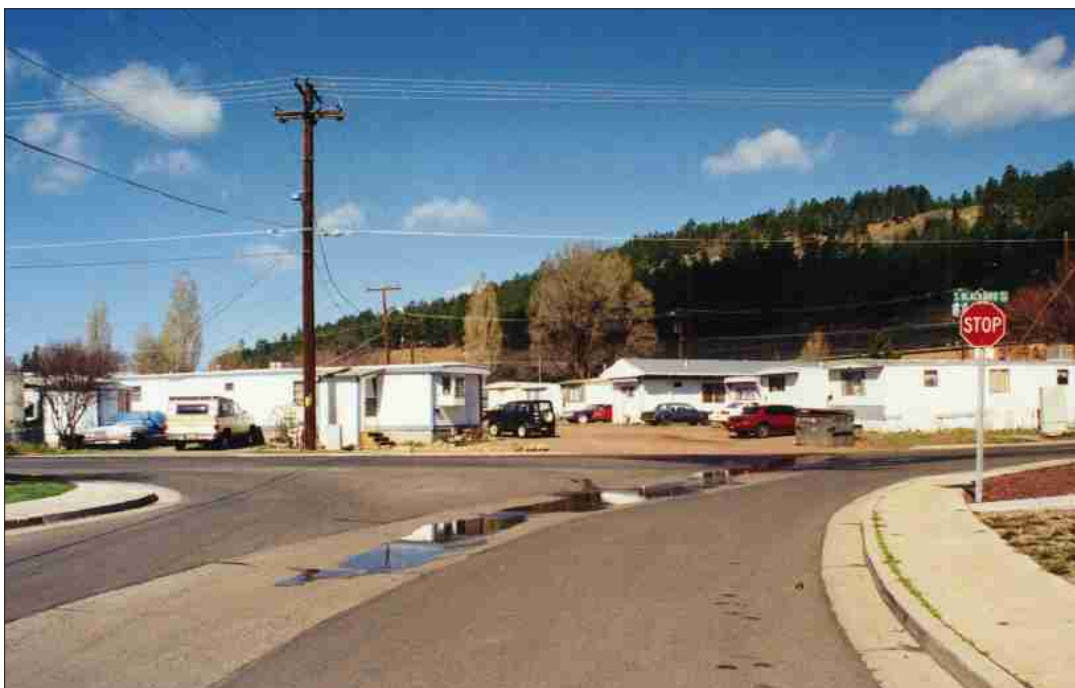
From this KOP, motorists, pedestrians, and residents at the University Roost Apartments would have an unobstructed view of the proposed riprap channel. Removal of the 15 mobile homes and the construction of a well-defined channel for Clay Avenue wash would result in a weak contrast because the overall appearance of this area would continue to be dominated by residential buildings in the foreground (i.e., apartment buildings and those mobile homes that would not be removed) and undeveloped hills in the background. Accordingly, esthetic impacts would not be significant.

KOP 8

This KOP is located near Cheshire Park and would only be affected by Alternative 7.

KOP 9

This KOP is located in the Continental Estates area and would only be affected by Alternative D.



KOP 7- Facing west on McCracken Drive, towards intersection with Blackbird Roost.



KOP 8- Facing east towards Cheshire Park from intersection of Fremont Blvd. and Brenda Loop

Figure 4-6
Key Observation Points (KOP 7 and KOP 8)

Consistency of Alternative 6a with Adopted Plans

As discussed in Section 3.11, the GMG 2000 encourages a “non-structural approach” to flood control. From an esthetics standpoint, concrete-lined channels are typically the most undesirable structural flood control solution; however, under Alternative 6a, the use of concrete channels would not represent a significant visual impact because:

- The use of open concrete channel has been minimized. The covered Clay Avenue Wash concrete channel under Mike’s Pike would not represent the conversion of an existing open channel to a covered channel; instead, it would entail the replacement of an existing covered channel with a similar (but larger) covered channel along another alignment.
- The covered Rio de Flag channel parallel to the railroad tracks would constitute a new channel rather than a conversion of the existing channel to an underground structure. The existing open, unlined, shallow Rio de Flag channel south of Phoenix Avenue would remain. Because the visual amenities associated with this stretch of existing channel would remain, the diversion of flows into a new underground channel would not constitute a significant esthetic impact.

Alternative 6a would not otherwise conflict with esthetic-related guidance contained in locally adopted planning documents.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would only differ from Alternative 6a at KOPs 3 and 4. The esthetic impacts at these two KOPs and the consistency of Alternative 6b with adopted plans are addressed below.

KOP 3

The view from KOP 3 would be substantially different under Alternative 6b in comparison to existing conditions or Alternative 6a. Under Alternative 6b, the section of open, unlined channel visible downstream of Sitgreaves Street would be replaced with a covered, concrete channel. The FUTS trail would be relocated to the center of the current channel alignment (i.e., the trail would be at ground level, directly above the center of the underground concrete arch). As with Alternative 6a, many of the trees

which currently line the channel would either be removed or would be susceptible to severe root damage during construction. Landscaping would be provided along the edges of the trail, including trees along the sides of the alignment. (Based on the arched shape of the underground channel, trees would have room for their roots to grow along the edges of the channel, but not near its center—moving the FUTS trail to the center of the alignment would allow room for trees along the sides of the channel.) Unlike Alternative 6a, the houses to the southwest (right) of the channel would remain under Alternative 6b.

The conversion of an open, unlined channel to an underground concrete arch would represent a strong visual contrast, as would the loss of trees. Mitigation provided in Section 4.11.3 would help compensate for the loss of trees; however, the esthetic impacts at this site would remain significant after mitigation.

KOP 4

Under Alternative 6b, the visual changes at KOP 4 would be similar to those described at KOP 3 in that a section of the existing open, unlined channel would be replaced with a covered underground concrete arch. Similar to Alternative 6a, the majority of trees lining the channel in this location would be removed. The FUTS trail would extend along the center of the channel alignment and landscaping would be provided along the edges of the trail. Downstream of KOP 4, the channel would transition to an open riprap configuration as described for Alternative 6a from KOP 5. Impacts associated with tree loss would be mitigated; however, the overall visual contrast at this location would remain strong and significant esthetic impacts would be considered unavoidable.

Consistency of Alternative 6b with Adopted Plans

Because Alternative 6b uses a concrete-lined underground arch to convey Rio de Flag flood flows where there currently is an unlined channel, it is not consistent with GMG 2000 guidance encouraging the use of non-structural approaches to flood control. As described for KOPs 3 and 4, the use of an underground concrete arch along this section would result in a significant esthetic impact.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 7 only differs from Alternative 6b at KOPs 1 and 2 (Thorpe Park) and at KOP 8 (Cheshire Park). These three KOPs and the consistency of Alternative 7 with adopted plans are addressed below.

KOP 1

While Alternative 7 would involve substantial changes to Thorpe Park; few of the park facilities seen from KOP 1 (Figure 4-2) would be noticeably altered. The trees in the foreground would remain, and the two Little League fields which dominate this view would also be kept in their current condition. Similar to Alternative 6a, a combined berm and floodwall would be constructed to the east of Thorpe Park (to the left of the photograph in Figure 4-2). The esthetic impacts of the berm and floodwall would not be significant for the reasons described under Alternative 6a. The majority of trees in the background of this KOP would be removed; however, the effects of tree removal are better described in the context of KOP 2.

KOP 2

Alternative 7 would result in dramatic changes to the visual setting of Thorpe Park as seen from KOP 2 (Figure 4-3, top photograph). The majority of the area visible from this KOP would be excavated to a depth of two feet. This would alter the hydrology of Frances Short Pond, resulting in a larger pond and an overall increase in the area of shallow water. Over the long term, the shallow fringes of the pond would experience greater wetland vegetation growth, and there would generally be less open water. One of the more substantive changes associated with Alternative 7 would be the removal of virtually all the trees visible in at KOP 2, with the exception of those trees located near the top of the hill leading to the school (at the left edge of the photograph in Figure 4-3). Many of these trees would be removed during detention basin excavation, with the remainder displaced to accommodate the bypass channel, floodwall, or embankment.

The berm and floodwall combination would be similar in appearance to the berm and floodwall described for KOP 2 under Alternative 6a, and they would not result in a strong visual contrast to the existing setting as described for that alternative. The bypass channel would be constructed along the eastern edge of Thorpe Park, near the bottom of the hill leading up to the school. Once construction is complete, the bypass channel would be planted with wetland vegetation as a biological resources mitigation measure (see Section 4.3.3). As this vegetation matures, the channel would take on a more natural appearance would look similar to the sections of channel that currently traverse Thorpe Park.

The embankment would be constructed downstream from and to the east (right) of the historic weir, and the weir would not be affected by construction. The embankment would be planted with native

vegetation and would not differ in magnitude from other topographical changes at the park (such as the difference in elevation between KOP 1 and the Little League fields visible at that location—see Figure 4-2). Accordingly, the embankment would not result in a significant esthetic impact.

Additionally, the effects of berm, floodwall, bypass channel, and embankment construction would pale in comparison to the loss of virtually all the mature trees visible at this location. Within and immediately downstream from Thorpe Park, roughly 350 trees, including approximately 280 mature ponderosa pines, would be removed. The loss of these trees would result in a strong contrast to existing conditions at KOP 2 and at other locations within Thorpe Park. While mitigation has been provided to mitigate the loss of trees, the esthetic impact of Alternative 7 at Thorpe Park would remain significant and unavoidable.

KOP 8

This KOP (see Figure 4-6, bottom photograph) depicts a view of Cheshire Park as seen from a residential neighborhood to the west of the park. Under Alternative 7, the park would be removed, as would most of the trees visible immediately east (behind) the park; the detention basin would be excavated; and the park would be replaced either on site or at a new location within the same neighborhood. This esthetic impacts analysis is based on the projection that the park could be replaced on site.

The post-construction view from this KOP would be of a park whose facilities are located at a slightly lower elevation (that is, within the new detention basin). Because all park facilities would be replaced, the visual contrast between the current park and the new park would be weak. The removal of mature ponderosa pines east of the park, however, would have a much more noticeable long-term esthetic impact. It may take decades for ponderosa pines to mature; thus, even with replanting (see mitigation measures described in Section 4.11.3), there would be moderate-to-strong contrast to the existing visual setting. Trees located outside of the potential detention basin limits would remain, so residents would not be subjected to an entirely treeless view. In addition, where tree removal occurs, it would open up views to the mountains which currently dominate the background of this KOP (see Figure 4-6). Thus, although Alternative 7 would cause a moderate-to-strong contrast to the existing visual setting (and therefore a significant visual impact), the views to residents in this area would remain esthetically pleasing.

Consistency of Alternative 7 with Adopted Plans

Of all the alternatives evaluated in detail in this EIS, Alternative 7 would involve the most structural flood control features, including

- constructing detention basins that would remove numerous mature trees at and adjacent to two separate city parks
- replacing a section of open, unlined channel along the downtown reach of the Rio de Flag with a covered concrete arch
- other channel modifications throughout the downtown reach of the Rio de Flag and along Clay Avenue Wash.

This approach would be inconsistent with many of the adopted policies described in Section 3.11.2, including the GMG 2000 policy that calls for the City to “manage development on hillsides, ridge lines, and drainage courses in order to protect scenic quality, [and] vegetation....” Additionally, Alternative 7 would not be consistent with GMG 2000 guidance which calls for using non-structural approaches to flood control.

Alternative D: Localized Non-Structural Flood Proofing

Of the nine KOPs evaluated in this EIS, Alternative D would only be visible from KOP 9. This KOP and the consistency of Alternative D with adopted plans are addressed below.

KOP 9

KOP 9 (Figure 4-7) is located in the Continental Estates area just west of Country Club Drive on Fairview Drive. The photograph was taken from a parking lot on Fairview Drive, facing west towards the Elden Hills Golf Club. The parking lot services a small residential complex of approximately 30 units, and this KOP is considered representative of views from the back yards of residents along the east side of Fairview Drive.



KOP 9- Facing west from residential area on Fairview Drive in the Contintal Estates Area.

Figure 4-7
Key Observation Point 9 (KOP 9)

As can be seen in Figure 4-7, KOP 9 provides a view of a golf course in the foreground, with residential buildings and trees visible on the hillside beyond the fairway. Under Alternative D, a flood control berm would be constructed to the east side of the golf course fairway (i.e., between the fairway and KOP 9). This would be a section of the south berm described in Section 2.2.4. At this location the berm would be approximately 10 to 12 feet high, and it would dominate the view. The golf course would no longer be visible from the ground floors and back yards of nearby residences, and the views to the hillside across the fairway would also be obstructed. Although the berm would be vegetated with native plants—which are generally considered esthetically pleasing—the replacement of a golf course view with a view of a flood control berm would represent a strong visual contrast. Accordingly, this would constitute a significant esthetic impact.

Adjacent Residents' Views at Continental Estates

Many residents located adjacent to the two potential flood control berm sites would have their views obstructed under Alternative D. The south berm would extend up to 26 feet high in some locations, with the majority of the berm east of Country Club Drive ranging in height from 18 to 24 feet. The south berm would obstruct views from approximately 15 single-family and 20 multi-family residential buildings east of Country Club Drive and from three multi-family residential buildings along Fairview Drive. Many of these residences have backyard views of the hills and mountains surrounding Flagstaff, and these scenic views would be partially or totally blocked (especially from first floor windows and back yards). The loss of these views would constitute a significant esthetic impact.

The north berm would also obstruct views, particularly from the first floors of five apartment buildings located near the potential berm footprint. In this location, the berm would generally range between 10 and 14 feet high. The bases of the affected apartment buildings, however, would be roughly six feet higher in elevation than the base of the north berm in that location, reducing the extent to which the berm would block views. Thus, although portions of the views would be blocked by the north berm, residents would still be expected to have scenic views to the surrounding topography, and the partial obstruction of these views would not represent a significant esthetic impact.

Consistency of Alternative D with Adopted Plans

The flood control berms would be located along the periphery of the floodplain between open space areas (e.g., golf course and undeveloped land) and residences or commercial structures. The berms would be vegetated with native plants and would appear compatible with the bordering open space areas. Accordingly, this alternative would be consistent with GMG 2000 and Open Space and Greenways Plan policies addressing open space areas. No other visual quality objectives in the GMG 2000 or the Open Space and Greenways Plan are considered applicable to the potential flood control berms.

No Action Alternative

The No Action Alternative would not significantly alter the existing esthetic characteristics of the study area. Development would continue around the existing channels, which would presumably be consistent with the existing visual character. No esthetic impacts would result from this alternative.

4.11.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Alternative 6a would result in significant visual resource impacts associated with the loss of mature trees during construction of channel modifications and associated facilities. In order to help reduce the esthetic effects of tree loss, the following measures would be implemented:

- All mature trees removed or suffering significant root loss during construction will be replaced at a 1:1 ratio following construction. For this purposes of this mitigation measure, mature trees are defined as those that are five-inches or greater in diameter at breast heigh, over 20 feet tall, or both. (This is not necessarily the biological resources definition of a “mature tree.”) Significant root loss means root damage extensive enough to kill the affected tree. During tree replacement, the use of native trees will be favored over the use of nonnative ornamentals. However, homeowners adjacent to the channel who incur tree mortality may choose to have the affected trees replaced in-kind, even if they are nonnative. Trees will be replaced at or close to their original locations except where prevented by flood control project features.

- In order to facilitate regrowth, container plants will be used instead of seedlings during tree replacement.
- Five years after the initial tree planting has been conducted, an inspection will be made of all replaced trees. Trees which have died or appear to be dying will be replaced at a 1.5:1 ratio.

These measures will help offset the loss of trees associated with project construction. Because it can take some trees, such as ponderosa pines, decades to mature, the loss of trees would represent a long-term significant impact even after mitigation.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The mitigation for this alternative would be identical to that described for Alternative 6a. Even with mitigation, the long-term esthetic impacts of this alternative would remain significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

The mitigation for this alternative would be identical to that described for Alternative 7 with two exceptions:

- The affected area requiring tree replacement would be larger, including much of Thorpe Park as well as the Cheshire Park detention basin site.
- It may not be feasible to replace all displaced trees following the construction of Cheshire Park based on soil and geologic conditions and the topographical changes that may be necessary to accommodate the new park within the detention basin. Accordingly, tree replacement at the Cheshire Park detention basin site may occur at a 0.5:1 ratio.

Even with mitigation, the long-term esthetic impacts of Alternative 7 would remain significant, especially at Thorpe Park.

Alternative D: Localized Non-Structural Flood Proofing

This alternative would result in significant unavoidable esthetic impacts associated with the obstruction of views by flood control berms. Because these impacts are considered unavoidable, no mitigation measures are provided.

No Action Alternative

No esthetic impacts would result from the No Action Alternative; therefore, no mitigation measures are required.

4.12 HAZARDOUS AND TOXIC MATERIALS

4.12.1 Significance Criteria

This section analyzes the impacts of each alternative in terms of hazardous, toxic, and radioactive waste (HTRW) sites in the study area. Impacts are considered significant if there is an increased risk of exposure to local human populations or if there is an increased potential for contaminant transport and migration off-site.

Based on the nature of the potential flood control alternatives, the potential for causing a significant hazardous and toxic materials impact is generally limited to project construction. The operation of the project alternatives would not result in the creation, use, or disposal of hazardous materials or wastes. The potential for fuel or solvent spills associated with construction equipment use is addressed in Section 4.2, Water Quality.

4.12.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

As described in Section 3.12, a comprehensive database search was conducted for a two-mile radius around the Beaver Street/Butler Avenue intersection. Based on the search and preliminary test excavations, the Rio de Flag and Clay Avenue Wash channel modifications may require construction in areas contaminated with hazardous wastes. The contaminants most likely to be encountered during construction are hydrocarbons, although it is possible that contamination along the channel alignments could include bacteria, bleach, and chemicals used during industrial processes. For known or suspected hazardous materials sites, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic waste be identified during construction. These include monitoring soil and testing for vapors in the vicinity of known or suspected sites, locating proposed channel modifications away from areas of contamination, using protective gear as necessary, containing contaminated soils on site until they are ready for disposal, and disposing of contaminated soils in compliance with local, state, and Federal remediation requirements. These measures are anticipated to avoid significant hazardous and toxic materials impacts.

In the event that previously undetected contamination is encountered during construction, the mitigation measures identified below would reduce impacts to less than significant levels.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

This alternative includes all of the components described for Alternative 6a; however, Alternative 6b includes a two-block-long covered channel segment extending from Dale Avenue downstream to Birch Avenue. The use of a covered channel would not significantly affect the potential to encounter hazardous materials during construction, and the environmental effects of the channel modifications and Clay Avenue Wash detention basin would be the same as those described for Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

A two-mile radius database search and preliminary test excavations were conducted for Thorpe Park, but not for the potential Clay Avenue Wash or Cheshire Park detention basin sites. Based on the tests from the Thorpe Park area, no hazardous materials are expected to be encountered during construction. Given the relatively undeveloped nature of the potential Clay Avenue Wash and Cheshire Park detention basin sites, hazardous material are not expected to be encountered at that these locations either. As a result, no hazardous materials impacts are anticipated.

It is possible, however, that either site may include previously undetected contamination. If hazardous materials are encountered during construction, the mitigation measures identified below would reduce impacts to less than significant levels.

Alternative D: Localized Non-Structural Flood Proofing

Although the potential berm locations were not included in the database search, no hazardous or toxic material impacts are expected given the types of uses located in the area (primarily residential and golf course) and the limited extent of grading required for berm construction (most material would be imported to the site). In the event that previously undetected contamination is encountered during construction, the mitigation measures identified below would reduce impacts to less than significant levels.

No Action Alternative

The No Action Alternative would not require construction and would therefore not have the potential to disturb any hazardous or toxic material sites. Accordingly, this alternative would not result in hazardous or toxic material impacts.

4.12.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

As described above, this alternative is not expected to result in hazardous and toxic materials impacts. However, should hazardous or toxic materials be encountered, construction will be halted and the USACOE will implement the previously described field screening procedures and response plans. Any contaminated soil or groundwater removed from the site will be transported and disposed pursuant to applicable regulations. With the implementation of these measures, hazardous and toxic materials impacts would be mitigated to less than significant levels.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be identical to the measures identified for Alternative 6a. As mitigated, impacts would be less than significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Impacts are expected to be less than significant; however, if unexpected contamination is encountered during construction, the measures described for Alternative 6a would mitigate impacts to less than significant levels.

Alternative D: Localized Non-Structural Flood Proofing

No hazardous or toxic materials impacts are anticipated from this alternative. If unexpected contamination is encountered during construction, the measures described for Alternative 6a would mitigate impacts to less than significant levels.

No Action Alternative

Hazardous and toxic materials impacts would not result from this alternative; therefore, no mitigation measures are provided.

4.13 SAFETY

4.13.1 Significance Criteria

Impacts on safety are considered significant if project related activities

- interfere with emergency response or evacuation plans
- result in unsafe conditions for motorists, bicyclists, or pedestrians
- involve the improper transportation, use, or storage of hazardous materials
- involve the improper disposal of hazardous waste
- increase the potential for contamination migration off-site.

Each of the project alternatives would employ standard construction safety practices, and all construction would be conducted in compliance with the Arizona Occupational Safety and Health Act of 1972 (Ariz. Rev. Stat. §23-401, *et seq.*). The Arizona Occupational Safety and Health Act of 1972 invokes in full the Federal Occupational Safety and Health Administration (OSHA) standards of construction (29 C.F.R., Part 1926). As part of compliance with these state and OSHA requirements, public access to construction sites would be restricted.

4.13.2 Impact Assessment

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

Bridge Modifications

Bridge modifications would occur at the locations of Meade Drive, Anderson Road, and Beal Road. The bridges on Anderson Road and Beal Road would be completely replaced and would entail closing these bridges for approximately two weeks. Modifications to the bridge on Mead Drive involve the installation of wing walls which direct flood flows, this improvement would allow for the street to remain open during construction. Road closures due to bridge modifications would not occur concurrently. Based on these factors, there would not be a significant impact to emergency response systems.

Channel Modifications

Emergency Response and Evacuation Procedures

Thorpe Park to Upstream of Beaver Street. During construction of the Rio de Flag channel modifications, several street segments would be temporarily closed including Bonito Street, Dale Avenue, Cherry Avenue, Birch Avenue, and Aspen Avenue at the Rio de Flag crossing. These road closures would be limited to approximately five to seven days per crossing and would not be conducted simultaneously (see Table 2-1 and Section 4.8, Transportation). Construction of the culvert under Route 66 would restrict the road to one lane eastbound and one lane westbound for approximately two weeks during construction.

The primary emergency response unit for this area is the City Fire Station No. 1 (see Figure 3-8). This area is located within a four mile radius of this four additional stations, including Station Nos. 2, 4, 5, and 6. Depending on the timing of an emergency call, any of these stations may serve as the secondary responder. As with the previous alternative, mitigation is provided to reduce impacts on emergency response times below the level of significance.

Clay Avenue Wash Detention Basin to Mike's Pike. This reach would require the temporary closure of five street segments, including portions of Chateau Drive, Blackbird Roost, McCracken Drive, Malpais Lane, and the "Five Points" Intersection. These roadways are located within the service area of City Fire Station No. 1, which is located immediately north of the proposed Clay Avenue Wash alignment at Malpais Lane. The secondary emergency service providers for this location include Station Nos. 2, 4, and 6 which are all located within four miles of this reach. Road closures are anticipated to last approximately 5 to 7 days at each location and would not be conducted simultaneously

During the short-term closure of Malpais Lane, emergency vehicles departing from City Fire Station No. 1 would be restricted from exiting southbound onto Malpais Lane. For some emergency situations, response times would be slightly increased due to the minor detour that would be required to access Route 66 or Milton Road (i.e., Dupont Avenue). This detour, however, is expected to be very minor and would not significantly alter or disrupt emergency response plans from Station No. 1. Similarly, the closure of the three other road segments could slightly alter response routes through the area but would not be considered significant impacts. The mitigation measures described for the previous reach would apply.

Mike's Pike Alignment. Mike's Pike is located in the primary service area of Fire Station No. 1. This street is within the service radius of Station Nos. 2, 4, 5, and 6 which serve as the area's secondary emergency responders. Since Mike's Pike is not a major thoroughfare and construction operations will last only six weeks, temporary closure of the street would not significantly affect the City's emergency response plans. Access to the streets surrounding Mike's Pike would not be restricted by construction operations.

Upstream of Beaver Street to Butler Avenue. As discussed in Section 4.8 (Transportation), San Francisco Street would be converted to a two-way street during construction of the covered channel at Beaver Street. Conversely, Beaver Street would become a two-way street during construction at San Francisco Street. Since adequate north/south access would be maintained between both sides of the railroad tracks in the downtown area, impacts on emergency response routes would be less than significant during construction. The roadway modifications would last approximately one week per street, and each street would be returned to its pre-construction (one-way) configuration after construction.

Construction Safety

Channel modifications would result in less than significant construction safety impacts. All construction activities would incorporate standard safety requirements. If blasting is required, all applicable requirements will be undertaken to ensure the safety of construction workers and the general public.

Other Hazards

Channel modifications could result in the creation of a potential safety hazard regarding unauthorized pedestrian access in the channel during flood events. As stated in Section 2.2.2, many portions of the modified channel would not be fenced off or otherwise closed to pedestrian access. During major flood events, if people enter the channel, they would be at risk from high velocity flows. Mitigation is provided in Section 4.13.3 to reduce these potentially significant impacts to public safety below the level of significance.

Clay Avenue Wash Detention Basin

The potential Clay Avenue Wash detention basin site is located in a sparsely populated area and would not require the closure or alteration of any city streets or emergency response routes. The primary responder to this area is the City Fire Station No. 1 and the secondary response unit is Station No. 6. The construction and operation of this detention basin would not interfere with any emergency response plans associated with these stations. As with the Thorpe Park detention basin, the construction and operation of the detention basin would not impact emergency evacuation procedures or generate unsafe conditions for construction workers or the general public.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Alternative 6b would result in two more blocks of covered channel than Alternative 6a, with a corresponding incremental increase in the public safety risks associated with covered channels. As described for Alternative 6a, the safety impacts associated with covered channels would be mitigated to less than significant levels. With the exception of the safety impacts associated with the additional section of covered channel, the safety-related impacts associated with this alternative would be identical to those described for Alternative 6a.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Under Alternative 7, the Clay Avenue detention basin, Clay Avenue Wash, and Rio de Flag channel modifications would be the same as described for Alternative 6b. The difference between these two alternatives is that Alternative 7 would also include upstream detention basins at Thorpe Park and Cheshire Park. The additional impacts associated with these two basins are discussed below.

Emergency Response and Evacuation Procedures

Cheshire Park

The primary emergency responder for Cheshire Park is the City Fire Station No. 5, located less than one mile to the north of the project site on West Mountain Drive. Cheshire Park is located within a five

mile radius of three additional City Fire Stations: Stations Nos. 2, 4, and 6. Any of these three stations could be the secondary responder to an emergency in the vicinity of the detention basin, depending on their availability at the time of an emergency call. The traffic impacts that would result from project construction would be minimal due to the direct site access via Highway 180 and Fremont Boulevard, and construction of the detention basin would not result in any road closures. Accordingly, the construction of the detention basin would not cause a significant impacts to emergency response systems.

Thorpe Park

The primary emergency responder for Thorpe Park is the City Fire Station No. 1, located on Malpais Lane just north of its intersection with Route 66. Thorpe Park is located within a four-mile radius of four additional city fire stations, including Station Nos. 2, 4, 5, and 6 (see Figure 3-8). Any of these four stations could be the secondary responder to an emergency at the park, depending on their availability at the time of an emergency call.

During construction of the detention basin, a segment of Thorpe Road between Aztec Street and Hopi Drive may be closed for approximately two weeks. This closure would limit emergency access to an isolated residential area northwest of the park that is only accessible via Curling Smoke Drive. During the closure of this segment, secondary emergency responders arriving from the north or east would have to drive approximately one additional mile to access Thorpe Road from the south via Cherry or Birch Avenue. Given the distance required to bypass the closed road segment and the temporary nature of the closure, this impact would not be significant. In order to ensure adequate emergency response to this residential area during the closure of the Thorpe Road segment, however, a mitigation measure has been provided.

The city does not currently have an official evacuation plan in the event of flooding or other large-scale emergency (City of Flagstaff 1999b). Should such an event happen, evacuation would be directed by the police and other emergency response personnel. Construction and operation of the detention basin would not significantly interfere with emergency evacuation procedures in the area.

Alternative D: Localized Non-Structural Flood Proofing

The construction-safety impacts associated with this alternative would be similar to those described under Alternative 6a. Since streets closures would not be anticipated under this alternative, impacts on emergency response routes and evacuation procedures would also be less than significant.

No Action Alternative

As discussed in the transportation section, flooding in the downtown area can cause serious transportation delays during both minor and major flood events. During minor flood events, Route 66 through downtown becomes completely impassable, and during a 25-year or greater event, most of the streets on the north and south sides become impassable. Closure of these streets would affect emergency response routes throughout the city, and the provision of emergency services is in high demand during and immediately after natural disasters such as major flooding. Under this alternative, the closure of Route 66 and other intersecting roadways would represent a significant safety hazard.

4.13.3 Mitigation Measures

Alternative 6a: Single Detention Basin with Channel Modifications (Open Channel Between Dale and Birch Avenues)

No significant safety-related impacts are anticipated from construction or operation of the channel modifications and Clay Avenue detention basin. The following measure is provided, however, to further reduce safety impacts associated with the temporary road closures:

- Prior to construction, City Fire Stations 1 through 6 will be provided with a schedule of all temporary road closures due to construction activities associated with project construction.

Potentially significant impacts could result from unauthorized entry into the flood control channels during flood events. In order to reduce this risks below the level of significance, the following mitigation measure has been provided:

- A public information program will be established and maintained by the City of Flagstaff. This will primarily focus on elementary and middle school visitation by city staff but will also include public

service announcements and advisory notices to be sent with utility bills. This type of program has been found to be the single most important element in reducing unauthorized access to drainage facilities. Such a program, when supplemented by appropriate signage and maintenance of facilities to assure visibility from the public right-of-way, where possible, forms an effective well-rounded program.

Alternative 6b: Single Detention Basin with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be the same as the mitigation described for the Alternative 6a. As mitigated, safety impacts would be less than significant.

Alternative 7: Three Detention Basins with Channel Modifications (Covered Channel Between Dale and Birch Avenues)

Mitigation for this alternative would be the same as the mitigation described for the Alternative 6a. As mitigated, safety impacts would be less than significant.

Alternative D: Localized Non-Structural Flood Proofing

Safety related impacts from this alternative would not be significant; therefore, no mitigation measures are provided.

No Action Alternative

Mitigation for the safety hazards that could result from the No Action Alternative would entail the provision of improved flood protection. The provision of flood protection is not considered as mitigation; rather, this approach is represented by the other alternatives evaluated in this EIS.

4.14 CUMULATIVE IMPACTS

This cumulative impact analysis addresses the incremental effects of the proposed action in conjunction with related past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time (see CEQ Regulations Implementing NEPA, 40 C.F.R. §1508.7). In order to be considered cumulative impacts, the effects must meet the following criteria: the effects would occur in a common locale or region; the effects would not be localized (i.e., they would contribute to effects of other actions); the effects would impact a particular resource in a similar manner; and the effects would be long-term (short-term impacts would be temporary and would not typically contribute to significant cumulative impacts).

4.14.1 Past, Present, And Reasonably Foreseeable Actions

With the exception of the potential Clay Avenue Wash detention basin site, the study area is located entirely within the Flagstaff city limits. The potential Clay Avenue Wash detention basin site extends to the west of the city boundary onto unincorporated Coconino County land. This unincorporated land is located within the Metropolitan Planning Organization boundary of the City of Flagstaff.

Past actions within the Flagstaff area were originally centered around the timber industry and railroad-related activities. Within the past 25 years, the amount of developed land in the city has more than doubled and residential development now extends outward to the boundaries of the surrounding Coconino National Forest. Current actions are primarily related to residential growth which is fueled by the tourism industry and the proliferation of “second residences” in the Flagstaff area. Past and present actions within the study area have led to the existing conditions that are described in Section 3.0 and provide the basis for the analysis in Section 4.0 of this document.

In order to adequately assess the potential cumulative impacts associated with the proposed action, the following section analyzes the reasonably foreseeable future actions within the study area. These actions are described with respect to the agencies or jurisdictions involved in those actions.

City of Flagstaff

There are four major projects that have been identified by the City of Flagstaff as potentially occurring within the study area between 2000 and 2005. These projects were determined to be reasonably foreseeable based on their current status (design or construction phase), and the likelihood of project implementation. The four projects identified by the city are shown on Figure 4-8 and are described below.

Railroad Springs Subdivision

This housing development project is currently under construction in western Flagstaff and includes development of mobile home subdivisions between Dunham Street and the western city boundary. The project area is bounded on the south by Route 66 and on the north by the B.N. & S.F. Railroad tracks. It is anticipated that construction will be complete (to the western city limits) by 2003. Upon completion, the westernmost boundary of the Railroad Springs Subdivision will be located within 0.5 mile of the proposed Clay Avenue Wash detention Basin

Tank Farm Overpass

As shown on Figure 4-8, the proposed Tank Farm Overpass project would connect Butler Avenue with Route 66 east of downtown. The overpass would involve construction of a bridge to traverse the railroad tracks, connecting the two major thoroughfares just west of Switzer Canyon Drive on the north side and approximately 0.5 mile east of Lumber Street on the south side. Construction is expected to begin between 2002 and 2004.

Fourth Street Overpass

This overpass will connect Fourth Street over the B.N. & S.F. tracks east of downtown (see Figure 4-8). The overpass will be constructed during the same approximate time as the Tank Farm Overpass described above.

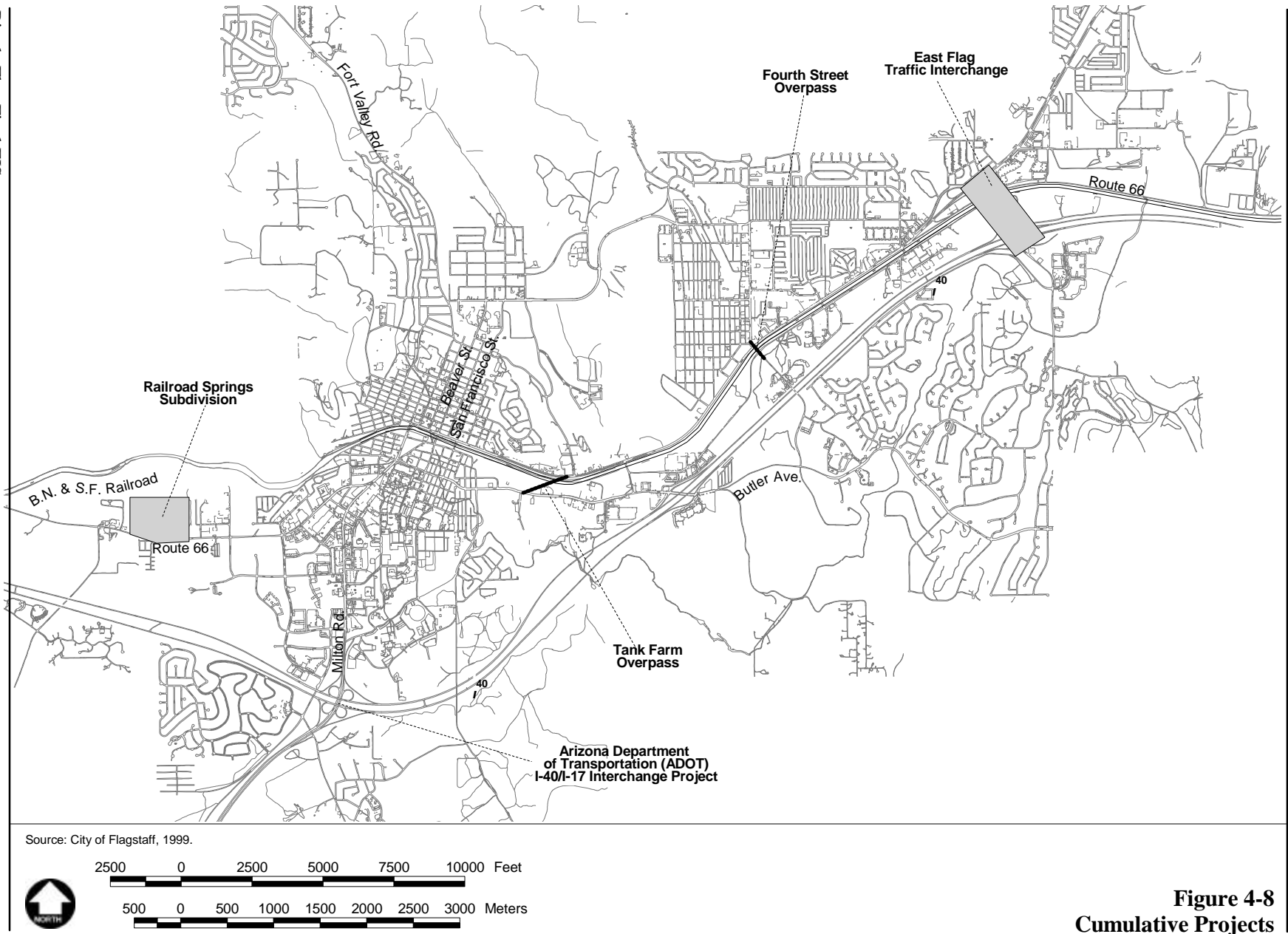


Figure 4-8
Cumulative Projects

East Flag Traffic Interchange

The East Flag Traffic Interchange project involves construction of a new interchange between I-40, Country Club Drive, Highway 89 (north) and W. Route 66. Construction is projected to last approximately five years and begin between 2002 and 2004. The location of the proposed interchange is depicted on Figure 4-8.

Arizona Department of Transportation (ADOT)

The ADOT initiated a major interchange project in the southern part of the City in early 2000. The project involves modifications to the I-40/I-17 interchange (located approximately two miles south of downtown) and is expected to require three years to construct. Phase I of this project was recently completed, and Phase II is currently underway (ADOT 20000). Major components of Phase II include:

- A new ramp connecting I-40 west to I-17 north
- A new ramp connecting I-40 west to I-17 south
- Bridge improvements at I-17 over Lake Mary Rd.
- Reconstruction of the Lake Mary Rd./University Heights North/Bevlah Blvd. intersection
- Widening of Lake Mary Rd. to four lanes
- New ramps from I-17 north to I-40 east and west
- New ramp from I-17 south to I-40 west

The daily construction activities can result in substantial highway restrictions, including lane reductions and speed limitations. In some cases, detours may be required.

United States Forest Service

The study area is surrounded, in large part, by lands managed by the U.S. Forest Service (USFS). Of the 525 square miles that comprise the Greater Flagstaff Metropolitan Planning Organization area, 384 square miles are included in the Coconino National Forest and managed by the USFS. Ongoing maintenance and management of these surrounding lands would not substantially contribute to cumulative impacts for the Rio de Flag flood control project.

4.14.2 Cumulative Impacts by Issue Area

This cumulative impact analysis addresses the incremental effects of the proposed action when considered with the cumulative effects of other past, present, and reasonably foreseeable future actions. A cumulative impact analysis by resource area is presented below. The cumulative impacts are discussed with respect to Alternatives 6a, 6b, 7, and D. In most cases, the primary discussion involves Alternative 7, because it includes three detention basins and it entails substantially more construction activity than Alternative 6a, 6b, and D (see Section 2.2). Accordingly, the incremental contribution of Alternatives 6a, 6b, and D to cumulative impacts would be less than that of Alternative 7. The proposed berms associated with Alternative D are discussed with regard to cumulative impacts where the resulting cumulative impacts would be different or greater than those associated with Alternative 7. The No Action Alternative would not contribute to cumulative effects, and it is not discussed in this section.

Topography/Geography

Alternatives 6a, 6b, 7, and D would involve some grading during the construction of the flood control features (floodwalls, channel modifications, etc.). The amount of grading and earthwork required for each alternative would not contribute incrementally to a significant cumulative impact. This assessment is based on the types of other major projects anticipated to occur in the study area (primarily residential development and highway interchanges) and the effect these types of projects have on topography and geography. While other projects may contribute to localized erosion or seismic-related impacts, none of the flood control alternatives addressed in this EIS would contribute to these localized effects.

Water Quality/Hydrology

Cumulative impacts on the quality of stormwater runoff could occur if the other projects in the watershed are constructed at the same time as one of the project alternatives. The Railroad Springs subdivision will be constructed in the vicinity of the Clay Avenue Wash Detention Basin and may potentially contribute to erosion and sedimentation in the Clay Avenue Wash.

The Railroad Springs subdivision and other projects in the study area will also be subject to laws and regulations that address water quality; construction projects over five acres will require a General Construction Activity Storm Water Permit. Permit applicants are required to submit a Notice of Intent (NOI) describing the proposed action and local drainage/water quality conditions (if known), as well as

a Storm Water Pollution Prevention Plan (SWPPP) designed to eliminate or reduce pollutant discharge. Specific SWPPP provisions include requirements for identifying potential pollution sources, controlling stormwater runoff and erosion, implementing best management practices (BMPs) to prevent or reduce contaminant discharge, and conforming with applicable state and local stormwater and erosion control plans. The identification of applicable BMPs is based on site-specific characteristics, but typically involves implementing and monitoring pollution control measures both during and after construction. Based on these requirements, the cumulative impact of the projected future actions in the study area would not cause a significant construction-related impact to water quality (including impacts associated with erosion and sedimentation).

Because the alternative flood control projects addressed in this EIS would not result in post-construction water quality or hydrology impacts, the operation of the alternatives would not contribute to cumulative impacts to these resources.

Biological Resources

As described in Section 4.3, none of the alternatives would affect federally threatened or endangered species. Construction of Alternatives 6a, 6b, and 7 would result in short-term impacts to wetland/riparian habitats. These impacts would be mitigated through the creation of additional wetland and riparian areas. Because there would be no net loss of wetland/riparian habitat with any of the alternatives, they would not contribute to a cumulatively significant loss of wetland or riparian resources. The loss of ponderosa pines would not contribute to a cumulatively significant biological resources impact because of the large amount of pine forest that is located within the National Forest lands surrounding Flagstaff and relatively protected from development.

Cultural Resources

The proposed action could potentially result in impacts on NHPA eligible cultural resource sites. Because this alternative has the potential to affect historic properties, it therefore has the potential to contribute to a cumulative effect with regard to cultural resources.

There may be one-half to one million cultural resources (principally archeological sites) in Arizona, of which roughly 50,000 to 60,000 have been recorded (U.S. Navy 1997). The Arizona State Historic Preservation Officer (SHPO) annually reviews 2,000 to 3,000 actions that could destroy cultural

resource sites, and an unestimated number of unregulated actions (e.g., most activities on private lands) also affect sites. Legislation that has been enacted to protect cultural resources includes the National Historic Preservation Act, the Archeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

Although cumulative data with regard to cultural resource impacts are not precise, it seems reasonable to conclude that the destruction or disturbance of sites that may occur as a result of the proposed action would contribute to the continuing loss of cultural resources in the western United States. These losses would represent only a fraction of a percent of the resources that exist on a local, regional, or state resource basis. Based on Section 106 compliance requirements, resources that may be destroyed or disturbed by Federal actions (which may include some of the reasonably foreseeable actions) will contribute to our understanding of past societies.

Because the USACOE will comply with Section 106 compliance requirements for the Rio de Flag Flood Control Project, the project's incremental contribution to cultural resource impact would not result in a significant cumulative effect.

Land/Water Use

The proposed flood control alternatives would not conflict with any relevant land use plans or policies contained in the *Flagstaff Growth Management Guide 2000* (GMG) and the *Flagstaff Area Open Spaces and Greenways Plan*. Similarly, the reasonably foreseeable projects in the study area would be consistent with local land use plans and would not lead to cumulative land use impacts. The Railroad Springs subdivision development is an approved, ongoing project within the city limits near the proposed Clay Avenue Wash detention basin. The other projects are related to the local roadway/highway network and would provide improved transportation in the area. Implementation of the proposed action would not interfere with or alter land plans or land use designations of the anticipated future development areas; accordingly, cumulative land use impacts would not be significant.

Recreation

Alternatives 6a, 6b, and 7 would provide new recreational amenities as described in Section 4.6 (Recreation). These include improvements to the FUTS trail in the downtown area by providing access under the railroad. These amenities would increase publicly available recreation facilities and would

result in a direct benefit to recreational users in the city. Short-term recreation impacts would occur, however, at Cheshire Park and Thorpe Park during construction of the various flood control features. Under Alternatives 6a and 6b, only minor disruptions would occur at Thorpe Park. Alternative 7, on the other hand, would result in significant unavoidable impacts from the closure of both parks for 4 to 12 months.

The other projects identified within the study area would not preclude the access to or otherwise impact any recreational resources; therefore, these projects would not contribute to cumulative recreational impacts. Although the Railroad Springs subdivision would generate additional demand for recreation resources in the study area, Alternatives 6a, 6b, and 7 would provide some of the needed recreation resources (i.e., FUTS trail improvements), and they would not contribute incrementally to this increased demand. Based on these factors, the cumulative recreation impact of the alternatives would not be significant.

Socioeconomics

Alternative 6a, 6b, and 7 would result in significant unavoidable socioeconomic impacts regarding the displacement of several residences. The greatest socioeconomic impacts would result from Alternative 6a with the acquisition of 19 residences (3 along the downtown reach of the Rio de Flag, 1 at the proposed Clay Avenue Wash detention basin site, and 15 along the Clay Avenue Wash near Blackbird Roost).

The five reasonably foreseeable future projects that are described above would not be expected to contribute incrementally to these impacts. In contrast, the Railroad Springs subdivision would increase the supply of local housing. The short-term generation of construction-related jobs would be beneficial to the local economy and would not be expected to substantially alter the area's population/housing balance. Accordingly, significant cumulative socioeconomic impacts are not anticipated.

Transportation

Alternative 7 would generate the greatest transportation-related impacts of the five alternatives. The transportation impacts associated with Alternative 7 would be potentially significant due to construction-related vehicle trips on the local roadway network (approximately 36 truck trips per hour under the "worst case" scenario). In addition, short-term road closures would occur under Alternative 7. These

impacts would be reduced to less than significant levels through incorporation of the provided mitigation measures.

The effects of the abovementioned transportation impacts would not contribute to significant cumulative transportation impacts. The incremental effects of the five reasonably foreseeable future projects are discussed below:

- The **Railroad Springs subdivision** would generate both short-term and long-term traffic impacts. Short-term traffic impacts would be associated with housing construction. However, this site is accessible from Route 66, minimizing the potential for localized traffic circulation impacts. Long-term traffic would be generated by residents of the subdivision.
- Construction of the **Tank Farm** and **Fourth Street overpasses** would not require a large amount of imported fill material and would not result in the closure of any major city roads. The long-term effect of these projects would be to improve circulation.
- The **East Flag Traffic Interchange** project is located approximately 4.5 miles east of downtown Flagstaff. Construction activities are anticipated to last approximately five years and would affect the roadway system on the eastern side of town. Given that this project is located outside of the downtown area, it would not be expected to incrementally contribute to the traffic impacts resulting from the potential flood control alternatives.
- The **Interstate-40/Interstate-17 Interchange** is another major roadway project located outside of the downtown area. This project is located approximately two miles south of downtown Flagstaff and would require lane reductions and other traffic controls. Due to the geographical isolation of this project, it would not be expected to contribute noticeably to the traffic circulation impacts associated with the potential flood control alternatives.

Although it is possible, the probability that all of the construction activities (i.e., hauling, lane restrictions and detours) would be conducted concurrently for the above projects is low. Assuming the “worst case” scenario, however, the cumulative effects of these projects are not expected to be significant. Those projects with the greatest transportation impacts (i.e., East Flag Traffic Interchange and I-40/I-17 Interchange) would be located in different parts of the city and would not significantly contribute to transportation impacts on the local roadway network. If it is determined by the city that significant cumulative transportation impacts would occur, these impacts could be mitigated to less than

significant levels through construction phasing and implementation of a city-wide traffic control plan during periods of heavy construction.

Noise

Noise impacts associated with the proposed action are limited to short-term construction noise generated by construction of the proposed channel modifications. Noise impacts would be created by on-site construction activities and, to some degree, roadway noise from construction traffic. These impacts could be mitigated to less than significant levels, with the exception of blasting related noise. In the event that blasting occurs the proposed channel modifications would result in significant unavoidable impacts.

Cumulative noise impacts would be less than significant due to the location of the proposed flood control features. The Railroad Springs subdivision is located approximately 0.5 mile from the proposed Clay Avenue Wash detention basin. Given the noise attenuation factors described in Section 4.9, this distance would reduce construction noise from the one location to the other by over 30 dB. The other reasonably foreseeable future projects are also located far enough away from the proposed detention basin sites, channel modifications, or flood control berms to avoid creating a cumulative noise impact.

Air Quality

The Flagstaff area is in attainment with Federal and state air quality standards. Additionally, the City of Flagstaff is within Arizona's Airshed 3, which is a Class II area (and therefore has less stringent air quality standards than Class I areas, as described in Section 3.10). Based on these two factors, there are no emission levels set for proposed action and other local projects. Given these factors, the cumulative contributions of the reasonably foreseeable projects in the area would not be expected to affect Flagstaff's status as an attainment area, and cumulative air quality impacts would be less than significant.

Esthetics

Alternatives 6a, 6b and 7 would each result in unavoidable long-term significant impacts associated with the channel modifications and the resulting loss of mature trees along Rio de Flag through downtown Flagstaff. Alternative 7 would also cause significant esthetic impacts at Thorpe and Cheshire parks. The esthetic impacts associated with Alternative D would be significant and unavoidable because the proposed berms in the Continental Estates area would significantly obstruct views from neighboring residences.

The reasonably foreseeable projects would not cumulatively result in a significant change to the visual character of the Flagstaff area. The most visible changes associated with the other potential cumulative projects would be the new houses at the Railroad Springs subdivision, and the new Tank Farm and Fourth Street overpasses. The cumulative effect of these changes would result in an increased presence of human activity in the Flagstaff area. However, these projects would not significantly change the overall appearance of the city (i.e., an urban center surrounded by scenic and relatively undeveloped terrain). Thus, while each of the potential Rio de Flag flood control alternatives would cause significant esthetic impacts, none would contribute incrementally to a significant cumulative impact in terms of the overall visual quality of the Flagstaff area.

Hazardous and Toxic Materials

Impacts regarding hazardous and toxic materials are not anticipated during construction or operation of the project alternatives. Additionally, none of the reasonably foreseeable projects would be expected to generate or expose the public to hazardous and toxic materials. Thus, the potential flood control projects would not contribute incrementally to cumulatively significant hazardous and toxic materials impacts.

Safety

Alternative 6a, 6b, and 7 would reduce the risk of flooding within the 100-year floodplain. In consideration of the cumulative projects in the study area (particularly development in the downtown area), the flood control project would be beneficial to numerous residential, commercial, and industrial uses. Alternative D would also provide limited flood protection; however, the safety benefits would be less, given the lesser degree of flood protection. Potential safety hazards regarding access to the flood

control channels would be mitigated to less than significant levels under each alternative. It is expected that all construction sites would be restricted from public access. Based on this expectation, none of the other reasonably foreseeable projects would cause safety impacts, and they would therefore not contribute to a significant cumulative safety impact.

4.15 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA (40 C.F.R. § 1502.16) requires analysis of significant irreversible and irretrievable effects.

Irreversible commitments are damages to the environment that cannot be reversed, even after the life of a project. *Irretrievable commitments* are those that are lost for a long period of time (e.g., the life of a project). This includes the use of nonrenewable resources, such as metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered committed because they would be used for the proposed action when they could have been conserved or used for other purposes.

Another impact that falls under the category of the *irreversible* and *irretrievable commitment* of resources is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

The flood control alternatives evaluated in this EIS would each result in an irreversible commitment of building materials and fuel for construction vehicles and equipment, as well as other resources. The flood control alternatives would require the commitment of work force time for construction, engineering, environmental review and compliance and, after project completion, maintenance. These commitments of resources are neither unusual nor unexpected given the nature of the proposed project, and they are generally understood to be tradeoffs for the benefits of the respective alternatives, if implemented.

The flood control alternatives would also result in long-term impacts to socioeconomics. As discussed in Section 4.14.2 (Socioeconomics), Alternatives 6a, 6b, and 7 would result in significant unmitigated social impacts from the displacement of residences, and disproportionate effects on minority and low-income neighborhoods. No other irreversible or irretrievable commitments of resources would occur with the implementation of the alternatives addressed in this EIS.

4.16 RELATIONSHIP OF SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA (40 C.F.R. § 1502.16) requires an EIS to address the relationship between short-term uses of the environment and the impacts that such uses may have on the maintenance and enhancement of the long-term productivity of the affected environment. Of particular concern are impacts that would narrow the range of beneficial uses of the environment. This refers to the possibility that choosing one alternative reduces future flexibility in pursuing other options, or that transforming land or other resources to a certain land use often eliminates the possibility of other uses being performed at that site.

Short-term uses resulting from the implementation of the Alternatives 6a, 6b, 7, and D are primarily associated with construction activities. Although some short-term impacts would be significant prior to mitigation (e.g., noise and transportation), these impacts would generally be mitigated to less than significant levels and would cease upon completion of construction. While the noise impacts of blasting during channel or detention basin excavation (if necessary) could not be mitigated to less than significant levels, this short-term impact would not effect long-term productivity. The impacts associated with the loss of riparian/wetland habitat would be offset by the long-term gain in similar habitat from habitat restoration and creation. Overall, these impacts would be short-term and would not affect the long-term productivity of the area's resources.

Some alternatives would also result in long-term significant impacts. For example, significant and unavoidable social impacts would result from the displacement of several residences (Alternative 6a, 6b, and 7) as described in Section 4.14.2 (Socioeconomics). These socioeconomic impacts would not, however, be expected to affect long-term productivity.

The proposed flood control alternatives would reduce public health and safety risks from flooding dangers. Accordingly, the provision of increases flood protection would be considered as a long-term benefit to productivity within the affected portion of the Rio de Flag floodplain.

4.17 ENVIRONMENTAL COMMITMENTS

This EIS incorporates environmental commitments made by the USACOE for the Rio de Flag Flood Control Project. These include elements that have been incorporated into project design that avoid or minimize environmental effects and mitigation measures identified in this EIS to reduce project impacts to less than significant levels. This section provides a summary of these commitments for Alternative 6b, including general commitments (e.g., those that may apply to more than one resource area) and resource-specific commitments (e.g., construction noise mitigation measures).

4.17.1 General Commitments

- All berms and detention basin embankments will be revegetated pursuant to a native plant species revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff (see Appendix J).
- In riprap-lined channels, the riprap will be covered with soil, allowing the establishment of some vegetation, for example, grass. See the following discussion of biological resource-specific mitigation (in Section 4.17.2) for areas where wetland and riparian vegetation will be restored or created within the Rio de Flag channel.
- At a point approximately 250 feet south/southeast of the North Elden Street/Route 66 interchange, the underground concrete channel will transition into an open greenbelt channel. The term “greenbelt” is used because this section of Rio de Flag will include several features favoring the establishment of vegetation in and along the channel, including a 56-foot wide channel bottom and shallow 4:1 (H:V) side slopes. Additionally, the channel will not be lined with riprap or concrete. This segment will extend east and south from the underground channel, joining an existing remnant section of the historic Rio de Flag channel approximately 1,700 feet upstream of Butler Avenue.
- Vehicular barriers will be provided where a riprap channel is located along a street, and pedestrian barriers will be placed where warranted. Warning signs will be posted at major access points (such as gates) and periodic maintenance inspections for vagrants/campers will be implemented along the modified channel.
- Blasting activities will comply with all applicable construction and safety requirements, and the need for blasting will be minimized or eliminated during the project design phase.

- Access will be maintained to all businesses and residences along Mike's Pike during the construction of the underground channel along this roadway.
- During construction activities, all staging areas and construction sites will be fenced to prohibit public access.

4.17.2 Resource-Specific Commitments

Topography/Geography

- The flood protection structures (embankments, floodwalls, wingwalls, etc.) will be designed and constructed according to applicable seismic safety standards.

Water Quality/Hydrology

- Construction in and along the Rio de Flag and Clay Avenue Wash will cease if and while substantial rain events are predicted or are occurring in the project vicinity. Exposed bare ground will be covered with seed-free loose straw or erosion control matting prior to these events to protect the soil from erosion while construction activities have ceased.
- Bare ground on the construction site will be covered with seed-free loose straw or erosion control matting during the post-construction period prior to establishment of vegetative cover or during periods of prolonged inactivity once the soil surface has been disturbed and bare ground exposed.
- Embankments will be planted with native vegetation as specified in the native species revegetation plan developed by the USACOE and the Flagstaff Arboretum (see Appendix J).
- The Rio de Flag and Clay Avenue Wash channels upstream of construction activity will be dammed temporarily to prevent water from entering the reach under construction should a storm occur. A diversion pipe will be installed in the dam to convey any water around the construction area for discharge downstream of the construction activity.
- Equipment will be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The USACOE and/or the City of Flagstaff will develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements. Construction supervisors and workers will be instructed to be alert for indications of

equipment-related contamination such as stains and odors. Construction supervisors and workers will be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment will only be operated within dewatered areas of the creek.

- Fuels, solvents, and lubricants will be stored in a bermed area so that potential spills and/or leaks will be contained. Soil contamination resulting from spills and/or leaks will be remediated as required by state and/or Federal law. Storage areas will be constructed so that containers will not be subjected to damage by construction equipment.

Biological Resources

- Biological resources mitigation for Alternative 6b will be 1.2 acres of on-site restoration at Thorpe Park and in the Rio de Flag Channel, with an additional 1.8 acres of habitat creation. Subject to the timing constraints (which require that 0.6 acre of the habitat creation occur prior to project construction), and to the extent feasible, the additional habitat creation for the channel modifications downstream of Thorpe Park and along Clay Avenue Wash will be accomplished in the realigned Rio de Flag channel between Route 66 and Beaver Street. If the realigned channel in this area cannot accommodate all of the required wetland and riparian habitat creation, the additional mitigation will be provided in the greenbelt channel or immediately downstream from the greenbelt channel in the remnant historic channel. For more detailed information regarding the biological resource mitigation measures for Alternative 6b, see Appendix E of this EIS.
- Mitigation to reduce the potential for introducing nonnative weed species into the Rio de Flag system will be accomplished by maximizing the reuse of soil excavated from the Rio de Flag channel modifications to cover riprap in the channel and to construct berms and embankments. Where imported soil is necessary, preference will be given to soil from sites with minimal invasive weed species. The native plant revegetation plan developed by the USACOE in consultation with the Arboretum at Flagstaff contains post-construction monitoring and maintenance requirements for revegetated areas, including exotic species management measures (see Appendix J).

Cultural Resources

- Following determinations of eligibility, historic properties will be assessed for the criteria of effect and adverse effect. If the project will adversely affect a historic property, mitigation measures will

be required to reduce the impacts to a level of no adverse effect. This entire procedure will be followed as specified in a Programmatic Agreement (PA). The PA is a document detailing how Section 106 of the NHPA will be implemented for this proposed action. It is an agreement between the USACOE, the SHPO, and the Advisory Council on Historic Preservation (Council). The Hopi Tribe, The Haulipai Tribe, and the Pueblo of Zuni will be invited to participate as concurring parties. The PA will contain stipulations that may involve requiring additional surveys and historic building inventories, determinations of eligibility, assessment of effects, and mitigation. When the PA is executed by the Council, the project as planned will be in compliance with Section 106 of the National Historic Preservation Act.

Mitigation can be achieved through a variety of methods. The optimal form of mitigation is avoidance or preservation in place. Barring that preferred method, the primary mode of mitigation for historic properties may be limited to, but will probably include Historic American Building Survey (HABS) recordation for any historic property that will be adversely affected by the preferred alternative. For the structural element; the Atlantic and Pacific Railroad Bridge and the ranch complex, Historic American Building Survey/Historic American Engineering Record (HABS/HAER) recordation may be used. If possible, a protective berm should be place around the ranch buildings to protect their integrity. The National Parks Service dictates the level of recordation in both cases. The National Parks Service may not be interested in overseeing mitigation of these historic features. In that case, the State of Arizona has their own approved documentation standards that are outlined in Section 41-861, *et seq*, of the Arizona Revised Statutes. Mitigation measures will be specified in a PA.

- In summary, mitigation requirements will include HABS/HAER recordation of the Atlantic and Pacific Railroad Bridge and the ranch complex on Route 66.

Recreation

- During construction of the channel between Thorpe Park and the railroad tracks, signs shall be posted on appropriate trail markers identifying alternative routes to re-connect to the FUTS trail. It is anticipated detours would primarily utilize residential streets.

Socioeconomic Impacts

- The property owners that will be affected by land acquisition are entitled by law to be justly compensated for their property, based on fair market value as determined by an independent appraiser. Relocation assistance payments and counseling will be provided in accordance with the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601 (1996)) to ensure adequate relocation and a decent, safe, and sanitary home for displaced residents. All eligible displaces will be entitled to moving expenses. This applies to the ranch house and property at the Clay Avenue Wash detention basin site and at the Trailers Ho mobile home park at 703 South Blackbird Roost.

Eligible homeowners will also be entitled to certain supplemental payments to compensate for increased cost of replacement homes over and above the amount received for their homes, increased interest costs, and certain other expenses. In accordance with the provisions of the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, no residential occupant will be displaced unless replacement housing is available. All benefits and services will be provided equitably to all residential relocates without regard to race, color, religion, age, national origin, and handicap as recorded under Title VI of the 1964 Civil Rights Act (42 U.S.C. § 2000d-1).

Traffic and Transportation

- Closure of the Anderson Road and Beal Road bridges and North Thorpe Road would not occur simultaneously.
- To avoid access-related impacts to the schools near Thorpe Park, construction-related road closures at North Thorpe Road and the access road to Flagstaff Junior High will be conducted during the summer.
- At the Bonito Street and Dale, Cherry, Birch, and Aspen Avenue road crossings, construction of underground culverts will necessitate road closures of approximately 5 to 7 days each. At the Route 66 and Butler Avenue crossings, the two culverts will be poured by halves to maintain through traffic (to a total closure time of 5 to 7 days per half). At the Beaver Street and San Francisco Street crossings (one-way south and one-way north, respectively), construction will require about 1 week each, and will not be undertaken concurrently. In order to minimize impacts on traffic, each road will become a 2-way road during construction of the other.

- During construction of the underground culvert at the railroad crossing (approximately 700 feet west of Beaver Street), one of the two tracks at this crossing will always remain open.
- A traffic control plan shall be prepared during the final design stage of the project, and implemented during the construction phase. The plan shall address and outline appropriate vehicular speeds in construction areas; travel routes, detours, or lane/road closures; flag-person requirements; appropriate signage and safety reflectors; coordination with the Arizona Department of Transportation (ADOT); appropriate notification to the public; any utility relocation requirements; the location of staging areas; safety procedures to reduce hazards to motorists, bicyclists, and pedestrians; approach to ensuring access to businesses and residences; and emergency information. The traffic control plan will be reviewed by the city and ADOT. The final version of the plan will be submitted to all appropriate entities.
- A road improvement plan shall be prepared during the final design stage of the project, and implemented during the actual construction phase. The plan shall identify road segments, bridges, and culverts that need to be improved and turnout locations that need to be constructed to accommodate project construction, maintenance, and operational activities. The plan will also identify any damage to existing roadways, caused by construction vehicles, that will need to be repaired.
- Construction activities would result in the closure of several road segments throughout the City. During construction activities, alternate routes and detour signage will be used to ensure motorist safety and minimize commute inconveniences. In addition, it may also be advantageous to request a local radio station to assist in notifying the community of the anticipated roadway closures and major construction dates. Other public notification methods which can be implemented could include: a roadway hotline number, local newspaper announcements/press release information, television news, city/community bulletins, or web site announcements.

