Finding of No Significant Impact
Kootenai River Project
Downstream of Libby Dam
Lincoln County, MT

1. **Background**: The Kootenai River ("Kootenay" River in Canada) originates in southeastern British Columbia, flows south and west through Montana, and northwest through Idaho, then returns to Canada where it flows through Kootenay Lake and joins the Columbia River at Castlegar, BC. Following the construction of Libby Dam in 1972, the Kootenai River downstream of the dam has been impacted by altered hydrology; changes in nutrient, wood and sediment loading, and changes in water quality. These changes have altered riparian processes and affected aquatic and terrestrial habitat conditions, resulting in degraded ecosystem conditions relative to historical conditions. The U.S. Army Corps of Engineers (Corps), in response to the U.S. Fish and Wildlife Service (USFWS) Biological Opinion for sturgeon and National Marine Fisheries Service Biological Opinion for Columbia River salmon and steelhead, as well as to the Northwest Power and Conservation Council Mainstem Amendments, has implemented a more normative flow regime in the Kootenai River. The proposed project will improve salmonid habitat in the Kootenai River downstream of Libby Dam and protect sensitive resources from further erosion. The project area is located in an approximately three mile reach of the Kootenai River downstream of Libby Dam to the mouth of the Fisher River.

2. **Purpose and Need**: Since this proposed project has two primary functions to improve salmonid habitat and protect resources from further erosion, there are two separate purposes and need statements.

a. There is an overall lack of aquatic habitat complexity downstream of Libby Dam. Fish habitat downstream of Libby Dam is limited by lack of recruitment of large wood and sediment due to the existence of the dam. Existing large wood complexes are aged and degraded, and although they continue to function, have become less functional over time. In addition, the seasonal hydrograph below Libby Dam is reversed, and blockage by the dam has led to an almost total absence of recruitment of woody vegetation on existing river banks and gravel bars, though recent flow changes have allowed limited recruitment of willows, cottonwoods, and grasses and shrubs in relatively small areas. Pool formation by large wood complexes is absent. Point bar formation in the absence of sediment recruitment is non-existent. This limited fish habitat directly affects fish populations in the river and contributes to the observed declines in trout populations in recent studies. The purpose for the habitat improvement project components is to address the lack of fish habitat, help restore Kootenai River ecosystem function, and thereby increase fish populations.

b. High flows from Libby Dam for sturgeon and for flood risk management, including spill above powerhouse capacity, have eroded the toe and slope of the right bank of Dunn Creek at the confluence with the Kootenai River in the vicinity of the sensitive resource site. Since the listing of Kootenai River white sturgeon as endangered in 1994, the flow regime from the dam was altered to provide a more normative hydrograph for sturgeon during the spawning period, as discussed in the 2006 *Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement* (EIS). High water events associated with fish flows and flood risk management, as well as for winter-time power production, have exacerbated bankline erosion in some areas. Cut banks, such as those at the confluence of Dunn Creek and the river, are eroding faster, and existing vegetation is unable to produce and maintain root structure, which would naturally stabilize the bankline. The 2006 EIS anticipated that the change in flow regime could create the conditions which would further affect sensitive resource sites. The underlying need for the bank stabilization action is the ongoing degradation of sensitive resources. The purpose of this project component is to provide long-term, durable, minimal-maintenance bank stabilization that prevents catastrophic losses of sensitive and irreplaceable resources.

3. **Proposed Action:** The Kootenai River Project consists of three sub-projects: 1) Dunn Creek Spit In-stream Habitat Enhancement, 2) Mid-Channel Bar Boulder Placement, and 3) Dunn Creek Bank Stabilization. Construction is planned to begin August/September of 2015. The Dunn Creek Spit In-stream Habitat Enhancement project would construct three engineered log jams along the gravel bar at the confluence of Dunn Creek and Kootenai River. The Mid-Channel Bar Boulder Placement project would place approximately 30 boulders 3 to 6 feet diameter across the top of an existing mid-channel bar. Dunn Creek Bank Stabilization project involves placing fill material along approximately 450 linear feet of lower Dunn Creek's bank, stabilizing the toe with logs and angular rocks, refilling the space with soil, and replanting the area. The projects are located downstream of Libby Dam, Lincoln County, Montana. The Mid-Channel Bar Boulder Placement would be approximately 0.8 miles downstream of the dam, and the Dunn Creek Spit In-stream Habitat Enhancement and Dunn Creek Bank Stabilization projects would be approximately 2.0 miles downstream of the dam. Best management practices (BMPs) would be implemented to minimize project impacts. Some of the BMPs include no end dumping of materials into the water, and installing a temporary deflector structure. All the proposed actions would be constructed during low flow conditions in August/September timeframe and take up to approximately six weeks to construct including mobilization and final site clean-up.

4. **Impacts Summary:** Pursuant to the National Environmental Policy Act, the Environmental Assessment (EA) has been prepared. The EA provides an evaluation of the potential environmental impact of the proposed work which is briefly summarized below.

a. Impacts from the project are expected to include minor construction related effects on water quality, vegetation, fish, wildlife, and noise. These impacts would generally be highly localized and short in duration. Approximately 0.5 acre of wetlands would be temporarily disturbed due to the construction activities; however, the wetland area would be replanted with native vegetation such as cottonwoods and willows. The Corps would use BMPs to minimize potential adverse effects to aquatic and terrestrial resources. Long-term impacts associated with Kootenai River Project are expected to include beneficial effects on aquatic habitat and water quality which would offset the short-term construction related impacts. The establishment of aquatic and riparian habitats and habitat complexity needed in this area will benefit wildlife, fish, and water quality.

b. The work associated with the preferred alternative will occur below ordinary high water and will result in a discharge of fill material into waters of the United States and, therefore, does require a Section 401 water quality certification and a 404(b)(1) evaluation. The Corps prepared a 404(b) (1) evaluation and has received a 401 certification from Montana Department of Environmental Quality dated 22 June 2015. For compliancy with the Endangered Species Act (ESA), the Corps has determined that the proposed project may affect but is not likely to adversely affect bull trout or its designated critical habitat. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, Spalding's catchfly, or their designated critical habitats. The USFWS concluded informal Section 7 ESA consultation on the project with a letter dated 8 May 2015 concurring with the Corps effects determination. For Section 106 consultation, the Corps has consulted with the State Historic Preservation Office (SHPO), and the Confederated Salish and Kootenai Tribes. The Corps has found, and the SHPO has concurred on 15 October 2014 and 20 October 2014, respectively, that construction of the two riverine habitat improvement and bank stabilization projects would result in no historic properties affected. Therefore, the undertaking is in compliance with the consultation requirements of the Section 106. The public comment period for the draft EA was from 24 April 2015 to 25 May 2015. Two comment letters were received. One letter expressed support for the project. The other letter had technical questions regarding the design of the all three projects; response to the comments is provided in the EA.

c. Unavoidable adverse effects of the proposed project will be minor and include the following:

- Activities of local birds, small mammals, and fish in the area would be temporarily disrupted due to construction activities.
- Approximately 0.5 acre of wetlands would be temporarily disturbed
- Recreational activities at Dunn Creek Campground would be temporarily disrupted during construction

5. **Conclusion**: For the reasons described above, I have determined that the proposed actions will not result in significant adverse environmental impacts. The project will not constitute a major Federal action with significant impacts on the quality of the human environment, and therefore, does not require an environmental impact statement.

13 Jul 15

DATE

John G. Buck
Colonel, Corps of Engineers
District Commander

Final ENVIRONMENTAL ASSESSMENT

Kootenai River Project downstream of Libby Dam
Lincoln County, Montana

US Army Corps of Engineers
Seattle District

July 2015

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EXECUTIVE SUMMARY

Responsible Agency: The lead federal agency responsible for this project and related environmental compliance with the National Environmental Policy Act (NEPA) is the U.S. Army Corps of Engineers, Seattle District (Corps).

Abstract: Per the National Environmental Policy Act (NEPA) (42 U.S.C. § 4321 et seq.), this Environmental Assessment (EA) evaluates the environmental, cultural, and social effects of actions associated with the implementation of the Kootenai River Project downstream of Libby Dam, Lincoln County, Montana, to increase habitat complexity and prevent erosion and loss of sensitive resources. The Kootenai River Project consists of three sub-projects: 1) Dunn Creek Spit Instream Habitat Enhancement, 2) Mid-Channel Bar Boulder Placement, and 3) Dunn Creek Bank Stabilization. Construction is planned to begin August/September of 2015. . The Dunn Creek Spit Instream Habitat Enhancement project would construct three engineered log jams along the gravel bar at the confluence of Dunn Creek and Kootenai River. The Mid-Channel Bar Boulder Placement project would place approximately thirty (30) 3 to 6 foot diameter boulders across the top of an existing mid-channel bar. Dunn Creek Bank Stabilization project involves placing fill material along approximately 450 linear feet of lower Dunn Creek's bank, stabilizing the toe with logs and angular rocks, refilling the space with soil, and replanting the area.

Impacts associated with Kootenai River Project are expected to include beneficial long-term effects on aquatic habitat and water quality. There may be some increased noise and disturbance during the construction actions but these impacts would be temporary and not occur upon completion of the project. The utilization of best management practices will minimize these impacts. The establishment of aquatic and riparian habitats and habitat complexity needed in this area will benefit wildlife, fish, and water quality.

Based on the impact analysis contained in this EA, implementation of the Kootenai River Project is not a major Federal action significantly affecting the quality of the human or natural environment and therefore does not require preparation of an Environmental Impact Statement (EIS). The public comment period for the Draft EA was 24 April 2015 through 25 May 2015. Two comment letters were received.

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1 INTRODUCTION

This Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC 4321-4370e), Sec. 102(C) and the U.S. Army Corps of Engineers (Corps) NEPA procedures at ER 200-2-2. It evaluates the potential environmental, cultural and social effects of the Kootenai River Project downstream of Libby Dam, Lincoln County, Montana. The Kootenai River Project consists of three sub-projects: 1) Dunn Creek Spit Instream Habitat Enhancement, 2) Mid-Channel Bar Boulder Placement, and 3) Dunn Creek Bank Stabilization.

1.1 BACKGROUND

The Kootenai River ("Kootenay" River in Canada) originates in southeastern British Columbia, flows south and west through Montana, and northwest through Idaho, then returns to Canada where it flows through Kootenay Lake and joins the Columbia River at Castlegar, BC (Figure 1). Following the construction of Libby Dam in 1972, the Kootenai River downstream of the dam has been impacted by altered hydrology; changes in nutrient, wood and sediment loading; and changes in water quality. These changes have altered riparian processes and affected aquatic and terrestrial habitat conditions, resulting in degraded ecosystem conditions relative to historical conditions. The Corps, in response to the U.S. Fish and Wildlife Service (USFWS) Biological Opinion for sturgeon and National Marine Fisheries Service Biological Opinion for Columbia River salmon and steelhead, as well as to the Northwest Power and Conservation Council Mainstem Amendments, has implemented a more normative flow regime in the Kootenai River. The proposed project will improve salmonid habitat in the Kootenai River downstream of Libby Dam. The project area is located in an approximately three mile reach of the Kootenai River downstream of Libby Dam to the mouth of the Fisher River.

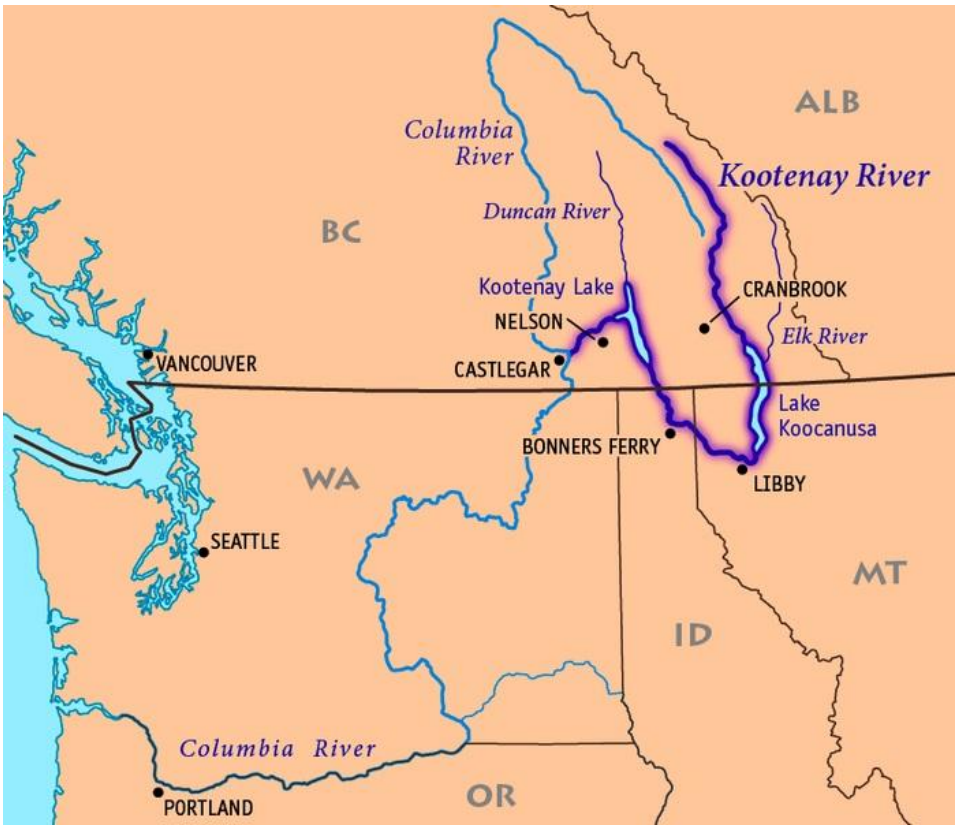

Figure 1. Kootenai/Kootenay River, US and Canada

1.2 AUTHORITY

Libby Dam was authorized by Public Law No. 81 – 516, the Flood Control Act of 17 May 1950, substantially in accordance with the plan set forth in House Document 531 (81st Congress, Second Session) as part of the comprehensive plan for water resource development of the Columbia River and tributaries. House Document 531 indicates that Libby Dam is intended to provide benefits of flood control, power generation, navigation, fish and wildlife conservation, and recreation. The Columbia River Treaty provides for coordination between Canada and the U.S. on flood risk reduction and power generation and imparts significant mutual benefits across the Columbia River Basin. The reservoir created by Libby Dam was designated Lake Koocanusa by Public Law No. 91-625 dated 31 December 1970. The proposed action falls under the operation and maintenance authority of the dam. This EA is being prepared pursuant to Sec. 102(C) of the National Environmental Policy Act (NEPA) of 1969.

Authority for the proposed action also includes the National Historic Preservation Act of 1966 (Public Law 89-665)("NHPA"), as amended by the National Historic Preservation Act amendments of 1980 (Public Law 96-515); Engineer Regulation/Pamphlet ER/EP 1130-2-540, Project Construction and Operation, Programmatic Agreement for Management of Historic Properties at Libby Dam and Lake Koocanusa Project approved in October 2014.

1.3 PROJECT LOCATION

The projects are located downstream of Libby Dam, Lincoln County, Montana. The Mid-Channel Bar Boulder Placement would be approximately 0.8 miles downstream of the dam, and the Dunn Creek Spit Instream Habitat Enhancement and Dunn Creek Bank Stabilization projects would be approximately 2.0 miles downstream of the dam (Figure 2).

The Dunn Creek Spit Instream Habitat Enhancement project site is located on the gravel bar where Dunn Creek joins the Kootenai River, upstream of the Dunn Creek Campground boat ramp on the left bank. The Dunn Creek Bank Stabilization project site is approximately 0.1 mile upstream of the Dunn Creek Campground's boat ramp and parking area at the confluence of Dunn Creek and the Kootenai River, and approximately 2 miles downstream of Libby Dam. The Mid-Channel Bar Boulder Placement project site is adjacent to Warland Road, approximately 0.80 miles downstream of the dam on the right bank.

Figure 2. Location of proposed projects downstream of Libby Dam, Montana

2 PURPOSE AND NEED

2.1 RIVERINE HABITAT IMPROVEMENT[1]

There is an overall lack of aquatic habitat complexity downstream of Libby Dam. Fish habitat downstream of Libby Dam is limited by lack of recruitment of large wood and sediment due to the existence of the dam. Existing large wood complexes are aged and degraded, and although they continue to function, have become less functional. In addition, the hydrograph below Libby Dam is reversed, and blockage by the dam has led to an almost total absence of recruitment of woody vegetation on existing river banks and gravel bars, though recent flow changes have allowed limited recruitment of willows, cottonwoods, and grasses and shrubs in relatively small areas. Pool formation by large wood complexes is absent. Point bar formation in the absence of sediment recruitment is non-existent. This limited fish habitat directly affects fish populations in the river and contributes to the observed declines in trout populations in recent studies (MFWP, 2013). The need for this action is to address the lack of fish habitat and thereby increasing fish population. The purpose for the habitat improvement project components is to address the lack of fish habitat, help restore Kootenai River ecosystem function, and thereby increase fish populations

2.2 BANK STABILIZATION

The underlying need for action is to address the ongoing degradation of sensitive resources. The purpose of the project is to provide long-term, durable, minimal-maintenance stabilization that curtails incremental erosion and prevents catastrophic losses of sensitive irreplaceable resources.

High flows from Libby Dam, including spill above powerhouse capacity for sturgeon and for flood risk management, have eroded the toe slope of upstream bank of Dunn Creek at the confluence with the Kootenai River in the vicinity of the sensitive resource site. In 2006, the flow regime from the dam was altered to provide a more normative hydrograph for sturgeon during the spawning period, as discussed in the *Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement* (EIS) (USACE, 2006b). High water events associated with fish flows and flood risk management, as well as for winter-time power production, have exacerbated bankline erosion in some areas. Cut banks, such as those at the confluence of Dunn Creek and the river, are eroding faster, and existing vegetation is unable to produce and maintain root structure, which would naturally stabilize the bankline. The 2006 EIS anticipated that the change in flow regime could create the conditions which would further affect sensitive resource sites.

[1] Riverine Habitat Improvement refers to both the Dunn Creek Spit Instream Habitat Enhancement and Mid-Channel Bar Boulder Placement

3 PROPOSED ACTION AND ALTERNATIVES

3.1 NO ACTION ALTERNATIVE

Under the no action alternative, no action would be constructed. The project area would continue to have a deficiency of large wood debris and habitat complexity such as homogenous sized river cobble in the river system. Low diversity of aquatic habitat would continue to occur. At Dunn Creek campground including the boat ramp, ongoing operation and maintenance activities would occur.

Without action to stabilize the bank at the mouth of Dunn Creek, it would continue eroding at the current rate until a stable configuration is naturally reached. At that point, vegetation would repopulate the bank protecting from further loss of material. The quantity and rate of bank erosion is unknown, as is a temporal estimate for when a stable angle of repose would be achieved without action. This alternative would not meet the purpose of this project. Nevertheless, this alternative was carried over for comparative consideration to the preferred alternative in Section 4.0 Affected Environment and Environmental Consequences.

3.2 PROPOSED ACTION ALTERNATIVE

All the proposed actions would be constructed during low flow conditions in August/September timeframe and take up to approximately six weeks to construct including mobilization and final site clean-up. The sub-projects may be phased for construction. If the construction is phased, all construction would still occur during low flow conditions in August/September.

3.2.1 Riverine Habitat Improvement

3.2.1.1 Site 1: Mid-Channel Bar Boulder Placement

Approximately thirty (30) boulders ranging 3 to 6 foot in diameter would be placed across the top of an existing mid-channel bar. These boulders may be out of the water during low flows, depending upon their diameter. The Libby Dam quarry would provide the boulders from its existing stockpile, approximately 5 miles south of the project site.

The boulders would be individually placed by an excavator. It is anticipated that equipment would be driven into the water and rounded gravel may be added as necessary to the riverbank/channel to make an accessible path to the site. Upon completion of the project, the rounded gravel would be spread across the riverbank to reflect a more natural state. Signs would be placed along the shore alerting boaters to the boulders.

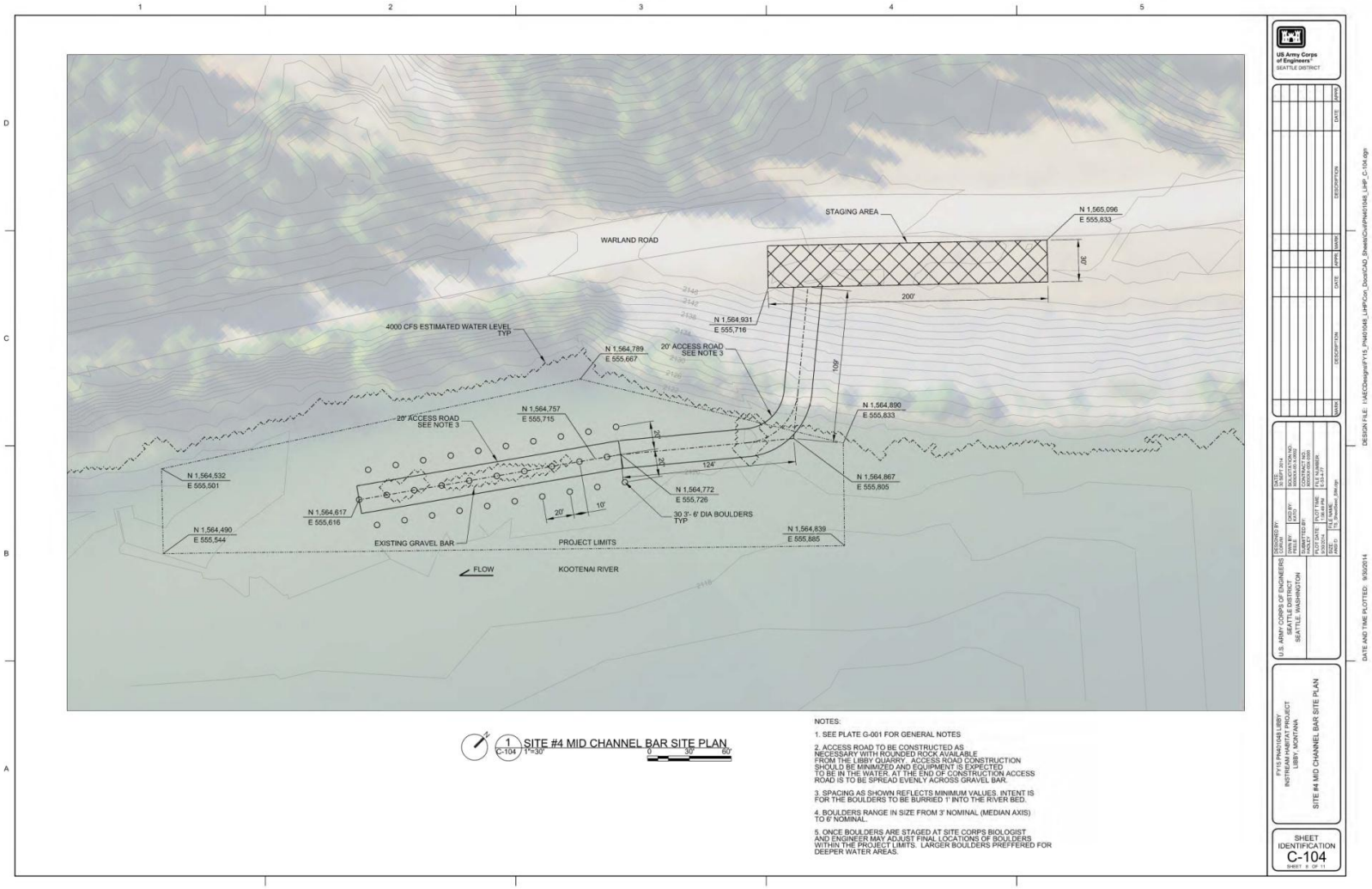

Figure 3. Mid Channel Boulder Bar

3.2.1.2 Site 2: Dunn Creek Spit Instream Habitat Enhancement

Three (3) engineered log jams (ELJ's) are proposed along 500 feet of an 850 foot long gravel bar from the confluence of Dunn Creek towards the boat launch along the left bank of the Kootenai River near River Mile (RM) 217.8. The locations of the three ELJ's proposed are based on a desire to maximize the amount of flow that impinges in the logjams to create large permanent pools along the left bank upstream of the boat launch. The ELJ's include pre-excavated scour pools to the expected scour depth during a major flood event. The majority of the wood in the jams would be placed slightly below the ordinary low water level to ensure that they create the desired pool habitat and associated woody edge at all flows. The tops of the jams would extend a few feet higher than the gravel bar to help increase resistance against buoyancy. Cottonwood live stakes and willows would be planted on top of the ELJ's and gravel bar. These plantings would help increase stability of the ELJ's over time and improve habitat by increasing overhanging cover and leaf fall. The ELJ's would include a large quantity of logging slash to reduce the void spacing in the front of the structure.

Access to the construction site from the staging area would be down the boat ramp and heading upstream on the river bank to the construction site along the top of the gravel bar to the landward side of the ELJ's. Material that is excavated for the ELJ's construction would be stockpiled on the gravel bar without impeding flow from Dunn Creek. The staging area would be in the grass field directly to the south of the boat ramp at Dunn Creek Campground. It is expected that equipment would be driven and operated near or in the water and over the gravel bar and rounded gravel may be added as necessary to the river bank to ease access. Upon completion of the project, the rounded gravel would be spread across the river bank to reflect a more natural state.

Each ELJ would be comprised of forty three 19- to 40-foot logs with rootwads, nine of which are placed vertically, 10 feet below the streambed in excavated pits. Additional materials for each ELJ include nine 4- 6-foot nominal diameter boulders and anchoring hardware, 450 cubic yards (CY) of excavated streambed material, approximately 210 CY of slash material, 25 cottonwood live stakes, and 480 willow live stakes. The Libby Dam quarry would provide the boulders and rounded gravel from its existing stockpile, approximately 5 miles south of the project site. The logs would either be purchased or donated from the USFS. The slash materials would be obtained either from vegetation removal as part of the Souse Gulch Volunteer Village project or the top of the overburden at the Libby Dam quarry.

For sediment control, a deflector structure (gravel kick-up berm, boulder and *Visqueen* barrier, or equivalent) would be built at the head of the gravel bar to reduce flow through the construction site. The mouth of Dunn Creek would be lined with silt fence since runoff from the stockpiles would flow toward the creek into the river.

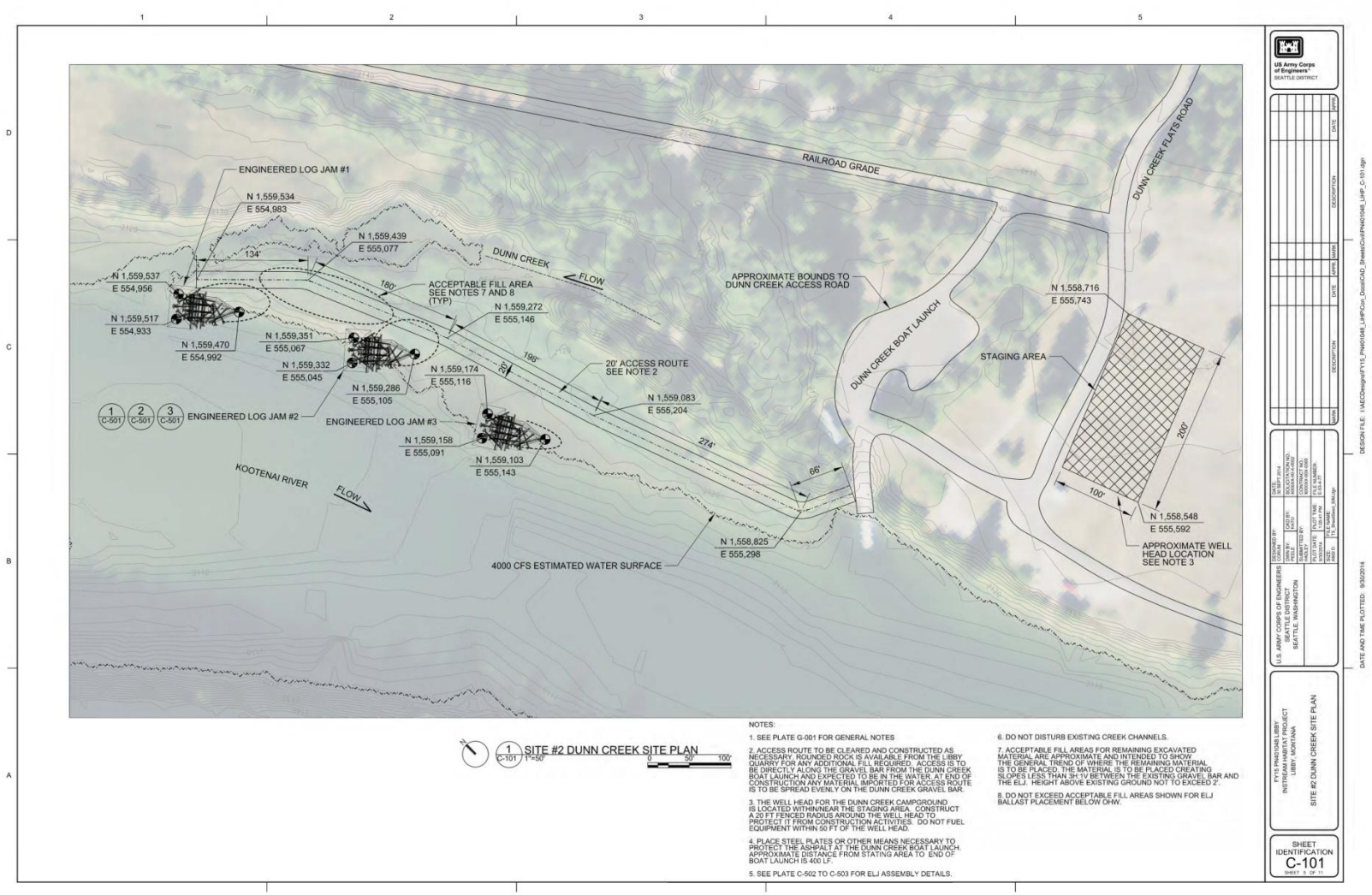

Figure 4. Dunn Creek Spit Instream Habitat Enhancement Project

3.2.2 Bank stabilization

Approximately 450 linear feet of lower Dunn Creek's bank will be stabilized by reducing the slope of the bank, stabilizing the toe with logs and angular rocks, refilling the space with soil, and replanting the area. The eroded bank will be graded back from the current, unstable, steep slope to a more stable slope of 3H: 1V. The grading work will remove approximately 8,900 CY of soils with an excavator and dozer. These soils will be stored on-site to be reused as backfill. A log and rock toe will be constructed consisting of approximately seven log clusters embedded perpendicularly into the bank. Clusters will consist of three logs at various angles, oriented perpendicular to the flow of Dunn Creek, with rootwads exposed into the channel. This configuration will create roughness at the slope toe causing erosive velocities to be reduced. Rock will be placed beneath, above, and between log clusters to help anchor them and protect against scour behind or below the log toe. Additional anchors may be required for the logs in the form of large boulders or earth anchors. After the logs were in place, the area will be backfilled with soils from grading and replanted with native vegetation. The plantings will provide additional stability and roughness near the toe, as well as ground cover and localized erosion protection.