Noise

- In compliance with the City of Flagstaff Noise Ordinance (Ordinance No. 1511), no construction activity will be conducted between the hours of 12:00 a.m. (midnight) and 6:00 a.m. Monday through Friday or between 1:00 a.m. and 7:00 a.m. on Saturday or Sunday. It is expected that construction activities for will be limited to 6:00 a.m. through 6:00 p.m. on weekdays and occasionally on weekends between 7:00 a.m. and 5:00 p.m.

- All construction equipment shall have sound-control devices that are at least as effective as those devices provided on the original equipment. No equipment shall have an unmuffled exhaust.
- All construction equipment shall be located, stored, and maintained as far as possible from adjacent residents, City Hall, and the Flagstaff Public Library.
- No construction staging shall take place within the Rio de Flag Channel between Cherry Avenue and Route 66. Due to the proximity of sensitive noise receptors, all construction equipment in this area will be turned off when not in use.
- Prior to construction, appropriate personnel at the City Hall and Flagstaff Public Library will be notified of the proposed construction activities and schedule. Recommendations will be provided to alleviate construction noise at these locations, including the closure of all windows facing the construction activities (assuming the proper ventilation systems are in place) and the rescheduling or relocation of special events away from the affected areas.

Air Quality

The preferred alternative would not result in significant air quality impacts; accordingly, no mitigation is required. The following voluntary measures will, however, help reduce the nuisance factor associated with dust generation at construction sites and along haul routes.

- Water active sites at least twice daily. Frequency should be increased if wind speeds exceed 15 mph.
- Cover inactive storage piles.
- Cover haul trucks securely or maintain at least 2 feet of freeboard on all haul trucks when transporting materials.
- Prohibit all grading activities during periods of high wind (i.e., winds greater than 30 mph).
- Apply nontoxic chemical soil stabilizers to inactive construction areas (i.e., disturbed lands within construction areas that are unused for at least 4 consecutive days), or water at least twice daily.
- Apply nontoxic binders (e.g., latex acrylic copolymer) to exposed areas after cut-and-fill operations.
- Install wheel washers for all exiting trucks.

- Sweep streets if visible soil material is carried onto adjacent public roads.

Esthetics

- The floodwalls will be constructed using reinforced concrete covered with basalt fieldstone (malpais basalt) as an esthetic treatment. The stones will be placed on the outside of the walls to form a mosaic veneer, characteristic of other recent stonework in the city (including the Flagstaff public library).
- The retaining walls for North Thorpe Road will incorporate a similar basalt fieldstone veneer.
- All mature trees removed or suffering significant root loss during construction will be replaced at a 1:1 ratio following construction. For this purposes of this mitigation measure, mature trees are defined as those that are five-inches or greater in diameter at breast height, over 20 feet tall, or both. (This is not necessarily the biological resources definition of a “mature tree.”) Significant root loss means root damage extensive enough to kill the affected tree. During tree replacement, the use of native trees will be favored over the use of nonnative ornamentals. However, homeowners adjacent to the channel who incur tree mortality may choose to have the affected trees replaced in-kind, even if they are nonnative. Trees will be replaced at or close to their original locations except where prevented by flood control project features.
- In order to facilitate regrowth, container plants will be used instead of seedlings during tree replacement.
- Five years after the initial tree planting has been conducted, an inspection will be made of all replaced trees. Trees which have died or appear to be dying will be replaced at a 1.5:1 ratio.

Hazardous and Toxic Materials

- The USACOE has developed field screening procedures and preliminary response plans that will be finalized and implemented should any hazardous or toxic waste be identified during construction. These include monitoring soil and testing for vapors in the vicinity of known or suspected sites, locating proposed channel modifications away from areas of contamination, using protective gear as necessary, containing contaminated soils on site until they are ready for disposal, and disposing of contaminated soils in compliance with local, state, and Federal remediation requirements.

Safety

- Prior to construction, City Fire Stations 1 through 6 will be provided with a schedule of all temporary road closures due to construction activities.
- A public information program will be required to be setup and maintained by the City of Flagstaff. This will primarily focus on elementary and middle school visitation by city staff but will also include public service announcements and advisory notices to be sent with utility bills. This type of program has been found to be the single most important element in reducing unauthorized access to drainage facilities. Such a program, when supplemented by appropriate signage and maintenance of facilities to assure visibility from the public right-of-way, where possible, forms an effective well-rounded program.

5.0 ENVIRONMENTAL DOCUMENTATION AND COMPLIANCE WITH FEDERAL LAWS, ORDERS, AND REGULATIONS

This section describes the environmental compliance requirements associated with the proposed flood control alternatives addressed in this Final EIS.

5.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

This Environmental Impact Statement has been prepared in compliance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4332 (1996)) and its Council on Environmental Quality Regulations (40 C.F.R. §§ 1500-1508 (1994)) and following guidelines contained in the Army Corps of Engineers Regulations for Implementing NEPA Procedures (33 CFR 230; 45 FR 56761, August 25, 1980, Amended by 46 FR 14745, March 2, 1981, Revised by 53 FR 3127, February 3, 1988).

NEPA is the nation's primary charter for protection of the environment. It establishes national environmental policy, provides a framework for federal agencies to prevent environmental damage, and requires federal agencies to evaluate the potential environmental impacts of their proposed actions. Under NEPA, a federal agency must prepare an EIS describing the environmental effects of any proposed action having a significant impact on the environment. The EIS must also identify measures necessary to avoid or minimize adverse impacts resulting from the proposed action. The USACOE will be the lead federal agency under NEPA for the preparation of the Rio de Flag EIS.

5.2 CLEAN WATER ACT OF 1972 (33 U.S.C. § 1251 (1996))

Federal and state laws for the control of water quality establish requirements for adequate planning, implementation, management, and enforcement of actions designed to improve the quality of the nation's water resources, including penalties for non-compliance. In addition, federal regulations have been developed to augment and clarify the laws and to provide details not included in the law. Regulations and plans that are adopted by the applicable governmental body have legal stature and are enforceable. Federal guidelines and state policies, on the other hand, express the intent of the governing body and, while they are not legally enforceable, set forth direction that should be followed to achieve the goals expressed in the laws.

The Clean Water Act (CWA) of 1972 (33 U.S.C. § 1251 (1996)) is the major federal legislation concerning improvement of the nation's water resources. It provides for development of municipal and industrial wastewater treatment standards and a permitting system to control wastewater discharges to surface waters. State operation of the program is encouraged, and in Arizona, the Arizona Department of Environmental Quality (ADEQ) is the state agency responsible for carrying out the CWA. Arizona's water quality standards are contained in the Arizona Administrative Code (Title 18, Chapter 11). As described in Section 4.3 of this EIS, none of the alternatives would cause violations of these water standards.

The goals and standards of the Clean Water Act are enforced through permit provisions. Sections 401 and 404 of the Clean Water Act pertain directly to the proposed action. Section 401 requires certification from the ADEQ that the proposed action is in compliance with established water quality standards, or a waiver from those requirements. Section 404 outlines the permit program required for dredging or filling the nation's waterways. The Corps will be requesting from Congress a 404(r) exemption from state water quality certification. The USACOE does not issue itself a 404 permit but must comply with the Clean Water Act. Appendix F contains an alternatives analysis as required by Section 404(b)(1). Because the proposed action would not violate water quality standards and is consistent with Section 404 requirements, it is in compliance with the Clean Water Act.

In addition to the Clean Water Act, Executive Order 11990, Wetlands Protection (42 Fed. Reg. 2696 (1977)), and Executive Order 11988, Floodplain Management (42 Fed. Reg. 26951 (1977)), are also applicable federal regulations. The key requirement of these orders is determining whether a practicable alternative to locating an action in wetlands or floodplains exists. If there is no practicable alternative, the action must include all practical measures to minimize harm to the wetlands. The potential flood control alternatives are in compliance with these Executive Orders because it is not practicable to locate the potential detention basins or channel modifications outside of wetlands or floodplains. These types of facilities must be located in channels in order to function. In compliance with Executive Order 11990, impacts to wetlands would be minimized, including the creation and restoration of wetlands to mitigate project-related impacts.

Alternative D would not affect wetland vegetation, but would be located in the floodplain. As with the other alternatives, the flood control berms must be located inside the floodplain in order to provide flood protection. Accordingly, there is not practicable non-floodplain location for the flood control berms.

5.3 ENDANGERED SPECIES ACT OF 1973 (16 U.S.C. § 1531 (1996))

The Endangered Species Act (ESA) protects threatened and endangered species by prohibiting federal actions that would jeopardize the continued existence of such species or by minimizing actions that would result in the destruction or adverse modification of any critical habitat of such species. The ESA requires that consultation regarding protection of such species be conducted with the U.S. Fish and Wildlife Service (USFWS) prior to project implementation. As described in Section 4.3, the potential flood control alternatives would not affect the continued existence of any threatened or endangered species or result in the destruction or adverse modification of any critical habitat of such species. Accordingly, the proposed action is in compliance with the ESA, and consultation under the Act is not required.

5.4 FISH AND WILDLIFE COORDINATION ACT (16 U.S.C. § 661 (1934)).

The Fish and Wildlife Coordination Act (FWCA) directs the Department of the Interior (DOI) to provide assistance to and foster cooperation between federal, state, and local agencies in order to promote wildlife conservation in water resource development programs. Agencies must consult with the section of the DOI that has jurisdiction over this project, in this case USFWS, on wildlife conservation measures to be implemented during construction and maintenance of the project. Conservation measures are documented in the USFWS Coordination Act Report (CAR), which addresses the biological resources within the project area, assesses the biological impacts of the preferred alternative, and proposes mitigation measures to avoid or offset these impacts. The USFWS submitted a final CAR for the Rio de Flag project on December 20, 1999 and is currently preparing an addendum to that CAR to address the changes to the Recommend Plan. The project is in compliance with this Act. Refer to Appendix G for the final Coordination Act Report provided by USFWS.

5.5 MIGRATORY BIRD TREATY ACT (16 U.S.C. § 703 (1996))

The Migratory Bird Treaty Act (1916) between the United States and Canada, the Convention for the Protection of Migratory Birds and Animals (1936) between the United States and Mexico, and subsequent amendments to these acts provide legal protection for almost all breeding bird species occurring in the United States. These acts restrict the killing, taking, collecting, and selling or purchasing of native bird species or their parts, nests, or eggs. Certain gamebird species are allowed to be hunted for specific periods determined by federal and state governments. None of the alternatives addressed

in this EIS would significantly affect native bird species or otherwise result in noncompliance with the Migratory Bird Treaty Act.

5.6 ARIZONA NATIVE PLANT LAW (Ariz. Rev. Stat. § 3-901 *et seq.*)

The Arizona Native Plant Law calls for the “noncommercial salvage of highly safeguarded native plants whose existence is threatened by intended destruction.” Examples of protected native species are ironwood, paloverde, mesquite, and all cacti. The salvage of such listed plants requires prior notification and the submittal of a Notice of Intent, whereupon the Arizona State Department of Agriculture would issue a salvage permit. The Department of Agriculture will also issue tags and seals intended for taking, transporting, and possessing these plants. The Arizona Native Plant Law states that “a person shall not take, transport, or have in his possession any protected native plant taken from the original growing site in this state without having in his possession a valid permit issued by the division [of Agriculture]” (Ariz. Rev. Stat. § 3-906.A). Because the federal government is not required to comply with state-level natural resource laws, except in cases where the federal government has delegated the enforcement of federal regulations to the state level, the Arizona Native Plant Law is not applicable to the USACOE. Nonetheless, none of the potential flood control alternatives are anticipated to affect plants regulated by the Arizona Native Plant Law.

5.7 NATIONAL HISTORIC PRESERVATION ACT (NHPA) OF 1966 (16 U.S.C. 470 (1996))

Cultural resources are buildings, sites, structures, or objects with historical, architectural, archaeological, cultural, or scientific importance. A number of laws exist that protect cultural resources potentially affected by federal undertakings or permitted actions. Key federal legislation includes the National Historic Preservation Act (NHPA) of 1966 (16 U.S.C. 470 (1996)), the Archaeological Resources Protection Act (ARPA) of 1974 (16 U.S.C. 470aa (1996)), and the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. § 3001 (1996)).

A key provision under the NHPA is Section 106, which requires a federal agency to take into account the potential effect of a proposed action on properties listed on or eligible for listing on the National Register of Historic Places. Under NHPA, the State Historic Preservation Officer and the Advisory Council on Historic Preservation (ACHP) are part of the consultation process. Regulations of the ACHP (36 C.F.R. § 800 (1994)) outline the procedures used by a federal agency to meet the

requirement of Section 106 of NHPA. Section 110 of NHPA requires adaptive reuse of historic properties to the maximum extent feasible.

Compliance with Section 106 of the NHPA and associated laws regulating the protection of cultural resource will be accomplished for the Rio de Flag Flood Control Project through the implementation of measures identified in a Programmatic Agreement (PA). The PA is a document detailing how Section 106 of the NHPA will be implemented for this proposed action. It is an agreement between the USACOE, the SHPO, and the Advisory Council on Historic Preservation (Council). The Hopi Tribe, The Haulipai Tribe, and the Pueblo of Zuni will be invited to participate as concurring parties. The PA will contain stipulations that may involve requiring additional surveys and historic building inventories, determinations of eligibility, assessment of effects, and mitigation. See Section 4.4, Cultural Resources for additional discussion of the PA.

5.8 EXECUTIVE ORDER 12372, THE INTERGOVERNMENTAL REVIEW OF FEDERAL PROGRAMS (7 C.F.R. § 3015, Subpart V and final rule-related notices published at 48 Fed. Reg. 29114 (1983), and 49 Fed. Reg. 22676 (1984))

Executive Order 12372, the Intergovernmental Review of Federal Programs (7 C.F.R. § 3015, Subpart V and final rule-related notices published at 48 Fed. Reg. 29114 (1983), and 49 Fed. Reg. 22676 (1984)), regulates land use for federal actions. The order directs federal agencies to make efforts to accommodate state and local elected officials' concerns regarding federal development. It requires that agencies consult with and solicit comments from state and local officials whose jurisdictions would be affected by the federal action. Land use issues, including compatibility with local land use plans, are addressed in Sections 3.5 and 4.5. The potential flood control projects have been developed in coordination with the City of Flagstaff, the project's local sponsor. As a result of this coordination, the Rio de Flag Flood Control Project is in compliance with Executive Order 12372.

5.9 FEDERAL CLEAN AIR ACT

The Federal Clean Air Act (CAA) of 1970 (42 U.S.C. § 7401, amendments of 1977, 1990, and 1993), sets forth National Ambient Air Quality Standards (NAAQS) for several criteria pollutants. The NAAQS for the criteria pollutants must not be exceeded more than once per year. The criteria pollutants regulated under the CAA are ozone (O₃), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter less than ten microns in diameter (PM₁₀), and lead (Pb). The

CAA requires individual states to adopt standards that set acceptable pollutant concentrations equal to or less than the federal standards. The State of Arizona standards for these pollutants are the same as federal standards. In Arizona, the ADEQ is the implementing agency for federal air quality regulations.

The Flagstaff area is in attainment with federal and state air quality standards. Additionally, the City of Flagstaff is within Arizona's Airshed 3, which is a Class II area (and therefore has less stringent air quality standards than Class I areas, as described in Section 3.10). Based on these two factors, there are no emission levels set for proposed actions such as the potential flood control alternatives, and the construction of these alternatives would therefore be in compliance with the Federal CAA.

5.10 EXECUTIVE ORDER 12088 - FEDERAL COMPLIANCE WITH POLLUTION CONTROL STANDARDS (43 Fed. Reg. 47707 (1978) (Codified as 3 C.F.R., 1978 Comp., p. 243) as amended by Executive Order 12580, 52 Fed. Reg. 2923 (1987))

This order directs that federal agencies consult with state and local agencies concerning the best techniques and methods available for the prevention, control, and abatement of environmental pollution. A federal agency must also comply with applicable pollution control standards concerning air pollution, water pollution, hazardous materials, and hazardous substances.

None of the alternatives would result in the generation of hazardous wastes or other environmental pollution, and potential water quality impacts would be mitigated to less than significant levels (see Section 4.2). As described in Section 4.12, Hazardous and Toxic Materials, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic materials sites be identified during construction. Based on these factors, the potential flood control alternatives would be in compliance with Executive Order 12088.

5.11 RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) (42 U.S.C. § 6901 (1996))

RCRA was the first step in regulating the potential health and environmental problems associated with hazardous waste disposal. RCRA and the regulations developed by the EPA to implement its provisions provide the general framework of the national hazardous waste management system. RCRA provides criteria for the determination of whether hazardous wastes are being generated, techniques for

tracking wastes to eventual disposal, and the design and permitting of hazardous waste facilities. None of the alternatives addressed in this EIS would result in the generation of hazardous wastes. As described in Section 4.12, Hazardous and Toxic Materials, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic materials sites be identified during construction.

5.12 HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA) (40 C.F.R. § 280 (1994))

HSWA address regulatory gaps in the RCRA program in the area of highly toxic wastes. For example, these include regulation of carcinogens, listing and delisting of hazardous wastes, permitting for hazardous facilities, underground storage tank (UST) management, and the elimination of land disposal of hazardous wastes. None of the alternatives addressed in this EIS would result in the generation of hazardous wastes. As described in Section 4.12, Hazardous and Toxic Materials, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic materials sites be identified during construction.

5.13 COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA) OF 1980 (42 U.S.C. § 9601 (1996))

CERCLA, also known as Superfund, ensures that a source of funds is available to clean up past hazardous waste sites, address releases of hazardous substances, and establish liability standards for responsible parties. CERCLA also requires the creation of a National Priorities List (NPL), which sets forth the sites considered to have the highest priority for clean-up under Superfund. There are no Superfund sites that would be affected by project construction.

5.14 SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) (Pub. L. No. 99-499, 100 Stat. 1613)

SARA was enacted in 1986 to increase the Superfund to \$8.5 billion, modify contaminated site clean-up criteria scheduling, and revise settlement procedures. It also provides a fund for leaking UST clean-ups and a broad, new emergency planning and community right-to-know program. SARA establishes directives for selecting permanent remedies, complying with state requirements by federal agencies, and establishing the role of the state in the clean-up process. None of the alternatives addressed in this EIS

would result in the generation of hazardous wastes. As described in Section 4.12, Hazardous and Toxic Materials, the USACOE has developed field screening procedures and preliminary response plans that would be finalized and implemented should any hazardous or toxic materials sites be identified during construction.

**5.15 EXECUTIVE ORDER 13045 - PROTECTION OF CHILDREN
FROM ENVIRONMENTAL HEALTH RISKS AND SAFETY RISKS
(62 Fed. Reg. 19885 (1997))**

This Executive Order was issued April 21, 1997 by President Clinton. Specifically, each federal agency:

- (a) shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children; and
- (b) shall ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

None of the alternatives addressed in this report would result in environmental health or safety risks that would disproportionately affect children.

**5.16 EXECUTIVE ORDER 12898 - ENVIRONMENTAL JUSTICE
(59 Fed. Reg. 7629 (1994))**

This order was issued by President Clinton on February 11, 1994, and requires each federal agency to achieve environmental justice by addressing “disproportionately high and adverse human health and environmental effects...on minority and low-income populations.” Environmental justice is addressed in Sections 3.7 and 4.7. As discussed in Section 4.7, Alternatives 6a, 6b, and 7 would result in unmitigated social impacts (e.g., loss of social ties, upheaval, and sense of loss) associated with the acquisition of up to 17 residences. Under each of these alternatives, at least 80 percent of the affected homes are located at the Trailers Ho mobile home park, which represents low income housing. This constitutes a disproportionate effect to low income housing. Additionally, the affected mobile home park is located at the edge of the City of Flagstaff’s Oldtown neighborhood, which has a disproportionately higher level of minority residents than the City as a whole.

Compliance with Executive Order 12898 would be achieved for Alternatives 6a, 6b, or 7 (if implemented) because the USACOE has implemented an extensive public participation program, clearly identified those impacts that would disproportionately affect low-income or minority populations, and mitigated those impact to the extent feasible. The Environmental Justice discussion in Section 4.7 further addresses compliance with Executive Order 12898, including a discussion on why the impacts to those 13 mobile homes are considered unavoidable from a hydrology and hydraulics engineering standpoint.

5.17 FEDERAL UNIFORM RELOCATION ASSISTANCE AND REAL PROPERTY ACQUISITION POLICIES ACT OF 1970 (42 U.S.C. § 4601 (1996))

In order to acquisition private property, the federal government must follow guidelines set forth under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601 (1996)). The Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act was created to ensure that (1) owners of real property to be acquired for federal and federally assisted projects are treated fairly and consistently; (2) persons displaced as a direct result of federal or federally assisted projects are treated fairly; and (3) agencies implement these regulations in a manner that is efficient and cost effective. The Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act also contains provisions for just compensation, policies for acquisition, and relocation requirements. The USACOE will comply with this act for any alternatives that require the acquisition or private property, the relocation of residents, or both.

5.18 FEDERAL WATER PROJECT RECREATION ACT (Public Law 89-72)

The Federal Water Project Recreation Act requires that any federal water project must give full consideration to opportunities afforded by the project for outdoor recreation, and fish and wildlife enhancement. As a part of Alternatives 6a, 6b, and 7, new recreational trails would provide enhanced connection with the FUTS. Alternative D provides fewer opportunities for recreational enhancement because it does not entail linear features conducive to trail creation.

The Rio de Flag and Clay Avenue Wash are ephemeral streams, which do not provide substantive fish habitat. The restoration and creation of wetland and riparian habitat and as part of Alternatives 6a, 6b, and 7 would mitigate construction-related impacts. Also, a greenbelt channel would be constructed under Alternatives 6a, 6b, and 7 providing potential wildlife habitat. Given the urban nature of the area

where the greenbelt would be constructed, however, wildlife use may be fairly low. The construction of flood control berms (Alternative D) does not provide feasible opportunities for enhancing wildlife habitat.

Because the alternatives provide for recreation and wildlife enhancement were practicable, they would be in compliance with the Federal Water Project Recreation Act.

6.0 PUBLIC INVOLVEMENT

This section describes the public involvement process associated with the proposed Rio de Flag Flood Control Project.

6.1 PUBLIC INVOLVEMENT PROGRAM

The USACOE and the City of Flagstaff (the project's local sponsor) implemented a public involvement program to obtain input from numerous groups, organizations, or individuals that represent business, homeowner, educational, environmental, government, neighborhood, and community interests. The program established a project "point of contact" at the City for public questions or comments, and developed a mailing list of interested parties. The mailing list was used for the distribution of invitations to public meetings and dissemination of project documents. Announcements for public meetings were also made in local newspapers, including date, time, place, and subject matter. The public input addressed the proposed flood control improvements as well as potential recreation improvements that could be incorporated into the project.

At the core of the public involvement program were a series of public meetings and workshops held throughout the plan formulation phase of the project. The goal of the meetings were to inform all interested parties of the status and direction of the project and to solicit public input during the formulation of project alternatives. Additional public meetings were held during and subsequent to the extended public review period for the Draft Feasibility Report and Environmental Impact Statement to incorporate public concerns into the re-evaluation and the design of the project. The Public meetings and/or workshops conducted through May, 2000 are identified chronologically as follows:

- Initial Public Workshop (December 11, 1997)
- EIS Scoping meeting (February 27, 1998)
- Public Workshop with Regional Land Use and Transportation Plan and the ADOT Interstate 40 Corridor Study (February 10, 1999)
- Public Open House (November 17, 1999)
- City Council Worksession (televised) [December 13, 1999]
- City of Flagstaff Park & Recreation Commission Meeting (December 15, 1999)
- Public Meeting No.1 for Draft Report and EIS (December 16, 1999)
- Public Open House (January 12, 2000)

- Workshop with local technical experts (March 15, 2000)
- Workshop for Navajo Drive Residents (March 30, 2000)
- Open House with Regional Land Use and Transportation Plan (May 24, 2000)
- Open House with Regional Land Use and Transportation Plan (May 25, 2000)

An additional public meeting was held during the 45-day public review period of the revised Draft Feasibility Report and Environmental Impact Statement. The meeting was held at 6:15 p.m. on July 25, 2000 at Flagstaff High School. A transcript of the proceedings is included in Appendix B of this Final EIS.

6.2 REQUIRED COORDINATION

6.2.1 Past Coordination

In February 1998, the USACOE prepared a Notice of Intent (NOI) for the Rio de Flag Flood Control Project EIS. This notice was published in the *Federal Register* (February 4, 1998, Volume 63, Number 23) in compliance with 40 C.F.R. 1508.22. As recommended in 40 C.F.R. 1501.7(b), public scoping meetings also were held for the project. The meetings were held on February 27, 1998 at 211 W. Aspell Avenue in Flagstaff. An afternoon meeting was held from 1:00 p.m. to 3:00 p.m. and an evening meeting was conducted between 5:00 p.m. and 7:00 p.m (see Appendix B for a transcript of the public comments).

The Notice of Availability (NOA) for the initial draft EIS was published in the *Federal Register* (November 19, 1999, Volume 64, Number 223) in compliance with 40 C.F.R. 1508.22. Notices for extension of the comment period on the draft EIS were published in the *Federal Register* on December 29, 1999 (Volume 64, Number 249) and on January 26, 2000 (Volume 65, Number 17). The NOA for the revised Draft EIS was published in the *Federal Register* on Friday June 30, 2000 (Volume 65 Number 127). All public notices required for this project are included in Appendix H.

6.2.2 Required Future Coordination

The initial Draft EIS and revised Draft EIS were distributed for public review and comment in accordance with NEPA requirements. Responses to public and agency comments received during the revised Draft EIS comment period are included in Part II of this Final EIS. This Final EIS will be released for a 30-day public review period, although comments received will not be given written responses.

As the lead Federal agency for the Rio de Flag Feasibility Study, the USACOE will issue a Record of Decision (ROD) after the EIS has been finalized and the 30-day public review period is completed. The ROD will indicate the alternative selected for implementation, summarize the reasons for that decision, and serve as notification that appropriate procedures and consultations have been executed. Once the ROD has been issued, the selected alternative can proceed to implementation (e.g., final engineering design, project construction, and operation).

6.3 PUBLIC VIEWS AND RESPONSES

Public comments received through execution of the public involvement program, including the review and comment period for the initial draft EIS, have been incorporated into the plan formulation, feasibility, and evaluation process associated with this flood control project. The key issues that were raised during the public scoping process are summarized below.

- **Planning Process.** Several general questions were raised in the public scoping meetings regarding the USACOE planning process. These questions centered around the roles of the USACOE and the City of Flagstaff and the formulation of alternatives. Most of these questions were directly addressed by USACOE and city staff at the scoping meetings. Sections 1.6 and 2.1 of this EIS also address these issues.
- **Design Features.** At the scoping meetings, some questions were asked regarding the specific design features of the project alternatives (e.g., size of channel modifications, hydraulic specifications, etc.). The public was informed that this information would be available closer to and during the draft EIS review process. The description of the alternatives in Section 2.2 provides the type of information requested by the public.

- **General Procedure.** Some questions that arose at the public meetings concerning the general procedure associated with the project. These mostly included clarifications regarding the project timeframe and cost, the public involvement process, and the alternatives selection process. The majority of these questions were responded to directly at the public meetings. Additional clarification is provided in Sections 2.3, 5.1, and 6.2 of this EIS.
- **NEPA Process.** Some public inquiries at the scoping meetings dealt with the NEPA process. Typically, these questions were related to the schedule for completion of the EIS, the required coordination and public involvement, and the selection of the proposed action. Some questions focuses on the post-EIS process and when the flood control improvements would be constructed. As with the other procedural questions, these were answered at the scoping meetings, and the NEPA process is also discussed in Sections 5.1 and 6.2 of this document.
- **Environmental Impacts.** At the scoping meetings, the public voiced their concern over the potential effects of the project alternatives (e.g., historic resources and recreation). The impacts associated with the project alternatives are discussed in Section 4.0 of this EIS.

Additional public comments were received during the NEPA mandated public comment period of the initial Draft EIS which began on November 19, 1999 and concluded on March 31, 2000. (The 45-day public review period was officially extended on two occasions in order to accommodate interested parties.) The written comments that were received during the initial draft EIS comment period are included in Appendix A of this EIS. Although the USACOE did not prepare formal responses to these comments, they were considered during the re-evaluation of project alternatives and, where applicable, changes were made to the Feasibility Report and draft EIS. The individuals and agencies listed below submitted written comments on the initial Draft EIS during the official comment period.

- Connie Kim (17 November 1999)
- Mike and Riki Parvin (17 November 1999)
- Karen Kinne-Herman (17 November 1999)
- Maury Herman (17 November 1999)
- Stan Mish (17 November 1999)
- Peter Bloomer (17 November 1999)
- Rick Brandel (17 November 1999)
- Michael Conner (17 November 1999)
- David Evans (17 November 1999)

- Anne Wittke (17 November 1999)
- U.S. Department of Interior (28 December 1999)
- Bob and Evelyn Patterson (20 December 1999)
- Mike Clifton (20 December 1999)
- Arizona Game & Fish Department (7 January 2000)
- Heather Green (14 January 2000)
- Mimi Murov (14 January 2000)
- Linda Henden (14 January 2000)
- Maury Herman (3 January 2000)
- Michael & Nancy Gibson (13 January 2000)
- Jessie Mangum (15 December 1999)
- Sharon and Randy Waltz (15 December 1999)
- Dan and Janet Wef (15 December 1999)
- Bonnie Feather (15 December 1999)
- Sandra Hubarely and Maran Ind (15 December 1999)
- Kari Morehaise (15 December 1999)
- Lance Dislson (15 December 1999)
- Diane Weston and Caroline Pelkington (15 December 1999)
- Randy Shannon (26 February 2000)
- Rose Houk (17 January 2000)
- Maury Herman (18 January 2000)
- Rick Moore (21 Februray 2000)
- Peter Bloomer (15 March 2000)
- U.S. Environmental Protection Agency (undated letter)

The following individuals and agencies submitted comments during the 45-day comment period (June 30, 2000 to August 14, 2000) for the revised Draft EIS:

- Arizona Department of Game and Fish (30 June 2000)
- Friends of Flagstaff's Future (14 August 2000)
- Mary Ann and Jackson Keim (21 June 2000)
- Keith and Mary Hunter (19 July 2000)
- Peter Bloomer (25 July 2000)
- Rose Houk (1 August 2000)

- Mimi Murov (3 August 2000)
- Tom Brownold (3 August 2000)
- Susan Lamb Bean (8 August 2000)
- Jack D. Taylor (10 August 2000)
- Blake Whitten (11 August 2000)
- Connie Kim (not dated)

The U.S. EPA was provided a 10-day extension by the USACOE to submit written comments on the revised Draft EIS. A comment letter was received from the EPA on August 24, 2000 which is included in the public record for this project. A copy of each comment letter on the revised Draft EIS and the corresponding USACOE responses are included in Part II of this Final EIS.

7.0 ORGANIZATIONS AND PERSONS CONSULTED

The following organizations and/or persons were consulted prior to or during the preparation of this EIS:

Federal

U.S. Fish and Wildlife Service Mike Martinez
U.S. Forest Service Coconino National Forest Staff

State

Arizona Department of Fish and Game Randy Smith
Arizona Department of Transportation Rick Shilke
Arizona Department of Water Quality Staff
Arizona State Parks Department James Garrison

Local

City of Flagstaff Kim Gavigan

Other

Arizona Historical Society Susan Wilcox
Arizona State Museum Staff
Flagstaff Arboretum Staff
Kinlani Archaeology, Ltd. Deborah S. Dosh
Museum of Northern Arizona Dave Wilcox

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8.0 LIST OF PREPARERS

This Final Environmental Impact Statement was prepared for the **U.S. Army Corps of Engineers**, Los Angeles District by **KEA Environmental**.

The USACOE provided alternative descriptions, the majority of the Section 3.0 (Affected Environment), and the cultural resources impact analysis. David Compas, Regional Planning Section, is the USACOE Environmental Coordinator for this project. Timothy J. Smith, Biological Sciences Environmental Manager, Ecosystem Planning Section, managed the preparation of the EIS and related environmental studies. Additional USACOE personnel who participated in the preparation of this report include:

- Pam Castens, Ecosystems Planning Section Chief, Ecosystem Planning Section
- Richard Perry, Archaeologist, Ecosystem Planning Section
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Years Experience: 8

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10.0 LIST OF ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
ADEQ	Arizona Department of Environmental Quality
ADHS	Arizona Department of Health Services
ADOT	Arizona Department of Transportation
ADT	average daily traffic
ADWR	Arizona Department of Water Resources
AGFD	Arizona Game and Fish Department
AGS	Arizona Geological Survey
amsl	above mean sea level
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
ASTM	American Society of Testing Materials
BA	Biological Assessment
BLM	Bureau of Land Management, U.S. Department of the Interior
BMP	best management practice
B.N.&S.F.	Burlington Northern & Santa Fe Railroad
BO	Biological Opinion
BOR	Bureau of Reclamation, U.S. Department of the Interior
CAA	Clean Air Act
CAR	Coordination Act Report
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO ₂	carbon dioxide
CWA	Clean Water Act
cy	cubic yards
dB	decibel
dBA	“A-weighted” noise level
DOT	Department of Transportation
EIS	Environmental Impact Statement
EPA	(United States) Environmental Protection Agency

ESA	Endangered Species Act
ESA	Environmental Site Assessment (for hazardous materials)
F	Fahrenheit
FEMA	Federal Emergency Management Agency
FHPC	Flagstaff Historic Preservation Commission
FPPA	Farmland Protection Policy Act
FUTS	Flagstaff Urban Trail System
FWCA	Fish and Wildlife Coordination Act
GIS	Geographic Information System
GMA	Growth Management Alliance
GMG 2000	City of Flagstaff Growth Management Guide 2000
HABS/HAER	Historic American Building Survey/Historic American Engineering Record
HSWA	Hazardous and Solid Waste Amendments
HTRW	Hazardous, Toxic, and Radioactive Waste
H:V	horizontal:vertical
I-40	Interstate Highway 40
I-17	Interstate Highway 17
KOP	Key Observation Point
L_{dn}	day-night average sound level
L_{eq}	average hourly noise levels
LOS	level of service
MBTA	Migratory Bird Treaty Act
MCL	Maximum Concentration Limit
MOU	Memorandum of Understanding
mph	miles per hour
MRA	Multiple Resource Area
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NED	National Economic Development
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NO ₂	nitrogen dioxide
NOI	Notice of Intent

NPDES	National Pollution Discharge Elimination System
NPL	National Prehistoric List
NRCS	Natural Resources Conservation Service
NTU	nephelometric turbidity unit
O ₃	ozone
OSHA	Occupational Safety and Health Act
PA	Programmatic Agreement
Pb	lead
PM ₁₀	particulate matter less than or equal to 10 microns in diameter
RBC	risk-based criteria
RCRA	Resource Conservation and Recovery Act
RMP	Resource Management Plan
ROD	Record of Decision
ROI	region of influence
RUGB	Regional Urban Growth Boundary
RV	Recreational Vehicle
RVP	Recreational Vehicle Park
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO ₂	sulfur dioxide
SOHD	Southside/Old Town Historic District
SRL	Soil Remediation Level
SRMA	Special Recreation Management Area
SSC	Species of Special Concern
SWPPP	Storm Water Pollution Prevention Plan
TDS	total dissolved solids
UBC	Uniform Building Code
U.S.C.	United States Code
USACOE	United States Army Corps of Engineers
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

10.0 List of Acronyms and Abbreviations

USGS	United States Geological Survey
UST	underground storage tank
WSCA	Wildlife of Special Concern in Arizona

11.0 INDEX

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**RIO DE FLAG
FINAL ENVIRONMENTAL IMPACT STATEMENT**

APPENDICES

The following section contains the appendices in the order that they are referred to in the text of the Final EIS. The ten appendices include:

- A. Public/Agency Comment Letters - November 1999 Draft EIS¹
- B. Transcripts from Public Meetings
- C. Agency Coordination and Consultation
- D. Conceptual Recreation Report
- E. Mitigation Planning
- F. 404(b)(1) Analysis
- G. U.S. Fish and Wildlife Service Coordination Act Report
- H. Public Notices/Responses
- I. Mailing List
- J. The Arboretum at Flagstaff, Rio de Flag Planting Recommendations

¹ All comment letters received during the public review period for the June 2000 Revised Draft EIS are included in Part II of this EIS. This section also includes responses to all substantive comments on the revised Draft EIS.

APPENDIX A
PUBLIC/AGENCY COMMENT LETTERS
NOVEMBER 1999 DRAFT EIS



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
75 Hawthorne Street
San Francisco, CA 94105

U.S. Army Corps of Engineers
Los Angeles District
Attn: CESPL-PD-RN
P.O. Box 532711
Los Angeles, CA 90053

Dear Mr. Compas:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers Draft Environmental Impact Statement (DEIS) for Rio de Flag, City of Flagstaff, Coconino County, AZ. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act (CAA).

We understand that the Preferred Alternative (Full Detention With Channel Modification) would provide 100-year flood protection in downtown Flagstaff and would also reduce flooding downstream. This alternative would involve construction of two detention basins and channel modifications. The project would utilize various types of channel improvements and would include construction of soft bottom channels with riprap lined slopes covered with soil, an open "greenbelt" channel with shallow side slopes that is not lined with riprap or concrete, and an underground channel.

The DEIS indicates that as a result of construction of the Preferred Alternative, approximately 1.34 acres of riparian/wetland habitat would be affected. The proposed mitigation for the temporary loss of wetlands during construction (0.64 acres) would be to restore riparian vegetation at those sites (0.64 acres) through a revegetation program. To mitigate for the 0.70 acres of wetlands that would be permanently lost, the DEIS indicates that the Corps would create 1.40 acres of riparian habitat in the historic Rio de Flag channel through site recontouring/grading and revegetation.

Based on our review and the environmental commitments outlined in the DEIS, we have assigned the DEIS a rating of **EC-2 (Environmental Concerns-Insufficient Information)**. We are concerned that the DEIS does not sufficiently address the extent or boundaries of Clean Water Act Section 404 jurisdiction (i.e., waters of the United States). See the enclosed "Summary of EPA Rating System" for a more detailed definition of the ratings. Also see the enclosed detailed comments.

We appreciate the opportunity to review this DEIS. Please send two copies of the FEIS to me at the address above. If you have any questions, please call me at (415) 744-1584 or Rosalyn Johnson of my staff.

Sincerely,

David J. Farrel, Chief
Federal Activities Office

Enclosures (2): Detailed Comments
Summary of EPA Ratings

cc: Cliff Rader USEPA
Sharon Moreland USEPA

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SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the CEQ.

ADEQUACY OF THE IMPACT STATEMENT

Category 1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

"Category 2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analysed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

"Category 3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analysed in the draft EIS, which should be analysed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Detailed Comments

Section 3.3 Biological Resources

We are concerned that the DEIS does not sufficiently address the extent or boundaries of Clean Water Act Section 404 jurisdiction (i.e., waters of the United States). The entire proposed project area(s) should be surveyed for jurisdictional areas by using jurisdictional criteria, and the boundaries of such areas should be delineated and described by functional type (e.g. using the Cowardin classification system). Greater detail on the assessment of jurisdictional area function should be included in the FEIS. While it is highly likely that wildlife habitat is one such function, it is unlikely that habitat is the only function. The assessment should attempt to quantify the functions as well as stating the functions of each aquatic area. Some of the functions of waters of the U.S. are listed at 33 CFR 320.4(b)(2).

Section 4.3.1 "Significance Criteria"

While impacts to "waters of the United States" may not be considered significant, they must be fully described if the DEIS is to comply with Section 404 of the Clean Water Act.

Section 4.3.2 Impact Assessment

Each alternative should be described in terms of which functions of "waters of the U.S." will be impacted and to what extent. The "footprint" of the impact should be described, as well as the relative impact to each function (e.g. "1 acre of pond will lose 1/2 of its sediment capturing ability").

Section 4.3.3 Mitigation Measures (mistakenly listed as 3.3.3 on page 4-17)

The Clean Water Act Section 404(b)(1) Guidelines state that there are three components to mitigation: avoidance, minimization and compensatory mitigation. Only after all possible measure that insure avoidance have been undertaken should compensatory mitigation be considered for the remaining unavoidable impacts to waters of the U.S. Each alternative should describe the avoidance and minimization of impacts to waters of the United States that are included in the design of that alternative.

Each alternative should then propose compensatory mitigation measures that fully compensate for any remaining loss of function as described above in section 4.3.2. An additional portion of mitigation should be provided for each alternative to ensure that each function is fully mitigated, since many mitigation measures do not adequately or fully develop the functions they were intended to replace.

Since the document does not address how operations or maintenance could affect on-site mitigation it is not possible to comment on the appropriateness of the proposed on-site mitigation. Mitigation within the project itself may not be appropriate. If the project will require periodic maintenance which could reduce the value of the mitigation, even if temporarily, then off-site mitigation would be more appropriate.



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
600 Harrison Street, Suite 515
San Francisco, California 94107-1376



December 28, 1999

ER 99/995

Colonel John P. Carroll, Commander
U.S. Army Corps of Engineers
Los Angeles District
Attention: Planning Division, Water Resources Branch
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Colonel Carroll:

The Department of the Interior has reviewed the Draft Environmental Impact Statement (EIS) and Draft Feasibility Report for the Rio de Flag Flood Control Study in Flagstaff, Arizona and offers the following comments.

GENERAL COMMENTS

The Fish and Wildlife Service (Service) is working with the Army Corps of Engineers (COE) as required by the Fish and Wildlife Coordination Act. Environmental concerns and appropriate measures to be undertaken in this development project will be addressed by the Service through the Coordination Act report process. A draft Coordination Act report has been completed.

Throughout the Draft Feasibility Report, Draft EIS, and accompanying Appendices, the COE indicates that it recognizes the City of Flagstaff and its populace are environmentally aware and sophisticated (Appendix A: Transcripts Feasibility Report on Public Scoping Meetings). An example is the Flagstaff Urban Trails System (FUTS), developed by the City, and how the COE proposes the Rio de Flag project can connect with FUTS. The reports acknowledge FUTS "... promotes (among users) enjoying the environment, and provides a diverse exposure to various native wildlife and plant life (FUTS program description)."

The reports state that "both riparian and wetland habitats have sharply declined throughout the arid southwest, making these habitats rare and regionally sensitive" and "native plant communities, primarily wetland and riparian vegetation, have been afforded local and regional scientific significance" (Draft Feasibility Report, Mitigation, page VI-39). Considering what is known about the ecology of the Rio de Flag, and the sentiments of the Flagstaff citizens, it seems that the proposed project, if it complied with known ecological concerns, would satisfy not only the frequently mentioned national economic development (NED) plan but an ecological one, which enhances economic, environmental and aesthetic aspects of the project. To increase these

enhancements of the proposed project, consultation with Department ecologists at the USGS Flagstaff Field Station, The Arboretum at Flagstaff, and at the Ecological Services Field Office in Phoenix may be warranted.

The Draft EIS states that the preferred alternative is alternative 5, full detention with channel modifications. A component of this alternative is the construction of a detention basin within Thorpe Park, near downtown Flagstaff. Upon completion, the proposed detention basin would encompass approximately 43 acres of Thorpe Park. Alternative 1, full detention, includes an identical sized detention basin within Thorpe Park.

Thorpe Park was developed by the City of Flagstaff with assistance from the Land and Water Conservation Fund (L&WCF) program in grants 04-00128, 04-00190, 04-00478, and 04-00585. This park, therefore, is encumbered by section 6(f)(3) of the L&WCF Act of 1965, as amended (Public Law 88-578), which states: "No property acquired or developed with assistance under this section shall, without the approval of the Secretary, be converted to other than public outdoor recreation uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreation properties of at least equal fair market value and of reasonably equivalent usefulness and location."

A conversion occurs when the scope of a project is changed to other than public outdoor recreation uses. The question whether there is a change to other than public outdoor recreation use is based upon a comparison of the public outdoor recreation assets provided by the original L&WCF agreement and the impact of any proposed changes thereto. If the changes provide for other than public outdoor recreation as originally agreed to, in all or in part, a conversion exists.

Consultation with the official administering the L&WCF program in the State of Arizona, to determine any potential conflicts with section 6(f)(3), is recommended. The administrator for the L&WCF program in Arizona is Ms. Renee Bahl, Assistant Director, Arizona State Parks, 1300 West Washington Street, Phoenix, Arizona 85007.

SPECIFIC COMMENTS

Comments in the Draft Feasibility Report are often only implied in the Draft EIS; therefore, the following specific comments may apply to either, or both, the Draft Feasibility Report and the Draft EIS.

Feasibility Report

Page VI-37, Rio de Flag Modifications, paragraph 2

The Draft Feasibility Report states, "The habitat in this reach (Reach 6) was evaluated as low and is composed primarily of remnant riparian vegetation dominated by ruderal plants and exotic and

ornamental species." The Draft Feasibility Report, page VI-38, Clay Avenue Wash Channel Modifications, paragraph 2, states "Both of these sections (Blackbird Roost to Milton Road and McCracken Place to Milton Road) are considered to have low functional value characterized as remnant riparian corridors dominated by ruderal grasses and herbs."

The term "remnant riparian vegetation", used to describe existing conditions at both sites, is confusing. "Remnant habitat", regardless of habitat type, is an ecological term used to describe pristine ecological conditions remaining within a highly fragmented ecosystem; e.g., remnant tallgrass prairie, consisting of undisturbed native tallgrasses and forbs. A remnant riparian habitat in the Flagstaff region would consist primarily of native willows (*Salix* spp), alder (*Alnus oblongifolia*), birch (*Betula occidentalis*), perennial forbs (example Golden Columbine, *Aquilegia chrysantha*), grasses and sedges (personal communication, The Arboretum at Flagstaff). The native vegetation could, in turn, provide breeding and nesting habitat for native mammals, neotropical migrant bird species (including the endangered Southwestern willow flycatcher), and herptiles. The proposed Rio de Flag project provides a situation to reclaim and restore riparian areas that have been severely fragmented and otherwise disturbed.

Draft Environmental Impact Statement

Page 1-8, Section 1.2, LOCATION, Rio de Flag Historic Channel Reach

There is confusion in the Draft Feasibility Report and Draft EIS as to the correct historic path of the Rio de Flag. The description on this page is incorrect. In addition, the maps on page IV-3 (Figure 4.1) and IV-4 (Figures 4.2) of the Draft Feasibility Report as well as on page 1-3 (Figure 1-2) and page 1-6 (Figure 1-3) of the Draft EIS are incorrect.

The correct description of the historic path of the Rio de Flag is as follows:

Before 1890, the Rio de Flag ran southeastward from what is now Frances Short Pond to Aspen Avenue between Humphreys and Beaver Streets. There, the channel turned south. The Atlantic and Pacific Railroad built a trestle over this section of the channel in 1882. Downstream of Phoenix Avenue, the channel curved south of Cottage Avenue and then ran east-southeast for three quarters of mile close to the south side of the railroad tracks until it plunged into a deep canyon that joined Sinclair Wash near Interstate 40.

In particular, the historic channel did not "...extend east of Beaver Street, parallel to...the railroad tracks..." The historic channel continues south at Beaver Street and does not parallel the railroad tracks until it reaches an area near the northern projection of Lone Tree Road.

See the 1892 Sanborn-Perris Fire Insurance map and page 92 in *Stone Landmarks: Flagstaff's Geology and Historic Building Stones* by Marie Jackson for the correct course of the historic Rio de Flag.

Page 2-6 and Page 2-9, Section 2.2, DESCRIPTION OF ALTERNATIVES, Thorpe Park Detention Basin, Embankment, paragraph 2

The Draft EIS states, "Following construction, the embankment would be vegetated with low maintenance grasses, wild flowers, and shrubs. The grasses and wild flowers would be planted with [by] hydro seeding. All plants would be selected from the plant species lists included in the Recommended Landscape Plant Material for the Flagstaff Area (City of Flagstaff, undated)." A copy of that document was not found in the Appendices, however, the plants listed in the Draft Feasibility Report, pages VI-32-33, "Recommended Landscape Plant Material", published by the City of Flagstaff, Planning Division, are ornamental hybrids, mostly nonindigenous, not native species. These ornamental plantings are likely to require supplemental moisture beyond natural precipitation.

The Draft Feasibility Report, page VI-41, reports "hydroseeding" as a means of sowing seed and indicates "Application of the seedmix will occur during the Fall and/or Winter months to promote seed establishment and germination." The Draft EIS, however, indicates on p. 3-2, Section 3.1.3 Soils, "Permeability of frozen ground during winter is nearly zero." We would like to point out that seed scarification may occur during freezing, but that freezing conditions are not conducive to seed germination. Further, if high, desiccating winds are prevalent during winter and affect the hydro seeded site, few viable seeds might remain for germination during the spring.

The Draft Feasibility Report, page VI-32 states "Irrigation will be required for plant establishment. After plant establishment, irrigation may be necessary to maintain healthy and attractive plantings." In fact, ornamental plants may require irrigation. However, native plants, if planted with adequate restored soil conditions to ensure soil moisture availability, should require very little ancillary water. We recommend a restored soil with moderate to high organic matter but free from weed seeds.

Page 2-6, Section 2.2.1, Alternative 1: Full Detention, Thorpe Park Detention Basin

Infiltration characteristics of the detention basin should be considered. The clays and alluvium of Thorpe Park have a low permeability, thus requiring a large area for retention of the floodwaters. There is a natural basin of highly fractured basalt upstream of The Narrows, east of Fremont Boulevard, close to the Museum of Northern Arizona (page 3.3, Figure 3-1, Flagstaff West 7.5 Minute Quadrangle topographic map). This basin would allow more rapid infiltration of floodwaters as well as local recharge of groundwater reservoirs. Locating the detention basin upstream would also help protect homes built along Highway 180 between Sechrist and Marshall Schools. A detention basin, which drains water more quickly than Thorpe Park, would reduce the amount of water that eventually reaches the Continental area. The Thorpe Park detention basin could be built as a much smaller storage facility to hold local urban runoff.

Page 2-15, Section 2.2.2, Alternative 5: Full Detention With Channel Modifications, Rio de Flag Channel Modifications

The Draft EIS should contain a detailed plan on the clean-up and restoration of the narrow trench in the Downtown Reach of the Rio de Flag that runs from Phoenix Avenue to Lone Tree Road and then on to Sinclair Wash. This trench was excavated in 1895 to divert the Rio from its original course near the Brannen Addition and will be abandoned, except for urban runoff, by implementing Alternative 5.

Page 2-17, Section 2.2.2, Alternative 5: Full Detention with Rio de Flag Channel Modifications, point 2

The Draft EIS states "The 2:1 (sic) rip-rap would be covered with soil, allowing the establishment of some vegetation such as grass." The document does not describe the type or size of rip-rap, nor the type, depth or preparation of soil proposed to cover the rip-rap. Rip-rap is very often coarse waste concrete material, through which soil could easily fall, leaving bare concrete and poor soil moisture availability. If adequate soil were provided, a suitable grass for revegetation might be Arizona fescue (*Festuca arizonica*), a dense, tufted, perennial native bunchgrass. Consultation with The Arboretum at Flagstaff horticulturist is recommended.

Page 3-14, Section 3.3 Biological Resources Section, Section 3.3.1 Vegetation Communities, Wetland

This section, Vegetation Communities, Wetland, describes existing wetlands in the proposed Rio de Flag project site. Loss of wetlands by the proposed project "...totals 0.70 acre with a mitigation requirement of 1.40 acres following the application of respective mitigation ratios (Draft Feasibility Report, page VI-42, Section H Mitigation, Permanent Loss Mitigation)." The recommended wetland mitigation measure for the Historic Rio de Flag Channel states (same page) "This mitigation measure compensates for the loss in wetland habitat through creation of riparian habitat in the historic Rio de Flag channel." Consultation with The Arboretum at Flagstaff for adequate riparian habitat mitigation measures at these locations is recommended.

Page 3-2, Section 3.1.2, Geologic Structure

Within the study area, the Rio de Flag channel is not entirely controlled by faults. Although several faults, at least one of them active, do traverse the channel, the Rio de Flag flows in graben controlled valleys (faulted-down areas) and follows the edges of surficial lava flows. In addition, its course downtown has been extensively altered both north and south of the railroad tracks by the City of Flagstaff in the 1890s.

Page 3-4, Figure 3.1, Topography

This map is very difficult to read. A black and white copy of the original map would be more readable.

Page 3-5, Section 3.1.5, Faulting and Seismicity, first paragraph

The statement, "... the Rio de Flag does not intersect any major known fault zones within the study area ...," is not correct. The Rio de Flag encounters the Lake Mary Fault east of town and flows along the fault under I-40. The Lake Mary Fault is a significant fault along which a recent (12/6/99) magnitude 3.1 earthquake was recorded. Also, the northern tip of the Anderson Mesa fault crosses the Rio de Flag west of the Fox Glen area. Slip along this fault generated a magnitude 6.2 earthquake in 1906, which damaged several of Flagstaff's masonry buildings downtown.

The Flagstaff Earthquake Community Earthquake Hazard Evaluation (Bausch and Brumbaugh 1997) states that there is a 50% probability of a magnitude 6.0 or larger earthquake occurring during the next 30 years. A large ground-rupturing earthquake on the Lake Mary/Anderson Mesa fault system could produce a magnitude 7+ event. This seismic risk needs to be factored into the impact analysis.

Page 3-9, Section 3.2.2, Groundwater, first paragraph

According to John Carollo Engineers and Harshbarger & Associates 1973, well yields are 200 - 800 gallons per minute as opposed to 1-5 gpm as stated here.

It is unclear why the test boring (TDB-1, TDB-2, and TDB-3) only went to depths of 2 - 25 feet in the Thorpe Park detention area (page 3-9, third paragraph). Was basalt encountered? An understanding of the depth of groundwater and the subsurface geology in this area would be helpful.

Page 3-11, Section 3.2.2, Groundwater, third paragraph

The use of the word sump is incorrect. Fracture or sinkhole is preferable.

There is not a perched aquifer in this area; therefore, the groundwater travels north, not south into Walnut Canyon National Monument.

Page 4-3, Section 4.1.1, Impact Assessment, Alternative 1: Full Detention Alternative, Faulting/Seismicity

The berms, culverts, levees, and underground structures should be built to resist ground shaking from a magnitude 7+ (1.2g) earthquake (see above and Vol. 2, Appendix D, p. 30). These specifications need to be included in the final EIS.

Page 4-8, Section 4.2.2, Impact Assessment, Alternative 1: Full Detention Alternative

The groundwater in this area is at a depth of only 1.7 feet (page 3-11), so small spills could have a significant impact.

Thank you for the opportunity to comment on this environmental document.

Sincerely,



Kathleen G. Shummin
Acting Regional Environmental Officer

cc:

Director, OEPC, w/original incoming
Regional Director, FWS, Region II
Regional Director, NPS, Intermountain Region
Director, USGS, Reston, VA

References:

Jackson, Marie D., 1999, Stone landmarks: Flagstaff's geology and historic building stones: Piedra Azul Press, Flagstaff, Arizona, pp. 128.

Sanborn-Perris Map Co. Limited, 1892, Fire insurance map: Sanborn-Perris Map Co., Limited, 117 & 119 Broadway, New York, New York, p. 1

The Arboretum at Flagstaff, 4001 South Woody Mountain Road, Flagstaff, Arizona. Phone number: 520-774-1442. <http://FLAGGUIDE.COM/ARBORETUM>.

U.S. Geological Survey Forest and Rangeland Ecosystem Science Center, Flagstaff Field Station, Flagstaff, Arizona. Phone number 520-556-7466. <http://biology.usgs.gov>, located under BRD Centers.

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET
PUBLIC MEETING OF
16 DECEMBER 1999

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet at the conclusion of the meeting or mail to:

Mr. Sam Arrowood, Study Manager
U.S. Army Corps of Engineers
3636 N. Central Ave., Suite 740
Phoenix, AZ 85012

Your participation and/or comments are greatly appreciated. Thank you.

NAME: _____ **BOB AND EVELYN PATTERSON** _____

ADDRESS: _____

PHONE: _____ **Apt. #219** _____

Comments: _____ **700 Blackbird Roost Street** _____
_____ **Flagstaff, Arizona 86001** _____
_____ **Our Phone # is : 520-773-9809** _____
_____ **Our Fax # is : 520-774-1096** _____

DATE: DECEMBER 20th, 1999

WE ARE SENIOR CITIZENS, RESIDENTS OF FLAGSTAFF..VERY INTERESTED
IN THIS PROJECT..

WE ATTENDED THE DECEMBER 16th MEETING ..WE WANTED TO HEAR THE
PRESENTATION ABOUT THE FEASIBILITY STUDY...WE HAD PREVIOUSLY WRITTEN
TO MR. KIM GAVIGAN TO BEGIN INQUIRING ABOUT THIS FLOOD CONTROL WORK...
WE HAVE BEEN IN FLAGSTAFF SINCE SEPTEMBER OF 1997..WE MOVED HERE FROM
NORTH AND SOUTH CAROLINA..WE HAVE ONLY LIVED IN ONE PLACE..THE
UNIVERSITY ROOST APARTMENTS AND WE HAVE SEEN HEAVY WATER FLOW
DURING RAINS HERE ON BLACKBIRD ROOST ST. AT MCCracken AVE...
THE DEC. 16th MEETING WAS VERY INFORMATIVE..AND WE WOULD
APPRECIATE BEING ON A MAILING LIST TO KNOW OF FUTURE MEETINGS
AS WE WOULD LIKE TO KEEP INFORMED AS THIS PROJECT HOPEFULLY
MEETS COMPLETION IN 2005..
VERY SINCERELY,

Bob & Evelyn
BOB AND EVELYN PATTERSON

Mike Clifton
P.O. Box 357
Flagstaff, AZ. 86002

December 20, 1999

Sam Arrowood, Study Manager
U.S. Corps of Engineers
3636 N. Central Ave., Suite 740
Phoenix, AZ. 85012

Dear Sam,

I attended your meeting in Flagstaff on the 16th of December. I am somewhat confused about the design of the proposed channel relocation on Butler Ave. Please send a copy of the Rio De Flag Feasibility Study map along with the details of the proposed project. I also want to be informed in writing of any and all meetings being held in regards to the project.

Sincerely,

Mike Clifton
Mike Clifton

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet to the address listed below:

City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Connie (Constance) S. Kim

ADDRESS: 223 W. Cherry Ave.

PHONE: 779-2589 AFFILIATION: Resident

Comments: I have lived adjacent to the Rio De Flag for 28 years and love the sound of the water rushing through when it is high and the riparian habitat at all times of the year. It has been even more enjoyable since the Urban Trail completion.

It now concerns me to learn of a plan to line the riverbed with concrete. In past meetings held by the city regarding flooding potential in Flagstaff and Rio De Flag drainage, it has been pointed out or admitted to by authorities present, that the water runoff, therefore, danger of flooding, has increased over the years as development, paving and blacktopping have increased. Thus, when you reference covering great sections of this drainage path to "control flooding", it would seem to me more like "flood contribution". Vast amounts of water must now permeate into the sides and bottom of the river path and be taken up by the plants and trees along

P.2

the way - another important means of flood control. Further, the natural percolation of water further replenishes the natural groundwater systems along its route. This is a very important issue, especially in Arizona when we are mining groundwater at such perilous rates while we continue to, at the same time, seal and drain off, even to the point of death, our rivers, which are used up before their courses are run. We develop and fill up natural drainage systems like R.D. Flag, washes and wetlands. We dam our rivers and further waste many thousands of acre feet of water into evaporation, clear trees to save water and pave to "move it along". Where, in all of this is protection of aquifers? What about increased volumes of water not being absorbed as it moves its course?

Now you propose to pave one more area - as it passes our homes and businesses. I have watched the Rio De Flag for these 28 years through every spring melt and "monsoon" season. It flows very fast past my home and does not become sluggish until it comes to the widened area south of Birch street and at the very unsightly concrete lined area.

83 I firmly believe that by not letting water
to be taken up by earth and plant life
along its course in the natural way, you
are going to greatly increase the total
amount of water that comes through town
thus offsetting whatever you think you might
gain in moving it faster. If the proposed
development further upstream (that recently
came to our attention) is allowed to take place, the
problems will be worsened.

Other problems that could develop might
include safety - concrete sides, faster moving
water could make it much more dangerous
for anyone, especially children, falling in.
Further, the riparian habitat, much of
it anyway, would disappear through
town and along the Urban Trail. This would
affect the entire eco-system of the area -
trees, plants and grasses, wildlife.

Please, please, do not seal in
& cement in the Rio De Flag. Deepen
it if this will help but let run in its
natural way and do what it is meant
to do in the natural order of things.

Sincerely,

Constance S. Kim

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

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City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Mike & Riki Parwin

ADDRESS: 211 S. San Francisco

PHONE: 774-1037 AFFILIATION: Business Owner

Comments: We are new in the area. This

meeting gave us a great outlook on
the value and how much we are able
to safely expand on this property.
We want to support you and would
like it to start within the next year
on land.

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

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City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: James Linn-Herman

ADDRESS: 2240 N. Fremont 86001

PHONE: 774-8706 AFFILIATION: Property owner

Comments: Re: Alt. 5

This will be a significant
contribution to the stability &
development of Flagstaff, parti-
cularly in the downtown area.
Thank you for investing in
the future.

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

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City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: MAURY HERMAN
ADDRESS: 3 WILKINSON SUITE 201
PHONE: 7796211 AFFILIATION: PROPERTY OWNER
Flagstaff Man & Woman
Comments: _____

GREAT PROJECT.
WE NEED TO FIND ROOM FOR
A BIKE PATH UNDER 66 &
THE RAIL ROAD.

THE FLOOD PLAIN IS A
MAJOR HAZARD AND IMPEDIMENT
TO THE COMMUNITY.

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

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City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Stan Mish
ADDRESS: 1620 SPYGLASS Flagstaff 86004
PHONE: 520 527 3346 AFFILIATION: CITIZEN
Comments: I like it. Alternative 5 looks good.

Please keep Bike lanes in mind; Plan to
limit impact on the downtown business and traffic
functions; Move forward quickly

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet to the address listed below:

City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Eric Bloomer

ADDRESS: 427 S. SAN FRANCISCO FLAG 86001

PHONE: 779-1014 AFFILIATION: _____

Comments: GO FOR IT !!

SOONER THE BETTER.

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet to the address listed below:

City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Rick Brandel

ADDRESS: 3263 S. Debbie Flagstaff, AZ 86011

PHONE: 779-5508 AFFILIATION: Parks and Rec. Commission - Flagstaff

Comments: What are the implications for:
a) existing structures, as well as b) future renovations and expansion of
Concession Stands, structure.

Equipment Sheds, Dugouts etc. for both the
Thorpe softball complex and the Flagstaff
Sr. League Baseball field and Flagstaff
Major and Minor League fields under the
preferred plan or any similar plan that
would include these areas as a designated
detention area?

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet to the address listed below:

City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Michael Conley

ADDRESS: 211 W Aspen Ave

PHONE: 779 7690 AFFILIATION: C.O.F.

Comments: Thorpe Park =

✓ Will existing structures be "Grandfathered"
in the Flood Plain.

Could existing structure be re-built if
destroyed. Could existing structure be
expanded, and a new structure built.

✓ Can access to the East side of Park
(Oak field Pond & Parking area) be provided.
Can Park be improved w/ Public Access
to East Park area. Maint. access to
E. side of Park elements.

Will FOTS trail meet ADA standards,
be improved, re-constructed.

11/29/99

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

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City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

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ENGINEERING

Your participation and/or comments are valuable to this effort. Thank you.

NAME: DAVID EVANS

ADDRESS: 2380 N. OAKMONT DRIVE

PHONE: 526-5125 AFFILIATION: CONTINENTAL COUNTRY CLUB

Comments: ALTERNATIVE D: I WAS SURPRISED

TO SEE THIS ALTERNATIVE IN THE EIS SINCE I
DO NOT REMEMBER DISCUSSING IT BEFORE. IF IT
WAS DISCUSSED, I MISSED THE SCOPE.

THE DESCRIPTION OF ALTERNATIVE D (pg ES-6)
IS INCORRECT. THE DRAWING OF THE BERM
SHOWS IT GOING THROUGH A SIGNIFICANT
PORTION OF PRIVATE PROPERTY I.E GOLF COURSE,
DRIVING RANGE, GREEN BELT. IN FACT THE
ONLY PUBLIC PROPERTY INVOLVED IS ARE THE
STREET CROSSINGS.

I THINK THE HOMEOWNERS ASSOCIATIONS INVOLVED
(CONT. COUNTRY CLUB, CONT. TOWNHOMES, WALCUT CANYON
VILLAGE TOWN HOMES WOULD FIND THIS ALTERNATIVE
TO BE TOTALLY UNSATISFACTORY.

DAVID

U.S. ARMY CORPS OF ENGINEERS AND CITY OF FLAGSTAFF
RIO DE FLAG FEASIBILITY STUDY COMMENT SHEET

If you have new information, concerns, input, or were not previously contacted please include your ideas and comments below and return this comment sheet to the address listed below:

City of Flagstaff Engineering Division
Stormwater Management Section
211 W. Aspen Avenue
Flagstaff, AZ 86001

Your participation and/or comments are valuable to this effort. Thank you.

NAME: Anne Witthe

ADDRESS: 1616 N. Owl Rd.

PHONE: _____ AFFILIATION: resident

Comments: I like the detention basins in alternative 5

but am concerned about the L style of the
concrete culverts. The 8 foot depth means any
child playing in the area risks falling in and
getting seriously hurt on the concrete (liability issues)
as well as possibly getting stuck in there and
being unable to get out. I would like to
see more graduated sides.

Having the detention basins upstream may reduce
the need for such deep channels as well, as
they would decrease the total flow at any one time.

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NOV 19 1999

ENGINEERING

GAME & FISH DEPARTMENT

2221 West Greenway Road, Phoenix, Arizona 85023-4399 (602) 942-3000
www.gf.state.az.us

Governor
Jane Dee Hull
Commissioners:
Chairman, Herb Guenther, Tucson
Michael M. Goughly, Flagstaff
William Berlat, Tucson
M. Jean Hassell, Scottsdale
Dennis D. Manning, Alpine

Director
Duane L. Shroufe
Deputy Director
Thomas W. Spalding

Flagstaff Office, 3500 S. Lake Mary Road, Flagstaff, AZ 86001-1043

January 7, 2000

Mr. David Compas
Environmental Coordinator
Environmental Planning Section
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Re: Arizona Game and Fish Department (Department) Comments on the Draft
Environmental Impact Statement (DEIS) for the Rio de Flag Flood Control Study, City Of
Flagstaff, Coconino County, Arizona, dated November 1999.

Dear Mr. Compas:

The Department has reviewed the above noted document and would offer the following
comments for consideration.

The Department believes that any of the considered alternatives will contribute significantly
to the protection of property within the Rio de Flag flood plain. Toward that end the
Department does not have a preference with regard to alternatives.

One question, which the Department was unable to ascertain, was the potential impacts to
the greenbelt, I-40 wetlands, and proposed wetland mitigation sites due to increased flow
rates associated with channel modification. Will a faster flow rate affect these areas?
Channel modifications as described in selected plan /alternative five removes much of the
existing upstream vegetation and replaces those with concrete lined culverts or channels.
The descriptive analysis of this alternative stated some erosion and long-term side bank
erosion might occur at the beginning of the greenbelt channel. However, whether or not it
would remove or significantly damage important wildlife habitats and proposed wildlife
mitigation sites further downstream was unclear. The Department would appreciate a
response to this inquiry in the final analysis.

Mr. David Compas

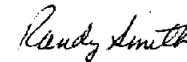
January 7, 2000

2

Lastly, the Department believes that narrow leafed cottonwoods might be a better choice
than fremont cottonwoods for mitigation replacements as it appears to occur more frequently
higher elevations.

Thank you for the opportunity to comment. If you have any questions regarding this
correspondence please contact me at (520) 774-5045.

Sincerely,



Randy Smith
Habitat Specialist

cc: John Kennedy, Habitat Evaluation Program Supervisor, Phoenix

2206 Lantern Lane
Flagstaff, AZ 86001
January 14, 2000

Dr. David Compas
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Compas:

I am writing to provide input regarding the Draft Feasibility Study Report and EIS on the Rio de Flag in Flagstaff, AZ.

The input is in specific regard to both native and non native vegetation in the areas to be affected directly and non directly by construction, channel shaping, access roads and other ground disturbing activities.

- The vegetation section in the EIS for existing conditions should clearly describe conditions in the riparian corridor, or other areas to be affected, not just a general description of the overstory in the watershed. For non native species, it should be mentioned that there are known plants of noxious weeds including diffuse knapweed, poison hemlock and scotch thistle both within and upstream of proposed activities in the Rio corridor. Therefore it should be assumed that these species are in the seedbank and are highly likely to colonize areas disturbed during construction activities and be more successful in colonization than other native or non native disturbance species in the area.
- Strategies should be developed to minimize the area of disturbance surrounding detention basins, wall construction, channel shaping, bridge removal and replacement, road access etc. The area and location of disturbance for each of these activities should be clearly stated in the EIS so both the writer and the reader can understand the scope and magnitude of the effect e.g. at the Meade Street bridge, equipment will need to access @ 300 feet on either side of the existing bridge in order to accomplish the job effectively and safety. There should be a clear statement from someone who has visited the site on the species, amount and age of vegetation to be impacted within the disturbance area and likewise the the same of vegetation that will remain following implementation.
- A noxious weed risk assessment should be done to assess the type of species likely to occur and colonize following activities; develop a species specific plan for control, eradication and prevention, develop a strategy to minimize the spread of plant parts, seeds, soil etc from construction site to construction site; assure that dirt, cinder and water materials needed for construction, demolition, etc purposes come from weed free sources; develop a revegetation strategy and mitigation plan for a number of years following completion of the action to assure either eradication and control of species that will colonize in spite of best efforts because weed seeds can remain in the seed bank for a

number of years following removal of plants.

- Equipment should be cleaned on site to remove plant fragments, seeds, etc. prior to moving to a new site. This same measure should apply to equipment both contracted or subcontracted for the various jobs or phases of the project. Control and eradication measures should be clearly articulated.
- Diffuse knapweed is well established in the Doney Park area where there are nearby cinder pits or where soil might have been gathered from local materials firms. Yellow starthistle is extremely close and possible in the seed bank of cinder pits in some of the cinder pits in east Flagstaff and has been located at the Robison pit near O'Leary Peak, a common material source in Flagstaff. A visit to the Rain Valley Rd portion of the Rio de Flag will clearly show what will happen following disturbance of the Rio de Flag drainage in the presence of scotch thistle seeds. Rapid and aggressive infestation followed disturbance resulting in the establishment of large stands of large plants. The scotch thistle plants I have seen here form impenetrable stands of spiny plants exceeding 8-10 feet in height and 2 or more inches at the base. Chemical treatment of large plants is seldom economical without physical pre treatment. The expense of control and eradication escalates rapidly as populations of any noxious weed increases in number or size. I believe it is far more cost effective to treat early and aggressively. The effects of the presence of these plants should be displayed in the EIS and/or subsequent documentation showing the potential effects to safety, environment, economics and aesthetics.
- Good local sources of information regarding weed assessment, revegetation strategies and species would be the Northern Arizona Weed Council; the Arboretum at Flagstaff, Flagstaff Native Plant and Seed or other native plant nurseries.
- I would like to encourage that the residual slopes following any channel work be low enough to discourage erosion and runoff, and encourage plant and root establishment to hold the soil in place. This will also encourage retention of fewer disturbance plant species and provide more plant competition in the event of noxious weed establishment.
- Obviously a certain amount of ground disturbance, large equipment and so on is necessary to complete the job but I'd like to propose that impacts to local willows, aspen or native plants, particularly larger or older plants be minimized. Purpose: keep the root systems in place to hold soil and stabilize the slope. They can also serve as sources for vegetative expansion into recently disturbed sites which increases likelihood of rapid and successful plant establishment. Planting young plants in an area where decades old vegetation recently grew is very different. There are some obvious wildlife and aesthetic benefits as well.
- I'd like to see serious consideration of Marie Jackson's proposal to construct a detention basin in the 6 million year fractured lava flow upstream of the proposed detention basin in Thorpe park. I'd like to see inclusion of Jim David and Nat White's information on the

subsurface materials associated with the City Pond/Duck Pond in the vicinity of Flagstaff Middle School. This was brought up verbally at last night's meeting at the Flagstaff City Council Chambers. I would also like to see some sort of recorder for verbal comments at these meetings or an opportunity at meeting to provide written comments to assure that comments are received, heard and acted upon if the time is being spent to solicit them.

Thank you for the opportunity to comment and I appreciate the Corps willingness to extend comment deadlines and come to Flagstaff for public meetings. Feel free to contact me if you have any questions regarding these comments.

Sincerely,

Heather Green

From: mimi murov [tbrownold@earthlink.net]
Sent: Friday, January 14, 2000 8:39 AM
To: dcompas@spl.usace.army.mil
Cc: dwilcox@ci.flagstaff.az.us
Subject: Rio de Flag Feasibility Study and EIS

I find all of your alternatives except the No Action alternative and possibly alternative 4 to be both environmentally and publicly unacceptable. The detention walls in the other alternatives are completely unacceptable and contradictory to the hard work and \$\$ the city has invested in recreation and non-vehicular traffic corridors. Dams of all shapes and sizes have always been detrimental to the natural environment though these degradations often are not realized until the structure is in place and functioning. I realize the duck pond is not in the original Rio de Flag channel and therefore not natural but I see no reason to add insult to injury when perhaps another alternative will reach your desired end. The proposed floodwalls will be eyesores in their own right but will also surely be graffiti magnets.

According to the study (Page IV-18) the capacity of the Rio de Flag upstream of Thorpe park approximates the 100-year discharge. Why can't the channel downstream of the duck pond be deepened and/or widened so that its capacity is also equal to the 100-year discharge. There is plenty of room for doing this between the duck pond and Rt.66 south of city hall. From here if the original Rio de Flag channel is resurrected along the south side of the railroad tracks while still maintaining the viability of the existing rerouted channel from Rt. 66 to Sinclair Wash; you may be able to accomplish your goals with less cost, less interruption to daily activities and less environmental damage. The alternative that has been recommended seems to be the costliest, most complex, and most damaging. I also found it interesting and negligent that the costs of recreational and environmental mitigation were not included in the study analysis. This is reason enough to find all alternatives except No Action unacceptable.

I noticed on Page 3-12 and 3-14 of the EIS that all of the plants referred to as being annuals are actually perennials. I hope this erroneous oversight is not indicative of the accuracy of the rest of the feasibility study and EIS. Please reconsider these alternatives and their full costs prior to any implementation. Thank you for continually informing me of public meetings. Unfortunately I have been working out of town for all of them except the Jan 12, 2000 meeting.

Sincerely,

Mimi Murov (resident since 1976)
801 W. Summit
Flagstaff, Az.
86001

From: lhenden [lhenden@infomagic.com]
Sent: Friday, January 14, 2000 8:34 PM
To: dcompas@spl.usace.army.mil
Subject: Rio de Flag Feasibility Study

I attended part of the public workshop for the Rio de Flag Feasibility Study on Wed., 1/12/00, in Flagstaff City Hall, but had to leave before I was able to ask my question. As a member of the American Society of Landscape Architects, I couldn't help but wonder whether a landscape architect was involved in the design process at all? From what I could see in your plan and section drawings, your stormwater management solutions look quite "engineered." If a landscape architect was not involved, I would like to suggest you find one. I believe you would find it useful to gain a different perspective on how to control stormwater -- a perspective that should result in a more natural-looking solution and be more acceptable to the public. There's so much potential here to make the Rio de Flag a beautiful asset to the City of Flagstaff. One firm that I know of, that does outstanding work in the Denver area (and elsewhere), is

Wenk Associates, Inc.
1035 Cherokee St.
Denver, CO 80204
303-628-0003
Fax: 303-628-0004
wenk@central.com

I look forward to hearing from you.

Linda Henden, LAIT

Mr. Maury Herman
President
COAST AND MOUNTAIN PROPERTIES, INC.
3 N. Leroux Street, Suite 201
Flagstaff, AZ 86001

January 3, 2000

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
Attn: Mr. David Compas
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: Rio de Flag Draft Environmental Impact Statement Comments

Dear Mr. Compas:

I have reviewed the Draft Environmental Impact Statement for the Rio de Flag Flood Control Study, Flagstaff, Arizona, dated November 1999. I am enthusiastically in support of Alternative 5; not only will it eliminate the potential for destructive flooding, but it will also be an esthetic improvement. It is very important to develop a north/south bike lane along the Rio de Flag under the highway and railroad in conjunction with this plan.

Sincerely,



Maury Herman

e.com3589/oo

Compas, David F SPL

From: lhenden [lhenden@infomagic.com]
Sent: Friday, January 14, 2000 8:34 PM
To: dcompas@spl.usace.army.mil
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Wenk Associates, Inc.
1035 Cherokee St.
Denver, CO 80204
303-628-0003
Fax: 303-628-0004
wenk@ecentral.com

I look forward to hearing from you.

Linda Henden, LAIT

1/18/00

Mr. Maury Herman
President
COAST AND MOUNTAIN PROPERTIES, INC.
3 N. Leroux Street, Suite 201
Flagstaff, AZ 86001

January 3, 2000

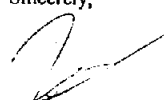
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Sincerely,


Maury Herman

e:com3509@co

1/13/00

District Engineer
USACOE

Los Angeles District
attn. Mr. David Compas
P.O. Box 532711

Los Angeles, CA 90053-2325

Dear Mr. Compas -

The owners of Palace Haircutters,
a barber shop in Flagstaff, Arizona, endorses
the alternative 5 option in the Rio De Flag
Flood control project, as outlined in the
RIO De Flag EIS, dated 11/9/99.

Our business is semi-dab in the
middle of the flood plain. We are
of the opinion that when you do
build alternative 5, the water will come!

Cordially -
Mike & Nancy Gibson
Flagstaff, AZ

MICHAEL T. GIBSON
2421 Fremont
Flagstaff, AZ 86001

December 15, 1999

Dear Mayor Bavasi and Members of the Flagstaff City Council,

We have just recently become aware of a major flood-control project to be undertaken by the City of Flagstaff and the Army Corps of Engineers and its potential negative impact on our neighborhood. Insofar the preferred plan involves the construction of a sizable retention basin in the fields behind our homes, and may well limit our access to the urban trail and entomb us behind a massive barrier, we would, first of all, like to express our unhappiness that we were not directly notified of this plan by the City. As our representatives we believe that it would have been proper for you to send out letters to the properties owners most directly affected by this project. It does not seem to be in keeping with the spirit of a period of "public comment," when the public is not effectively notified of what the City is planning.

Second, we would like to formally go on record as wanting to be involved in all aspects of the design of this project. We are not totally opposed to the construction of a catchment basin in the Thrope Park area and we are willing to work with both the City and the Corps of Engineers, but insofar as our properties (and our investments) will be most directly affected by the final design of the project, we would like full and adequate representation in the decisions involving the placement and the design of the retaining wall and the rechannelization of this segment of the Rio de Flag.

We all hope that it will not be necessary for us to retain legal council to adequately protect our properties and quality of life. Our hope, rather, is that it will be possible for you to find a way to work with us to find a solution which addresses public protection while simultaneously addressing the needs of the property owners on North Navajo Drive.

Thank you. We look forward to working with you on this matter.

Jessie Mae Mangum
1613 N. Navajo Rd.

CC: Army Corps of Engineers

December 15, 1999

Dear Mayor Bavasi and Members of the Flagstaff City Council,

We have just recently become aware of a major flood-control project to be undertaken by the City of Flagstaff and the Army Corps of Engineers and its potential negative impact on our neighborhood. Insofar the preferred plan involves the construction of a sizable retention basin in the fields behind our homes, and may well limit our access to the urban trail and entomb us behind a massive barrier, we would, first of all, like to express our unhappiness that we were not directly notified of this plan by the City. As our representatives we believe that it would have been proper for you to send out letters to the properties owners most directly affected by this project. It does not seem to be in keeping with the spirit of a period of "public comment," when the public is not effectively notified of what the City is planning.

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Thank you. We look forward to working with you on this matter.

Sharon L. Waltrip
911 N. Navajo Dr.

Randy Waltrip
911 N. Navajo Dr.

CC: Army Corps of Engineers

Dear Mayor Bavasi and Members of the Flagstaff City Council,

Thank you. We look forward to working with you on this matter.

Jan 21 to 22

1007 N. N. 1007
1007 N. N. 1007

CC: Army Corps of Engineers

Dear Mayor Bavasi and Members of the Flagstaff City Council,

Thank you. We look forward to working with you on this matter.

Bonnie K. Feather
1015 N. Navajo Dr.

CC: Army Corps of Engineers

December 15, 1999

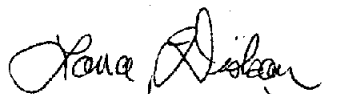
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Thank you. We look forward to working with you on this matter.


1107 N. Navajo Drive

CC: Army Corps of Engineers

December 15, 1999

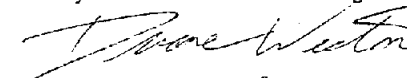
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Thank you. We look forward to working with you on this matter.


Caroline Pilkington

CC: Army Corps of Engineers

2/26/00
Dear City of Flagstaff & Army Corp of Engineers

I am against the proposed flood control project that has been presented for the Rio de Flag river in Northwest Flagstaff.

I realize since south Flagstaff has many buildings built in the flood zone some sort of control project needs to be done but not the one proposed.

The proposed eight foot walls along the existing riverbed and the addition of 20 feet to the dam at the pond behind the grade school is NOT the solution.

The urban trail along the river, the riparian zone habitat in the river and the access and sense of community should not be compromised in a rushed and hastily thought out plan.

Retaining dams should be built further northwest of town behind Cheshire or East of Baderville but not in an old established part of

the city within one half mile of three schools.

These eight foot walls and the dam could present a huge liability to the city in the form of visual barricades that could cause decreased visibility for motorists.

Could not the river bottom be deepened by a few feet and possibly a few feet wider to increase the water flow within the existing riverbed without adding above right line walls. This combined with further upstream retaining dams should have nearly the same effect without destroying the charm and safety of the Cocovino Estates neighborhood.

We have lived with this problem for years, let's not jump to a "quick fix" that we may later regret and possibly even have to change at an even greater expense. Let's look at alternatives to this one proposal that will help control a possible flood without

destroying the feel of the Coxons
Estate neighborhood.

Thanks for your time,

Randy Shannon

779-2828

ROSE HOUK

P.O. Box 22311
Flagstaff, Arizona 86002
520.779.2962
e-mail: mpcreh@aol.com

January 17, 2000

David Compas
U.S. Army Corps of Engineers
Environmental Coordinator
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Compas:

This letter contains comments to the Corps of Engineers preferred alternative in the draft environmental impact statement for the Rio de Flag Flood Control project in Flagstaff, Arizona. After attending meetings on this project in Flagstaff this month, it is indeed fortunate that the public comment period has been extended. Though I realize meetings were held during the feasibility study process, it has only been with the unveiling of the specifics of the plan that people are beginning to grasp the full scope of the long-term impacts of this project for residences and businesses--both existing and potential--in the heart of our town.

In general, I agree that the need to plan for a large flow event is important, given the number of structures that could be damaged in a 100-year flood. It appears that the idea of rerouting the Rio into its old channel on the south side of town has merit, and a greenbelt through there also has my highest approval. My biggest concern is with using Thorpe Park as the only detention basin on the main channel. I live right beside the park, and for more than a decade have enjoyed frequent visits to what we residents fondly call the "duck pond." This pond, now formed by a small, street-level weir, serves as a pleasant destination for walkers and bicyclists and kids and adults fishing and playing. It also affords an award-winning view of the San Francisco Peaks. The Rio's channel in this stretch is lined with lovely stands of willows. The plan proposes to replace the weir with a 27-foot-high berm, or dam, to hold back flood flows on the Rio. A structure of that magnitude simply does not fit in that place, and neither does an 8 to 10-foot-high concrete floodwall from the Flagstaff Junior High all the way to Beal Avenue. As the Corp's own draft EIS states, such a wall would be an aesthetic intrusion whose effects could not be mitigated. In addition, I am chagrined to see plans for a concrete channel lined with chainlink fence along the residential section of West Cherry Avenue, and use of raw rock riprap. None of these structures are appropriate to the scale of this historic residential neighborhood and popular regional park. The construction impacts alone are frightening to consider, not to mention what we would be left with for as long as any of us will live here.

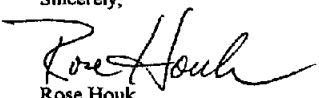
Page 2--Rio de Flag

I urge the Corps to seriously investigate alternative detention areas, possibly several smaller ones, farther upstream that would collectively serve the same purpose as a large single basin in Thorpe Park, which geologists and engineers say is not the best site geologically for rapid water infiltration. Another concern is that the Thorpe ballfields are used heavily all summer long. In the event of a flood, even a 25-year event, players could be left for some time without use of these fields. The cost to the city of cleaning them of debris or making any necessary turf repairs, etc. has not been quantified as far as I can ascertain. In fact, I am a member of the city parks & recreation commission and it was only two months ago that we were advised that Thorpe was being recommended as the detention area.

Instead of the traditional "hard" approach suggested in the draft EIS, I also urge the Corps to go back the drawing boards and apply bioengineering principles to this project. Wherever possible, riparian restoration methods should be used, including plantings of native trees and shrubs along the channel and natural in-channel modifications that would slow down water and hasten infiltration. Though I understand you are working with a complex, altered watershed and river channel, I feel confident that more suitable, environmentally and aesthetically sensitive measures could be employed, measures that treat this river like a river, rather than a concrete sluiceway.

Such an ambitious plan will not succeed without community support, and I think that support will be forthcoming if people in Flagstaff feel their concerns have been seriously considered and addressed. Thank you.

Sincerely,


Rose Houk

cc: David Wilcox, Flagstaff City Manager

Mr. Maury Herman
President
COAST AND MOUNTAIN PROPERTIES, INC.
3 N. Leroux Street, Suite 201
Flagstaff, AZ 86001


January 18, 2000

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
Attn: Mr. David Compas
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Compas:

I would like to amend my statement of January 3 to indicate continued support for the flood control and bike path work. However, it is clear that the Cheshire neighborhood has legitimate concerns and suggestions. I hope that you will seriously consider their suggestions and adapt the project to meet their legitimate needs.

Sincerely,



Maury Herman

February 21, 2000

City of Flagstaff Engineering Division
Stormwater Management Section
211 West Aspen Avenue
Flagstaff AZ 86001

Hello,

I'm writing to comment on the proposed Rio De Flag flood control project. I believe that this project should be viewed as an opportunity to begin addressing some of the mistakes made in the past regarding the Rio De Flag and its flood plain. For too many years, Western towns such as Flagstaff have treated rivers as problems rather than assets, which is surprising, given the scarcity of streams/rivers and the many positive things they provide. I encourage the City to begin thinking of the Rio as something that could provide a positive and attractive addition to the community, rather than simply as a way to get rid of occasional excess water.


I have heard that Marie Jackson has proposed that rather than constructing one large detention basin at Thorpe Park, smaller detention basins located in areas where the water may sink into the ground through a series of cracks and fissures, be constructed upstream. This seems like a great idea to me. Whatever can be done to slow the water along the length of the watercourse, allowing for infiltration and possibly the creation of a riparian vegetative community sounds good to me.

In those areas where the Rio must remain channelized, I believe it is important to use as much native vegetation to reduce erosion as possible, and that the use of riprap should be kept at an absolute minimum. Where riprap must be used, I encourage the City—and am willing to help pay for through taxes and/or bonds—to use attractive materials, including stone masonry. I think this is particularly important if a wall is constructed on the east side of Thorpe Park. Again, the goal should be to make the Rio an attractive addition to Flagstaff.

In addition, I think that the City should begin looking at ways to maximize water table recharge, and minimize stormwater runoff. Impervious surfaces, such as asphalt parking lots, greatly increase runoff. In some parts of the country, cities are beginning to recognize the need to do this and are requiring new businesses to retain water on site, or use surfaces that are permeable. One example of such a surface can be found in Flagstaff at the Grand Canyon Trust, where a honeycomb plastic (made from recycled plastic) provides a stable base for gravel while allowing water to soak into the ground. The Trust parking lot has been in place for three years and is heavily used. There are most likely similar options and I encourage the City to begin looking into them.

Thank you for providing an opportunity for comments on the proposed project. I hope that the City truly takes citizen's comments to heart and incorporates the many good ideas into the final proposal.

Sincerely,



Rick Moore
405 West Cherry Ave.
Flagstaff AZ 86001



March 15, 2000

Mr. David Compas
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

FAX - 213-452-4204

Re: Rio de Flag Feasibility Study

Dear Mr. Compas

The work of the Corps of Engineers is greatly appreciated. The flood control study addresses a critical need. It is probably obvious from my address that I would be directly benefitted. This would be true if it weren't for the fact that I probably will not own this building by the time the control work is in place.

However, there is a broader issue, and that is the greater benefit to a wide area of Flagstaff. The use of detention basins to temporarily hold flood waters is a very feasible and viable approach.

The objections of a few citizens who may have mitigateable issues in their immediate vicinity should not out-weigh the benefit to the greater community. Any tweaking of the design/construction so as to minimize negative aspects should be pursued, but it should not delay the process of going to the design phase and finding.

Please proceed forward with the Flagstaff project as soon as possible.

Sincerely,



Peter L. Bloomer

APPENDIX B
TRANSCRIPTS FROM PUBLIC MEETINGS

APPENDIX B-1
FEBRUARY 27, 1998
TRANSCRIPT FROM PUBLIC SCOPING MEETING

RIO DE FLAG
FEASIBILITY STUDY
NEPA SCOPING MEETING
FEBRUARY 27, 1998
211 W. Aspell Avenue
1:00 to 3:00 P.M. Meeting

SEW: Good afternoon. My name is Sam Arrowood, I'm with the US Army Corps of Engineers Phoenix office. I have with me Dave Compas, our Environmental Coordinator for this Feasibility Study, and Kim Gavigan, Stormwater Manager with the city of Flagstaff. I'd just like to do some quick introductions. Why don't we introduce ourselves...

___: (INAUDIBLE)

___: Robert ___, Flagstaff

___: Susan ___

___: Hi, Susan.

___: Bill ___

___: ___, Flagstaff.

SA: Thanks. Can everybody see that okay, with the angle? It's kind of a strange place for a screen, but can everyone read it? The Corps of Engineers just recently completed a Reconnaissance Report. A Reconnaissance Report is funded a hundred percent by the Corps of Engineers. It is an initial screening to answer these four questions: technical feasibility, economic justification, benefit cost ratio, environmentally acceptable and acceptable to the general public, with a local sponsor.

So we completed that Reconnaissance Report and (SLIDE) it is part one of a two-phase planning process. So we've done our preliminary screening -- it's a very general screening to obtain approval to conduct a Feasibility Study, so we're beginning the Feasibility Study now. We're in the very beginning stages of the Feasibility Study and the Feasibility Study is fifty percent cost-shared by the City of Flagstaff and the purpose of the Feasibility Study then is to complete this two-phase planning process that we're in, and if favorable produce a report which we use to pursue a potential project.

Also as part of the Feasibility Study process we will conduct an environmental impact statement and that will be part of that feasibility report. That's what this meeting is about today is the scoping process that we need to do for that environmental impact that we're going to prepare.

There are a few problems, flood related problems. There are a number of structures in the flood plain out here, in the continental area, in the downtown area. A lot of damages could occur in a large flood in the city here, and large floods would create numerous problems. These are just some of the highlights as far as problems. But we've identified a few problems. We'll identify more through the scoping process.

We've also identified a number of opportunities to do something here. It looks like the major categories of opportunities would be flood control, green belts, natural settings, environmental restoration, and recreational opportunities.

Currently the FEMA floodplain shows a large portion of the north and south part of the Flagstaff here would be, subject to hundred and five-hundred year flooding. A lot of structures, about a thousand structures. And the Continental area has some problems.

I'll turn this to show north. We have an outlet point at the downstream end that's constrained and isn't backing water up, and there's some property owners in this area that are experiencing some problems due to the flooding.

That's basically a synopsis of where we're at today. We've done the recon, we've identified some problems and some opportunities, areas of flooding, and now we're going into this Feasibility Study which will look at all of this in a lot more detail, a lot more technical analysis, a lot of environmental coordination, environmental analysis. And so as part of our NEPA process we are going to do environmental scoping, so we're having this

meeting today, from one to three. Five to seven tonight we'll have this same meeting, the same presentation again. The real purpose here is for us to get input from the public and from the resource agencies as far as the issues that we need to look at for the environmental impact statement.

And what I'd like to do is just let Dave talk briefly about what an environmental impact statement is, what it consists of and all the kinds of things we need to do. So I'll just turn it over to Dave.

DC: Thanks, Sam. I am Dave Compass with the Corps of Engineers in Los Angeles. I'm glad to be here today to get your input into the EIS, which for those of you that may not know is an environmental impact statement. It's a required document under NEPA, which is the National Environmental Policy Act, and usually it turns out to be a quite large document. In the study we will coordinate locally with the State, Federal agencies, even though they may not be here today, or they may not send us any input early into the process. But we will contact them and get all of their input. To my knowledge today there are no threatened or endangered species in the Rio De Flag or Clay Wash or Sinclair Wash areas. Not to say that bald eagles or falcons or whatever may not be in the area, but they're not in our immediate study areas, that we know of.

Items that we will definitely study will include the flora, fauna, historical and cultural/historical items that may exist in the area, and safety items, water quality, air quality, just about anything

you can think of that relates to the human or natural environment in the Rio De Flag area.

The scoping process starts off the environmental impact statement procedures. Then we progress through all the coordination, putting the document together into a draft EIS, which anyone that desires a copy it will be mailed to them. For your review there will be a forty-five day review period, and during that there will be another public meeting for any additional input or possible changes to the document. And then a final EIS will be submitted at the end of the report period and that will be approximately August 1999.

So we appreciate your comments today and everything will be considered.

SA: With that I just open it up and say are there any issues, concerns, things that you 'all are aware of that we need to address? It's not limited here in this meeting to simply environmental issues. We're here to listen to you and get your input on all the different issues, including all the environmental issues that we're going to address. So are there any questions? Comments? Is there anything...? What can we do for you? We're here to listen.

___: I have a question on the size of the drainage channel or whatever you put in. How much flood control did you have... How much flood control did you put in on _____, or Skunk Creek. Those are massive channels.

SA: You're wondering about the size?

___: Yes.

SA: Well, right now, since we're just in the beginning of the Feasibility Study all we really have is kind of conceptual ideas. We just have the recon at this point. So the level of detail -- I mean I can give you the size, but I just want to caveat it by saying that the level of detail that we do in a reconnaissance study is pretty general. So right now as far as sizes up there you're talking around like a box culvert, say fifty deep and twenty feet. It's a larger channel. You'd have to take it _____. So that's kind of the size which... During the feasibility what we do is we go ahead and we analyze it in much more detail, what those flows are, and really what the size of it needs to be.

___: (INAUDIBLE)

___: Yeah, that's based on the....

___: (INAUDIBLE)

___: I don't remember what things specifically. It depends where you're asking. Right here by City Hall I think it's about a little under two thousand CFS, and again that number is based upon the

generalized kind of analysis you get in the recon. We'll provide that in much more detail during this Feasibility Study.

___: What's the proposal _____ under the railroad?

___: Yeah.

___: (INAUDIBLE)

___: You know, it's difficult because right now we don't have any set plans, because we haven't-- In the recon study you don't go into real design work or anything like that, so in talking about sizing and everything, you know, it's hard to... I don't want to give you the impression that we don't have any plans or anything, but we have to go through this analysis process to really ensure that the numbers are correct and everything. But based upon this preliminary screening we did, yeah, it's about that size.

___: Is the study required to _____?

___: No.

___: _____ outside the city or the county?

___: Yes, we have received some previous public input, and as a result of the public input that we've received, yes, we will be considering those options because the public's requested us to do.

___: (INAUDIBLE)

___: Yes, the EIS is a document that is part of the big report that we'll put together, and so yes, that's cost-shared.

___: What is the cost of this?

___: The cost of the Feasibility Study is 2.4 million dollars.

___: What?

SA: 2.4 million dollars. And we have a signed agreement with the city. We're _____ and we're just in the beginning phase now of that Feasibility Study.

___: At the last meeting there was a large part of the discussion about whether or not to increase the flow under the railroad tracks at Route 66.

___: Right.

____: _____ the natural watershed. Is the EIS now going to look at drainage through the _____ area?

SA: Yes. So as far down the stream as we go with our study, then the EIS will parallel that. So wherever we're proposing to do anything, the EIS will have to evaluate the environmental compliance.

____: The reason I ask the question is because at the very first meeting this study really was going to stop at the country club area.

____: Right. The _____ was going to stop, so now that it is going to continue to go on down

SA: Right, we're going to study further down. We now base that upon the other public input that we've received that we need to do that.

____: I'd like to direct something to George. Does the county have many _____. It will be very expensive. There's a designated flood plain now based on the _____, to increase the flow of the James flood plain there. _____

____: I thought there was one discussion that stated that the existing flood plain, that existed on there was based on the original _____ flood plain, and it wasn't tied to the _____.

____: What do you mean?

____: Well currently there is a regulatory flood plain out there that's set by FEMA, because there's a FEMA study that's been done previously.

____: And is that study based upon the flow going under the tracks?

____: Yes. Because that's been there forever, and so when they came out and said okay, they took a snapshot as of the time that day. But those flows have been constricted for a long long time.

____: (INAUDIBLE)

SA: Yes, and, you know, there's always the trade-offs and, you know, the city's interests and the county's interests are not necessarily the same, so you have to try to coordinate as much as you can, obviously, and see if you can find something that everybody can be happy with.

____: I don't think it's a matter of decreasing values. You know the original need, the idea, was to accelerate the water and alleviate the flooding problems down in that area, and that's been solved. _____ the water in that area and it's not going out any fast. And our _____ in that area is increasing, and all

we're saying is-- the problem _____ solutions
begin downstream, and not upstream.

____: (INAUDIBLE)

SA: Right. One of the things that I'm thinking is that we've got-- on the
upstream end you've got the County and then it transitions into
the City, and then it comes back after it gets out of
_____ you're back into the County again. So during
this Feasibility Study I perceive really working a lot more
extensively with the County to try to figure this out.

FV: _____ urban area _____ story I think,
because I didn't know that the alternative realignment has already
been decided on. Is that true?

____: No, it has not been decided.

FV: So you're going to be studying within the urban part of town? You're
going to be studying several different routes for the channel?

SA: Yes. Are you looking at this map that Flagstaff has put out? They've
got that written on that map and that particular route is based
upon a study that the city had done at their own expense before
the Corps was even involved, back in 1990. And so...

FV: I heard a lot of different versions of where the river channel was going
to be going, and my concern, of course, was the historic resources
_____, which there are at least three or four
that are affected by this project. The other concern of course was
historic preservation. because, you know, bring San Antonio out
of it then these property values _____. I
just was wondering if you had decided where...

____: No. During the Feasibility Study what we do is we go through this
process and we get the public involved and the resource agencies,
and what happens is you kind of start figuring out what you can
do and what you can't do. So, you know, we did not have any
pre-determined or pre-set plans here.

FV: So would it be helpful for you to have something from us that says this
is an area where historical resources are?

SA: Yes.

FV: -- not only an historic or architectural resource, but....

SA: And the ramifications and concerns.

____: Has Los Angeles done a study on the primary water flow involved?

SA: Yes. When the Corps of Engineers does a project, before we do a project we have to figure out what the project's purposes are, and you can have a lot of different project purposes. We think that in this case the project purposes would be flood control, environmental restoration and recreation. So what you would want to do then -- if those end up being project purposes as a result of this feasibility process, then what you want to do is you want to end up with a project that combines those purposes and meets them in the best way.

___: I'd love to see a permanent _____ authority all the way out here, _____.

SA: Like the Babbling Brook concept or....

DC: We'll also consider aesthetics, land use, those types of things.

SA: Flagstaff's a growing area. The county areas surrounding Flagstaff are growing areas, and so you've got to manage that growth in one way or another. And one of the things that we do with these types of projects is we have to look at the future, whether it's going to meet the needs in the future, with what will happen in the future. So all of that gets put into the feasibility report.

Is anybody going to come back to the five o'clock meeting tonight?
We're going to have the same meeting. We're having two because

we want to give ample opportunity. You mentioned that a lot of people were coming tonight, right?

___: Yes, I talked to three or four people this morning that couldn't come at one o'clock, that might come at five. So...

SA: It's the same meeting. We're just trying to give as much opportunity into this eventual scoping as we can.

___: Let me ask you another question. The limiting factor in the water going out, coming down into our area, _____ railroad heads, _____. If you don't open that up and dump more water from beyond out on the county side, what are you gonna do with that?

SA: A good question. This is going to be something that we're going to have to figure out during the study.

DC: We'll look into the implications and the impacts of all these things. Continental _____, we'd much like to see all of that water go out. You've got the folks downstream, like Bill said, that _____, so yeah, it's a good question. I don't have the answer to it yet.

___: I have a question. Let's say the environmental impact statement is done. What are your next steps after that? And what are you doing besides that, right now?

SA: Do you mean between now and then?

___: Yes. Are you doing something else besides the environmental impact? And what are you going to do after it's done?

SA: Yes. So yes, we're doing the environmental impact statement, but we're also conducting the feasibility studies, so we're doing hydrology analysis, hydraulic analysis, economics, land use, real estate, geo-technical studies, cost estimates, a lot of different technical disciplines are going to be doing work. And then we will -- it's probably going to be at least six months minimum before we start taking all of that information and putting it together and figuring out what's possible to do. And then we start looking at the different alternatives and trying to compare them and those types of things. So yeah, in addition to the EIS process we'll be doing this "trying to figure out what to do" process, and doing a lot of really detailed technical work to support that.

___: So that's what you'll be doing also in the next year and a half or so?

___: Yes. And then what will happen is August of '99 is when the draft gets out, and that's not only the draft of the EIS, but also the draft of

the feasibility report that's got all this in there. We will submit that to the Corps, to the local sponsors, to the public, to the resource agencies, the EPA, Game and Fish, for a review period and comments, and we will have to respond to the comments.

___: Initially there will a large number of alternatives. Will there be a public process at some point to review and pare down the alternatives to a certain number that _____?

SA: Yeah. We've got some information about things that probably won't work, but we need to put that back out there again to the public and say okay, here's the information we know, here's the information we started with, here's what we developed. So yeah, there will be an ongoing process.

___: When you say _____ does that mean six months in or something like that? Do you know?

SA: I think Tim and I are planning to do it periodically, rather than just one or two times. Right now our intent is to try to do this on a periodic basis, so we don't get all the way to the end and people have no idea what we're talking about. So yeah, I see it as being an on-going process.

RIO DE FLAG
FEASIBILITY STUDY
NEPA SCOPING MEETING
FEBRUARY 27, 1998
211 W. Aspell Avenue
5:00 - 7:00 P.M. Meeting

SA: I've got a little brief presentation to make. My name is Sam Arrowood. I'm with the U.S. Army Corps of Engineers, out of the Phoenix office. I work with the Los Angeles District, Phoenix Office, Planning. And I've got with me today Dave Compass and he's our environmental coordinator with the L.A. District, and Kim with the City of Flagstaff. Who's been to one of my meetings before? I know you have, and you've been here. Weren't you at our last one in December?

___: Yes. I own a real estate office on the east side.

SA: So where we're at today... I'm just going to do a brief presentation. The Corps of Engineers has a two-phase planning process. The first phase of the planning process is what we call the reconnaissance study. It's a preliminary screening to determine whether or not to go to a feasibility study. That's the purpose of a recon: do we - yes or no -- on a feasibility study. It's a hundred percent funded.

So we have completed the reconnaissance study, and based upon these four criteria, which is does it look like there's something technically feasible that could be done, economic justification, the benefits outweigh the costs, environmental acceptability, and acceptable to the general public. And so based upon this preliminary screening we've done the recon study and we have been able to answer yes to these four questions. The entire purpose is yes or no for a feasibility study.

So where we're at today is we're in the very beginning stages of the feasibility study. The City of Flagstaff has signed an agreement with the Corps of Engineers and they have agreed to pay for fifty percent of this feasibility study -- the Corps of Engineers pays for fifty percent of the feasibility study. And the purpose of the feasibility study is to complete the second step of the planning process that we have to do.

We would produce a report. If it's favorable, if we come out with a favorable feasibility study, we would produce a report that we can use to ask Congress to help us solve our problems here in Flagstaff.

We've identified some problems -- a flooding problem. There's a flooding problem in the downtown area and in the Continental area. There's a lot of homes and structures in the flood plain. There's a lot of encroachment in town here, NAU and commercial and industrial properties are subject to damage from a large flood. The railroad has several problems for a large flood -- traffic delays -- and the '93 flood was a pretty large flood and they had

some problems from the '93 flood, pretty minor compared to a large flood that would come through here.

So we've identified a few problems. These are just some of them. Part of the feasibility study process is to continue to identify the problems that need to be solved in Flagstaff and in the region, in the county, upstream, downstream, downstream of the Continental area. So we haven't identified all the problems yet, and one of the things we do is we ask the public to continue to give us input on what they perceive the problems are. So it's an ongoing process.

We think that there are some opportunities here in Flagstaff for the people, for the benefit of the community here. We think there's an opportunity to provide flood protection, green belts, natural settings, environmental restoration, and a recreational opportunity. Currently the three authorized purposes for the feasibility study is to look at flood control, environmental restoration and recreation, as what would be the things we'd be trying to accomplish.

In the downtown area - a hundred and five hundred year flood plain -- each one of those little boxes is a house or a business or some sort of structure that someone owns, so a lot of businesses, especially in the downtown area, in the flood plain. And the Continental area has some problems because they catch all the water that gets down there. So we've got some... Route 66, Outlook Point, it backs up water into this area and creates some problems for the people down there.

So where we're at today, and the basic purpose of this meeting then, is to solicit your input and coordinate for environmental issues. We have to comply with the National Environmental Policy Act and so as part of that process we do scoping meetings, we solicit public input on the environmental issues that we need to consider. So that's basically what we're here for is just to let the public know through our letters that we mailed out to our mailing list -- you all received the letter -- so we mailed that out to a lot of people, and then to have the meetings to give folks a chance to come in here and talk to us about whatever they want.

If you desire to you can use the comment sheets and those will become part of the record and report as far as environmental issues. You're not limited to environmental if you want to put other concerns down. It all becomes part of the record that we consider in trying to figure out what we're going to do here.

So with that I'd like to just kind of turn it over to Dave, our environmental coordinator, to talk about the EIS process, what an EIS is, and where do we go from here on the environmental issues. So Dave....

DC: Thanks, Sam. I am Dave Compass with the Corps of Engineers in Los Angeles, and we'll be the environmental coordinator for the EIS, which stands for Environmental Impact Statement. It's required when Federal participation is desired for a project, and therefore the National Environmental Policy Act, Clean Water Act, Clean Air Act, National Historic Preservation Act, Endangered Species

Act, etcetera, at the Federal level are involved and we have to make sure that those laws are adhered to in their own particular ways for any kind of project like this, as well as local and state laws and requirements of Arizona Department of Game and Fish, Arizona Department of Environmental Quality, etcetera.

So this scoping process is to get your input, your ideas, into our project in this case for the Rio De Flag as defined by the map. If you haven't gotten one please pick one up. And your comments... If you'd like any specific comments please give us your name and address so that it'll be part of the record.

The process of an EIS is beginning today with public meetings and then we'll look at all the environmental factors such as water quality, air quality, land use, cultural features, old buildings, Indian involvement in the area, etcetera, and aesthetics, traffic flows, utilities in the area, all of these items will be covered.

So during the next year, year and a half -- and the draft EIS is due out as of now, in August of 1999. And you will all be on the mailing list so you can review it. There will be a forty-five day review period. During that time we'll also have another public meeting, and any additional input, questions, concerns, whatever can be addressed at that time. Then any changes needed to the document will be done, and a final environmental assessment then published. And those will be distributed to most people on the mailing list, not necessarily all. But organizations, public agencies, private citizens, will all be involved in this process.

The total report -- and we're primarily here tonight for the environmental end of it -- that will go into the hydraulics, hydrology -- I keep forgetting the financial as usual -- economics, etcetera, will all be part of the full report. So we'd like to get your input, your comments at this time if you'd like.

____: _____ My question would be would you be expecting much input from the city concerning that design process report.

____: Wherever utilities would be near the river, or Sinclair Wash, _____.

____: _____

____: Correct.

____: _____

____: The other broad issue that you didn't mention hydraulics. I wonder if you are willing to look at that, based on elevation and the height of Route 66 to Phoenix. Because of the small retention of the _____,

END TAPE SIDE 1

BEGIN SIDE 2

___: So what happens is-- (TRAIN WHISTLE OVER) we'll have to evaluate the environmental impact.

___: Is that what you meant when you said control?

___: Yes, so whatever we're looking at, whether it's downstream or up, anything that we would be doing has _____, so that gets _____ as well. So if you ask me questions, yes.

___: I'm fully aware that based on elevation is quote/unquote arbitrary.

___: Yeah, there's a number that we came up with and we'll apply that number as long as it operates, then the further we go.

___: _____ so when you're talking control there's a very definite amount of opportunity _____. The other question. Dave, you haven't been at the other meetings, but Kim and I have and one of the concerns was _____, your capacity _____.

___: Sure, and they were here this afternoon. Their representative was here this afternoon.

___: My other question _____ Mr. Chamberlain.....

___: I have not been yet, no. Not myself.

___: But they were here?

___: Bill Tower, the County Community Development guy showed up, and showed a lot of interest. He attended this afternoon.

___: One of the things is you've been at every meeting.

___: I wasn't at the last meeting. That was scheduled while I was up in Alaska. You guys scheduled while I was up in Alaska.

___: Well we waited till you went to do that.

___: Let us know you're fishing next time so we know when ...

SA: But, you know, during the recon study we're just trying to figure out whether to go forward in a feasibility or not, so we generalize and we just rely on existing information and stuff like that. Feasibility is a lot more detailed, and then the coordination that has to occur

with all of these different governmental and public and non-profit entities, and all of them, is a lot more extensive.

___: I appreciate it because it's _____ unanimity in the community.

SA: Yeah, and so I see that the county will be much more involved than they were.

___: That's very good, because that will create _____

___: The sewer infrastructure is engineering, rather than environmental.

SA: What is your concern there?

___: Well, in the past all the lakes _____ in the sewer and _____

___: Is that high water...

___: _____

___: Yeah, the criteria that the Arizona Department of Environmental Quality makes us adhere to now is somewhat different than the old sewer lines down in the Continental area which were built in the 60's and 70's. Those in 93 - those were big trunk mains which became

infiltrated with water. They've come under pressure flow, and the lids blow off, and the sewage just spills out into that lake out there and is continuing.

___: That's an engineering...

___: It is, at a cost. (LAUGHS) It really comes with a cost. You could design water-proof manholes with vent systems in it. Ground water seepage is a different issue. There's a contamination from the sewage. The Flagstaff sewer system is gravity. It runs down the Rio De Flag. So it's a serious consideration.

SA: I wanted to also say... you 'all were at the last meeting in December. I just wanted to let you know that we don't have new information yet. At that meeting I'd said long about May or so we think we're going to have another public meeting and we'll be able to have new information. For this meeting today I don't have any new information yet. We're trying to get this environmental scoping going for this meeting today. I know I told you before that we're going to have new information at the next meeting and this is like a separate meeting from the next meeting, so I just wanted to clarify that, just in case you were wondering if we had any new information yet. We really don't. We don't have any new information yet. And we don't have any set plans or anything like that, so we're just still in this public input process both on the

environmental side and then public involvement side with the coordination that you mentioned. Do you have any questions?

FV: Not so far.

___: Okay.

___: We don't have, or I don't have any input, but is this time to ask you a general question?

SA: Sure.

___: You mentioned the feasibility studies come out in say a year and a half, August of '99. I'm just trying to get the steps. You then come up with recommendations and alternatives.. When is the timing for the final decision?

SA: Oh, okay. Right now we are currently working on figuring out what the existing conditions are, and when we do that we look at the hydrology, hydraulics, all of the technical issues. And what we're doing is we're going into much more detail than what we did in the generalized kind of screening study we did. So that's what we're doing now. The timing on that is we think we'll have that pretty well catalogued by this coming June, and then after that what we do is we take that information and then we utilize that to start coming up with scenarios and alternatives, looking at

different routes, different configurations, green belt channels, different combinations of things. But the first step for us is to catalogue the existing conditions and get all of the public input that we can. And then we take that and we start putting the pieces together to try to figure out what different plans are available.

And I've got a schedule here if I can find it. So you're not going to have to wait until August of '99. But I've got to find this schedule.

(LOOKS FOR SCHEDULE)

SA: March of '99. So June '98 is when we will present our existing conditions, and try to determine that okay, this is what we've got. Then from there we have the next half of 1998 and about three months and then March of '99 is when we would produce our preliminary plans. So then after that we'd get more input, and then by August of 1999 then we would have a draft report, that has the draft EIS and the draft ... here's the plans, here's what we're considering recommending. And that goes out for public review, agency review, Corps of Engineers review at that time. So before March though we're going to have another meeting. We're going to present this to the public.

So we're not going to wait until March of '99 to present it. We're going to do an ongoing effort as far as presenting this information, and asking people what they think about it on a periodic basis in between now and then. So it's not going to be like you have to wait until March before we tell you anything. It'll be ongoing, and periodically we'll have meetings or mail-outs, we'll send mail-

outs to the mailing list, and so we'll keep people informed and ask people to help us as we go, so that by March of '99 we can say that we have a plan that's technically feasible, but also the other criteria -- we think it's publicly acceptable because everyone's helped us figure out what to do here. So that's the schedule. Does that make sense?

___: Will it become a City Council issue after August? Somewhere along the line do you make a selection? You don't make the selection, right? you make a recommendation I assume and when does the process of selection come along? After all of that, I suppose?

SA: The draft report comes out in August of '99, and that's where we tell everybody here's what we're thinking of selecting, but that's not the selection. So then we still have to get public comment, all the review, and the selection may change. Frequently it does. So then based upon all that then we produce the final report with the selection recommendation. We recommend this particular plan.

___:

SA: No, that is December of '99. So it moves along pretty quick, when you consider all the work that has to be done to actually go from a draft report to a final that you're going to send up to Congress with your recommendation. Congress makes the selection. So

our report is a Corps of Engineers report saying we recommend this to Congress, and then Congress can say yes or no.

___:

SA: Sure. Yeah. It's an integrative process. There's nothing set in stone today.

___: Have you read the report?

SA: I mean there's something set in stone. You do have to ask Congress for the money and the process has to be a certain way so that's it's correct.

___: We're probably in the year 2000, aren't we, after December '99?

SA: Yes, probably, I guess. Yes, what would happen is that if Congress says yes, we agree with the recommendation here in this report and we agree to fund it, then they will fund the design phase. So that's when they say okay, yes, we agree with this, and so we agree now to fund the design phase. And then we'll have to go through the actual design where we're doing all of these engineering calculations for the structural. It's really extensive, the design work that gets done for a project. And the landscape design. The environmental features, the recreation features, the picnic table design or whatever, that has to happen. So we don't really start

designing anything until after we've gotten the approval from Congress that okay, this basic idea here is the right one, and so then we go into the design phase.

Design typically takes a couple of years, two to three years, to go through the entire design process, and then once we go through the design process and get all of that reviewed and approved all over, then we ask Congress for the construction money.

In each step of this process -- I've got another slide that's the four phase process which is recon, feasibility, design, construct. At each step we have to go back to Congress and get them to say yes again. So it's a pretty extensive process to go through. So what you're looking at as far as actually beginning construction on something, no earlier than 2002, and probably later than that just because it takes us a certain amount of time and effort to go through all of the hoops that we have to jump through.

FV: Kim and I talked a while ago about Rio and pointed out that in a lot of communities in the west the communities were built on flood plains because people didn't understand the dynamics and stuff. Is there a community that you can think of that's pretty similar to Flagstaff, with similar problems that you've already done a project _____, to use as a comparison?

___: No, not really. The reason why is because every community's different. The basic idea is the same that you want to try to provide opportunities for the citizenry, flood protection, and other

opportunities, but as far as comparing, every community is different. The people, the players, the entities, the institutional coordination and stuff. It's unique to each community.

FV: When I asked the question I was really thinking about similar geography, but you've raised something else I didn't think about, where each community probably regards its Rio, it's version of the Rio in a different way. Some think it's drainage and some people think it's a scenic place, or a recreational place, a place to put soccer fields and stuff like that.

___: Geographically I can't think of any specifics, but the Corps of Engineers does stuff everywhere, so I mean I'm sure that somewhere there's a town at seven thousand feet that there's... that's they've done...

___: Albuquerque?

___: Well, yeah, Albuquerque, which is at five thousand feet, has some flood control.

FV: So there's some Corp stuff...

___: Yeah, so there's some Corps stuff there. But Albuquerque is a lot bigger town than Flagstaff, so it's really not a comparison. So I can't really make any comparisons that you could really... because no matter what you say it'd be different one way or another, so...

But, yeah, the Corps' done stuff in mountainous rugged areas like this before, I'm sure. I just assume, because they've been in business for a long time so I would assume that somewhere there's something comparable, yeah. But I don't know myself.

FV: I'll try to find out. There's the idea recently of these watershed associations. And I was talking to somebody in the Murray Watershed Association. He told me that each of the ones that he knows in Arizona has been a group of people who came together -- some of them are agency professionals, some of them are private citizens, some of them are business folks or whatever -- and each group has its own dynamics, just like you said -- every town is different and the folks are different. He said that the Murray Watershed Association has managed to get _____ for wildlife and the one in Scottsdale is managing it for the creation of a soccer field, and so on. And I was wondering, we don't have a watershed association here in Flagstaff, and I'm wondering if you would think it more helpful, or if you think a group like that would help you get your job going in a more optimistic manner, so that you wouldn't come with a plan and then have everybody start complaining about it. Is that a fear of yours? Is that something that happens?

____: No, it's not a fear at this point.

FV: Yeah. This is a pretty contentious town, I have to inform you.

____: Well we need private, public input from whatever source. And if you know of someone that can look at this watershed in a similar manner, pass on the comment sheet to them.

SA: Talk about the deal that's coming out _____. That regional planning thing showing the different _____. The City of Flagstaff is really pretty expert at public involvement and there's a number of different efforts going on. I mean there's the Forest Management Effort somewhere and different efforts that are going on, and so what they're doing is they're doing regional planning now, the City, and why don't you talk about that just a little bit, because I think what you're talking about -- the way that these associations typically get started up is that people who are really interested get together and do it. And that's how they get together. And they go to the meetings and when they have an opportunity to send information in to these different efforts or whatever. So it's really more of an active participation on the part of the public to get these things going, but the Corps doesn't typically come out and say we're forming a watershed association.

____: No.

SA: We don't tell people what to do like that. So...

FV: It's the Natural Resources Conservation Service, _____, mostly.

SA: But talk a little bit about that effort so that she can understand.

____: I don't see a Rio De Flag Watershed Association forming. I mean we kind of have a pseudo-association which is just a sub-part. When we started back with this regional Flagstaff envisioning 20/20, Rio De Flag was identified, you know, and environmental areas of that visioning statement is preserving that. So we've now taken up the next step which is the-- we've gone into a Regional Planning Effort which coincides with the Flagstaff Metropolitan Planning Organization which is the big red outlined area on that map. That's the FMPO and that's our regional planning area, and that's in cooperation with many entities, mainly the county and city. There's National Forest, Forest Service, Game and Fish. It incorporates the Open Space Greenways Plan. The Rio De Flag Corridor, you know, puts trails systems. So we think we're kind of covering and preserving the watershed and addressing watershed issues through that regional planning effort and this Rio De Flag study with the Corps. Because the same kind of issues of watershed organization look at water quantity, water quality, species, flora and fauna, etcetera. We feel it's going to be addressed in this regional plan, and it's just a sub-element of the plan.

____: My understanding, and correct me if I'm wrong, is that as part of this regional planning effort they will form both these groups. They will invite people to participate in different groups and stuff like that and will try to blend that all together. So I believe that really the answer to your question is yes, I think that there will be some kind of groups that will get formed up and stuff like that, but right now I don't know what that might look like in three months or six months or....

____: Just as there was with the _____ Greenways Plan, you know. The same extensive public involvement will go into this regional plan, which is occurring over the next twelve months.

FV: So I guess my question is what is the link between that planning process and the Corps' planning process?

____: We're running in concurrent. As concurrent as possible, because we have all these milestones set up with the Corps which need to be met, but the Rio De Flag, that whole corridor is identified as a concern and a priority in the 20/20 which then extends to the regional plan.

SA: So the Corps is planning the process. They have a planning process that they're going through. Our planning process is mandated by law and regulations and all these things, because we have to satisfy specific criteria to make a recommendation to Congress. So our

planning process is specific to the purpose of what we're trying to do, whereas they are doing this master planning, regional planning. So really I'm just a piece of the overall _____.

____: It's worked out quite nicely actually, this feasibility study at the same time as we're doing the regional plan. I mean we hit it right on the coattails of the regional plan, and are directly involved in that, so...

FV: Well, that's good.

____: Our public involvement in the plan is probably tenfold what would normally be done, and than what is required. We don't want to do what's the minimum. We want to go way above and beyond that, so.... Public buy-off on this, whatever the final project is, it's not going to get done if the public doesn't want it done. That's the bottom line.

FV: Right. I'm not looking at ways to interfere with the process. I'm just looking at ways to help it.

____: No, I know.

FV: Because I'm really interested.

____: So are we.

SA: Susan, if I could address your first question, that is the similar area both population and environment-wise, the nearest I've seen is San Luis Obispo.

FV: Really!!

____: But the major difference is elevation. They're near sea level, so their trees and shrubs are much different than here. But it's a small creek that flows through the historical part of town, and they've done it -- and I don't know if the Corps was involved or not -- but they have walking trails and places for people to sit. And it flows near the downtown area so they've got some restaurants and that sort of thing nearby, so it's a really nice area. If anybody has a chance to go over there and see that I think it might give you some good ideas to look at here.

____: Boulder, Colorado is also another excellent example. I don't know if the Corps was involved in what they did, but that is an excellent example of what can be done. I'm not saying we're going to do that here, but... They put a lot of money into that.

FV: _____ San Antonio?

____: No. _____ more in Boulder.

____: Yeah, we feel we're more important than Boulder.

___: Your population and your taxbase are similar.

___: This place could be _____

SA: And everybody wants to be in our mailers, is that right?

FV: Yes.

SA: Because we use the sign-in sheet to continually update our mailing list, so I want to make sure you do want to receive it. If there are any other questions or concerns you can use the sign-in sheet. Thanks. So I appreciate you 'all coming. We had five people at our afternoon meeting, and we really appreciate it. There's a lot of folks that have been involved in this over a couple of years so...

And on the comment sheet's my name, address, phone number, fax number and e-mail address are on there, so hopefully you can touch base with me if you need to via any of those means. The fact sheet has the facts of all that. Well one of those sheets. One of those handouts back there. We really appreciate everyone coming all the way out here today.

FV: Thanks for coming to see us.

END SESSION

APPENDIX B-2
JULY 25, 2000
TRANSCRIPT FROM PUBLIC COMMENTS MEETING

RIO DE FLAG FEASIBILITY STUDY
PUBLIC MEETING

ORIGINAL

TRANSCRIPT OF PUBLIC COMMENTS MEETING PROCEEDINGS

July 25, 2000
Flagstaff High School
Flagstaff, Arizona
6:15 p.m.

APPEARANCES:

LIEUTENANT COLONEL CHARLES LANDRY, Deputy
District Engineer, US Army Corps of Engineers,
Los Angeles District
SAM ARROWOOD, Study Manager for the Feasibility
Study, with the Corps' Phoenix Planning Office
DAVE WILCOX, Flagstaff City Manager
RON SPINAR, City of Flagstaff, Engineering
Division
KIM GAVIGAN, City of Flagstaff, Engineering
Division
BOB KOPLIN, Chief of Planning Division, Los
Angeles District Corps of Engineers
JOE DIXON, Chief of the Los Angeles District
Corps' Planning Office in Phoenix
TIM SMITH, Environmental Representative for the
Corps' Los Angeles District
ALEX WATT, Environmental Coordinator with the
Corps' Los Angeles District
EHSAN ESHRAGHI, Project Manager with the Corps
of Engineers, Los Angeles District

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REPORTED BY:
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NOTARY PUBLIC
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PROCEEDINGS

MR. WILCOX: I'd like to begin by welcoming
everyone and thanking you for coming. This is kind
of round two of the public comment session, public
meeting to hear your comments officially. We've had
this meeting before in Flagstaff, and this is the
second round, on the Rio de Flag floodplain project.

And, for the record, my name is Dave
Wilcox. I am Flagstaff City Manager. And, as I
said, I'd like to welcome you and thank you all for
coming.

If you'll recall, the City has been working
with the Army Corps of Engineers for quite a long
time. First of all, doing preliminary -- is that
called a reconnaissance --

LIEUTENANT COLONEL LANDRY:
Reconnaissance.

MR. WILCOX: -- study of the Rio de Flag
project, and now conducting a feasibility study. And
we have had many, many meetings, and meetings with
groups of people, leading to this evening's meeting,
when you will hear a presentation of the Draft Final
Report, and the members of the Army Corps of
Engineers and City staff who are here will hear from
you and hear what you have to say about the project.

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1 I'd like to make just a few introductions
2 as we begin. And then I'll turn it over to Colonel
3 Charles Landry, who is right here -- (Indicating.) --
4 Deputy District Engineer for the US Army Corps of
5 Engineers in the Los Angeles District. And he will
6 give the presentation. I also want to introduce Mr.
7 Bob Koplin, Chief of Planning Division, Los Angeles
8 Corps of Engineers. Mr. Joe Dixon, who is over here
9 -- (Indicating.) -- Chief of the Los Angeles --
10 whoops. Yes, Chief of Los Angeles District Corps'
11 Planning Office in Phoenix. I must have skipped over
12 that one. Mr. Sam Arrowood, who many of you may
13 know, Study Manager for the Feasibility Study with
14 the Corps' Phoenix Planning Office. Mr. Tim Smith,
15 who is the Environmental Representative for the
16 Corps' Los Angeles District. Mr. Alex Watt,
17 Environmental Coordinator with the Corps' Los Angeles
18 District. Mr. Ehsan Eshraghi, Project Manager for
19 the Corps of Engineers, Los Angeles District. I also
20 want to introduce Kim Gavigan, who is the City Staff
21 Engineer in charge of storm water and Project Manager
22 for the City. And Ron Spinar, who you all met as you
23 were signing in, who is outside, not coming into the
24 room yet, I think.

25 And, with that, I'm going to turn it over

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1 to Colonel Landry, and -- unless you had some
2 preliminary comments?

3 MR. ARROWOOD: No.

4 MR. WILCOX: Colonel Landry will make the
5 presentation. There will be ample time for your
6 comments and questions.

7 LIEUTENANT COLONEL LANDRY: Good evening,
8 ladies and gentlemen. Again, I'm Lieutenant Colonel
9 Charles Landry, I'm the Deputy District Engineer
10 for the Los Angeles Corps District. And this
11 evening I'll start working through the study, and the
12 first slide.

13 We're here this evening to present the
14 findings for the Rio de Flag Feasibility Study and
15 our proposal to provide flood control projects for
16 the City of Flagstaff.

17 The City of Flagstaff has been a full
18 partner with us for the study, and they've actively
19 participated in the development of this plan. They
20 provided 50 percent of the feasibility study costs,
21 and they've conducted extensive public involvement,
22 which many of you have participated in.

23 As a result, we think the project is -- is
24 one that best meets the needs for the City, as well
25 as for the community, and meets the Corps'

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1 appropriation process. (Indicating.)