Access to the construction site from the staging area would be down the railroad grade, across the flat to the construction site. The staging area would be same staging area as the Dunn Creek Spit Instream Habitat Enhancement project.

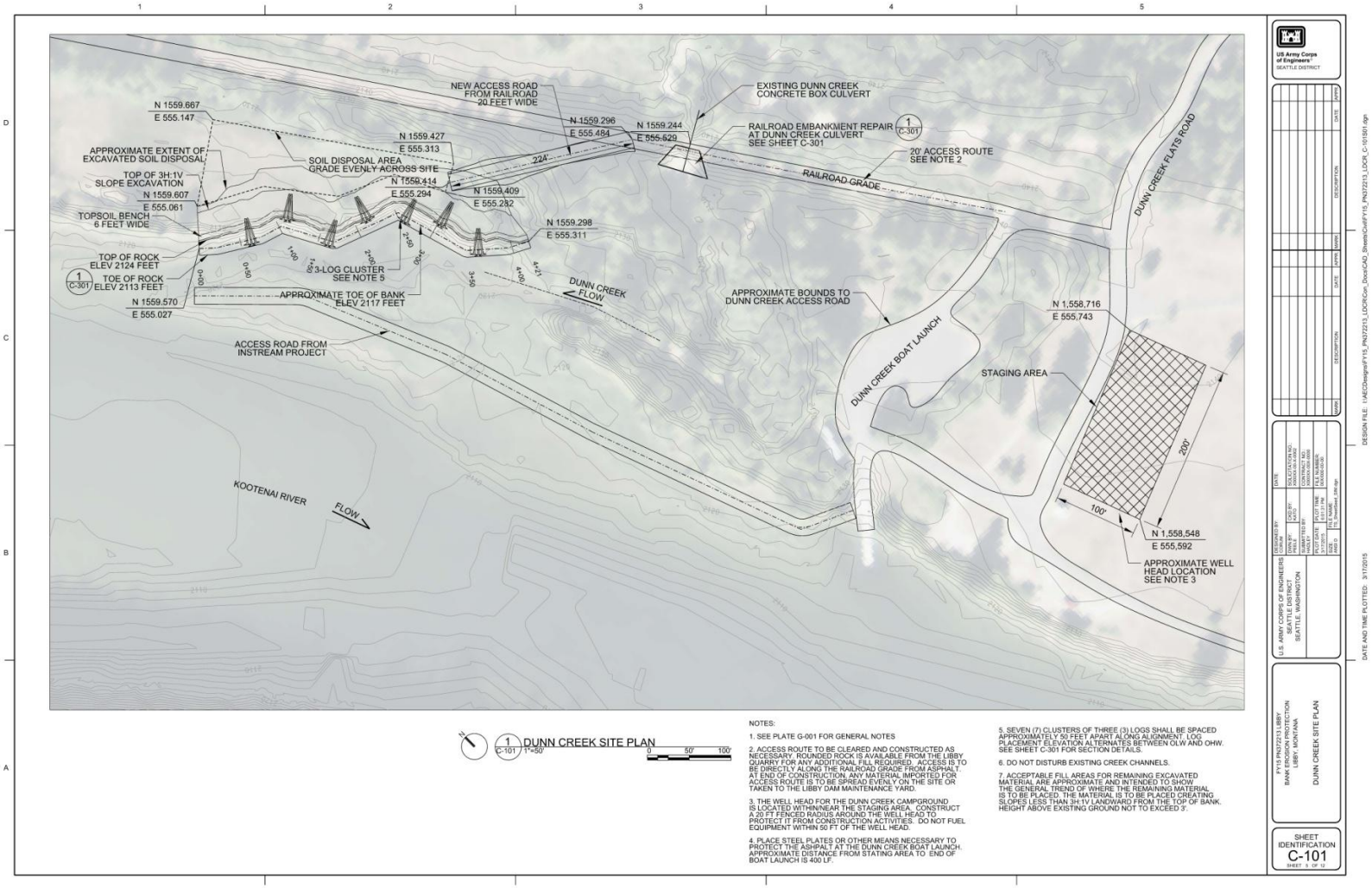

Figure 5. Dunn Creek bank stabilization alignment

The following construction Best Management Practices (BMP) would be included during the construction for all three actions:

- Equipment that would be used near the water would be cleaned prior to construction.
- Re-fueling would occur a minimum of 100 feet away from the shoreline.
- Vegetable based hydraulic fluid would be used in heavy equipment assigned to work in or near the Kootenai River or Dunn Creek. Construction equipment would be regularly checked for drips or leaks.
- At least one fuel spill kit with absorbent pads would be on-site at all times, and construction personnel would be properly trained in its use.
- Equipment would not be allowed to idle longer than 15 minutes when not in use.
- All motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise, fumes, or smoke. Mufflers and sound attenuation devices (such as rubber strips or sheeting) would be installed and maintained on all equipment. This includes truck tail and other gate dampeners (both opening and closing) for all dump trucks on the project. Use of un-muffled engine brakes or Jake Brakes is prohibited unless required for safety. Use of air horns would be limited to emergencies only.
- Individual placement of clean rip-rap (no end dumping) into the water.
- At Dunn Creek Spit Instream Habitat Enhancement site, a temporary deflector structure (gravel kick-up berm, boulder and *Visqueen* barrier, or equivalent) would be built at the head of the gravel bar to reduce flow through the construction site.

3.3 ALTERNATIVES CONSIDERED AND ELIMINATED FROM FURTHER CONSIDERATION

3.3.1 Large wood - methods of construction

For the Dunn Creek Spit Instream Habitat Enhancement project, the ELJ's would be constructed by pile driving a number of logs vertically into the substrate and then weaving the remaining logs horizontally between the vertical logs. Cottonwood live stakes and willows would be planted on top of the ELJ's and gravel bar. The ELJ's would include logging slash to reduce the void spacing in the front of the structure. While this alternative would meet the purpose of this project, pile driving logs poses unacceptable safety risks and therefore this construction method is not considered further.

3.3.2 Bank stabilization – vegetation alternative

The eroded bank would be graded back to a gentler slope, between 2-4H:1V and could include a mid-slope bench as space allows. Slopes would be seeded with a native mix of ground cover and have additional plantings of native shrubs and trees throughout. Although this alternative would appear to be stable, it was determined that with the seasonal high flows from Libby Dam and divergent flows of Dunn Creek, the bankline would not remain stable in the long-term, risking erosion into sensitive resources. This alternative would not meet the purpose of this project, which is to provide a long-term solution and therefore is not considered further.

3.3.3 Bank stabilization – rock toe alternative

The rock toe alternative would be similar to the vegetation alternative, but would include an additional feature of a rock toe for additional confidence against erosion. The eroded bank would be graded back to a gentler slope, between 2-4H:1V, and could include a mid-slope bench as space allows. Slopes would be seeded with a native mix of ground cover, with additional plantings of native shrubs and trees added throughout. Although this alternative may be the most stable in the long term, hardening of the bank at the water's edge is the least preferred alternative for fish and wildlife habitat. This alternative, therefore, would not meet the project purpose and is not considered further.

4 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter focuses on those resources specific to the proposed project area that have the potential to be affected by activities connected with the installation of large wood jams, boulders, and bank stabilization in and along the Kootenai River downstream of Libby Dam. An environmental effect, or impact, is defined as a modification in the existing environment brought about by the Corps' mission and support activities; these impacts are described as direct or indirect. The Council on Environmental Quality (CEQ) guideline 40 CFR 1508.8 describes direct impacts to be those which are caused by the action and occur at the same time and place. The CEQ regulations define indirect impacts as those that are caused by the action and are later

in time or farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Cumulative impacts are those that result from the incremental impacts of an action added to other past, present, and reasonably foreseeable actions, regardless of who is responsible for such actions.

The following resources were not studied in detail as existing conditions and the project alternatives would not have direct, indirect, or cumulative effects on the resources:

Land Use. Current land ownership and land management would not change with construction of the proposed projects. A portion of adjacent campgrounds or picnic areas would be temporarily closed during construction and utilized as staging areas, but once construction is complete, these areas would be returned to public use.

Floodplains. The effective flood maps (Lincoln County, 1980, map panel 760 of 1100) indicates that the project reach is entirely in an A Zone, which is an approximate delineation of the flood hazard area associated with the 1 percent or 100 year flood event. No detailed flood elevations (BFEs) or a floodway boundary are provided on the map. This project would not affect the floodplain or promote encroachment of the floodplain development.

Aesthetics and Visual Resources. The Kootenai River Project would not change the overall aesthetics and visual resources of the area. During construction, construction equipment such as dump trucks and excavators would be present, but impacts to aesthetics and visual resources would be temporary and minor.

Utilities and Infrastructure. Installation of the Kootenai River Project would not affect any utilities or infrastructure.

Transportation. During construction, dump trucks would use the local roads delivering materials for the projects from the Corps quarry, no more than approximately 5 miles away. The annual average daily traffic on Highway 37 near the Dunn Creek Campground is 450 vehicles (MDT, 2013). An increase of approximately 10 trucks per day would be added to the existing traffic. This slight increase in traffic would be negligible and short term.

Hazardous, Toxic, and Radioactive Materials. Rocks utilized would come from the Corps' quarry and would be free of contaminants (such as asbestos) to avoid adverse impacts to human health and to the environment. The Corps' quarry has been certified as asbestos free.

4.1 HYDROLOGY AND HYDRAULICS

4.1.1 Existing Conditions

Presently, Libby Dam operations are dictated by a combination of power production, flood control, recreation, and special operations for the recovery of Endangered Species Act (ESA)-listed species, including Kootenai River white sturgeon and bull trout in the Kootenai River, and salmon and steelhead in the lower Columbia River. In 1977, a selective withdrawal system was installed to better control the temperature of water released from Libby Dam. The selective

withdrawal system provides for the release of more natural water temperatures from late spring through fall; however, the reservoir remains isothermic during winter, and water temperatures remain warmer than prior to closure of Libby Dam (MFWP, 2013). Since the early 1990s, the Corps has increased spring discharge to benefit downstream sturgeon spawning. In 2001, the Corps began operating Libby Dam to provide minimum flows for bull trout. The year-round minimum instantaneous discharge target is 4,000 cubic feet per second (cfs), and bull trout minimum flow increases to between 6,000 and 9,000 cfs during the period of highest productivity from May 15 through September 30 (USFWS, 2006). An alternative flood control operation termed Variable Q (Q=flow), or VARQ, was implemented in 2002 to ensure reservoir refill and provide volume from Libby Dam during salmon emigration downstream in the Columbia River during late summer.

Much of the annual runoff in the Kootenai River valley occurs in spring with the snowmelt. High inflow into Lake Koocanusa tends to occur between April and July from the snowmelt, with relatively low runoff the rest of the year. Average pre-impoundment (1912 through 1971) flows in the Kootenai River at Libby Dam ranged from about 65,000 cfs in late May and early June to about 2,000 cfs in January. Post-impoundment conditions (1972 to present) have resulted in retaining water during historical high flow periods and discharging water during historical low flow periods. In general, the Kootenai River experiences reduced flows during the spring and early summer, with peak flows of up to 26,000 cfs in late May through June for sturgeon spawning.

4.1.2 No Action Alternative

With the no action alternative, hydrology and hydraulics of the project area would remain the same as the current condition.

4.1.3 Preferred Alternative

For both sites, dam operations would not be modified or changed as a result of this alternative and construction would occur during the low flow period in September/October. Effects on hydrology and hydraulics would be minimal because the riverine habitat improvement projects would not result in alterations to the overall flow regime..

4.1.3.1 Mid-Channel Bar Boulder Placement

Pools would likely form at the upstream end of each boulder placed on the mid-channel bar. Frequent overflows and river ramping should create adequate conditions to maintain the pools. Scour around the boulders would not be expected to exceed half of the boulder height. The largest pools would form adjacent to the largest boulders or boulders placed adjacent to deeper faster water on the margins of the bar. Because very little if any sediment is transported in this reach, any pools that form are likely to persist. A small rise in the water surface upstream of the project is expected resulting from the reduction in conveyance but this should not result in negative impacts to adjacent stream banks due to the presence of existing rip-rap along the toe.

4.1.3.2 Dunn Creek Spit Instream Habitat Enhancement

The ELJ locations were selected to maximize the amount of flow that impinges on each structure to create and maintain large pools for fish habitat. The jams are spaced 80 to 120 feet apart along the left bank. Each ELJ would occupy approximately 100 feet of bankline and would be keyed into the gravel bar/shoreline to prevent flanking. The ELJ's would include pre-excavated scour pools to the expected scour depth during a major flood event. Similar to the upstream ELJ, the middle ELJ would tie into the left bank gravel bar. Due to changes in bank line topography, the downstream ELJ would be built completely in the river and would not tie into the left bank bar. The majority of the wood in the jams would be placed slightly below the ordinary low water level to ensure that they create the desired pool habitat and associated woody edge at all flows. The tops of the jams would extend a few feet higher than the gravel bar to help increase resistance against buoyancy.

Because the ELJ's would include projecting elements (logs), high turbulence and complex hydraulic conditions would be created. Turbulent intensities would be greatest as the jams become submerged, which would likely occur when flows approach 40,000 cfs (between a 10 year and 100 year event). The gravel used to help anchor the wood in the ELJ's would likely erode, requiring adequate quantities of erosion resistant backfill. Living vegetation (cottonwood live stakes, willows) is proposed as part of the ELJ's. This helps increase stability of the ELJ's over time and improves habitat by increasing overhanging cover and leaf fall. The ELJ's would also include a large quantity of logging slash to reduce the void spacing in the front of the structure. This helps account for a lack of wood in the system due to the dam, and because it is ramped up to the top of the jam from the bottom of the pool, may help reduce risks of large rootwads creating a strainer condition at the front of the jam.

The ELJ's would not result in significant increases in 1% annual chance exceedance flood water surface elevations due to their relatively modest encroachment. In large floods the ELJ's could be overtopped by as much as 2 feet of water, which indicates unanchored wood would not be stable at this site. Maximum powerhouse flows would engage the structures to nearly full height of the ELJ's annually and would have high enough velocities to maintain or enlarge the as-built scour pools. The ELJ's extend into the river at flows of 4,000 cfs, indicating that they should be engaged with the full range of flows expected at the site. Scour analysis accounts for flows varying from 25,000 cfs to 51,500 cfs.

The ELJ's would likely cause a localized increase in velocities in the main channel as much as 0.44 feet/second (ft/s) -from 6.3 to 6.75 ft/s. This velocity of 6.75 ft/s would be less than that currently experienced just downstream at the boat ramp. Conditions downstream of the boat ramp would be unaffected by the ELJ's. Upstream of the project, mid channel velocities are expected to decrease slightly.

Given that the thalweg is 200 to 300 feet from the proposed ELJ's, and the ELJ widths are a maximum of 80 feet wide in a 600 to 650 foot wide river, the ELJ's are not expected to affect the river position. Large boulders line the existing toe of the right bank, and the existing banks were subject to much higher flows historically. Of the three ELJ's, ELJ nearest the boat ramp would be closest to the thalweg and would be in proximity to the highest velocities, upwards of 8

feet/second. All ELJ's would overtop during flows in excess of 40,000 cfs, which helps prevent them from training the flow into adjacent banks. The ELJ's are also aligned with the flow similar to how natural log jams form along the bank, where the angle formed by the upstream face of the log jams sweeps downstream.

Prediction of conditions at this site is complicated by the presence of Dunn Creek flowing upstream into the Kootenai just left of the bar where the three ELJ's are proposed. Some of the complexity would be mitigated by the bank stabilization project presented in this draft EA, which would harden the eroding left bank (right bank of Dunn Creek). Dunn Creek could episodically fill the pool of the upstream ELJ or the downstream ELJ. Conversely enlargement of the pool may cause some over-steepening and erosion of the mouth of Dunn Creek.

4.1.3.3 Bank Stabilization

The placement of rip-rap along the shoreline below Ordinary High Water (OHW) would bury some of the existing riverbed substrate; however when the river and Dunn Creek are at low flow conditions. All applicable BMP's would be implemented throughout the construction process. Dam operations would not be modified.

4.2 WATER RESOURCES AND WATER QUALITY

4.2.1 Existing Conditions

Water quality in the Kootenai River has been affected by Libby Dam operations; operations have generally increased median Kootenai River temperatures by more than 5°F (2.8°C) during the winter months, increased by about 2°F (1°C) on the rising limb of the spring freshet, and reduced the summer median temperatures by about 2°F (1°C) until the fall (KTOI, 2009). Lake Koocanusa, the reservoir formed by Libby Dam, acts as a nutrient sink. The reservoir traps significant portions of the phosphorous and nitrogen supplied by the watershed above the dam. This has led to an oligotrophic, or nutrient poor, condition in the river downstream of the dam. This condition provides *Didyomosphenia geminata* , a native stalked diatom that exists at nuisance/noxious densities below Libby Dam, the conditions in which to flourish.

For water quality standards in the State of Montana, the Kootenai River has been classified as B-1 and suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply according to MDEQ 2012 MAC 17.30.623. In this river reach, temperature is listed as a concern by MDEQ (2014).

4.2.2 No Action Alternative

With the no action alternative, water quality at the project area would remain the same as the current condition, since no construction would occur.

4.2.3 Preferred Alternative

4.2.3.1 Mid-Channel Bar Boulder Placement

There may be localized and short-term impacts from increases in turbidity caused by rock placement; however these impacts would be minor. Boulder placement would take no more than a week to complete. No excavation would occur.

4.2.3.2 Dunn Creek Spit Instream Habitat Enhancement

This proposed project would result in increases in turbidity which would affect the water quality in the project vicinity due to in water work. These increases in turbidity would be short term and localized to this river reach; only during construction. The construction of the ELJ's would involve excavating scour pools at the upstream end of each ELJ and placing large woody debris (LWD) and boulders to form the ELJ's. The excavated material would be stockpiled on the existing gravel bar to be used as backfill for the ELJ's. To minimize turbidity, sediment control features would be implemented. A deflector structure such as rock and *Visqueen* barrier would be built at the upstream end to the Dunn Creek gravel bar to reduce flow through the construction site. Constructing the project during low flow conditions would also lessen turbidity by minimizing the amount of in-water work. Cottonwood and willows would be planted on top of the ELJ's and gravel bar, which in the long term provide shade and lower water temperature. The construction phase is estimated to be approximately four weeks in duration. Following completion of project, no impacts to water quality are anticipated. Due to implementation of sediment control features, plantings, and temporary nature of the action, impacts to water quality would be less than significant.

4.2.3.3 Bank Stabilization

There may be minor localized and short-term negative impacts from increases in turbidity caused by rock placement. To minimize these short-term impacts, appropriate BMP's would be implemented. Material for construction would be obtained from USACE established borrow pit. No contaminants are known or suspected to be present in the materials. Stabilization of the shoreline would reduce erosion which may improve water quality conditions resulting from turbidity and suspended sediments over the long-term.

4.3 SOILS

4.3.1 Existing Conditions

Soils in the project area are predominately lacustrine or glacial outwash in origin as typified by the Natural Resources Conservation Service (NRCS, 2013). After the completion of Libby Dam in 1975 overbank flooding from the Kootenai River was significantly reduced, limiting the deposition of new sediment from the seasonal floods.

4.3.2 No Action Alternative

With the no action alternative, natural soil processes would continue.

4.3.3 Preferred Alternative

4.3.3.1 Riverine Habitat Improvement

Soils would be minimally affected by the two habitat improvement projects. For the Mid-Channel Bar Boulder Placement, no soil would be disturbed by the placement of the boulders. For the Dunn Creek Spit Instream Habitat Enhancement, the existing gravel bar and river bottom would be excavated in order to construct the ELJ's and that material would be backfilled on the ELJ's. Upon completion of the construction, access road materials would be spread around for a more natural appearance. No soil would be permanently removed.

4.3.3.2 Bank Stabilization

Approximately 8,900 CY yards of soil would be removed when the eroding bank is cut back to a more stable slope and trenches are dug to place the logs. Soil would be held on site for re-use as backfill material after the logs are placed. Approximately 60 percent (5,500 CY) of the soil would be left over after re-grading, and this soil would be removed from the vicinity. To improve planting success, 520 CY of topsoil would be added to the top layer of the re-graded slope.

4.4 VEGETATION AND WETLANDS

4.4.1 Existing Conditions

Shrubs and trees are present along the banks of the Kootenai River downstream of the Libby Dam tailwater dikes. The steep right bank is vegetated with a strip of woody shrubs and trees and rises quickly to a road; the forest covers the mountains above the river. Vegetation on the mountain sides is dominated by Ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), western larch (*Larix occidentalis*), western red cedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), and lodgepole pine (*Pinus contorta* var. *latifolia*). A narrow strip of woody shrubs and deciduous trees exists between the river's left bank and an abandoned railroad grade. Floodplain surfaces suitable for natural recruitment and establishment of native trees and shrubs are limited in this reach due to the altered hydrology and lack of flood disturbance. The small patches of floodplain that do exist are covered with woody vegetation and a mix of invasive reed canarygrass (*Phalaris arundinacea*) and other non-native grasses. Non-native grasses reduce bank margin roughness, out-compete woody vegetation and reduce potential for sustainable LWD recruitment from the banks. Wetland habitat occurs in general on the river's gravel bars, occurring mainly at the Dunn Creek site, where the creek produces sediment to an otherwise starved system.

4.4.1.1 Mid-Channel Bar Boulder Placement

The proposed project area is located in active river channel that receives flows year-round. During the June 2014 site visit, the site was covered by approximately two feet of water. No vegetation was present at the time of the site visit, and annual water levels are not low enough to allow for vegetative growth. For these reasons, it was determined that this area is not wetland.

4.4.1.2 Dunn Creek Spit Instream Habitat Enhancement

The Dunn Creek spit is dominated by young shoots of reed canary grass and appears to be a wetland based on the vegetative community and landscape position (Figure 6). Wetland functions are limited because the area is relatively small; it does not have the ability to provide water storage, and does not possess structural diversity.

4.4.1.3 Bank Stabilization

A narrow band of emergent wetland fringes a portion of the shoreline (Figure 6). This area consists of a sparse stand of reed canary grass interspersed with young shoots of coyote willow (*Salix exigua*). At this location, the soil is very gravelly and was inundated during the time of the June site visit. This wetland also appears to have limited function as the area is relatively small; it does not provide water storage or shoreline stabilization, and it would not possess structural diversity until the willows mature.

Figure 6. Approximate location of wetlands at the mouth of Dunn Creek.

4.4.2 No Action Alternative

With the no action alternative, successional riparian vegetative processes would continue.

4.4.3 Preferred Alternative

4.4.3.1 Riverine Habitat Improvement

The instream habitat projects would be constructed on gravel bars and near banks that are exposed when the Kootenai River seasonally runs low. Any vegetation in the immediate vicinity of these proposed projects would be disturbed or removed during the construction process. At the Mid-Channel Bar Boulder Placement site, boulders would be placed on an existing gravel bar below OHW to create hydraulic complexity. Even though these boulders would permanently cover the existing river bottom, no existing vegetative growth would be displaced, and they would be creating instream habitat complexity that is lacking in this river reach.

At the Dunn Creek Spit Instream Habitat Enhancement site, the ELJ's including anchor boulders, backfill material, and slash would be placed below OHW, permanently covering the riverbed. Similar to the Mid-Channel Bar Boulder Placement project, this project would restore instream habitat complexity. The existing vegetation on the gravel bar would be disturbed; however, the majority of the existing vegetation is non-native reed canarygrass. Reed canarygrass is non-native to this area and it only provides marginal habitat. In addition, the site would be replanted with cottonwoods and willows.

At the Dunn Creek Spit Instream Habitat Enhancement site, minimal effects to wetlands would occur. Approximately 0.5 acre of wetlands would be disturbed due to the construction activities; however the wetland area would be replanted with native vegetation such as cottonwoods and willows. The overall wetland function would not be reduced upon completion of the project. Since there are no wetlands at the Mid-Channel Bar Boulder Placement site, no impacts to wetlands would occur.

4.4.3.2 Bank Stabilization

In order to create a more stable bank, the angle of the slope would be lessened, thus requiring excavation and removal of approximately 0.2 acres of existing grassy meadow and small shrubs. Much of this is dominated by the non-native reed canarygrass. In addition, the rip rap would be placed below OHW. Once construction is complete, the new slope would be replanted with native shrubs:

Table 1. Native vegetation for replanting

Common Name	***Scientific Name***
Woods Rose (prairie rose)	*Rosa woodsii*
Prickly Rose	*Rosa acicularis*
Saskatoon Serviceberry	*Amelanchier alnifolia*
Shrubby Cinquefoil	*Potentilla fruticosa*
Oregon Grape	*Mahonia aquifolium*

The shrub's roots would further stabilize the new slope, and the plants would provide additional habitat for wildlife.

Similar wetland impacts would occur at the Dunn Creek Bank Stabilization site as described for the Dunn Creek Spit Instream Habitat Enhancement site, Section 4.4.3. Approximately 0.05 acre of wetlands would be disturbed; however the site would be replanted with shrubs.

4.5 AQUATIC HABITAT

4.5.1 Existing Conditions

The Kootenai River downstream of Libby Dam is characterized by a combination of riffles, pools and slow moving, broad, meandering river sections. The reach between Fisher River and Libby Dam offers a variety of habitats including deep water, shallow rapids and mid-stream islands and side channels. This reach is deficient in the following habitat features: cover, complexity, spawning substrate, and macroinvertebrate habitat. Cover and complexity in the form of wood-formed pools is sparse. The supply of large wood to the reach has been eliminated by the dam, which has resulted in reduced channel boundary roughness and simplification of edge habitat. Substrate is primarily composed of large cobble that may be too large for spawning substrate, and is largely embedded by the fine sediment that does pass through the dam. The reach is largely devoid of macroinvertebrate habitat in the form of large wood.

In addition, *Didymosphenia geminata,* a non-native aquatic stalked diatom also known as "Didymo" or "rocksnot", has become established at a nuisance/noxious density in the Kootenai River downstream of Libby Dam. Unlike most algae, *Didymosphenia geminata* biomass increases in low-nutrient conditions via stalk formation, and dominates stream surfaces by covering substrate with mat formations up to three inches thick in the Kootenai River. This in turn blocks sunlight and can interrupt ecological processes, which decreases habitat quality and reduces the abundance and diversity of native flora and fauna (Spaulding & Elwell, 2007). Increases in these dense blooms coincide with a decline in trout density in the Kootenai River downstream of Libby Dam (Kootenai River Network, 2014).