2 Now I'd like to cover the feasibility
3 study. We identified the study area generally as
4 within the City of Flagstaff and the immediate
5 vicinity. These are all subject to significant flood
6 problems, which include the downtown area, west
7 Flagstaff along Clay Avenue Wash, and the Continental
8 Estates area downstream. (Indicating.)

9 The feasibility study identifies the
10 problems, develops a range of alternatives that we
11 can address the problems, and evaluates each of those
12 alternatives, and finally recommends the alternative
13 that best meets the feasibility criteria.

14 Can you all hear me in the back?

15 (Affirmative response.)

16 LIEUTENANT COLONEL LANDRY: I want to make
17 sure you can.

18 Under Corps guidelines the identified
19 problem is flooding of major portions of Flagstaff,
20 which includes the downtown area, west Flagstaff,
21 Northern Arizona University, the Railroad, and
22 Continental, which will be subject to significant
23 flood damage from a large flood. A single large
24 flood, which is approximately a 100 year event, would
25 affect nearly 1500 structures and cause an estimated

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1 \$93 million worth of damage.

2 Damage is caused due to the confined and
3 narrow channels which do not have the capacity for
4 greater than a 10 year flood event, which is a minor
5 flood situation as compared to the 100 year events.

6 Here's just one area that floodflows break
7 out -- out of the channel and cause flooding. We
8 have historical evidence of these floods.

9 (Indicating.)

10 A major portion of the University and the
11 south side of Flagstaff is the subject of significant
12 flood damage. The slide shows the major flood would
13 cause water to flow in downtown, south side, and also
14 the University areas. Some areas here would have
15 water from 6 to 8 feet during a large flood.

16 (Indicating.)

17 The water levels in the downtown and south
18 side areas would be approximately the level of the
19 Railroad tracks, across the street and just south of
20 the City Hall.

21 New development is currently required to
22 elevate above the 100 year water level.

23 We have some photos of the flooding problem
24 from '93, from 1982 floods, that can show -- are
25 shown here. (Indicating.) Both of these floods were

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1 guidelines.

2 Let me give you an idea of how the
3 proceedings tonight will go.

4 First, I'll give a brief description of the
5 Corps' processes. I'll go through the study
6 findings, and then describe the recommended plan,
7 its costs, benefits, environmental impacts, and the
8 federal and nonfederal cost sharing of the plan.

9 After my presentation we'll conduct a
10 public comment session. You'll have the opportunity
11 to participate in this important decision making on
12 the future of our proposed plan.

13 We will use the registration form that you
14 filled out in the back, and those who have indicated
15 they would like to make oral comments, we will hear
16 you. Written comments will be accepted from this
17 meeting all the way until August the 14th, which is
18 the close of our comment period.

19 I'd like to provide a brief description of
20 the process the Corps goes through for authorizing a
21 federal flood control project. In general we have a
22 two-part study phase and a two-part implementation
23 phase.

24 The study phase starts when the local
25 interests recognize that there is a flooding problem

1 and they believe that they need and require federal
2 assistance to solve. And they request the Corps of
3 Engineers' assistance through their Congressional
4 representative. If Congress agrees, they authorize
5 and fund the Corps to conduct a reconnaissance study
6 to determine if there is a federal interest in the
7 problem.

8 If the interest is warranted -- the federal
9 interest -- Congress agrees, then a feasibility study
10 is conducted. On this slide we've highlighted the
11 feasibility study. That's where we are in the
12 process right now.

13 The study determines if a project is
14 technically feasible, environmentally acceptable,
15 economically justified, and also acceptable to the
16 general public. If the project that meets these
17 criterias is identified, the feasibility report
18 serves as the Corps' recommendation to Congress to
19 authorize the project for the next phase, which is
20 the implementation phase, which consists of
21 additional design work and finally the construction
22 of the project.

23 Each of the four steps shown on this slide
24 requires a specific Congressional authorization and
25 ongoing funding for -- through the yearly

1 minor, were less than 25 year events.

2 We also are aware of the '95 floods and the
3 1978 floods and other floods that have occurred
4 regularly within Flagstaff in the past years.

5 What we're concerned about is the impacts
6 and damages from a very large flood and what it would
7 cause to the community. The extent of such a large
8 flood is shown here for the downtown and south side
9 areas, to the west along Clay Avenue Wash, which has
10 a large number of structures which are subject to
11 flood damage as well. (Indicating.)

12 The Continental area downstream has flood
13 problems. The 1993 flood shown here is estimated
14 approximately a 25 year event. (Indicating.) The 100
15 year floodplain is shown here, along with the 500
16 year floodplain. (Indicating.)

17 The problem is regional in nature, and we
18 have to address this from an overall perspective.

19 As a result of the problems that we
20 identified, and also in accordance with our
21 guidelines and regulations, there are opportunities
22 for federal participations that are consistent with
23 the Corps' missions as mandated by law.

24 The opportunities we identified for
25 Flagstaff are both flood control and recreation. We

1 developed specific objectives that would guide us
2 through the alternatives to address the problems and
3 the opportunities for federal participation in the
4 project.

5 Our objectives are shown here.
6 (Indicating.) First, to minimize flood damages.
7 Develop a comprehensive plan. Be consistent with the
8 local plans and the local community for future
9 activities. And to protect historic resources.

10 In developing those alternatives we took a
11 regional approach and a regional look to develop and
12 evaluate solutions for the downtown and Continental
13 areas. Upstream alternatives and downstream
14 alternatives were developed and evaluated for the
15 combined effects for both areas. The City of
16 Flagstaff and the public were involved throughout
17 this process.

18 Alternatives were evaluated in terms of
19 environmental impacts and technical, economical and
20 public feasibility.

21 We developed a total of 14 -- a number of
22 alternatives, came up with a total of 14 total
23 alternatives. Eight were for the downtown area,
24 which included a no action alternative. And five
25 were for the Continental area, which also included a

1 no action alternative.

2 Of the preliminary alternatives, we
3 narrowed that down to a final array that consisted of
4 6A, 6B, and 7 for downtown, and Alternative D for
5 Continental.

6 In addition to these three the no action
7 plan was also carried forward in our evaluation.

8 All the alternatives have been reevaluated
9 in response to public comments and concerns that have
10 been expressed previously. Only those alternatives
11 that made it to the final array are eligible under
12 Corps feasibility criteria for consideration as a
13 potential project.

14 Additional evaluation of the final array in
15 terms of the economic justification, the
16 environmental impacts, and technical and public
17 feasibility resulted in the selection of the best
18 overall plan. That alternative was Alternative 6B.
19 It was then evaluated in additional detail for
20 economic justification.

21 The recommended plan is the Alternative 6B.
22 The recommended plan consists of low flood walls at
23 Thorpe Park, a detention basin on Clay Avenue Wash,
24 and a series of channel improvements designed to
25 reroute floodflows back into the historic Rio de Flag

1 which had been obscured by years of growth and
2 development.

3 The plan provides benefits to the downtown
4 and Continental area.

5 I'll talk about the highlights of the plan
6 in the next few slides.

7 Out of all the alternatives, this plan
8 provides the best overall combination of benefits for
9 the overall region. It is the most cost efficient
10 plan due to being able to use the historic channel
11 alignment, and the real estate costs are minimized on
12 this plan as well.

13 The plan has a benefit to cost ratio of
14 1.4.

15 One thing I'd like to point out here, that
16 even though the improvements will be constructed in
17 the downtown and west Flagstaff area, the detention
18 basin provides for a slight reduction in the future
19 water surface at Continental.

20 We did look at several options specifically
21 for the Continental area, but the options that could
22 provide flood control protection for that particular
23 area could not meet the economic justification.

24 I'd like to briefly describe some of the
25 major features of the recommended plan.

1 I'll start with Thorpe Park, which is north
2 of the downtown area. The major features are shown
3 here in red. (Indicating.)

4 Thorpe Park contains several recreational
5 facilities, ball fields, and a small duck pond. With
6 our proposed improvements all of these features will
7 basically remain undisturbed. The plan includes a
8 flood wall that would be no more than 5 foot high at
9 Thorpe Road. Downstream of the duck pond there will
10 be 4 foot high wing walls to direct the flows
11 into the channel further downstream. The walls will
12 have a stone treatment for aesthetics -- to be
13 aesthetically pleasing.

14 The flood walls ensure that the large
15 floods will pass downstream into the channels instead
16 of overtopping the natural topography and flowing
17 into the residences to the east.

18 Right of way requirements, and additional
19 design work to avoid the impacts to wells, as well as
20 additional technical work, will be included in the
21 design of these features.

22 Clay we have a short embankment within the
23 existing topography and another small embankment to
24 protect historic structures. The embankments would
25 be treated with vegetation and other amenities to be

1 aesthetically pleasing. A third embankment would be
2 constructed to the north to prevent the detained
3 water from coming against the Railroad's embankment.

4 By detaining the floodwater you minimize
5 the flows in the channels downstream. This provides
6 significant protection from the 100 year flood for
7 west Flagstaff. It allows us to basically minimize
8 the sizing of the channel downstream.

9 The flows along the wash will be reduced by
10 approximately 80 percent during large floods. The
11 detention basin will serve as open space and retain
12 a natural setting that can be enjoyed by all.

13 I'll now briefly talk about the channel
14 improvements we're proposing for the immediate
15 vicinity of downtown. One of the key elements of
16 this is we determined that combining the flows from
17 Clay Wash and Rio de Flag will be the best to achieve
18 the most cost effective solution.

19 These combined flows will be routed into a
20 channel alongside the Railroad, and then into a large
21 channel that is the historic Rio de Flag just
22 upstream of Butler Avenue.

23 A series of open channels and covered
24 channels will be used. Covered channels are used in
25 areas -- narrow areas to avoid the need for us to

1 take private property.

2 The open channels will be riprap with
3 vegetative or grass cover similar to what you see
4 beside City Hall. A couple of sections of open
5 channel on Clay Wash Avenue -- or Clay Avenue Wash --
6 correction -- would be rectangular concrete with an
7 artistic pattern or plated with a natural rock
8 facing.

9 Further downstream we're proposing to
10 overplant the open channel with natural vegetation
11 such as grass, shrubs or trees.

12 As an integral part of this channel we're
13 providing recreational trail to pass under Route 66
14 and the Railroad track that will allow linkage of the
15 north and south side of town trail systems.

16 The recreational trail passthrough will be
17 under the Railroad and Route 66 just south of City
18 Hall. This slide shows in red the line that the new
19 channel will follow. (Indicating.) At the bottom is
20 where the flows from Clay Wash come in and combine
21 with the flows from Rio de Flag coming in from the
22 north from Thorpe Park.

23 We use the existing flow line north of
24 Route 66, and we widen and deepen the channel to
25 handle the flows coming out of Thorpe Park area

1 upstream.

2 This slide shows how the combined flows
3 will be routed alongside the Railroad tracks and
4 directed into a large historic channel downstream.
5 (Indicating.)

6 In this area we would have a covered
7 channel which would discharge the floodflows into a
8 wide channel downstream, which is proposed as a
9 naturally vegetated channel.

10 All of the features I've shown in a
11 combination plan would essentially prevent the \$93
12 million worth of flood damage that a 100 year event
13 would cause.

14 The plan prevents significant damages to
15 commercial, industrial, residential, and historic
16 properties, including Northern Arizona University and
17 the Burlington Northern and Santa Fe Railroad. A 100
18 year floodplain for the downtown area will
19 essentially be eliminated, and it will be reduced for
20 Continental.

21 Now I'd like to talk about our compliance
22 with the National Environmental Policy Act, or NEPA.

23 We held our initial public scoping meeting
24 in December of '97. And we published our Notice of
25 Intent in the Federal Register in February of '98.

1 The previous Draft Environmental Impact
2 Statement was available for public review until the
3 end of March 2000. A number of comments have been
4 received and considered and the alternatives
5 reevaluated. We have complete copies of the Revised
6 Draft Report, the Draft EIS, and the supporting
7 technical documentation at the City Hall, the City
8 library, the University library, and also our Corps
9 office in Phoenix.

10 The new 45 day public comment period is
11 from June 30th until August 14th.

12 We have developed a mitigation plan for the
13 proposed project, and this mitigation plan is
14 described in detail in the Draft EIS.

15 The recommended plan results in a minimum
16 of impacts in relation to the benefits that are
17 provided, and prior to the construction the Corps
18 will enter into agreement with the State Historic
19 Preservation Officer to minimize impacts to historic
20 properties. The project will provide flood
21 protection to numerous registered properties
22 throughout the community.

23 The recommended plan is estimated to cost
24 24.1 million -- see the costs on the slide --
25 (Indicating.) -- which would be cost shared by the

1 federal government in the amount of approximately
2 15.6 million and by local interests in the amount of
3 8.5 million.

4 These costs will be further refined during
5 the next detailed design phase of the project. We do
6 not expect it to change significantly or affect the
7 recommendation of the proposed plan.

8 The plan will remove most of Flagstaff from
9 the 100 year floodplain and will prevent the
10 estimated \$93 million in damages that that flood
11 could cause.

12 In wrapping up this presentation I'd like
13 to point out that the basic overall features I've
14 shown you are not expected to change a lot, but the
15 details, such as aesthetic treatments, technical --
16 other technical details, will be evaluated and
17 analyzed more during the next step, which is the
18 design phase for the project.

19 We'll be seeking additional public
20 participation in the final design of this project.
21 At this point the City's and the Corps' objective is
22 to complete the feasibility report so we can go on to
23 the next step.

24 The current schedule for the project is to
25 complete the feasibility study this year in December,

1 and begin the detailed design next year in January.

2 The design phase is projected to take two
3 years to complete, with construction of the project
4 to begin currently projected for May 2003. That's
5 depending on Congressional funding.

6 The construction of the project is
7 estimated to take two and a half years to complete.

8 This schedule is based upon standardized
9 time frames and is subject to revision after more
10 detailed information is developed as we go through
11 the design phase.

12 Now I'd like to go ahead and begin our
13 public comments session. First, those people who
14 wish to make a statement can do so. Then we'll
15 accept any written comments. If you want, you can
16 either turn them in tonight, or give -- submit
17 written comments in before August the 14th.

18 All comments will be made part of the
19 record, and we'll consider them as we finalize the
20 feasibility report.

21 We are recording this meeting, and
22 everyone's input will be made a part of the
23 transcript that will be included in the feasibility
24 report.

25 Kim, do we have some --

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1 MR. GAVIGAN: Just one sign up so far.

2 Mr. Peter Bloomer.

3 MR. BLOOMER: Thank you.

4 I would just like to express my
5 appreciation to the Corps for the effort they've put
6 into this project. I think it must have been long
7 before the Corps even got involved there was local
8 meetings down on South San Francisco with the members
9 of the business community down there to talk with
10 members of the City staff about whether something
11 like this could be brought about. And I filed those
12 back many years on those meetings. So it's been a
13 long, drawn-out process. And, as it comes here
14 hopefully to a conclusion, I just wanted to let you
15 know that those of us down there who are directly to
16 benefit from this -- obviously we have a biased point
17 of view about wanting to get on with it, because we
18 are in the floodplain per se -- do appreciate the
19 effort you've put into it and coming up with the
20 design that will essentially solve the problem we're
21 faced with on a regular basis.

22 On the minor less than 25 year events that
23 you've talked about, I had water in the front door of
24 my office twice, and always live with some degree of
25 trepidation about that happening in a worse case

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1 scenario. So I hope between now and 2005 we'll be
2 done and we don't have any serious rain; although I'd
3 like to have a little more than we've had today.

4 So that's all I really have to say. Thank
5 you.

6 LIEUTENANT COLONEL LANDRY: They're never
7 minor events when you get water against your
8 property.

9 Okay. Any other comments?

10 MR. KELSEY BOLTZ: My name is Boltz. My
11 wife Barbara. We live in the Continental area. And
12 I have a comment here.

13 I really didn't see any -- any proposal to
14 alleviate the problem there at the bottom of what we
15 call Continental Lake, which those people who live in
16 the bottom of the lake, if there is a -- if there is
17 a slight -- as you say, a slight improvement, right
18 now the high-water mark for the 100 year flood is
19 about 4 feet above the floor level of some of the
20 houses. So we don't see from 4 feet - three, four,
21 nine inches probably won't help a lot.

22 And I didn't -- in reading the feasibility
23 study that is available in the library, there was
24 mention of the possibility of widening or improving
25 the flow -- the outflow under the Railroad tracks and

1 Route 66. A visual inspection of that area looks as
2 though there -- what is there, which is very
3 inadequate, is half plugged up with dirt most of the
4 time. And I didn't hear any proposal to do anything
5 about that.

6 And I would have another question. There
7 is -- as I recall, the maximum flow rate to go under
8 that Route 66, according to the study, was 210 cubic
9 feet per second. And I only have a question: How
10 was that determined? Apparently there was a
11 determination by FEMA that the downstream side of
12 that Route 66 area crossing can only stand 210 cubic
13 feet per second. And -- but there was no discussion
14 as to how that was determined, or why that was
15 determined.

16 But under the presentation that I see here
17 there doesn't seem to be any -- any logical or any
18 workable solution to the problem of Continental Lake.

19 LIEUTENANT COLONEL LANDRY: You've covered
20 pretty significant areas. So if I could ask if you
21 -- we'll have some folks after the meeting that can
22 address these issues.

23 MR. KELSEY BOLTZ: I appreciate that.

24 LIEUTENANT COLONEL LANDRY: You've really
25 hit four complicated, four different areas there.

1 And we'll need to address each one of those.

2 Any other questions or any other comments?

3 (Negative response.)

4 LIEUTENANT COLONEL LANDRY: Okay. I'd like
5 to thank you all and -- Sam?

6 MR. ARROWOOD: Written comments, we have a
7 sheet with the address. It's the office address.
8 We'd welcome the written comments back to us. We
9 consider everyone's comments on the plan. And for
10 the comments that -- in the official record and
11 feasibility report, we need to get them by the 14th
12 of August. But, you know, we continue to talk and
13 have workshops and stuff up here with folks, so any
14 -- any comments, we'll continue to have meetings on
15 this.

16 MR. BOLTZ: All right.

17 MR. ARROWOOD: That's just part of our
18 official comments period. So if you would like to
19 make written comments, I'd ask that you get them in
20 by August 14th.

21 LIEUTENANT COLONEL LANDRY: Well, that
22 concludes our formal part then. And we're available
23 here if you have any specific items for at least a
24 few minutes.

25 MR. BLOOMER: Thank you.

NORTHERN ARIZONA REPORTERS

1 (The proceedings concluded at 7:05 p.m.,
2 July 25, 2000.)

3 -ooo-

NORTHERN ARIZONA REPORTERS

STATE OF ARIZONA
COUNTY OF COCONINO

SS: REPORTER'S CERTIFICATE

I, Pamela E. Banas'-Cook, Court Reporter and Notary Public in and for the State of Arizona, do hereby certify that the foregoing proceedings were held before me at the time and place hereinbefore set forth.

I further certify that the proceedings were reported by me stenographically; subsequently with computer-aided transcription, produced under my direction and supervision; and that the foregoing is a full, true, and correct transcript of my original shorthand notes.

I further certify that I am not a relative or attorney of either party and that I am not interested in the outcome of this action.

WITNESS my hand this 9th day of August .

2000.

Pamela E. Banas'-Cook

Pamela E. Banas'-Cook, RPR, CSR



APPENDIX C
AGENCY COORDINATION AND CONSULTATION



United States Department of the Interior
Fish and Wildlife Service

Arizona Ecological Services Field Office
2321 W. Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
(602) 640-2720 Fax (602) 640-2730



In Reply Refer To:

AESO/SE
2-21-99-I-134
(CCN 990223)

February 5, 1999

Mr. Robert E. Koplin
Chief, Planning Division
Department of the Army
Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

RE: Water Course Projects in Flagstaff, Arizona: Rio de Flag and Clay Avenue Wash

Dear Mr. Koplin:

This letter responds to your February 1, 1999, request for an inventory of threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may potentially occur in your project area (Coconino County). The enclosed list may include candidate species as well. We hope the enclosed county list of species will be helpful. In future communications regarding this project, please refer to consultation number 2-21-99-I-134.

Please be aware that you may also access limited county species lists for Arizona on our internet web site at the following:

<http://ifw2es.fws.gov/endspcs/lists/>

The enclosed list of the endangered, threatened, proposed, and candidate species includes all those potentially occurring anywhere in the county, or counties, where your project occurs. Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Also on the enclosed list is the Code of Federal Regulations (CFR) citation for each listed or proposed species. Additional information can be found in the CFR and is available at most public libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency


must request formal consultation with the Service. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency must enter into a section 7 conference with the Service. Candidate species are those which are being considered for addition to the list of threatened or endangered species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, the Service recommends the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways or excavation in waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona protects some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species in your project area.

The Service appreciates your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz.

Sincerely,

A handwritten signature in dark ink, appearing to read "David L. Harlow", with a long horizontal flourish extending to the right.

David L. Harlow
Field Supervisor

Enclosure

cc: Director, Arizona Game and Fish Department, Phoenix, AZ

1/14/99

1) LISTED

TOTAL= 16

NAME: BRADY PINCUSHION CACTUS

PEDIOCACTUS BRADYI

STATUS: ENDANGERED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 44 FR 61784, 10-26-1979

DESCRIPTION: SMALL, SEMI-GLOBOSE CACTUS, 2.4 INCHES TALL AND 2 INCHES IN
DIAMETER. SPINES ARE WHITE OR YELLOWISH-TAN. THE SPINE
CLUSTERS 1-2 CENTRAL SPINES & 14-15 SPREADING RADIAL SPINES.
FLOWER: STRAW YELLOW PRODUCED AT TOP OF THE STEM

ELEVATION

RANGE: 3850-4500 FT.

COUNTIES: COCONINO

HABITAT: BENCHES & TERRACES IN NAVAJO DESERT NEAR MARBLE GORGE.

SUBSTRATE IS KAIBAB LIMESTONE CHIPS OVER MOENKOPI SHALE AND SANDSTONE SOIL. PLANT COMMUNITY
DOMINATED BY SHADSCALE (*ATRIPLEX CONFERTIFOLIA*), SNAKEWEED (*GUTIERREZIA SAROTHRAE*), MORMON
TEA (*EPHEDRA VIRIDIS*), AND DESERT TRUMPET (*ERIOGONUM INFLATUM*). PROTECTED BY CITES AND ARIZONA
NATIVE PLANT LAW.

NAME: NAVAJO SEDGE

CAREX SPECUICOLA

STATUS: THREATENED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 50 CFR 19373, 5-8-85

DESCRIPTION: PERENNIAL FORB WITH TRIANGULAR STEMS, ELONGATED RHIZOMES.
FLOWER: WHITE JUNE AND JULY

ELEVATION

RANGE: 5700-6000 FT.

COUNTIES: COCONINO, NAVAJO, APACHE

HABITAT: SILTY SOILS AT SHADY SEEPS AND SPRINGS

DESIGNATED CRITICAL HABITAT IS ON THE NAVAJO NATION NEAR INSCRIPTION HOUSE RUINS. FOUND AT SEEP
SPRINGS ON VERTICAL CLIFFS OF PINK-RED NAVAJO SANDSTONE.

NAME: SAN FRANCISCO PEAKS GROUNDSEL

SENECIO FRANCISCANUS

STATUS: THREATENED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 48 FR 52743, 11-22-1983

DESCRIPTION: MEMBER OF SUNFLOWER FAMILY, DWARF ALPINE SPECIES 1.2-4
INCHES TALL. LEAVES DEEPLY LOBED. FLOWERS: 0.5 INCH DIAMETER 1-
6 YELLOW-GOLD FLOWERS.

ELEVATION

RANGE: 10900+ FT.

COUNTIES: COCONINO

HABITAT: ALPINE TUNDRA

DESIGNATED CRITICAL HABITAT IS SAN FRANCISCO PEAKS. FOUND ABOVE SPRUCE-FIR AND PINE FORESTS ON
TALUS SLOPES.

1/14/99

NAME: SENTRY MILK-VETCH

ASTRAGALUS CREMNOPHYLAX VAR *CREMNOPHYLA*

STATUS: ENDANGERED

CRITICAL HAB No RECOVERY PLAN: No CFR: 55 FR 50184, 12-5-1990

DESCRIPTION: < 1 INCH HIGH FORMING A MAT 1-10 INCHES IN DIAMETER. FLOWERS:
PALE PURPLE APRIL TO MAYELEVATION
RANGE: >4000 FT.

COUNTIES: COCONINO

HABITAT: PINYON-JUNIPER-CLIFFROSE ON A WHITE LAYER OF LIMESTONE

GROWS ON KAIBAB LIMESTONE WITH LITTLE SOIL IN AN UNSHADED OPENING IN PINYON-JUNIPER. POSSIBLY
MORE POPULATIONS TO BE FOUND ON SOUTH RIM OF GRAND CANYON AND EAST RIM OF MARBLE GORGE.

NAME: SILER PINCUSHION CACTUS

PEDIOCACTUS SILERI

STATUS: THREATENED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 44 FR 61786, 11-25-1979

DESCRIPTION: SMALL SOLITARY OR CLUSTERED CACTUS GLOBOSE SHAPED ABOUT 5
INCHES TALL AND 3-4 INCHES IN DIAMETER. FLOWERS: YELLOW WITH
MAROON VEINSELEVATION
RANGE: 2800-5400 FT.

COUNTIES: MOHAVE COCONINO

HABITAT: DESERTSCRUB TRANSITIONAL AREAS OF NAVAJOAN, SAGEBRUSH AND MOHAVE DESERTS

GROWS ON GYPSIFEROUS CLAY AND SANDY SOILS OF MOENKOPI FORMATION.

NAME: WELSHS MILKWEED

ASCLEPIAS WELSHII

STATUS: THREATENED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 52 FR 41435, 10-28-1987

DESCRIPTION: MILKWEED FAMILY (ASCLEPIADACEAE), RHIZOMATOUS, HERBACEOUS
PERENNIAL, 10-40 INCHES TALL WITH LARGE OVAL LEAVES. FLOWERS:
CREAM COLORED, ROSE TINGED IN CENTER.ELEVATION
RANGE: VARIES FT.

COUNTIES: COCONINO

HABITAT: OPEN STABILIZED DESERTSCRUB DUNES AND LEE SIDE OF ACTIVE DUNES

DESIGNATED CRITICAL HABITAT IS IN UTAH.

1/14/99

NAME: KANAB AMBERSNAIL

OXYLOMA HAYDENI KANABENSIS

STATUS: ENDANGERED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 57 FR 13657, 04-17-1992

DESCRIPTION: SMALL 14-19 MM (<0.7 INCH), LIGHT AMBER COLOR, SOMETIMES
GRAYISH-AMBER MOTTLED; RIGHT HANDED SHELL

ELEVATION

RANGE: 2,900 FT.

COUNTIES: COCONINO

HABITAT: TRAVERTINE SEEPS AND SPRINGS IN GRAND CANYON NATIONAL PARK

EXTREMELY GEOGRAPHICALLY ISOLATED. THREE HISTORIC POPULATIONS; TWO REMAINING; ONE ON PRIVATE PROPERTY IN UTAH AND ONE IN GRAND CANYON NATIONAL PARK; SPECIES AFFECTED BY OPERATIONS BY GLEN CANYON DAM. ASSOCIATED WITH WATERCRESS, MONKEY FLOWER, AND OTHER WETLAND VEGETATION.

NAME: BLACK-FOOTED FERRET

MUSTELA NIGRIPES

STATUS: ENDANGERED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-67

DESCRIPTION: WEASEL-LIKE, YELLOW BUFF COLORATION WITH BLACK FEET, TAIL TIP,
AND EYE MASK. IT HAS A BLUNT LIGHT COLORED NOSE AND IS 15-18
INCHES LONG AND TAIL LENGTH IS 5-6 INCHES.

ELEVATION

RANGE: <10,500 FT.

COUNTIES: COCONINO, APACHE, NAVAJO

HABITAT: GRASSLAND PLAINS GENERALLY FOUND IN ASSOCIATION WITH PRAIRIE DOGS

UNSURVEYED PRAIRIE DOG TOWNS MAY BE OCCUPIED BY FERRETS OR MAY BE APPROPRIATE FOR FUTURE REINTRODUCTION EFFORTS. THE SERVICE DEVELOPED GUIDELINES FOR SURVEYING PRAIRIE DOG TOWNS WHICH ARE AVAILABLE UPON REQUEST. NO POPULATIONS OF THIS SPECIES CURRENTLY KNOWN TO EXIST IN ARIZONA.

NAME: HUMPBAC CHUB

GILA CYPHA

STATUS: ENDANGERED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 32 FR 4001, 03-11-1967;59

DESCRIPTION: LARGE (18 INCH) MINNOW FLATTENED HEAD LONG FLESHY SNOUT, FR 13374, 03-21-1994
LARGE FINS, AND A VERY LARGE HUMP BETWEEN THE HEAD AND THE
DORSAL FIN

ELEVATION

RANGE: <4000 FT.

COUNTIES: COCONINO, MOHAVE

HABITAT: LARGE WARM TURBID RIVERS ESPECIALLY CANYON AREAS WITH DEEP FAST WATER

CRITICAL HABITAT IN GRAND CANYON

1/14/99

NAME: LITTLE COLORADO SPINEDACE

LEPIDOMEDA VITTATA

STATUS: THREATENED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 52 FR 35054

DESCRIPTION: SMALL (<4 INCHES LONG) SILVERY MINNOW WHICH IS DARKER ON THE
BACK THAN THE BELLY

ELEVATION

RANGE: 4000-8000 FT.

COUNTIES: COCONINO, APACHE, NAVAJO

HABITAT: MODERATE TO SMALL STREAMS IN POOLS AND RIFFLES WITH WATER FLOWING OVER GRAVEL AND SILT

CRITICAL HABITAT INCLUDES EIGHTEEN MILES OF EAST CLEAR CREEK, EIGHT MILES OF CHEVELON CREEK, AND
FIVE MILES OF NUTRIOS CREEK

NAME: RAZORBACK SUCKER

XYRAUCHEN TEXANUS

STATUS: ENDANGERED

CRITICAL HAB Yes RECOVERY PLAN: Yes CFR: 55 FR 21154, 05-22-1990;

DESCRIPTION: LARGE (UP TO 3 FEET AND UP TO 16 POUNDS) LONG, HIGH SHARP-
EDGED KEEL-LIKE HUMP BEHIND THE HEAD. HEAD FLATTENED ON TOP.
OLIVE-BROWN ABOVE TO YELLOWISH BELOW.

ELEVATION

RANGE: <6000 FT.

COUNTIES: GREENLEE, MOHAVE, PINAL, YAVAPAI, YUMA, LA PAZ, MARICOPA (REFUGIA), GILA, COCONINO, GRAHAM

HABITAT: RIVERINE & LACUSTRINE AREAS, GENERALLY NOT IN FAST MOVING WATER AND MAY USE BACKWATERS

SPECIES IS ALSO FOUND IN HORSESHOE RESERVOIR (MARICOPA COUNTY). CRITICAL HABITAT INCLUDES THE 100-
YEAR FLOODPLAIN OF THE RIVER THROUGH GRAND CANYON FROM CONFLUENCE WITH PARIA RIVER TO HOOVER
DAM; HOOVER DAM TO DAVIS DAM; PARKER DAM TO IMPERIAL DAM. ALSO GILA RIVER FROM AZ/NM BORDER TO
COOLIDGE DAM; AND SALT RIVER FROM HWY 60/SR 77 BRIDGE TO ROOSEVELT DAM; VERDE RIVER FROM FS
BOUNDARY TO HORSESHOE LAKE.

NAME: AMERICAN PEREGRINE FALCON

FALCO PEREGRINUS ANATUM

STATUS: ENDANGERED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 35 FR 16047, 10-13-70; 35

DESCRIPTION: A RECLUSIVE, CROW-SIZED FALCON SLATY BLUE ABOVE WHITISH
BELOW WITH FINE DARK BARRING. THE HEAD IS BLACK AND APPEARS
TO BE MASKED OR HELMETED. WINGS LONG AND POINTED. LOUD
WAILING CALLS ARE GIVEN DURING BREEDING PERIOD.

ELEVATION

RANGE: 3500-9000 FT.

COUNTIES: MOHAVE COCONINO NAVAJO APACHE SANTA CRUZ MARICOPA COCHISE YAVAPAI GILA PINAL PIMA
GREENLEE GRAHAM

HABITAT: CLIFFS AND STEEP TERRAIN USUALLY NEAR WATER OR WOODLANDS WITH ABUNDANT PREY

THIS IS A WIDE-RANGING MIGRATORY BIRD THAT USES A VARIETY OF HABITATS. BREEDING BIRDS ARE YEAR-
ROUND RESIDENTS. OTHER BIRDS WINTER AND MIGRATE THROUGH ARIZONA. SPECIES IS ENDANGERED FROM
REPRODUCTIVE FAILURE FROM PESTICIDES. SPECIES HAS BEEN PROPOSED FOR DELISTING (63 FR 45446) BUT
STILL RECEIVES FULL PROTECTION UNDER ESA

1/14/99

NAME: BALD EAGLE

HALIAEETUS LEUCOCEPHALUS

STATUS: THREATENED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 60 FR 35999, 07-12-95

DESCRIPTION: LARGE, ADULTS HAVE WHITE HEAD AND TAIL. HEIGHT 28 - 38";
WINGSPAN 66 - 96". 1-4 YRS DARK WITH VARYING DEGREES OF
MOTTLED BROWN PLUMAGE. FEET BARE OF FEATHERS.

ELEVATION

RANGE: VARIES FT.

COUNTIES: YUMA, LA PAZ, MOHAVE, YAVAPAI, MARICOPA, PINAL, COCONINO, NAVAJO, APACHE, SANTA CRUZ, PIMA,
GILA, GRAHAM, COCHISE

HABITAT: LARGE TREES OR CLIFFS NEAR WATER (RESERVOIRS, RIVERS AND STREAMS) WITH ABUNDANT PREY

SOME BIRDS ARE NESTING RESIDENTS WHILE A LARGER NUMBER WINTERS ALONG RIVERS AND RESERVOIRS.
AN ESTIMATED 200 TO 300 BIRDS WINTER IN ARIZONA. ONCE ENDANGERED (32 FR 4001, 03-11-1967; 43 FR 6233, 02-
14-78) BECAUSE OF REPRODUCTIVE FAILURES FROM PESTICIDE POISONING AND LOSS OF HABITAT, THIS
SPECIES WAS DOWN LISTED TO THREATENED ON AUGUST 11, 1995. ILLEGAL SHOOTING, DISTURBANCE, LOSS OF
HABITAT CONTINUES TO BE A PROBLEM.

NAME: CALIFORNIA CONDOR

GYMNOPS CALIFORNIANUS

STATUS: EXPERIMENTAL/NONESENTIAL CRITICAL HAB No RECOVERY PLAN: Yes CFR: 32 FR 4001; 03-11-67

DESCRIPTION: VERY LARGE VULTURE (47 IN., WINGSPAN TO 9 1/2 FT, WEIGHT TO 22
LBS); ADULT PLUMAGE BLACKISH, IMMATURE MORE BROWNISH; ADULT
WING LININGS WHITE, IMMATURE MOTTLED; HEAD & UPPER PARTS OF
NECK BARE; YELLOW-ORANGE IN ADULTS, GRAYISH IN IMMATURE.

ELEVATION

RANGE: VARIES FT.

COUNTIES: MOHAVE, COCONINO, NAVAJO, APACHE

HABITAT: HIGH DESERT CANYONLANDS AND PLATEAUS

LAST WILD CONDOR REPORTED IN ARIZONA IN 1924. RECOVERY PROGRAM HAS REINTRODUCED CONDORS TO
NORTHERN ARIZONA, WITH THE FIRST RELEASE (6 BIRDS) IN DECEMBER 1996. RELEASE SITE LOCATED AT THE
VERMILLION CLIFFS (COCONINO CO.), WITH AN EXPERIMENTAL/NONESENTIAL AREA DESIGNATED FOR MOST OF
NORTHERN ARIZONA AND SOUTHERN UTAH.

NAME: MEXICAN SPOTTED OWL

STRIX OCCIDENTALIS LUCIDA

STATUS: THREATENED

CRITICAL HAB No RECOVERY PLAN: Yes CFR: 56 FR 14678, 04-11-91

DESCRIPTION: MEDIUM SIZED WITH DARK EYES AND NO EAR TUFTS. BROWNISH AND
HEAVILY SPOTTED WITH WHITE OR BEIGE.

ELEVATION

RANGE: 4100-9000 FT.

COUNTIES: MOHAVE, COCONINO, NAVAJO, APACHE, YAVAPAI, GRAHAM, GREENLEE, COCHISE, SANTA CRUZ, PIMA,
PINAL, GILA, MARICOPA

HABITAT: NESTS IN CANYONS AND DENSE FORESTS WITH MULTI-LAYERED FOLIAGE STRUCTURE

GENERALLY NESTS IN OLDER FORESTS OF MIXED CONIFER OR PONDEROSA PINE/GAMBEL OAK TYPE, IN
CANYONS, AND USE VARIETY OF HABITATS FOR FORAGING. SITES WITH COOL MICROCLIMATES APPEAR TO BE
OF IMPORTANCE OR ARE PREFERRED.

1/14/99

NAME: SOUTHWESTERN WILLOW FLYCATCHER

EMPIDONAX TRAILLII EXTIMUS

STATUS: ENDANGERED

CRITICAL HAB Yes RECOVERY PLAN: No CFR: 60 FR 10694, 02-27-95

DESCRIPTION: SMALL PASSERINE (ABOUT 6") GRAYISH-GREEN BACK AND WINGS.
WHITISH THROAT, LIGHT OLIVE-GRAY BREAST AND PALE YELLOWISH
BELLY. TWO WINGBARS VISIBLE. EYE-RING FAINT OR ABSENT.

ELEVATION

RANGE: <8500 FT.

COUNTIES: YAVAPAI, GILA, MARICOPA, MOHAVE, COCONINO, NAVAJO, APACHE, PINAL, LA PAZ, GREENLEE, GRAHAM,
YUMA, PIMA, COCHISE, SANTA CRUZ

HABITAT: COTTONWOOD/WILLOW & TAMARISK VEGETATION COMMUNITIES ALONG RIVERS & STREAMS

MIGRATORY RIPARIAN OBLIGATE SPECIES THAT OCCUPIES BREEDING HABITAT FROM LATE APRIL TO
SEPTEMBER. DISTRIBUTION WITHIN ITS RANGE IS RESTRICTED TO RIPARIAN CORRIDORS. DIFFICULT TO
DISTINGUISH FROM OTHER MEMBERS OF THE EMPIDONAX COMPLEX BY SIGHT ALONE. TRAINING SEMINAR
REQUIRED FOR THOSE CONDUCTING FLYCATCHER SURVEYS. CRITICAL HABITAT ON PORTIONS OF THE 100-YEAR
FLOODPLAIN ON SAN PEDRO AND VERDE RIVERS; WET BEAVER AND WEST CLEAR CREEKS, INCLUDING TAVASCI
MARSH AND ISTER FLAT; THE COLORADO RIVER, THE LITTLE COLORADO RIVER, AND THE WEST, EAST, AND
SOUTH FORKS OF THE LITTLE COLORADO RIVER, REFERENCE 60 CFR:62 FR 39129, 7/22/97.

2) PROPOSED

TOTAL= 1

NAME: PARISH ALKALI GRASS

PUCCINELLIA PARISHII

STATUS: PROPOSED ENDANGERED

CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: A SMALL, BLUE-GREEN, ANNUAL GRASS. FLOWERING STEMS 1-8
INCHES TALL

ELEVATION

RANGE: 3000-6000 FT.

COUNTIES: COCONINO, NAVAJO

HABITAT: MOIST SALINE SOILS

POTENTIALLY ANY SALINE SEEPS AND ASSOCIATED WETLANDS IN ARIZONA.

1/14/99

3) CANDIDATE

TOTAL= 3

NAME: ARIZONA BUGBANE

CIMICIFUGA ARIZONICA

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: PERENNIAL HERB IN THE BUTTERCUP FAMILY UP TO 6-7 FEET TALL.
SMALL WHITE PETAL-LESS FLOWERS APPEAR IN JULY-AUGUST. FRUIT
A FOLLICLE THAT SPLITS OPEN ON ONE SIDE AS IT DRIES.

ELEVATION

RANGE: 5300-7000 FT.

COUNTIES: COCONINO, GILA

HABITAT: MOIST, LOAMY SOIL BETWEEN CONIFEROUS AND RIPARIAN ECOTONES.

RICH, FERTILE SOILS HIGH IN HUMUS CONTENT, DEEP SHADE, AND HIGH HUMIDITY APPEARS TO BE PRIMARY
HABITAT REQUIREMENTS FOR THIS SPECIES.

NAME: FICKEISEN PINCUSHION CACTUS

PEDIOCACTUS PEEBLESIANUS FICKEISENIAE

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: VERY SMALL (3 INCHES TALL- 1.5 INCHES DIAMETER) UNBRANCHED
CACTUS THAT RETREATS INTO GRAVELY SOILS AFTER FLOWERING
AND FRUITING. TUBERCLES FORM A SPIRAL PATTERN AROUND PLANT. ELEVATION
CENTRAL SPINE 3/8 INCH LONG FLOWERS CREAM/YELLOW RANGE: 4000-5000 FT.

COUNTIES: COCONINO, MOHAVE

HABITAT: EXPOSED LAYERS OF KAIBAB LIMESTONE ON CANYON MARGINS OR HILLS OF NAVAJOAN DESERT

NAME: CHIRICAHUA LEOPARD FROG

RANA CHIRICAHUENSIS

STATUS: CANDIDATE CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: CREAM COLORED TUBERCLES (spots) ON A DARK BACKGROUND ON
THE REAR OF THE THIGH, DORSOLATERAL FOLDS THAT ARE
INTERRUPTED AND DEFLECTED MEDIALY, AND A CALL GIVEN OUT OF
WATER DISTINGUISH THIS SPOTTED FROG FROM OTHER LEOPRD ELEVATION
RANGE: 3000-8300 FT.

COUNTIES: SANTA CRUZ, APACHE, GILA, PIMA, COCHISE, GREENLEE, GRAHAM, YAVAPAI, COCONINO, NAVAJO

HABITAT: STREAMS, RIVERS, BACKWATERS, PONDS, AND STOCK TANKS THAT ARE FREE FROM INTRODUCED FISH
AND BULLFROGSREQUIRE PERMANENT OR NEARLY PERMANENT WATER SOURCES. POPULATIONS NORTH OF THE GILA RIVER ARE
THOUGHT TO BE CLOSELY-RELATED, BUT DISTINCT, UNDESCRIBED SPECIES. SPECIES ALSO FOUND ON FORT
HUACHUCA

1/14/99

CONSERVATION AGREEMENT

TOTAL= 1

NAME: KAIBAB PLAINS CACTUS

PEDIOCACTUS PARADINEI

STATUS: NONE

CRITICAL HAB No RECOVERY PLAN: No CFR:

DESCRIPTION: SMALL, GREEN, GLOBOSE CACTUS; USUALLY LESS THAN 40 MM TALL
WITH HALD OF ITS STEM UNDERGROUND. PLANT DIAMETERS CAN
REACH 60-80 MM. 4-6 SPINES PER AEREOLE; FLOWERS ARE 19-25 MM
WITH CREAM TO PALE YELLOW PETALS AND PINK MIDRIB.

ELEVATION
RANGE: >4,500 FT T.

COUNTIES: COCONINO

HABITAT: PINYON-JUNIPER WOODLAND, AND SHRUB/GRASSLAND

SPECIES ALSO CALLED PARADINE PLAINS CACTUS. CONSERVATION AGREEMENT BETWEEN THE SERVICE, KAIB.
NATIONAL FOREST, AND BUREAU OF LAND MANAGEMENT FINALIZED IN OCTOBER 1996



DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

April 8, 1999

Office of the Chief
Environmental Resources Branch

Ms. Loretta Jackson
Program Manager
Office of Cultural Resources
Hualipai Tribe
P.O. Box 310
Peach Springs, Arizona 86434

Dear Ms. Jackson:

The Los Angeles District, U.S. Army Corps of Engineers, is writing to inform you of the Rio de Flag Flood Control Project (RDFFCP) that we are planning in the City of Flagstaff, Arizona (Enclosure 1). We understand that the Flagstaff area may involve locations that are of cultural interest or value to the Hualipai people. According to Dr. Dave Wilcox, of the Museum of Northern Arizona, there is very little potential for finding prehistoric cultural materials within the area of potential effects. The majority of the landscape where the RDFFCP will be constructed is in historic neighborhoods (Enclosure 2, attachments 1 and 2). However, we will require an archaeological monitor for all ground disturbing activities in areas that have had little or no prior disturbance.

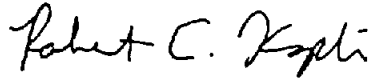
The selected alternative will be primarily linear in design with detention basins on the north and east ends of town. Selection of the preferred alternative is in the early stages so we are inviting the Zuni, the Hopi, and the Hualipai to provide comments and inform us if there may be areas of traditional cultural value in the proposed project area. We do not know what the impacts will be, so we will probably execute a Programmatic Agreement (PA) for the proposed RDFFCP. If you are interested we will invite you to participate in the PA as a concurring party.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

If you have any questions or comments concerning this project, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855.

Sincerely,

A handwritten signature in cursive script, reading "Robert E. Koplin".

Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures



DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

April 8, 1999

Office of the Chief
Environmental Resources Branch

Mr. Leigh J. Kuwanwisiwma, Director
Cultural Preservation Office
Hopi Tribe
P.O. Box 123
Kykotsmovi, Arizona 86039

Dear Mr. Kuwanwisiwma:

The Los Angeles District, U.S. Army Corps of Engineers, is writing to inform you of the Rio de Flag Flood Control Project (RDFFCP) that we are planning in the City of Flagstaff, Arizona (Enclosure 1). We understand that the Flagstaff area may involve locations that are of cultural interest or value to the Hopi people. According to Dr. Dave Wilcox, of the Museum of Northern Arizona, there is very little potential for finding prehistoric cultural materials within the area of potential effects. The majority of the landscape where the RDFFCP will be constructed is in historic neighborhoods (Enclosure 2, attachments 1 and 2). However, we will require an archaeological monitor for all ground disturbing activities in areas that have had little or no prior disturbance.

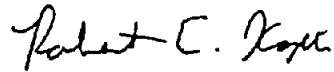
The selected alternative will be primarily linear in design with detention basins on the north and east ends of town. Selection of the preferred alternative is in the early stages so we are inviting the Zuni, the Hopi, and the Hualapai to provide comments and inform us if there may be areas of traditional cultural value in the proposed project area. We do not know what the impacts will be, so we will probably execute a Programmatic Agreement (PA) for the proposed RDFFCP. If you are interested we will invite you to participate in the PA as a concurring party.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

If you have any questions or comments concerning this project, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855.

Sincerely,

A handwritten signature in cursive script, reading "Robert E. Koplin".

Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures



DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS

P.O. BOX 532711

LOS ANGELES, CALIFORNIA 90053-2325

April 8, 1999

Office of the Chief
Environmental Resources Branch

Mr. Loren Panteah
Coordinator
Zuni Heritage and Historic Preservation Office
P.O. Box 339
Zuni, New Mexico 87327

Dear Mr. Panteah:

The Los Angeles District, U.S. Army Corps of Engineers, is writing to inform you of the Rio de Flag Flood Control Project (RDFFCP) that we are planning in the City of Flagstaff, Arizona (Enclosure 1). We understand that the Flagstaff area may involve locations that are of cultural interest or value to the Zuni people. According to Dr. Dave Wilcox, of the Museum of Northern Arizona, there is very little potential for finding prehistoric cultural materials within the area of potential effects. The majority of the landscape where the RDFFCP will be constructed is in historic neighborhoods (Enclosure 2, attachments 1 and 2). However, we will require an archaeological monitor for all ground disturbing activities in areas that have had little or no prior disturbance.

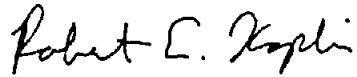
The selected alternative will be primarily linear in design with detention basins on the north and east ends of town. Selection of the preferred alternative is in the early stages so we are inviting the Zuni, the Hopi, and the Hualapai to provide comments and inform us if there may be areas of traditional cultural value in the proposed project area. We do not know what the impacts will be, so we will probably execute a Programmatic Agreement (PA) for the proposed RDFFCP. If you are interested we will invite you to participate in the PA as a concurring party.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

If you have any questions or comments concerning this project, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855.

Sincerely,

A handwritten signature in black ink, reading "Robert E. Koplin". The signature is written in a cursive style with a large, stylized 'R' and 'K'.

Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures



DEPARTMENT OF THE ARMY

LOS ANGELES DISTRICT, CORPS OF ENGINEERS

P.O. BOX 532711

LOS ANGELES, CALIFORNIA 90053-2325

July 23, 1999

Office of the Chief
Environmental Resources Branch

Mr. James Garrison, AIA
State Historic Preservation Officer
Arizona state Parks
1300 West Washington
Phoenix, Arizona 85007

Dear Mr. Garrison:

We are proceeding with the proposed Rio de Flag Flood Control Project (RdFFCP) in the City of Flagstaff, Coconino County and are transmitting a draft Programmatic Agreement (DPA) for your review and comment (Enclosure 1), and a request for concurrence with a determination of eligibility for a historic railroad bridge that will be potentially affected by the project. The entire study area is depicted in the enclosed map (Enclosure 2). At this time, the final alternative has not been selected, and no determinations of eligibility have been completed. We are preparing a DPA pursuant to 36 CFR 800.14(b) to take into account adverse effects that may occur as a result of the proposed RdFFCP.

Consultation with your office was initiated on February 17, 1997. In response Ms. Carol Heathington supplied our project archeologist, Mr. Richard Perry, with a list of National Register listed properties that were identified during numerous historic surveys in Flagstaff. Mr. William Collins of your office visited the APE with Mr. Perry in February 1998. The proposed alignments will avoid all historic structures that are contributing elements to any of the six National Register listed historic districts.

Record and literature searches were conducted at the Museum of Northern Arizona (MNA), and the Arizona State Museum (ASM). We have also consulted with Dr. Dave Wilcox of the MNA, Ms. Susan Wilcox of the Arizona Historic Society-Northern Division, Mr. Peter Pilles, archeologist with the Coconino National Forest, and local Flagstaff consulting archeologist, Ms. Deborah S. Dosh. The ASLD parcel was surveyed in 1996 by Ms. Dosh's consulting company, Kinlani Archaeology, LTD (Kinlani), for a proposed affordable housing project. We have surveyed the other portions of the area of potential effects (APE) on two occasions and are preparing a survey report.

With the exception of two isolated artifacts, the project does not involve prehistoric materials, or other Native American resources. However, the possibility exists that ground-

disturbing activities may uncover buried archeological deposits. With regard to this possibility, we wrote the Hopi Tribe, the Pueblo of Zuni, and the Hualapai Tribe (Enclosure 3, attachments 1-3) to notify them of the project and invite them to participate in consultation. Thus far, no response has been received. They will be sent copies of the DPA to review and comment on if they desire. We are also inviting ASLD to participate in the process.

Kinlani's survey of the ASLD property identified the remains of a historic railroad bridge, built by the Atlantic and Pacific Railroad (APR) in 1885. The tracks are long gone but the red Coconino Sandstone abutments are still in place with excellent integrity and approximately 340 meters of the railroad bed are intact. Site number AZ:I:14:334 was assigned to it by the ASM. A copy of Kinlani's survey report is enclosed for your review as well (Enclosure 4).

We have determined that the bridge is eligible for inclusion in the National Register of Historic Places under criterion a. because it was an important segment of the transcontinental railroad system (TRS) that was responsible for major growth and business consolidation in the latter part of the nineteenth century. The APR element of the TRS linked Albuquerque with the Southern Pacific Railroad in San Francisco. The Southern Pacific Railroad by this time had monopolized transport of freight from San Pedro (Enclosure 5). This enabled transcontinental shipment of freight from the Los Angeles Harbor in San Pedro to the nation's interior. Additionally, the bridge is eligible on the local level because the railroad was instrumental in the development of Flagstaff. Donna Ashworth summarized this point in her book, Biography of a Small Mountain. On page 24 (Enclosure 6) she said, "The key to growth in Flagstaff was the railroad. Without the transcontinental line, there might never have been much of a town or a sawmill either, since the mill was started to cut ties for track. It was the daily presence of the trains that made it all possible." Based on this information we are requesting your concurrence with our determination of eligibility for AZ:I:14:334.

On July 7, 1999 Mr. Perry consulted by telephone with ASLD archeologist, Mr. Ken Rozen, concerning this eligibility determination and the Corps' need to engage in geotechnical testing with a backhoe in the dirt railroad bed. Mr. Rozen concurred fully with the determination of eligibility, and he supported a finding of no adverse effect following 36 CFR 800.5(b) for the proposed undertaking. His approval was predicated by our affirmation that the backhoe operator will recompact the railroad bed back to grade, returning it to its original configuration. We are enclosing a copy of the geotechnical exploration plan (GEP) which has already been forwarded to Mr. Rozen for review (Enclosure 7). Based on this information and your acceptance of the Corps' GEP, we are also requesting your concurrence that geotechnical testing will have no adverse effect on AZ:I:14:334

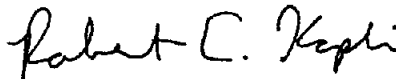
We are simultaneously transmitting a copy of the DPA to the Advisory Council on Historic Preservation (Council) for review and comment. Copies will be mailed to the concurring parties after comments from your office and the Council have been addressed.

Correspondence may be sent to:

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Thank you for your assistance with these issues. If you have any questions concerning this eligibility determination, the finding of no adverse effect, the project or the DPA, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855, or by Email at rperry@spl.usace.army.mil.

Sincerely,



Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures

**PROGRAMMATIC AGREEMENT
AMONG
THE LOS ANGELES DISTRICT, CORPS OF ENGINEERS,
THE ADVISORY COUNCIL ON HISTORIC PRESERVATION,
AND THE ARIZONA STATE HISTORIC PRESERVATION OFFICER
REGARDING IMPLEMENTATION OF THE
RIO DE FLAG FLOOD CONTROL PROJECT**

WHEREAS, the Los Angeles District, Corps of Engineers (COE) under authority given in House Resolution 2425, for the Rio de Flag Flood Control Project (undertaking); and

WHEREAS, the COE has determined that the proposed undertaking may have an effect on properties included in or eligible for inclusion in the National Register of Historic Places (historic properties) and has consulted with the Advisory Council on Historic Preservation (Council) and the Arizona State Historic Preservation Officer (SHPO) pursuant to Section 800.13 of the regulations (36 CFR 800) regarding implementation of Section 106 of the National Historic Preservation Act (16 U.S.C. 470f); and

WHEREAS, the City of Flagstaff, Arizona State Land Department, the Hopi Tribe, The Pueblo of Zuni, and the Hualapai Tribe participated in consultation and have been invited to concur in this Programmatic Agreement (PA); and

WHEREAS, the definitions set forth in 36 CFR 800.2 are incorporated herein by reference and apply throughout this PA;

NOW, THEREFORE, the COE, the Council and the SHPO agree that the proposed undertaking shall be implemented in accordance with the following stipulations in order to take into account the effects of the undertaking on historic properties and to satisfy the COE' Section 106 responsibilities for all individual aspects of the undertaking.

STIPULATIONS

The COE shall ensure that the following measures are carried out:

Stipulation I.

Inventory, Evaluation, and Effect Determination

- A. The Area of Potential Effects (APE) for the purposes of this PA is defined as the structural elements of the historic Rio De Flag channel from Thorpe Park Detention Basin to Butler Avenue, and Clay Avenue Wash and Detention Basin (Attachment 1), and additional ancillary areas as may be determined by the COE, The City of Flagstaff, and the SHPO pursuant to stipulation IV. of this PA. Sinclair Wash and the eastern half of the Rio de Flag channel are non-structural and are considered outside of the

APE. Within the APE also are approximately 12 acres of property currently owned by the ASLD.

- B. In the 1977, 1993, 1996 and 1998-99, the APE, as established as of the date of execution of this PA, was surveyed for historic properties by:
1. Janus Design, Inc, or Woodward Architectural Group conducted four historic building surveys in the APE. These surveys resulted in the designation of three historic districts in the APE that are included in the National Register of Historic Places. The historic districts and dates they were listed are:
 - a. the *Railroad Addition Historic District: Nomination to the National Register of Historic Places.*, 1986;
 - c. the *Flagstaff Townsite Historic District*, 1986;
 - d. the *Multiple Resource Area*, 1986;
 - e. the *City of Flagstaff Southside/Oldtown Historic Building Survey*, 1993 by Woodward Architectural Group. District nomination has been recently submitted to the National Parks Service for evaluation.
 2. Kinlani Archaeology, Inc conducted a survey of Arizona State Land in 1996. The survey report is entitled "*A Cultural Resources Survey of the Proposed Railroad Springs Affordable Housing Subdivision, Flagstaff, Coconino County, Arizona.*"
 3. The Los Angeles District, Corps of Engineers, surveyed the Rio de Flag, and Clay Avenue Wash and Detention Basin in 1998 and 1999. The draft survey report under preparation is entitled "*A Cultural Resources Survey of the Rio de Flag and proposed Detention Basins for the Rio de Flag Flood Control Project: Flagstaff, Coconino County, Arizona.*"
- D. The COE shall ensure that if additional intensive surveys of the undertaking's APE are required, they shall be done in a manner consistent with the "Secretary of the Interior's Standards and Guidelines for Identification" (48 FR 44720-23) and taking into account both NPS publication, "The Archeological Survey: Methods and Uses" (1978: GPO stock #024-016-00091. This will include areas not previously surveyed, and may also include additional areas that may be affected by changes in the project design, borrow areas, haul roads, staging areas, extra work space, and other ancillary areas related to the undertaking.
- E. Additional required surveys shall be conducted and reports prepared by or under the direct supervision of persons that meet the "Secretary of the Interior's Professional Qualifications Standards" (48 fr 44738-9), (hereafter, "Qualification Standards").
- F. The COE shall ensure the approved testing plan (TP) is implemented in consultation with the SHPO and that this TP shall be consistent with the "Secretary of the

Interior's Standards and Guidelines for Evaluation (48 FR 44723-26). The TP shall be employed whenever the COE, in consultation with the SHPO, determines that an historic property should be evaluated and that use of the TP is essential to the feasibility of the re-evaluation; or whenever the COE, in consultation with the SHPO, determines that testing would help to accommodate both the needs of the undertaking and the appropriate consideration of historic properties.

The draft TP shall be submitted concurrently by the COE to the SHPO, appropriate Native American group(s) and individuals, and interested persons upon request for review. Reviewers shall have 20 calendar days after receipt to comment on the draft TP. The COE shall ensure that any comments received within that time period are taken into account and incorporated into the final TP. The COE shall resolve disputes in accordance with Stipulation XI below. Failure of the SHPO to comment within the specified time period shall not preclude the COE from allowing the draft TP to be finalized and implemented in accordance with the terms of this Stipulation. The COE shall ensure that the the SHPO is sexpeditiously provided with copies of the final TP.

- G. The COE shall ensure that all properties within the undertaking's APE that may be affected and that have not previously been so evaluated shall be evaluated for their National Register of Historic Places eligibility in consultation with the SHPO using the criteria set forth in 36 CFR 60.4. If the COE and the SHPO cannot agree on the National Register eligibility of a property, the COE shall obtain a determination from the Keeper of the National Register in accordance with 36 CFR 63. The determination of the Keeper shall be conclusive for purposes of this PA. Following determinations of eligibility, the COE shall apply the Criteria of affect and Adverse Effect pursuant to 36 CFR 800.5 to all historic properties within the APE.
- H. COE will seek comments from all potentially interested Native American Groups pursuant to National Register Bulletin 38 in making determinations of eligibility for any identified Traditional Cultural Properties.

Reviewers shall have 30 calendar days after receipt to comment to the COE. The COE shall ensure that any comments received during this period are taken into account and incorporated into the final survey and evaluation reports. Disputes shall be resolved by the COE in accordance with Stipulation VIII below. Failure by any reviewer to comment within this time period shall not preclude the COE from allowing draft reports to be finalized. The COE shall ensure that all reviewers named in this Stipulation shall expeditiously receive copies of all final survey and evaluation reports.

Stipulation II. Preparation of Historic Property Treatment Plan

- A. COE in consultation with SHPO, shall ensure that an Historic Property Treatment Plan (HPTP) is developed for the mitigation of anticipated effects on historic properties that will result from the Project and any related uses and activities. A Discovery Treatment Plan (DTP) and a Construction Monitoring Plan (CMP) shall be developed as components of an HPTP. Further
- B. An HPTP shall be developed by persons meeting the Qualifications Standards and shall be consistent with the "Secretary of the Interior's Standards and Guidelines for Archeological Documentation" (48 FR 44734-37) and take into account the Council's publication, "Treatment of Archeological Properties" (Advisory Council on Historic Preservation, 1980), subject to any pertinent revisions the Council may make in the publication prior to completion of the treatment plan and research design, and relevant SHPO guidance. At a minimum, the HPTP shall address the following:
1. the historic properties or portions of historic properties where treatment will be implemented;
 2. any historic properties or portions of historic properties that will be destroyed or altered without treatment;
 3. a Research Design that will contain the research questions and goals that are applicable to the Project area as a whole and that will be addressed through data recovery, along with an explanation of their relevance and importance. These research questions and goals shall reflect the concepts of historic contexts as defined in National Register Bulletin 16.
 4. the field and analysis methods to be used, with an explanation of their relevance to the research questions;
 5. the methods to be used in data management and dissemination of data, including a schedule;
 6. the proposed disposition of recovered materials and records;
 7. proposed methods for disseminating results of work to the interested public;
 8. proposed methods by which appropriate Native American groups and individuals, local governments and other interested persons will be kept informed about implementation of the HPTP and afforded an opportunity to comment;
 9. a proposed schedule for submission of progress reports to the COE, SHPO, and the Council;
 10. methods and procedures for the recovery, analysis, treatment, and disposition of human remains, associated grave goods, and objects of cultural patrimony that reflect any concerns and /or conditions identified as a result of consultations between COE and any affected Native American Group (see VII below).
- C. Treatment Approach and Preservation In-Place of Historic Properties. Avoidance of adverse effects on historic properties is the preferred treatment approach. The HPTP

will discuss and justify the chosen approach(es) to the treatment of project historic properties and those treatment options considered, but rejected. If preservation of part or all of any historic properties is proposed, the treatment plan will include discussion of the following:

1. Description of the area or portion(s) of the historic properties to be preserved in-place, and an explanation of why those areas or portions of sites were chosen;
2. Explanation of how the historic properties will be preserved in-place, including both legal and physical mechanisms for such preservation;
3. A plan for monitoring and assessing the effectiveness of mechanisms to preserve the historic properties; and
4. A plan for minimizing or mitigating future adverse effects on the historic properties, should preservation in-place mechanisms prove to be ineffective.

D. Discovery/Monitoring Plan. The HPTP shall include discussion and justification of the following:

1. how unanticipated historic properties that are not visible from the surface or known from previous survey efforts shall be identified, evaluated, and treated;
2. procedures to be followed in communicating information and decisions regarding unanticipated discoveries, including the implementation of stipulation VII of this PA.

E. Public Involvement Provisions.

1. Discussion of the views of the interested public, including Native American tribes, on the identification, evaluation, and treatment of historic properties;
2. Discussion of how their views have been addressed within the Treatment Plan; and,
3. Discussion of proposed means for continuing to involve the public in the future.

Stipulation III.

Review of Treatment Plan and Data Recovery Plan(s)

The COE shall ensure that draft HPTPs are submitted concurrently to the SHPO, the Council and appropriate Native American group(s) and individuals for review and comment. Reviewers shall have 20 calendar days after receipt of the draft HPTP to comment to the COE. The COE shall ensure that any comments received during this time period are taken into account and incorporated into the final HPTP. Disputes shall be resolved by the COE in accordance with Stipulation VIII below. Failure to comment within this time period shall not preclude the COE from allowing the HPTP to be finalized and implemented. The COE shall ensure that all reviewers are expeditiously provided with copies of the final HPTP.