4.5.2 No Action Alternative

With the no action alternative, aquatic habitat at the project vicinity would continue to be degraded.

4.5.3 Preferred Alternaive

4.5.3.1 Riverine Habitat Improvement

Overall, the instream habitat projects would add habitat complexity to the river system, resulting in a beneficial effect to aquatic habitat. At the Mid-Channel Bar Boulder Placement site, the placement of boulders would create hydraulic complexity and increase cover habitat for fish.

The ELJ's at the Dunn Creek gravel bar would increase the complexity of aquatic habitat by increasing the amount of LWD downstream of the dam. Cover habitat for fish would be created by the ELJ's. The ELJs would increase the amount of riverine pool habitat. Over time, the cottonwoods and willow plantings would enhance the riparian buffer and provide shading to help reduce local water temperatures. In addition, these trees could provide potential aquatic invertebrate prey resources for fish. Approximately 0.45 acres would be disturbed below OHW as a result of this project; however, the increase in habitat complexity would offset the disturbance.

A Clean Water Act Section 404(b)(1) analysis including the instream habitat projects and bank stabilization project has been prepared in parallel with this document (Appendix E). Even though both instream habitat projects would place materials below OHW and disturb the river bed, these projects would increase aquatic habitat complexity which is currently lacking in this river reach. This increase in complexity will benefit the overall aquatic ecosystem, and the short-term negative effects to aquatic habitat due to construction would be negligible.

4.5.3.2 Bank Stabilization

Rip-rap would permanently cover approximately 0.2 acres of the creek bottom at the bank stabilization site. However, to mitigate this loss of aquatic habitat, LWD and native plantings would be incorporated into the bank stabilization design. The addition of plantings would improve shoreline conditions for local water temperatures and could provide potential aquatic invertebrate prey resources for smaller fish.

4.6 FISH AND WILDLIFE

4.6.1 Existing Conditions

4.6.1.1 Fish

According to Montana Fish, Wildlife and Parks (MFWP), there are 16 native fish species in the Kootenai River drainage and 11 non-native fish species (MFWP, 2013). The Kootenai Tribe of Idaho and MFWP prepared the Kootenai Subbasin Plan (KSBP), an assessment of the Kootenai River subbasin to develop the biological objectives that form the foundation of the management plan (2004). Three fish species identified as focal species in the KSBP reside in the project reach: bull trout (*Salvelinus confluentus*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), and redband trout (*Oncorhynchus mykiss gairdnerii*). These species were selected for the KSBP based upon their population status and their ecological and cultural significance. For further discussion of bull trout, refer to Section 4.7 Endangered and Threatened Species.

Westslope cutthroat trout are often considered an indicator of the health of the aquatic ecosystem. A status report estimated that the subspecies currently occupies about 59 percent of its historic range, but only about 10 percent of its currently occupied range is populated by westslope cutthroat trout with no evidence of genetic introgression (Shepard et al., 2003).

Inland redband trout (Montana's only native rainbow trout) are found in the Kootenai River drainage in the mainstem Kootenai River downstream of Libby Dam and above barriers in some

tributaries and considered a species of concern (MFWP, 2013). The Kootenai River Basin redband trout represents the furthest inland penetration of redband trout in the Columbia River Basin (Muhlfeld, 1999). The abundance of Columbia River redband trout is estimated at ten percent of historic levels. Redband trout, specifically Great Basin redband trout are considered a species of concern by USFWS and MFWP and a sensitive species by the USFS.

To successfully complete their life history, these species require high quality, cold water and clean gravel for spawning, and they prefer complex habitat, much of which is created by LWD. Availability of preferred habitat for fish assemblages is lacking in the Kootenai River due to effects of dam construction and operation on aquatic habitat conditions and other factors. The lack of habitat is directly contributing to the decline in populations (KTOI and MFWP 2004).

Fisheries habitat downstream of Libby Dam is limited by lack of recruitment of large wood and sediment due to the existence of the dam. Existing large wood complexes are aged and degraded, and although they continue to function, have become less functional. In addition, the hydrograph below Libby Dam is reversed, and has led to an almost total absence of recruitment of woody vegetation on existing river banks and gravel bars, though recent flow changes have allowed limited recruitment of willows, cottonwoods, and grasses and shrubs in relatively small areas. Pool formation by large wood complexes is absent. Point bar formation in the absence of sediment recruitment is non-existent.

4.6.1.2 Wildlife

Wildlife species occupying the area include birds, bats, small terrestrial mammals and other species common to the region. Deer and elk eat the twigs and foliage of Oregon grape, ponderosa pine, and Douglas fir, as well as shrubs such as snowberry. White-tailed deer (*Odocoileus virginianus)* show a preference for kinnikinnick, the fruit of which is also eaten by blue grouse. Red squirrels (*Tamiasciurus hudsonicus*) are insectivorous during spring and summer, but turn to the seeds of Douglas fir and ponderosa pine during fall and winter. Black bears (*Ursus americanus*) utilize these areas as well, feeding on berries, tubers, insects, small mammals, and honey. Several species of bats breed in the area and are a common sight at dawn and dusk when they are out foraging for insects. Bird species observed during the June 2014 site visit include song sparrow (*Melospiza melodia*), Bohemian waxwing (*Bombycilla garrulus*), gray catbird (*Dumetella carolinensis*), northern flicker (*Colaptes auratus*), American robin (*Turdus migratorius*), hairy woodpecker (*Picoides villosus*), spotted sandpiper (*Actitis macularius*), common raven (*Corvus corax*), osprey (*Pandion haliaetus*), and bald eagle (*Haliaeetus leucocephalus*). There are several known active bald eagle nests downstream of the dam in the project's river reach, and the closest nest is approximately 0.5 miles from the Dunn Creek sites and Mid-Channel Bar Boulder Placement site.

4.6.2 No Action Alternative

Fisheries habitat would remain degraded and continue to lose functionality over time.

4.6.3 Preferred Alternative

4.6.3.1 Riverine Habitat Improvement

Short-term construction-related effect to fish would occur; however the project would result in positive effects to fisheries and habitat in the long-term. Implementation of projects to increase habitat area, volume of LWD, and complexity of instream aquatic structure would replace, to some extent, the functionality of a non-impounded Kootenai River. Benefits include pool habitat formation and persistence, and increased habitat for fish cover and food production.

Due to the construction timing in the fall of the proposed project and the lack of significant bank vegetation, minimal impacts to wildlife are expected. There would be temporary noise-related disturbance to any mammals and birds in the area. Effects to roosting habitat would be limited, since minimal tree loss is expected in relation to other available roosting habitat in the immediate vicinity of the project. Due to the timing and distance from the bald eagle nests, no impacts to nesting bald eagles and their fledglings are expected. The construction of the proposed project would not occur during eagles' breeding season. The project would have less than significant effect on bald eagles.

4.6.3.2 Bank Stabilization

Similar impacts as described in Section 4.6.3.2 – Riverine Habitat Improvement would occur. The bank stabilization project would also result in short-term construction related impacts to fish and wildlife. Implementation of bank stabilization strategies incorporating wood and rock structures would increase habitat complexity where none currently exists.

4.7 THREATENED AND ENDANGERED SPECIES

4.7.1 Existing Conditions

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973 (as amended), federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. The U.S. Fish and Wildlife Service (USFWS) lists five species as protected under the Endangered Species Act, as amended in Lincoln County, Montana (USFWS, 2014a). For species information such as life history, please go to website:
http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=30053

Table 2. ESA listed species, Lincoln County, Montana

Species	Listing	Critical Habitat
Bull trout (*Salvelinus confluentus*)	Threatened	Designated
White sturgeon (*Acipenser transmontanus*)	Endangered	Designated, not in project area
Grizzly bear (*Ursus arctos horribilis*)	Threatened	Proposed
Canada lynx (*Lynx canadensis*)	Threatened	Designated, not in project area
Spalding's Catchfly (*Silene spaldingii*)	Threatened	None designated

Except Columbia Basin bull trout, none of these species, with the possible exception of Canada lynx, are known or suspected to occur within the project vicinity due to the species' specialized habitat requirements not found there, lack of tolerance of human activity, or both. The Kootenai River white sturgeon is not known to be upstream of Kootenai Falls, Montana, located 31 river miles below Libby Dam and upstream of the town of Troy, Montana. No critical habitat is located in the project area.

Moderately suitable Canada lynx habitat is present. Lynx generally occur above approximately 3,500 feet. The elevation of the project area is 2,300 feet, and thus, lynx are not anticipated to occur. While lynx have not been documented in the proposed construction area, a single sighting was made during the winter of 1999 within five miles of Souse Gulch Campground, which is higher in elevation than Dunn Creek Campground.

In 1975, the USFWS listed the grizzly bear (*Ursus arctos horribilis*) as a threatened species in the Lower 48 States under the ESA, as amended (USFWS 1975). Most existing grizzly bear habitat is characterized by contiguous, relatively undisturbed mountainous habitat with a high level of topographic and vegetative diversity. Grizzlies prefer open meadows and avalanche chutes in the spring and timberlands with berry bushes in late summer and fall. Winter hibernation requires access to high elevation areas where deep snow accumulates (USFWS 2013a). Grizzly bears tend to avoid areas of human use, including areas with roads and signs of timber cutting. Given the amount of human activity with the three USACE campgrounds near the project site, there is only a low probability that grizzly bears would be present in the project area.

Spalding's catchfly (*Silene spaldingii*) is an herbaceous perennial in the pink family (Caryophyllaceae) that was listed as threatened in 2001 (USFWS 2001b). The species is endemic to the Palouse region of south-east Washington and adjacent Oregon and Idaho, and is disjunct in northwestern Montana and British Columbia, Canada. It is found predominantly in the Pacific Northwest bunchgrass grasslands and sagebrush-steppe, and occasionally in open-canopy pine stands. The species is impacted by habitat loss due to human development, habitat degradation associated with domestic livestock and wildlife grazing. Extant occurrences of

Spalding's catchfly are known to be near Lake Koocanusa in the Tobacco Plains area of the US and Canadian border (Montana Natural Heritage Program 2014). The plant has not been found downstream of Libby Dam in the project action area.

Bull trout are members of the family Salmonidae and are char native to Washington, Oregon, Idaho, Nevada, Montana, and western Canada. This species was listed as threatened in 1998 (USFWS 1998). Compared to other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance. They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees (F). They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Bull trout exhibit two forms: resident and migratory. Bull trout are listed as threatened in the Columbia River Basin by the US Fish and Wildlife Service (1998). An assessment, the KRSBP prepared by (KTOI and MFWP 2004) estimated that the abundance and productivity of bull trout, a Federal endangered listed species, is currently at about 60 percent of what it was historically. Spawning and rearing of migratory bull trout have been documented in four tributaries of the Kootenai River between Libby Dam and Kootenai Falls (Quartz, Pipe, and Libby creeks and Fisher River (USFWS 2014b) These creeks are all downstream of the action area. Migratory bull trout utilize the Kootenai River, including the action area, as sub-adults and adults (USFWS 2002).

4.7.2 No Action Alternative

No impact concerning threatened and endangered species would occur as a result of taking no action to address the lack of aquatic habitat complexity and ongoing erosion in this reach of the river.

4.7.3 Preferred Alternative

4.7.3.1 Riverine Habitat Improvement

Short-term effects to bull trout would occur during construction, including brief increases in turbidity, and possible short-duration noise. However, the expected outcome of the projects aligns with the recovery actions in the Revised Draft Recovery Plan for the Coterminous United States Population of Bull Trout (USFWS, 2014b); specifically, the proposed projects would "protect, restore, and maintain suitable habitat conditions for bull trout that promote diverse life history strategies and conserve genetic diversity". Implementation of projects to increase habitat area, volume of LWD, and complexity of instream aquatic structure would replace, to some extent, the functionality of a non-impounded Kootenai River. Benefits include pool habitat formation and persistence, and increased habitat for fish cover and food production.

Turbidity would be controlled during construction by working during a period of low flows, installation of sediment control measures, placing rock individually or in small bucket loads (no end-dumping into the river), and use of clean rock with minimal fines. During construction, vibrational disturbance would be minimized by working during a period of low flows and by placing rock individually or in small bucket loads (no end-dumping into the river). Based on the relative absence of adult and juvenile bull trout during construction of the project, the anticipated

benefits to adult and juvenile bull trout resulting from project implementation, and the use of BMPs to minimize short-term construction-related turbidity and noise effects, the proposed action is expected overall to benefit bull trout and its designated critical habitat.

4.7.3.2 Bank Stabilization

This component would have the similar short-term and long-term effects to bull trout and its designated critical habitat as described above in Section 4.7.3.1 Riverine Habitat Improvement.

The USACE rationale for the effect determinations is summarized in Table 3.

Table 3: Endangered Species Act effects determination summary.

Common Name	*Effect Determination*
Bull trout	May affect, not likely to adversely affect species or its critical habitat
White sturgeon	No effect on species or its critical habitat
Grizzly bear	No effect on species or its critical habitat
Canada lynx	No effect on species or its critical habitat
Spalding's Catchfly	No effect

4.8 CULTURAL RESOURCES

Cultural resources are locations of past human activity, occupation or use and typically include archaeological sites such as lithic scatters, villages, procurement areas, rock art, shell middens; and historic era sites such as trash scatters, homesteads, railroads, ranches, logging camps, and any structures or buildings that are over 50 years old. Cultural resources also include Traditional Cultural Properties (TCP's), which are aspects of the landscape that are a part of traditional lifeways and practices and are considered important to a community. The National Historic Preservation Act (NHPA) is the major piece of federal legislation that mandates that federal agencies consider how undertakings could affect significant cultural resources.

4.8.1 Existing Conditions

The project area falls within an area rich in cultural resources ranging from archaeological sites and TCP's associated with the Kootenai people to early historic sites associated with the region's early importance as a transportation corridor, first by steamboat and later with the construction of the Great Northern Railway.

A cultural resource inventory of most of the lands downstream of Libby Dam, including the project areas, occurred in 1975 in response to the proposed but never constructed Libby Additional Units Reregulation Dam project (Choquette et al 1978; Munsell and Salo 1979).

Over 50 sites were located within this reach of the River. In 2012 the Corps contracted with the firm AMEC to resurvey portions of these lands and to update site forms. The report detailing the results of this survey *Historic Properties Inventory of Libby Dam and Lake Koocanusa Project Lands* (AMEC 2014) is on file with the Corps, Seattle District office and with the Montana State Historic Preservation Office in Helena, Montana. This survey included the area of potential effect for the bankline stabilization and the Dunn Creek Spit Instream Habitat Enhancement projects. Because the work for the mid channel bar would occur within the riverbed and utilize existing roads, the Corps determined that a cultural resource inventory at this location was not needed.

Section 304 of the NHPA prohibits Federal agencies from publicly disclosing information, such as locational data, that could lead to vandalism or looting of cultural resources. Specific site locations are, therefore, not given in this analysis. Four cultural sites, three prehistoric camp sites and the historic Jennings-to-Fernie branch line of the Great Northern Railroad (24LN1171) have been recorded within the general area.

No cultural resources are located within any of the construction zones; however, access to the bank stabilization project would occur over the historic grade of the Jennings to Fernie branch line.

4.8.2 No Action Alternative

Under the No-Action Alternative, cultural resources would continue to be at risk due to ongoing human activites and natural processes in the area.

4.8.3 Preferred Alternative

4.8.3.1 Riverine Habitat Improvement

There are no known cultural resources located within the project footprint or access routes for either the Dunn Creek Spit Instream Habitat Enhancement Habitat project or the Mid-Channel Bar Boulder Placement. The Dunn Creek Spit Instream Habitat Enhancement project does occur within a stretch of river with known archaeological sites within a half mile along the river's banks. The construction of ELJ's does have the potential to divert river flows which in turn could increase erosion at other points in the system. The design team worked with Corps archaeologists to ensure that the ELJ's were constructed in a manner that would not increase erosion at other points along the river bank where archaeological sites have been recorded.

The Corps has found, and the Montana State Historic Preservation Officer (SHPO) has concurred, that construction of the two riverine habitat improvement projects would result in no historic properties affected (Appendix C).

4.8.3.2 Bank Stabilization

The Corps has determined that the archaeological site (24LN1047) located near the Dunn Creek bank stabilization project and the Jennings to Fernie Branch line of the Great Northern Railroad

(24LN1171) are eligible for the National Register of Historic Places under Criterion D as part of the Libby to Jennings Archaeological District.

No ground disturbance would occur within the boundaries of the archaeological site; however the bank stabilization project would be accessed via the historic railroad grade. The route is currently utilized as a graded and maintained road and would not be adversely impacted by the temporary increase in traffic or the temporary fill that would be placed alongside the grade to allow the equipment to ramp down to the work area.

The Corps has found, and the Montana SHPO has concurred, that construction of the Dunn Creek bank stabilization project would result in no historic properties adversely affected (Appendix C).

4.9 RECREATION

4.9.1 Existing Conditions

The Kootenai River and surrounding Kootenai National Forest offer abundant opportunities for wildlife observation, fishing, boating, camping, picnicking, and hiking. Campgrounds along the Kootenai River below Libby Dam include Alexander Creek, Blackwell Flats, and Dunn Creek. The campgrounds offer potable water, picnic tables, fire rings, and vault or flush toilets, but do not include improvements such as electricity or RV hook-ups. Single or dual lane public boat ramps can also be found at the campgrounds. An old railroad grade, designated for foot-traffic only, connects the Dunn Creek campground upstream to Libby Dam. Recreational use tends to be higher in the summer months, and is very light in the winter months.

4.9.2 No Action Alternative

Under the no-action alternative recreational opportunities are expected to be the same as existing conditions.

4.9.3 Preferred Alternative

4.9.3.1 Riverine Habitat Improvement

During installation of the LWD and creation of the improved riverine habitat, recreation in the immediate project vicinity and staging areas would be restricted, including potential closure of the Dunn Creek boat ramp. However, scheduling the construction work during the late summer/fall months would be during a time of year when there is less usage by visitors; therefore direct recreational effects would be minimal. In the long term, providing improved fishery habitat should improve fishing opportunities in the area. The LWD would be installed on existing gravel bars or on bank and not in the main river channel, so it should not create an obstacle that would be hazardous to boaters. The boulders installed at the Mid-Channel Bar Boulder Placement site could pose a boating hazard, however this hazard would be reduced with the proposed signs.

4.9.3.2 Bank Stabilization

Effects to recreation for the bank stabilization work would be similar to the riverine habitat improvement project. Construction of this project could be scheduled at the same time as the adjacent Dunn Creek Spit Instream Habitat Enhancement project, so additional storage areas for the large logs may be required. Target area for staging would be a portion of the adjacent meadow inside the campground's loop road. No long-term effects to recreation would occur; once construction is completed, the campground would be fully open to the public.

4.10 AIR QUALITY AND NOISE

4.10.1 Existing Conditions

Air resources describe the existing concentrations of various particulate pollutants and the climatic and meteorological conditions that influence the quality of the air. Precipitation, wind direction, wind speed, and atmospheric stability are factors that determine the extent of pollutant dispersion. The Environmental Protect Agency (EPA) is the federal agency responsible for National Ambient Air Quality Standards and designates localities that exceed these maximum levels as non-attainment areas. For the area around the city of Libby, two non-attainment areas have been designated, but neither includes Libby Dam or Lake Koocanusa.

Noise levels are consistent with "natural wilderness" conditions. Aside from occasional recreational boat motors, vehicle traffic, day use visitors, or maintenance equipment (such as lawn mowers) human-caused noise disturbance is minimal.

4.10.2 No Action Alternative

No effects to air quality will result from the No-Action Alternative.

4.10.3 Preferred Alternative

4.10.3.1 Riverine Habitat Improvement

During construction, there may be a temporary and localized reduction in air quality due to emissions from heavy machinery operating during placement of the boulders and installation of the ELJs. These emissions will not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone). Therefore, effects of construction would be insignificant. Once the sub-projects are completed, no effects to air quality would occur.

Ambient noise levels will increase slightly while construction equipment is operating and during the recreation season. However, these effects will be localized. As a result, effects are anticipated to be insignificant. Once the sub-projects are completed, no effects to nosie would occur.

4.10.3.2 Bank Stabilization

Effects to air quality and noise for the bank stabilization work would be similar to the riverine habitat improvement sub-projects.

5 CUMULATIVE AND ADVERSE IMPACTS

5.1 CUMULATIVE IMPACT ANALYSIS

The closest fish habitat restoration project to the project area is the Kootenai Tribe of Idaho's Kootenai River Habitat Restoration Project upstream of Bonners Ferry, Idaho. In 2013, the Corps installed a bank stabilization project downstream of Libby Dam at Alexander Creek Campground. On-going operation and maintenance activities of the dam and surrounding Corps properties will continue to occur. These activities include routine maintenance of the dam, repairs to dam equipment, and routine maintenance of the Corps campgrounds.

The USFS has completed the NEPA documentation in 2014 on the East Reservoir Project which is for land management activities such as timber harvest, fuel reduction in areas adjacent to private property, wildlife habitat enhancement, road storage and decommissioning, commercial thinning and pre-commercial thinning within the East Reservoir Project Area. These various activities by the USFS would, most likely, be done in the future.

The Kootenai River Project would result in only negligible short term adverse effects in combination with the above mentioned actions on the following resources discussed in Chapter 4: soils, wildlife, and recreation. For effects to water quality, fish including bull trout, and aquatic habitat, this project would have beneficial results on those resources.

5.2 BEST MANAGEMENT PRACTICES

The following construction BMP's would be included during the construction:

- Equipment that would be used near the water would be cleaned prior to construction.
- Refueling would occur a minimum of 100 ft away from the shoreline.
- Vegetable based hydraulic fluid would be used in heavy equipment assigned to work in or near the Kootenai River. Construction equipment would be regularly checked for drips or leaks.
- At least one fuel spill kit with absorbent pads would be on-site at all times, and construction personnel would be properly trained in its use.
- Equipment would not be allowed to idle longer than 15 minutes when not in use.
- All motor vehicles and equipment would have mufflers conforming to original manufacturer specifications that are in good working order and are in constant operation to prevent excessive or unusual noise, fumes, or smoke. Mufflers and sound attenuation devices (such as rubber strips or sheeting) would be installed and maintained on all

equipment. This includes truck tail and other gate dampeners (both opening and closing) for all dump trucks on the project. Use of un-muffled engine brakes or Jake Brakes is prohibited unless required for safety. Use of air horns would be limited to emergencies only.

- Individual placement of clean rip-rap (no end dumping) into the water.
- At Dunn Creek Spit Instream Habitat Enhancement site, a deflector structure (gravel kickup berm, boulder and visqueen barrier, or equivalent) would be built at the head of the gravel bar to reduce flow through the construction site.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Unavoidable adverse effects of the proposed project include the following:

- Activities of local birds, small mammals, and fish in the area would be temporarily disrupted due to construction activities.
- Approximately 0.5 acre of wetlands would be temporarily disturbed
- Recreational activities at Dunn Creek Campground would be temporarily disrupted during construction

For the reasons discussed in this document, the USACE has determined that these effects are not significant.

6 COORDINATION

The Corps has coordinated the proposed project with the following agencies and entities:

- U.S. Forest Service (Kootenai National Forest)
- U.S. Fish and Wildlife Service
- Montana Fish, Wildlife & Parks
- Montana Department of Environmental Quality
- Montana State Historic Preservation Officer (Montana SHPO)
- Confederated Salish and Kootenai Tribe (CSKT)
- Trout Unlimited

The public comment period for the draft EA was from 24 April 2015 to 25 May 2015. Two comment letters were received (Appendix F). One letter expressed support for the project. The other letter had technical questions regarding the design of the all three projects; response to the comments is provided in this final EA (Appendix F).

7 ENVIRONMENTAL COMPLIANCE

7.1 NATIONAL ENVIRONMENTAL POLICY ACT

The National Environmental Policy Act (NEPA) (42 U.S.C. §4321 et seq.) commits federal agencies to considering, documenting, and publicly disclosing the environmental effects of their actions. This EA, prepared April 2015, is intended to achieve NEPA compliance for the proposed project. As required by NEPA, this Final EA describes existing environmental conditions at the project site, the proposed action and alternatives, potential environmental impacts of the proposed project, and measures to minimize environmental impacts. The document determines if the project would create any significant environmental impacts that would warrant preparing an EIS, or whether it is appropriate to prepare a FONSI.

7.2 ENDANGERED SPECIES ACT

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species and their critical habitats. A Biological Evaluation was prepared and submitted to USFWS on 25 March 2015. The Corps has determined that the proposed project may affect but not likely to adversely affect bull trout or its designated critical habitat. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, Spalding's catchfly, or their designated critical habitats. The USFWS concluded informal Section 7 ESA consultation on the project with a letter dated 8 May 2015 concurring with the Corps effects determination.

7.3 CLEAN WATER ACT

The object of the Federal Water Pollution Control Act (33 U.S.C § 1252 et seq.), commonly referred to as Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the nation's waters by preventing point and nonpoint pollution sources, providing assistance to publicly owned treatment works for the improvement of wastewater treatment, and maintaining the integrity of wetlands. Because permanent fill is necessary under the proposed project, a 404(b)(1) evaluation was prepared for this project (Appendix E). The Section 404(b)(1) evaluation demonstrates that work involving discharge of fill material into the waters of the United States complies with the substantive requirements of the Clean Water Act.

Under Section 401 of the CWA, an activity involving a discharge into waters of the United States authorized by a federal permit or license must receive certification from the affected certifying agency or tribe. The issuance of a certification means that the activity will comply with the water quality standards and any established effluent limitations of the certifying agency or tribe. For the Kootenai River Project, the delegated authority, Montana Department of Environmental Quality (MDEQ) is responsible for 401 Water Quality Certification. 401 Water Quality Certification signifies that the MDEQ has reasonable assurance that the project will comply with all applicable Federal, State, or Tribal effluent limitations and water quality

standards, as well as other applicable aquatic resource protection requirements under the certifying entity's authority. USACE has received the 401 certification dated 22 June 2015 from MDEQ.

Section 402(p) of the CWA provides that stormwater discharges associated with industrial activity that discharge to waters of the United States must be authorized by an National Pollutant Discharge Elimination System (NPDES) permit when construction footprints exceed one acre. The term "discharge" when used in the context of the NPDES program means the discharge of pollutants (40 CFR §122.2). The project would not require a NPDES permit for the construction activities because the area of disturbance is less than one acre (0.65 acres).

7.4 CLEAN AIR ACT

The Clean Air Act (CAA) as Amended (42 U.S.C. §7401, et seq.) prohibits federal agencies from approving any action that does not conform to an approved State or federal implementation plan. The operation of equipment and vehicles during construction would result in increased vehicle emissions and a slight increase in fugitive dust. These effects would be localized and temporary. Emissions would not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxide and 50 ton/year for ozone) or standards set under Montana's Clean Air Act implementation plan (Montana Department of Environmental Quality, 2009). Therefore, effects would be insignificant.

7.5 FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Coordination Act (16 USC 470) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. A Fish and Wildlife Coordination Act Report is not required for maintenance work. This project is considered to be part of the operation and maintenance of the Libby Dam project.

7.6 MIGRATORY BIRD TREATY ACT

The Migratory Bird Treaty Act (16 U.S.C. §703-712) as amended protects over 800 bird species and their habitat, and commits that the U.S. will take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations. EO 13186 directs federal agencies to evaluate the effects of their actions on migratory birds, with emphasis on species of concern, and inform the USFWS of potential negative effects to migratory birds. The proposed projects would be built in the fall months, which is outside the nesting season for resident or migratory birds. In addition, construction work would be localized and short-term in duration causing minimal disturbance to birds in the area.

7.7 BALD AND GOLDEN EAGLE PROTECTION ACT

The Bald and Golden Eagle Protection Act (16 U.S.C. §668-668c) applies to Corps civil works projects through the protection of bald and golden eagles from disturbance. The proposed projects would be built in the fall months, which is outside the nesting season for resident or

migratory bald and/or golden eagles. The work would not affect any nest trees. In addition, construction work would be localized and short-term in duration causing minimal disturbance to birds in the area.

7.8 NATIONAL HISTORIC PRESERVATION ACT

Section 106 of the NHPA (16 U.S.C. 470) requires that Federal agencies evaluate the effects of Federal undertakings on historical, archeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking if there is an adverse effect to an eligible Historic Property. The lead agency must examine whether feasible alternatives exist that would avoid eligible cultural resources. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects. The Corps has coordinated its review under NEPA with agency responsibilities under Section 106 of the NHPA. The Corps has consulted with the SHPO, and the Confederated Salish and Kootenai Tribes. The Corps has found, and the SHPO has concurred on 15 October 2014 and 20 October 2014, respectively, that construction of the two riverine habitat improvement and bank stabilization projects would result in no historic properties affected.

7.9 TRIBAL TRUST RESPONSIBILITY

The Federal trust responsibility to Native American Tribes arises from the treaties signed between them and the US Government. Under Article VI, Clause 2 of the U.S. Constitution, treaties with the Tribes are the supreme law of the land, superior to State laws, and equal to Federal laws. In these treaties, the United States made a set of commitments in exchange for tribal lands, including the promise that the United States would protect the tribe's people. The Supreme Court has held that these commitments create a trust relationship between the United States and each treaty tribe, and impose upon the federal government "moral obligations of the highest responsibility and trust." The scope of the Federal trust responsibility is broad and incumbent upon all Federal agencies. The U.S. government has an obligation to protect tribal land, assets, and resources that it holds in trust for the Tribes, and a responsibility to ensure that its actions do not abrogate Tribal treaty rights.

The Confederated Salish and Kootenai Tribes and Kootenai Tribe of Idaho (KTOI) have been notified of this project early in the planning process. KTOI have expressed support for this project. The study team anticipates that the proposed ecosystem restoration would have significant benefits to ecosystem and fisheries resources, which are of economic and cultural value to the Tribe, and is consistent with the Tribe's treaty rights.

7.10 EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE IN MINORITY POPULATIONS AND LOW-INCOME POPULATIONS

Executive Order 12898 directs federal agencies to take the appropriate steps to identify and address any disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American,

American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50 percent or is meaningfully greater than in the general population.

The proposed action would not disproportionately affect minority or low-income populations nor have any adverse human health impacts. No interaction with other projects would result in any such disproportionate impacts. No cumulative impacts to Environmental Justice would be expected from interaction of the proposed action with other past, present, and reasonably foreseeable projects. Further, tribal governments that are also environmental justice communities in the project area have been engaged and are supportive of the proposed action.

8 SUMMARY / CONCLUSION

Based on the above analysis, this project is not a major Federal action significantly affecting the quality of the human or natural environment, and therefore does not require preparation of an environmental impact statement. A signed FONSI will complete this environmental review.

9 LIST OF PREPARERS

The following people contributed directly to preparation of this document:

- David Doll, Hydraulic Engineer
- Hannah Hadley, Environmental Coordinator
- Greg Hoffman, Fishery Biologist
- Travis Macpherson, Civil Engineer
- Paul Massart, Project Manager
- Elizabeth L. McCasland, Biologist/Environmental Coordinator
- Danielle Storey, Archaeologist
- J. Robert Thomas, Supervisory Biologist

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11 ACRONYMS AND ABBREVIATIONS

APE	Area of potential effect
BC	British Columbia
BFE	Base Flood Elevation
BMP	Best Management Practices
CEQ	Council on Environmental Quality
Corps	Corps of Engineers, Seattle District
CY	cubic yard
HTRW	Hazardous, Toxic, and Radioactive Waste
H:V	ratio of height to vertical length
LWD	Large woody debris
KTOI	Kootenai Tribe of Idaho
MFWP	Montana Fish, Wildlife & Parks
NRCS	Natural Resource Conservation Service
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

12 APPENDICES

Appendix A: Photos

Photo 1: Looking downstream at the Dunn Creek Spit Instream Habitat Enhancement site

Photo 2: Looking upstream at the Dunn Creek Spit Instream Habitat Enhancement site

Photo 3: Looking downstream at the Mid-Channel Bar Boulder Placement site

Photo 4: Dunn Creek Bank Stabilization site

Appendix B: Project Drawings

US Army Corps
of Engineers ®
Seattle District

FY 15 LIBBY INSTREAM HABITAT PROJECT
LIBBY DAM
LIBBY, MT

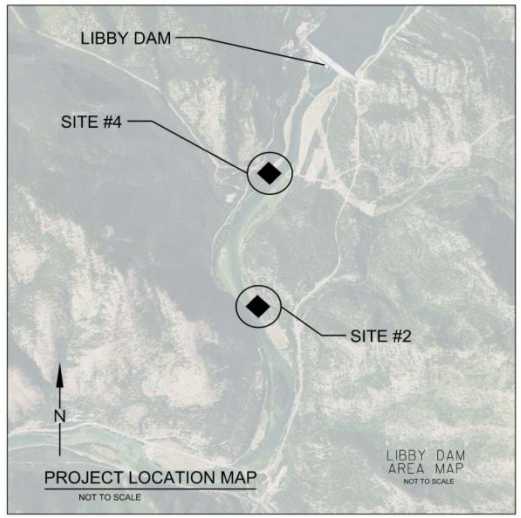
PN 401084

GENERAL NOTES

1. RUBBISH, DEBRIS, GARBAGE, AND OTHER REFUSE SHALL BE REMOVED FROM THE JOB SITE AND DISPOSED OF LEGALLY, OFF SITE.
2. ENSURE THE WORK CREW HAS ALL APPLICABLE SAFETY TRAINING PRIOR TO CONSTRUCTION.
3. ALL AREAS OF THE JOB SITE TEMPORARILY DISTURBED BY CONSTRUCTION SHALL BE GRADED TO THE PRE-CONSTRUCTION GRADE AND PROTECTED AND/OR REVEGETATED AS NECESSARY
4. ALL MATERIALS USED FOR CONSTRUCTION SHALL BE NEW AND UNDAMAGED UNLESS OTHERWISE APPROVED BY USACE. THE SAME MANUFACTURER OF EACH ITEM SHALL BE USED THROUGHOUT THE WORK UNLESS OTHERWISE APPROVED BY USACE.
6. DO NOT FILL EXISTING DITCHES OR CHANNELS UNLESS OTHERWISE SHOWN ON PLANS.
7. TARGET FLOW FOR PROVIDING INSTREAM HABITAT IS 4,000 CFS.
8. ELEVATIONS SHOWN HEREON ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
9. HORIZONTAL COORDINATES SHOWN ARE IN INTERNATIONAL FEET AND REFER TO THE MONTANA STATE PLANE COORDINATE SYSTEM, NAD83.
10. IF ISSUES ENCOUNTERED DURING CONSTRUCTION OF ELJS, SEE CMP SECTION 12 FOR POTENTIAL REMEDIES FOR ISSUES.

INDEX OF DRAWINGS

SHEET NO.	PLATE NO.	DESCRIPTION
1	G-001	COVER INDEX
2	C-001	GENERAL SITE PLAN
3	C-002	SITE #2 EXISTING CONDITIONS
4	C-003	SITE #4 EXISTING CONDITIONS
5	C-101	SITE #2 DUNN CREEK SITE PLAN
6	C-102	SITE #2 DUNN CREEK SITE PLAN
7	C-103	SITE #2 DUNN CREEK SITE PLAN
8	C-104	SITE #4 MIDCHANNEL BAR SITE PLAN
9	C-501	ELJ DETAILS
10	C-502	LOG JAM CONSTRUCTION SEQUENCE 1
11	C-503	LOG JAM CONSTRUCTION SEQUENCE 2



SAFETY PAYS

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers ® Seattle District

File No.: E-53-4-77
Date: 30 SEPT 2014
Solicitation No.: W911XX-00-X-0000

Recommended by: CLIFT L. GREEN, P.E. Chief, Design Branch — XX/2011
Approved by: JOAN T. WALLS P.E. Chief, Engineering Div. — XX/2011

Submitted by: HANNAH HADLEY Project Manager — XX/2011
Reviewed by: ANN L. NEARGARD, P.E. Chief, Space and Tech Review — XX/2011

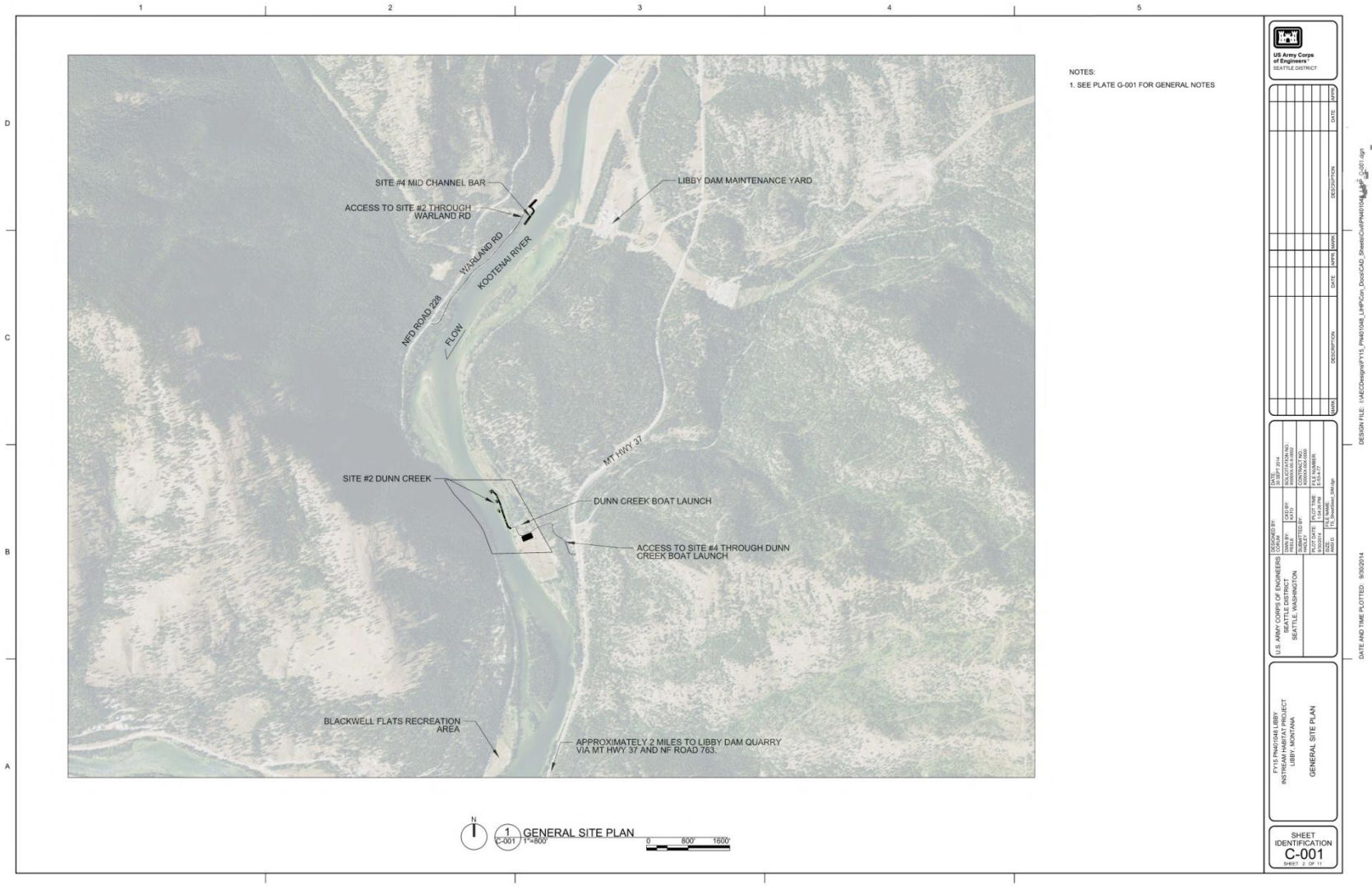
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
Prepared by: JENNIFER L. WEST, P.E. Chief, CIVIL SECTION — Date

FY15 PN401084 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA

TITLE AREA AND VICINITY MAPS

SHEET IDENTIFICATION G-001

DESIGN FILE: I:\AEC\Design\FY15_PN401048_LHP\Civil_Docs\CAD_Sheets\General\PN401048_LHP-G-001CVR.dgn
DATE AND TIME PLOTTED: 9/30/2014


NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
SITE #4 MID CHANNEL BAR
ACCESS TO SITE #2 THROUGH WARLAND RD
LIBBY DAM MAINTENANCE YARD
WARLAND RD
KOOTENAI RIVER
NFD ROAD 228
FLOW
MT HWY 37
SITE #2 DUNN CREEK
DUNN CREEK BOAT LAUNCH
ACCESS TO SITE #4 THROUGH DUNN CREEK BOAT LAUNCH
BLACKWELL FLATS RECREATION AREA
APPROXIMATELY 2 MILES TO LIBBY DAM QUARRY VIA MT HWY 37 AND NF ROAD 763.
N
1
C-001
GENERAL SITE PLAN
1"=800'
0
800'
1600'
US Army Corps of Engineers
SEATTLE DISTRICT
FY15 PN401048 LIBBY
INSTREAM HABITAT PROJECT
LIBBY, MONTANA
GENERAL SITE PLAN
SHEET IDENTIFICATION
C-001
SHEET 2 OF 11
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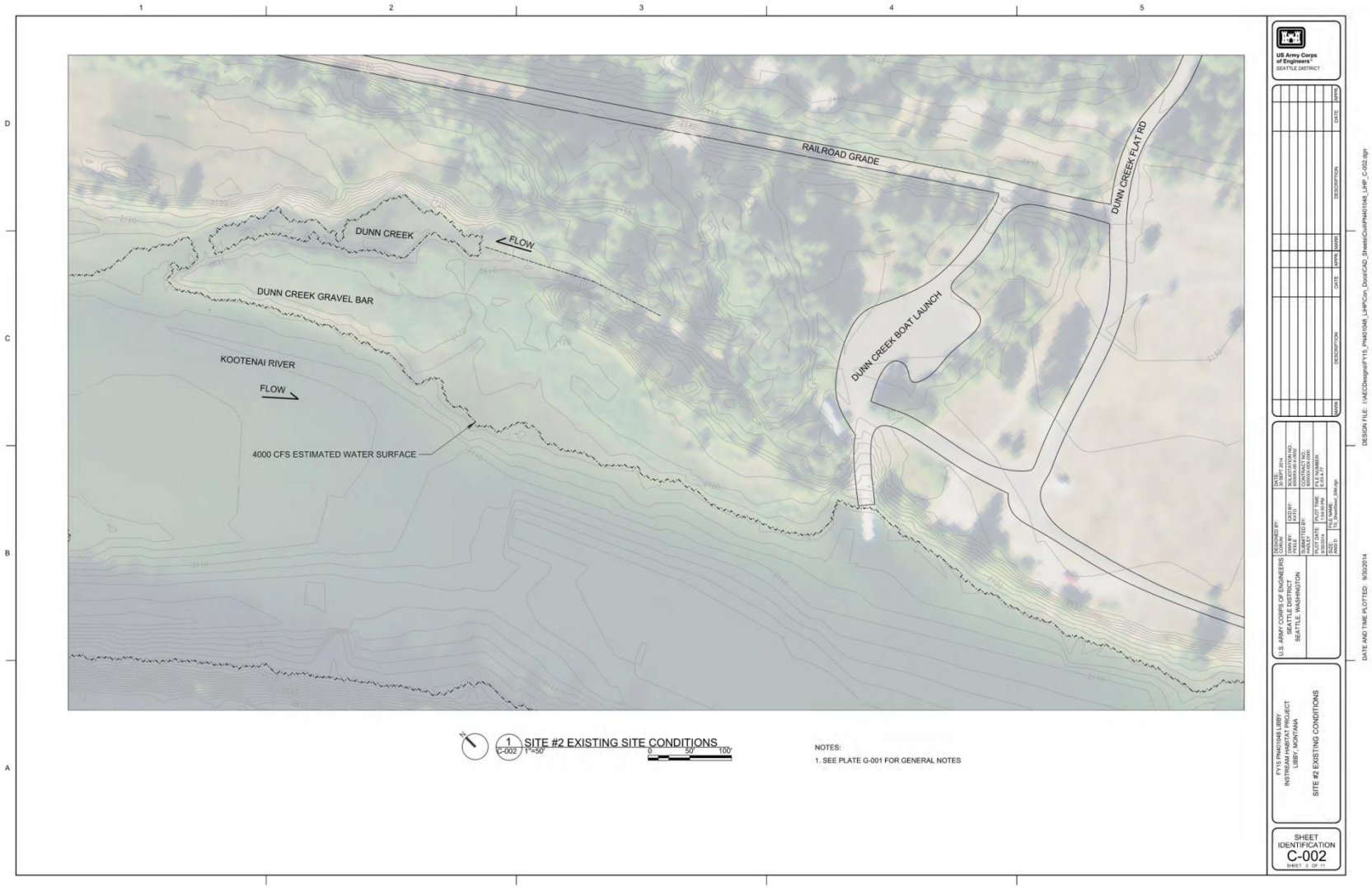
DATE AND TIME PLOTTED: 9/30/2014


RAILROAD GRADE
DUNN CREEK FLAT RD
DUNN CREEK
FLOW
DUNN CREEK GRAVEL BAR
DUNN CREEK BOAT LAUNCH
KOOTENAI RIVER
FLOW
4000 CFS ESTIMATED WATER SURFACE
1 C-002 SITE #2 EXISTING SITE CONDITIONS 1"=50'
0 50' 100'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
SITE #2 EXISTING CONDITIONS
SHEET IDENTIFICATION C-002
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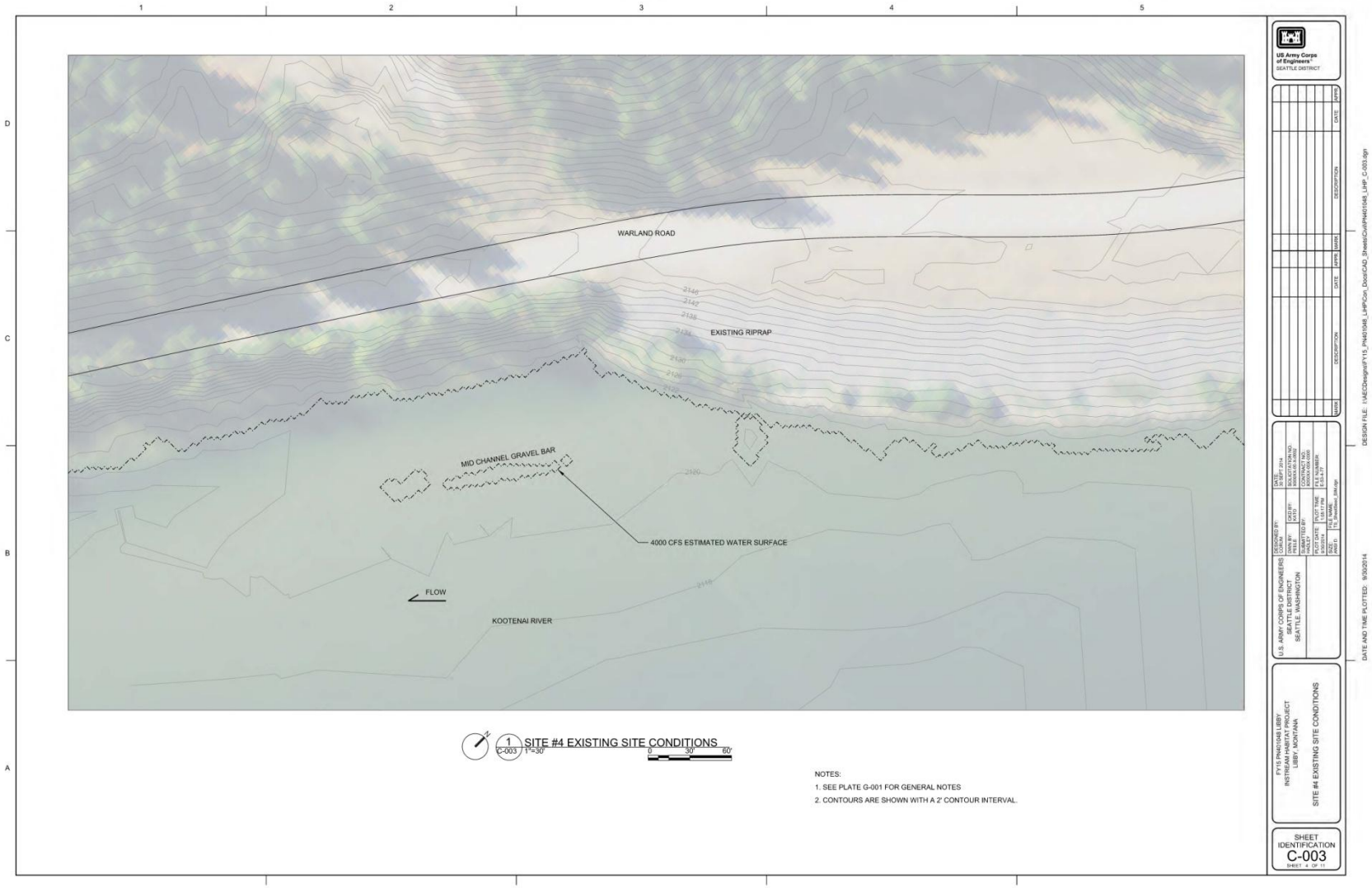
WARLAND ROAD
EXISTING RIPRAP
MID CHANNEL GRAVEL BAR
4000 CFS ESTIMATED WATER SURFACE
FLOW
KOOTENAI RIVER
1 C-003 SITE #4 EXISTING SITE CONDITIONS 1"=30'
0 30' 60'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
2. CONTOURS ARE SHOWN WITH A 2' CONTOUR INTERVAL.
US Army Corps of Engineers
SEATTLE DISTRICT
FY15 PN401048 LIBBY
INSTREAM HABITAT PROJECT
LIBBY, MONTANA
SITE #4 EXISTING SITE CONDITIONS
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
SHEET IDENTIFICATION
C-003
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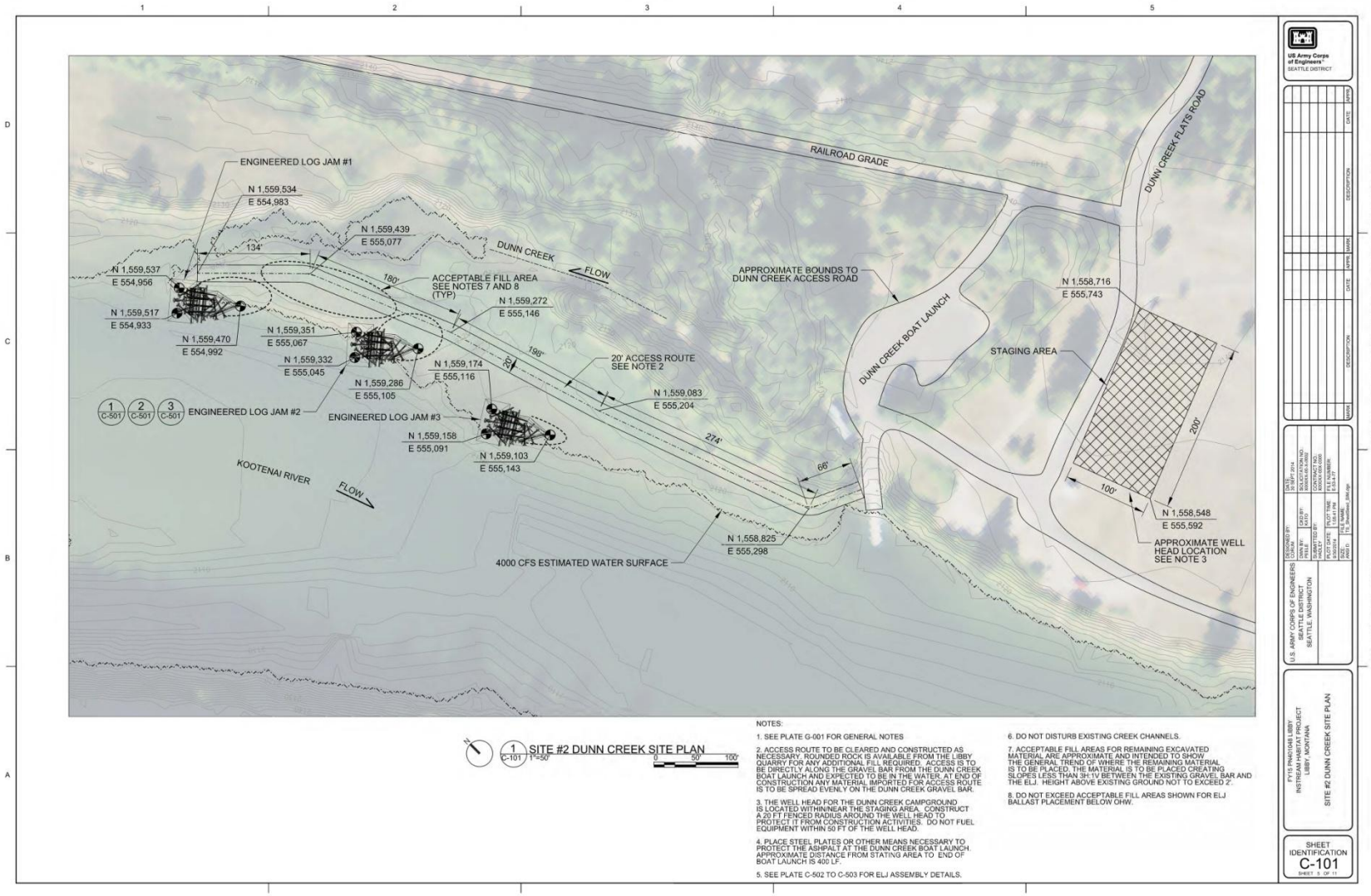
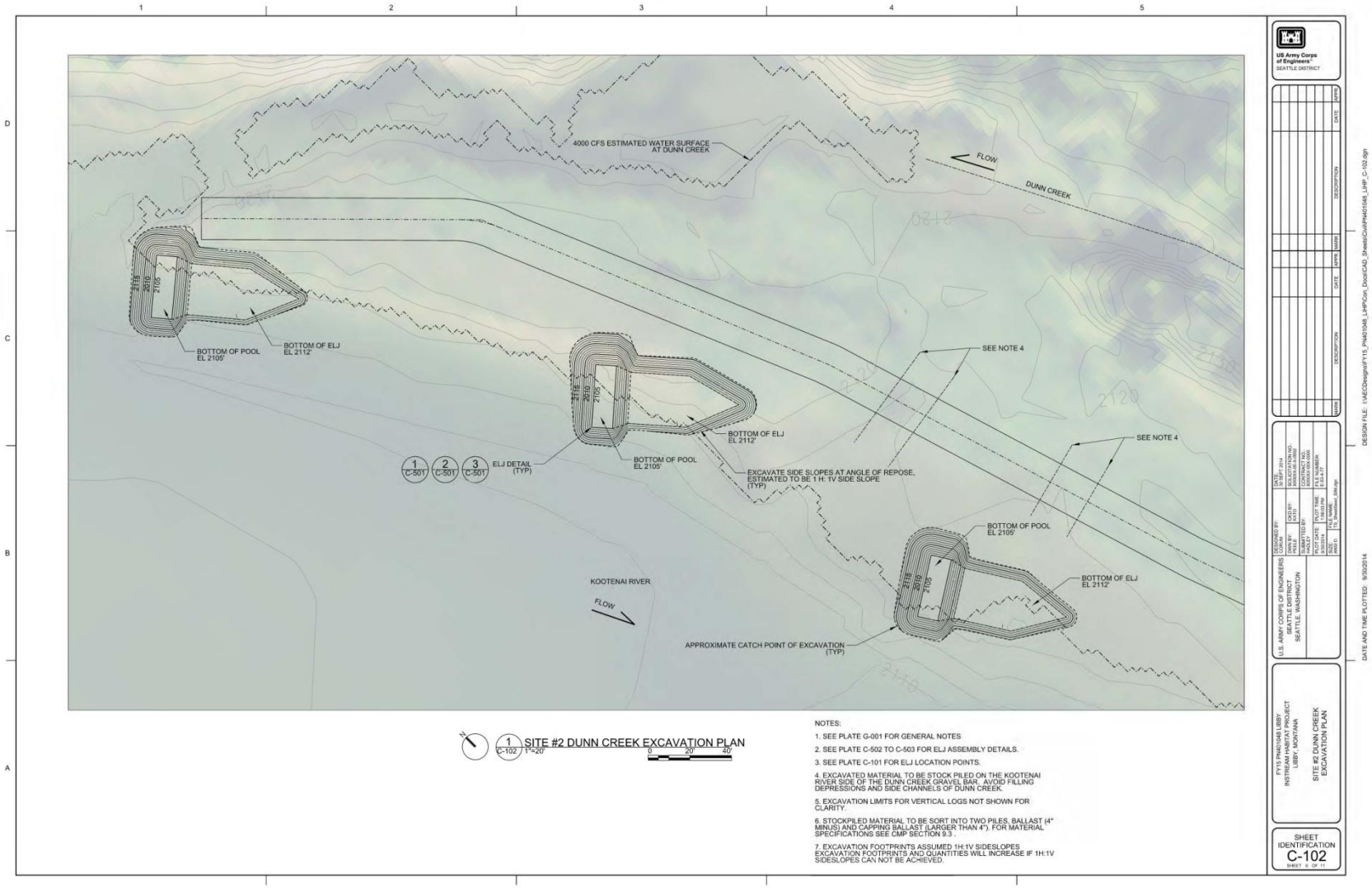