- A. If revisions are needed, any party, including SHPO, has 20 days to review the revisions. If no comments are received within 20 days, concurrence among the parties will be assumed.
- B. Once the HPTP is determined adequate by the reviewing parties, COE shall issue authorization to proceed with the development of the Data Recovery Plan(s).
- C. Once the data recovery Plan(s) is determined adequate by the reviewing parties, COE shall issue authorization to proceed with the implementation of the Plan.
- D. Final drafts of the Treatment Plan and all subsequent and supplemental Data Recovery Plan(s) will be provided to SHPO and the Council.

Stipulation IV.

Modifications in Construction, right-of-ways, and Ancillary Areas

A. Identification and Evaluation

If rerouting a portion of the proposed ROW becomes necessary or if activities are proposed in AAs that have not been previously surveyed for historic properties, the COE shall ensure that the APEs of the rerouted ROW and of the relevant AAs are surveyed and that any properties located within those APEs that may be affected by the undertaking are evaluated. Identification and evaluation of such properties will be carried out in the manner specified in Stipulation I.A.-E., inclusive, except as noted below.

B. Supplemental Historic Properties Treatment Plans (SHPTP)

Where historic properties within the rerouted ROW or AAs may be affected by the undertaking, the COE shall ensure that specific Supplemental Historic Properties Treatment Plans (SHPTP) are prepared. The SHPTPs shall be prepared in the manner specified in Stipulation III.A.-B., inclusive, except as noted below.

C. Review of SHPTP

Review of SHPTP shall proceed in the manner specified in Stipulation IV., above, except as noted below.

D. Optional Expedited Review

At its discretion, the COE may decide that all documents required by Section A.-C., inclusive, of this Stipulation shall be submitted concurrently in a single package only to the SHPO, the Council, and appropriate Native American group(s) and individuals for review and comment.

Reviewers shall have 20 calendar from receipt of such documents to provide the COE with comments. The COE shall ensure that any comments received during this time period are taken into account and incorporated into the final versions of such documents. Failure to comment within this time period shall not preclude the COE from assuming that the documents are acceptable to the reviewers and from allowing implementation of the SHPTP. The COE shall ensure that all reviewers named in this Stipulation are expeditiously provided with copies of final versions of all documents.

- E. The COE may authorize construction to proceed in any area subject to the provisions of this Stipulation after the COE and the SHPO have consulted and agreed in writing that such construction either will not affect historic properties or that the area does not contain historic properties and that the area will be monitored in accordance with the CMP and DTP included in the SHPTP cited in Section B. of this Stipulation.

Stipulation V.

Implementation of Construction (or Portions of the Undertaking)

- A. The COE may authorize construction to proceed in any area after the COE and the SHPO have consulted and concurred that: (1) such construction will not affect historic properties, (2) or the area does not contain historic properties, (3) or effected historic properties have been satisfactorily mitigated, and (4) that the proposed construction will be monitored in accordance with the Monitoring / Discovery Plans cited in Stipulation II D. of this PA.
- B.. The COE shall ensure that historic properties scheduled for treatment in accordance with Stipulation I.A. of this PA are protected against damage until the applicable treatment measures are implemented.

Stipulation VI.

Curation

The COE shall ensure that all materials and records resulting from identification, evaluation and treatment efforts conducted are curated in accordance with 36 CFR Part 79, except as specified in Stipulation VII below. Materials to be returned to their owners shall be maintained in accordance with 36 CFR 79 until any specified analyses are complete and they are returned.

Stipulation VII.

Treatment of Human Remains

The COE shall ensure that any human remains shall follow the requirements and

specifications contained in an agreement document prepared under Arizona Revised Statute (A.R.S.) § 41-865. An Agreement should be (is) in place for the testing at any unevaluated archeological site. An Agreement shall be finalized for any data recovery or any future studies. Construction and data recovery excavations shall not commence prior to this agreement document being in place.

Stipulation VIII.

Discovery of Unknown Historic Properties

If potential historic or archaeological materials or properties (including artifacts, features, stratigraphic evidence, or other material) are discovered during project ground-disturbing activities, all ground disturbance and other activities that may cause damage to the materials or historic properties shall cease immediately and steps shall be taken to ensure that the area is protected and secured. The City of Flagstaff and the Corps shall be contacted immediately. A plan for the evaluation and treatment of the discovered historic property shall be developed. This plan shall be subject to the review and concurrence of Corps and The City of Flagstaff, in consultation with the SHPO, Native American tribes, and other signatories. In addition, discoveries made during ground-disturbing activities on state land, including the discovery of human remains, shall be treated according to Arizona Law A.R.S. Sec. 41-844.

Stipulation IX.

Dispute Resolution

Should the SHPO or the Council object within 20 calendar days to plans provided for review by the COE or the Applicants pursuant to this PA, the COE shall immediately consult with the objecting party to resolve the objection. If the COE determines that the objection cannot be resolved, the COE shall request the further comments of the Council pursuant to 36 CFR 800.6(b). Any Council comment provided in response to such a request will be taken into account by the COE in accordance with 36 CFR 800.6(c)(2) with reference only to the subject of the dispute; the COE's responsibility to carry out all actions under this PA that are not subjects of the dispute will remain unchanged.

Stipulation X.

Amendment

Any signatory to this PA may request that it be amended, whereupon the signatories to this PA will consult to consider such amendment in accordance with 36 CFR 800.13.

Stipulation XI.

Termination

Any signatory to this PA may terminate it by providing thirty (30) days written notice to the other parties, provided that the signatories will consult during the period prior to the termination to seek agreement on amendments or other actions that would avoid termination. In the event of termination, the COE will comply with 36 CFR 800.4 through 800.6 with regard to all individual aspects of the undertaking that would otherwise be considered under the terms of this PA.

Stipulation XII.

Failure to carry out the Terms of this PA

In the event the COE does not carry out the terms of this PA, the COE will comply with 36 CFR 800.4 through 800.11 with regard to all individual aspects of the undertaking that would otherwise be considered under the terms of this PA.

Execution and implementation of this PA evidences that the COE has satisfied its Section 106 responsibilities for all individual aspects of the undertaking.

Advisory Council on Historic Preservation

BY: _____ DATE: _____

TITLE:

U.S. Army Corps of Engineers, Los Angeles District

BY: _____ DATE: _____

John P. Carroll, Colonel, Corps of Engineers, District Engineer

Arizona State Historic Preservation Officer

BY: _____ DATE: _____

TITLE:

Concur:

City of Flagstaff

BY: _____ DATE: _____

TITLE:

Arizona State Land Department

BY: _____ DATE: _____

TITLE

Hopi Tribe

BY: _____ DATE: _____

Zuni Pueblo

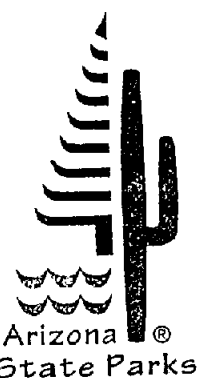
BY: _____ DATE: _____

TITLE

The Hualapai Tribe

BY: _____ DATE: _____

TITLE



September 15, 1999

Jane Dee Hull
Governor

State Parks
Board Members

Chair
Sheri J. Graham
Sedona

Vernon Roudebush
Safford

Walter D. Armer, Jr.
Benson

Suzanne Pfister
Phoenix

Joseph H. Holmwood
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Director's Office Fax:
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Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CDSPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: DOD-Army Corps of Engineers/Rio de Flag Flood Control Project

Dear Mr. Perry:

Thank you for submitting documentation on the above referenced project. I have reviewed the material pursuant to 36 CFR Part 800 and have the following comments:

1. I concur with your recommendations that the property AZ I:14:334 (ASM) is eligible for listing in the National Register of Historic Places.
2. It is my opinion that the planned geotechnical testing will have no adverse effect on the property provided the stipulations concerning recompacting the railroad bed after the testing is completed are carried out.
3. We have not yet completed our review of the draft Programmatic Agreement on the project. We will have comments on it for you soon.

If you have any questions or requests, please call me at (602) 542-7159.

Sincerely,

William S. Collins, Ph.D.
Historian
State Historic Preservation Office

APPENDIX D
CONCEPTUAL RECREATION REPORT

RIO DE FLAG CONCEPTUAL RECREATION REPORT

1.0 INTRODUCTION

1.01 GENERAL

This document details the purpose and scope for the development of recreation features along the Rio de Flag, Flagstaff, Arizona.

1.02 PURPOSE

The purpose of this report is to present a plan for development of recreation features along a portion of the Rio de Flag that conforms with and reflects the requirements of the City of Flagstaff (CoF) and the U.S. Army Corps of Engineers (Corps), as a component of the Rio de Flag Feasibility Study.

This plan will accommodate the needs of the local population while remaining compatible with the flood control purpose of the Rio de Flag channel improvements.

1.03 SCOPE

Through the Flagstaff 2020 visioning process, the people of the greater Flagstaff area expressed their desire to direct the development of their community. In particular, they expressed a desire to orient neighborhoods to pedestrians and bicycles by expanding the Flagstaff Urban Trails System (FUTS). There was also interest in overcoming the barriers to non-automobile travel created by Route 66 and the Burlington, Northern & Santa Fe Railroad (BNSFRR) by providing links to downtown with Northern Arizona University (NAU) and the Southside neighborhood.

The proposed trail will help accomplish both of these goals by linking segments of the FUTS and providing safe, belowgrade crossings of Route 66 and the BNSFRR. The resulting trail system will provide a complete FUTS link from Observatory Mesa in the west, across town to the Mount Elden Conference Grounds in the east.

2.0 PROJECT DESCRIPTION

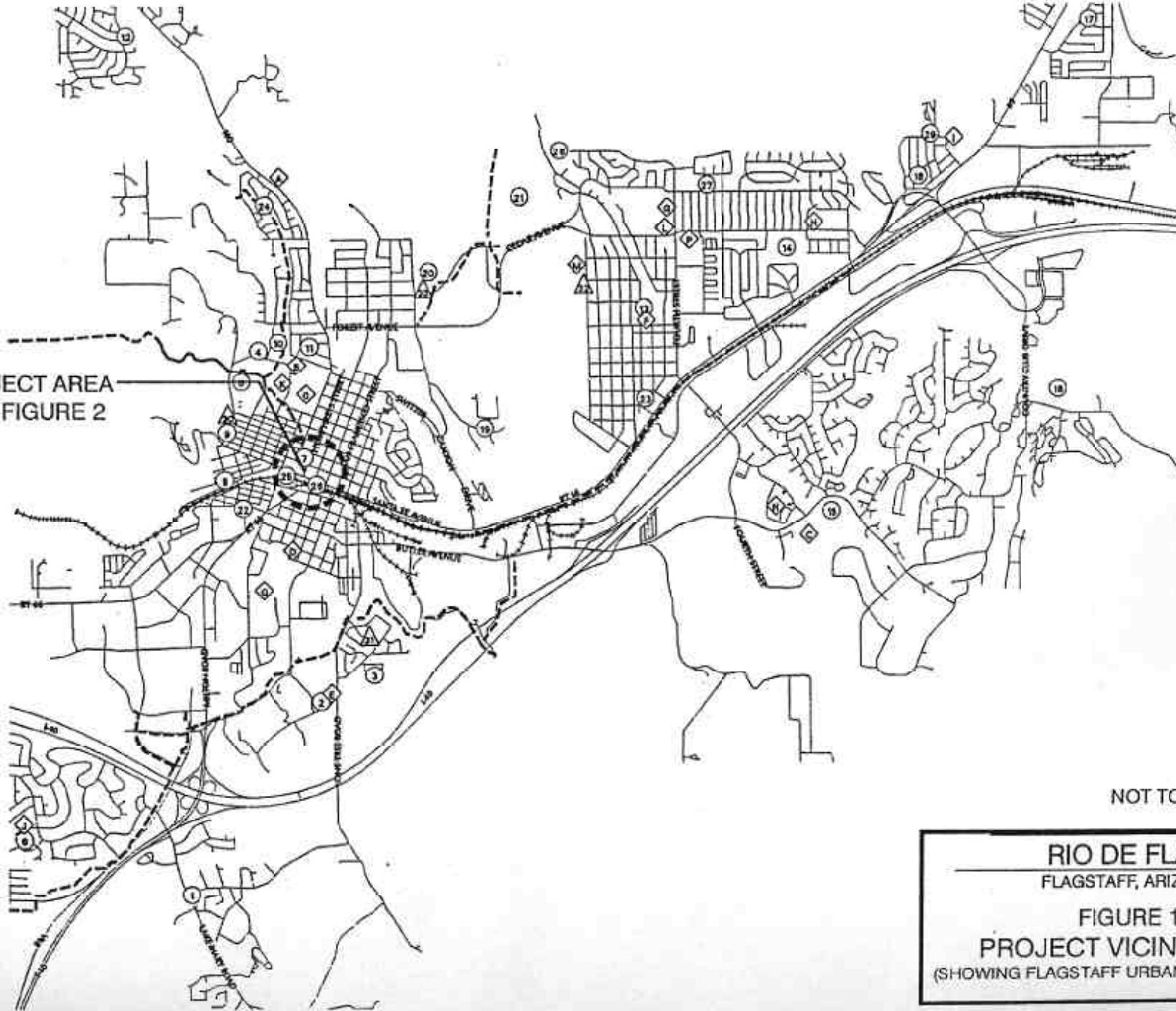
2.1 PROJECT LOCATION

The Rio de Flag is a tributary of the San Francisco Wash, which feeds into the Little Colorado River. The project area includes the downtown portions of the channel from Cherry Avenue to Beaver Street. The river in this area has been artificially channelized over the years due to development of the downtown area.

2.2 OVERALL PROJECT

The Rio de Flag originates on the southwestern slopes of the San Francisco Mountains north of Flagstaff flowing over various types of terrain: the wide, flat valleys of the Fort Valley region; the steep, narrow canyons north of Flagstaff; and the wide, flat bottomed canyons southeast of Flagstaff. The total drainage area of the Rio de Flag watershed is about 116 square miles.

PROJECT AREA
SEE FIGURE 2

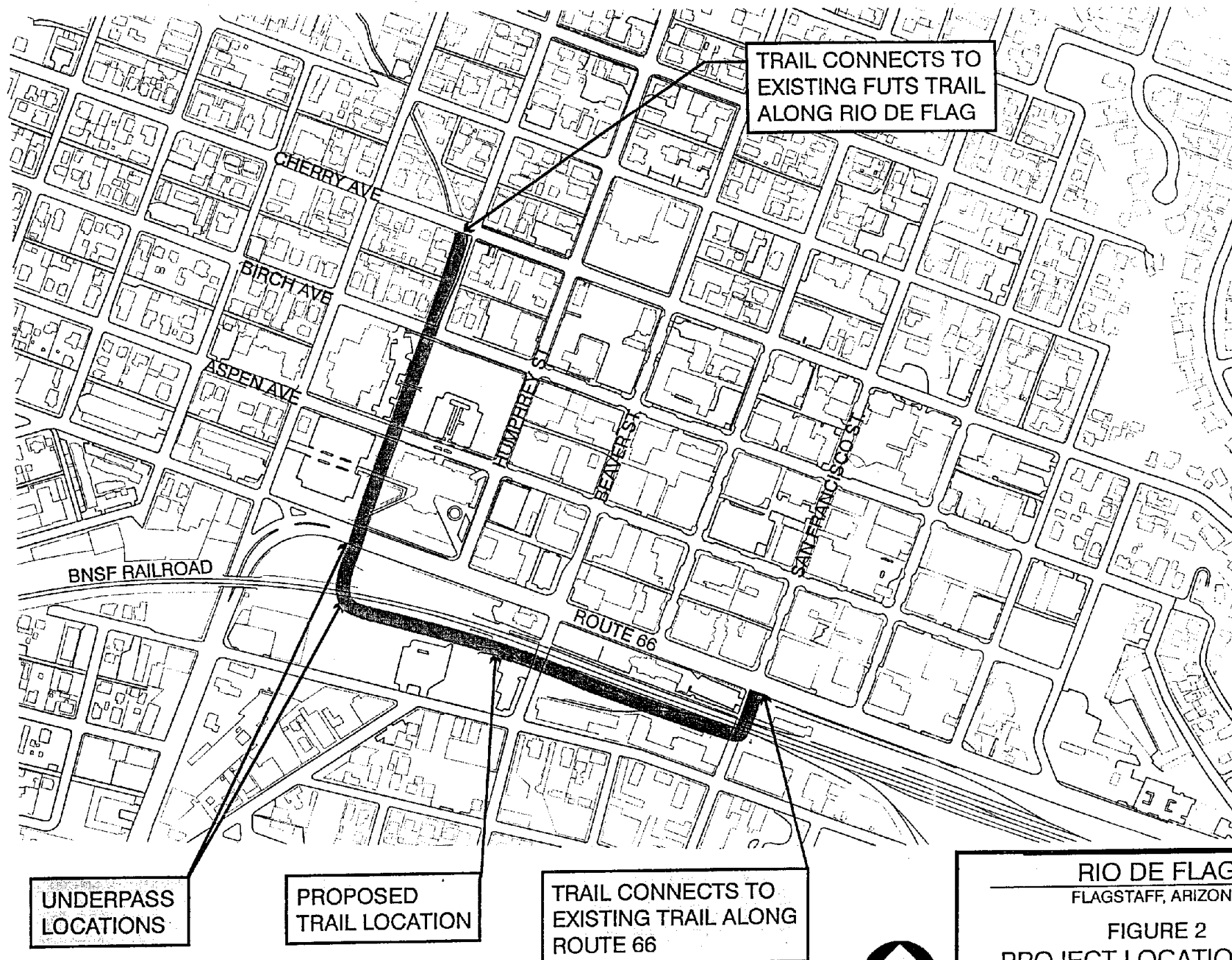


NOT TO SCALE



RIO DE FLAG
FLAGSTAFF, ARIZONA

FIGURE 1
PROJECT VICINITY MAP
(SHOWING FLAGSTAFF URBAN TRAILS SYSTEM)



NOT TO SCALE



RIO DE FLAG
FLAGSTAFF, ARIZONA

FIGURE 2
PROJECT LOCATION MAP

3.0 GENERAL PHYSICAL CHARACTERISTICS

3.1 TOPOGRAPHY

The Rio de Flag originates on the southwestern slopes of the San Francisco Mountains north of Flagstaff flowing over various types of terrain: the wide, flat valleys of the Fort Valley region; the steep, narrow canyons north of Flagstaff; and the wide, flat bottomed canyons southeast of Flagstaff. The total drainage area of the Rio de Flag watershed is about 116 square miles. The total drainage area above the Flagstaff city limits is about fifty square miles. The elevation of the drainage area as a whole ranges from approximately 6,800 feet to 12,356 feet.

3.2 ACCESS AND CIRCULATION

Route 66 and the Burlington, Northern, and Santa Fe Railroad (BN&SFRR) bisect the southern half of the project area. The proposed trail will cross Cherry Avenue, Birch Avenue, Aspen Avenue, Beaver Street, and San Francisco Street. It will be accessible at all these points. Additionally, the proposed trail will be located on the west side of Wheeler Park.

4.0 RECREATION MARKET AREA

4.1 EXISTING LAND USE

The project is located in downtown Flagstaff. Existing land uses in the project vicinity are primarily residential mixed with commercial and some city services. The proposed trail begins in a residential area and continues through an area occupied by the City Hall and the Flagstaff Public Library. Once under Route 66 and the railroad, the proposed trail continues through an area that is currently used by the railroad, but is transitioning to commercial/light industrial uses.

4.2 FUTURE LAND USE

Future land use is expected to remain as existing, with the possible addition of commercial or park uses of the land immediately south of the railroad.

5.0 RESOURCE USE OBJECTIVES

5.1 BASIC OBJECTIVES

Development and evaluation of recreation plans involves three steps:

1. Assessing the need for recreation facilities in the project area.
2. Assessing the potential for recreation development of project lands.

3. Evaluating the economic feasibility of recreation development.

5.2 RESOURCE USE OBJECTIVES

Several resource use objectives are provided for general guidance of future recreation development related to the Rio de Flag.

- 5.2.1 To provide recreation opportunities for the general public that will meet expressed needs of local and regional users.
- 5.2.2 To develop recreation facilities and resources that will complement, and not conflict with, the primary project purpose of flood control.
- 5.2.3 To provide a trail along the channel that will link existing segments of the Flagstaff Urban Trails System (FUTS).
- 5.2.4 To protect and enhance aesthetic qualities of the project area by incorporating landscaping and aesthetic design features.

5.3 RESOURCE USE CONSTRAINTS

Due to lack of space, recreation trail uses will be restricted to one side of the channel. The trail will also serve as an operation and maintenance (O&M) road. Observation of other trails with similar dual functions indicates that there should be no significant conflict.

6.0 PHYSICAL PLAN FOR RECREATION DEVELOPMENT

6.1 MULTI-USE TRAIL

The Flagstaff Vision 2020 report has identified the Rio de Flag as an important area for development of recreation features that link FUTS and provide for neighborhood uses. The proposed multiuse trail will support bicycle, pedestrian, and related uses. The trail expansion will link existing segments of the FUTS, including those currently separated by Route 66 and the BNSF Railroad. The result will allow trail travel from Observatory Mesa to the west across town to the Mount Elden Conference Grounds to the east. The trail will use the maintenance access road in its travel along the Rio de Flag channel. Interpretive and directional signs will be provided along the proposed trail. Interpretive signs will present information on the unique historical features and biological habitats of the area.

6.2 BICYCLE UNDERPASS

Below-grade crossings for recreation users will only be required in two places: under Route 66 and under the BN&SFRR tracks. Below grade crossings are required due to the high traffic volumes on both Route 66 and the railroad,

making at-grade crossings impractical and potentially unsafe. The trail will descend adjacent to the channel improvements to pass under Route 66 and the Railroad through a new arch culvert under each thoroughfare. Due to the closeness of Route 66 and the railroad, the trail will be connected between these two crossings. The ramps into and out of the channel must be a minimum 10 wide with a slope not to exceed 12:1. At-grade crossings will be used at other roads. It is not expected that traffic volume on these other roads will increase to a point precluding at-grade crossings.

6.3 INTERPRETIVE ELEMENTS

The Rio de Flag trail will travel through several areas of environmental significance. Interpretive elements may be used to inform and educate visitors about endangered plant and animal species, habitat preservation and restoration, historic uses of the stream, and other cultural resources. Information about the river's early role as a transportation mode, in agricultural irrigation and mill works, and as a food source may also be offered. The interpretive elements may include small signs with graphics or photographs and brief written narratives.

The Rio de Flag trail will also travel through several areas of historic/cultural prominence in the City of Flagstaff. Historic Downtown Flagstaff is the most prominent historic/cultural site, along with the Spanish/Basque settlement area. Several small local streets from these areas bisect the proposed trail and offer opportunities for bicyclists or pedestrians to leave the trail and enter the historic districts. Signs at key areas would inform the user of the important early links between these settlements and the river.

All interpretive signage should use natural materials as much as possible. Entry signs at trail entrances or exits should be made of materials consistent with those used in other parts of the FUTS. All signage should be uniform in size and shape and be displayed for easy observation by both bicyclists and pedestrians. The riverpark name and/or logo should be featured prominently on all entry and exit signs.

6.4 AESTHETIC TREATMENTS

The Rio de Flag trail improvements will connect to the existing river trail at Birch Avenue and continue to San Francisco Street. The existing trail is eight (8) feet wide and composed of a treated gravel surface. The trail composition will remain consistent throughout the project site, except at areas where the trail is part of an existing or proposed roadway or where it travels under existing structures (such as Route 66 or the railroad). Trail surfaces at these locations will be consistent with the existing improvements. Excess graded areas along the trail should be revegetated with species consistent with the habitat mitigation measures used downstream of the railroad tracks.

There are several areas of sufficient size along the trail to allow opportunities for additional facilities such as a drinking fountain or bench. Interpretive or scenic overlooks are encouraged at wide spots along the trail. Clearing an area along the trail may develop the opportunity for an interpretive viewing area. These areas/interpretive nodes may be appropriate for interpretive signage describing wildlife habitats or other significant features in the area. Additional amenities such as protective fencing, seating, trash receptacles and drinking fountains may also be included.

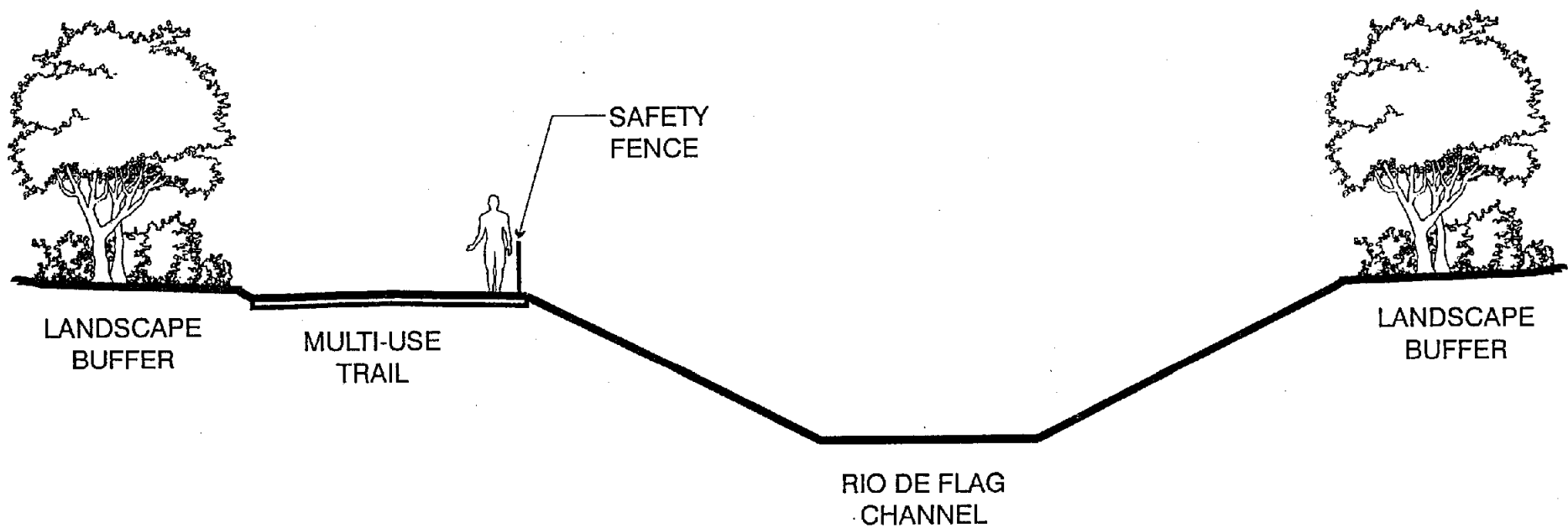
6.5 FENCING REQUIREMENTS

Fencing and safety rails will be utilized along the river trail to define the trail boundary and restrict public access to particular areas. Fencing will be necessary between the channel and the edge of the trail. Fence materials will be limited to wooden >split-rail= fencing consistent with other portions of FUTS. Treated wood posts with safety chains or coated steel wire may also be considered. Overlook areas will require tubular steel or wood >split-rail= fencing. Utility fencing should be unobtrusive and blend into the surrounding landscape. If chain link is needed to protect areas, plant material may be used to screen it. Any color coating of materials will be done with colors that are compatible with the surrounding environment. All fencing or safety rails will meet ADA requirements and City of Flagstaff development standards.

6.6 PLANTING

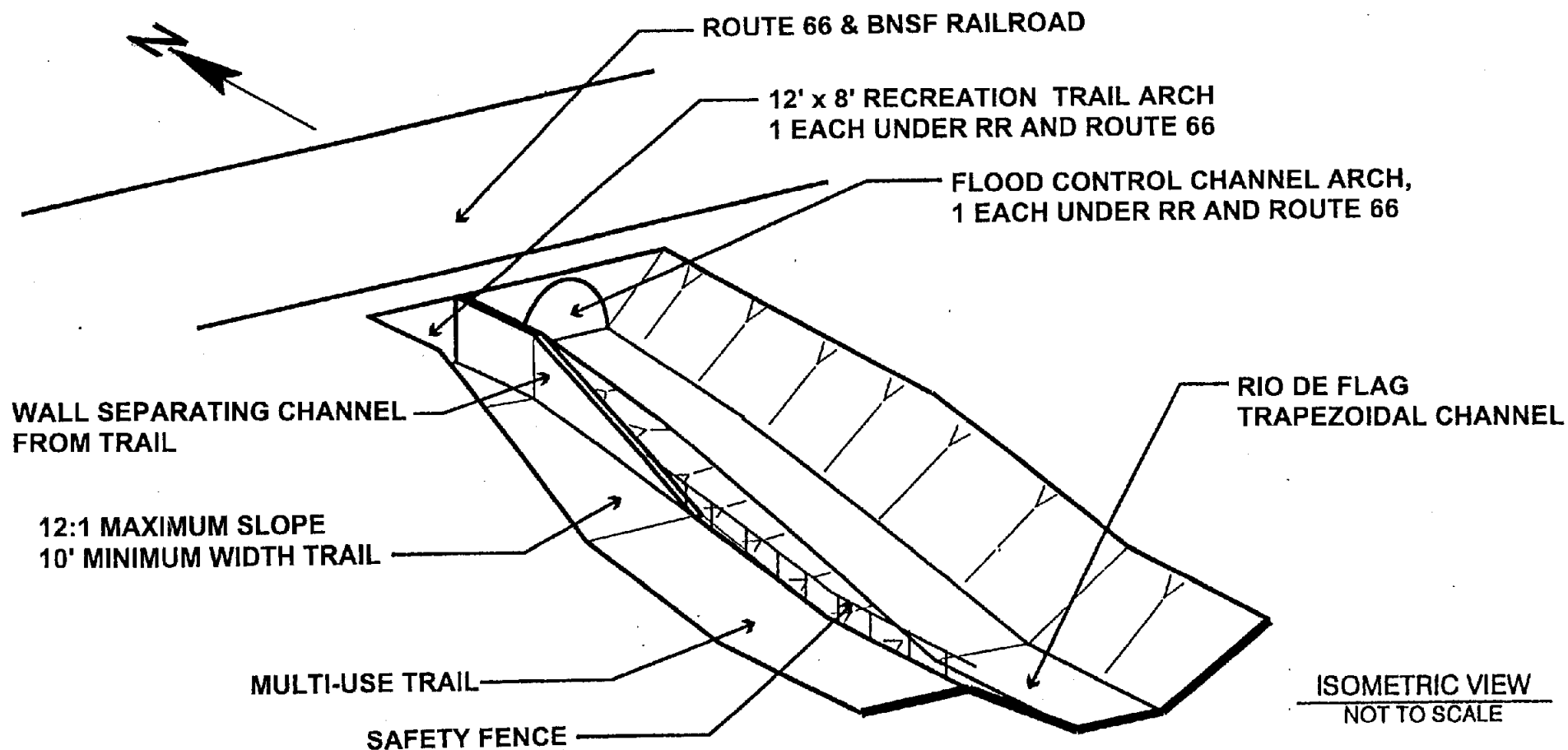
All planting installed under the recreation plan will occur upstream of the railroad tracks. Planting of downstream sections is covered under the mitigation requirements. Landscape plantings should be used to add shade, variety, and interest to the trail. Plantings should also be used as a screen to block undesirable views and enhance trail entrances and interpretive areas.

Irrigation will be required for plant establishment. After plant establishment, irrigation may be necessary to maintain healthy and attractive plantings.



RIO DE FLAG
FLAGSTAFF, ARIZONA
FIGURE 3
TYPICAL TRAIL
CROSS-SECTION

RECREATION TRAIL UNDERPASS SCHEMATIC



SEE PLAN SHEETS 5, 6, AND 10, DESIGN APPENDIX,
FOR ADDITIONAL DETAILS. THESE SHEETS ARE SHOWN AS FIGURES
6.6, 6.9, AND 6.10 IN THE FEASIBILITY REPORT

RIO DE FLAG
FLAGSTAFF, ARIZONA

FIGURE 4
RECREATION TRAIL
UNDERPASS

7.0 PARTICIPATION RATES FOR BICYCLE TRAIL

The City of Flagstaff does not currently collect usage data on the FUTS, therefore usage information was determined by application of information from a similar project. Usage data was taken from the Rillito River Park, Tucson Arizona. This park is a multiuse bike path along the Rillito River. It is located adjacent to residential areas for much of the length where the usage data was collected. It connects neighborhood parks and has links to on-street bicycle routes. Hence, the Rillito project is very similar to the proposed project for the Rio de Flag since it incorporates similar features (connecting existing trail systems) in a comparable environmental setting. Therefore, per capita usage rates for the proposed trail improvements are expected to be similar to those applied in the Rillito study. Based upon the per capita usage rates applied in the Rillito study and the differences in the relative study area populations, the proposed improvements at Rio de Flag are projected to result in an additional 11,729 annual user days.

Bicycling/walking is defined as general recreation and 47 points have been allocated to the proposed trail. General Recreation Points and conversion of points to dollars were determined per ER 11052-100, Chapter 6, Section VII, Tables 6-28 and 6-29. Table 1 shows the point values that were calculated for the proposed trail. Additional details are in the Economics Appendix.

Annual Recreation Value: 11,729 [user days] X \$5.58 [Table 1] = \$ 65,448

Net Annual Benefit (rounded): \$65,450 - \$0 = \$ 65,450

[w/project condition B w/o project condition]

Recreation Plan Benefit/Cost Analysis	
Construction Cost	\$336,250
Contingency	\$67,250
PED/EDC	\$48,026
S&A	\$21,856
LEERDs	\$0
Total First Cost	\$473,382
IDC (3 mo. Const. Period)	\$3,800
Gross Investment	\$477,182
Annualized Cost (6.625%, 50 yrs)	\$32,946
O&M	\$1,000
Total Annual Cost	\$33,946
Average Annual Benefits	\$65,450
Benefit/Cost Ratio	1.93
Net Benefits	\$31,504

Table 1: General Recreation Points

Criteria	Points		Judgment Factors
	Given	Possible	
A. Recreation Experience	8	30	Biking, Walking, Rollerblading, Interpretive Features
B. Availability of Opportunity	3	18	Several biking & hiking opportunities within 1 hour in region
C. Carrying Capacity	8	14	Facilities will adequately support required usage
D. Accessibility	18	18	Downtown location, high standard roads to site, multiple access points, links existing trail segments
E. Environmental	10	20	Historic buildings adjacent to trail; portions travel through park
Point subtotal	47	100	
User day dollar	\$5.58		

8.0 ENVIRONMENTAL COMMITMENTS

8.1 GENERAL

8.1.1 VEGETATION

Vegetation in the project area can be described as disturbed/Urban. Trees in this habitat type include cottonwood and poplar (*Populus* sp.), willow (*Salix* sp.), and domestic fruit trees (apple*, cherry*, plum*). Weedy plants are common and typically include sunflower (*Helianthus* sp.), gum-weed (*Grindelia* sp.), ragweed (*Ambrosia* sp.), white sweet clover* (*Melilotus alba*), toad-flax* (*Linerria dalmatica*), and field bind weed* (). Grasses include agropyron (*Agropyron* sp.), bentgrass (*Agrostis* sp.), orchard grass* (*Dactylis glomerata*), and canary grass* (*Phalaris canariensis*). Non-native plants are marked by an

asterisk (*).

Refer to the EIS for plant species that would be appropriate for this project.

8.1.2 PROJECT EFFECTS

It is anticipated that the proposed trail will be used by bicyclists and pedestrians in the immediate area, as well as by those utilizing the FUTS. The proposed trail links and enhances existing trail systems, providing a higher quality experience for the users. To maximize safety, at grade crossings are used only on residential streets with low traffic volume. Belowgrade crossings are used at Route 66 due to traffic volume and at the BN&SFRR due to right-of-way and safety considerations.

The trail will be surfaced with treated gravel matching the existing FUTS surfacing. Portions of the trail in the below grade crossings may have a hard surface material consistent with the flood control efforts. Materials for fencing will be limited to wooden split-rail fencing consistent with other portions of FUTS, or similar materials.

Use of the trail may serve to enhance local air quality by reducing traffic volume. No significant impacts are expected as a result of construction of the proposed trail.

9.0 COORDINATION WITH OTHER AGENCIES

9.1 LOCAL SPONSORS

The City of Flagstaff will be the cost sharing partner in this development.

10.0 COST ESTIMATE

10.1 CONSTRUCTION

The following is a cost estimate for the proposed multipurpose trail, including below-grade crossings.

DESCRIPTION	ESTIMATED QUANTITY		UNIT	UNIT COST	TOTAL COST
Bicycle/Pedestrian Underpasses		2	Lump Sum	\$137,000	\$274,000
Landscape Improvements (planting seeding, misc.)		0.25	Mile	\$125,000	\$31,250
Irrigation for Plant Establishment		1	Lump Sum	\$16,000	\$16,000
Landscape Establishment		1	Lump Sum	\$2,000	\$2,000
Site Furniture (bike racks, benches, trash receptacles)		1	Lump Sum	\$6,000	\$10,000
Directory & Informational Signs		1	Lump Sum	\$6,000	\$3,000
Total					\$336,250

10.2 OPERATIONS AND MAINTENANCE

Operation and Maintenance (O&M) costs over and above current O&M costs for the existing channel are estimated at \$1000 and includes irrigation using an above-ground temporary system.

10.3 COST-SHARING

The City of Flagstaff will be the cost-sharing partner in the development of the proposed recreation facilities along the Rio de Flag Channel. No additional land is required for the recreation features above that already required for the flood control project. Detailed cost-shareable guidelines are outlined in ER1165-2-400, A Recreation Planning, Development, and Management Policies.

11.0 CONCLUSIONS

Based on thorough review of the recreation potential and physical constraints within the project area, it has been concluded that development of the proposed multi-use trail along the Rio de Flag would not have a significant environmental impact, and would constitute reasonable development of these lands.

APPENDIX E

MITIGATION PLANNING

1.0 INTRODUCTION

ER 1105-2-100 requires that District commanders ensure that project-caused adverse impacts to fish and wildlife resources be avoided or minimized to the extent practicable and that remaining unavoidable impacts be compensated to the extent justified. The following mitigation plan has been developed for the Rio de Flag Feasibility Study to comply with this regulation. As specified in the regulation, both the recommended plan and the NED plan must contain sufficient mitigation to ensure that either plan selected will not have more than negligible adverse impacts on fish and wildlife resources. Since, for the Rio de Flag Feasibility study, the recommended plan and the NED plan are one in the same, only one evaluation is contained herein (from this point on only the NED plan will be referred to although “NED plan” and “recommended plan” are synonymous).

The formulation of mitigation measures for the Rio de Flag Feasibility Study involved a series of steps to evaluate the biological effects (beneficial and adverse) resulting from the implementation and maintenance of the NED plan. The basis for the evaluation was a modified functional habitat assessment of the Rio de Flag and Clay Avenue Wash throughout the project area. The modified approach is based on the framework of the Corps of Engineers Hydrogeomorphic Method (HGM) for wetland functional assessment (Smith et al. 1995). The HGM approach measures field indicators of the biotic and abiotic condition of a wetland and uses these indicators to estimate the capacity of the system to perform a set of functions relative to a local or regional reference condition. Section 2.0 of this plan outlines the assessment methodology and summarizes the results of the functional assessment. In general, engineering designs and project footprint maps were used in conjunction with results of hydraulic modeling, the Rio de Flag Fish and Wildlife Coordination Act Report, and site visits to estimate direct impacts from the NED plan.

2.0 ASSESSMENT METHODOLOGY

The Hydrogeomorphic Method (HGM) approach was developed to satisfy the need for better information on wetland functions within the programmatic requirements of the Section 404 Clean Water Act program. The HGM is an assessment tool that estimates the capacity of a wetland system to perform certain functions. The “function” of a wetland refers to actions naturally performed by a wetland. These functions are the product of the interactions between and among the biotic and abiotic components of a wetland system and vary regionally in degree and magnitude with changes in climate, topography, hydrology, and geomorphology.

The application of the HGM approach follows a series of steps to focus the analysis on the functions of a particular wetland type and then evaluate this system relative to a range of comparable systems from the same region which function in a similar manner. In a strict sense this includes the classification of the wetland system; development of a functional profile that describes the physical, chemical, and biological characteristics of the wetland system (including reference wetlands and metrics); field data collection; and, finally, the assessment phase using the model developed for the system under study. In regions where a regional model has been developed, the time required to complete this process is

greatly reduced and can be accomplished within the time frames of a typical Corps of Engineers Feasibility Study. In the case of the Rio de Flag study, a regional model had not been developed so a modified, mostly qualitative approach was employed for the assessment of wetland functions.

The Modified Functional Assessment (referred to hereafter as the assessment) was completed utilizing a team approach with representatives from the U.S. Fish and Wildlife Service (Phoenix Field Office), City of Flagstaff, and the U.S. Army Corps of Engineers Los Angeles District. Additional technical input was provided by the Arizona Game and Fish Department through written comments. The team participated in the identification of representative variables; development of functional profiles, selection and evaluation of reference conditions, and ranking estimated functional capacity.

2.1 Wetland Classification

The Rio de Flag (and Clay Avenue Wash) is a tributary of the San Francisco Wash which feeds into the Little Colorado River. Originating on the southwestern slopes of the San Francisco Mountains north of Flagstaff, the Rio De Flag traverses a variety of land forms including wide flat valleys, steep narrow canyons, and broad flat-bottomed canyons. Elevations in the approximate 116 square mile watershed range from 6,800 feet in the City of Flagstaff to 12,356 feet in the San Francisco Mountains. Based on site investigations in the watershed and analysis of USGS 7.5 minute topographic maps, the Rio de Flag is assumed to be a 3rd order stream and Clay Wash a 2nd order stream (using the Strahler system) throughout the study area.

Due to the highly ephemeral nature of the system, the majority of wetlands in and along both Clay Avenue Wash and the Rio de Flag are classified as riverine intermittent streambed although classes of the riverine lower perennial subsystem are found downstream of the discharge from the water treatment plant. Another wetland system, palustrine, is found sporadically throughout the project area as small islands within the active channel or outside of the channel within the active floodplain. Classes of palustrine wetlands found in the project area include emergent wetland, scrub-shrub wetland, and unconsolidated bottom.

2.2 Wetland Function Variables

The functions a wetland provides are defined by a set of variables which are requisite for the function to occur. The set may be limited to a single variable or may contain numerous variables depending on the particular function and the reference domain. For the assessment of the Rio de Flag, the Assessment Team identified ten variables based on a review of an existing HGM model, scientific literature, and best professional judgement. The variables were selected to evaluate habitat function throughout the study area and represent the physical and biologic conditions of the reference site. Biogeochemical and hydrologic functions were considered only to the extent that the variables included in the assessment provided some incidental information as to their functionality. Since the Rio de Flag and Clay Wash are highly modified systems, including complete rerouting from their historical alignment, the Assessment Team decided to focus exclusively on variables associated with habitat functions as a means of

qualitatively assessing functional capacity. Biogeochemical and hydrologic functions, although not quantified, were assumed to be consistently low throughout the study area because of the high amount of anthropogenic disturbance and channel modification. Habitat function, however, was expected to vary considerably throughout the project area and its component variables were used as indicators of function in the qualitative assessment.

The ten variables included in the assessment are described in the following paragraphs.

V_{pa} Floodprone Area. The floodprone area is defined as a projection of a horizontal plane at a level twice the bankful discharge.

V_{age} Stand Age Distribution. The stand age distribution for trees, small trees, saplings, and seedlings. Forested plant communities that are sustaining themselves and providing optimal habitat conditions for characteristic species are composed of individuals in all age classes.

V_{tree} Trees. Abundance of trees greater than or equal to 5 inches dbh and greater than or equal to 20 feet in height. The abundance of mature trees is important with respect to spatial and structural diversity (habitat functions) as well as energy dissipation (hydrologic functions) and nutrient cycling (biogeochemical functions).

V_{sap} Saplings. Abundance of small trees (less than 5 inches dbh and less than 20 feet in height), saplings (single stem woody species less than 5 inches dbh and greater than 3 feet in height), and seedlings (single stem woody species less than 5 inches dbh and less than 3 feet in height). Sapling density is used as an indicator of a healthy system and contributes to spatial heterogeneity, surface roughness and nutrient cycling.

V_{shrub} Shrubs. Abundance of shrubs (multiple stem, woody species). Shrubs contribute to overall structural diversity as well as energy dissipation, surface water storage, and nutrient cycling.

V_{cwd} Coarse Woody Debris. Abundance of dead and down woody debris larger than or equal to 0.2 feet in diameter. Coarse woody debris provides a substrate for microbial activity that is important in biogeochemical processes, increases habitat for wetland species, and increases energy dissipation.

V_{fwd} Fine Woody Debris. Abundance of dead and down woody debris smaller than 0.2 feet in diameter. Fine woody debris provides energy, nutrients, and substrate for microbial activity. It also acts as a long-term source of carbon to the system.

V_{litter} Litter. Abundance of leaf litter and other detrital matter. The leaf litter layer is important for food, cover, nesting, nutrient cycling, and nutrient export.

V_{topo} Macro/Micro Topographic Complexity. Macrotopography generally refers to large-scale features such as secondary channels and in channel ponds. Microtopography generally refers to small-

scale features such as pit-and-mound and hummock-and-hollow patterns. Topological complexity provide surface roughness that aids in energy dissipation, opportunities for surface water storage, and spatial diversity in the form of ecotones and ecozones.

V_{contig} Contiguous Vegetation Cover. Contiguous cover and corridors between waters/wetlands and uplands, channels, and upstream-downstream areas. Contiguous vegetation cover offers both horizontal and vertical connectivity throughout the riverine system.

2.3 Reference Wetland

In order to complete the qualified functional assessment a reference data set was required to use as a standard of comparison for the study area. This reference wetland represents a set of conditions that a functioning riverine system would be expected to achieve in the study area. It is not intended to represent a pristine, undisturbed, and fully functioning system; rather, it is a representation of the highest attainable functional capability for a wetland within that region. The reference site selected for the Rio de Flag assessment was located in North Flagstaff along the portion of the Rio de Flag that borders the Museum of Northern Arizona. The assessment team visited the reference site in February 1999 to compare/augment field data collected during the biological field surveys completed in August 1998. This combined data set was then used to establish a measurement scale for each variable. The measurement conditions are provided in Attachment 1 to this Mitigation Plan.

2.4 Assessment of Project Area

The assessment was completed by defining specific reaches along the study area, collecting field data from each reach, and then evaluating each indicator variable against the measurement condition developed from data collected at the reference wetland. Reaches were established following biological surveys and vegetative mapping performed in August 1998. A total of twenty reaches were defined for the Rio de Flag and one for Clay Avenue Wash. The reaches generally represent segments of the creek with similar geomorphic characteristics, vegetation communities, adjacent land use, and stream order. When one or more of these factors changed significantly along a segment of the creek, a reach boundary was defined and a new reach established. In Flagstaff, reach breaks were often associated with channel modifications or constrictions caused by culverts or road crossings. The reaches for the assessment are defined in Table 2-1.

For the baseline condition, data from each were evaluated against the measurement conditions and given a qualitative ranking of high, medium, low, or none. Future with-project conditions and future without-project conditions were estimated by using assumptions about trends in the Flagstaff area. High represented a condition for an indicator variable that closely resembled the condition documented at the reference wetland. Medium and low ratings represent deviations from the reference condition that reduce the relative contribution a variable has towards wetland functions. A rating of “none” indicates the variable is not present at the location and is not recoverable and sustainable under natural processes. Results of the assessment are provided in Section 3.0.

Table 2-1
Rio de Flag and Clay Avenue Wash Functional Assessment Reaches

Reach	Upstream Boundary	Downstream Boundary
1	Stevens Way	Crescent Drive
2	Crescent Drive	Thorpe Park Road
3	Thorpe Park Road	Francis Short Pond
4	Francis Short Pond	
5	Downstream extent of Francis Short Pond	Bonita Street
6	Bonita Street to Birch Street	Birch Street
7	Birch Street	Route 66 (grassy swale in Wheeler Park Adjacent to City Hall)
8	Route 66	Phoenix Street
9	Phoenix Street to First Lone Tree Road Crossing	First Lone Tree Road Crossing
10	First Lone Tree Road Crossing	Confluence with Sinclair Wash
11	Confluence with Sinclair Wash	Approximately. 100 yards upstream of the historic Rio de Flag
12	Approximately. 100 yards upstream of the historic Rio de Flag	unnamed road crossing below the I-40 wetland
13	Unnamed road crossing below the I-40 wetland	Herold Ranch Road
14	Herold Ranch Road	Confluence With Switzer Canyon Wash
15	Confluence With Switzer Canyon Wash	Butler Avenue
16	Butler Avenue to First Golf Course	First Golf Course
17	First Golf Course (Continental Country Club)	Downstream end of First Golf Course
18	Downstream end of First Golf Course	Beginning of Second Golf Course
19	Second Golf Course	Downstream end of Second Golf Course
20	Downstream end	Downstream end of Second Golf Course
Clay	Clay Avenue Wash Detention Basin	Milton Road

3.0 INVENTORY OF BIOLOGICAL RESOURCES

3.1 Baseline (Existing) Conditions

The year 2003 has been adopted as the baseline condition for the development of alternatives and the assessment of impacts for the Rio de Flag project. This year was selected because it represents the earliest point in time that a flood control project could begin to accrue flood damage reduction benefits. Baseline biological resources were established by inventorying existing resources in 1998 and 1999 and then forecasting 2003 conditions using defensible assumptions regarding land use, growth, and biology. Specifically, the following assumptions were used to guide the assessment of baseline biological conditions:

- Flagstaff and the surrounding areas are expected to sustain a steady growth rate of 2 to 4%.
- There would be no flood control projects or major channel modification projects implemented before 2003.
- Discharges from the water treatment plant at the I-40 wetlands would remain constant or slightly increase.
- The project area, specifically the downtown region, would continue to be void of suitable habitat for any threatened and endangered species.
- Land use adjacent to the Rio de Flag and Clay Wash would remain the same or similar.

These assumptions were then incorporated into the qualitative functional assessment outlined in Section 2.0 to yield an inventory of biological baseline from which biological impacts could be estimated. The results of the qualitative assessment are summarized in Table 3-1. Additional information on baseline environmental resources, including fish and wildlife resources can be found in Section 3.0 of the EIS.

In general, the qualitative functional assessment underscores the degree of disturbance throughout the project area. The lowest functional ratings are observed in the downtown reaches beginning at approximately Thorpe Park and extending downstream to Lone Tree Road (end of reach 10). Downstream of the confluence with Sinclair Wash functional values recover as the Rio de Flag meanders through a dedicated floodplain with a significant upland buffer eventually passing through the I-40 wetlands. Functional values remain fairly high through reach 13 (a montane meadow) before the Rio de Flag re-enters areas of more intensive development (agricultural fields, channelized sections, golf course, etc.) and the overall functional value is reduced.

3.2 Future Without-Project Condition

The Rio de Flag within the project area is a narrow corridor surrounded by residential and commercial developments. For the most part, these conditions are not expected to change significantly in the future since most development pressure in Flagstaff is occurring on the undeveloped portions of the City adjacent to the National Forest. Biologically, the Rio de Flag is not expected to change significantly in the future mainly because the system is in a highly modified, disturbed condition in the downtown area and does not have the capacity to recover naturally over time. A significant increase in the function of the system would only come about as a result of one or more large scale restoration projects. At this time, the City has no plans for any such projects and it is therefore assumed that, within the area of impact of the project, future without-project conditions will closely resemble the conditions documented at the site during the feasibility study.

Table 3-1
Qualitative Functional Assessment Results

Reach	Assessment Variable										Overall Reach Rating	Comments
	V _{na}	V _{age}	V _{tree}	V _{sap}	V _{shrub}	V _{cwd}	V _{frwd}	V _{litter}	V _{topo}	V _{contig}		
1	med	high	low	low	med	med	med	low	med	med	Medium	buffer zone w. side; steep
2	med	med	low	low	low	med	med	low	low	low	Medium	entering residential
3	high	high	high	low	med	med	med	med	high	low	High	isolated riparian corridor
4	na	na	na	na	na	na	na	na	na	na	NA	Duck Pond
5	high	high	low	low	med	high	med	med	high	low	Medium	high gradient downstream of
7	med	low	low	low	low	low	low	low	low	low	Low	grassy swale next to City Hall
8	low	med	low	low	low	high	high	low	med	low	Medium	confined btw railroad & Rte
9	low	low	low	low	low	low	med	low	low	none	Low	downtown reach
10	med	high	low	low	med	high	high	med	high	low	Medium	poor connectivity; culverts
11	high	high	med	low	med	high	med	high	high	high	High	broad floodway; low
12	na	na	na	na	na	na	na	na	na	na	NA	I-40 wetlands
13	high	low	low	low	low	low	low	low	med	high	Medium	meadow vegetation
14	med	low	low	low	low	low	high	low	low	low	Low	meadow/ag veg; highly
15	low	low	low	low	low	low	high	low	med	low	Low	meadow/ag veg; highly
16	med	med	low	low	low	med	low	low	med	low	Medium	highly disturbed managed
17	low	low	low	low	low	low	low	low	low	low	Low	Golf Course
18	med	low	low	low	low	low	low	low	med	low	Low	highly disturbed vacant parcel
19	low	low	low	low	low	low	low	low	low	low	Low	Golf Course
20	high	low	low	low	low	low	med	low	low	med	Medium	Continental Lake; meadow
Clay	low	low	low	low	low	low	low	low	low	low	Low	highly disturbed

4.0 SIGNIFICANT MITIGABLE IMPACTS

Significant project impacts were identified by estimating the net loss or gain in function of the Rio de Flag riverine system resulting from the construction and maintenance of the Rio de Flag Flood Control Project. Engineering drawings depicting the project footprint along with temporary construction easements, right-of-ways, ingress/egress points, construction duration, and maintenance requirements were used to estimate the areal extent of impacts resulting from implementation of the NED Plan. The results of the qualitative functional assessment were then used to assess the degree of impact on the system (in terms of loss of function) to assist in the development of mitigation ratios and the formulation of mitigation alternatives.

4.1 With-Project Condition (NED Plan)

The NED plan as determined during the Feasibility Study is Alternative 6b (as described in the Feasibility Report) This alternative would provide increased flood protection along the Rio de Flag's Downtown Reach and would also reduce flooding along Clay Avenue Wash. This alternative would include the Clay Avenue Wash detention basin in addition to channel modifications on Clay Avenue Wash and the Rio de Flag.

Rio de Flag Channel Modifications

Flood control features along the Rio de Flag would consist of three basic components: (1) bridge modifications upstream of Thorpe Park; (2) flood control structures and road modifications in Thorpe Park; and (3) channel modifications downstream of Thorpe Park. These features are described below.

Bridge Modifications

As discussed above, three bridges would be modified along the Rio de Flag, including the Meade Lane, Anderson Road, and Beal Road bridges. Wingwalls would be constructed upstream of the Meade Lane bridge and the existing bridge would remain in place. The Anderson and Beal road bridges, however, would be demolished and replaced. The Anderson and Beal bridge crossings would each be closed for approximately 2 to 4 weeks during construction. The bridges would not be closed simultaneously.

Thorpe Park Modifications

- *Floodwalls.* Floodwalls would be constructed along the eastern side of the Rio de Flag through Thorpe Park. The top elevation of the walls would range between 6,936 and 6,942 feet above mean sea level (msl) and the walls would not exceed 5 feet in height. The walls would be constructed approximately 3 feet west of the property lines of Flagstaff Junior High School and 14 residential properties that front on North Navajo Drive. The floodwalls would be constructed using reinforced concrete covered with basalt fieldstone (malpais basalt) as an

esthetic treatment. The stones would be placed on the outside of the walls to form a mosaic veneer, characteristic of other recent stonework in the city (including the Flagstaff public library).

- *North Thorpe Road Modification.* In order to minimize flooding of North Thorpe Road and adjacent properties, an approximately 350-foot section of the road would be rebuilt at a higher elevation. This would require the use of retaining walls up to 5 feet in height along the side of the elevated road. This retaining wall would also incorporate a mosaic veneer of basalt fieldstone. North Thorpe Road would be closed for two weeks while pavement is removed, fill added, and the road repaved. This road closure would also occur during the summer to avoid access impacts to the nearby school. The existing culvert at the Rio de Flag crossing under Thorpe Road would be replaced.
- *Embankments.* Small embankments would be constructed on either side of the Rio de Flag just downstream of the existing weir. These embankments would be designed to direct floodwaters into the channel and would not result in upstream detention. The eastern embankment would tie-in to the proposed floodwalls at an 6,939 feet msl. The western embankment would be located just south of the historic weir, which would remain in place.

Rio de Flag Channel Modifications

Channel modifications would occur along the Rio de Flag through the downtown reach from Bonito Road downstream to Butler Avenue. These modifications are described below.

- A trapezoidal channel with a soft bottom and 2:1 riprap lined slopes would be constructed from Bonito Street to approximately Dale Street. This segment of channel would be riprap-lined and would have a channel bottom width of approximately 24 feet and depth of approximately 7.9 feet. The riprap would be covered with soil, allowing the establishment of some vegetation. A 24-foot wide by 9-foot deep concrete arch would begin just upstream of Dale Avenue and continue to approximately Birch Street. The channel would transition back to an open 2:1 slope riprap channel downstream of Birch Street and continue downstream to Route 66. A recreational trail would continue along the entire downtown reach, including the covered channel segment.
- At the Route 66 crossing, two underground culverts would be constructed: (1) a 24-foot by 9-foot concrete arch for drainage conveyance, and (2) a parallel 12-foot by 8-foot arch for bicycle/pedestrian access (which would be a continuation of the Flagstaff Urban Trail System [FUTS] trail). The portion of the project south of Route 66 would entail the construction of a new channel and adjacent recreational trail. The first segment of this new channel would curve into an east/southeast heading, forming an alignment parallel to and south of the railroad tracks. This channel segment would be similar to, but slightly larger than, the riprap-lined channel described above, with a depth of approximately 8.2 feet. The riprap-lined channel and recreation trail would extend from just south of Route 66 to a point approximately 170 feet west of South Beaver Street.

- At approximately 170 feet west of South Beaver Street, the Rio de Flag channel would be joined by an underground (covered) concrete channel conveying flows from Clay Avenue Wash. Both channels would converge and transition into an arch-shaped underground concrete channel that would run parallel to the railroad tracks through downtown. The underground channel would be approximately 28 feet wide at the base and approximately 12 feet tall at its center. This section of underground channel would extend east/southeast through downtown Flagstaff for approximately 1,900 feet. The existing downtown reach south of Route 66 would no longer carry storm flows and other runoff from upstream portions of the Rio de Flag.
- At a point approximately 250 feet south/southeast of the North Elden Street/Route 66 interchange, the underground concrete channel would transition into an open greenbelt channel. The term “greenbelt” is used because this section of Rio de Flag would include several features favoring the establishment of vegetation in and along the channel, including a 56-foot wide channel bottom and shallow 4:1 (H:V) side slopes. Additionally, the channel would not be lined with riprap or concrete. This segment would extend east and south from the underground channel, joining an existing remnant section of the historic Rio de Flag channel approximately 1,700 feet upstream of Butler Avenue.
- Gabion grade control structures would be constructed approximately 150 feet and 400 feet upstream of Butler Avenue. These two structures would reduce the elevation of the channel by roughly 12.5 feet over a distance of approximately 250 feet. The channel flows would proceed under Butler Avenue through a 24-foot-wide and 8.5-foot-high concrete arch that would replace the existing culverts. Wingwalls would be constructed near the entrance of the concrete arch to direct flows into the arch. Traffic on Butler Avenue would be disrupted during construction. Construction would occur in segments, allowing at least one lane of through traffic in each direction at all times.

Clay Avenue Wash Detention Basin

Detention basins provide flood protection by temporarily storing runoff and snow melt upstream from areas that are likely to flood during periods of high flow. The detained water, which may have otherwise exceeded the capacity of downstream channels and flooded surrounding areas, is released slowly from the detention basin.

An “on-line” detention basin would be constructed along the Clay Avenue Wash to the west/southwest of downtown Flagstaff, just west of the city limits and north of Route 66. Water would pass through the detention basin unrestricted during periods of relatively low flow. During periods of higher flow, however, the influx of water into the basin would exceed the discharge capacity of the basin’s outlet structures, and the detention basin would begin to fill. Only after the rate of water entering the basin drops below the capacity of the outlet structure would basin water level begin to drop. Water would be discharged from the Clay Avenue Wash detention basin over a period of up to 60 hours, depending on the amount of rainfall and snow melt. By extending the period during which runoff and snow melt flow through the downstream channel, the amount of flow within the channel at any one time is reduced.

This, in turn, lowers the potential for flooding adjacent to the downstream Clay Avenue Wash and Rio de Flag channels.

During large flood events, the basins may reach capacity. If a detention basin reaches capacity and water continues to flow into the basin in excess of the basin's outlet structure capacity, then basin, and it ceases to provide flood protection to downstream areas.

The proposed detention basin site consists primarily of undeveloped state-owned land; however, the site also encompasses privately- owned property including a rural residence and its associated agricultural buildings. This private property would be acquired by the City of Flagstaff as part of this project, pursuant to applicable Federal and state laws.

Grading and site work would consist of two relatively small embankments tied into high ground, with the site's natural topography serving to contain detained flood flows within the basin. Each of these embankments is described below; no other flood control measures (e.g., floodwalls) or grading would be required at the site. The capacity of the Clay Avenue Wash detention basin would be approximately 295 acre-feet. When filled to capacity, water contained within the basin would cover approximately 71 acres. The basin would be sized to completely drain within 48 to 60 hours for the 100-year event, 36 hours for the 50-year event, and less than 24 hours for other more frequent events.

- *Northeast Embankment.* The embankment constructed at the northeast edge of the detention basin would contain the outlet structure and spillway. The outlet structure would consist of a single 42-inch diameter corrugated metal pipe, with a capacity of approximately 165 cfs. In addition, a smaller "bleed off" pipe or irrigation gate valve would be installed at the channel invert to eliminate long-term ponding. The spillway would be at an elevation of 7,065.6 feet above mean seal level. The top of the embankment would be approximately 17 feet above ground level.
- *Northwest Embankment.* An embankment would be constructed just south of the Burlington Northern & Santa Fe (BNSF) railroad tracks along the northern boundary of the detention basin. This embankment would be approximately 1,225 feet in length and 50 feet in width. The top of the embankment would be no more than 10 feet above ground level. The elevation of the embankment would be at 7,068 feet above mean sea level.
- *Southeast Embankment.* This embankment would be adjacent to the Hidden Hollow Mobile Home park, and it would be specifically constructed to protect the mobile home park from flooding. This embankment would not contain an outlet structure or spillway, and it would be approximately 8 feet tall at its highest point. It would extend approximately 475 feet along the northern edge and 500 feet along the western edge of the mobile home park.

Clay Avenue Wash Channel Modifications

The Clay Avenue Wash channel modifications would generally entail either (1) expanding and lining the existing channel with concrete or riprap or (2) diverting the channel underground through developed areas. The channel modifications are described below.

The Clay Avenue Wash channel modifications would start immediately north of the Chateau Royal mobile home park (also referred to as the Chateau Royal Apartments) in western Flagstaff. This segment of the channel would be modified into a trapezoidal channel with a soft bottom and 2:1 (H:V) riprap-lined side slopes. Three gabion grade control structures would be located in the first 500 feet of the riprap channel. This riprap-lined segment of the Clay Avenue Wash channel would extend east to Blackbird Roost.

The eastern section of this channel segment would traverse the “Trailers Ho” mobile home park at 703 South Blackbird Roost, and it would require the relocation of up to 13 mobile homes from this park to an offsite location. The affected tenants and landlord of the Trailers Ho mobile home park would be compensated for this action in accordance with applicable Federal and state laws.

From Blackbird Roost east to the edge of the parking lot at McCracken Place, Clay Avenue Wash would be diverted into an arch-shaped underground concrete channel. This segment of the wash currently follows a cul-de-sac and driveway which extend east from Blackbird Roost into an adjacent apartment building complex. The underground concrete channel would be approximately 24 feet wide at the base and approximately 5.5 feet tall at its center.