ENGINEERED LOG JAM #1
N 1,559,534
E 554,983
N 1,559,439
E 555,077
134'
DUNN CREEK
FLOW
180'
ACCEPTABLE FILL AREA
SEE NOTES 7 AND 8
(TYP)
N 1,559,272
E 555,146
N 1,559,537
E 554,956
N 1,559,517
E 554,933
N 1,559,470
E 554,992
N 1,559,351
E 555,067
N 1,559,332
E 555,045
N 1,559,286
E 555,105
N 1,559,174
E 555,116
196'
20' ACCESS ROUTE
SEE NOTE 2
N 1,559,083
E 555,204
1 C-501
2 C-501
3 C-501
ENGINEERED LOG JAM #2
ENGINEERED LOG JAM #3
N 1,559,158
E 555,091
N 1,559,103
E 555,143
274'
66'
KOOTENAI RIVER
FLOW
4000 CFS ESTIMATED WATER SURFACE
N 1,558,825
E 555,298
RAILROAD GRADE
DUNN CREEK FLATS ROAD
APPROXIMATE BOUNDS TO
DUNN CREEK ACCESS ROAD
DUNN CREEK BOAT LAUNCH
STAGING AREA
N 1,558,716
E 555,743
200'
100'
N 1,558,548
E 555,592
APPROXIMATE WELL
HEAD LOCATION
SEE NOTE 3
1 C-101 SITE #2 DUNN CREEK SITE PLAN
1"=50'
0 50' 100'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
2. ACCESS ROUTE TO BE CLEARED AND CONSTRUCTED AS NECESSARY. ROUNDED ROCK IS AVAILABLE FROM THE LIBBY QUARRY FOR ANY ADDITIONAL FILL REQUIRED. ACCESS IS TO BE DIRECTLY ALONG THE GRAVEL BAR FROM THE DUNN CREEK BOAT LAUNCH AND EXPECTED TO BE IN THE WATER. AT END OF CONSTRUCTION ANY MATERIAL IMPORTED FOR ACCESS ROUTE IS TO BE SPREAD EVENLY ON THE DUNN CREEK GRAVEL BAR.
3. THE WELL HEAD FOR THE DUNN CREEK CAMPGROUND IS LOCATED WITHIN/NEAR THE STAGING AREA. CONSTRUCT A 20 FT FENCED RADIUS AROUND THE WELL HEAD TO PROTECT IT FROM CONSTRUCTION ACTIVITIES. DO NOT FUEL EQUIPMENT WITHIN 50 FT OF THE WELL HEAD.
4. PLACE STEEL PLATES OR OTHER MEANS NECESSARY TO PROTECT THE ASHPALT AT THE DUNN CREEK BOAT LAUNCH. APPROXIMATE DISTANCE FROM STATING AREA TO END OF BOAT LAUNCH IS 400 LF.
5. SEE PLATE C-502 TO C-503 FOR ELJ ASSEMBLY DETAILS.
6. DO NOT DISTURB EXISTING CREEK CHANNELS.
7. ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL ARE APPROXIMATE AND INTENDED TO SHOW THE GENERAL TREND OF WHERE THE REMAINING MATERIAL IS TO BE PLACED. THE MATERIAL IS TO BE PLACED CREATING SLOPES LESS THAN 3H:1V BETWEEN THE EXISTING GRAVEL BAR AND THE ELJ. HEIGHT ABOVE EXISTING GROUND NOT TO EXCEED 2'.
8. DO NOT EXCEED ACCEPTABLE FILL AREAS SHOWN FOR ELJ BALLAST PLACEMENT BELOW OHW.
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
FY15 PN401048 LIBBY
INSTREAM HABITAT PROJECT
LIBBY, MONTANA
SITE #2 DUNN CREEK SITE PLAN
SHEET IDENTIFICATION
C-101
SHEET 5 OF 11
DESIGN FILE: I:\AE\Design\FY15_PN401048_LIHP\Con_Docs\CAD_Sheets\Civil\PN401048_LIHP_C-101.dgn
DATE AND TIME PLOTTED: 9/30/2014


4000 CFS ESTIMATED WATER SURFACE AT DUNN CREEK
FLOW
DUNN CREEK
BOTTOM OF POOL EL 2105'
BOTTOM OF ELJ EL 2112'
SEE NOTE 4
BOTTOM OF ELJ EL 2112'
BOTTOM OF POOL EL 2105'
1 C-501
2 C-501
3 C-501
ELJ DETAIL (TYP)
EXCAVATE SIDE SLOPES AT ANGLE OF REPOSE, ESTIMATED TO BE 1 H: 1V SIDE SLOPE (TYP)
SEE NOTE 4
BOTTOM OF POOL EL 2105'
BOTTOM OF ELJ EL 2112'
KOOTENAI RIVER
FLOW
APPROXIMATE CATCH POINT OF EXCAVATION (TYP)
1 C-102 SITE #2 DUNN CREEK EXCAVATION PLAN 1"=20'
0 20' 40'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
2. SEE PLATE C-502 TO C-503 FOR ELJ ASSEMBLY DETAILS.
3. SEE PLATE C-101 FOR ELJ LOCATION POINTS.
4. EXCAVATED MATERIAL TO BE STOCK PILED ON THE KOOTENAI RIVER SIDE OF THE DUNN CREEK GRAVEL BAR. AVOID FILLING DEPRESSIONS AND SIDE CHANNELS OF DUNN CREEK.
5. EXCAVATION LIMITS FOR VERTICAL LOGS NOT SHOWN FOR CLARITY.
6. STOCKPILED MATERIAL TO BE SORT INTO TWO PILES, BALLAST (4" MINUS) AND CAPPING BALLAST (LARGER THAN 4"). FOR MATERIAL SPECIFICATIONS SEE CMP SECTION 9.3 .
7. EXCAVATION FOOTPRINTS ASSUMED 1H:1V SIDESLOPES. EXCAVATION FOOTPRINTS AND QUANTITIES WILL INCREASE IF 1H:1V SIDESLOPES CAN NOT BE ACHIEVED.
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
SITE #2 DUNN CREEK EXCAVATION PLAN
SHEET IDENTIFICATION C-102
DESIGN FILE: I:\AE\Designs\FY15_PN401048_LIHP\Civ_Docs\CAD_Sheets\Civil\PN401048_LIHP_C-102.dgn
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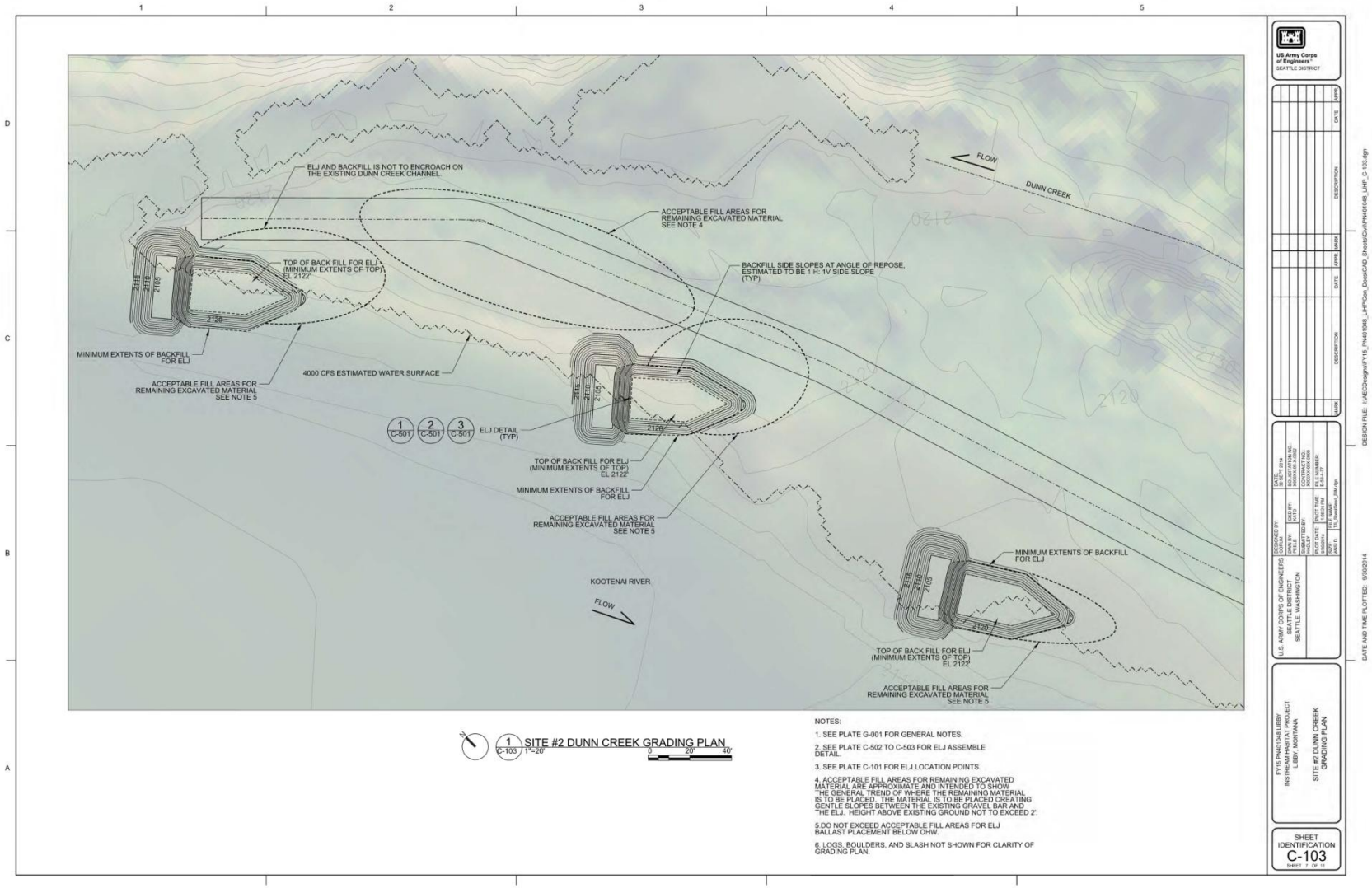
ELJ AND BACKFILL IS NOT TO ENCROACH ON THE EXISTING DUNN CREEK CHANNEL
ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL SEE NOTE 4
FLOW
DUNN CREEK
TOP OF BACK FILL FOR ELJ (MINIMUM EXTENTS OF TOP) EL 2122'
BACKFILL SIDE SLOPES AT ANGLE OF REPOSE, ESTIMATED TO BE 1 H: 1V SIDE SLOPE (TYP)
MINIMUM EXTENTS OF BACKFILL FOR ELJ
ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL SEE NOTE 5
4000 CFS ESTIMATED WATER SURFACE
1 C-501 2 C-501 3 C-501 ELJ DETAIL (TYP)
TOP OF BACK FILL FOR ELJ (MINIMUM EXTENTS OF TOP) EL 2122'
MINIMUM EXTENTS OF BACKFILL FOR ELJ
ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL SEE NOTE 5
KOOTENAI RIVER
FLOW
MINIMUM EXTENTS OF BACKFILL FOR ELJ
TOP OF BACK FILL FOR ELJ (MINIMUM EXTENTS OF TOP) EL 2122'
ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL SEE NOTE 5
1 C-103 SITE #2 DUNN CREEK GRADING PLAN 1"=20'
0 20' 40'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES.
2. SEE PLATE C-502 TO C-503 FOR ELJ ASSEMBLE DETAIL.
3. SEE PLATE C-101 FOR ELJ LOCATION POINTS.
4. ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL ARE APPROXIMATE AND INTENDED TO SHOW THE GENERAL TREND OF WHERE THE REMAINING MATERIAL IS TO BE PLACED. THE MATERIAL IS TO BE PLACED CREATING GENTLE SLOPES BETWEEN THE EXISTING GRAVEL BAR AND THE ELJ. HEIGHT ABOVE EXISTING GROUND NOT TO EXCEED 2'.
5.DO NOT EXCEED ACCEPTABLE FILL AREAS FOR ELJ BALLAST PLACEMENT BELOW OHW.
6. LOGS, BOULDERS, AND SLASH NOT SHOWN FOR CLARITY OF GRADING PLAN.
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
SITE #2 DUNN CREEK GRADING PLAN
SHEET IDENTIFICATION C-103
SHEET 7 OF 11
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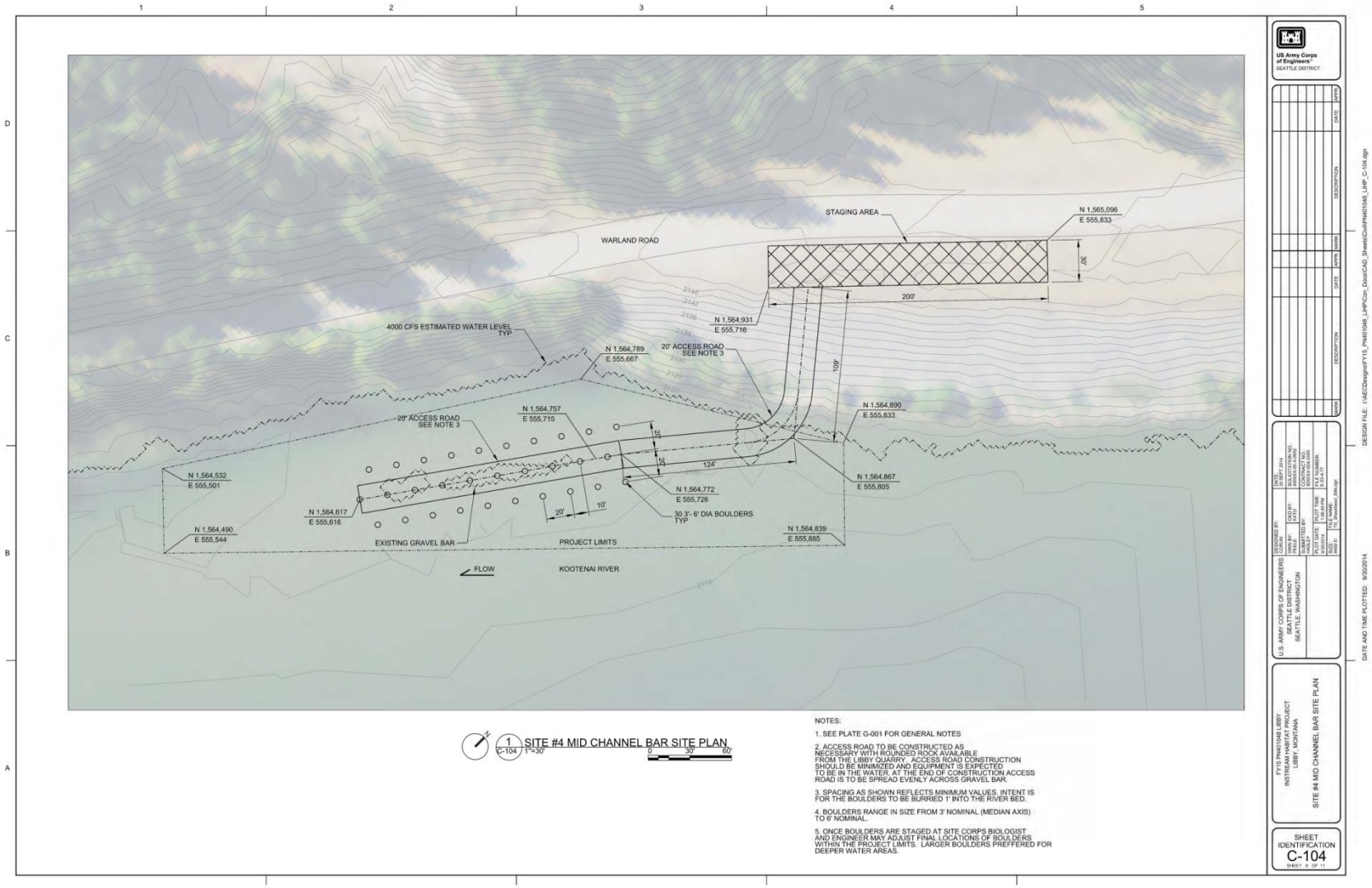
STAGING AREA
N 1,565,096
E 555,833
WARLAND ROAD
200'
30'
4000 CFS ESTIMATED WATER LEVEL TYP
N 1,564,931
E 555,716
N 1,564,789
E 555,667
20' ACCESS ROAD SEE NOTE 3
109'
N 1,564,890
E 555,833
20' ACCESS ROAD SEE NOTE 3
N 1,564,757
E 555,715
25'
25'
124'
N 1,564,532
E 555,501
N 1,564,772
E 555,726
N 1,564,867
E 555,805
N 1,564,617
E 555,616
30 3'- 6' DIA BOULDERS TYP
20'
10'
N 1,564,490
E 555,544
EXISTING GRAVEL BAR
PROJECT LIMITS
N 1,564,839
E 555,885
FLOW
KOOTENAI RIVER
1 C-104 SITE #4 MID CHANNEL BAR SITE PLAN 1"=30'
0 30' 60'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
2. ACCESS ROAD TO BE CONSTRUCTED AS NECESSARY WITH ROUNDED ROCK AVAILABLE FROM THE LIBBY QUARRY. ACCESS ROAD CONSTRUCTION SHOULD BE MINIMIZED AND EQUIPMENT IS EXPECTED TO BE IN THE WATER AT THE END OF CONSTRUCTION ACCESS ROAD IS TO BE SPREAD EVENLY ACROSS GRAVEL BAR.
3. SPACING AS SHOWN REFLECTS MINIMUM VALUES. INTENT IS FOR THE BOULDERS TO BE BURRIED 1' INTO THE RIVER BED.
4. BOULDERS RANGE IN SIZE FROM 3' NOMINAL (MEDIAN AXIS) TO 6' NOMINAL.
5. ONCE BOULDERS ARE STAGED AT SITE CORPS BIOLOGIST AND ENGINEER MAY ADJUST FINAL LOCATIONS OF BOULDERS WITHIN THE PROJECT LIMITS. LARGER BOULDERS PREFFERED FOR DEEPER WATER AREAS.
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
SITE #4 MID CHANNEL BAR SITE PLAN
SHEET IDENTIFICATION C-104
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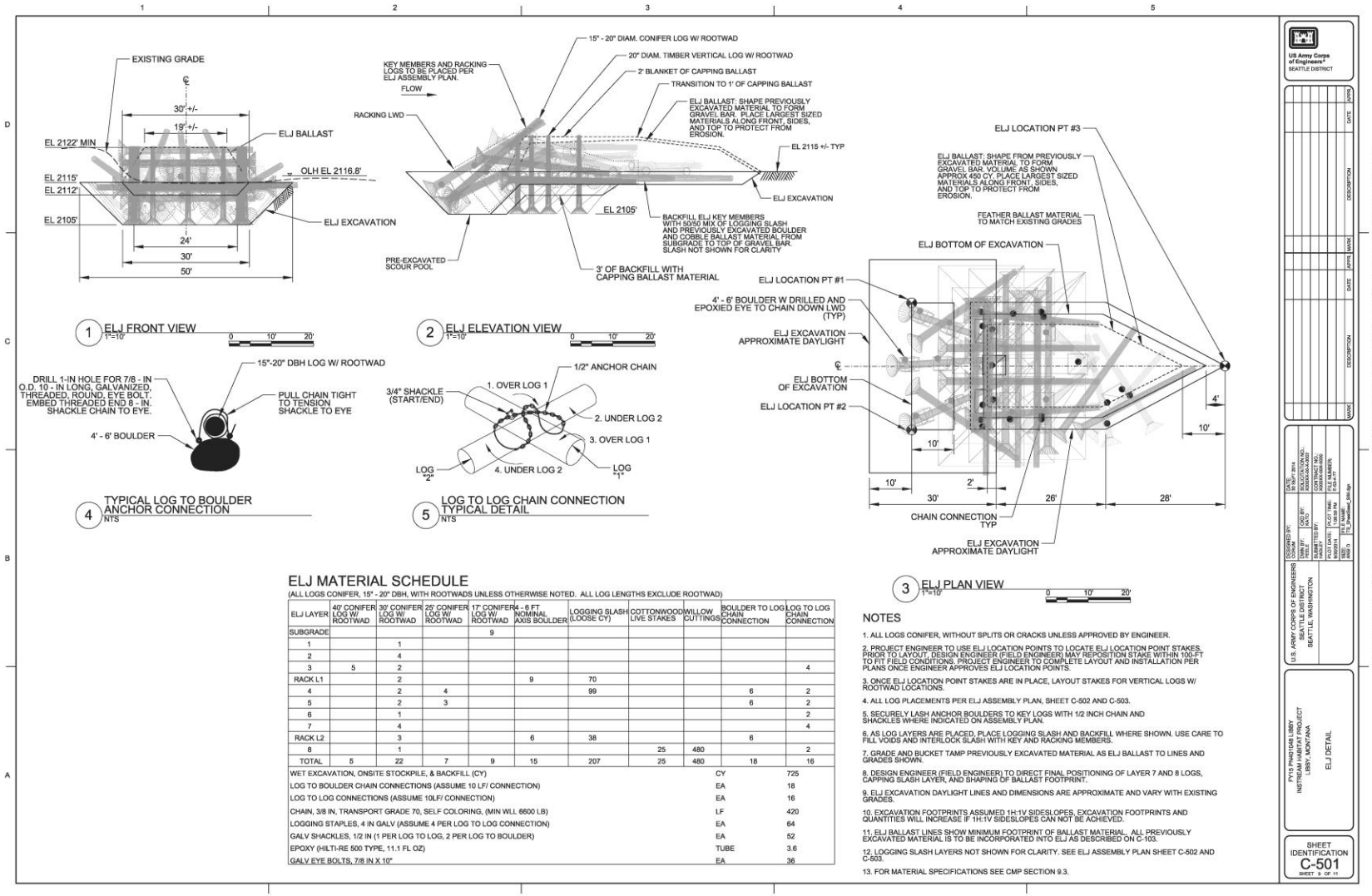

ELJ MATERIAL SCHEDULE

(ALL LOGS CONIFER, 15" - 20" DBH, WITH ROOTWADS UNLESS OTHERWISE NOTED. ALL LOG LENGTHS EXCLUDE ROOTWAD)

ELJ LAYER	40' CONIFER LOG W/ ROOTWAD	30' CONIFER LOG W/ ROOTWAD	25' CONIFER LOG W/ ROOTWAD	17' CONIFER LOG W/ ROOTWAD	4 - 6 FT NOMINAL AXIS BOULDER	LOGGING SLASH (LOOSE CY)	COTTONWOOD LIVE STAKES	WILLOW CUTTINGS	BOULDER TO LOG CHAIN CONNECTION	LOG TO LOG CHAIN CONNECTION
SUBGRADE				9						
1		1								
2		4								
3	5	2								4
RACK L1		2			9	70				
4		2	4			99			6	2
5		2	3						6	2
6		1								2
7		4								4
RACK L2		3			6	38			6	
8		1					25	480		2
TOTAL	5	22	7	9	15	207	25	480	18	16

WET EXCAVATION, ONSITE STOCKPILE, & BACKFILL (CY)	CY	725
LOG TO BOULDER CHAIN CONNECTIONS (ASSUME 10 LF/ CONNECTION)	EA	18
LOG TO LOG CONNECTIONS (ASSUME 10LF/ CONNECTION)	EA	16
CHAIN, 3/8 IN, TRANSPORT GRADE 70, SELF COLORING, (MIN WLL 6600 LB)	LF	420
LOGGING STAPLES, 4 IN GALV (ASSUME 4 PER LOG TO LOG CONNECTION)	EA	64
GALV SHACKLES, 1/2 IN (1 PER LOG TO LOG, 2 PER LOG TO BOULDER)	EA	52
EPOXY (HILTI-RE 500 TYPE, 11.1 FL OZ)	TUBE	3.6
GALV EYE BOLTS, 7/8 IN X 10"	EA	36

NOTES

1. ALL LOGS CONIFER, WITHOUT SPLITS OR CRACKS UNLESS APPROVED BY ENGINEER.
2. PROJECT ENGINEER TO USE ELJ LOCATION POINTS TO LOCATE ELJ LOCATION POINT STAKES. PRIOR TO LAYOUT, DESIGN ENGINEER (FIELD ENGINEER) MAY REPOSITION STAKE WITHIN 100-FT TO FIT FIELD CONDITIONS. PROJECT ENGINEER TO COMPLETE LAYOUT AND INSTALLATION PER PLANS ONCE ENGINEER APPROVES ELJ LOCATION POINTS.
3. ONCE ELJ LOCATION POINT STAKES ARE IN PLACE, LAYOUT STAKES FOR VERTICAL LOGS W/ ROOTWAD LOCATIONS.
4. ALL LOG PLACEMENTS PER ELJ ASSEMBLY PLAN, SHEET C-502 AND C-503.
5. SECURELY LASH ANCHOR BOULDERS TO KEY LOGS WITH 1/2 INCH CHAIN AND SHACKLES WHERE INDICATED ON ASSEMBLY PLAN.
6. AS LOG LAYERS ARE PLACED, PLACE LOGGING SLASH AND BACKFILL WHERE SHOWN. USE CARE TO FILL VOIDS AND INTERLOCK SLASH WITH KEY AND RACKING MEMBERS.
7. GRADE AND BUCKET TAMP PREVIOUSLY EXCAVATED MATERIAL AS ELJ BALLAST TO LINES AND GRADES SHOWN.
8. DESIGN ENGINEER (FIELD ENGINEER) TO DIRECT FINAL POSITIONING OF LAYER 7 AND 8 LOGS, CAPPING SLASH LAYER, AND SHAPING OF BALLAST FOOTPRINT.
9. ELJ EXCAVATION DAYLIGHT LINES AND DIMENSIONS ARE APPROXIMATE AND VARY WITH EXISTING GRADES.
10. EXCAVATION FOOTPRINTS ASSUMED 1H:1V SIDESLOPES. EXCAVATION FOOTPRINTS AND QUANTITIES WILL INCREASE IF 1H:1V SIDESLOPES CAN NOT BE ACHIEVED.
11. ELJ BALLAST LINES SHOW MINIMUM FOOTPRINT OF BALLAST MATERIAL. ALL PREVIOUSLY EXCAVATED MATERIAL IS TO BE INCORPORATED INTO ELJ AS DESCRIBED ON C-103.
12. LOGGING SLASH LAYERS NOT SHOWN FOR CLARITY. SEE ELJ ASSEMBLY PLAN SHEET C-502 AND C-503.
13. FOR MATERIAL SPECIFICATIONS SEE CMP SECTION 9.3.

US Army Corps of Engineers® SEATTLE DISTRICT

U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT PORT SEATTLE, WASHINGTON

PY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA

ELJ DETAIL

SHEET IDENTIFICATION C-501 SHEET 9 OF 11

DESIGN FILE: I:\AEC\Design\FY15_PN401048_LIHP\Con_Docs\CAD_Sheets\Civil\PN401048_LIHP_C-501.dgn

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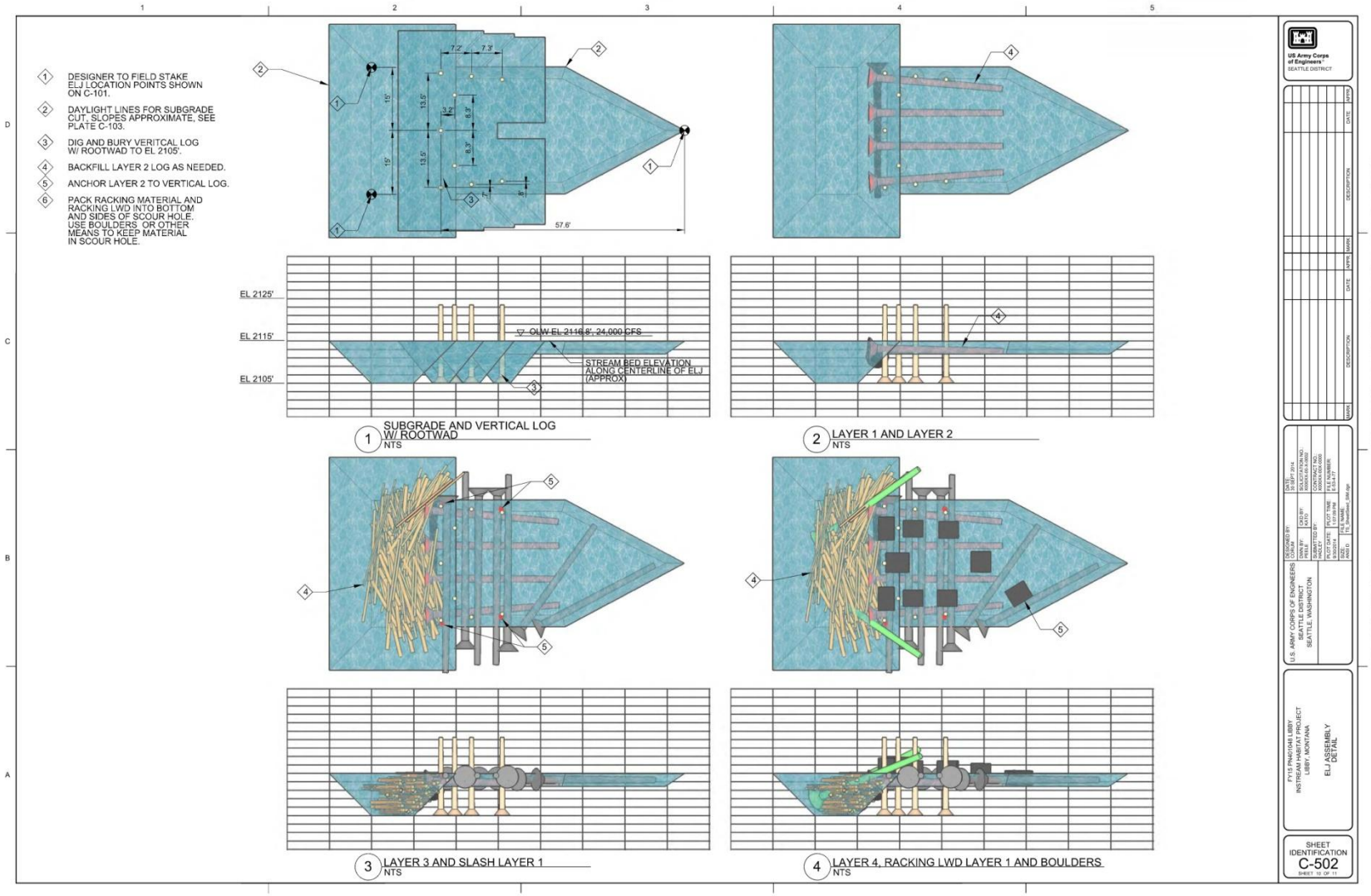
1 DESIGNER TO FIELD STAKE ELJ LOCATION POINTS SHOWN ON C-101.
2 DAYLIGHT LINES FOR SUBGRADE CUT, SLOPES APPROXIMATE, SEE PLATE C-103.
3 DIG AND BURY VERITCAL LOG W/ ROOTWAD TO EL 2105'.
4 BACKFILL LAYER 2 LOG AS NEEDED.
5 ANCHOR LAYER 2 TO VERTICAL LOG.
6 PACK RACKING MATERIAL AND RACKING LWD INTO BOTTOM AND SIDES OF SCOUR HOLE. USE BOULDERS, OR OTHER MEANS TO KEEP MATERIAL IN SCOUR HOLE.
EL 2125'
EL 2115'
EL 2105'
OLW EL 2116.8', 24,000 CFS
STREAM BED ELEVATION ALONG CENTERLINE OF ELJ (APPROX)
1 SUBGRADE AND VERTICAL LOG W/ ROOTWAD NTS
2 LAYER 1 AND LAYER 2 NTS
3 LAYER 3 AND SLASH LAYER 1 NTS
4 LAYER 4, RACKING LWD LAYER 1 AND BOULDERS NTS
US Army Corps of Engineers SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN401048 LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
ELJ ASSEMBLY DETAIL
SHEET IDENTIFICATION C-502
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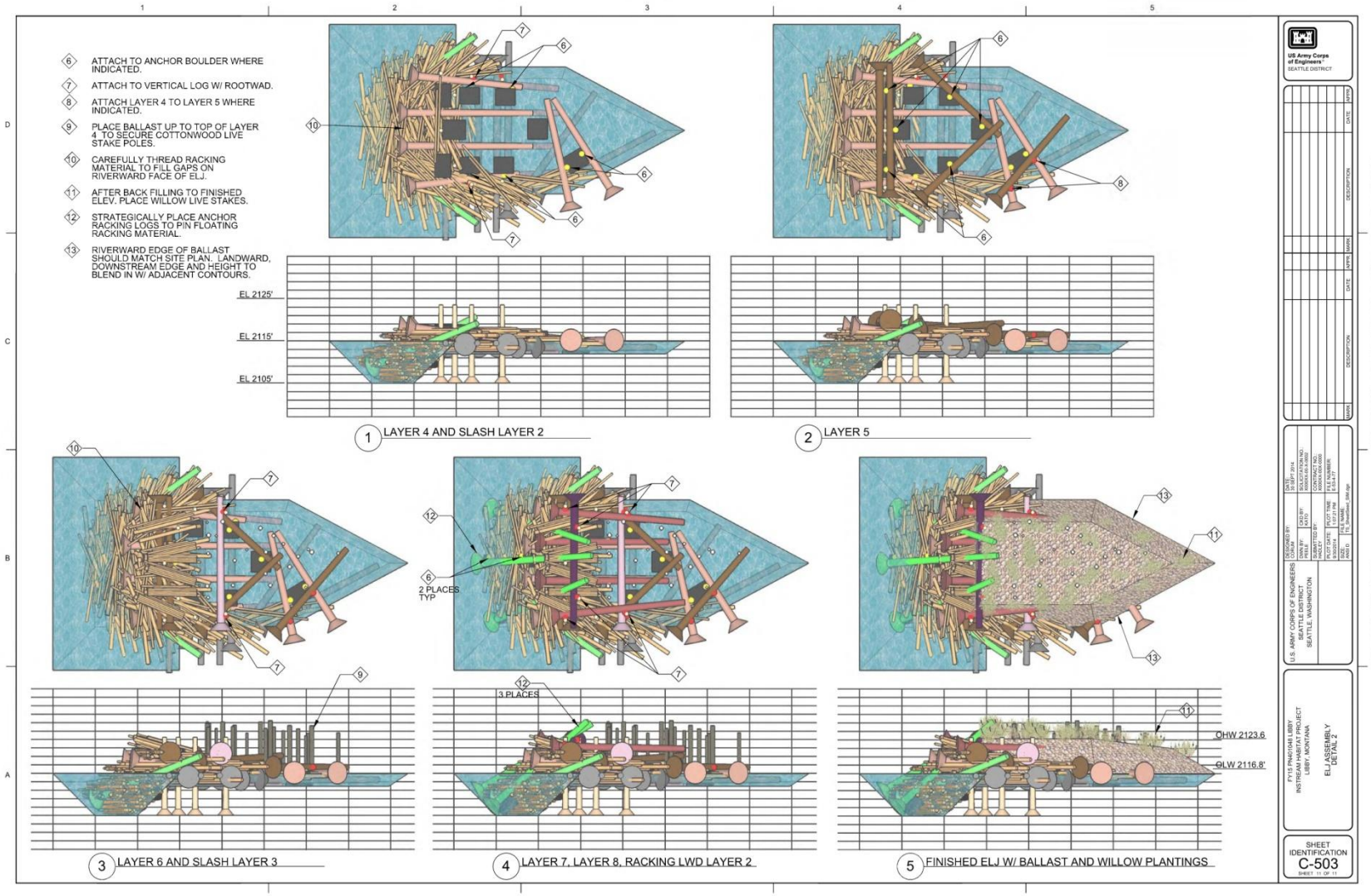
6 ATTACH TO ANCHOR BOULDER WHERE INDICATED.
7 ATTACH TO VERTICAL LOG W/ ROOTWAD.
8 ATTACH LAYER 4 TO LAYER 5 WHERE INDICATED.
9 PLACE BALLAST UP TO TOP OF LAYER 4 TO SECURE COTTONWOOD LIVE STAKE POLES.
10 CAREFULLY THREAD RACKING MATERIAL TO FILL GAPS ON RIVERWARD FACE OF ELJ.
11 AFTER BACK FILLING TO FINISHED ELEV. PLACE WILLOW LIVE STAKES.
12 STRATEGICALLY PLACE ANCHOR RACKING LOGS TO PIN FLOATING RACKING MATERIAL.
13 RIVERWARD EDGE OF BALLAST SHOULD MATCH SITE PLAN. LANDWARD, DOWNSTREAM EDGE AND HEIGHT TO BLEND IN W/ ADJACENT CONTOURS.
EL 2125'
EL 2115'
EL 2105'
1 LAYER 4 AND SLASH LAYER 2
2 LAYER 5
2 PLACES TYP
3 PLACES
OHW 2123.6
OLW 2116.8'
3 LAYER 6 AND SLASH LAYER 3
4 LAYER 7, LAYER 8, RACKING LWD LAYER 2
5 FINISHED ELJ W/ BALLAST AND WILLOW PLANTINGS
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PHDYHM LIBBY INSTREAM HABITAT PROJECT LIBBY, MONTANA
ELJ ASSEMBLY DETAILS
SHEET IDENTIFICATION C-503
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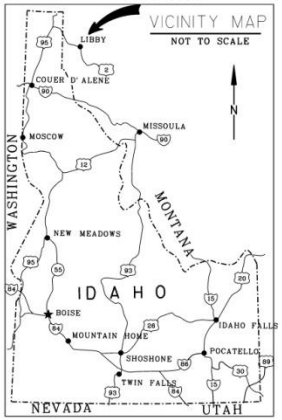
DATE AND TIME PLOTTED: 9/30/2014

US Army Corps
of Engineers ®
Seattle District

FY 15 LIBBY BANK EROSION PROTECTION
LIBBY DAM
LIBBY, MT



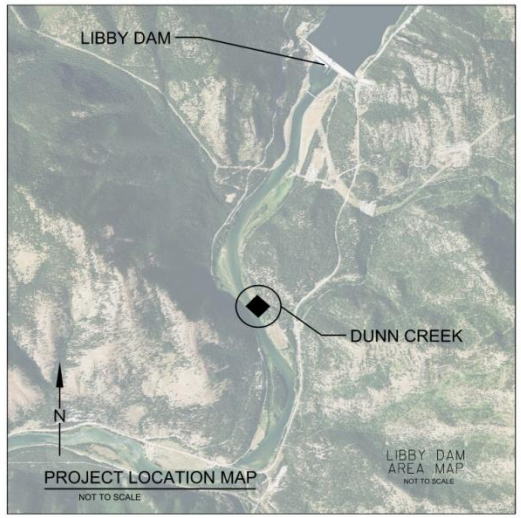
PN 372213

GENERAL NOTES

1. RUBBISH, DEBRIS, GARBAGE, AND OTHER REFUSE SHALL BE REMOVED FROM THE JOB SITE AND DISPOSED OF LEGALLY, OFF SITE.
2. ENSURE THE WORK CREW HAS ALL APPLICABLE SAFETY TRAINING PRIOR TO CONSTRUCTION.
3. ALL AREAS OF THE JOB SITE TEMPORARILY DISTURBED BY CONSTRUCTION SHALL BE GRADED TO THE PRE-CONSTRUCTION GRADE AND PROTECTED AND/OR REVEGETATED AS NECESSARY
4. ALL MATERIALS USED FOR CONSTRUCTION SHALL BE NEW AND UNDAMAGED UNLESS OTHERWISE APPROVED BY USACE. THE SAME MANUFACTURER OF EACH ITEM SHALL BE USED THROUGHOUT THE WORK UNLESS OTHERWISE APPROVED BY USACE.
6. DO NOT FILL EXISTING DITCHES OR CHANNELS UNLESS OTHERWISE SHOWN ON PLANS.
7. ELEVATIONS SHOWN HEREON ARE IN FEET AND REFER TO THE NORTH AMERICAN VERTICAL DATUM (NAVD) OF 1988.
8. HORIZONTAL COORDINATES SHOWN ARE IN INTERNATIONAL FEET AND REFER TO THE MONTANA STATE PLANE COORDINATE SYSTEM, NAD83.

INDEX OF DRAWINGS

SHEET NO.	PLATE NO.	DESCRIPTION
1	G-001	COVER INDEX
2	C-001	GENERAL SITE PLAN
3	C-002	EXISTING CONDITIONS
4	C-101	DUNN CREEK SITE PLAN
5	C-301	LOW LOG SECTION
6	C-302	HIGH LOG SECTION
7	C-303	RAILROAD REPAIR SECTION



SAFETY PAYS

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers
Seattle District

File No.: E-XXX
Date: 06 MARCH 2015
Solicitation No.: W911XX-00-X-0000

Recommended by: GUY L. GREEN, P.E. Chief, Design Branch — XX/2011
Approved by: JOHN T. WALLS P.E. Chief, Engineering Div. — XX/2011

Submitted by: HANNAH HADLEY Project Manager — XX/2011
Reviewed by: ANN L. NEARGARD, P.E. Chief, Specs. and Tech Review — XX/2011
Prepared by: JENNIFER L. WEST, P.E. Chief, CIVIL SECTION — Date

U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON

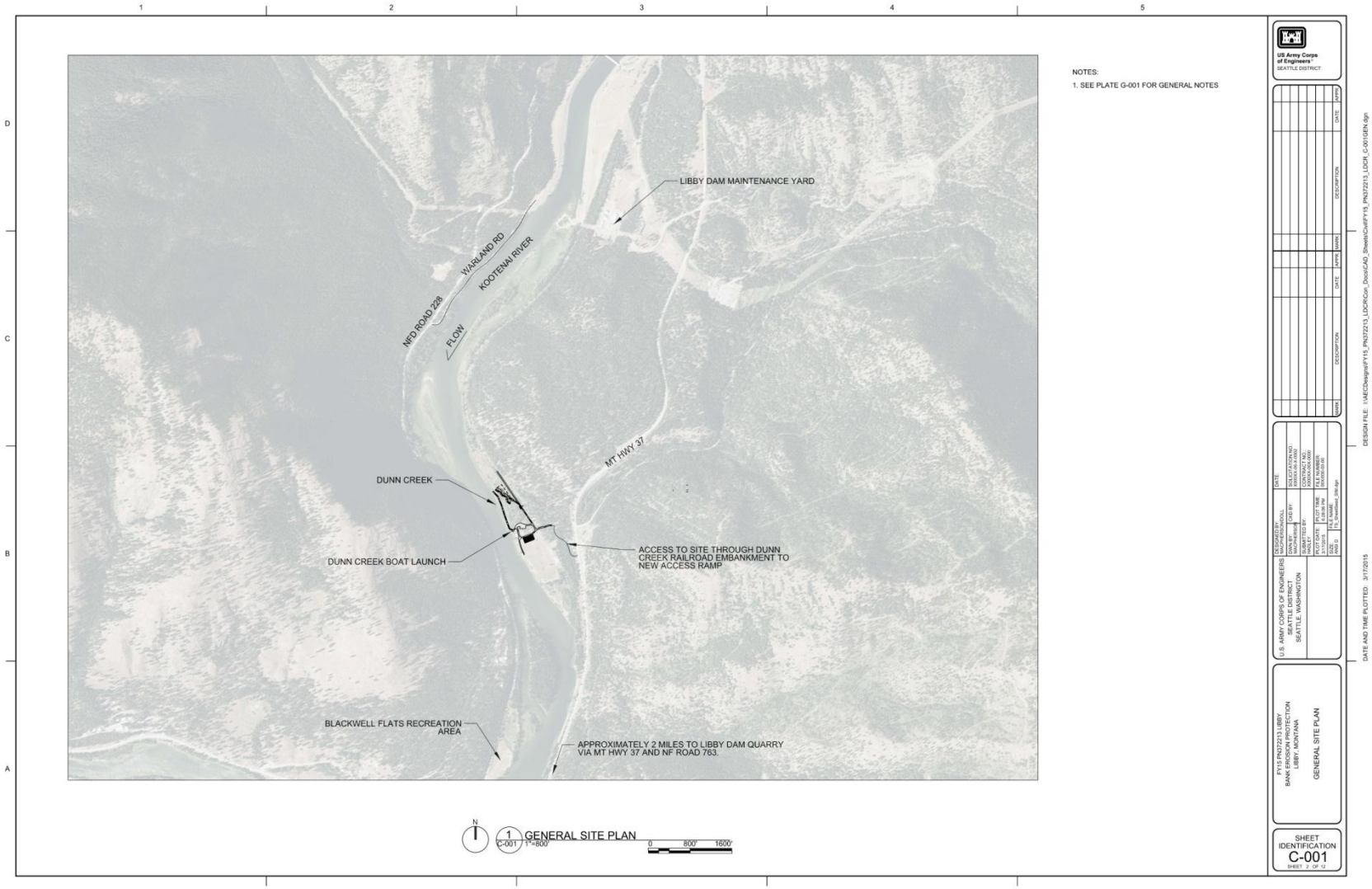
FY15 PN372213 LIBBY BANK EROSION PROTECTION LIBBY, MONTANA

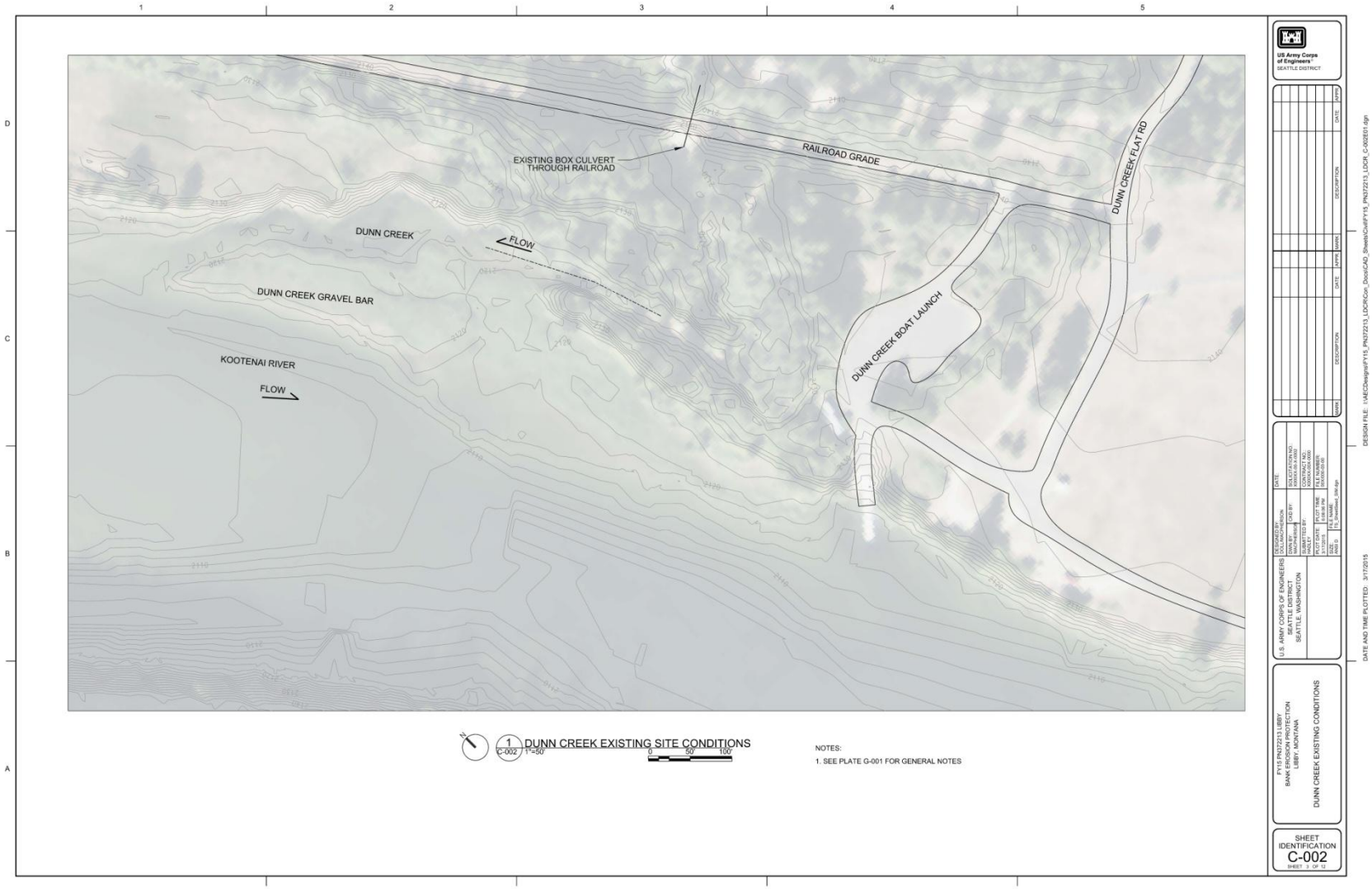
TITLE AREA AND VICINITY MAPS

SHEET IDENTIFICATION G-001 SHEET 1 OF 12

DESIGN FILE: I:\AE\Designs\FY15_PN372213_LIDA\Con_Docs\CAD_Sheets\General\PN372213_LIHP-G-G01COVR.dgn

DATE AND TIME PLOTTED: 3/6/2015


NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
LIBBY DAM MAINTENANCE YARD
WARLAND RD
KOOTENAI RIVER
NFD ROAD 228
FLOW
MT HWY 37
DUNN CREEK
DUNN CREEK BOAT LAUNCH
ACCESS TO SITE THROUGH DUNN CREEK RAILROAD EMBANKMENT TO NEW ACCESS RAMP
BLACKWELL FLATS RECREATION AREA
APPROXIMATELY 2 MILES TO LIBBY DAM QUARRY VIA MT HWY 37 AND NF ROAD 763.
N
1 GENERAL SITE PLAN
C-001 1"=800'
0 800' 1600'
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
FY15 PN372213 LIBBY
BANK EROSION PROTECTION
LIBBY, MONTANA
GENERAL SITE PLAN
SHEET IDENTIFICATION
C-001
SHEET 1 OF 12
DESIGN FILE: I:\AE\Design\FY15_PN372213_LDCR\Con_Docs\CAD_Sheets\Civil\FY15_PN372213_LDCR_C-001GEN.dgn
DATE AND TIME PLOTTED: 3/17/2015


EXISTING BOX CULVERT THROUGH RAILROAD
RAILROAD GRADE
DUNN CREEK FLAT RD
DUNN CREEK
FLOW
DUNN CREEK GRAVEL BAR
DUNN CREEK BOAT LAUNCH
KOOTENAI RIVER
FLOW
1 C-002 1"=50'
DUNN CREEK EXISTING SITE CONDITIONS
0 50 100
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN372213 LIBBY BANK EROSION PROTECTION LIBBY, MONTANA
DUNN CREEK EXISTING CONDITIONS
SHEET IDENTIFICATION C-002
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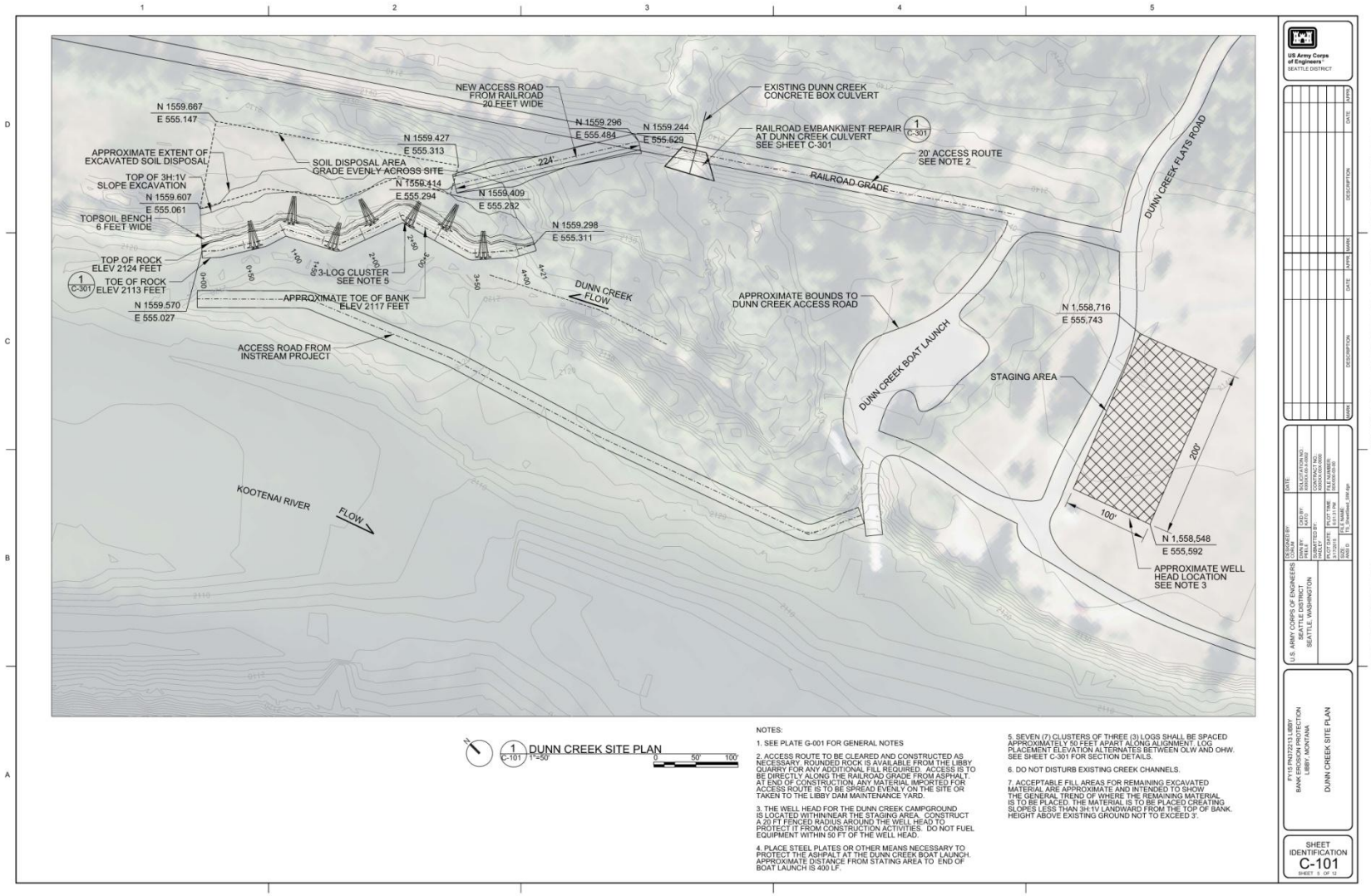
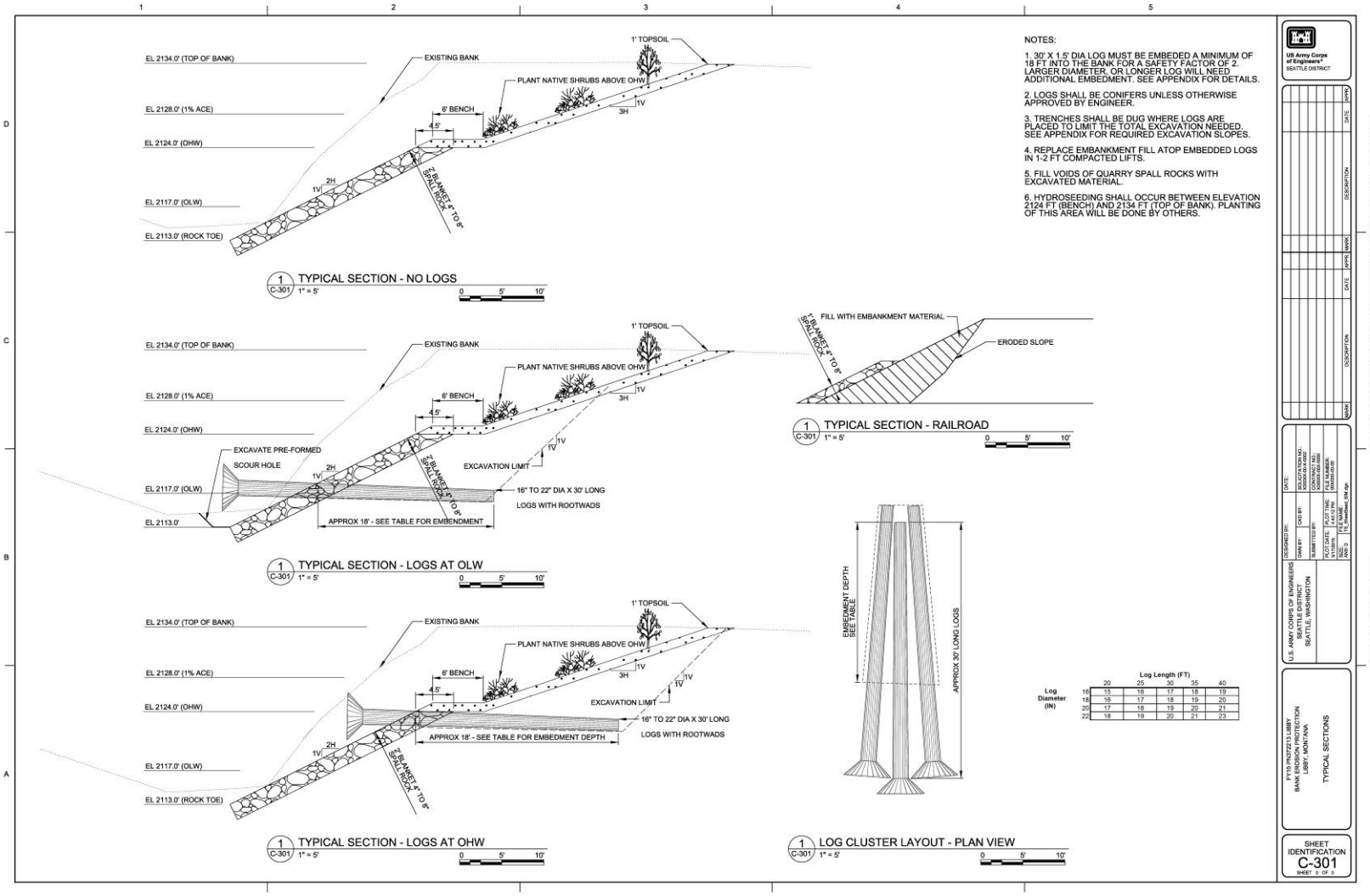
DATE AND TIME PLOTTED: 3/17/2015