The covered underground channel would open up into an un-covered concrete-lined box channel at the southern edge of the McCracken Place parking lot. This segment of box channel would be approximately 18 feet wide and 8.3 feet deep. The open box concrete channel would extend east (downstream) to South Milton Road/Route 66.

- Downstream from South Milton Road/Route 66, Clay Avenue Wash would transition back to a covered, underground concrete channel. This underground channel would be similar to the one constructed east of Blackbird Roost (see above). The underground channel would generally follow the alignment of Mike’s Pike, terminating approximately 250 feet northeast of Mike’s Pike at a confluence with the Rio de Flag channel. This route would require construction within the intersection of Clay Avenue, South Milton Road/Route 66, and Mike’s Pike.

Construction Requirements

Construction of the Alternative 6b project components would require approximately 6 to 12 months. Typical equipment to be used during the construction period would include loaders, scrapers, dozers, trucks, blades, roller compactors, concrete mixers, water trucks, and backhoes. The specific construction requirements for each project component are described below.

Rio de Flag

Bridge Replacement

The Anderson Road and Beal Road bridges would be closed for approximately 2 to 4 weeks each during construction of the bridge modifications. These bridges would not be closed simultaneously, nor would construction overlap with the closure of North Thorpe Road described below. Approximately 460 cubic yards (46 truck loads) of concrete would be imported to the Anderson and Beal Road bridges and approximately 30 cubic yards (3 truck loads) would be delivered to the Meade Lane bridge during construction. The Meade Road bridge would not be closed during construction.

Thorpe Park Modifications

Construction of the floodwall and embankments and elevation of North Thorpe Road last approximately 6 months. Approximately 615 cubic yards of concrete and 615 cubic yards of stone would be imported to construct the floodwall and approximately 300 cubic yards of riprap and 500 cubic yards of fill material would be delivered for construction of the two embankments. This would generate approximately 35 truck trips per day for the first 2 months of the 6 month construction period.

North Thorpe Road would be closed for approximately 2 weeks in order to elevate the road bed. Construction staging would occur at disturbed open space areas in the park.

Rio de Flag Channel Modifications

The Rio de Flag channel modifications would require 6 to 12 months to construct and would primarily involve open trench construction. The majority of the excavation would extend downward into sandstone or basalt bedrock. The sandstone is friable and weathered and is generally rippable with heavy equipment, whereas the basalt is hard and not always rippable. (“Friable” means soil or rock crumbles easily, and “rippable” means that rock can be broken by mechanical equipment.) In areas that are not sufficiently rippable, blasting may be required (especially in some of the deeper sections near the confluence of the Clay Avenue Wash and Rio de Flag). Blasting activities would comply with all applicable construction and safety requirements, and the need for blasting would be minimized or eliminated during the project design phase.

At the Cherry, Birch, and Aspen Avenue road crossings, construction of underground culverts would necessitate road closures of approximately 5 to 7 days each. At the Route 66 crossing, the two culverts would be poured by halves to maintain through traffic (to a total closure time of 5 to 7 days per half). At the Beaver Street and San Francisco Street crossings (one-way south and one-way north, respectively), construction would require about 1 week each, and construction at these two crossings would not be undertaken concurrently. In order to minimize impacts on traffic, each road would become a 2-way road during construction of the other. Construction of the underground culvert at the

railroad crossing (approximately 700 feet west of Beaver Street) would conform to the following method of construction: (1) remove track and excavate; (2) lower in prefabricated units by crane from flatbed train car on the adjacent (un-removed) track; and (3) re-cover and replace track. It is anticipated that this work could be accomplished within 24 hours per track. One of the two tracks at this crossing would always remain open. Construction of the covered arch at Butler Avenue would be undertaken in segments in order to maintain at least one lane of through traffic in each direction at all times.

The channel modifications between Bonito Street and Butler would involve the import of approximately 8,557 cubic yards of concrete and 8,190 cubic yards of riprap. Roughly 175,041 cubic yards of soil and 86,210 cubic yards of rock would be excavated, some of which would be used for construction of the detention basin. Excess material would be delivered to disposal site(s) within six miles of the proposed channel modifications. Assuming that roughly 10 percent of the excavated material is re-used on site, the Rio de Flag channel modifications would generate approximately 20 truck trips per hour on the local roadway network (6 month “worst-case” scenario).

Clay Avenue Wash

Clay Avenue Wash Detention Basin

The Clay Avenue Wash detention basin would require approximately 6 months to complete and would be undertaken concurrently with the other project components. Approximately 14,947 cubic yards of fill material would be imported to the site for construction of the embankments. In addition, approximately 770 cubic yards of riprap and 732 cubic yards of concrete would be delivered to the site during construction.

The grading phase for the Clay Avenue Wash detention basin would last approximately 3 weeks and would generate approximately 46 round-trip truck trips per day. Construction staging would take place primarily within the basin, and, if needed, adjacent to the existing subdivision construction staging area just downstream. The use of the privately owned land adjacent to the existing subdivision downstream from the detention basin site would be contingent upon reaching an agreement with the respective subdivision owner/developer.

Clay Avenue Wash Channel Modifications

The Clay Avenue Wash channel modifications would be completed within the overall 6- to 12-month schedule described for the Rio de Flag channel modifications. Construction would result in the temporary (approximately 1 week) closures of Chateau Drive, Blackbird Roost, and Malpais Lane, respectively. Only short segments of these roads would be closed during the construction of the underground culvert. Along Mike’s Pike, trenching would occupy nearly the full width of the road.

Construction would occur in a series of segments that progress along Mike's Pike, with approximately 350 feet of trench open at any given time. The arched underground channel would be constructed by pouring concrete into a form built with the trench and backfilling the trench as soon as the concrete sets. Approximately 50 feet of concrete channel would be poured per day with a 7 day cycle of excavation, forming, pouring, curing, and backfill. The underground channel would be constructed in sections, as to maintain access during the 6-week construction process. Detours would be required and would change daily; however, access would be maintained to all businesses and residences during the construction period.

As with the Rio de Flag modifications, an open trench method of construction would be used along the majority of the Clay Avenue Wash Reach. The channel modifications would involve the import of approximately 2,700 cubic yards of concrete and 2,100 cubic yards of riprap. Roughly 50,100 cubic yards of soil and 17,200 cubic yards of rock would be excavated, some of which would be used for construction of the detention basin. Excess material would be delivered to disposal site(s) within six miles of the proposed channel modifications. Assuming that roughly 10 percent of the excavated material is re-used on site, the Clay Avenue Wash channel modifications would generate approximately 6 truck trips per hour on the local roadway network (based on a 6 month construction period, a longer construction period would reduce the number of daily trips).

As with the Rio de Flag channel modifications, blasting may be required in some areas where basalt is encountered. Steps will be taken to minimize or eliminate the need for blasting during the project design phase.

Operational Requirements

Alternative 6b would require inspection, maintenance, and repair of the flood control structures. The scope of these activities would include the modified sections of the Rio de Flag and Clay Avenue Wash channels, the Thorpe Park floodwalls and embankments, and the Clay Avenue Wash detention basin. The City of Flagstaff would need to implement a long-term public information program regarding the hazards associated with drainages, especially the previously described covered concrete channels.

The Clay Avenue Wash detention basin would be designed and constructed to operate with minimal operational requirements. Based on its design, the basin would detain peak flows and then discharge them over a period of up to 60 hours without human intervention (e.g., opening or closing valves and spillway gates). Periodic inspection, maintenance, and repair would be conducted by the City of Flagstaff. The level of effort required to inspect, maintain, and repair the detention basin would not be extensive and would include tasks such as ensuring that the embankments do not erode following storms and removing debris and sediment buildup in the outlet structure. The traffic generated by these activities would be minimal, averaging a few trips per month.

4.2 Summary of Project Impacts

Significant mitigable impacts to biological resources were identified by applying the significance criteria presented in Section 4.3 of the EIS to project impacts. The area of impact has been quantified using aerial photographs, overlays of the project footprint, and ground verification. In the case of impacts to wetlands, formal delineations were not performed as part of the impact analysis although the aerial extent of the impacted wetland was determined based upon existing vegetation and site hydrology. Soils were not assumed to be a reliable indicator of a wetland in most of the areas impacted by the project (downtown section of the Rio de Flag and Clay Avenue Wash) because of the high degree of channel modification and realignment during the development of downtown Flagstaff. The area of impact for each project feature has been conservatively estimated and is believed to be a reliable assessment of impacts for the purpose of mitigation planning.

Rio de Flag Channel Modifications

Under the NED Plan, modifications to the Rio de Flag would begin at upstream of Thorpe Park and would continue downstream until the channel reached Butler Avenue. This includes the re-establishment of the historic channel from approximately Beaver Street to Butler Avenue. Although the Rio de Flag is in an urbanized area and has very limited function throughout most of the downtown reaches, there are three areas of significant mitigable impacts to biological resources.

- Construction of the floodwall along the Rio de Flag from downstream of Beale Street to Thorpe Road and the elevation of Thorpe Road would result in a significant but temporary impact to approximately 0.3 acre mixed riparian vegetation.
- Construction of the open trapezoidal channel between Bonito Street and Dale Street would result in a significant but temporary impact to 0.6 acre of mixed riparian and wetland vegetation.
- The construction of a covered concrete arch channel from Dale Street to Birch Street would result in the permanent loss of 0.40 acre of wetland habitat. The habitat in this reach (Reach 6) was evaluated as low and is characterized as highly disturbed riparian vegetation dominated by exotic and ornamental species.
- The realignment of the Rio de Flag from the Route 66 crossing of the Rio de Flag downstream to Beaver Street. In this section, the existing channel will be abandoned and the channel re-aligned to receive flows from Clay Avenue Wash (via the culvert underneath Mike's Pike) and re-establish the hydrologic connection with the historic Rio de Flag channel. The abandoned section is approximately 590 feet long and 25 feet wide totaling 0.3 acre. It is contained entirely within Reach 8 and is classified as providing medium functional value.

Additional consideration also was given to the realignment of the channel and the direct impact on the higher value riparian systems downstream of the diversion; in particular Reaches 10 and 11. It was determined through field observations and additional review of stream gage data that, despite the

change in hydrology under the NED Plan, there would not be a significant impact on the riparian systems of these reaches for two reasons. First, flows from local drainage and Sinclair Wash would continue to provide periodic flushing flows to the system during storm events. Second, vegetation in this section of the Rio de Flag has become adapted to low or no flow conditions prevalent during the dry season and should not be affected by the diversion of flows upstream.

Impacts from the Rio de Flag Channel Modifications are summarized in Table 4-1.

Table 4-1
Rio de Flag Channel Modifications Mitigable Impacts

Project Feature	Functional Reach	Impacted Area (acres)	Vegetation Type	Qualitative Assessment Rating
Thorpe Park Floodwall	3	0.3	Mixed Riparian	Medium/high
Bonito Street to Dale Street Channel Enlargement	6	0.6	Mixed Riparian and wetland	Medium
Covered Arch Culvert	6	0.4	Disturbed Riparian	low
Route 66 to Beaver Street Re-alignment	8	0.3	Mixed Riparian	medium

Clay Avenue Wash Detention Basin

The features proposed for the Clay Avenue Wash Detention Basin will not result in any significant impacts to biological resources in the project area. Although a formal wetland delineation was not performed as part of the study, the impacted areas do not exhibit characteristics of “waters of the United States” pursuant to Section 404 of the Clean Water Act using the three parameter evaluation of soils, hydrology, and vegetation (Corps, 1987). As such, impacts were not considered significant and there is no mitigation proposed for the Clay Avenue Wash Detention Basin.

Clay Avenue Wash Channel Modifications

Channel modifications to Clay Avenue Wash would extend from north of the Chateau Royal Trailer Park downstream to Milton Road. Impacts from the modifications proposed for the portion extending from the Chateau Royal Trailer Park to Blackbird Roost Road were not considered significant and would not require mitigation since the wash through this section is highly degraded and, in some places, has no defined channel. This modification will most likely result in a net benefit to the system through the establishment of a vegetated channel and the removal of debris and structures that currently reduce the functionality of the system.

Modifications completed between Blackbird Roost and Milton Road would result in the loss of 0.40 acre of highly disturbed riparian habitat. Approximately 0.1 acre (230 feet in length by 15 feet wide) would be permanently lost during the construction of the underground arched culvert from Blackbird

Roost to the western edge of the McCracken Place parking lot. An additional 0.30 (860 feet in length and 15 feet wide) acre would be lost to the construction of an open concrete boxed culvert from the western edge of McCracken Place to Milton Road. Both of these sections are considered to have low functional value and are characterized as highly disturbed riparian corridors dominated by ruderal grasses and herbs. Impacts from the Clay Avenue Wash Channel Modifications are summarized in Table 4-2.

Table 4-2
Clay Avenue Wash Channel Modifications Mitigable Impacts

Project Feature	Functional Reach	Impacted Area (acres)	Vegetation Type	Qualitative Assessment Rating
Underground Arched Culvert	Clay Wash	0.10	Disturbed Riparian	low
Open Concrete Channel	Clay Wash	0.30	Disturbed Riparian	low

5.0 MITIGATION FORMULATION PROCESS

5.1 Mitigation Planning Objectives

Based on coordination with Federal, State, and local resource agencies, along with input from the general public during the scoping process, biological resources occurring in the project area have been deemed to have both public and technical significance. Public significance is afforded certain resources when it is clear that the public has strong concern for that resource as reflected in the public scoping process or during public review of the Draft EIS. Private citizens and local planning/community groups have expressed an interest in preserving the natural features of the Rio de Flag. To the extent practicable, this entails the avoidance of concrete and the preservation of native vegetation and landscapes along the creek, including the aesthetic qualities associated with a natural greenbelt channel through the City of Flagstaff. Also of public concern is the integration of recreation opportunities along or adjacent to the channel with the recognition of the need to sustain the integrity of the existing businesses, industries and associated infrastructure. Appendix C of the EIS discusses the conceptual recreation plan associated with this project.

Technical significance is derived from published literature and the professional judgement of experts in the biological sciences field. Both riparian and wetland habitats have sharply declined throughout the arid southwest, making these habitats rare and regionally sensitive. Despite their relatively small expanse, riparian systems provide vital habitat for requisite life cycles for an inordinate number of wildlife species (Briggs 1996). Although no endangered or threatened species are known to inhabit the Rio de Flag Project area, its native plant communities, primarily wetlands and riparian vegetation, have been afforded local and regional scientific significance.

For these reasons, both public and technical significance was placed on the degradation, disturbance to or removal of riparian and wetland habitats. Accordingly, habitat losses associated with the NED Plan were evaluated for significance and mitigation options established to compensate for unavoidable significant adverse impacts.

The mitigation planning objective for the Rio de Flag Feasibility Study is to compensate for the loss of wetland function resulting from construction and maintenance of the NED Plan (as estimated using the qualitative functional assessment). These objectives were used to guide the formulation of mitigation alternatives. The unit of measurement selected to describe the losses being addressed in each mitigation alternative is acres of wetland habitat. The functional assessment was used as a tool in defining the features and components of each mitigation alternative to ensure that lost wetland functions are compensated for at an appropriate functional level.

5.2 Mitigation Requirements

Mitigation requirements were established by assessing the significant impacts of the NED plan (Section 4.0) relative to the benefits the project may accrue through habitat restoration, preservation, or enhancement. Features of the NED Plan that will, over the life of the project, improve the functional value of the Rio de Flag riverine system include the acquisition of lands at Clay Avenue Wash detention basin and the re-establishment of seasonal flows to the historic Rio de Flag Channel. While the acquisition of lands for the detention basin on Clay Wash will serve as a net benefit to wildlife in the project area, the lands are not considered wetlands and do not satisfy the requirements of the Clean Water Act which stipulates a policy of no net loss of wetlands. As such, this land acquisition is not considered an acceptable form of mitigation for the significant impacts resulting from the NED Plan. The hydrologic “restoration” of the historic Rio de Flag channel potentially increases the extent of riverine wetlands in the project area by re-establishing a portion of the historic channel. However, in the absence of any targeted re-vegetation and/or restoration the functional value of this area was questioned by representatives of the resource agencies and was not viewed as an acceptable offset for project impacts in upstream areas. The Corps concurred with this conclusion and agreed to consider the area as a potential mitigation site.

Since the estimated benefits of from implementation of the NED Plan do not adequately offset the significant impacts identified in Section 4.0, mitigation is required. A total of 2.0 acres would need be to be mitigated for including 1.2 acres of temporary impacts to medium and high value riparian habitats and 0.8 acre of permanent impacts to low value habitats. Significant impacts requiring mitigation are presented in Table 5-1.

Table 5-1
Significant Impacts Requiring Mitigation for the NED Plan

Project Feature	Area of Impact (acres)	Qualitative Assessment Rating	Type of Impact
<i>Rio de Flag Modifications</i>			
Thorpe Park Floodwall	0.3	medium/high	Temporary
Covered Arch	0.4	low	Permanent
Open Trapezoidal Channel	0.6	medium	Temporary
Route 66 to Beaver Street Re-alignment	0.3	medium	Temporary
<i>Clay Wash Modifications</i>			
Underground Arched Culvert	0.10	low	Permanent
Open Concrete Channel	0.30	low	Permanent

5.3 Justification of Mitigation

5.3.1 Temporary Impacts

Temporary impacts are expected to be short-term and not prohibitive to the long-term function of the system. As such, mitigation is required to offset the temporal impacts resulting from disturbances to these areas that may have an effect on the function of the wetland with respect to its biogeochemical, hydrological, and habitat functions. Typically, temporal impacts are difficult to mitigate for because of the nature and duration of most construction projects. Ideally, the goal of temporal mitigation is to offset the anticipated impacts from construction prior to the onset of construction, thereby reducing the impact to the system. Then, subsequent to construction, the impacted area(s) are restored to their previous condition.

The three areas temporarily impacted by construction represent some of the higher value segments of the Rio de Flag identified during the 1998 field surveys. In particular, the riparian corridor between Thorpe Road and Frances Short Pond is one of the most structurally diverse and highest functioning segments outside of the reference site at the Museum of Northern Arizona. To compensate for the temporal impacts to these higher value systems, each will be restored subsequent to construction to reduce the recovery period. In addition, one-half acre of similar habitat will be restored outside of the area of impact prior to construction to offset the temporal aspect of the impact. Mitigation for temporal impacts is summarized below:

Thorpe Park Floodwall. The 0.3 acre of impacted mixed riparian would require the replacement of 0.3 acre onsite after construction and 0.15 acre of restoration prior to construction to offset temporal impacts.

Open Trapezoidal Channel. The 0.6 acre of impacted wetlands and mixed riparian would require the replacement of 0.6 acre onsite after construction and 0.3 acre of restoration prior to construction to offset temporal impacts.

Route 66 to Beaver Street Re-alignment. The 0.3 acre of impacted wetlands and mixed riparian would require the replacement of 0.3 acre onsite after construction and 0.15 acre of restoration prior to construction to offset temporal impacts.

5.3.2 Permanent Impacts

Permanent impacts result in a long-term loss to the system in the absence of compensatory mitigation. For those impacts determined to be significant, mitigation measures are developed to offset the impact. The development of mitigation measures for the Rio de Flag project used the results of the functional assessment and the predicted future with- and without-project conditions as a basis for determining an appropriate amount of mitigation for the wetland impacted. The areas with significant impacts requiring compensatory mitigation are described below:

Covered Arch Section from Dale to Birch Street. The covered arch section will permanently impact 0.4 acre of mixed riparian habitat. As evaluated in the functional assessment, this habitat is of low value and is in a highly disturbed condition. The lack of native riparian vegetation, encroachment of adjacent developments, and modified channel geometry severely limit the potential of this segment to function at a high level both currently and in the future. As such compensatory mitigation would consist of replacement of the lost area plus one additional half acre of replacement for each acre impacted to account for temporal losses. The total mitigation required is 0.6 acre.

Underground Arched Culvert and Open Concrete Channel on Clay Wash. Channel modifications on Clay wash will result in the permanent loss of 0.4 acre of wetland and riparian habitat (0.1 acre for the underground arch culvert and 0.3 acre for the open concrete channel). Both of these areas are highly disturbed and were rated low value during the functional assessment. The current and future value of these areas are very limited by the high degree of disturbance and the almost complete absence of native wetland vegetation. Similar to the low value areas impacted on the Rio de Flag, compensatory mitigation would consist of replacement of the lost area plus one additional half acre of replacement for each acre impacted to account for temporal losses. The total mitigation required is 0.6 acre.

5.4 Mitigation Alternatives

Mitigation alternatives were developed to compensate for losses attributable to the implementation of the NED Plan. Temporal and permanent losses are addressed separately to take advantage of

opportunities to compensate for temporal losses at the impact location. Full consideration was given to utilization of both public and private lands during the formulation process.

5.4.1 Mitigation for Temporal Losses

Temporal losses were identified along the Rio de Flag at three locations (total of 1.2 acres). At each location, implementation of the NED Plan will result in the temporary loss of riparian wetland habitat during construction activities. Mitigation at these sites will consist of restoring the impacted area to a condition that is at least equal in function to the pre-construction condition. The mitigation plan for each site will utilize a rigorous planting palette, with plants of multiple age classes, to facilitate the development of structural diversity from the onset of the mitigation project. The planting design will utilize the same native species that exist in the project area. A species palette is currently being developed by the Arboretum at Flagstaff for each area impacted by the project. Revegetation would involve the use of pole cuttings, containerized plant material, and native seed mix as described below.

Pole Cuttings To the maximum extent practicable, pole will be harvested from the project area and planted within the designated side slope areas. Pole cuttings shall be collected during the winter dormant season and properly stored and handled prior to installation. The pole cuttings will be planted 15 feet on center and within 3 to 10 feet of existing groundwater. The detailed planting design and mosaic will be prepared during the Planning, Engineering and Design (PED) phase of this project and will include the list of plant species developed by the Flagstaff Arboretum.

Hydroseeding A herbaceous seedmix shall be applied to the interstitial areas of the restoration site (i.e., in between pole cuttings and containerized plants). The seedmix will be from a local source and conform to industry standards. Application of the seedmix will occur during the Fall and/or Winter months to promote seed establishment and germination.

Containerized Plantings As part of the revegetation program, nursery grown containerized native plants (1- and 5-gallon) will be installed 8-foot on center. The detailed planting design and mosaic will be prepared during PED, and is dependent on further groundwater and soil agricultural suitability testing. To limit plant stress and encourage successful plant establishment, planting will occur during the dormant season, preferably November through February. Table 5-2 displays a sample of species and quantities of containerized plants and pole cuttings per acre typically used on Corps' projects in Southern California. This list is for cost estimating purposes only and will be revised upon receipt of the recommended list of plant species.

Irrigation A temporary irrigation system will be installed at the detention basin mitigation site to provide supplemental watering to reduce the chance of plant stress and to encourage downward growth of the roots. Irrigation will be applied and maintained for a minimum of two years from the date of plant installation being complete. A detailed irrigation plan would be designed during PED, including identification of potential water sources.

Estimated Costs An average cost for implementation of this mitigation measure was developed based on the assumptions that no additional real estate or water rights or would be required. Costs were broken down into initial (i.e., first year) revegetation costs and subsequent O&M costs required for five (5) years of biological monitoring and site maintenance. An average annual cost of \$5,000 was applied to the biological maintenance and monitoring activities, which would include weed control, plant replacement (if necessary), monitoring of established success criteria, preparation of monitoring reports, and coordination. Table 5-2 displays the breakdown of costs associated with the initial planting, irrigation during plant establishment, and long term biological monitoring and maintenance activities.

Table 5-2
Estimated Costs for Temporal Mitigation

Item	Quantity	Cost per acre
Cuttings		
Cottonwood	97 per acre	\$2,910
Goodding's willow	97 per acre	\$2,910
		Subtotal: \$5,280
Containers		
Goodding's willow	85 per acre	\$3,400
Red willow	85 per acre	\$3,400
Arroyo willow	85 per acre	\$3,400
Cottonwood	85 per acre	\$3,400
		Subtotal: \$13,600
Hydroseed Mix		
Herbaceous mix	Lbs. per acre	\$2,000
		Subtotal: \$2,000
Temporary Irrigation		
Above-ground drip system (2 years)	Lump sum per acre	\$10,000
		Subtotal: \$10,000
Site Grading/Contouring		
Excavation of 5,000 cy	Lump sum per acre	\$10,000
		Subtotal: \$10,000
Monitoring and Maintenance (Plant Establishment Period Only)		
Fertilizers, Weeding, Irrigation	Lump Sum	\$1,000
		Subtotal: \$1,000
Total First and Second Year Cost: \$42,420		
Long Term Monitoring Costs		
Annual Biological Monitoring and Maintenance	per year	\$5,000
Total Mitigation Cost: \$101,360 Required temporal mitigation: 1.8 acre Estimated cost per acre (first and second year) \$42,420 Estimated cost for required mitigation (excluding biological monitoring): \$76,360 Estimated cost for biological monitoring: \$25,000 Total cost for temporal mitigation: \$101,360		

5.4.2 Permanent Loss Mitigation

Permanent losses of wetland habitat were identified at three locations in the project area. As displayed in Table 5-1 these areas include: 1) Rio de Flag channel modifications; 2) Clay Avenue Wash underground culvert at McCracken Place; and 3) Clay Avenue Wash open concrete channel from McCracken Place to Milton. In sum, the loss of wetlands from these areas totals 0.80 acre with a mitigation requirement of 1.2 acres. The following alternatives were developed to meet this mitigation requirement.

Mitigation Measure A: I-40 Wetlands

This mitigation measure seeks to compensate losses through restoration and creation of wetland habitat at the I-40 wetlands along the Rio de Flag downstream of Butler Avenue. The mitigation site would be located either upstream of the current emergent marsh area or in the vacant field between the two I-40 overpasses. Special emphasis would be placed on the establishment and recruitment of riparian woodland species including willow (*Salix spp.*) and cottonwood (*Populus fremontii*). Additional information is provided in the following sections:

Site Recontouring/Grading: Site grading would be performed to create hydrologic conditions suitable for the establishment of riparian vegetation. Currently, the I-40 wetlands has poor water circulation which results in stagnant ponded areas upstream of the water treatment plant outfall. Recontouring of the site to favor a more dynamic flow through system would favor the establishment of riparian species.

Pole Cuttings To the maximum extent practicable, pole will be harvested from the project area and planted within the designated side slope areas. Pole cuttings shall be collected during the winter dormant season and properly stored and handled prior to installation. The pole cuttings will be planted 15 feet on center and within 3 to 10 feet of existing groundwater. The detailed planting design and mosaic will be prepared during the Planning, Engineering and Design (PED) phase of this project.

Hydroseeding A herbaceous seedmix shall be applied to the interstitial areas of the restoration site (i.e., in between pole cuttings and containerized plants). The seedmix will be from a local source and conform to industry standards. Application of the seedmix will occur during the Fall and/or Winter months to promote seed establishment and germination.

Containerized Plantings As part of the revegetation program, nursery grown containerized native plants (1- and 5-gallon) will be installed 8-foot on centers. The detailed planting design and mosaic will be prepared during PED, and is dependent on further groundwater and soil agricultural suitability testing. To limit plant stress and encourage successful plant establishment, planting will occur during the dormant season, preferably November through February.

Irrigation A temporary irrigation system will be installed at the detention basin mitigation site to provide supplemental watering to reduce the chance of plant stress and to encourage downward growth of the roots. Irrigation will be applied and maintained for a minimum of two years from the date of plant

installation being complete. A detailed irrigation plan would be designed during PED, including identification of potential water sources.

Estimated Costs An average cost for implementation of this mitigation measure was developed based on the assumptions that additional real estate or water rights or would be required. Costs were broken down into initial (i.e., first year) revegetation costs and subsequent O&M costs required for five (5) years of biological monitoring and site maintenance. An average annual cost of \$5,000 was applied to the biological maintenance and monitoring activities, which would include weed control, plant replacement (if necessary), monitoring of established success criteria, preparation of monitoring reports, and coordination. Table 5-3 displays the breakdown of first year costs associated with the initial planting, irrigation during plant establishment, and maintenance activities. The estimated total cost for Mitigation Alternative A is \$87,900.

Table 5-3
Estimated Costs for Mitigation Alternative A

Item	Quantity	Cost per acre
Cuttings		
Cottonwood	97 per acre	\$2,910
Goodding's willow	97 per acre	\$2,910
Subtotal: \$5,280		
Containers		
Goodding's willow	85 per acre	\$3,400
Red willow	85 per acre	\$3,400
Arroyo willow	85 per acre	\$3,400
Cottonwood	85 per acre	\$3,400
Subtotal: \$13,600		
Hydroseed Mix		
Herbaceous mix	Lbs. per acre	\$2,000
Subtotal: \$2,000		
Temporary Irrigation		
Above-ground drip system (2 years)	Lump sum per acre	\$10,000
Subtotal: \$10,000		
Site Grading/Contouring		
Excavation, hauling, grading, dewatering	Lump sum per acre	\$20,000
Subtotal: \$20,000		
Monitoring and Maintenance (Plant Establishment Period Only)		
Fertilizers, Weeding, Irrigation	Lump Sum	\$1,000
Subtotal: \$1,000		
Total First and Second Year Cost: \$52,420		
Long Term Monitoring Costs		
Annual Biological Monitoring and Maintenance	per year	\$5,000
Total Mitigation Cost: \$87,900		
Required temporal mitigation: 1.20 acre		
Estimated cost per acre (first and second year) \$52,420		
Estimated cost for required mitigation (excluding biological monitoring): \$62,900		
Estimated cost for biological monitoring: \$25,000		
Total cost for mitigation: \$87,900		

Mitigation Measure B: Historic Rio de Flag Channel

This mitigation measure compensates for the loss in wetland habitat through creation of riparian habitat in the historic Rio de Flag channel. Following implementation of the NED Plan, a hydrologic link between the upper Rio de Flag watershed and the historic channel alignment will be reestablished creating an opportunity to restore habitat in the previously abandoned channel. The mitigation site will be located downstream of the terminus of the underground arched culvert just downstream of South Elden Street. The current design in this reach calls for a natural channel with an invert width of 56 feet and 4:1 side slopes. Riparian restoration in this channel would consist of creation of a low flow meandering channel with high diversity micro topographic features and reestablishment of native riparian species across the 56 foot invert for a distance of 1,000 feet. Revegetation would involve the use of pole plantings, containerized plant material, and native seedmix, as described below. Soil amendments will be added if analysis indicates the substrate is not suitable for riparian species establishment. Additional components of the mitigation project are discussed in the following paragraphs.

Site Recontouring/Grading: Site grading would be performed to create a meandering low flow channel. Additional site work would be performed to “roughen” the invert which increases micro- and macro topographic diversity and more closely mimics a natural stream corridor.

Pole Cuttings To the maximum extent practicable, pole cuttings will be harvested from the project area and planted within the mitigation area. Additional investigations conducted during the Planning, Engineering and Design (PED) phase of the project will determine what species are best suited for the site.

Hydroseeding A herbaceous seedmix shall be applied to the interstitial areas of the restoration site (i.e., in between pole cuttings and containerized plants). The seedmix will be from a local source and conform to industry standards. Application of the seedmix will occur during the Fall and/or Winter months to promote seed establishment and germination.

Containerized Plantings As part of the revegetation program, nursery grown containerized native plants (1- and 5-gallon) will be installed 8-foot on centers. The detailed planting design and mosaic will be prepared during PED, and is dependent on further groundwater and soil agricultural suitability testing. To limit plant stress and encourage successful plant establishment, planting will occur during the dormant season, preferably November through February.

Irrigation A temporary irrigation system will be installed at the detention basin mitigation site to provide supplemental watering to reduce the chance of plant stress and to encourage downward growth of the roots. Irrigation will be applied and maintained for a minimum of two years from the date of plant installation being complete. A detailed irrigation plan would be designed during PED, including identification of potential water sources.

Estimated Costs An average cost for implementation of this mitigation measure was developed based on the assumptions that additional real estate or water rights or would be required. Costs were broken

down into initial (i.e., first year) revegetation costs and subsequent O&M costs required for five (5) years of biological monitoring and site maintenance. An average annual cost of \$5,000 was applied to the biological maintenance and monitoring activities, which would include weed control, plant replacement (if necessary), monitoring of established success criteria, preparation of monitoring reports, and coordination. Table 5-4 displays the breakdown of first year costs associated with the initial planting, irrigation during plant establishment, and maintenance activities. The estimated total cost for Mitigation Alternative B is \$75,900.

5.5 Incremental Analysis of Mitigation Alternatives

Corps of Engineers' regulations require that all recommended mitigation measures be incrementally justified. The purpose of incremental cost analysis is to discover and display variation in costs, and to identify and describe the least cost plan. This involves an examination of the cost efficiency of each mitigation alternative presented in terms of environmental benefits gained per dollar expended. The goal of the process is to select the option or combination of options that best meets the mitigation goals for the lowest overall cost.

Policy also requires that the Corps seek to minimize acquisition of private land and maximize mitigation opportunities on project lands first and adjacent or nearby public lands second in order to optimize the cost effectiveness of mitigation. For the Rio de Flag project, there is ample area for mitigation within the project boundaries should it be determined that compensatory mitigation is required.

Incremental analysis of mitigation alternatives requires that resource losses expected from the implementation and maintenance of the project and resource gains expected from the mitigation measures be specified in quantitative terms by resource category. For this study, a Functional Assessment was used to characterize biological resource values for the habitat within the study area and aid in the development of mitigation ratios. Specific losses to wetland habitat were addressed using acres of habitat as the standard unit of measurement. Mitigation for temporal losses was developed independent of mitigation for permanent losses since there was sufficient opportunity to mitigation on-site following construction activities. Mitigation alternatives are summarized in Table 5-5.

Based on the analysis, mitigation Alternative B is incrementally justified as maximizing the environmental outputs for the least cost. Selection of the least cost mitigation alternative for permanent losses combined with the mitigation proposed for temporal losses results in a total estimated mitigation cost for the project of \$177,260.

Table 5-4
Estimated Costs for Mitigation Alternative B

Item	Quantity	Cost per acre
Cuttings		
Cottonwood	97 per acre	\$2,910
Goodding's willow	97 per acre	\$2,910
Subtotal: \$5,280		
Containers		
Goodding's willow	85 per acre	\$3,400
Red willow	85 per acre	\$3,400
Arroyo willow	85 per acre	\$3,400
Cottonwood	85 per acre	\$3,400
Subtotal: \$13,600		
Hydroseed Mix		
Herbaceous mix	Lbs. per acre	\$2,000
Subtotal: \$2,000		
Temporary Irrigation		
Above-ground drip system (2 years)	Lump sum per acre	\$10,000
Subtotal: \$10,000		
Site Grading/Contouring		
Excavation of meandering channel	Lump sum per acre	\$10,000
Subtotal: \$10,000		
Monitoring and Maintenance (Plant Establishment Period Only)		
Fertilizers, Weeding, Irrigation	Lump Sum	\$1,000
Subtotal: \$1,000		
Total First and Second Year Cost: \$42,420		
Long Term Monitoring Costs		
Annual Biological Monitoring and Maintenance	per year	\$5,000
Total Mitigation Cost: \$75,900 Required temporal mitigation: 1.20 acre Estimated cost per acre (first and second year) \$42,420 Estimated cost for required mitigation (excluding biological monitoring): \$50,900 Estimated cost for biological monitoring (5 years): \$25,000 Total cost for mitigation: \$75,900		

Table 5-5
Cost Efficiency of Mitigation Alternatives

Mitigation Alternative	Habitat Provided	Acres Provided	Total	Cost per Acre
<i>Mitigation for Temporal Losses</i>				
On-site	Riparian	1.8	\$101,360	\$56,300
<i>Mitigation for Permanent Losses</i>				
Alternative A	Riparian/Emergent Marsh	1.2	\$87,900	\$73,250
Alternative B	Riparian	1.2	\$75,900	\$63,250

Attachment 1

Qualitative Functional Assessment Measurement Conditions

Rio de Flag Feasibility Study
Qualitative Functional Assessment Measurement Conditions

Assessment Variable	Measurement or Condition	Index
V_{pa}: Floodprone Area The area defined by the projection of a horizontal plane at a level twice the bankful thalweg depth.	Floodprone area not modified by cultural processes (artificial levees, rip rap, concrete etc.).	high
	Floodprone area is confined within artificial levees on one or both sides and floodprone area is greater than two times the bankful width.	medium
	Floodprone area is confined within artificial levees on both sides and floodprone area is less than two times the bankful width.	low
	Floodprone area is entirely within a concrete or rip rap channel.	none

Assessment Variable	Measurement or Condition	Index
V_{age}: Stand Age Stand age distribution for trees, small trees, saplings, and seedlings.	Assessment area supports trees (including small trees), saplings, and/or seedlings.	high
	Assessment area supports trees (including small trees) but there are no saplings or seedlings present.	medium
	Assessment area supports no trees (including small trees) but does support saplings and/or seedlings.	low
	Assessment area does not support trees (including small trees), saplings, and/or seedlings. Variable is not recoverable and sustainable through natural processes	none

Assessment Variable	Measurement or Condition	Index
V_{sap}: Saplings Abundance of small trees (>5 inches dbh and <20 feet height), saplings (single stem woody <5 inches dbh and >3 feet height) and seedlings (single stem woody species < 5 inches dbh and < 3 feet height)	50 - 75% cover	high
	25 - 49% cover or >75% cover	medium
	0 - 24% cover; AND if less than 10% variable is recoverable and sustainable through natural processes	low
	< 10 % cover; variable is not recoverable and sustainable through natural processes	none

Assessment Variable	Measurement or Condition	Index
V_{tree}: Trees Abundance of trees >5 inches dbh and > 20 feet high	50 - 60% cover	high
	20 - 49% cover or >60% cover	medium
	0 - 24% cover; AND, if less than 5%, variable is recoverable and sustainable through natural processes	low
	< 10 % cover; < 10 % cover; variable is not recoverable and sustainable through natural processes	none

Assessment Variable	Measurement or Condition	Index
V_{shrub}: Shrubs Abundance of shrubs (multiple stem, woody species)	15 - 25% cover	high
	10 - 14% AND >25% cover	medium
	0 - 5% cover. Variable is recoverable and sustainable through natural processes.	low
	< 5% cover. Variable is not recoverable and sustainable through natural processes.	none

Assessment Variable	Measurement or Condition	Index
V_{cwd}: Coarse Woody Debris Abundance of dead and down coarse woody debris larger than or equal to 0.2 feet in diameter	Coarse wood cover between 5 - 7%	high
	Coarse wood cover between 2 - 4%..	medium
	Coarse wood cover between 0 - 1%. Variable is recoverable and sustainable through natural processes.	low
	Coarse wood cover between 0 - 1%. Variable is not recoverable and sustainable through natural processes.	none

Assessment Variable	Measurement or Condition	Index
V_{fwd}: Fine Woody Debris Abundance of dead and down woody debris smaller than 0.2 feet in diameter	Fine wood cover between 5 - 10%	high
	Fine wood cover between 2 - 4% or >10%	medium
	Fine wood cover between 0 - 1%. Variable is recoverable and sustainable through natural processes.	low
	Fine wood cover between 0 - 1%. Variable is not recoverable and sustainable through natural processes.	none

Assessment Variable	Measurement or Condition	Index
V_{litter}: Litter Abundance of leaf litter and other detrital matter.	Litter cover between 50 - 90%	high
	Litter cover between 20 - 49% and > 90%	medium
	Litter cover between 0 - 19% ; if <5%. Variable is recoverable and sustainable through natural processes.	low
	Litter cover between 0 and 5%. Variable is not recoverable and sustainable through natural processes.	none

Assessment Variable	Measurement or Condition	Index
V_{topo}: Macro/Micro Topographic Complexity Macro and microtopographic relief. Macrotopography generally refers to large-scale features such as secondary channels and in channel ponds. Microtopography generally refers to small scale features such as pit and mound patterns	Floodprone area is characterized by the presence of macro- and microtopographic relief (e.g., secondary channels, pits, ponds, hummocks, and depositional bars)	high
	Floodprone area is characterized by the presence of macro- and microtopographic relief. but the predominant condition is relatively homogeneous surfaces that lack macro- and microtopographic relief..	medium
	Floodprone area is characterized by relatively homogeneous surfaces that lack macro- and microtopographic relief.	low
	Floodprone area is characterized by a steep bank. Variable is not recoverable and sustainable through natural processes	none

Assessment Variable	Measurement or Condition	Index
V_{contig}: Contiguous Vegetation Cover Contiguous cover and corridors between waters/wetlands and uplands, channels, and upstream-downstream areas.	Assessment area is connected to adjacent areas and to up and downgradient reaches through plant communities dominated by native species along > 75% of its boundary. Plant communities must extend at least 100 feet beyond the assessment area boundary.	high
	Assessment area is connected to adjacent areas and to up and downgradient reaches through plant communities dominated by native species along 25 - 75% of its boundary. Plant communities must extend at least 100 feet beyond the assessment area boundary.	medium
	Assessment area is connected to adjacent areas and to up and downgradient reaches through plant communities dominated by native species along 0 - 25% of its boundary. Plant communities must extend at least 100 feet beyond the assessment area boundary.	low
	Assessment area is connected to adjacent areas and to up and downgradient reaches through plant communities dominated by native species along 0% of its boundary. Variable is not recoverable and sustainable through natural processes	none

APPENDIX F
404(b)(1) ANALYSIS

SECTION 404(b)(1) EVALUATION

RIO DE FLAG FLOOD CONTROL PROJECT
COCONINO COUNTY
FLAGSTAFF, ARIZONA

AUGUST 2000

EVALUATION OF THE EFFECTS
OF THE DISCHARGE OF DREDGED OR FILL MATERIAL
INTO WATERS OF THE UNITED STATES

INTRODUCTION. The following evaluation is provided in accordance with Section 404 (b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92 -500) as amended by the Clean Water Act of 1977 (Public Law 95 -217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into waters of the United States. As such, it is not meant to stand alone and relies heavily upon information provided in the environmental document to which it is attached. This evaluation demonstrates that the recommended plan – Alternative 6b – is in compliance with the Clean Water Act. See pages 2-20 to 2-22 in the Environmental Impact Statement (EIS).

I. PROJECT DESCRIPTION.

A. Location: The study area is on a 12-mile section of the Rio de Flag within the City of Flagstaff, Coconino County, Arizona. A portion of Clay Avenue Wash is included. See Figures 1-1 and 1-2 in the EIS.

B. General Description: The project consists of using a detention basin, floodwalls, building removal, channel widening, channel relocation, bridge modifications, and covered culvert.

C. Authority and Purpose: The project authority is House Resolution 2425, dated May 17, 1994. The purpose is to provide improved flood protection, reduce transportation related damages, and provide greenbelt/parkway in portions of the floodplain for the City of Flagstaff.

D. General Description of Dredged or Fill Material:

(1) General Characteristics of Material. Dredged material that would be redistributed onsite would consist of soils excavated from the stream channel and streambanks. The soil materials would be used as compacted fill or as a component of soil cement. These soils consist of mixed alluvium originating from sedimentary rocks and unconsolidated alluvium derived from granitic rocks.

(2) As much as 333,000 cubic yards of soil and rock material could be excavated, and as much as 318,000 cubic yards could be exported to off-project sites. Approximately 25,000 cubic yards of concrete and riprap could be imported into the project area.

(3) Materials to be used as fill (i.e., concrete, aggregate, and stone) would be imported from commercial sources.

E. Description of the Proposed Discharge Site:

- (1) Location: The proposed discharge sites for fill will include the Thorpe Park Basin, the Clay Avenue Wash, and various sections of the river channel downstream of the Basins (See pages 2-15 to 2-19 of the EIS).
- (2) Size: The area to be impacted by the proposed project is a total of 2.0 acres, which is comprised of 0.8 acres of permanent impact and 1.2 acres of temporary.
- (3) Type of Site: The type of areas subject to discharges are confined channels through the downtown area of Flagstaff.
- (4) Types of Habitat: The types of habitat are described fully in the EIS, and include mixed riparian, mixed riparian and wetland, and disturbed riparian.
- (5) Timing and Duration of Discharge: The construction will be approximately 12 months for these features. These sites will be confined by construction requirements in mostly disturbed habitat.

F. Description of Disposal Method: Disposal of excavated soil and rock will be by truck for construction of project features (i.e. channel areas or basin perimeter) or offsite to a location, outside any waters of the United States, within 10 miles of the project area.

II. FACTUAL DETERMINATIONS.

A. Disposal Site Physical Substrate Determinations:

(1) Substrate Elevation and Slope: The existing substrate consists of the Rio de Flag streambed and adjacent banks. The composition of the streambed varies from soil, to sand, to bedrock. The elevation and slope will not be changed except in the detention basin. No significant impact.

(2) Sediment Type: Material to be placed as fill consists of alluvial soils originating from the streambed and banks, and local bedrock. This native material would be used as compacted fill or hauled to a disposal site. Other fill materials consist of concrete and riprap. No significant impact.

(3) Dredged/Fill Material Movement: Soil and stone will be placed on areas of open channel. Soil will be placed along side and/or on top of concrete channel. No significant impact.

(4) Physical Effects on Benthos: Rio de Flag has intermittent seasonal flow that does not support aquatic life, except during prolonged wet periods. It does support some riparian plant communities. Culverts will be temporarily utilized where it is necessary for trucks to cross the flowing water. No significant impact.

(5) Other Effects: Potential short-term sedimentation and turbidity effects could occur during construction. Construction activities in and along the water courses will cease during and after precipitation events. No significant impacts.

(6) Actions taken to Minimize Impacts: No construction will take place in flowing water. Bare ground will be covered with straw or matting. Upstream dams or water diversion will temporarily protect construction areas from erosion forces. Construction activities in and along the watercourse will cease during and after moderate to heavy precipitation events.

B. Water Circulation, Fluctuation, and Salinity Determinations :

(1) Water. Water in the channel streambed is comprised of drainage from the upper basin, urban runoff and groundwater. These flows would continue intermittently. Where blasting would take place the flow of water would be temporarily stopped and/or rerouted.

- (a) Salinity: The proposed project will have no effect on salinity
- (b) Water Chemistry: The proposed project will not affect water chemistry.
- (c) Clarity: The proposed project will not affect water clarity.
- (d) Color: The proposed project will not affect water color.
- (e) Odor: The proposed project will not affect water odor.
- (f) Taste: The proposed project will not affect water taste.
- (g) Dissolved Gas Levels: The proposed project will not affect dissolved gas levels.
- (h) Nutrients: The proposed project will not affect the nutrient levels in the water.
- (i) Eutrophication: The proposed project will alter the eutrophic levels of the water.

(2) Current Patterns and Circulation.

- (a) Current Pattern and Flow: Portions of the historic channel, from the railroad bridge to north of Butler Street, will be reclaimed. The presently utilized channel will remain open to local drainage. No significant impacts.

- (b) Velocity: Velocity of flood flows will not significantly change from existing conditions. Project design flood flows will remain within the river channels.
- (c) Stratification: The proposed project will not induce stratification.
- (d) Hydrologic Regime: The proposed project will not alter the hydrologic regime.

(3) Effect on Normal Water Level Fluctuations. : The proposed project will not affect the normal water level fluctuations, but will increase the capacity of the river channel to contain the project design flood through the City of Flagstaff.

(4) Salinity Gradient. The proposed project will have no impact on the salinity gradient.

(5) Action Taken to Minimize Effects. Best management practices (as listed above) will be utilized before, during and after construction to minimize any possible contamination, erosion and/or runoff.

C. Suspended Particulate/Turbidity Determinations at the Disposal Site:

(1) Expected Change in Suspended Particulate and Turbidity levels in the Vicinity of the Disposal Site: Short-term increases in suspended particulates and turbidity levels may occur locally during construction if water is flowing. Construction will stop during wet and/or water flow events. No significant impacts.

(2) Effects on Chemical and Physical Properties of the Water Column: Only local stream channel or near stream channel materials will be utilized to construct the natural materials (soils and gravels) portion of the project. All other construction materials (concrete and riprap) will be separated from the flowing waters during construction. No significant impacts.

- (a) Light Penetration: The proposed project will have no impact on light penetration over most of the project area. Over the portion of the project that will utilize a covered arch culvert, light penetration will be impacted.
- (b) Dissolved Oxygen: The proposed project will not affect dissolved oxygen.
- (c) Toxic Metals and Organics: The proposed project will not introduce toxic metals or organics to the project area.
- (d) Pathogens: The proposed project will not introduce pathogens to the project area.
- (e) Aesthetics: The proposed project will affect the aesthetics of the project area as described in Section 4.11 of the EIS. Overall the impacts are not considered to be significant.

(3) Effects of Turbidity on Biota: Any flowing stream water will be separated from construction activities by barriers. Where haul trucks may need to cross the stream, culverts will be installed to minimize any turbidity that could affect the flora and fauna in the stream. No significant impacts.

- (a) Primary Production, Photosynthesis: The proposed project will not affect primary production or photosynthesis.
- (b) Suspension/Filter Feeders: The proposed project will not affect suspension/filter feeders.
- (c) Sight Feeders: The proposed project will not affect sight feeders.

(4) Actions taken to minimize Impacts. Dry season construction period, barriers, curtains, culverts and associated best construction practices will be incorporated into the project construction to reduce the potential for effect.

D. Contaminant Determination: The study area was evaluated to determine the potential for encountering hazardous materials that would be disturbed during construction (See Sections 3.12 and 4.12 in the EIS). The Rio de Flag and Clay Avenue Wash channels could be contaminated with hydrocarbons, and possibly bacteria, bleach, and chemicals used during industrial processes. Suspected sites will be screened by monitoring soils and testing for vapors. Actions to be taken and mitigation measures are listed in Sections 4.12.2 and 4.12.3 in the EIS.

E. Effect on Aquatic Ecosystem and Organism Determinations: With implementation of the erosion control measures specified in the EIS no significant effects are anticipated.

- (1) Effects on Plankton: The proposed project will have no effect on plankton.
- (2) Effects on Benthos: The proposed project will have no effect on benthic organisms.
- (3) Effects on Neckton: The proposed project will have no effect on necktonic organisms.
- (4) Effects on Aquatic Food Web: The proposed project will have no effect on the aquatic food web.
- (5) Effects on Special Aquatic Sites
 - (a) Sanctuaries and Refuges: There are no sanctuaries or refuges in the project area.
 - (b) Wetlands: The proposed project will result in a temporary impact to a total of 0.6 acres of wetlands.
 - (c) Mud Flats: The proposed project will not affect any mud flats.
 - (d) Vegetated Shallows: The proposed project will not affect any vegetated shallows.
 - (e) Coral Reefs: There are no coral reefs in the project area.
 - (f) Riffle and Pool Complexes: The proposed project will not affect any riffle and pool complexes.

(6) **Threatened and Endangered Species:** The proposed project will not directly affect any federally listed species.

(7) **Other Wildlife:** The proposed project will not have any unmitigable impacts on wildlife.

(8) **Actions to Minimize Impacts:** The proposed project will incorporate environmental commitments as described in Section 4.17 of the EIS.

F. **Proposed Disposal Site Determinations:** The disposal sites shall be limited to the project area and shall be confined to the smallest practicable areas.

(1) **Mixing Zone Determination:** The mixing zone for each disposal site is confined to the smallest practicable zone.

(2) **Determination of Compliance with Applicable Water Quality Standards:** The proposed project has been coordinated with the local resource agencies, and all work will cease if and while substantial rain events are predicted or are occurring in the project vicinity. The project shall be constructed in compliance with the environmental commitments as outlined in Section 4.17 of the EIS. As detailed in Section 4.3 of the EIS the project will not violate any water standards contained in the Arizona Administrative Code (Title 18, Chapter 11) . Compliance with the Clean Water Act of 1972 is detailed in Section 5.2 of the EIS.

(3) **Potential Effects on Human Use Characteristics:** The proposed project will not alter the human use characteristics of the project area.

(a) **Municipal and Private Water Supply:** The proposed project will not affect any municipal or private water supplies.

(b) **Recreation and Commercial Fisheries:** There are no fisheries within the project footprint.

(c) **Water Related Recreation:** The proposed project will not affect water related recreation.

(d) **Aesthetics:** The proposed project will not have a significant effect on aesthetics.

(e) **Parks, National and Historical Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves.** The proposed project will not affect any parks within the City of Flagstaff. None of the other resources listed in this category are present in the project area.

G. **Determination of Cumulative Effects on the Aquatic Ecosystem:** With implementation of the mitigation measures specified no significant effects are anticipated.

H. **Determination of Secondary Effects on the Aquatic Ecosystem:** With implementation of the mitigation measures specified no significant effects are anticipated.

III. FINDING OF COMPLIANCE

A. No significant adaptations of the guidelines were made relative to this evaluation.

B. Disposal sites for all alternatives for this project are the same, only the amount of material would change. Usage of best management/construction practices will minimize impacts to the waters of the Rio.

C. Turbidity of flowing water could be adversely affected by high flows during storm events. Any construction activities in or near the channels would be halted during and immediately after such an event. The project will be in compliance with all applicable state water quality standards.

D. The project shall be in compliance with applicable toxic effluent standards and prohibitions.

E. Utilizing the planned disposal methods outlined in the project EIS/R will not harm any endangered species or their habitat or violate any federal, state or local laws. The project is in compliance with the Endangered Species Act of 1973.

F. The proposed project will not affect any areas designated under the Marine Protection, Research and Sanctuaries act of 1972.

G. The proposed project will not degrade waters of the United States.

(1) The proposed project will not have a significant adverse effect on human health or welfare. The disposal of dredged material will not result in significant adverse effects on human health and welfare. The life stages of aquatic life and other wildlife will not be adversely affected in the long term. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

(a) The project will not significantly affect municipal or private water supplies.

(b) The project will not significantly affect recreational or commercial fisheries

(c) The project will not significantly affect plankton

(d) The project will not significantly affect fish

(e) The project will not significantly affect shellfish

(f) The project will not significantly affect wildlife

(g) The project will not affect special aquatic sites.

(2) Significant Adverse Effects of Life Stages of Aquatic Life and Other Wildlife Dependent on Aquatic Ecosystems: The project will not have a significant effect on life stages of aquatic life or other wildlife dependent on the aquatic ecosystem of the project area.

- (3) Significant adverse Effects on Aquatic Ecosystem Diversity, Productivity and Stability: The project will not have a significant effect on the aquatic ecosystem of the project area.
- (4) Significant Adverse Effects on Recreational, Aesthetic and Economic Values. The project will not have a significant effect on the recreational, aesthetic, or economic values of the project area.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem: Potential adverse impacts to the project environment will be minimized by utilizing best management/construction practices during construction.

I. On the Basis of the Guidelines, the Proposed Disposal sites for the Discharge of Dredged or Fill Material is specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

Prepared by: _____

Alex C. Watt

Environmental Coordinator
Regional Planning Section

Date: 25 August, 2000

401 WATER QUALITY CERTIFICATION

RIO DE FLAG FLOOD CONTROL PROJECT
COCONINO COUNTY
FLAGSTAFF, ARIZONA

The Corps will be requesting a 404 (r) from Congress for exemption from state water quality certification.

APPENDIX G
U.S. FISH AND WILDLIFE SERVICE
COORDINATION ACT REPORT



United States Department of the Interior

U.S. Fish and Wildlife Service
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 640-2720 FAX: (602) 640-2730



In Reply Refer To:

AESO/FA

December 20, 1999

Mr. Robert E. Koplin
Chief, Planning Division
Los Angeles District
U.S. Army Corps of Engineers
Attn: Tim Smith, CESPL-PD-RN
P.O. Box 2711
Los Angeles, California 90053-2352

Dear Mr. Koplin:

This report presents our analysis of the Rio de Flag Feasibility Study and identifies potential measures to avoid, minimize, and/or mitigate project related impacts. It is provided pursuant to the Fish and Wildlife Coordination Act (FWCA) (48 stat. 401, as amended; 16 U.S.C. 661 et seq.) and constitutes the U.S. Fish and Wildlife Service (Service) report under Section 2(B) of the FWCA. This report is based on interagency project meetings, field investigations, literature research, file reviews, coordination with the Arizona Game and Fish Department (AGFD), and information provided by the U.S. Army Corps of Engineers (Corps).

PROJECT DESCRIPTION

Purpose and Scope

In 1996 the Los Angeles District of the Corps initiated a reconnaissance level study to determine the potential for Federal interest in addressing flooding along the Rio de Flag in Flagstaff, Coconino County, Arizona (Corps 1996). The reconnaissance study identified a Federal interest for a multi-purpose project providing flood control, environmental restoration, and recreation benefits. In October of 1997 a feasibility study was initiated to explore and prepare project alternatives. The Rio de Flag Feasibility Study is being conducted by the Los Angeles District in cooperation with the City of Flagstaff (City). The specific purpose of the study is to define flooding and related problems in the Rio de Flag watershed and tributaries within the City and Coconino County and investigate the feasibility of providing solutions to these problems. The scope of this study consists of identifying problems and needs associated with flooding and related water resource concerns, formulating alternative measures to prevent future flood damages and maximize National Economic Development benefits, and identifying the opportunity and role for Corps' participation in flood control and related water resources planning.

Study Area

The City is located in southern Coconino County, in north-central Arizona, nearly center between the east and west State boundaries along historic Route 66 and Interstate 40, and is surrounded by the Coconino National Forest. Coconino County has a total land area of 18,608 square miles. Fourteen percent of this land is privately owned while approximately 69 percent is either Indian or U.S. Forest Service land. The remaining 17 percent is owned by the State and other public entities.

The City has identified Rio de Flag, and Clay Avenue Wash as the primary drainages contributing to flooding of major damage centers and problem areas to be evaluated during the feasibility study. Located generally within the City and Coconino County, the study area for flood damages is approximately 15 square miles and encompasses Rio de Flag upstream from the City limits to the Route 66 crossing just downstream of the Continental Estates housing development. A study area map is presented as Figure 2 in Corps (1999).

Rio de Flag is a tributary of San Francisco Wash, which in turn flows into the Little Colorado River. The stream originates on the southwestern slopes of San Francisco Mountain north of the City. The total drainage area of the watershed is approximately 116 square miles. Rio de Flag has numerous tributaries with major contributing flows coming from Clay Avenue Wash drainage area to the west and Sinclair Wash drainage area to the southwest. Flooding in Rio de Flag is related to runoff from winter rainfall, spring snowmelt, and intense summer thunderstorms. The average annual precipitation for the Rio de Flag drainage area ranges from about 20 inches in the City to about 35 inches in the San Francisco Peaks with a basin average of about 25 inches. Annual temperature extremes can typically range from 0° to 90° F with yearly average high and low temperatures of 61° F and 30° F, respectively.

Flood Problems

The last major floods in Flagstaff occurred in the 1920s and 1930s and only minor floods (less than a 25-year event) have occurred since. Significant development within the City's floodplains occurred until the adoption of Federal Emergency Management Act (FEMA) flood insurance in 1983. Since 1983, development within the floodplain has been required to elevate above the FEMA flood zone depth. However, nearly 100 years of prior unregulated development and encroachment has left the channel very narrow and shallow through much of the City. Upstream and downstream of Flagstaff's urbanized areas the natural channel is very wide and deep, but within the City, homes and businesses back up to an encroached channel that is narrow and shallow. The channel's current alignment does not follow its original historic path through the City.

The floodplain of Rio de Flag is intensely developed through most of the City center. Land use in the area consists of residential dwellings, recreation areas, schools, light industry, railroad and utility easements, and retail business structures. Residential, commercial, and industrial

development are extensive within the floodplain of Rio de Flag throughout most of the City. Within the overall study area, there are two specific areas which suffer flood damages. These are the downtown area; which consists of downtown, west portions of the City, and the south side including Northern Arizona University; and the Continental Estates area which is at the downstream limits of the study area. Portions of the campus of Northern Arizona University and the downtown and south side areas, which contain numerous registered historic structures, are almost entirely within the 100-year floodplain, and nearly half of the 100-year floodplain along Rio de Flag is zoned as residential and nearly a quarter is zoned as commercial. The 500 and 100 year floodplains in the downtown and Continental areas, for the base year 2003, are depicted in Figures 4.3 and 4.4 in Corps (1999). The expected annual damages for the base year is estimated at \$1,989,000 (Corps 1999).

ALTERNATIVES

The following alternatives are based on information contained in Corps reports (Corps 1998, 1999) as well as information gained through subsequent meetings and communication with Corps personnel. Several alternatives have been eliminated due to environmental, social, technical, or economic constraints (Tim Smith, Corps, personal communication).

Downtown area detention basins alternative

This alternative would include the construction of a detention basin and floodwalls at Thorpe Park to minimize outflow into Rio de Flag. This would also include a detention basin on Clay Avenue Wash west of the City. This alternative would not include any channel improvements downstream of these basins and the existing channels are not adequate to contain all flows downstream of the detention basins. Significant flooding would still be expected in the downtown area and the south side of town including the Northern Arizona University campus. The major features of this alternative are depicted in Figure 5.1 in Corps (1999).

Downtown area detention basins plus channelization alternative

This alternative would include detention basins at both Thorpe Park and on Clay Avenue Wash, with channel improvements downstream of both basins. Clay Avenue Wash channel improvements would be provided throughout most of the reach, while Rio de Flag channel improvements would begin just upstream of Birch Street. The alternative would also include the construction of an improved channel between the confluence and Butler Avenue. The major features of this alternative are depicted in Figure 5.5 in Corps (1999).

Continental area localized levees alternative

This alternative would involve the implementation of localized levees for properties around the periphery of the Continental floodplain, especially in the vicinity of Butler Avenue and the

Country Club Drive area. This would be accomplished through construction of protective levees around localized specific areas and homes.

No action alternative

The Corps would implement no improvements to alleviate flooding in the City, including the downtown and Continental areas. This alternative represents the without-project condition.

EXISTING BIOLOGICAL RESOURCES

Vegetation

SWCA (1998) conducted a general field reconnaissance, in which the Rio de Flag within the study area was divided into 20 reaches for the purpose of classifying and comparing vegetation communities along the Rio de Flag (see Table 1 and Figure 1 in SWCA 1998). At least five vegetation communities, as described by Brown (1994), were identified in the study area, including Petran montane conifer woodland, montane meadow grassland, wetland, mixed riparian, and disturbed / urban. Vegetation species from each community are commonly mixed throughout the study area. Dominant woody species include ponderosa pine (*Pinus ponderosa*) and Gambel's oak (*Quercus gambelii*), with occasional pinyon pine (*Pinus edulis*) and junipers (*Juniperus* spp). Other vegetation species may include buckbrush (*Ceanothus fendleri*), Arizona rose (*Rosa arizonica*), lupines (*Lupinus* spp), toad flax (*Linerria dalmatica*), snowberries (*Symphoricarpos* spp), Flagstaff pennyroyal (*Hedeoma diffusum*), and Arizona leather flower (*Clematis hirsutissima arizonica*) to name a few. Common grasses may include mountain muhly (*Muhlenbergia montana*), bromes (*Bromus* spp), Arizona fescue (*Festuca arizonica*), squirreltail (*Sitanion hystris*), and muttongrass (*Poa fendleriana*).

Plant species along Rio de Flag and Sinclair Wash may include cottonwood (*Populus fremontii*), quaking aspen (*Populus tremuloides*), sycamores (*Platanus* spp), willows (*Salix* spp), and salt cedar (*Tamarix chinensis*). Areas of special interest include the Francis Short pond located near Thorpe Park just downstream of Thorpe Road, the stretch of Rio de Flag from the confluence of Sinclair Wash to Herold Ranch Road, and the wetlands and wastewater treatment plant ponds located near the Rio de Flag and Interstate 40 crossing. Plant species in wetland and pond areas include sedges (*Carex* spp), rushes (*Juncus* spp), cattails (*Typha* spp), dock (*Rumex* spp), bentgrasses (*Agrostis* spp), and bluegrasses (*Poa* spp).

Wildlife and fish

The study area is potentially inhabited by a diversity of wildlife species. Large mammals may include elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). Smaller mammals may include striped skunk (*Mephitis mephitis*), gray fox (*Urocyon cinereoagrenteus*), coyote (*Canis latrans*), bobcat (*Felis rufus*),

Abert's squirrel (*Sciurus aberti*), chipmunks (*Eutamias* spp), cottontail rabbits (*Sylvilagus* spp), voles (*Microtus* spp), woodrats (*Neotoma* spp), and various bat species (Chiroptera).