NEW ACCESS ROAD FROM RAILROAD 20 FEET WIDE
EXISTING DUNN CREEK CONCRETE BOX CULVERT
N 1559.667
E 555.147
N 1559.296
E 555.484
N 1559.244
E 555.629
RAILROAD EMBANKMENT REPAIR AT DUNN CREEK CULVERT SEE SHEET C-301
1 C-301
APPROXIMATE EXTENT OF EXCAVATED SOIL DISPOSAL
N 1559.427
E 555.313
SOIL DISPOSAL AREA GRADE EVENLY ACROSS SITE
224'
20' ACCESS ROUTE SEE NOTE 2
RAILROAD GRADE
TOP OF 3H:1V SLOPE EXCAVATION
N 1559.607
E 555.061
N 1559.414
E 555.294
N 1559.409
E 555.282
DUNN CREEK FLATS ROAD
TOPSOIL BENCH 6 FEET WIDE
N 1559.298
E 555.311
TOP OF ROCK ELEV 2124 FEET
1 C-301 TOE OF ROCK ELEV 2113 FEET
0+00
0+50
1+00
1+50
3-LOG CLUSTER SEE NOTE 5
2+00
2+50
3+00
3+50
4+00
4+21
N 1559.570
E 555.027
APPROXIMATE TOE OF BANK ELEV 2117 FEET
DUNN CREEK FLOW
APPROXIMATE BOUNDS TO DUNN CREEK ACCESS ROAD
N 1,558,716
E 555,743
ACCESS ROAD FROM INSTREAM PROJECT
DUNN CREEK BOAT LAUNCH
STAGING AREA
200'
100'
KOOTENAI RIVER
FLOW
N 1,558,548
E 555,592
APPROXIMATE WELL HEAD LOCATION SEE NOTE 3
1 C-101 DUNN CREEK SITE PLAN 1"=50'
0 50' 100'
NOTES:
1. SEE PLATE G-001 FOR GENERAL NOTES
2. ACCESS ROUTE TO BE CLEARED AND CONSTRUCTED AS NECESSARY. ROUNDED ROCK IS AVAILABLE FROM THE LIBBY QUARRY FOR ANY ADDITIONAL FILL REQUIRED. ACCESS IS TO BE DIRECTLY ALONG THE RAILROAD GRADE FROM ASPHALT AT END OF CONSTRUCTION. ANY MATERIAL IMPORTED FOR ACCESS ROUTE IS TO BE SPREAD EVENLY ON THE SITE OR TAKEN TO THE LIBBY DAM MAINTENANCE YARD.
3. THE WELL HEAD FOR THE DUNN CREEK CAMPGROUND IS LOCATED WITHINNEAR THE STAGING AREA. CONSTRUCT A 20 FT FENCED RADIUS AROUND THE WELL HEAD TO PROTECT IT FROM CONSTRUCTION ACTIVITIES. DO NOT FUEL EQUIPMENT WITHIN 50 FT OF THE WELL HEAD.
4. PLACE STEEL PLATES OR OTHER MEANS NECESSARY TO PROTECT THE ASHPALT AT THE DUNN CREEK BOAT LAUNCH. APPROXIMATE DISTANCE FROM STATING AREA TO END OF BOAT LAUNCH IS 400 LF.
5. SEVEN (7) CLUSTERS OF THREE (3) LOGS SHALL BE SPACED APPROXIMATELY 50 FEET APART ALONG ALIGNMENT. LOG PLACEMENT ELEVATION ALTERNATES BETWEEN OLW AND OHW. SEE SHEET C-301 FOR SECTION DETAILS.
6. DO NOT DISTURB EXISTING CREEK CHANNELS.
7. ACCEPTABLE FILL AREAS FOR REMAINING EXCAVATED MATERIAL ARE APPROXIMATE AND INTENDED TO SHOW THE GENERAL TREND OF WHERE THE REMAINING MATERIAL IS TO BE PLACED. THE MATERIAL IS TO BE PLACED CREATING SLOPES LESS THAN 3H:1V LANDWARD FROM THE TOP OF BANK. HEIGHT ABOVE EXISTING GROUND NOT TO EXCEED 3'.
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS SEATTLE DISTRICT SEATTLE, WASHINGTON
FY15 PN372213 LIBBY BANK EROSION PROTECTION LIBBY, MONTANA
DUNN CREEK SITE PLAN
SHEET IDENTIFICATION C-101
SHEET 5 OF 12
DESIGN FILE: I:\AEC\Design\FY15_PN372213_LDCR\Civil_Dsgn\CAD_Sheets\Civil\FY15_PN372213_LDCR_C-101501.dgn
DATE AND TIME PLOTTED: 3/17/2015


NOTES:
1. 30' X 1.5' DIA LOG MUST BE EMBEDED A MINIMUM OF 18 FT INTO THE BANK FOR A SAFETY FACTOR OF 2. LARGER DIAMETER, OR LONGER LOG WILL NEED ADDITIONAL EMBEDMENT. SEE APPENDIX FOR DETAILS.
2. LOGS SHALL BE CONIFERS UNLESS OTHERWISE APPROVED BY ENGINEER.
3. TRENCHES SHALL BE DUG WHERE LOGS ARE PLACED TO LIMIT THE TOTAL EXCAVATION NEEDED. SEE APPENDIX FOR REQUIRED EXCAVATION SLOPES.
4. REPLACE EMBANKMENT FILL ATOP EMBEDDED LOGS IN 1-2 FT COMPACTED LIFTS.
5. FILL VOIDS OF QUARRY SPALL ROCKS WITH EXCAVATED MATERIAL.
6. HYDROSEEDING SHALL OCCUR BETWEEN ELEVATION 2124 FT (BENCH) AND 2134 FT (TOP OF BANK). PLANTING OF THIS AREA WILL BE DONE BY OTHERS.
EL 2134.0' (TOP OF BANK)
EL 2128.0' (1% ACE)
EL 2124.0' (OHW)
EL 2117.0' (OLW)
EL 2113.0' (ROCK TOE)
EXISTING BANK
1' TOPSOIL
PLANT NATIVE SHRUBS ABOVE OHW
6' BENCH
4.5'
1V
3H
2H
2' BLANKET 4" TO 8" SPALL ROCK
1 TYPICAL SECTION - NO LOGS
C-301 1" = 5'
EXCAVATE PRE-FORMED SCOUR HOLE
EXCAVATION LIMIT
16" TO 22" DIA X 30' LONG LOGS WITH ROOTWADS
APPROX 18' - SEE TABLE FOR EMBENDMENT
1 TYPICAL SECTION - LOGS AT OLW
C-301 1" = 5'
FILL WITH EMBANKMENT MATERIAL
ERODED SLOPE
1 TYPICAL SECTION - RAILROAD
C-301 1" = 5'
EMBEDMENT DEPTH SEE TABLE
APPROX 30' LONG LOGS
Log Length (FT)
Log Diameter (IN)
16 15 16 17 18 19
18 16 17 18 19 20
20 17 18 19 20 21
22 18 19 20 21 23
1 LOG CLUSTER LAYOUT - PLAN VIEW
C-301 1" = 5'
0 5' 10'
US Army Corps of Engineers
SEATTLE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
FY15 PN372213 LIBBY
BANK EROSION PROTECTION
LIBBY, MONTANA
TYPICAL SECTIONS
SHEET IDENTIFICATION
C-301
DESIGN FILE: I:\AE\Design\FY15_PN372213_LIDOR\Civil\FY15_PN372213_LIDOR_DistrictCAD_Sheets\Civil\FY15_PN372213_LIDOR_C-301X01.dgn
DATE AND TIME PLOTTED: 3/17/2015

Appendix C: National Historic Preservation Act

20141014120

-Stan
-DOD/COE
-Libby Dam
Riverine
Improvement
Projects
(ELJs & BOULDERS)

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

Environmental and Cultural Resources Branch

Mark Baumler, Ph.D.
State Historic Preservation Officer
Post Office Box 201201
225 North Roberts
Helena, Montana 59620-1201

RECEIVED
OCT 14 2014
BY: SHPO

OCT 0 6 2014

Subject: Section 106 Review of the National Historic Preservation Act for the Libby Dam Riverine Improvement Projects

Dear Dr. Baumler:

The United States Army Corps of Engineers (Corps) is proposing to construct two in-stream habitat improvement projects downstream of Libby Dam in Lincoln County, Montana. The first project would involve installing three engineered log jams (ELJs) along a gravel bar at the confluence of the Kootenai River and Dunn Creek approximately two miles downstream from Libby Dam near RM 217.8. The second project would include placing boulders across the top of an existing mid channel bar to reduce the growth of Didymo, an invasive aquatic species. The Corps has determined that the proposed federal action is an undertaking that has the potential to affect historic properties as part of our review under Section 106 of the National Historic Preservation Act (NHPA). We are notifying you of the undertaking, but given the nature and scope, we are proposing to expedite consultation by addressing the multiple steps of 36 C.F.R § 800.3 through § 800.6 in this letter as provided at 36 C.F.R. § 800.3(g). This letter provides a brief project description, documents the area of potential effect (APE), summarizes the efforts to identify historic properties, and provides agency findings. We also request your concurrence with our finding that there will be *no historic properties affected.*

Project Description: The construction of the ELJs would involve excavating roughly 700 cubic yards of material at each of the three locations. The excavated material would be stockpiled on the gravel bar without impeding the flow from Dunn Creek and would later be used as backfill material. The ELJs would be constructed with 25 to 50 foot logs, four foot diameter boulders, rounded gravel, and approximately 425 cubic yards of logging slash material to reduce the void space in the front of the structure. The ELJs would be anchored into the gravel bar. Cottonwood and willows would be planted on top of the ELJs and gravel bar to stabilize the ELJs over time and improve habitat. Access to the ELJ location would occur via the Dunn Creek boat ramp and the staging area would be in the grass field directly to the south of the boat ramp at Dunn Creek Campground (See Enclosure).

CONCUR
NO PROPERTIES ON OR ELIGIBLE
FOR NRHP APPEAR LIKELY TO
EXIST WITHIN PROJECT IMPACT AREA
MONTANA SHPO
DATE 10/15/14 SIGNED

For the proposed mid-channel bar project, approximately thirty boulders ranging from four to six feet in diameter would be placed across the top of an existing mid channel bar. The boulders would be individually placed by an excavator. It is anticipated that equipment would be driven into the water and rounded gravel may be added as necessary to the river bank/channel to make an accessible path to the site. Upon completion of the project, the rounded gravel would be spread across the river bank to reflect a more natural state (See Enclosure).

Area of Potential Effect: The Corps has defined the APE as the 500 by 50 foot stretch of gravel bar where the ELJs would be installed, the mid channel bar where the boulders would be placed, and the access routes and staging areas for both project locations as described above.

Summary of Efforts to Identify and Evaluate Historic Properties: In 2012, the Corps contracted with AMEC Environment and Infrastructure, Inc to survey Corps fee lands including the area surrounding the Dunn Creek ELJ project. Two sites, a prehistoric camp site (24LN1047) and the historic Jennings to Fernie branch line of the Great Northern Railroad (24LN1171) are located within a quarter mile of the proposed project location. No historic properties were located within the APE. The AMEC report, *Historic Properties Inventory of Libby Dam and Lake Koocanusa Project Lands* (AMEC 2014) is on file with your office.

The mid channel bar project involves the use of existing roads and ground disturbance would occur within the Kootenai River or the existing gravel bar. Due to the highly dynamic nature of riverbeds and the extremely low likelihood of encountering cultural materials, no cultural resource inventory occurred at this location.

The Corps has consulted with the Confederated Salish and Kootenai Tribe (CSKT) to identify places to which they attach religious and cultural significance or any concerns they might have with the project. Conceptual designs for both riverine improvement projects were presented to the Libby Dam Cooperative Group in August of 2014. The group is comprised of representatives from the Corps, Bonneville Power Administration, Kootenai National Forest and the CSKT. The Corps is concurrently notifying the CSKT of our findings. Should a party object to our findings, we will notify your office immediately and forward that information to you for your consideration.

At this time the Corps is requesting your review and agreement with our finding that there will be *no historic properties affected.* We appreciate your consideration of our request. If you have specific questions or if we can provide any clarification about this request or any other concerns please contact Ms. Danielle Storey (Lead Archaeologist) by telephone at (206) 764-4466 or by email at Danielle.L.Storey@usace.army.mil. I can be reached by telephone at (206)316-3069 or by email at rolla.l.queen.@usace.army.mil

Sincerely,

Rolla Queen, Chief
Cultural Resources Section
Environmental and Cultural Resources Branch

Enclosure

20141014O1

-Stan
-DOD/ARMY
-Libby Dam
Dunn Creek
Stabilization,
(24LN1047)

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

Environmental and Cultural Resources Branch

Mark Baumler, Ph.D.
State Historic Preservation Officer
Post Office Box 201201
225 North Roberts
Helena, Montana 59620-1201

RECEIVED OCT 0 6 2014
OCT 14 2014
BY: SHPO

Subject: Section 106 Review of the National Historic Preservation Act for the Dunn Creek Cultural Resources Stabilization Project, Libby Dam, Lincoln County, Montana

CONCUR
MONTANA SHPO
10/20/14

Dear Dr. Baumler:

The United States Army Corps of Engineers (Corps) in conjunction with the Bonneville Power Administration (BPA) is proposing to stabilize between 350 and 400 feet of stream bank along the Kootenai River in order to prevent erosion to archaeological site 24LN1047 near Libby Dam, Lincoln County, Montana. This project is funded under the Federal Columbia River Power System (FCRPS) Cultural Resources Program and undertaken jointly by the Corps and BPA as required by the 2009 FCRPS *Systemwide Programmatic Agreement for the Management of Historic Properties affected by the Multipurpose Operations of Fourteen Projects of the Federal Columbia River Power System for Compliance with Section 106 of the National Historic Preservation Act* (SWPA). The Corps and BPA have determined that the proposed federal action is an undertaking that has the potential to affect historic properties as part of our review under Section 106 of the National Historic Preservation Act (NHPA). We are notifying you of the undertaking, but given its nature and scope, we are proposing to expedite consultation by addressing the multiple steps of 36 C.F.R § 800.3 through § 800.6 in this letter as provided at 36 C.F.R. § 800.3(g). This letter provides a brief project description, documents the area of potential effect (APE), summarizes the efforts to identify historic properties, and provides agency findings. We also request your concurrence with our finding that there will be no *historic properties adversely affected.*

Site 24LN1047 is located about two miles downstream of Libby Dam along the mouth of Dunn Creek, a small tributary of the Kootenai River in T. 30 N. R. 29 W (Figure 1). The creek enters against the current of the main river and creates an eddy that is slowly eroding the bank just south of the existing site. The site was originally recorded by the Corps in 1975 as part of the proposed but never constructed Libby Additional Units Reregulation Dam project. The site was determined eligible for the National Register of Historic Places under Criterion D as part of the Libby-Jennings Archaeological District in 1978.

In 2012, the Corps contracted with AMEC Environment and Infrastructure, Inc to resurvey the larger site area and update any applicable site forms. During their extensive shovel

probe effort, AMEC found that the site did not extend as far south as originally recorded. The survey report, *Historic Properties Inventory of Libby Dam and Lake Koocanusa Project Lands* (AMEC 2014), is on file with your office. The current stabilization effort is proposed just south of the newly delineated site boundary. Stabilization efforts at this location essentially prevent the river from continuing to erode the bank before it reaches the archaeological site. The purpose of the stabilization project is to provide a long term, durable, minimal-maintenance solution that curtails incremental erosion and prevents catastrophic losses of an eligible cultural resource

Specific stabilization efforts at the site would include cutting back the eroded bank (outside the site boundary) to a more stable slope between 2 and 4 High: 1 Vertical. The grading would remove approximately 8,000 cubic yards of soil that would be stored on site for back fill. Large woody debris would be incorporated into the toe to enhance aquatic habitat and to naturalize the appearance of the stabilization effort. This configuration will also create roughness at the slope toe and cause erosive velocities to be reduced. Rock would be place behind and on top of the logs to help anchor them and protect against scour behind or below the log toe. Additional anchors may be required for the logs in the form of large boulders or earth anchors. After the logs are in place, the area would be backfilled with soil and replanted with native vegetation. The plantings would provide additional stability and roughness near the toe (Figures 2 and 3).

The Corps and BPA have defined the area of potential effects (APE) for this specific undertaking as the 400 foot x 100 foot stretch of bank where excavation would occur, the protected archaeological site, the access route and any staging areas needed for the project. The total APE is less than 2 acres. Equipment access would occur along the historic Jennings to Fernie branch line of the Great Northern Railroad (24LN1171). The route is currently utilized as a graded road. The railroad grade would not be impacted by the temporary increase in traffic associated with project construction. The entire APE was surveyed in 2012 as part of the previously discussed cultural resources report (AMEC 2014). No additional sites beyond the railroad Grade (24LN1171) and the Dunn Creek site (24LN1047) were located within the APE Prior to project construction, the southern edge of the archaeological site would be clearly demarcated to ensure that equipment and materials would not be stockpiled on the site. All ground disturbance for the stabilization project would occur outside of the site boundary.

The need for the 24LN1047 erosion control project was originally identified by the Libby Dam Cultural Resources Cooperative Group which is comprised of representatives of the Corps, BPA, the Kootenai National Forest and the Confederated Salish Kootenai Tribe. The project was listed as a 2014 priority action. Conceptual project designs were provided to all Cooperative Group members in August of 2014 at the group's quarterly meeting. The Corps has also sought information from Indian tribes regarding places which they attach religious and cultural significance and to identify any concerns they have with the project. Concurrently with this letter, the Corps is notifying the Confederated Salish Kootenai Tribe of our findings and seeking their view and comments.

At this time the Corps is requesting your review and agreement with our finding that there will be *no historic properties adversely affected.* We appreciate your consideration of our request. If you have specific questions or if we can provide any clarification about this request or any other concerns please contact Ms. Danielle Storey (Lead Archaeologist) by telephone at (206) 764-4466 or by email at Danielle.L.Storey@usace.army.mil. I can be reached by telephone at (206)316-3069 or by email at rolla.l.queen.@usace.army.mil

Sincerely,

Rolla Queen, Chief
Cultural Resources Section
Environmental and Cultural Resources Branch

Enclosures

Appendix D: Endangered Species Act

United States Department of the Interior

Fish and Wildlife Service
Ecological Services
Montana Field Office
585 Shepard Way, Suite 1
Helena, Montana 59601-6287
Phone: (406) 449-5225, Fax: (406) 449-5339

In Reply Refer To:
File: M.06 COE (I)
06E11000-2015-I-0201 Kootenai River Project

May 8, 2015

Evan R. Lewis, Chief
Environmental and Cultural Resources Branch
Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124

Dear Mr. Lewis:

This letter is in response to your March 25, 2015, request for U.S. Fish and Wildlife Service (Service) consultation on the Kootenai River Project located downstream of Libby Dam, Lincoln County, Montana. Effects of the proposed action were reviewed in regards to the threatened bull trout *(Salvelinus confluentus*), and designated bull trout critical habitat.

The proposed action includes two projects aimed at increasing habitat complexity in the Kootenai River. The first project will be the installation of three engineered log jams (ELJs) along 500 feet of a gravel bar between the mouth of Dunn Creek and the Dunn Creek boat launch. Each ELJ will be comprised of 19 to 40 foot logs and rootwads anchored to boulders in pre-excavated scour pools. Cottonwood live stakes and willows will be planted on top of the ELJs to increase stability and provide overhanging structure. The second habitat enhancement project will be a mid-channel bar boulder placement project 0.8 miles downstream of Libby Dam. Approximately 30 boulders ranging from four to six feet in diameter will be placed on top of an existing mid-channel bar. Placement of the boulders will be completed with an excavator.

In addition to the habitat enhancement projects, the proposed action also includes the Dunn Creek bank stabilization project. This project seeks to stabilize nearly 450 feet of lower Dunn Creek's banks in an effort to preserve cultural resources. The toe of the bank will be stabilized with logs and angular rocks, and the eroded bank surface will be re-graded to reduce the slope. Once complete, the bank will be further stabilized by replanting with native vegetation.

The proposed action will take place within the Kootenai River which is designated as bull trout critical habitat. As noted in the provided Biological Evaluation, the proposed project will have an effect on Primary Constituent Element (PCE) number four (complex habitats) and number eight (water quality/quantity). During construction, water quality is likely to be affected via increased turbidity due to work being done in the water. However, given the Kootenai River's

size and velocity, it is expected that turbidity will return to normal levels within a short distance downstream of the construction area. The proposed action will likely have a long term beneficial effect on habitat complexity as this type of habitat downstream of Libby Dam is limited due to decreased recruitment of large woody debris, leading to an absence of large wood complexes and pools. The proposed action will increase these habitat elements.

The Service has reviewed the Kootenai River Project Biological Evaluation and concurs with the determinations that the proposed action is not likely to adversely affect the threatened bull trout, or designated bull trout critical habitat. The Service bases its concurrence on the information and analysis in the Biological Evaluation provided by Hannah Hadley, Environmental Coordinator, information received during the consultation process, and information in our files.

This project should be re-analyzed if new information reveals effects of the actions that may affect listed species or designated or proposed critical habitat (1) in a manner or to an extent not considered in this letter, (2) if the action is subsequently modified in a manner that causes an effect to a listed species or designated or proposed critical habitat that was not considered in this letter, and (3) if a new species is listed or critical habitat is designated that may be affected by this project.

We appreciate your efforts to ensure the conservation of threatened and endangered species as part of your responsibilities under the Endangered Species Act, as amended. If you have questions or comments related to this consultation, please contact Kevin Aceituno at kevin_aceituno@fws.gov or (406) 758-6871.

Sincerely,

Jodi L. Bush
Field Supervisor

Appendix E: Clean Water Act

Appendix E-1: 404(b)(1) Analysis

Clean Water Act Section 404(b)(1) Analysis

Kootenai River Project

Libby, Lincoln County, Montana

Clean Water Act

Prepared by:

U.S. Army Corps of Engineers
Seattle District
Environmental and Cultural Resources Branch

July 2015

1.0 Introduction

The purpose of this document is to record the U.S. Army Corps of Engineers (Corps) Clean Water Act Section 404 compliance evaluation of the implementation of the Kootenai River Project downstream of Libby Dam, Lincoln County, Montana, to increase habitat complexity and prevent erosion and loss of sensitive resources. The Kootenai River Project consists of three projects: 1) Dunn Creek Spit Instream Habitat Enhancement, 2) Mid-Channel Bar Boulder Placement, and 3) Dunn Creek Bank Stabilization.

The main body of this document summarizes the information presented in Attachment A and includes relevant information from the draft Environmental Assessment for the project that was collected pursuant to the National Environmental Policy Act (NEPA) of 1969 [42 USC §4321 et seq.]. Attachment A provides the specific analysis of compliance with the CWA 404(b)(1) and the General Regulatory Policy requirements.

2.0 Project Background

The Kootenai River ("Kootenay" River in Canada) originates in southeastern British Columbia, flows south and west through Montana, and northwest through Idaho, then returns to Canada where it flows through Kootenay Lake and joins the Columbia River at Castlegar, BC. Following the construction of Libby Dam in 1972, the Kootenai River downstream of the dam has been impacted by altered hydrology; changes in nutrient, wood and sediment loading; and changes in water quality. These changes have altered riparian processes and affected aquatic and terrestrial habitat conditions, resulting in degraded ecosystem conditions relative to historical conditions. The Corps has adjusted Libby Dam operations to improve conditions in the Kootenai River. Despite these efforts, the abundance of trout in the reach downstream of the dam has declined from historical levels (Kootenai Tribe of Idaho and MFWP 2004). The Corps wants to improve salmonid habitat in the Kootenai River downstream of Libby Dam. The project area is located in the reach of the Kootenai River between Libby Dam and the Fisher River, approximately three miles downstream of the dam.

3.0 Project Need

High flows from Libby Dam have eroded the toe of Dunn Creek at the confluence with the Kootenai River in the vicinity of a sensitive resource site. In 2006, the flow regime from the dam was changed to improve river conditions for fish, as discussed in the Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement (EIS) (USACE 2006). High water events such as spills from the dam are increasing bank line erosion in some areas. Cut banks, such as those at the confluence of the creek with the river, are eroding

faster, and vegetation is unable to take hold by producing root structure which would naturally stabilize the bank line. The 2006 EIS anticipated that the change in flow regime could create the conditions which would further affect sensitive resource sites.

Fish habitat downstream of Libby Dam is limited by lack of recruitment of large wood and sediment due to the existence of the dam. Existing large wood complexes are aged and degraded, and although they continue to function, have become less functional. In addition, the hydrograph below Libby Dam is reversed, and blockage by the dam has led to an almost total absence of recruitment of woody vegetation on existing river banks and gravel bars, though recent flow changes have allowed limited recruitment of willows, cottonwoods, and grasses and shrubs in relatively small areas. Pool formation by large wood complexes is absent. Point bar formation in the absence of sediment recruitment is non-existent.

4.0 Project Purpose

The purpose of the bank stabilization project is to provide long-term, durable, minimal-maintenance, and stabilization that curtails incremental erosion and prevents catastrophic losses of sensitive irreplaceable resources. The purpose of the habitat projects is to restore, in part, the ecosystem function of the Kootenai River immediately downstream of Libby Dam.

5.0 PROPOSED ACTION AND ALTERNATIVES

Alternatives considered under the NEPA must include the proposed action (preferred alternative), and the no-action alternative. Other reasonable alternatives that meet the project purpose and need must also be considered in detail.

The Corps evaluated the no-action alternative as well as four action alternatives: 1) Riverine Habitat Improvement and Bank Stabilization, 2) Large Wood – Methods of Construction, 3) Bank Stabilization – Vegetation and 4) Bank Stabilization – Rock Toe.

The No Action Alternative was eliminated because it did not meet the project objectives. Although the Bank Stabilization – Vegetation Alternative would increase the stability of the slope it was determined that with the seasonal high flows of the Kootenai River and divergent flows of Dunn Creek, the bank line would not remain stable in the long term, risking erosion into sensitive resources and was eliminated from further consideration. The Bank Stabilization – Rock Toe Alternative would be the most stable structure long-term, however, this alternative is the least acceptable for fish and wildlife habitat and was eliminated from further consideration.

The Riverine Habitat Improvement and Bank Stabilization Alternative was selected because it provides instream woody debris habitat and provides long-term bank line protection to sensitive resources. Riverine habitat improvement would occur at two locations: the mid-channel bar and Dunn Creek. The bank stabilization would occur along Dunn Creek. All the proposed actions would be constructed during low flow conditions in August/September timeframe and take up to approximately six weeks to construct including mobilization and final site clean-up.

Site 1: Mid-Channel Bar Boulder Placement

Approximately thirty (30) boulders ranging 3 to 6 foot in diameter would be placed across the top of an existing mid-channel bar. These boulders may be out of the water during low flows, depending upon their diameter. The Libby Dam quarry would provide the boulders from its existing stockpile, approximately 5 miles south of the project site.

The boulders would be individually placed by an excavator. It is anticipated that equipment would be driven into the water and rounded gravel may be added as necessary to the riverbank/channel to make an accessible path to the site. Upon completion of the project, the rounded gravel would be spread across the riverbank to reflect a more natural state. Signs would be placed along the shore alerting boaters to the boulders.

Site 2: Dunn Creek Spit Instream Habitat Enhancement

Three (3) engineered log jams (ELJ's) are proposed along 500 feet of an 850 foot long gravel bar from the confluence of Dunn Creek towards the boat launch along the left bank of the Kootenai River near River Mile (RM) 217.8. The locations of the three ELJ's proposed are based on a desire to maximize the amount of flow that impinges in the logjams to create large permanent pools along the left bank upstream of the boat launch. The ELJ's include pre-excavated scour pools to the expected scour depth during a major flood event. The majority of the wood in the jams would be placed slightly below the ordinary low water level to ensure that they create the desired pool habitat and associated woody edge at all flows. The tops of the jams would extend a few feet higher than the gravel bar to help increase resistance against buoyancy. Cottonwood live stakes and willows would be planted on top of the ELJ's and gravel bar. These plantings would help increase stability of the ELJ's over time and improve habitat by increasing overhanging cover and leaf fall. The ELJ's would include a large quantity of logging slash to reduce the void spacing in the front of the structure.