A variety of birds are known to occur in the ponderosa pine and riparian biotic communities within the study area. Resident avian species may include northern goshawk (*Accipiter gentilis*), great-horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), common flicker (*Colaptes auratus*), house finch (*Carpodacus mexicanus*), brown creeper (*Certhia americana*), solitary vireo (*Vireo solitarius*), American robin (*Turdus migratorius*), hairy woodpecker (*Picoides villosus*), white-breasted nuthatch (*Sitta carolinensis*), western bluebird (*Sialia mexicana*), Steller's jay (*Cyanocitta stelleri*), American crow (*Corvus brachyrhynchos*), black-headed grosbeak (*Pheucticus melanocephalus*), mourning dove (*Zenaida macroura*). During the spring and summer breeding season other songbirds may include Gray-headed junco (*Junco hyemalis*), mountain chickadee (*Parus gambeli*), pine siskin (*Carduelis pinus*), white-throated swift (*Aeronautes saxatalis*), Cassin's kingbird (*Tyrannus vociferans*), house wren (*Troglodytes aedon*), hermit thrush (*Catharus guttatus*), olive warbler (*Peucedramus taeniatus*), purple martin (*Progne subis*), summer tanager (*Piranga rubra*), and olive-side flycatcher (*Contopus virens*). During winter other species may include Brewer's blackbird (*Euphagus cyanocephalus*), Williamson's sapsucker (*Sphyrapicus thyroideus*), and winter wren (*Troglodytes troglodytes*).

Reptiles may include gopher snake (*Pituophis melanoleucus*), garter snakes (*Thamnophis* spp.), mountain kingsnake (*Lampropeltis gettulus*), western rattlesnake (*Crotalus viridis*), short-horned lizard (*Phrynosoma douglassi*), and lined tree lizard (*Urosaurus ornatus*).

Wetland and aquatic ecosystems in the study area are limited to the Francis Short Pond, the I-40 wetlands, and the wastewater treatment plant ponds located downstream of the I-40 crossing. These areas attract animal species dependent upon water availability such as waterfowl, shorebirds, amphibians, and fish. Bird species may include mallards (*Anas platyrhynchos*), lesser scaup (*Aythya affinis*), and red-winged blackbird (*Agelaius phoeniceus*). Amphibians likely to be found in and near these areas include bullfrog (*Rana catesbeiana*), treefrogs (*Hyla* spp), and western spadefoot toad (*Scaphiopus hammondi*). Fish species are likely limited to invasive non-native species, such as mosquitofish (*Gambusia affinis*), fathead minnow (*Pimephales promelas*), and sunfish (*Lepomis* spp). SWCA (1998) states that the Francis Short Pond is annually stocked with sport fish such as catfish (*Ictalurus* spp.) and sunfish for a fishing derby held every spring for Flagstaff Middle School.

Threatened and endangered species

No species listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA) of 1973, are known to regularly occur within the study area. However, the threatened Mexican spotted owl (*Strix occidentalis lucida*) and bald eagle (*Haliaeetus leucocephalus*) may occur within the ponderosa pine forests which surround the City. Although not present in the study area, the threatened Little Colorado spinedace (*Lepidomeda vittata*) is

found in the Little Colorado River which San Francisco Wash is tributary to. The American peregrine falcon (*Falco peregrinus anatum*), recently delisted under the ESA, may occur within the study area. No species classified as candidates for listing are known to occur within the study area.

Mexican spotted owl: The Mexican spotted owl was listed as threatened on March 16, 1993 (Service 1993). No critical habitat is designated. The primary factors leading to listing were timber harvest practices and catastrophic wildfire. Predation by great horned owls, northern goshawks, red-tailed hawks, and golden eagles; starvation; and accidents or collisions may all be mortality factors. The current known range of the Mexican spotted owl extends north from Aguascalientes, Mexico through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah and southwestern Colorado, and the Front Range of central Colorado. Nesting habitat is typically in areas with complex forest structure or rocky canyons, and contain mature or old-growth stands which are uneven-aged, multi-storied, and have high canopy closure (Ganey and Balda 1989, Service 1991). In Arizona, nesting begins in early springs with eggs laid in late March or early April. The incubation period is thought to be 30 days, and nestling owls fledge four to five weeks later, dispersing in mid September to early October (Ganey 1988). Spotted owls consume a variety of prey throughout their range but commonly eat small and medium sized rodents such as woodrats (*Neotoma* spp.), peromyscid mice, and microtine voles. They may also consume bats, birds, reptiles, and arthropods (Ward and Block 1995). The nearest known Mexican spotted owls to the study area occur almost two miles away in Walnut Canyon.

Bald eagle: The bald eagle is a large bird of prey that was listed as endangered south of the 40th parallel on March 11, 1967 (Service 1967), and was reclassified to threatened status on July 12, 1995 (Service 1995). No critical habitat is designated. The bald eagle was proposed for delisting on July 6, 1999 (Service 1999a). Declines in the number of waterfowl and shorebirds, loss of nesting habitat, and the widespread use of dichloro-diphenyl-trichloroethane (DDT) and other organochlorine compounds in the 1940s resulting in reproductive failure have all contributed to declines in bald eagle population. Threats persist largely due to the proximity of bald eagle breeding areas to major human population centers and recreation areas and include entanglement in monofilament fish line; overgrazing of riparian vegetation; malicious and accidental harassment such as shooting, off-road vehicle use, watercraft use, and low-level aircraft overflights; alteration of aquatic and riparian systems for water distribution systems; collisions with transmission lines; poisoning; and electrocution. The bald eagle historically ranged throughout North America except extreme northern Alaska, Canada, and central and southern Mexico. The species occurs in association with aquatic ecosystems such as estuaries, lakes, reservoirs, major riverine systems, and some seacoast areas. All breeding areas in Arizona are located in close proximity to aquatic habitats. Southwestern bald eagles establish breeding territories in December or January and lay eggs in January or February. Young eagles remain in the vicinity of the nest until June (Hunt *et al.* 1992). Arizona also provides habitat for wintering bald eagles, which migrate through the state between October and April each year. The most concentrated population of wintering bald eagles is found at Lake Mary and Mormon Lake,

Coconino County (Beatty and Driscoll 1996). Their primary food is fish but also includes waterfowl and carrion. Bald eagles are infrequent visitors in the project area.

Little Colorado spinedace: The spinedace was listed as a threatened species on September 16, 1987. Critical habitat was designated for portions of East Clear Creek, Chevelon Creek, and Nutrioso Creek. Populations are known from East Clear Creek, lower Chevelon Creek, Silver Creek, Nutrioso Creek, Rudd Creek, and portions of the Little Colorado River. Alteration of habitats and the introduction of non-native fish and invertebrates that prey on or compete with spinedace have been identified as reasons for the decline of the species. It is a small fish, generally less than 100 millimeters (mm) in total length with little size differentiation between the sexes. Both mountain streams and lower gradient streams and rivers provide habitat for the spinedace (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). Suitable habitat includes clear and turbid water conditions, pools of moderate depth with flowing water and containing cover in the form of rocks, detritus or aquatic plants and a variety of substrates, lotic sections of streams with moderate velocity currents, and pools which are important during dry periods. The spawning period is from May to June or July (Blinn 1993, Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). Spinedace are opportunistic feeders and may forage in the water column or on the bottom for whatever is seasonally available. Aquatic and terrestrial insects form the basis of the spinedace diet (Runck and Blinn 1993), but they also consume algae and detritus (Blinn and Runck 1990, Minckley and Carufel 1967).

Other sensitive species

American Peregrine Falcon: The American peregrine falcon was listed as an endangered species on October 13, 1970. The peregrine falcon occurs across much of North America. It nests on cliffs, usually near large bodies of water such as seacoasts, lakes, and large rivers (Ratcliffe 1980). Large cliffs overlooking chaparral, pinyon-juniper woodland, conifer forest, and riparian habitats provide suitable habitat and are currently occupied by breeding pairs almost wherever they occur in Arizona. The presence of rivers, riparian vegetation communities, or other surface water in peregrine nesting habitat may be a feature in determining the presence of an adequate food supply. Peregrines feed almost exclusively upon other birds, such as shorebirds, pigeons, doves, robins, flickers, jays, swifts, swallows, and other passerines, and may travel as far as 10 miles while hunting (Craig 1986). On August 25, 1999, the Service removed the American peregrine falcon from the list of endangered and threatened wildlife (Service 1999b). The delisting of the species removes all protections provided under the ESA, although protection is still provided by the Migratory Bird Treaty Act. Also, the ESA requires monitoring for at least five years after delisting. If during the monitoring period the species is not maintaining recovered status, it could be relisted under the ESA. The Service is currently developing a monitoring plan for the American peregrine falcon.

FUTURE WITHOUT PROJECT

Under the future without-project condition the Corps would take no action to alleviate flooding within the City. Urban development would be expected to continue and result in increased surface runoff within the study area (Corps 1999). Flooding would be expected to continue to result in damages to residential, commercial, and industrial structures; emergency and clean-up responses; and increased future floodproofing expenditures. The total expected annual damages under the without-project conditions, including structure and content damages, emergency clean-up costs, transportation damages, future floodproofing costs, and flood insurance administration costs, is estimated at \$2,666,000 (Corps 1999).

Existing vegetation along the Rio de Flag would not be expected to experience significant modification except for changes attributable to natural succession, urban development, or catastrophic events such as fire or disease outbreaks. The urban wetlands and ponds would continue to attract waterfowl, songbirds, amphibians, and mammals. The Service expects that as urban development encroaches on the wetlands and into minimally disturbed ponderosa pine communities, their value to native wildlife species would be reduced.

FUTURE WITH PROJECT

The Corps' preferred alternative would consist of detention basins at Thorpe Park and Clay Avenue Wash, channel modifications along Clay Avenue Wash and the Rio de Flag within the downtown area, and reestablishment of a hydraulic connection with the historic Rio de Flag alignment downstream of Beaver Street. The Corps (1999) has determined that this alternative would be most cost-effective, while maximizing National Economic Development benefits by reducing flooding along Rio de Flag in the downtown area and Clay Avenue Wash, and reducing peak flows that enter the Continental area. Project features would include earthen embankments at the detention basins, concrete floodwalls, riprap dressed with soil coverings, concrete arch culverts, and a natural greenbelt channel.

The Corps has not identified opportunities for large scale ecosystem restoration as a project purpose. However, they believe limited opportunities may exist for environmental features in some areas. These opportunities may include improving land management and development practices, planting riparian vegetation species, removing exotic vegetation species, creating and/or enhancing urban wetlands, enhancing stream courses, and removing movement barriers. In the Corps preliminary assessment of restoration potential (Appendix A in Corps 1999), they identified Rio de Flag reaches 1 through 5, 11 through 13, and 20 (as described in SWCA 1998) as meeting restoration appropriateness. Reaches 6 through 10 and 14 through 19 were eliminated due to uncertain property ownership, lack of landowner cooperation, limited connectivity, incompatible adjacent land use, limited water supply, and unsuitable soil conditions.

DISCUSSION

The Service does not expect significant adverse environmental effects to occur as a result of implementing the described flood control project. We were concerned that large scale flood control measures may be provided in undeveloped portions of the study area where development is currently limited due to flooding hazards, thus facilitating development into minimally disturbed forested ecosystems. However, subsequent information provided by the Corps has indicated that flood control features would only be provided for areas already developed and no features would remove current flood control requirements for undeveloped forested areas.

No flood control features or related activities are currently planned in areas known to be occupied by bald eagles or Mexican spotted owls. Vegetation along the Rio de Flag is not suitable for nesting by either of these species and the nearest known territories are several miles from the study area. It is possible that these species may occur in the study area as transients during foraging or dispersing activity. Assessments performed by the Corps and contractors have not identified adverse effects to listed species from the proposed activities. Provided that impact assessments are included as an on-going aspect of the study, any modification to the selected plan should be evaluated for potential effects to listed species and any necessary consultation with the Service conducted.

The construction of detention basins and channelization along the Rio de Flag, as well as hydrologic changes in flood flows, could have localized effects on local wildlife communities through vegetation modifications and disturbance, such as noise/activity, during construction operations. Resident animals may be displaced from these areas, resulting in increased competition, predation, disease transmission, and mortality. Effects to higher trophic level species, such as the Mexican spotted owl, bald eagle, American peregrine falcon, and northern goshawk may occur indirectly through the modification of habitats utilized by prey species such as passerine birds or small mammals. Effects to these predatory species from the expected subtle changes in prey base structure or availability would be difficult to detect or measure.

We are unaware of any isolated populations of rare species along Rio de Flag, and therefore do not expect long-term adverse effects to population viability of any species. We do, however, suggest that the loss of vegetation communities and wildlife habitat be quantified and any necessary mitigation formulated with input from the AGFD, Service, and City. The Corps has conducted a limited hydrogeomorphic assessment along Rio de Flag, which could be useful in developing mitigation or restoration activities.

The Corps has indicated that incidental environmental restoration activities may be incorporated into the proposed project design. Although potential wildlife habitat within the City may be limited, we encourage the Corps to pursue activities that would enhance the biological diversity and productivity of native vegetation and wildlife communities. From our perspective, the most significant opportunities for the proposed project would be the restoration of natural

hydrogeomorphic processes, planting of native riparian vegetation, and enhancement of native bird habitat along portions of Rio de Flag.

Marzluff (1997) contends that urbanized habitats typically support larger and richer avian communities that are less even in relative abundance because they are dominated by a few, abundant species. Marzluff (1997) surmises that habitat modification by urbanization in ponderosa pine forests likely: 1) benefits ground-gleaning and probing birds that are tolerant of human activity such as American robin, European starling, Brewer's blackbird, and American crow; 2) benefits species that nest in manmade structures or ornamental vegetation such as rock dove (*Columba livia*), house sparrow, European starling (*Sturnus vulgaris*), house wren, purple martin, barn swallow (*Hirundo rustica*), house finch, and eastern kingbird (*Tyrannus tyrannus*); 3) reduces shrub and canopy nesters and foragers, such as warblers, vireos, tanagers, grosbeaks, wrens, creepers, chickadees, and nuthatches; and 4) reduces burn specialists, cavity nesters, and bark drillers such as olive-sided flycatcher, swallows, woodpeckers, chickadees, nuthatches, creepers, and bluebirds. The observed shifts in bird community structure are largely the result of microhabitat changes resulting from the loss of large portions of the mid and upper canopy levels, the removal of native plants species, the removal of snags and dead material, and the introduction of non-native plant species and man-made structures.

We believe that restoration or mitigation efforts should focus on restoring those components of the biotic and abiotic environments that have been largely eliminated by urbanization within the study area. This would include adequate flood plain, natural stream meanders, proper width/depth ratio, native plant species that normally occupy the mid and upper canopy levels, and snags and dead standing trees. We would support the use of natural tree/shrub revegetations, debris dams, and vegetated textile mats to address localized flood prevention needs as well as the removal of non-native plant species. We believe these measures would provide habitat components that likely occur at reduced levels within the City's urban areas and result in benefits to local wildlife, especially guilds of the avian community that may typically be excluded or reduced in urban environments. Specific plant species utilized in restoration efforts should be coordinated with the AGFD, City, and other local entities familiar with ponderosa pine ecosystems, songbird communities, and native plant species that have experienced declines due to urbanization.

We believe revegetation would be appropriate only in areas where it has been determined that site specific environmental conditions are adequate to sustain the desired vegetation community. Consideration should be given to microhabitat conditions such as depth to water table, soil moisture, and salinity; and large scale ecological processes such as floods, which many riparian plant species depend upon for seed bed formation, seed dispersal, germination, seedling establishment, recruitment, and survival. The majority of riparian restoration activities that fail do so because of attempts to establish desirable species on degraded sites, typically with incompatible soil moisture or salinity (Briggs *et al.* 1994, Barrows 1998). Site specific evaluations should be conducted to determine depth to groundwater, soil salinity and texture, flood frequency and intensity, groundwater fluctuations, site preparation such as tilling the soil,

protection of plantings from herbivory, necessity of irrigation, potential for competition from undesirable species, and long term management potential for the site. Acceptable success criteria should be developed in coordination with the Service, AGFD, and City.

RECOMMENDATIONS

- 1) Do not pursue flood control measures that would provide protection to undeveloped forested areas, thus facilitating urban development that may further result in dramatic shifts in local wildlife community structure. If flood protection would facilitate development into undeveloped areas, the Corps should expand their scope of analysis to include the impacts of that development.
- 2) Continue to assess potential effects to listed species. If the Corps determines the proposed project may affect listed species, consultation with the Service is required under section 7 of the ESA.
- 3) Coordinate with resource agencies and local sponsor to mitigate any loss of vegetation and wildlife habitat attributable to construction of flood control features.
- 4) Incorporate environmental restoration activities along Rio de Flag into the proposed activity. Conduct site suitability assessments before proceeding with revegetation efforts. Focus restoration and enhancement efforts on habitat components important to native songbird populations that exhibit low abundance in urban areas. Coordinate native plant species selection with resource agencies and local sponsor.

We appreciate the opportunity to provide recommendations for the proposed project. If we can be of further assistance or you have questions, please contact Mike Martinez (x224).

Sincerely,



David L. Harlow
Field Supervisor

cc: Director, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Arizona Game and Fish Department Region II, Flagstaff, AZ
City of Flagstaff, Flagstaff, AZ

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APPENDIX H
PUBLIC NOTICE/RESPONSES

APPENDIX H-1
NOTICE OF INTENT

(3) Is not likely to be environmentally controversial.

(4) Will not likely result in litigation based on environmental quality issues.

(5) Does not require an Environmental Impact Statement (EIS).

Harry W. McClellan, Jr.,

LTC, EN, Product Manager, Construction Equipment/Materials Handling Equipment.
[FR Doc. 98-2668 Filed 2-3-98; 8:45 am]

BILLING CODE 3710-08-M

DEPARTMENT OF DEFENSE

Department of the Army

Corps of Engineers

Intent to Prepare an Environmental Impact Statement (EIS) for the Rio de Flag Area; Flagstaff, AZ Feasibility Study; City of Flagstaff, Coconino County, Arizona

AGENCY: U.S. Army Corps of Engineers, Los Angeles District, DoD.

ACTION: Notice of intent.

SUMMARY: The Los Angeles District intends to prepare an EIS to support the proposed study for flood control and environmental restoration, in the Flagstaff area. The study area is a riparian corridor traversing a mostly urban environment, extending approximately twelve (12) miles along the Rio de Flag (river), between U.S. Highway 180 on the north and west; and the Interstate 40 (I-40) bridge on the southeast. The lower segments of Sinclair Wash and Clay Avenue Wash near their convergence with the Rio de Flag area also included.

FOR FURTHER INFORMATION CONTACT: For further information contact the Environmental Coordinator, Mr. David Compas, U.S. Army Corps of Engineers, Los Angeles District, Attn: CESPL-PD-RN, P.O. Box 532711, Los Angeles CA 90053 at 213-452-3850.

SUPPLEMENTARY INFORMATION: The U.S. Army Corps of Engineers will sponsor a scoping meeting to solicit public input on 27 February 1998 at the City of Flagstaff offices, at 211 West Aspen Avenue, Flagstaff. Two sessions will be held from 1 to 3 PM and from 5 to 7 PM, both sessions will cover the same topics. This scoping will be held prior to preparing the Environmental Impact Statement to solicit public input on the significant environmental issues associated with the proposed action. The public, as well as Federal, State, and local agencies are encouraged to participate in the scoping process by attending the Scoping Meeting and/or submitting data, information, and

comments identifying relevant environmental and socioeconomic issues to be addressed in the environmental analysis. Useful information includes other environmental studies, published and unpublished data, alternatives that should be addressed in the analysis, and potential mitigation measures associated with the proposed action.

Individuals and agencies may offer information or data relevant to the proposed study by attending the public scoping meeting, or by mailing the information to Mr. David Compas at the address below prior to March 23, 1998. Comments, suggestions, and requests to be placed on the mailing list for announcements and for the Draft EIS, should be sent to: Mr. David Compas, U.S. Army Corps of Engineers, Los Angeles District, Attn: CESPL-PD-RN, P.O. Box 532711, Los Angeles, CA 90053. Comments will also be accepted via E-mail at: dcompas@spl.usace.army.mil

Alternatives

A full array of alternatives will be developed for further analyses. The proposed plan, viable project alternatives, and the "no action" plan will be carried forward for detailed analysis in the document. Conceptual alternatives will likely consist of: utilizing the present channel with modifications; utilizing the "historic" channel for a portion of the flow; splitting of northern flows from the southern flows; and/or diversion of flows to Walnut Canyon. Channel alternatives will likely consist of: a combination of open channels; covered channels; and/or greenbelt channels. Recreation alternatives will likely consist of: bike/walking trails; picnic tables; nature viewing areas; and/or a fitness course. Environmental alternatives will likely consist of: wetlands restoration; flora enhancement; and/or riparian enhancement.

Availability of the Draft EIS

The Draft EIS is expected to be published and circulated for public review in August 1999.

Gregory D. Showalter,

Army Federal Register Liaison Officer.

[FR Doc. 98-2709 Filed 2-3-98; 8:45 am]

BILLING CODE 3710-KF-M

DEPARTMENT OF DEFENSE

Department of the Navy

Notice of Intent to Prepare a Supplemental Environmental Impact Statement for Milcon Project P-527b, Sewage Effluent Compliance, at Marine Corps Base Camp Pendleton, California

AGENCY: Department of the Navy, DOD.

ACTION: Notice.

SUMMARY: The U.S. Marine Corps announces its intent to prepare a Supplemental Environmental Impact Statement (EIS) to evaluate the environmental effects of proposed alternative methods of sewage effluent disposal, in order to achieve compliance with a San Diego Regional Water Quality Control Board (RWQCB) Cease and Desist Order at Marine Corps Base (MCB), Camp Pendleton. This report will supplement the Sewage Effluent Compliance Project, Lower Santa Margarita Basin Environmental Impact Statement/Report (EIS/R).

DATES: Submit comments on or before March 23, 1998.

ADDRESSES: Send written comments to Southwest Division, Naval Facilities Engineering Command, 1220 Pacific Highway, San Diego, CA 92132-5190, (Attn: Ms. Vicky Taylor, Code 533.VT)

FOR FURTHER INFORMATION CONTACT: Ms. Vicky Taylor, (619) 532-3007.

SUPPLEMENTARY INFORMATION: Pursuant to section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969 as implemented by the Council on Environmental Quality Regulations (40 CFR parts 1500-1508), the U.S. Marine Corps announces its intent to prepare a Supplemental Environmental Impact Statement (EIS) to evaluate the environmental effects of proposed alternative methods of sewage effluent disposal, in order to achieve compliance with a San Diego Regional Water Quality Control Board (RWQCB) Cease and Desist Order at Marine Corps Base (MCB), Camp Pendleton. The Sewage Effluent Compliance Project, Lower Santa Margarita Basin Environmental Impact Statement/Report (EIS/R), which this report will supplement, addressed a system of pumps and piping to deliver effluent from Sewage Treatment Plants 1, 2, 3, 8, and 13 to percolation ponds and an existing ocean outfall for discharge. Each of the three alternatives evaluated included an element of effluent or brine discharge through the ocean outfall. During final consideration of the proposed action, the City of Oceanside City Council disapproved use

APPENDIX H-2
RESPONSES TO NOTICE OF INTENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

MAR 13 1998

Mr. David Compas
U.S. Army Corps of Engineers
Los Angeles District
Attn: CESPL-PD-RN
P.O. Box 532711
Los Angeles, CA 90053

Dear Mr. Compas:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers' Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the **Rio de Flag Area, City of Flagstaff, Coconino County, AZ**. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act (CAA).

The draft EIS (DEIS) will evaluate the environmental effects of a proposed project for flood control and environmental restoration in a twelve mile-long urban riparian corridor (i.e., the stream or river and its associated bank vegetation). The project area extends between U.S. Highway 180 on the north and west and the Interstate 40 bridge on the southeast. The lower segments of Sinclair Wash and Clay Avenue Wash near their convergence with the Rio de Flag are also included. The DEIS will describe approximately three to five major alternatives (from the 2/24/98 telephone conversation between David Compas of COE and Rosalyn Johnson of EPA). The alternative would include components such as recreational opportunities (e.g., trails, picnic tables, and nature viewing), and environmental improvement (e.g., wetlands restoration, flora enhancement, and/or riparian enhancement), and open, covered or greenbelt channels with multiple options for which channels to use for the flow in this stretch of river. Alternatives were scheduled to be better defined through the aid of public scoping meetings held February 27, 1998.

EPA recommends that the DEIS examine a combination alternative employing nonstructural means to attain the project's flood control objective that would also serve to compliment the various natural resource amenities associated with the non-flood control objectives of the project (e.g., especially improvements to fish and wildlife values. In keeping with this recommendation, EPA encourages the COE to include the following elements in each of the proposed alternatives to meet the needs of the project while taking reasonable opportunities to protect, restore, and enhance the environment.

1. Each alternative should address possibilities for the enhancement of fish and wildlife habitat along the riparian corridor.

2. The alternatives should reflect the awareness that not all recreational and interpretive activities are compatible with restoration of terrestrial and aquatic habitats by outlining strategies that can be used to reduce human impacts, especially in restoration areas (e.g., boardwalks in wetland restoration areas, set aside areas for high-impact or low impact uses, etc.)

We appreciate the opportunity to review this NOI. Additional comments are attached. Please send two copies of the DEIS to this office at the same time it is officially filed with our Washington D.C. Office. If you have any questions, please call me at (415) 744-1584 or Rosalyn Johnson of my staff at (415) 744-1574.

Sincerely,

A handwritten signature in cursive script, reading "David R. Tomson". The signature is written in dark ink and is positioned below the word "Sincerely,".

David J. Farrel, Chief
Federal Activities Office

Attachment
flagstaf.noi
ID: 003045/RJ

COMMENTS

NEPA

1. EPA recommends that a clear description be provided of the basic project purpose and need, project alternatives, potential impacts to the environment, and mitigation for these impacts. The analysis should comparatively evaluate environmental impacts of the four alternatives, defining the issues and providing a clear basis for choice among options for the decisionmaker and the public (40 CFR 1502.14).
2. NEPA requires evaluation of reasonable alternatives not within the jurisdiction of the lead agency (40 CFR Section 1502.14(c)). Furthermore, there should be a clear discussion of the reasons for the elimination of alternatives which were not evaluated in detail.
3. The DEIS should analyze potential cumulative effects in the Region of Influence (ROI). According to 40 CFR 1508.7, "(c)umulative impacts can result from individually minor but collectively significant actions taking place over a period of time." A description of all planned, pending and approved projects in the ROI, especially those that have or have pending Clean Water Act (CWA) section 404 permits, should be presented along with a map illustrating the locations of those projects. For example, consideration should be given to the cumulative impacts of this project and sand and gravel operations in the vicinity. Could project mitigations be developed in conjunction with these operations? See also **Section 404 Comments**. The effects of the proposed action should be analyzed in relation to the expected development effects in the ROI to determine the total cumulative impacts. Be aware that the Council on Environmental Quality has recently finalized guidance on assessing cumulative impacts under NEPA.
4. Nearby residential areas should be documented and described in the DEIS. The potential for effects on local residential communities (including temporary construction impacts) should be discussed in the DEIS in keeping with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations. See Environmental Justice.

Water Quality

1. The COE should provide a listing of permits and approvals needed for the project (e.g., CWA Section 402 National Pollutant Discharge Elimination System, general construction, and stormwater related permits). Be aware that while EPA Region IX issues NPDES permits, the Arizona Department of Environmental Quality has responsibility for water quality certification under CWA Section 401g.
2. The DEIS should evaluate the potential of the proposed project to cause adverse aquatic impacts (e.g., increased siltation and turbidity in surface waters, changes in dissolved oxygen,

and temperature changes), deterioration of aquatic habitats, and water quantity changes.

3. The DEIS should discuss potential impacts to existing beneficial uses of the Rio de Flag.

Section 404 Comments

The DEIS should identify potential impacts to wetlands and other aquatic resources protected under the CWA Section 404, including requirements and any associated proposals to ensure compliance. EPA will review the proposed action for compliance with the Federal Guidelines for Specification of Disposal Sites for Dredged or Fill Materials (40 CFR 230) [Guidelines], promulgated pursuant to Section 404(b)(1) of the CWA. To comply with the Guidelines, the proposed action must meet all of the following criteria:

- There is no practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem (40 CFR 230.10(a)).
- The proposed action does not violate State water quality standards, toxic effluent standards, or jeopardize the continued existence of federally listed species or their critical habitat (40 CFR 230.10(b)).
- The proposed action will not cause or contribute to significant degradation of waters of the United States, including wetlands (40 CFR 230.10(c)). Significant degradation includes loss of fish and wildlife habitat, including cumulative losses.
- All appropriate and practicable steps are taken to minimize adverse impacts on the aquatic ecosystem (i.e., mitigation) (40 CFR 230.10(d)). This includes incorporation of all appropriate and practicable compensation measures for unavoidable losses to waters of the United States, including wetlands. The DEIS should fully address the feasibility of "in-kind" habitat mitigation measures.

Pesticides, Herbicides, and Hazardous Materials

1. The DEIS should discuss known or suspected hazardous materials contamination at the site, and whether the proposed project would have the potential to affect planned or ongoing efforts that may be underway to remediate hazardous substances contamination of soil and/or groundwater.
2. For both the construction and maintenance phases of the project, discuss whether herbicides or pesticides would be used for vegetation clearance, management, or other activities. If use of herbicides or pesticides are proposed, discuss potential impacts to non-target species, water quality, visitors to the area, or local residents. Appropriate mitigation measures should also be discussed.

Air Quality

The DEIS should provide a discussion of air quality standards, ambient air quality conditions, and potential air quality impacts of the proposed project, including cumulative and indirect impacts. Federal agencies are required by the CAA to assure that actions conform to an approved air quality implementation plan. General Conformity Regulations can be found in 40 CFR Parts 51 and 93 (58 Federal Register, page 63214, November 30, 1993). These regulations should be examined for applicability to the proposed action.

Environmental Justice

In keeping with Executive Order 12898, **Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations** (EO 12898), the DEIS should describe the measures taken by the COE to fully analyze the environmental effects of the proposed Federal action on minority communities, e.g. Indian Tribes, and low-income populations, and to present opportunities for affected communities to provide input into the NEPA process. The intent and requirements of EO 12898 are clearly illustrated in the President's February 11, 1994 Memorandum for the Heads of all Departments and Agencies. Be aware that the Council on Environmental Quality is finalizing its guidance memorandum to federal agencies on incorporating Environmental Justice analyses into NEPA documents.



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13 March 1998

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602/929-0292

Tucson
949 E. Second Street
85719
520/628-5774

Yuma
240 Madison Avenue
85384
520/782-1811

To: David Compas, Environmental Coordinator
U.S. Army Corps of Engineers

From: Susan Wilcox, Arizona Historical Society, NAD *SW*
RE: EIS, Rio de Flag Feasibility Study

We hope that the EIS will give serious consideration to the historic resources in the proposed Rio de Flag study area. The map distributed at the Feb. 27 1998 meeting indicates that the study area could include seven historic districts (Railroad Addition, Townsite, North End, Normal School, Lowell Observatory, Southside, Old Town) and some individual properties in the multiple resource area.

Many of these districts represent not only a significant assemblage of residential, commercial and public buildings, but also viable neighborhoods whose citizens are concerned about the quality and continuity of the community. Some of these districts, particularly Southside/ Old Town were built and occupied by working class families of Hispanic, Basque and African-American origins, as well as those from Anglo-European backgrounds. In these neighborhoods are found the homes of the people who kept the lumbermills, the railroad and the college open and running. Preservation of this physical evidence of the social and economic history of Flagstaff's past is critical to an understanding of all the patterns that formed a part of the community's growth. Failure to recognize the value of a range of resources produces an elitist, "mansion mentality," serves few and produces a distorted view of the the effort, energy and sacrifice that were all a part of the process leading to the town's current character and appearance.



It is important that those affected by a flooding Rio de Flag be protected. It is equally important that they not be driven from homes occupied for three or four generations by demolition or gentrification. If desirable "riverside" residential and commercial districts are created as a result of the development of park or natural riparian areas, some protection for the original inhabitants should be made available. Steeply rising property values associated with channel control can drive elderly and low income families from their homes and change forever the character of the historic district.

We are certain you are aware that there are many segments of the Rio de Flag which are already riparian areas, of both native and naturalized species. These sections are also of value as part of the "street scape" and general character of the historic districts.

We appreciate the opportunity to comment, and will be happy to help the team as they need access to historic materials. Please don't hesitate to call us if you have questions.

March 18, 1998

Robert S. Joe, Chief
Planning Division
Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

RE: Flagstaff; Rio de Flag Feasibility Study, Scoping Meeting; DOD-Corps

Dear Mr. Joe,

Thank you for notifying this office of the scoping meeting; unfortunately, I was unable to attend. Please do keep this office on the project mailing list.

The City of Flagstaff is a participant in the Certified Local Government Program established by the National Historic Preservation Act, and as such has a historic district or districts, as well as local historic preservation ordinances. Jeffe Aronson is the Flagstaff Historic Preservation Commission Chair and may be reached at the address below.

In addition to historic buildings and structures, archaeological sites are numerous in the Flagstaff area. Although some areas have been systematically surveyed in order to locate such resources, many areas have not been surveyed. We recommend that a program to locate historic properties of all types should be a part of the Environmental Impact Statement, and we look forward to working with Corps of Engineers' archaeological staff as the project moves forward.

Your continued cooperation with this office in meeting the historic preservation requirements for Federal undertakings is appreciated. If you have any questions, please call me at (602) 542-7137 or 542-4009.

Sincerely,



Carol Heathington
Compliance Specialist
State Historic Preservation Office

c: Jeffe Aronson, Chair, Flagstaff Historic Preservation Commission,
323 W. Aspen Avenue, Flagstaff, AZ 86001



Jane Dee Hull
Governor

STATE PARKS
BOARD MEMBERS

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Joseph H. Holmwood
Mesa

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Commissioner

Kenneth E. Travous
Executive Director

Charles R. Eatherly
Deputy Director

300 West Washington
Phoenix, Arizona 85007

Tel & TTY: 602-542-4174
1-800-285-3703
from (520) area code
<http://www.pr.state.az.us>

General Fax:
602-542-4180

Director's Office Fax:

U.S. ARMY CORPS OF ENGINEERS
RIO DE FLAG FEASIBILITY STUDY
NEPA SCOPING MEETING COMMENT SHEET

If you have information, data, or comments identifying relevant environmental, historic preservation, and socioeconomic issues to be addressed in the environmental analysis please indicate on this sheet and/or submit your information to:

U.S. Army Corps of Engineers
Los Angeles District, Environmental Planning Section
Attn: David Compas, Environmental Coordinator
P.O. Box 532711
Los Angeles, CA 90053-2325

Your participation and/or comments are valuable to this effort. Thank you for your participation.

NAME: Susan Hank Bean

ADDRESS: 4680 Lake Mary Road, Flagstaff AZ 86001

PHONE: (520) 779-4381 AFFILIATION: private citizen
hankbeane@aol.com

Comments:

I appreciate your efforts to involve the public in the
planning process. Please continue to keep me informed.

My main concern is for the well-being of special
plants that may grow along the course of the Rio de Flag and
its tributaries. For this reason, I have forwarded a copy of
this form and your fact sheet and map to:

Philip Quotschly, Vice Chairman

Hopi Tribal Council, P.O. Box 123

Kykotsmavi, AZ 86039

Thanks for involving us all in the process!

Cheers,

Susan Bean

APPENDIX H-3
NOTICE OF AVAILABILITY
(NOVEMBER 1999 DRAFT EIS)

numbers for EPA's regulations are listed in 40 CFR part 9 and 48 CFR Chapter 15.

The EPA would like to solicit comments to:

(i) Evaluate whether the proposed collection of information is necessary for the proper performance of the functions of the agency, including whether the information will have practical utility;

(ii) Evaluate the accuracy of the agency's estimate of the burden of the proposed collection of information, including the validity of the methodology and assumptions used;

(iii) Enhance the quality, utility, and clarity of the information to be collected; and

(iv) Minimize the burden of the collection of information on those who

are to respond, including through the use of appropriate automated electronic, mechanical, or other technological collection techniques or other forms of information technology, e.g., permitting electronic submission of responses.

Burden Statement: EPA estimates that the average annual burden for this ICR is 1,091,445 hours for CAFO respondents (i.e., facilities that may be required to apply for and obtain an NPDES permit), 92,400 hours for States authorized to implement the NPDES permitting program for CAFOs, and 447 hours for Federal agencies. The estimated total number of CAFO respondents over the reporting period is 9,145. This ICR covers a three-year period and the number of respondents per year is phased in at approximately

20 percent in the first year, 40 percent in the second year, and 40 percent in the third year, yielding an annual average number of CAFO respondents of 5,487. Based on this annual average, EPA estimates that there will be 10,974 responses per year, some of which represent one-time responses while others occur annually after CNMP development has been completed. EPA estimates that the average burden per response will be 99 hours, although the burden to develop CNMPs will be larger than the burden for reporting activities. Average total annual O&M costs for manure and soil samples is \$665,373 for all respondents; there are no capital costs associated with this ICR. Table 1 summarizes these and other details of the ICR burden and cost estimates.

TABLE 1.—SUMMARY OF BURDEN AND COSTS FOR THE GUIDANCE MANUAL AND EXAMPLE NPDES PERMIT FOR CONCENTRATED ANIMAL FEEDING OPERATIONS INFORMATION COLLECTION REQUEST

Category	Burden or cost
CAFO Burden by Response:	
—One-time CNMP Development Burden (hours) (A)	1,025,072
—One-time CNMP Development Notification Burden (hours) (B)	3,048
—Annual CNMP Certification Burden (hours) (C)	2,439
—Annual Record Keeping Burden (hours) (D)	60,887
Total Annual CAFO Response Burden (hours) (A+B+C+D)	1,091,445
Annual Manure/soil Sample Cost (\$)	\$665,373
Annual Number of Responses (E)	10,974
Average Burden per Response (hours) (A+B+C+D)/(E)	99
Annual State Burden (hours)	92,400
Annual Federal Burden (hours)	447

Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

Dated: November 15, 1999.

Alfred Lindsey,

Deputy Director, Office of Wastewater Management.

[FR Doc. 99-30234 Filed 11-18-99; 8:45 am]

BILLING CODE 6560-50-U

ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-6248-2]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information, (202) 564-7167 or www.epa.gov/oeca/ofa.

Weekly receipt of Environmental Impact Statements filed November 08, 1999 through November 12, 1999 pursuant to 40 CFR 1506.9.

EIS No. 990423, Final EIS, NPS, NB, Homestead National Monument of America, General Management Plan, Implementation, Gage County, NB, Due: December 20, 1999, Contact: Michael Madell (608) 264-5257.

EIS No. 990424, Draft EIS, FHW, FL, FL-423 (John Young Parking), Improvements from FL-50 to FL-434, City of Orlando, Orange County, FL, Due: January 04, 2000, Contact: Mark Bartlett (850) 942-9650.

EIS No. 990425, Draft EIS, SFW, AK, Wolf Lake Area Natural Gas Pipeline Project, Construction, Approval Right-

of-Way Grant and COE Section 404 Permit, Kenai National Wildlife Refuge, AK, Due: January 18, 2000, Contact: Brian L. Anderson (907) 786-3379.

EIS No. 990426, Draft EIS, USA, CA, Oakland Army Base Disposal and Reuse Plan, Implementation, City of Oakland, Alameda County, CA, Due: January 03, 2000, Contact: Theresa Persick Arnold (703) 697-0216.

EIS No. 990427, Final EIS, NPS, CA, Redwood National and State Parks General Management Plan, Implementation, Humboldt and Del Norte Counties, CA, Due: December 20, 1999, Contact: Alan Schmierer (415) 427-1441.

EIS No. 990428, Final EIS, FRC, IL, MI, PA, IN, OH, NJ, Independence Pipeline and Market Link Expansion Projects, Construction and Operation, Interstate National Gas Pipeline, (Docket Nos. CP97-315-001, CP97-319-000, CP98-200-000 and CP98-540-000), NPDES and COE Section 404 Permits, IL, IN, MI, OH, PA and NJ, Due: December 20, 1999, Contact: Paul McKee (202) 208-1088.

EIS No. 990429, Draft EIS, FRC, MT, ID, Cabinet Gorge (No. 2058-014) and Noxon Rapids (No. 2075-014) Hydroelectric Project, Relicensing, MT and ID, Due: January 03, 2000, Contact: Bob Easton (202) 219-2782.

EIS No. 990430, Draft EIS, COE, AZ, Rio de Flag Flood Control Study, Improvement Flood Protection, City of Flagstaff, Coconino County, AZ, Due: January 04, 2000, Contact: David Compas (213) 452-3850.

EIS No. 990431, Draft EIS, FHW, OH, Meigs-124-21.16 Transportation Corridor, Relocating existing OH-124 and US 33, Meigs County, OH, Due: January 10, 2000, Contact: Timothy M. Hill (614) 644-0377.

EIS No. 990432, Final EIS, AFS, CO, Arapahoe Basin Ski Area Master Development Plan, Construction and Operation, COE Section 404 Permit, White River National Forest, Dillon Ranger District, Summit County, CO, Due: December 20, 1999, Contact: Michael Liu (970) 468-5400.

EIS No. 990433, Draft EIS, FTA, CA, Vasona Corridor Light Rail Transit Project, Extension of existing Light Rail Transit (LRT), in portion of the Cities of San Jose, Campbell and Los Gatos, Santa Clara County, CA, Due: January 03, 2000, Contact: Jerome Wiggins (415) 744-3115.

EIS No. 990434, Final EIS, DOE, CA, NM, TX, ID, SC, WA, Surplus Plutonium Disposition (DOE/EIS-0283) for Siting, Construction and Operation of three facilities for Plutonium Disposition, Possible Sites Hanford, Idaho National Engineering and Environmental Laboratory, Pantex Plant and Savannah River, CA, ID, NM, SC, TX and WA, Due: December 20, 1999, Contact: G. Bert Stevenson (202) 586-5368.

Dated: November 16, 1999.

William D. Dickerson,
Director, NEPA Compliance Division,
Office of Federal Activities.

[FR Doc. 99-30289 Filed 11-18-99; 8:45 am]

BILLING CODE 6560-50-U

ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-6248-3]

Environmental Impact Statements and Regulations; Availability of EPA Comments

Availability of EPA comments prepared November 01, 1999 through November 05, 1999 pursuant to the Environmental Review Process (ERP), under Section 309 of the Clean Air Act and Section 102(2)(c) of the National

Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of Federal Activities at (202) 564-7167.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 10, 1999 (63 FR 17856).

Draft EISs

ERP No. D-AFS-J65312-WY—Rating EC2, Squirrel Meadows—Grand Targhee Land Exchange Proposal, Implementation, Targhee National Forest, Teton County, WY.

Summary: EPA has environmental concerns about the lack of analysis on the direct and indirect impacts to wetlands and wildlife habitat from the additional development in proposed alternatives B, C, and D. Because the land exchange and resulting base area development are "connected actions" EPA believe a more detailed environmental analysis is required.

ERP No. D-AFS-K65219-CA—Rating EC2, Eldorado and Tahoe National Forests Land and Resource Management Plan, Standard and Guidelines for the Grazing Allotments, Implementation, CA.

Summary: EPA expressed environmental concerns with the potential resource shortfalls that might prevent monitoring and restoration activities as well as a lack of mandatory reductions in AUMs, elimination of grazing on specific allotments, or the triggering of additional protections when monitoring goals are not achieved.

ERP No. D-AFS-L65332-OR—Rating LO, Ashland Creek Watershed Protection Project, Proposal to Manage Vegetation, Rogue River National Forest, Ashland Ranger District, City of Ashland, Jackson County, OR.

Summary: EPA Region 10 used a screening tool to conduct a limited review of this action. Based upon the screen, EPA does not foresee having any environmental objections to the proposed project.

ERP No. D-FAA-A52169-00—Rating LO, Programmatic EIS—Commercial Launch Vehicles, Implementation, Issuing a Launch License.

Summary: EPA had no objection to the proposed action, although some text clarification suggestion were provided.

ERP No. D-FHW-J40151-WY—Rating EC2, Wyoming Forest Highway 23 Project, Louis Lake Road also known as Forest Development Road 300, Improvements from Bruce's Parking Lot to Worthen Meadow Road, Funding, NPDES Permits and COE Section 404 Permit, Shoshone National Forest, Fremont County, WY.

Summary: EPA expressed environmental concerns regarding the analysis of cumulative/indirect impacts and the range of alternatives. EPA requested that mitigation be included to reduce erosion and sedimentation of adjacent water and also requested additional information on alternatives for the existing roadway and potential cumulative effects to wildlife in the Forest.

ERP No. D-FRC-L05220-WA—Rating EC2, Warm Creek (No. 10865) and Clearwater Creek (No. 11485) Hydroelectric Project, Issuance of License for the Construction and Operation, Located in the Middle Fork Nooksack River (MFNR) Basin, WA.

Summary: EPA expressed concerns over the purpose and need for the projects, given their very small size; potential impacts to salmonids in the event of access above the Middle Fork Nooksack River diversion dam, which is downstream from the projects; and a lack of a true cost benefit analysis.

ERP No. DS-FHW-G50008-00—Rating EC2, Great River Bridge, Construction, US 65 in Arkansas to MS-8 in Mississippi, Funding, COE Section 404 Permit and US Coast Guard Bridge Permit, Desha and Arkansas Counties, AR and Bolivar County, MS.

Summary: EPA expressed environmental concerns regarding wetland and wildlife habitat impacts and the mitigation of these impacts. EPA requested that additional information be provided on these issues in the next document.

Final EISs

ERP No. F-AFS-L60106-ID, Long Prong Project, Timber Harvesting, Road Construction and Reconstruction, Boise National Forest, Cascade Ranger District, Valley County, ID.

Summary: No formal comment letter sent to the lead agency.

ERP No. F-AFS-L65290-ID, North Lochsa Face Landscape and Watershed Assessment Project, Implementation, Clearwater National Forest, Lochsa Ranger District, Idaho County, ID.

Summary: No formal comment letter was sent to the preparing agency.

ERP No. F-AFS-L65303-WA, I-90 Land Exchange between Forest Service and Plum Creek, within the Vicinity of the Wenatchee, Mt. Baker-Snoqualmie and Gifford Pinchot National Forests, Kittitas, King, Pierce, Lewis, Cowlitz and Skamania Counties, WA.

Summary: EPA expressed lack of objections.

ERP No. F-COE-L32010-OR, Columbia and Lower Willamette River Federal Navigation Channel,

APPENDIX H-4
EXTENSION OF PUBLIC COMMENT PERIOD
(NOVEMBER 1999 DRAFT EIS)

RETRIEVABILITY:

Automated and paper records pertaining to administrative investigation cases are indexed through the use of a computerized cross-reference system; they may be retrieved by individual names or case numbers.

SAFEGUARDS:

Records, both paper and automated, are accessible only to Office of the Assistant Inspector General for Departmental Inquiries personnel having official need therefor and are stored in locked rooms. The automated system is password protected, and regular back-ups of data are performed.

RETENTION AND DISPOSAL:

Automated and paper records are retained for a period of ten years following completion of final action.

SYSTEM MANAGER(S) AND ADDRESS:

Office of the Assistant Inspector General for Departmental Inquiries, Office of the Inspector General, Department of Defense, 400 Army Navy Drive, Arlington, VA 22202-2884.

NOTIFICATION PROCEDURE:

Individuals seeking to determine whether this system of records contains information about themselves should address written inquiries to the Chief, Freedom of Information Act/Privacy Act Office, 400 Army Navy Drive, Arlington, VA 22202-2884.

The request should contain the individual's full name, address, and Social Security Number. Requests submitted on behalf of other persons must include their written authorization. Provision of the Social Security Number is voluntary and it will be used solely for identification purposes. Failure to provide the Social Security Number will not affect the individual's rights.

RECORDS ACCESS PROCEDURES:

Individuals may access agency records or information about themselves should address written inquiries to the Chief, Freedom of Information Act/Privacy Act Office, 400 Army Navy Drive, Arlington, VA 22202-2884.

The request should contain the individual's full name, address, and Social Security Number. Requests submitted on behalf of other persons must include their written authorization. Provision of the Social Security Number is voluntary and it will be used solely for identification purposes. Failure to provide the Social Security Number will not affect the individual's rights.

CONTESTING RECORD PROCEDURES:

The OIG's rules for accessing records and for contesting contents and appealing initial agency determinations are published in 32 CFR part 312 or may be obtained from the system manager.

RECORD SOURCE CATEGORIES:

Information was obtained from sources, subjects, witnesses, all levels of government, private businesses, and nonprofit organizations.

EXEMPTIONS CLAIMED FOR THE SYSTEM:

Investigatory material compiled for law enforcement purposes may be exempt pursuant to 5 U.S.C. 552a(k)(2). However, if an individual is denied any right, privilege, or benefit for which he would otherwise be entitled by Federal law or for which he would otherwise be eligible, as a result of the maintenance of such information, the individual will be provided access to such information except to the extent that disclosure would reveal the identity of a confidential source.

An exemption rule for this record system has been promulgated in accordance with the requirements of 5 U.S.C. 553(b) (1), (2), and (3), (c) and (e) and published in 32 CFR part 312. For additional information contact the system manager.

[FR Doc. 99-33698 Filed 12-28-99; 8:45 am]

BILLING CODE 5001-10-F

DEPARTMENT OF DEFENSE**Department of the Army****Reserve Officer's Training Corps (ROTC) Program Subcommittees; Notice of Open Meeting**

In accordance with Section 10(a)(2) of the Federal Advisory Committee Act (5 U.S.C., App. 2), announcement is made of the following Committee meeting:

Name of Committee: Reserve Officers's Training Corps (ROTC) Program Subcommittee.

Date of Meeting: 6-8 February 2000.

Place: Pentagon, Washington, DC.

Time: 0800-1700 hours.

Proposed Agenda: Review and discuss status of Army ROTC since the July 1999 meeting held in Louisville, KY.

This meeting is open to the public. Any interested person may attend, appear before, or file statements with the committee. For further information, contact: Commander U.S. Army Cadet Command, ATTN: ATCC-TT (MAJ Hewitt), Fort Monroe, VA 23651; (757) 728-5456.

C. Paul Whitaker

Colonel, GS., Acting Chief of Staff.

[FR Doc. 99-33409 Filed 12-28-99; 8:45 am]

BILLING CODE 3710-08-M

DEPARTMENT OF DEFENSE**Department of the Army; Corps of Engineers****Rio de Flag Flood Control Study Environmental Impact Statement**

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Extension of comment period.

SUMMARY: Notice of Availability for the Rio de Flag Flood Control Study Draft Environmental Impact Statement was published in the **Federal Register**, Volume 64, No. 223 on November 19, 1999. The public comment is scheduled to conclude on January 4, 2000. However, in response to requests received from the public, the comment period will be extended two weeks and comments will be due on January 18, 2000.

FOR FURTHER INFORMATION CONTACT: Mr. David Compas, (213) 452-3850.

SUPPLEMENTARY INFORMATION: None.

Mary V. Yonts,

Alternate Army Federal Register Liaison Officer.

[FR Doc. 99-33769 Filed 12-28-99; 8:45 am]

BILLING CODE 3710-08-M

DEPARTMENT OF EDUCATION**Notice of Proposed Information Collection Requests**

AGENCY: Department of Education.

ACTION: Notice of proposed information collection requests.

SUMMARY: The Leader, Information Management Group, Office of the Chief Information Officer, invites comments on the proposed information collection requests as required by the Paperwork Reduction Act of 1995.

DATES: An emergency review has been requested in accordance with the Act (44 U.S.C. Chapter 3507 (j)), since public harm is reasonably likely to result if normal clearance procedures are followed. Approval by the Office of Management and Budget (OMB) has been requested by December 30, 1999. A regular clearance process is also beginning. Interested persons are invited to submit comments on or before February 28, 2000.

ADDRESSES: Written comments regarding the emergency review should be addressed to the Office of Information and Regulatory Affairs, Attention: Danny Werfel, Desk Officer: Department of Education, Office of Management and Budget; 725 17th Street, NW, Room 10235, New

APPENDIX H-5
NOTICE OF AVAILABILITY
(JUNE 2000 DRAFT EIS)

Alaska Department of Fish and Game and polarconsult alaska, inc and are addressed in the FEA.

The FEA contains the staff's analysis of the potential environmental impacts of the project and concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

Copies of the FEA are available for review in the Commission's Public Reference Room, Room 2A, at 888 First Street, N.E., Washington, D.C. 20426, and may also be viewed on the web at <http://www.ferc.fed.us/online/rims.htm> (please call (202) 208-2222 for assistance).

David P. Boergers,
Secretary.

[FR Doc. 00-16570 Filed 6-29-00; 8:45 am]

BILLING CODE 6717-01-M

ENVIRONMENT PROTECTION AGENCY

[ER-FRL-6608-6]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564-7167 www.epa.gov/oeca/ofa.

Weekly receipt of Environmental Impact Statements

Filed June 19, 2000 Through June 23, 2000

Pursuant to 40 CFR 1506.9.

EIS No. 000201, Draft EIS, AFS, ID, Myrtle-Cascade Projected, Implementation of Resource Management Activities, Idaho Panhandle National Forests, Bonners Ferry Ranger District, Boundary County, ID, Due: August 14, 2000, Contact: Pat Behresn (208) 267-6743.

EIS No. 000202, Final EIS, COE, AZ, Tres Rios Feasibility Study Project, Ecosystem Restoration, Located at the Salt, Gila and Agua Fria Rivers, City of Phoenix, Maricopa County, AZ, Due: July 31, 2000, Contact: Alex Watt (213) 452-3860.

EIS No. 000203, Final EIS, IBR, NB, KS, Republican River Basin Long-Term Water Supply Contract Renewals for Five Irrigation Districts, Frenchman-Cambridge, Frenchman Valley and Bostwick Irrigation District in Nebraska and Bostwick No. 2 and Almena Irrigation Districts on Kansas, NB and KS, Due: July 31, 2000, Contact: Jill Manring (308) 389-4557.

EIS No. 000204, Final EIS, COE, TX, Programmatic EIS—Upper Trinity

River Basin Feasibility Study, To Provide Flood Damage Reduction, Environmental Restoration, Water Quality Improvement and Recreational Enhancement, Trinity River, Dallas-Fort Worth Metroplex, Dallas, Denton and Tarrant Counties, TX, Due: July 31, 2000, Contact: Gene T. Rice (817) 978-2110.

EIS No. 000205, Final EIS, FHW, CA, CA-238 Construction, near Industrial Parkway to CA-238/I-580 Interchange, Funding, and 404 Permit, City of Hayward, Alameda County, CA, Due: July 31, 2000, Contact: robert F. Tally (916) 498-5020.

EIS No. 000206, Final Supplement, FHW, VA, DC, MD, Woodrow Wilson Bridge Improvements, Updated Information concerning the Changes and Discusses in differences between Alternative 4A of the September 1997 FEIS and Current Design Alternative 4A, I-95/I-495 (Capital Beltway), Telegraph Road to MD-210, Funding, COE Section 10 and 404 Permits and CGD Bridge Permit Issuance, City of, Due: July 31, 2000, Contact: Eugene Keller (202) 482-7251.

EIS No. 000207, Draft EIS, FHW, WA, Southeast Issaquah Bypass, Construction Connecting Issaquah-Hobart Road in the South with I-90 at the Sunset Interchange, Right-of-Way Permit, NPDES Permit and COE Section 404 Permit, King County, WA, Due: August 15, 2000, Contact: Don Petersen (360) 753-9413.

EIS No. 000208, Draft EIS, COE, WA, Programmatic EIS—Green/Duwamish River Basin Restoration Program, Capitol Improvement Type Program and Ecological Health, King County, WA, Due: August 14, 2000, Contact: Patrick Cagney (206) 764-6577.

EIS No. 000209, Draft EIS, COE, CA, Whitewater River Basin (Thousand Palms) Flood Control Project, Construction of Facilities to Provide Flood Protection, Coachella Valley, Riverside County, CA, Due: August 14, 2000, Contact: Hayley Lovan (213) 452-3863.

EIS No. 000210, Draft EIS, COE, CA, Upper Newport Bay Restoration Project, To Develop a Long-Term Management Plan to Control Sediment Deposition, Orange County, CA, Due: August 14, 2000, Contact: Larry Smith (213) 452-3846.

EIS No. 000211, Revised Draft EIS, COE, AZ, Rio de Flag Flood Control Study, Improvement and Flood Protection, To Reduce Damages to Residential Commercial, Industrial and Historic Property, City of Flagstaff, Coconino County, AZ, Due: August 14, 2000, Contact: David Compas (213) 452-3850.

EIS No. 000212, Final EIS, FHW, NM, New Mexico Forest Highway 45 (Forest Road 537) known locally as the Sacramento River Road, Improvements from Sunspot to Timberon, Otero County, NW, Due: July 31, 2000, Contact: Robert Nestel (303) 716-2142.

EIS No. 000213, Draft EIS, IBR, AZ, Central Arizona Project (CAP), Allocation of Water Supply and Long-Term Contract Execution, Maricopa, Pinal and Pima Counties, AZ, Due: August 25, 2000, Contact: Sandra Eto (602) 216-3857.

EIS No. 000214, Draft EIS, UAF, WY, F.E. Warren Air Force Base Deactivation and Dismantlement of the Peacekeeper Missile System, To Comply with the Strategic Arms Reduction Treaty (START), Laramie, Platte and Goshen Counties, WY, Due: August 14, 2000, Contact: Lee Schoenecker (703) 604-0552.

EIS No. 000215, Final EIS, DOE, TN, Treating Transuranic (TRU)/Alpha Low-Level Waste at the Oak Ridge National Laboratory, Construct, Operate, and Decontaminate/Decommission of Waste Treatment Facility, Oak Ridge, TN Due: July 21, 2000, Contact: Clayton Gist (865) 241-3498.

EIS No. 000216, Draft EIS, AFS, ID, West Mountain North Project, Timber Harvest, Road Construction and Reconstruction), Boise National Forest, Cascade Ranger District, Valley County, ID, Due: August 14, 2000, Contact: David D. Rittenhouse (208) 373-4100.

EIS No. 000217, Draft EIS, FHW, NB, Antelope Valley Study, Implementation of Stormwater Management, Transportation Improvements and Community Revitalization, Major Investment Study, City of Lincoln, Lancaster County, NB, Due: August 15, 2000, Contact: Edward Kosola (402) 437-5973.

EIS No. 000218, Final EIS, DOE, FL, JEA Circulating Fluidized Bed (CFB) Combustor Project, 300 Megawatt-Electric, Coal and Petroleum Coke-Fired, CFB Combustor and Boiler to Repower an existing Steam Turbine at JEA's Northside Generating Station Construction and Operation, Funding, Jacksonville, Duval County, FL, Due: July 31, 2000, Contact Lisa K. Hollingworth (304) 285-4992.

Amended Notices

EIS No. 000111, Draft EIS, SFW, NV, Stillwater National Wildlife Refuge Complex Comprehensive Conservation Plan and Boundary Revision, Implementation, Churchill

and Washoe Counties, NV, Due: July 12, 2000, Contact: Don DeLong (916) 414-6500. Revision of FR notice published on 04/21/2000: CEQ Comment Date has been Extended from 06/12/2000 to 07/12/2000.

EIS No. 000184, Draft EIS, COE, MS, TN, MS, TN, Wolf River Ecosystem Restoration, Memphis, Tennessee Feasibility Study, Marshall, Benton and Tippah Counties, MS and Shelby, Fayette and Hardeman, TN, Due: July 31, 2000, Contact: Richard Hite (901) 544-0706. Published FR-06-16-00—Correction to Title.

EIS No. 000187, Fianl Supplement, NOA, Atlantic Tunas, Swordfish and Sharks, Highly Migratory Species Fishery Management Plan, Due: July 17, 2000, Contact: Rebecca Lent (301) 713-2347. Published FR 06-16-00 Correction to Phone Number.

Dated: June 27, 2000.

Joseph C. Montgomery,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 00-16656 Filed 6-29-00; 8:45 am]

BILLING CODE 6560-50-M

ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-6608-7]

Environmental Impact Statement and Regulations; Availability of EPA Comments

Availability of EPA comments prepared June 12, 2000 Through June 16, 2000 pursuant to the Environmental Review Process (ERP), under Section 309 of the Clean Air Act and Section 102(2)(c) of the National Environmental Policy Act as amended. Requests for copies of EPA comments can be directed to the Office of FEDERAL ACTIVITIES AT (202) 564-7167.

An explanation of the ratings assigned to draft environmental impact statements (EISs) was published in FR dated April 14, 2000 (65 FR 20157).

Draft EISs

ERP No. D-AFS-L65356-ID Rating NR, Box Canyon Timber Sale, Vegetative Management, Implementation, Palisades Ranger District, Caribou-Targhee National Forest, Bonneville County, ID.

SUMMARY: EPA Region 10 used a screening tool to conduct a limited review of this action. Based upon this screen, EPA does not foresee having any environmental objections to the proposed project.

ERP No. D-COE-C39014-NJ Rating EO2, Raritan Bay and Sandy Hook Bay,

Hurricane and Storm Damage Reduction Project, Flood Control and Storm Damage Protection, Port Monmouth, Middletown Township, Monmouth County, NJ.

SUMMARY: EPA objected to the proposed mitigation plan, and recommended wetlands enhancement at a 3:1 ratio or creation of a Spartina dominated wetland at a 1:1 ratio. EPA requested more information on enhancement, monitoring, and borrow areas.

Final EISs

ERP No. F-SFW-L03009-AK Wolf Lake Area Natural Gas Pipeline Project, Construction, Approval Right-of-Way Grant and COE Section 404 Permit, Kenai National Wildlife Refuge, AK.

SUMMARY: No formal comment letter was sent to the preparing agency.

Dated: June 27, 2000.

Joseph C. Montgomery,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 00-16657 Filed 6-29-00; 8:45 am]

BILLING CODE 6560-50-M

ENVIRONMENTAL PROTECTION AGENCY

[FRL-6727-6]

Notice of Public Comment and Public Workshops; Western Regional Air Partnership

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This notice announces public workshops and a request for public comment sponsored by the Western Regional Air Partnership (WRAP). The workshops and the request for comments concern four proposed options regarding regional emissions milestones for stationary sources of sulfur dioxide (SO₂), as well as proposed recommendations regarding a backstop emissions trading program. EPA is publishing this notice on behalf of the WRAP.

DATES: See Supplementary Information section of this notice.

ADDRESSES: See Supplementary Information section of this notice for the Workshop locations.

FOR FURTHER INFORMATION CONTACT: Al Zemsky, Senior External Advisor, Air Division, (AIR-1), U.S. Environmental Protection Agency, Region IX, 75 Hawthorne Street, San Francisco, CA 94105, Telephone: (415) 744-1262.

SUPPLEMENTARY INFORMATION: The WRAP, comprising governors from

Western states, tribal leaders and federal agency representatives, is seeking public comment on four proposed options regarding regional emissions milestones for stationary sources of sulfur dioxide (SO₂), as well as proposed recommendations regarding a backstop emissions trading program. The comments are important for developing final recommendations for western air quality regulations to be submitted to the U.S. EPA.

The dates, times, and locations of the workshops and the availability of the documents to be reviewed for comment are described below.

Notice of Public Comment and Public Workshops

The Western Regional Air Partnership (WRAP), comprising governors from Western states, tribal leaders and federal agency representatives, is seeking public comment on four proposed options regarding regional emissions milestones for stationary sources of sulfur dioxide (SO₂), as well as proposed recommendations regarding a backstop emissions trading program. Public comments on these options are to be considered by the WRAP in developing final recommendations for sulfur dioxide emission reduction milestones and related western air quality issues. Under section 309 of the regional haze program (see 64 FR 35713; July 1, 1999), these recommendations are to be submitted to the U.S. Environmental Protection Agency (EPA) in October 2000.

Availability of Proposed Options

Availability of Proposed Options
Three documents are available for review on the WRAP Web site at www.wrapair.org. They are reports from the WRAP's Market Trading Forum, the Initiatives Oversight Committee, and a brief summary of the WRAP's proposal for comment. Copies may also be obtained by contacting: Patrick Cummins, Western Governors' Association; 600 17th Street, Suite 1705 S. Tower; Denver, Colorado 80202 (telephone: 303-623-9378; pcummins@westgov.org); or Bill Grantham, National Tribal Environmental Council; 2221 Rio Grande NW; Albuquerque, New Mexico 87104 (telephone: 505-242-2175; bgrantham@ntec.org).

Public Workshops Will Be Held on the Following Dates:

June 27: Santa Fe, New Mexico " 7 p.m.
Runnels Building Auditorium; 1190 St. Francis Drive
June 27: Las Vegas, Nevada " 10 a.m.-5 p.m. " Workshop for Tribes

APPENDIX I
MAILING LIST

RIO DE FLAG MAILING LIST

June 2000

Mr. Bob Holmes
U.S. Congressman
Mr J.D. Hayworth
1023 Longworth House Office Building
Washington, DC 20510-306

Phoenix Area Office
One North First Street
P.O. Box 10
Phoenix, AZ 85001

Ms. Patricia Brookins
U.S. Congressman
Mr J.D. Hayworth
1300 S. Milton Road, Suite 207
Flagstaff, AZ 86001

Hydrologist, River Forecast Center
National Weather Service
NOAA, USDC
1416 Ninth Street
Sacramento, CA 95814

Mr. Doug Nick
U.S. Congressman
Mr J.D. Hayworth
1017 S. Gilbert Street
Mesa, AZ 85204

Director
Advisory Council on Historic Preservation
12136 West Bayard Avenue
Suite #330
Lakewood, CO 80226

Director
Office of Environmental Policy & Compliance
U.S. Department of the Interior
Main Interior Building, Ms. 2340
1849 C Street, NW
Washington, DC 20240

Mr. David Farrel, Chief (2)
Federal Activities Office
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

Ms. Kathleen G Shimmin
Acting Regional Environmental Officer
U.S. Department of the Interior
600 Harrison Street, Suite 515
San Francisco, CA 94107-1376

U.S. Environmental Protection Agency
Office of Federal Activity
NEPA Compliance Division
EIS Filing Section
Ariel Rios Building (South Oval Lobby)
Mail Code 2252A, Room 7241
1200 Pennsylvania Avenue, NW
Washington, DC 20044

U.S. Forest Service
Coconino National Forest Supervisor
2323 Greenlaw Lane
Flagstaff, AZ 86004

Mr. Tom Ferrel
Walnut Canyon National Monument
2717 N. Steves Blvd., #3
Flagstaff, AZ 86004

U.S Fish & Wildlife Service
Ecological Services
2321 W. Royal Palm Rd., Ste. 104
Phoenix, AZ 85024-951

Director
United States Geologic Survey
2255 N. Gemini Drive
Flagstaff, AZ 86001

Bureau of Indian Affairs

The Honorable Jane Hull Governor of Arizona
ATTN: Constituent Services 1700 West
Washington Phoenix, AZ 85007

Arizona Department of Commerce
State Clearinghouse
3800 N. Central Ave., Suite 1400
Phoenix, AZ 85012

Mr. Randy Smith
Arizona Game and Fish Dept.
3500 S. Lake Mary Road
Flagstaff, AZ 86001

Mr. John Kennedy
Arizona Game & Fish Department
2221 West Greenway Road
Phoenix, AZ 85023 399

Terri Miller
AZ Department of Water Resources
500 N. Third Street
Phoenix, AZ 85004

Arizona Dept. of Transportation
Environmental Planning Service
205 S. 17th Ave., Rm. 240E
Phoenix, AZ 85007

Mr. Gary Hase, Jr.
Arizona State Land Department
3650 S. Lake Mary Road
Flagstaff, AZ 86001

Mr. Sam Garrison
Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Mr. Peter Jagow
ADEQ Nonpoint Source Unit
3033 N. Central Ave, 3rd Floor
Phoenix, AZ 85012

Mr. Harley Hiett
ADEQ Northern Regional Office
2501 N. Fourth Street, Rm. 4

Flagstaff, AZ 86004

Mr. James Garrison, AIA
State Historic Preservation Officer
1300 W. Washington
Phoenix, AZ 85007

Ms. Shelley Silbert
The Nature Conservancy
114 N. San Francisco Street, #100
Flagstaff, AZ 86001

Mr. Brad Ack
Grand Canyon Trust
2601 N. Fort Valley Rd.
Flagstaff, AZ 86001

Northern Arizona Audubon Society
P.O. Box 1496
Sedona, AZ 86339

Ms. Sharon Galbreath
Sierra Club- Plateau Group
P.O. Box 38
Flagstaff, AZ 86002

Mr. Peter Galvin
Southwest Center for Biodiversity
P.O. Box 710
Tucson, AZ 85702

Director
National Resource Conservation Service
1585 S. Plaza Way
Flagstaff, AZ 86001

Navajo Nation
Division Of Natural Resources
P.O. Box 4098
Window Rock, AZ 86515

Mr. Philip Quotshytewa, Vice Chairman
Hopi Tribal Council
P.O. Box 123
Kykotsmovi, AZ 86039

Mr. Sam Hitt
Forest Guardians
1413 Second Street
Sante Fe, NM 87505

Mr. David Kwail
YavapaiApache Tribe
P.O. Box 1188
Camp Verde, AZ 86322

Mr. Amis Holm
SWCA Environmental Consultants
114 N San Francisco Street
Suite 100
Flagstaff, AZ 86001

Trout Unlimited
2330 N. 31st. Ave.
Phoenix, AZ 85009

Mr. Warren Smith
7700 Slayton Ranch Rd.
Flagstaff, AZ 86004

Arizona Wildlife Federation
644 N. Country Club, Ste. E
Mesa, AZ 85201

Mr. Pete Coffin
4455 Wild Elk Trail
Flagstaff, AZ 86004

American Fisheries Society
2222 W. Greenway Rd.
Phoenix, AZ 85023

Lon & Kathy Franklin
972 N. Wakonda
Flagstaff, AZ 86004

Arizona Native Plant Society
P.O. Box 41206 Sun Station
Tucson, AZ 85717

R.J. McCoy
P.O. Box 716
Flagstaff, AZ 86002

Friends of the River
P.O. Box 1115
Flagstaff, AZ 86002

Tom & Jan Moffitt
4825 Mt. Pleasant Drive
Flagstaff, AZ 86004

The Arboretum
P.O. Box 670
Flagstaff, AZ 86002

Mr. Mark Flynn
3500 S. Walkup Drive
Flagstaff, AZ 86001

Sierra Club Legal Defense Fund
180 Montgomery St., #1400
San Francisco, CA 94104

Mr. Rich Johnson
3320 Moore Circle
Flagstaff, AZ 86001

Wilderness Society
510 Galisto St.
Santa Fe, NM 87501

Mr. Glenn Ross
3900 E. Industrial Dr.
Flagstaff, AZ 86004

Mr. Bob Best
909 N. Leroux Street
Flagstaff, AZ 86001

Ms. Patty Rubick Lutroll
Tall Pines Environmental
2. S. Beaver Street, Ste. 2
Flagstaff, AZ 86001

Mr. Bill Towler, Community Development Director
Coconino County
219 E. Cherry Avenue
Flagstaff, AZ 86001

Nikolai Ramsey
113 N. San Francisco St.
Apt. 207
Flagstaff, AZ 86001

Professor H. Paul Friesema
Institute for Policy Research
Northwestern University
2040 Sheirdan Road
Evanston, IL 60208-1100

Kelly Gibson
P.O. Box 3943
Flagstaff, AZ 86003

Ms. Susan Bean
4680 Lake Mary Road
Flagstaff, AZ 86001

Elson Miles
123 S. O'Leary Street
Flagstaff, AZ 86001

Mr. Rick Moore
405 West Cheery Ave.
Flagstaff, AZ 86001

Dr. Michael Edgley
2606 N. Patterson
Flagstaff, AZ 86004

Mr. Maury Herman
Coast and Mountain Properties, Inc.
3 N. Leroux Street, Suite 201
Flagstaff, AZ 86001

Mr. William L. Grafton
3320 S. Justin
Flagstaff, AZ 86001

Ms. Rose Houk
P.O. Box 22311
Flagstaff, AZ 86002

Mr. Peter Bloomer
427 S. San Francisco Street
Flagstaff, AZ 86001

Mr. Michael Gibson
2421 Fremont
Flagstaff, AZ 86001

Jeffe Aronson
215 N. Bonito Street
Flagstaff, AZ 86001

Jessie Mangum
613 N Navajo Road
Flagstaff, AZ 86001

Kelly Burke
Grand Canyon Wildlands Council
P.O. Box 1594
Flagstaff, AZ 86002

Randy & Sharon Waltip
911 N Navajo Drive
Flagstaff, AZ 86001

Arizona Historical Society
2340 N. Fort Valley Road
Flagstaff, AZ 86001

Mr. & Ms. Wef
1007 N Navajo
Flagstaff, AZ 86001

Ms. Bonnie Feather

1015 N Navajo Drive

Flagstaff, AZ 86001

Ms. Heather Green
2206 Lantern Lane
Flagstaff, AZ 86001

Ms. Linda Henden, LAIT
Wenk Associates, Ind.
1035 Cherokee Street
Denver, CO 80204

Ms. Mimi Murov
801 W Summit
Flagstaff, AZ 86001

Mr. Michael Conner
211 W Aspen Ave.
Flagstaff, AZ 86001

Ms. Daren KinnHerman
2240 N Fremont
Flagstaff, AZ 86001

Mike & Riki Parvin
211 S San Francisco
Flagstaff, AZ 86001

Mr. Rick Brandel
3263 S Dibble
Flagstaff, AZ 86011

Ms. Anne Witthe
1616 N Owl Road
Flagstaff, AZ 86001

Mr. David Evans
2380 N Oakmont Drive
Flagstaff, AZ 86001

Mr. Stan Mish
1620 Spyglass
Flagstaff, AZ 86004

Ms. Connie Kim
223 W Cherry Ave.
Flagstaff, AZ 86001

Mr. & Ms. Patterson
Apt. 219
700 Blackbird Roost Street
Flagstaff, AZ 86001

Mr. Mike Clifton
P.O. Box 357
Flagstaff, AZ 86002

Mr. Sean Evans
Cline Library, Reference Desk
Northern Arizona University
Knobs Drive
Flagstaff, AZ 86002

Mr. Sam Arrowood
U.S. Army Corps of Engineers
3636 North Central Avenue
Phoenix, AZ 85012

**The document will be available during the
public comment period foreview at**

Flagstaff City Hall
Community Development Department
211 West Aspen Avenue
Flagstaff, AZ 86001

Flagstaff Public Library
Reference Desk
300 West Aspen Avenue
Flagstaff, AZ 86001

APPENDIX J
THE ARBORETUM AT FLAGSTAFF
RIO DE FLAG PLANTING RECOMMENDATIONS

RIO DE FLAG CHANNELIZATION RECOMMENDATIONS

Prepared for the Army Corps of Engineers by Jan Busco and Joyce Maschinski, PhD, The Arboretum at Flagstaff, July 25, 2000.

GENERAL RECOMMENDATIONS:

1) Make decisions about the plants and seed that will be used for the revegetation and order them 24 months prior to the time of planting. This will assure that desired native species and quantities of plants will be available for your project. If specific genotypes (locally adapted) are desired, then the plants desired for the revegetation project can be propagated from local sources. Plant with plants, not seed, whenever possible. *Salix exigua* and *Salix lasiolepis* can be planted from whips if necessary.

2) We recommend planting grass plugs and at least 1-gallon size shrubs in July after monsoon rains have started. Plant all perennial species with planting basins/depressions to catch precipitation and irrigation water. Container plants should be watered in container prior to planting, then receive a deep watering-in immediately once planted. These plants will require mulching to slow weed invasion and daily watering for 8 weeks, followed by weekly watering for 4-6 months. If you choose to plant in spring or fall, greater attention to watering will be needed.

Drip irrigation is recommended for plants while overhead irrigation is best for seedling establishment. Temporary irrigation systems should be designed to run for 2 years, and maintained regularly.

3) All slopes should be prepared with a rough, varied final texture (such as that created with a goosefoot or other implement) which will prevent erosion, catch moisture and hold seed on the slope. Horizontal topography best serves this purpose.

4) If only part of an area is to be seeded, seeding is best done in small patches that can be watered several times a day for 6 weeks. Seed with the recommended grass mix and mulch with a thin (1") layer of pine needles. Heavy mulching (at least 4" deep) between patches will slow weed incursion).

5) Disturbance along the Rio will be a prime opportunity for expansion of noxious and nasty weeds in our community. Noxious weeds in the area include Bull Thistle, Scotch Thistle, Diffuse Knapweed, Star Thistle (east Flagstaff), Dalmatian Toadflax and bindweed. Other serious weed pests in the area include Kentucky Bluegrass and Canada Bluegrass. Fill, straw, path materials and construction materials are often sources of weed seed and spread and clean materials of known origin should be chosen. Spring watering of disturbed areas will allow for germination of some weed seeds before planting. These species can be turned under into the soil after germination. After planting all areas will require weeding on a regular basis. We suggest instituting "Adopt a Mile Along the Rio" for weed maintenance. By being proactive, we can stay on top of the problem. Laura Moser, Coconino National Forest, is a contact for this program.

PLANTING RECOMMENDATIONS FOR SPECIFIC AREAS

For the area South of Route 66 along train tracks and for the area from Route 66 North to Cherry:

Channel/ Native grass mix: This is a general low-growing mixture which does not require mowing, but could tolerate it.

Bouteloua gracilis

Carex geophila

Achillea lanulosa v. *millefolium*

Muhlenbergia wrightii.

If the channel is not going to be mowed, *Muhlenbergia rigens* should be added to the mix.

Tall native grass mix: This is a mixture of native grasses and wildflowers which will tolerate steep slopes and dry conditions.

Achillea lanulosa v. *millefolium*

Elymus smithii

Festuca arizonica

Ipomopsis aggregata

Lupinus argenteus

Muhlenbergia rigens

Muhlenbergia wrightii

Oenothera hookeri

Poa fendleriana

Sphaeralcea parvifolia or *S. fendleri*

Verbena macdougalii

Trees and shrubs for downtown area:

Trees:

Acer negundo var. *interior*

Populus tremuloides

Pseudotsuga menziesii var. *glauca*

Juglans major

Juniperus scopulorum

Juniperus deppeana

Populus angustifolia

Quercus gambelli

Shrubs:

Amelanchier utahensis

Ceanothus fendleri

Cornus sericea

Holodiscus dumosus

Rhus trilobata

Ribes cereum

Robinia neomexicana

Rosa woodsii var. *arizonica*.

Salix exigua

Sambucus racemosa

Vines for downtown area:

Clematis ligusticifolia
Humulus americanus
Parthenocissus inserta
Vitis arizonica.

Birch to Cherry:

Choose from downtown species listed above as needed. Slopes should be planted with tall native grass mix and/or vines to avoid weed incursion.

Cherry to Sitgreaves

Concrete culvert with soil and plants on top. The many Siberian Elms will need replacement with quick-growing native trees. Soil should have a minimum depth of 4' but be deeper if possible

The Tall Native Grass mixture should be seeded or planted between all woody plants. Suggested plants for this stretch of the project are:

Trees: * recommended as dominant species

* *Acer negundo* var. *interior*

* *Robinia neomexicana*

Juglans major

Salix exigua

Salix lasiolepis

Sambucus racemosa

Shrubs and Vines:

Rhus trilobata

Ribes cereum

* *Rosa woodsii* var. *arizonica*.

Humulus americanus

Parthenocissus inserta

Vitis arizonica.

Sitgreaves and East of Bonito

Widen to Bonito

Wing walls before city yard. 3:1 slope. (earthen mound).

Use tall native grass mix on areas of disturbance.

For wing walls use the following:

Plants for Berms and wing walls:

Trees and shrubs:

Acer negundo var. *interius* (top)

Ceanothus fendleri

Parthenocissus inserta

Rhus trilobata

Ribes cereum

Rosa woodsii

Salix exigua

Sambucus caerulea

Top of berm: Short grass mixture

Slopes: Tall grass mix.

Thorpe Park and Dam at Duck Pond

Berm and floodwall, 6' across at top, 2-3' high or less. 3:1 slope.

Wing walls at south of dam to divert water to Bonito. One in semi-shady area, one in sun (may both be sunny if trees are removed for construction).

Plants for Berms and wing walls:

Trees and shrubs:

- Acer negundo var. interius
- Ceanothus fendleri
- Monarda fistulosa var. menthaefolia
- Rhus trilobata
- Ribes cereum
- Rosa woodsii
- Robinia neomexicana
- Salix exigua
- Sambucus caerulea

Top of berm: Short grass mixture

Slopes: Tall grass mix.

Any disturbed areas near Flag Middle School/Duck Pond will need to be restored and monitored for weeds, as Scotch Thistle, Dalmatian Toadflax and Diffuse Knapweed are all coming in to the immediate vicinity. Flat grassy areas can be planted with the Short Grass Mixture, while slopes can be planted with the Tall grass mix.

Rosa woodsii (Wild Rose) and Robinia neomexicana (New Mexico Locust) can be planted on the slopes as a barrier plant to prevent erosion by Flag Middle School students.

Thorpe Rd. north to Beale

3:1 berm, 6' across, with floodwall on top. Top of floodwall at 6934'. Berm + floodwall < 5' tall. Will be taller at South end of block, shorter at Beale.

We recommend that both sides of the wall from Thorpe Road to Beale be landscaped for erosion control, to soften the visual impact of the wall, and to prevent rapid establishment of Scotch Thistle, Dalmatian Toadflax and Diffuse Knapweed which are already invading the area from the Duck Pond to Beale Road.

This area should be planted with fast-growing, deep-rooted species such as Salix exigua, Ribes cereum, Rosa woodsii, Parthenocissus inserta, Humulus americanus, Monarda fistulosa var. menthaefolia and Salix lasiolepis (if it has been removed). The general Tall Grass mixture of grasses, easy wildflowers and Yarrow should be planted heavily on the slope.

Wing Walls at Beale, Anderson and Meade

Use of the general berm/wing wall plants is recommended. In this area of the Rio, *Sambucus caerulea* can be used more frequently, as well as *Salix exigua* and *Salix lasiolepis*.

Plants for Berms and wing walls:

Trees and shrubs:

- Acer negundo* var. *interius*
- Monarda fistulosa* var. *menthaefolia*
- Parthenocissus inserta*
- Rhus trilobata*
- Ribes cereum*
- Rosa woodsii*
- Salix exigua*
- Salix lasiolepis*
- Sambucus caerulea*

Top of berm: Short grass mixture

Slopes: Tall grass mix.

Butler Avenue Area

Steeper terrain, more rugged, warmer. Difference between planting on North and South aspects.

I'd like to visit that; have questions.

Trees and Shrubs:

- Abies concolor*
- Amelanchier utahensis*
- Chrysothamnus nauseosus*
- Fallugia paradoxa*
- Juniperus deppeana*
- Juniperus scopulorum*
- Juniperus utahensis*
- Lonicera arizonica*
- Pinus edulis*
- Pinus ponderosa*
- Populus fremontii*
- Populus tremuloides* (moist areas)
- Purshia stansburiana*
- Quercus gambelli*
- Rhus glabra*
- Ribes cereum*
- Robinia neomexicana*
- Rosa woodsii*

Vines:

- Clematis ligusticifolia*
- Humulus americanus*
- Parthenocissus inserta*
- Vitis arizonica*

Use Tall Grass Mixture with the addition of the following species:

Andropogon gerardii
Calylophus fendleri
Eriogonum racemosum
Festuca ovina
Hilaria jamesii
Monarda menthaefolia var. fistulosa
Schizachryium scoparium
Stipa comata var. comata
Stipa pringlei

Tall Grass Mixture:

Achillea lanulosa v. millefolium
Elymus smithii
Festuca arizonica
Ipomopsis aggregata
Lupinus argenteus
Muhlenbergia rigens
Muhlenbergia wrightii
Oenothera hookeri
Poa fendleriana
Sphaeralcea parvifolia or S. fendleri
Verbena macdougalii

PART II
COMMENTS AND RESPONSES TO COMMENTS

COMMENTS AND RESPONSES TO COMMENTS

The USACOE received 14 letters of comment on the Draft EIS/EIR from agencies, organizations, and individuals (Table 1). The comment letters are reproduced in their entirety on the following pages, with responses provided adjacent to each comment. Written comments provided at the July 2000 public hearing are also included in Table 1. Responses to oral testimony from the public hearing are not provided; however, the transcripts from the hearing are included in the Final EIS appendices (see Appendix B).

Table RTC-1
Agencies, Organizations, and Individuals Submitting Written Comments

Letter Number	Agency/Organization	Date of Letter
	Federal	
1	U.S. Department of the Interior, Office of the Secretary	August 9, 2000
2	U.S. Environmental Protection Agency	August 15, 2000
	State Agencies	
3	Arizona Department of Game and Fish	June 30, 2000
	Organizations	
4	Friends of Flagstaff's Future	August 14, 2000
	Individuals	
5	Mary Ann and Jackson Keim	June 21, 2000
6	Keith and Mary Hunter	July 19, 2000
7	Peter Bloomer	July 25, 2000
8	Rose Houk	August 1, 2000
9	Mimi Murov	August 3, 2000
10	Tom Brownold	August 3, 2000
11	Susan Lamb Bean	August 8, 2000
12	Jack D. Taylor	August 10, 2000
13	Blake Whitten	August 11, 2000
14	Connie Kim	not dated



United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Coordination
500 Henderson Street, Suite 500
San Francisco, CA 94102-0001

RECEIVED

JUL 1 2000

RECEIVED

JUL 2 2000

RECEIVED

August 9, 2000

BL000495

Colonel John P. Carroll, District Engineer
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Col. Carroll:

The Department of the Interior has reviewed the Draft Feasibility Report and the Revised Draft Environmental Impact Statement for the Rio De Flag project in Arizona, and has no comment to offer.

Thank you for the opportunity to review this document.

Sincerely,

Tracey G. Quirpal

For

Tracey G. Quirpal
Regional Environmental Officer

cc:

Director, OEC, w/ original incoming
Regional Director, FWS, Albuquerque

U.S. Environmental Protection Agency (not yet received)

[responses to the U.S. EPA letter will be provided when the letter arrives]



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

AUG 15 1990

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
Attn: Mr. David Compas
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Compas:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers Revised Draft Environmental Impact Statement (RDEIS) for Rio de Flag, City of Flagstaff, Coconino County, AZ. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act (CAA). The CEQ number for the revised draft is 000211.

A total of five alternatives (i.e., Alternatives 6a, 6b, 7, D, and No Action) are analyzed in the RDEIS. The Preferred Alternative, Alternative 6b, would involve bridge modifications upstream of Thorpe Park along the Rio de Flag; flood protection structures and road modifications in Thorpe Park; channel modifications along the Clay Avenue Wash and in the downtown portion of the Rio de Flag; a detention basin along the Clay Avenue Wash just west of the city limits; and, a two block long covered segment along the downtown reach of Rio de Flag. Alternatives 6a and 7 are similar to 6b. Alternative D would consist of two berms which would protect some existing residential structures from floodflows. Under the No Action Alternative, no flood protection measures would be implemented.

Alternative 7 (Three Detention Basins with Channel Modifications/Covered Channel Between Dale and Birch Avenues) was not considered when the DEIS was originally published in November, 1999. We understand that this alternative was developed in response to concerns from local residents. The primary difference between this new alternative and the recommended plan is the construction of three detention basins instead of one detention basin. The RDEIS still identifies Alternative 6b (Single Detention Basin with Channel Modifications/Covered Channel Between Dale and Birch Avenues) as the Corps' preferred alternative, as it was in the original DEIS.

1 EPA submitted comments on the DEIS on December 23, 1999 (copy enclosed). Those comments focused on the need for the Corps to better address the extent of areas under Clean Water Act Section 404 jurisdiction that may be affected by the proposed project. We provided specific recommendations on how best to accomplish this, and how issues regarding mitigation of impacts to waters of the United States should be addressed. We were disappointed to learn

1. All comments provided by the EPA on the initial Draft EIS (November 1999) and revised Draft EIS (June 2000) have been reviewed by the USACOE in preparation of this Final EIS. In many cases, the Final EIS has been revised to reflect the EPA's concerns. (Substantial changes to the Draft EIS are identified by an annotated "R" in the margin of the Final EIS text.) In particular, the following changes have been made to the document to address EPA comments:

- The 404(b)(1) evaluation has been revised and updated and is consistent with the Corps Planning Guidance Notebook (ER 1105-2-100)
- The impact analysis for biological resources has been revised to more specifically address impacts to "waters of the United States" and habitat functions and values.
- A discussion has been added to the Biological Resources mitigation section of the Final EIS (Section 4.3.3) in response to EPA comments.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IX
75 Lawrence Street
San Francisco, CA 94103

409 15 260

District Engineer
U.S. Army Corps of Engineers
Los Angeles District
Attn: Mr. David Campos
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Campos:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers Revised Draft Environmental Impact Statement (RDEIS) for Rio de Flag, City of Flagstaff, Coconino County, AZ. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act (CAA). The CEQ number for the revised draft is 000211.

A total of five alternatives (i.e., Alternatives 6a, 6b, 7, D, and No Action) are analyzed in the RDEIS. The Preferred Alternative, Alternative 6b, would involve bridge modifications upstream of Thorpe Park along the Rio de Flag; flood protection structures and road modifications in Thorpe Park; channel modifications along the Clay Avenue Wash and in the downtown portion of the Rio de Flag; a detention basin along the Clay Avenue Wash just west of the city limits; and, a two block long elevated segment along the downtown reach of Rio de Flag. Alternatives 6a and 7 are similar to 6b. Alternative D would consist of two basins which would protect some existing residential structures from floodflows. Under the No Action Alternative, no flood protection measures would be implemented.

Alternative 7 (Three Detention Basins with Channel Modifications/Covered Channel Between Delo and Finch Avenues) was not considered when the DEIS was originally published in November, 1999. We understand that this alternative was developed in response to concerns from local residents. The primary difference between this new alternative and the recommended plan is the construction of three detention basins instead of one detention basin. The RDEIS still identifies Alternative 6b (Single Detention Basin with Channel Modifications/Covered Channel Between Delo and Finch Avenues) as the Corps' preferred alternative, as it was in the original DEIS.

EPA submitted comments on the DEIS on December 23, 1999 (copy enclosed). Those comments focused on the need for the Corps to better address the extent of impacts under Clean Water Act Section 404 jurisdiction that may be affected by the proposed project. We provided specific recommendations on how best to accomplish this, and how issues regarding mitigation of impacts to waters of the United States should be addressed. We were disappointed to learn

that our earlier comments were not responded to in this RDEIS; there are no substantive changes to the RDEIS regarding the analysis of impacts to waters of the United States. EPA takes the responsibility to provide comments on NEPA analyses seriously, and treats comments with the expectation that the action agency will take them under consideration and respond accordingly. While we understand that this RDEIS was prepared to examine a new Alternative, we believe it also represented an opportunity to respond to other comments received on the DEIS.

As to this RDEIS, we must reiterate our earlier comments dated December 23, 1999 and have assigned a rating of BC-2 (Environmental Concerns-Insufficient Information). See the enclosed "Summary of EPA Rating System" for a more detailed definition of the ratings.

We appreciate the opportunity to review the RDEIS. Please send two copies of the RDEIS to me at the address above. We look forward to discussing the approach to documenting compliance with the Section 304(b)(1) Guidelines as discussed in our Detailed Comments (see attachment). Please contact Mr. David Tomaszewski of my staff at 415-744-1575 should you have questions regarding our comments and recommendations.

Sincerely,


David J. Farrell, Chief
Federal Activities Office

Attachments (3): Summary of EPA Ratings
Detailed Comments
December 23, 1999 Comment Letter on the Rio de Flag Draft EIS

cc: Sharon Marsland USEPA
Chief Reader USEPA

cc: [illegible]

SUMMARY OF EPA RATING DEFINITIONS

This rating system was developed as a means to summarize EPA's level of concern with a proposed action. The ratings are a combination of qualitative and quantitative categories for evaluation of the environmental impacts of the proposed and numerical categories for evaluation of the adequacy of the EIS.

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EIS review has not identified any potential environmental impacts requiring substantial changes to the proposal. The review may have identified opportunities for application of mitigation measures that could be accomplished without more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EIS review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the proposed alternative or application of mitigation measures that reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EIS review has identified significant environmental impacts that must be avoided in order to provide adequate protection for the environment. Changes are needed that require substantial changes to the proposed alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"ED" (Environmentally Disruptive)

The EIS review has identified adverse environmental impacts that are of sufficient magnitude that they are unacceptable from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unacceptable impacts remain unaverted at the final EIS stage, this proposal will be recommended for referral to the CBQ.

ADEQUACY OF THE DRAFT STATEMENT

Category 1* (Adequate)

EPA believes the draft EIS adequately addresses the environmental impacts of the proposed alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2* (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EIS reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which would reduce the environmental impacts of the action. The identified additional information, data, analysis, or discussion should be included in the final EIS.

Category 3* (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EIS reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analysis, or discussion are of such magnitude that they are not a full part of the review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potentially significant impacts involved, this proposal could be a candidate for referral to the CBQ.

*From: EPA Manual 551, "Policy and Procedures for the Review of Federal Actions Impacting the Environment."

Detailed Comments

Clean Water Act Section 404

In addition to our earlier comments, we would like to express concern with the preliminary Clean Water Act Section 404(b)(1) Guidelines Evaluation presented in Appendix F of the Revised DEIS. We are concerned that the evaluation is lacking in both its presentation of information and its analysis. We are also concerned that this approach to demonstrating compliance with the Section 404(b)(1) Guidelines may be used for other Los Angeles District projects, and consequently we would like to take this opportunity to initiate a discussion between our Offices regarding this general matter. Of primary concern is the lack of information or analysis in Section II-B (Effect on Aquatic Ecosystem and Organism Determinations) and Section III (Finding of Compliance).

The Corps Planning Guidance Notebook (BL 1105-2-100) provides guidance on how Corps Districts are to document compliance with the Section 404(b)(1) Guidelines, and includes as an appendix a recommended outline for making that evaluation. In that recommended outline, it is suggested that the determination of effects on the aquatic ecosystem include an analysis of: (1) Effects on Plankton; (2) Effects on Benthos; (3) Effects on Nekton; (4) Effects on Aquatic Food Web; (5) Effects on Special Aquatic Sites, i.e., (a) Sanctuaries and Refugia, (b) Wetlands, (c) Mud Flats, (d) Vegetated Shallows, (e) Coral Reefs, (f) Riffs and Pool Complexes; (6) Threatened and Endangered Species; (7) Other Wildlife; and (8) Actions to Minimize Impacts. Instead of following this recommended outline, the Revised DEIS, in Appendix F, addresses effects to aquatic ecosystems in only one sentence, concluding that no significant effects are anticipated. While this conclusion may be supported, there is no information or analysis presented in the document.

Perhaps more important is the requirement under the Section 404(b)(1) Guidelines that Corps Districts make a finding that the discharge associated with the proposed alternative would have the least adverse effect to the aquatic environment of all the practicable alternatives under consideration. The recommended outline specifically calls for brief discussion of the alternatives considered and a statement of "why the one selected would result in the least amount of significant impacts." Again, the Section 404(b)(1) Evaluation in the Revised DEIS does not follow this recommended format, and provides no information or analysis regarding the selection of the least environmentally damaging alternative. We strongly recommend that the Los Angeles District re-evaluate how determinations of compliance with the Section 404(b)(1) Guidelines are documented for its proposed water resource development projects.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
LEGH IN IX
79 Riverside Street
San Francisco, CA 94105

U.S. Army Corps of Engineers
Los Angeles District
Attn: C884L-AD-RN
P.O. Box 532711
Los Angeles, CA 90053

DEC 23 1988

Dear Mr. Cooper:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers Draft Environmental Impact Statement (EIS) for Rio de Pinos, City of Nogales, Coahuila de Zaragoza, AZ. Our review is pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and Section 309 of the Clean Air Act (CAA).

We understand that the Preferred Alternative (Full Detention With Channel Modification) would provide 100-year flood protection in downtown Nogales and would also reduce flooding downstream. This alternative would involve construction of two detention basins and channel modifications. The project would utilize various types of channel improvements and would include construction of soft bottom channels with riprap lined slopes covered with soil, an open "paved" channel with shallow side slopes that is not lined with riprap or concrete, and an earthen channel.

The DEIS indicates that as a result of construction of the Preferred Alternative, approximately 1.54 acres of riparian habitat would be affected. The proposed mitigation for the temporary loss of riparian habitat during construction (0.54 acres) would be to restore riparian habitat on the site (0.54 acres) through a revegetation program. To mitigate for the 0.70 acres of wetlands that would be permanently lost, the DEIS indicates that the Corps would create 1.40 acres of riparian habitat in the Rio de Pinos reach through site restoration, planting and revegetation.

Based on our review and the environmental information obtained in the DEIS, we have assigned the DEIS a rating of "C" (Environmental Concerns-Insufficient Information). We are disappointed that the DEIS does not sufficiently address the extent of boundaries of Clean Water Act Section 303(j) jurisdiction (i.e., waters of the United States). See the official "Summary of EPA Rating System" for a more detailed definition of the ratings. Also see the attached detailed comments.

1

cc: CH2R Ltd. USEPA
Edison, Maryland USEPA

Detailed Comments

Section 3.3 Biological Resources

We are concerned that the DEIS does not sufficiently address the extent or boundaries of Clean Water Act Section 404 jurisdiction (i.e., waters of the United States). The entire proposed project area(s) should be surveyed for jurisdictional areas by using jurisdictional criteria, and the boundaries of such areas should be delineated and described by functional type (e.g., using the Cowardin classification system). Greater detail on the assessment of jurisdictional overfunction should be included in the FEIS. While it is highly likely that wildlife habitat is one such function, it is unlikely that habitat is the only function. The assessment should attempt to quantify the functions as well as stating the functions of each aquatic area. Some of the functions of waters of the U.S. are listed at 33 CFR 320.4(i)(2).

Section 4.3.1 "Significance Criteria"

While impacts to "waters of the United States" may not be considered significant, they must be fully described if the DEIS is to comply with Section 404 of the Clean Water Act.

Section 4.3.2 Impact Assessment

Each alternative should be described in terms of which functions of "waters of the U.S." will be impacted and to what extent. The "footprint" of the impact should be described, as well as the relative impact to each function (e.g., "1 acre of pond will lose 1/4 of its sediment capturing ability").

Section 4.3.3 Mitigation Measures (mistakenly listed as 3.3.3 on page 4-17)

The Clean Water Act Section 404(b)(1) Guidelines state that there are three components to mitigation: avoidance, minimization and compensatory mitigation. Only after all possible measures that cause avoidance have been undertaken should compensatory mitigation be considered for the remaining unavoidable impacts to waters of the U.S. Each alternative should describe the avoidance and minimization of impacts to waters of the United States that are included in the range of the alternatives.

Each alternative should then propose compensatory mitigation measures that fully compensate for any remaining loss of function as described above in section 4.3.2. An additional portion of mitigation should be provided for each alternative to ensure that each function is fully mitigated, since many mitigation measures do not adequately or fully develop the functions they were intended to replace.

Since the document does not address how operations or maintenance could affect on- and off-site mitigation, it is impossible to compare the appropriateness of the proposed on-site mitigation. Mitigation within the project itself may not be appropriate. If the project will require periodic maintenance which could reduce the value of the mitigation, even if temporarily, then off-site mitigation would be more appropriate.



THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT

2221 West Camelback Road, Phoenix, AZ 85023-4300
(602) 542-8000 • www.azgfd.com

DIRECTOR
JANE T. HEDRICK
CHIEF OF BUREAU
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MANAGER, HABITAT
JENNIFER L. BROWN
MANAGER, RECREATION
STEVE V. HEDRICK



Flagstaff Office, 3500 South Lake Mary Road, Flagstaff, Arizona 86001-8799

June 30, 2000

Mr. David Campos
Environmental Coordinator
Environmental Planning sector
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Re: Arizona Game and Fish Department (Department) Comments on the Draft Feasibility Report and Environmental Impact Statement for the Rio de Flag Flood Control Project, dated June 2000.

Dear Mr. Campos:

The Department has reviewed the received above noted documents and has no preference with regards to the selection of alternatives. We believe that any of the considered alternatives would provide some measure of flood relief.

Further we have reviewed the environmental consequences for each of the alternatives and believe that the wildlife assessments provided are adequate. We are looking forward to the development of the mitigation proposal extending the I-40 wetlands and to the re-creation of riparian habitat along the historic Rio de Flag below South Edison Street.

Thank you for this opportunity to comment.

Sincerely,

Randy Smith
Habitat Specialist

cc: John Kennedy, Habitat Evaluation Program Supervisor, Phoenix

Your comments regarding the project have been noted and will be considered in the decision-making process.

FRIENDS of FLAGSTAFF'S FUTURE

August 14, 2000

Decky Schipper
Executive Director

David of Clinesman

Jim White
Landscape Architecture
Flagstaff

Michael Bunker
Grand Canyon Trust
Flagstaff

David Bunker
Grand Canyon Trust
Flagstaff

Jim Debbis
Bunker Environmental
Flagstaff

David Bunker
Grand Canyon Trust
Flagstaff

Bill Dond
Bunker Environmental
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Blair Bunker
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Bob Bunker
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Angela Bunker
Bunker Environmental
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16 E. Aspen Avenue
Decky Schipper
P.O. Box 22402
Flagstaff, AZ 86002
(928) 895-0293
info@flagstafffuture.com

U.S. Army Corps of Engineers
Los Angeles District
Attn: Mr. David Compea
P.O. Box 582711
Los Angeles, CA 90058-2325
Fax (213) 482-4204

Dear Mr. Compea,

Thank you for the opportunity to comment on the draft EIS for the Rio de Flag Flood Control Project. I commend the City and the Corps for taking previous public comment into consideration when drafting the current EIS. We feel that this EIS is a marked improvement over last year's version.

We feel that the main issue in need of public scrutiny now is design and aesthetics. Here are our comments and concerns:

1. The draft EIS does not specify the size of riprap to be used in the modified channel. We suggest that the Corps consult with some of our local experts (such as Tom McLeod and Chuck Avery) for the best choice of material for the more natural channel design.
2. We wish to know specifically the nature and height of the embankments described on page 2-8, figure 2-2. It is important that these embankments be unobtrusive and natural looking.
3. City Avenue Wash between McCracken Place and Route 89 is described as an open concrete box channel. The City and the Corps need to avoid using vertical concrete walls and opt for a better design.
4. There needs to be a clear strategy to get the community involved in the plan for landscaping and siting of the Urban Trail.
5. To minimize stormwater runoff in the future, the City needs to look into using permeable street paving tiles as part of the building code for pavements in town. Many cities now use these tiles; they will help preserve the permeability of the volcanic landscape in town and allow more water to soak into the subsurface.

Feel free to contact me to discuss our comments.

Sincerely,

Decky Schipper
Decky Schipper
Executive Director

1. Information regarding the the size and source of riprap proposed for the project can be found in the Geotechnical Appendix to the Main Feasibility Report (Appendix C). In general, standard sizes and densities were used in the formulation of project alternatives and the preparation of cost estimates. Additional attention will be given to the selection of riprap during the next phase of the project.
2. The current design of the embankments calls for a four feet high earthen structure that is planted with native species. The vegetative treatment has been developed with assistance from the Flagstaff Arboretum (see Appendix X).
3. The physical constraints between McCracken Place and Route 66 dictated the need for the concrete box channel in this reach of the wash. Alternative channel cross sections were evaluated during the feasibility study but were not as cost effective as the recommended configuration. The design of the channel will be reviewed and re-evaluated during the next phase of the project.
4. The designs presented at the public workshops and in the draft Feasibility Report and EIS were preliminary and will be subject to refinement during the detailed design phase of the project. The City of Flagstaff and the Corps of Engineers have both committed to maintaining the high degree of public involvement utilized during the feasibility phase and would welcome community participation during the next phase of the project.
5. Your comments regarding the use of permeable street paving tiles are beyond the scope of this EIS.

RECEIVED

JUL 07 2000

ENGINEERING

June 21, 2000

RE: RIO DE FLAG FLOOD PLAN REVISED ALTERNATIVES
(Open houses - May 24, 25 and June 3, 2000)

The original Flood Plan is a good plan.

1 The revisions are a reasonable set of compromises. But eliminating upstream detention areas pushes the water through historic downtown and dumps it into the Continental area. We don't see that any attention has been given to move floodwaters through Continental any better than the last flood in the early 90's when the area flooded so badly.

The covered underground storm drain from Singsveas to Blush is a good solution to the problem in that area. However:

2 The Urban Trail from Route 66 to Thorpe Park should be kept just that - an Urban Trail. It should NOT be expanded or considered a "strip park", with picnic tables and benches.

Park-like construction would encourage loitering along the trail, which would result in privacy invasions for residents in the area, expanded policing requirements and additional areas for vandalism.

Mary Ann Keim
Joelann Keim
313 W. Cherry Ave.
520-774-2454

1. The Corps of Engineers evaluated a number of measures to reduce flood damages in the Continental area as part of the feasibility study. However, none of the measures were economically justified for federal participation. Measures to reduce flood damages that could be implemented at the local level, including Alternative D in the final array, are described in the Draft Feasibility Report.
2. The Urban Trail proposed from Route 66 to Thorpe Park would be an extension of the existing trail in both form and character. The designs presented at the public workshops were preliminary and will be subject to refinement during the detailed design phase of the project. The City of Flagstaff and the Corps of Engineers have both committed to maintaining the high degree of public involvement utilized during the feasibility phase and would welcome this type of input during the next phase of the project.

Kath and Mary Hunter
11325 E. Sunland Avenue
Mesa, Arizona 85205

July 19, 2000

RECEIVED
JUL 21 2000
ENGINEERING

City of Flagstaff
Flagstaff, Arizona

Dear Sirs:

We want to express our sincere appreciation to the Army Corp of Engineers and the City of Flagstaff for the time and effort that has been expended in researching the various improvement plans for the Rio de Flag project. We know that a great deal of time, effort and money has been spent on exploring the different plans and the impact that each will have upon the city and its residents. We are confident that whatever improvement is decided upon, it will enhance the beauty of the river and will be a wonderful contribution to the city. However as homeowners in the area, we have several concerns we would like to address.

In 1959 we built our home at 311 West Cherry, at the corner of Cherry and Kendrick. At that time the natural flow of the Rio de Flag was approximately 16 blocks to the east of our property line. Within a couple of years, the water flow was redirected by the city and an artificial path was formed parallel to Kendrick from Cherry to Santa Fe, directly west to our property. This redirection required that part of our property be used by the city for the newly formed path, which reduced the size of our usable property, and moved our home closer to the unfinished edge of the riverbank. For a time this caused a great deal of erosion to our property, however that was remedied when the city built the existing retaining wall along the river. The proposals that are now being considered to change this area yet another time cause us great concern.

It is our understanding that there are currently three proposed plans. If the gravel/built plan were adopted, we would have to relocate because our home is in the middle of the proposed area. This is something that we had never considered doing. We have lived in Flagstaff most of our lives and in our home for 43 years, and have planned on keeping this home through our retirement. A move would be extremely difficult for us to make, and would cause a definite emotional and financial setback for us. The second plan of creating a canal flanked by retaining walls would encroach upon our property also, however not to the same degree. However, this plan would also result in our need to relocate. The third plan of covering over the river and creating underground drainage is most desirable for us, although it also has some definite drawbacks. Our home would border the greenbelt so closely, that our bedroom windows would be close to four feet away from people who will be drawn there for activities. Our lifestyle would be severely altered as we would have to deal with the increased street and foot traffic, and the activities and noise that would be associated with this new recreational area. In addition, we venture to guess that any of these plans would require blasting and the use of heavy equipment, which could cause irreparable damage to our home, or other masonry structures in the area.

Although we personally do not look forward to the proposals ahead, we will be supportive of whatever decision is made; knowing that the improvements to the river will become a tremendous asset to the city. We of course, understand that if it becomes necessary for our home or our property to be used or taken by the city for any of the improvements, we will be compensated for a sum that would be consistent with the cost of comparable homes in the area. We further understand that if relocation does become a necessity, we will be moved or relocated with little or no expense to us.

We have appreciated the meetings that have been held and the information that has been made available to us thus far. We anticipate that the same will continue. If there is anyway we can be of service, or if we can answer any questions, please feel free to call us at 520-779-3012, or at 480-654-6267.

Thank you for your attention.

Sincerely,

Mary J. Hunter
Kath and Mary Hunter
Kath Hunter

1. In the June, 2000 Draft Feasibility Report and Environmental Impact Statement the Corps of Engineers identified Alternative 6b as the Recommended Plan. This alternative includes a detention basin on Clay Wash and channel modifications on Clay Wash and the Rio de Flag. The modifications on the Rio de Flag between Dale and Birch Avenues would consist of a covered channel through this segment thus negating the need to acquire any private property through this area.
2. Preliminary engineering design has indicated that blasting would not be required during construction of the covered channel. A more thorough analysis of this issue will be completed as part of the detailed design phase of the project. If it is determined that blasting is required, supplemental environmental compliance documentation will be prepared and avoidance/mitigation measures developed to offset the potential impacts.

2 | that any of these plans would require blasting and the use of heavy equipment, which could cause irreparable damage to our home, or other masonry structures in the area.

Although we personally do not look forward to the prospects ahead, we will be supportive of whatever decision is made, knowing that the improvements to the area will become a tremendous asset to the city. We of course, understand that if it becomes necessary for our home or our property to be used or taken by the city for any of the improvements, we will be compensated for a sum that would be consistent with the cost of comparable homes in the area. We further understand that if relocation does become a necessity, we will be moved or relocated with little or no expense to us.

We have appreciated the meetings that have been held and the information that has been made available to us thus far. We anticipate that the same will continue. If there is anyway we can be of service, or if we can answer any questions, please feel free to call us at 520-775-3047, or at 480-684-9267.

Thank you for your attention.

Sincerely,

Mary I Hunter

Keith and Mary Hunter.

Keith Hunter

**RIO DE FLAG DRAFT FEASIBILITY
STUDY/EIS COMMENT SHEET**

NAME: Bob Brown

ADDRESS: 427 S. San Francisco, Flag SDID

Comments: As a resident owner in the flood
plain, I have immediately turned interest in
seeing the project proceed.

The spirit of the state to solve the
problem while agreeing many of Phoenix's
concerns is appreciated. There is no way
to make everyone happy, so I urge the
consideration of the "good enough" permit
over the minor issues.

Your support of the flood control project has been noted and will be considered in the decision-making process.

ROSE HOUK

P.O. Box 322711

Flagstaff, Arizona 86001

520-719-1992

e-mail: roseh@cox.net

August 1, 2000

David Campos
U.S. Army Corps of Engineers
Environmental Coordinator
P.O. Box 322711
Los Angeles, CA 90053-2325

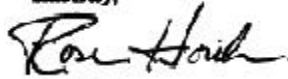
Dear Mr. Campos:

This letter contains my comments to the Corps of Engineers draft feasibility report and EIS for the Rio de Flag Flood Control project in Flagstaff, Arizona.

It appears that the Corps has done a fine job of incorporating input from all quarters in its revised plan. I am most pleased to see that the Thorpe Park detention idea has been dropped, and that the height of the floodwalls in that area has been greatly reduced. I hope that in the design stage, attention will continue to focus on keeping the Rio's channel as natural as possible and minimizing use of bare concrete channels or row rock riprap in all locations. I think the public will be most supportive of the Corps' obvious effort to keep the scale and aesthetics of the project appropriate to residential and historic neighborhoods and to Flagstaff's overall character.

I would like to add a strong vote of approval to constructing the bike/pedestrian path along the Rio-Sanito Route 66 to South Deerfoot. That is a feature that will greatly improve the safety and accessibility to the city's transportation network. Thank you for the opportunity to comment on this portion of the planning process.

Sincerely,



Rose Houk

cc: David Wilcox, Flagstaff City Manager



Your comments in support of the revised flood control project have been noted and will be considered in the decision-making process.

August 3, 2000

Mimi Murov
801 W. Summit
Flagstaff, Az. 86001

District Engineer
United States Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles
California
90053-2325

ATTN: Mr David Campos
Rc:Rio de Flag Feasibility Study

Dear Mr. Campos

I am requesting the No Action Alternative for the Rio de Flag feasibility study. I want zero of my local or federal tax dollars spent on this project.

Sincerely,
Mimi Murov
Mimi Murov
Flagstaff resident since 1976

Your support of the No Action Alternative has been noted and will be considered in the decision-making process.

August 9, 2000

Tom Brownold
801 W. Summit
Flagstaff, Az. 86001

District Engineer
United States Army Corps of Engineers
Los Angeles District
P.O. Box 592711
Los Angeles, California
90059-2711

ATTN: Mr. David Campos

Redo de Flag Feasibility Study

Dear Mr. Campos

I would like to recommend the "No Action Alternative" for the Redo de Flag feasibility study. I do not want my local or federal tax dollars spent on this ill conceived project.

Sincerely,



Tom Brownold
Flagstaff resident since 1977

Your support of the No Action Alternative has been noted and will be considered in the decision-making process.

Susan Lamb Bean
4680 Lake Mary Wood
Flagstaff, AZ 86001

August 8, 2000

Mr. David Campos
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Campos:

I'd like to thank you and your team very much for your willingness to revise the design of the Rio de Flag Flood Control Project here in Flagstaff, Arizona. Your extra work is appreciated; the new design appears to be much more appropriate for our community.

1 My only concerns at this point concern aesthetic details. I would like to suggest that your team consult with local experts on the landscaping of the project, especially Chuck Avery of Northern Arizona University. I would also like to recommend Nigel Sparks and Jeff Harris of Flagstaff Native Plant and Seed Company, who both have experience in the successful restoration of local landscapes with native vegetation. Olo Edwards of the Resource Center for Environmental Education would also be a helpful consultant in this regard. In fact, it would be a very positive strategy to invite the community at large to participate in landscaping, as it would give neighborhoods "ownership" of the Rio de Flag and reduce the likelihood of vandalism or misuse of the redeveloped channel.

Thanks again for your willingness to work with our community on this revision. I'd also like to commend one of your employees, Sam Arrowood, who handled what may have been a very exasperating situation with patience and tact.

Sincerely,

Susan Bean

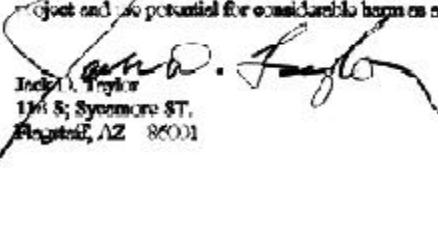
1. The Corps of Engineers has received planting recommendations for the areas impacted by the project from The Arboretum at Flagstaff. The staff at the Arboretum has prepared a set of recommendations regarding establishment, plant selection, irrigation, and maintenance. This information is provided in Appendix X of the EIS. In addition, it is anticipated that additional public involvement will occur during the next phase of the project to discuss final design including landscaping.

August 10, 2000
Flagstaff, AZ

ATTN: Mr. David Compa

Sir:

It is the purpose of this letter to express my opposition to the proposed project related to the Rio
de Flieg by the U.S. Army Corps of Engineers. As a long time resident of Flagstaff who is familiar
with the Rio de Flieg in its relationship to our city I can see no good coming from this proposed
project and the potential for considerable harm as a result of the project.


Jack O. Taylor
101 S. Symmore ST.
Flagstaff, AZ 86001

Your opposition to the proposed project has been noted and your comments
will be considered in the decision-making process.

Lilka Whitten
FSU Box 65630
Tallahassee, Florida 32313

August 11, 2000

Tim Smith
Army Corps of Engineers
CRSPL-PD-RL
PO Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Smith,

How do you do, sir? My name is Lilka Whitten, a homeowner in Flagstaff, Arizona. I am writing you to comment on the revised Rio de Flag Feasibility Report and EIS.

Please allow me to enthusiastically endorse both the report and the actual flood control project. I consider myself well-qualified to provide this endorsement because I've been involved in public discourse and meetings about this issue for more than ten years now.

My residence at 12 East Denton Avenue is currently located directly in the official Rio de Flag floodway, as determined by the FIRIM map which the City of Flagstaff uses to delineate such boundaries. This means, of course, that I must purchase rather expensive flood insurance through the National Flood Insurance Program, and means also that my house is endangered by flood risk in a very tangible sense.

Perhaps most debilitating and frustrating of all is the fact that the City's floodway regulations make it virtually impossible for me to significantly invest in the improvement of my home.

The social and economic implications of my particular situation are magnified manifold when you consider all of my neighbors in the area of Flagstaff south of the railroad tracks whose residences and businesses are located in the Rio floodplain. Floodplain regulations make it difficult and economically infeasible to legally improve the structures on our properties. This infeasibility contributes to economic blight in our neighborhoods, discourages investment consistent with zoning codes within city boundaries, and depresses property values and property tax revenue accordingly.

In 1990, I participated in a citizen-led petition drive in which 143 homeowners, small business owners, and employees in my neighborhood signed a petition, subsequently presented to the Flagstaff City Council, in which we strongly supported the flood control option to divert the Rio from its current path south of the railroad tracks to the route along the tracks proposed by your study. (Please see enclosed a copy of this petition.)

Your comments in support of the Rio de Flag Flood Control project have been noted and will be considered in the decision-making process.

I urge you to heed the call of my neighborhood: Please fund this project! Liberate our homes and businesses from the threat of flooding and from the burden of floodplain regulations. Please help to create the conditions under which my neighbors and I can invest in our neighborhood, and strengthen the social fabric accordingly.

Please contact me at my temporary address here in Florida if I can provide you with any other information about the petition drive in favor of the Rio de Flag flood control plan featured in your report.

Sincerely,

Blake Whitten

Blake Whitten

cc: Kim Gevigna
Storm Water Manager
City of Flagstaff
211 W. Aspen
Flagstaff, Arizona 86001

8-7-90
7:33 P.M.
E

CITIZEN'S PETITION:

We, the following citizens of West Flagstaff who reside, own businesses, or work in the vicinity of the Rio de Flag floodway south of Santa Fe Avenue, hereby urge that the Rio be rerouted by the city of Flagstaff out of our neighborhood into a channel adjacent to the Santa Fe railroad tracks to empty under Butler Avenue next to Abbott's Home Center.

We also urge that the current Rio path, acting as a local drainage, be equipped with pipes to channel runoff water below the ground surface, thus allowing citizens in this area to improve our use of the current Rio bed.

These actions would have several positive effects:

- 1) Remove our neighborhood from flood risk.
- 2) Preserve our homes and businesses and allow us to make improvements upon them by removing the construction zoning restrictions.
- 3) Remove the need for costly flood insurance.
- 4) Permit landowners to productively use the current Rio channel to improve our residences, businesses, and general appearance of our neighborhood.

Thank you for considering our request.

NAME:	ADDRESS:	DATE:
Blake Whitten	18 E. Benton Ave.	7/18/90
BETTY WHITTEN	117 S. SE ST	7/20/90
Hester Whitney	117 S. SE ST	7/20/90
William Fitzgerald	1728 N. EL VADO BL. #2	7/20/90
KERRI AGUINAGA	14 E. BENTON AV	7/20/90
GEOFFREY GOZALE	14 E. BENTON AV	7/20/90
TRACY AGUINAGA	16 E. BENTON AV	7/20/90
LISA AGUINAGA	119 S. SAN FRANCISCO	7 20
LEON AGUINAGA	119 S. SAN FRANCISCO	7 20
GLORIA INAGA	121 S. SAN ANTONIO	20 0
REYNA - 100	201 S. LEROUX	7 20 90
2 2 . .		20 90

Louise Nichols	912 S. Lansing	7/20/90
Peter W. W.	212 S. Lansing	7/20/90
Richard Kennedy	212 S. Lansing	7/20/90
FRANK C. WICK	117 S. Lansing	7/20/90
JOHN W. REED	211 S. Lansing #2	7/20/90
JOHN NOBLE	210 S. Lansing #3	7-20-90
Joe W. Louch	124 S. Lansing	7-20-90
Deborah L. Louch	124 S. Lansing	7-20-90
ELEN MILES	123 S. O'Leary St.	7-20-90
Yol Branch	223 N. Ellen	7-20-90
JOHN W. STRAND	176 Kona Trail	7-20-90
Mark Miles	7 S. Beaver #4	7-20-90
Muriel Herman	115 S. San Francisco	7-20-90
Lisa E. L.	115 S. San Francisco	7-20-90
Frances Gill	8 E. Benton	7-20-90
SEANER BUTLER	544 Cottage	7/20/90
SEANNA WINKFIELD	7 W. Cottage	7/20/90
Tommy L. L.	102 S. Beaver	7/20/90
John L. L.	102 S. Beaver	7/20/90
John L. L.	116 S. Benton	7-20-90
John L. L.	116 S. Benton	07-20-90
John L. L.	116 S. Benton	7/20/90
John L. L.	102 S. Benton	7/20/90
John L. L.	416 S. San Francisco	7/20/90
John L. L.	314 S. O'Leary	7/21/90
John L. L.	28 S. Beaver	7-21-90
John L. L.	1075 S. Stanford Rd	7-21-90
John L. L.	P.O. Box 8099	7/21/90
John L. L.	1071 Ave	7/21/90
John L. L.	3 S. Benton	7/21/90

Martha Nishida	116-118 W. 30th St	7/21/90
John Doe	101 S. BAKER	7/23/90
John Doe	3321 N. Wagon	7/23/90
Diane Wadsworth	212 S. LEROY	7/23/90
John Doe		
John Doe	218 N. Wagon	7/23/90
John Doe	115 S. Wagon	7/23/90
John Doe	3600 N. WALKER	7/23/90
John Doe	14 S. BAKER	7-23-90
John Doe	822 1/2 W. 1st St	7-23-90
John Doe	216 N. Park St. Chicago	7-23-90
John Doe	5 N. 1st Chicago	7-23-90
John Doe	101 S. BAKER	7-23-90
John Doe	101 S. BAKER	7-23-90
John Doe	679 N. Wagon	7-23-90
John Doe	128 S. BAKER	7-23-90
John Doe	218 S. BAKER	7-23-90
John Doe	616 S. BAKER	7-23-90
John Doe	1215 S. BAKER	7-23-90
John Doe	14 S. BAKER	7-23-90
John Doe	121 S. BAKER	7-23-90
John Doe	218 S. BAKER	7-23-90
John Doe	51 S. BAKER	7-23-90
John Doe	223 W. Chicago	7-23-90

We, the following citizens of West Flagstaff who reside, own businesses, or work in the vicinity of the Rio de Flag floodway south of Santa Fe Avenue, hereby urge that the Rio be rerouted by the City of Flagstaff out of our neighborhood into a channel adjacent to the Santa Fe railroad tracks to empty under Butler Avenue next to Hobitt's Home Center.

We also urge that the current Rio path, acting as a local drainage, be equipped with pipes to channel runoff water below the ground surface, thus allowing citizens in this area to improve our use of the current Rio bed.

These actions would have several positive effects:

- 1) Remove our neighborhood from flood risk.
- 2) Preserve our homes and businesses and allow us to make improvements upon them by removing the construction zoning restrictions.
- 3) Remove the need for costly flood insurance.
- 4) Permit landowners to productively use the current Rio channel to improve our residences, businesses, and general appearance of our neighborhood.

Thank you for considering our request.

NAME:	ADDRESS:	DATE:
Harriet Heder	1234 4th Francisco St.	7-23-90
John H. Heder	1012 W. Coconino Flagstaff	7-23-90
Paul H. Heder	1012 W. Coconino Flagstaff	7-23-90
David H. Heder	725 W. Coconino Flagstaff	7-23-90
John H. Heder	312 TINDLE	7-23-90
John H. Heder	3913 W. Coconino Flagstaff	7-23-90
Frank H. Heder	1485 E. Everest, Flagstaff	7-23-90
Marshall H. Heder	303 TL Linn	7-23-90
John H. Heder	1211 N. Arden	7-23-90
Marjorie H. Heder	1830 N. Coconino, Flagstaff	7-23-90
John H. Heder	1012 W. Coconino Flagstaff	7-23-90
John H. Heder	1012 W. Coconino Flagstaff	7-23-90

Oliver Borky	10 N. TO HOC. #1	FLG	7/23/90
John R. R. R.	531 N. B. B. B.	FLG	7/23/90
Danny St. Clair	526 S. B. B. B.	FLG	7/23/90
W. W. W.	W. W. W.	W. W. W.	W. W. W.
Thomas Borky	515 N. B. B. B.	FLG	7/23/90

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- 3) Remove the need for costly flood insurance.
- 4) Permit landowners to productively use the current Rio channel to improve our residences, businesses, and general appearance of our neighborhood.

Thank you for considering our request.

NAME:	ADDRESS:	DATE:
Officer T. Lopez	1162 Edley Ave.	7-22-1998
James J. Kelly	401 S. F. Avenue	7-22-1998
Juanita C. Andrade	405 S. F. Avenue	7-22-1998
John J. Lopez	405 S. F. Avenue	7-22-98
James J. Kelly	417 S. F. Avenue	7-22-98
James J. Kelly	424 S. F. Avenue	7-22-98
James J. Kelly	425 S. F. Avenue	7-22-98
James J. Kelly	316 S. F. Avenue	7/22/98
James J. Kelly	316 S. F. Avenue	7-22-98
James J. Kelly	324 S. F. Avenue	7-22-98
James J. Kelly	324 S. F. Avenue	7-22-98
James J. Kelly	324 S. F. Avenue	7-22-98
James J. Kelly	324 S. F. Avenue	7-22-98

Jean-Louis	312 St. Louis	7/22/90
E. T. Davis	312 St. Louis	7-22-90
John M. Davis	113 E. 3rd St.	7-22-90

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Thank you for considering our request.

NAME:	ADDRESS:	DATE:
Alvaro Rodriguez	2022 E. Canyon	7-22-90
John E. Dwyer	2022 E. Canyon	7-22-90
William F. Dwyer	203 E. Canyon	7-22-90
William F. Dwyer	207 E. Canyon	7-22-90
William F. Dwyer	207 E. Canyon	7-23-90
William F. Dwyer	122 E. Canyon	7-23-90
William F. Dwyer	124 E. Canyon	7-23-90
William F. Dwyer	208 E. Canyon	7-23-90
William F. Dwyer	209 E. Canyon	7-23-90
William F. Dwyer	314 S. Canyon	8-7-90
William F. Dwyer	314 S. Canyon	8-7-90
William F. Dwyer	314 S. Canyon	8-7-90

Madison, Colorado 3 1/2 South Denver 8-7-90
Elijio Flores b 1124 N 2nd St

**RIO DE FLAG FEASIBILITY
STUDY COMMENT SHEET**
(OPEN HOUSES - MAY 24, 25, and JUNE 03, 2000)

Based on public input received on the Draft Feasibility Study Report and Environmental Impact Statement, the Recommended Plan has been revised to address these comments. Please give us your thoughts on the revised plan being presented here today. Thank you.

NAME:

Bonnie Kim

ADDRESS:

223 W. Cherry Ave.

Comments:

This latest plan seems to be
the best so far. My one concern at this
point is Kendrick St. I do not want it closed.
There are two houses on my property.
I live in the front house. The rental house
sits back on the alley and abuts Kendrick which is
the outlet for the alley. Kendrick is the exit for this
house, it is where the trash is picked up ^{at both houses} and
important for emergency vehicle access.

When there are events in Wheeler Park,
this street is heavily used and helps in traffic
flow. I urge you to keep this open as the
single lane, one-way street that it is at
present.

Sincerely,

Bonnie Kim

My understanding is that the current plan is a broad
reverted, Dale to Birch.

1. The decision to close the short segment of Kendrick Street will be reviewed and reevaluated during the Design and Engineering Phase.

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