Access to the construction site from the staging area would be down the boat ramp and heading upstream on the river bank to the construction site along the top of the gravel bar to the landward side of the ELJ's. Material that is excavated for the ELJ's construction would be stockpiled on the gravel bar without impeding flow from Dunn Creek. The staging area would be in the grass field directly to the south of the boat ramp at Dunn Creek Campground. It is expected that equipment would be driven and operated near or in the water and over the

gravel bar and rounded gravel may be added as necessary to the river bank to ease access. Upon completion of the project, the rounded gravel would be spread across the river bank to reflect a more natural state.

Each ELJ would be comprised of forty three 19- to 40-foot logs with rootwads, nine of which are placed vertically, 10 feet below the streambed in excavated pits. Additional materials for each ELJ include nine 4- 6-foot nominal diameter boulders and anchoring hardware, 450 cubic yards (CY) of excavated streambed material, approximately 210 CY of slash material, 25 cottonwood live stakes, and 480 willow live stakes. The Libby Dam quarry would provide the boulders and rounded gravel from its existing stockpile, approximately 5 miles south of the project site. The logs would either be purchased or donated from the USFS. The slash materials would be obtained either from vegetation removal as part of the Souse Gulch Volunteer Village project or the top of the overburden at the Libby Dam quarry.

For sediment control, a deflector structure (gravel kick-up berm, boulder and *Visqueen* barrier, or equivalent) would be built at the head of the gravel bar to reduce flow through the construction site. In addition, on-site stockpiles of excavated gravel would be placed in areas that are lined with silt fence. The mouth of Dunn Creek would be lined with silt fence since runoff from the stockpiles would flow toward the creek into river.

Site 3: Dunn Creek Bank Stabilization

Approximately 450 linear feet of lower Dunn Creek's bank will be stabilized by reducing the slope of the bank, stabilizing the toe with logs and angular rocks, refilling the space with soil, and replanting the area. The eroded bank will be graded back from the current, unstable, steep slope to a more stable slope of 3H: 1V. The grading work will remove approximately 8,900 CY of soils with an excavator and dozer. These soils will be stored on-site to be reused as backfill. A log and rock toe will be constructed consisting of approximately seven log clusters embedded perpendicularly into the bank. Clusters will consist of three logs at various angles, oriented perpendicular to the flow of Dunn Creek, with rootwads exposed into the channel. This configuration will create roughness at the slope toe causing erosive velocities to be reduced. Rock will be placed beneath, above, and between log clusters to help anchor them and protect against scour behind or below the log toe. Additional anchors may be required for the logs in the form of large boulders or earth anchors. After the logs were in place, the area will be backfilled with soils from grading and replanted with native vegetation. The plantings will provide additional stability and roughness near the toe, as well as ground cover and localized erosion protection.

6.0 POTENTIALLY ADVERSE EFFECTS (INDIVIDUALLY OR CUMULATIVELY) ON THE AQUATIC ENVIRONMENT

a. Effects on Physical, Chemical, or Biological Characteristics of the Aquatic Ecosystem

Short-term impacts from temporary increases in turbidity may result from activities associated with slope grading and excavation as well as installation of engineered log jams, boulders and LWD erosion protection. In addition, there is a risk of a chemical spill (fuel, oil, or other machinery fluids) into the water whenever construction occurs near a water body. Best management practices such as temporary deflector structure and silt fences, would be implemented during construction to ensure the chances of this occurrence are minimized.

This reach of the Kootenai River is deficient in the following habitat features: cover, complexity, spawning substrate, and macroinvertebrate habitat. Cover and complexity in the form of wood-formed pools is sparse. The supply of large wood to the reach has been interrupted by the dam which has resulted in reduced channel boundary roughness and simplification of edge habitat. ELJ's, boulders and native plantings would increase the amount of available cover, complexity, spawning substrate and macroinvertebrate habitat within the project reach. Increased native vegetation and the introduction of ELJ and boulders into the channel would provide additional high quality habitat to a variety of fish species. During construction, access to the Dunn Creek boat ramp may be temporarily closed, however project timing will be during late August/September when recreational usage is low.

b. Effects on Recreational, Aesthetic, Historical, and Economic Values

The completion of the project may result in increased interest in the site and therefore recreational use, including fishing, might increase. During construction, access to the Dunn Creek boat ramp may be temporarily closed, however project timing will be during late August/September when recreational usage is low.

The visual quality of the Kootenai River basin varies but is generally high. The proposed project would not cause any negative impacts to visual quality within the project reach.

During construction at all three sites, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb recreational users. However, these impacts would be temporary and highly localized, and are not expected to result in significant impacts.

Professional cultural resources studies have been conducted for the proposed project. The bank stabilization is critical to the protection of sensitive resources.

c. Findings

There would be no significant adverse impacts to aquatic ecosystem functions and values. It is expected that aquatic ecosystem functions and values would increase by construction of the key project features and planting the ELJ's and bank stabilization sites with native vegetation.

7.0 ALL APPROPRIATE AND PRACTICABLE MEASURES TO MINIMIZE POTENTIAL HARM TO THE AQUATIC ECOSYSTEM

a. Impact Avoidance Measures

Potential impacts to aquatic species and fish would be avoided by performing all in-water work during low flow conditions.

b. Impact Minimization Measures

The Corps would take all practicable steps during construction of the project to minimize impacts to aquatic resources during in-water construction. Contingencies would be in place if any of the water quality protection measures fail to achieve their intended function. The Corps would observe all construction windows to ensure that impacts to migratory fish would be avoided or minimized. The minimization measures would be as follows:

- All stockpiled materials would be protected against surface run-off using measures such as perimeter silt fencing.
- All in-water activities would occur during the low flow conditions.
- Turbidity would be minimized through the installation of a deflector structure during excavation and placement of ELJ's.
- Water quality sampling would be conducted according to the protocol approved by the Montana Department of Environmental Quality for the following parameters: turbidity, dissolved oxygen, and pH. Construction could be halted if deemed necessary under the water quality sampling plan in compliance with the Water Quality Certification.
- Equipment that will be used near the water will be cleaned prior to construction.
- Refueling will occur away from the riverbank.
- Construction equipment will be regularly checked for drips or leaks.
- At least one fuel spill kit with absorbent pads will be on-site at all times, and construction personnel will be properly trained in its use.

- Construction site will be managed to be safe, efficient, and provide for the least amount of environmental disturbance as the project will allow. Work will be confined to the construction right-of-way and additional temporary workspace.
- Clearing of vegetation will be limited to that which is absolutely necessary for construction of the project.
- Existing streamflow will be maintained at all times (i.e. Dunn Creek).
- The Construction Lead is responsible for implementing sediment control measures as needed per relevant and applicable Montana State requirements and appropriate BMP's. As site conditions change (i.e. rain) implementation of other sediment devices may be necessary.
- Noise-generating activities will be performed between sunrise and sunset. Night construction work is not allowed. Noise generating activity is defined as any activity involving running heavy equipment such as excavators or dump trucks.
- At Dunn Creek Spit Instream Habitat Enhancement site, a temporary deflector structure (gravel kickup berm, boulder and *Visqueen* barrier, or equivalent) will be built at the head of the gravel bar to reduce flow through the construction site

c. Compensatory Mitigation Measures

No direct mitigation measures are planned other than incorporating native plantings into the two sites at Dunn Creek to enhance habitat. There may be a temporal lag of one year while the vegetation becomes established in disturbed areas. Long-term impacts associated with Kootenai River Project are expected to include beneficial effects on aquatic habitat and water quality which would offset the short-term construction related impacts. The establishment of aquatic and riparian habitats and habitat complexity needed in this area will benefit wildlife, fish, and water quality.

d. Findings

Given the temporary, localized, necessary, and minor nature of these effects, the Corps has determined that the proposed project would not result in significant adverse environmental impacts.

8.0 OTHER FACTORS IN THE PUBLIC INTEREST

a. Fish and Wildlife

The Corps has coordinated construction activities with local Native American Tribes, and state and federal resource agencies to ensure that only minimal impacts to fish and wildlife resources would occur. The in-water portions of project construction would take place during the low flow conditions. A Corps biologist would check for perched bald eagles

before construction begins to avoid and minimize disturbance due to large machinery. Work may be delayed if it appears that there would be a disturbance to eagles. The Corps has determined that the proposed project "may affect, not likely to adversely affect" bull trout and its critical habitat located in the project area. This determination was submitted to the U.S. Fish and Wildlife Service on 25 March 2015. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, and Spalding's catchfly, or their designated critical habitats. USFWS concurred with the Corps' determination on 8 May 2015.

b. Water Quality

The Corps concluded that this project is functionally analogous to the parameters of Nationwide Permit (NWP) 27. However, the State has denied the water quality certification for NWP 27, therefore an individual water quality certification would be obtained for this project.

c. Historical and Cultural Resources

The Corps has coordinated its review under NEPA with agency responsibilities under Section 106 of the National Historic Preservation Act (NHPA). The Corps has consulted with the Montana State Historic Preservation Officer (SHPO), the Confederated Salish and Kootenai Tribes. The Corps has found, and the SHPO has concurred on 15 October 2014 and 20 October 2014, respectively, that construction of the two riverine habitat improvement and bank stabilization projects would result in no historic properties affected.

e. Environmental Benefits

The project would improve significant ecosystem function, structure, and dynamic processes that have been limited within the project reach by increasing quality of mainstem channel habitat, for salmonids and other fish. The addition of native riparian plants along the Dunn Creek sites would provide shading and cover leading to localized cooler temperatures, and increase primary production in the form of insect and bird drop.

9.0 CONCLUSIONS

The Corps finds that this project is within the public's interest, complies with the substantive elements of Section 404 of the Clean Water Act and the Rivers and Harbors Act, and meets the criteria of Nationwide Permit 27: Aquatic Habitat Restoration, Establishment, and Enhancement Activities. However, the State has denied the water quality certification for NWP 27, therefore an individual water quality certification would be obtained for this project.

10.0 REFERENCES

Kootenai Tribe of Idaho and Montana Fish, Wildlife, & Parks. (2004). Kootenai Subbasin Plan: A report prepared for the Northwest Power and Conservation Council. Retrieved August 2014, from Northwest Power and Conservation Council web page; NW Council, Portland, OR: http://www.nwcouncil.org/fw/subbasinplanning/kootenai/plan

USACE. (2006). Upper Columbia Alternative Flood Control and Fish Operations Final Environmental Impact Statement. Seattle, Washington: US Army Corps of Engineers, Seattle District.

Attachment A

Clean Water Act 404(b)(1) Evaluation [40 CFR §230]

Permit Application Evaluation [33 CFR §320.4]

404(b)(1) Evaluation [40 CFR §230]

Potential Impacts on Physical and Chemical Characteristics [Subpart C]:

1. **Substrate [230.20]**

   Substrate would be temporarily impacted through the installation of ELJ's, boulders, and bank stabilization. Access road material would be left within the river channel upon completion of the project.

2. **Suspended particulates/turbidity [230.21]**

   Temporary increases in turbidity may result from construction activities. In order to reduce the temporary increases in turbidity and potential related effects on fish, all in-water construction work would take place during low flow condition. The design and implementation of the erosion-control would incorporate best management practices (BMP's) such as installation of erosion control measures and revegetation of disturbed areas to further reduce the duration and magnitude of the temporary increases in turbidity. Turbidity monitoring during construction would ensure these temporary increases are in compliance with State Water Quality Conditions. No exceedances are anticipated; however, should construction efforts increase turbidity above the state standards, work would be halted and construction methods adjusted to ensure that further exceedances would not occur.

3. **Water [230.22]**

   The project is not expected to add any nutrients to the water that could affect the clarity, color, odor, or aesthetic value of the water, or that could reduce the suitability of the project reach for aquatic organisms or recreation. It can be expected that localized temperatures within the project area may exhibit minor reductions in temperature due to the project. The cooler water temperatures in the immediate vicinity may increase dissolved oxygen in this area resulting in improved water quality.

Coniferous large woody debris, which is resistant to breakdown (and therefore has low biochemical oxygen demand), would be used for engineered log jams.

4. Current patterns and water circulation [230.23]

The locations of the three ELJ's proposed are based on a desire to maximize the amount of flow that impinges in the logjams to create large permanent pools along the left bank upstream of the boat launch. The ELJ's include pre-excavated scour pools to the expected scour depth during a major flood event. The majority of the wood in the jams would be placed slightly below the ordinary low water level to ensure that they create the desired pool habitat and associated woody edge at all flows. A Hydraulic Engineer assisted with the design of the project so as to not create a flow pattern that could be disruptive downstream of the project.

5. Normal water fluctuations [230.24].

Water levels of the Kootenai River are controlled by operations at Libby Dam. The only uncontrolled fluctuations in the project reach are from Dunn Creek flows.

6. Salinity gradients [230.25]

Not applicable, there is no salt intrusion into the Kootenai River.

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem [Subpart D]:

1. Threatened and endangered species [230.30]

The Corps has determined that the proposed project "may affect, not likely to adversely affect" bull trout and critical habitat located in the project area. This determination was submitted to the U.S. Fish and Wildlife on 25 March 2015. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, and Spalding's catchfly, or their designated critical habitats. USFWS concurred with the Corps' determination on 8 May 2015.

2. Fish, crustaceans, mollusks and other aquatic organisms in the food web [230.31]

There may be temporary impacts to aquatic organisms during construction due to turbidity and installation of engineered log jams, boulder placement and bank stabilization. However, aquatic habitat quality conditions are expected improve greatly following construction. Planting at the Dunn Creek sites with native vegetation would provide shading that functions as a thermal refuge during warm summer days as well as providing a source of organic input for the food chain and insect drop as a direct source of food.

3. Other wildlife [230.32]

Birds and other wildlife may be temporarily displaced during construction due to noise and presence of construction vehicles. Because these impacts would only occur during the period of construction, and no tree removal is proposed as part of this project, they are

expected to be inconsequential and temporary. Planting native trees and shrubs along the the two Dunn Creek sites would increase the extent and species diversity on the site and create additional opportunities for foraging, nesting, cover, and refuge for a wide variety of species.

Potential Impacts on Special Aquatic Sites [Subpart E]:

1. **Sanctuaries and refuges [230.40]**
   Not applicable. The project site is not designated by local, state or federal regulations to be managed principally for the preservation and use of fish and wildlife resources.
2. **Wetlands [230.41]**
   At the Dunn Creek Spit Instream Habitat Enhancement and bank stabilization sites, minimal effects to wetlands would occur. Approximately 0.5 acre of wetlands would be disturbed due to the construction activities; however the wetland area would be replanted with native vegetation, cottonwoods and willows. The overall wetland function would not be reduced upon completion of the project. Since there are no wetlands at the Mid-Channel Bar Boulder Placement site, no impacts to wetlands would occur.
3. **Mud flats [230.42]**

   Not applicable. There are no mudflats present.
4. **Vegetated shallows [230.43]**
   Not applicable because there are no vegetated shallows present.
5. **Coral reefs [230.44**]
   Not applicable.
6. **Riffle and pool complexes [230.45]**
   Not applicable because there are no riffle/pools present.

Potential Effects on Human Use Characteristics [Subpart F]:

1. **Municipal and private water supplies [230.50]**
   The project would not impact water supply or other public utilities.
2. **Recreational and commercial fisheries [230.51]**
   There are no known commercial fisheries at or near the project area. Recreational fishing does occur in the Kootenai River at the project site. The project is expected to increase in-channel habitat for fish in this reach. Therefore the proposed project should improve recreational and tribal fishing opportunities in the long run. The Corps would coordinate with the Confederated Salish and Kootenai Tribes prior to construction to ensure that construction activities are coordinated with the tribe and impacts to tribal fishing are avoided and minimized.
3. **Water-related recreation [230.53]**

The construction of the project would temporarily impact the Dunn Creek boat ramp, however the project features would likely result in increased interest in the site long-term. Signage would be placed along the shore alerting boaters to the boulders at mid-channel bar site.

4. **Aesthetics [230.53]**
   The aesthetic values within the project reach are generally high. No change is anticipated to aesthetics in the long-term. During construction of the project, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb recreational users. However, these impacts would be temporary and highly localized, and are not expected to result in significant impacts.

5. **Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves [230.54]**
   The project is within the Corps Libby Dam Recreation area, however no impacts would occur to any monuments or areas of significance.

Evaluation and Testing [Subpart G]:

1. **General evaluation of dredged or fill material [230.60]**
   All imported material would be free from contamination.
2. **Chemical, biological, and physical evaluation and testing [230.61]**
   Water quality sampling for turbidity would be conducted according to the protocol required in the water quality certification from the Montana Department of Environmental Quality. Construction could be halted if deemed necessary under the water quality sampling plan in compliance with the water quality standards.

Actions to Minimize Adverse Effects [Subpart H]:

1. **Actions concerning the location of the discharge [230.70]**
   Discharge would be at channel bottom below the ordinary high-water mark. It would utilize methods that minimize the likelihood of turbidity increases in the Kootenai River during construction and comply with all permit protocols and restrictions.
2. **Actions concerning the material to be discharged [230.71]**
   Material to be placed in the project area consists of boulders, ELJ's and LWD for bank stabilization.
3. **Actions controlling the material after discharge [230.72]**
   There would be short-term turbidity during in-water excavation and installation of ELJ's.

BMP's would be implemented to minimize impacts.

4. **Actions affecting the method of dispersion [230.73]**
   See above.
5. **Actions related to technology [230.74]**
   No technologies would be used to construct this site.
6. **Actions affecting plant and animal populations [230.75]**
   The Corps would coordinate construction activities with local Native American Tribes and state and Federal resource agencies to ensure that minimal impacts to fishery and wildlife resources would occur. The in-water portions of project construction would take place during low flow conditions to avoid impacts to fish. A Corps biologist would check for perched bald eagles before construction begins to avoid and minimize disturbance due to large machinery. Work would be delayed if it appears that there would be a disturbance to eagles.
7. **Actions affecting human use [230.76]**
   Recreation would be temporarily impacted by traffic along the roads surrounding the project site and the Dunn Creek boat ramp.
8. **Other actions [230.77]**
   Best management practices would be used to ensure that impacts are minimized during construction.

General Policies for Evaluating Permit Applications [33 CFR §320.4]

1. **Public Interest Review [320.4(a)]**
   The Corps finds this ecosystem restoration action to be in compliance with the 404(b)(1) guidelines and not contrary to public interest.
2. **Effects on wetlands [320.4(b)]**
   At the Dunn Creek Spit Instream Habitat Enhancement and bank stabilization sites, minimal effects to wetlands would occur. This site would be disturbed due to the construction activities; however the wetland area would be replanted with native vegetation, cottonwoods and willows. The overall wetland function would not be reduced upon completion of the project. Since there are no wetlands at the Mid-Channel Bar Boulder Placement site, no impacts to wetlands would occur.
3. **Fish and wildlife [320.4(c)]**
   The Corps consulted extensively with state and federal resource agencies, tribes and other interested members of the public on this action. The Corps has determined that the proposed project "may affect, not likely to adversely affect" bull trout and critical habitat located in the project area. This determination was submitted to the U.S. Fish and Wildlife Service on 25 March 2015. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, and Spalding's catchfly, or their designated critical habitats. USFWS concurred

with the Corps' determination on 8 May 2015.

4. **Water quality [320.4(d)]**
   The Corps concluded that this project is functionally analogous to the parameters of Nationwide Permit (NWP) 27. However, the State has denied the water quality certification for NWP 27, therefore an individual water quality certification would be obtained for this project.

5. **Historic, cultural, scenic, and recreational values [320.4(e)]**
   The bank stabilization at Site 3 is critical to the protection of sensitive resources.

6. **Effects on limits of the Territorial Sea [320.4(f)]**

   Not applicable, since the project would not occur in coastal waters.

7. **Consideration of property ownership [320.4(g)]**
   The projects are on Corps owned land.

8. **Activities affecting coastal zones [320.4(h)]**
   The proposed project is not in a coastal county and the Corps has concluded that the proposed project would not have any impacts to coastal uses or resources.

9. **Activities in marine sanctuaries [320.4(i)]**
   Not applicable, since the area is not a marine sanctuary.

10. **Other federal, state, or local requirements [320.4(j)]**
    The Corps has determined that the proposed project "may affect, not likely to adversely affect" bull trout and critical habitat located in the project area. This determination was submitted to the U.S. Fish and Wildlife Service on 25 March 2015. The project would have no effect on white sturgeon, grizzly bear, Canada lynx, and Spalding's catchfly, or their designated critical habitats.

11. **Safety of impoundment structures [320.(k)]**
    Not applicable, since an impoundment structure is not being built.

12. **Water supply and conservation [320.4(m)]**
    No impacts to water supply are anticipated.

13. **Energy conservation and development [320.4(n)]**
    Not applicable.

14. **Navigation [320.4(o)]**
    Not applicable because the Kootenai River is not considered navigable water at this river mile.

15. **Environmental benefits [320.4(p)]**
    ELJ's, boulders and native plantings would increase the amount of available cover, complexity, spawning substrate and macroinvertebrate habitat within the project reach. Increased native vegetation and the introduction of ELJ and boulders into the channel would provide additional high quality habitat to a variety of fish species.

16. **Economics [320.4(q)]**

No impacts to economics are anticipated.

17. Mitigation [320.4(r)]

No direct mitigation measures are planned other than incorporating native plantings into the two sites at Dunn Creek to enhance habitat. There may be a temporal lag of one year while the vegetation becomes established in disturbed areas. Long-term impacts associated with Kootenai River Project are expected to include beneficial effects on aquatic habitat and water quality which would offset the short-term construction related impacts. The establishment of aquatic and riparian habitats and habitat complexity needed in this area will benefit wildlife, fish, and water quality.

Appendix E-2: Section 401 Water Quality Certification

DEQ
Montana Department
of Environmental Quality

June 22, 2015

Hannah Hadley
US Army Corps of Engineers
PO Box 3755
Seattle, WA 98134

Re: Final 401 Water Quality Certification with Conditions
Applicant: US Army Corps of Engineers
Waterway: Kootenai River and Dunn Creek, Lincoln County, MT

Dear Ms. Hadley:

The Montana Department of Environmental Quality (DEQ) reviewed your application for 401 Water Quality Certification that was received on April 29, 2015. The following outlines the proposed project and DEQ's **final determination**:

Description of the Proposed Project:
The Kootenai River project consists of three projects:

1. Dunn Creek Spit Instream Habitat Enhancement – Construct 3 engineered log jams along the gravel bar at the confluence of Dunn Creek and Kootenai River
2. Mid-Channel Bar Boulder Placement – Place approximately 30 boulders across the top of an existing mid-channel bar
3. Dunn Creek Bank Stabilization – Place fill material along approximately 450 linear feet of bank on lower Dunn Creek

Beneficial Use Designations:
Kootenai River (MT76D001_010) and Dunn Creek are classified as B-1 (ARM 17.30.623) waters and are to be maintained suitable for drinking, culinary, and food processing purposes, after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply.

In addition, ARM 17.30.623 details the specific narrative water quality standards for B-1 waters including:

"No increases are allowed above naturally occurring concentrations of sediment or suspended sediment, settleable solids, oils, or floating solids which will or are likely to create a nuisance or render the waters harmful, detrimental, or injurious to public health, recreation, safety, welfare, livestock, wild animals, birds, fish, or other wildlife."

Steve Bullock, Governor I Tom Livers, Director I P.O. Box 200901 I Helena, MT 59620-0901 I (406) 444-2544 I www.deq.mt.gov

Status of Affected Waters:
Kootenai River is listed as not supporting aquatic life for other flow regime alterations and temperature. Dunn Creek has not been assessed.

401 Water Quality Certification General:
Section 401 of the Federal Clean Water Act provides DEQ the jurisdiction to implement the Montana Water Quality 401 Certification. 401 Certification is a federal/state cooperative program that increases the role of the state in decisions regarding the protection of natural resources. The program gives the state authority to review proposed activities affecting state waters and deny or place conditions on federal permits or licenses that authorize if the proposed may violate state water quality standards. State water quality standards were adopted to protect, maintain, and improve the quality of water, including uses for public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation, and other beneficial uses.

State water quality standards include the beneficial uses of a water body, the numeric and narrative water quality criteria that are necessary to protect the uses of the water body and a nondegradation policy. In the event beneficial uses, such as aquatic habitat or aquatic life are unavoidably impacted or lost, conditions of the 401 certification may require the applicant to provide compensatory mitigation for the impacts or losses.

401 Water Quality Certification - Project Specific Conditions:

Construction Conditions:

1. Construction Timing: All in-channel and wetland work shall occur during periods of low flow or in the dry.
2. Minimize Water Quality Impacts: All work in and near waters of the state shall be done so as to minimize turbidity, erosion, and other water quality impacts. All disturbed areas on the streambank and adjacent areas created by the construction activity shall be protected with temporary erosion control during construction activities. These areas shall be reclaimed with appropriate erosion control measures and revegetated to provide long-term erosion control. Construction stormwater, sediment, and erosion control Best Management Practices (BMPs) suitable to prevent exceedances of state water quality standards from temporary erosion associated with construction activities shall be in place before clearing, filling, and grading work and shall be maintained throughout construction. Examples of erosion and sediment control BMPs can be found here: http://www.mdt.mt.gov/research/projects/env/erosion.shtml
3. Machinery in Watercourse: To the maximum extent practical, the use of machinery in the watercourse shall be avoided unless absolutely necessary.
4. Mark Construction Areas: The project shall be clearly marked/staked prior to construction. Clearing limits, travel corridors and stockpile sites shall be clearly marked. Sensitive areas and buffers that are to be protected from disturbance shall be marked so as to be clearly visible to equipment operators. Equipment shall enter and operate within the marked clearing limits corridors and stockpile areas.
5. Stockpiling: No construction materials shall be stockpiled in the floodplain for longer than needed during the installation period.
6. Excavation: Excavated material will be placed so that it is isolated from the stream edge and not placed where it could re-enter waters of the state uncontrolled.

7. Deleterious Waste Materials: All construction debris, excess sediment, oil or petroleum products, and hazardous, toxic, and/or deleterious materials shall not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of waters of the State or be placed where it may be washed from the project site by rainfall or runoff into waters of the State. Waste materials shall not be stockpiled below the Ordinary High Water Mark (OHWM) and shall be properly managed and disposed of in an upland disposal site approved by the appropriate regulatory authority.
8. Spill Prevention: Vehicles must be fueled, operated, maintained, and stored in upland areas that minimize disturbance to habitat and prevent contamination to any surface water.
    a. No petroleum products, fresh concrete, lime, wash water, chemicals, or other toxic or harmful materials shall be allowed to enter state waters.
    b. All equipment is to be inspected for oil, gas, diesel, antifreeze, hydraulic fluid and other petroleum leaks. All such leaks will be properly repaired and equipment cleaned prior to being brought on site. The equipment is not allowed to continue operating upon discovery of the leak and will be removed from the project area until it is repaired.
9. Washing Vehicles: A separate contained area for washing down vehicles and equipment shall be established that does not have any possibility of draining to surface waters and wetlands. No wash water containing sediments, oils, grease, or other hazardous materials resulting from wash down of the work area, tools, and equipment shall be discharged into state waters.
10. Unauthorized Discharge to State Water: If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any water quality problem arises, the associated project activities shall cease immediately until adequate BMPs are implemented. DEQ shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.
11. Track-Out BMPs: Appropriate BMPs shall be implemented to minimize track-out during construction.

Vegetation Protection Conditions:

1. Minimize Disturbance: Disturbance of wetland and riparian vegetation shall be kept to a minimum.
2. Revegetating Impacted Riparian and Wetland Areas: Riparian weed management and native vegetation reestablishment shall be regarded as a high priority.
    a. A revegetation plan for the disturbed wetland area impacted by the Dunn Creek Spit Instream Habitat Enhancement and Bank Stabilization projects shall be submitted and approved by DEQ within 30 days of 401 certification issuance. The plan should also address monitoring and a performance requirements.
    b. Logs or LWD used in the construction of the ELJs shall be free of weed seeds.
    c. Control of invasive weeds on disturbance areas shall be with herbicides rated for safety near aquatic areas.
3. Revegetating Disturbed Areas: All disturbed areas shall be revegetated with salvaged sod and re-seeded with non-invasive native wetland, riparian, or upland species seed mix or plants. Certified weed free straw mulch shall be used to control erosion in areas of disturbance.

Water Quality Monitoring and Reporting Conditions:

1. Turbidity Monitoring: During project construction, the Applicant or their Contractor shall monitor and record turbidity each day when in-water work is being conducted to ensure there are no water quality turbidity exceedances.
    a. The applicants must submit a turbidity monitoring/sampling plan to DEQ within 30 days from 401 certification issuance and the plan must include frequency and sampling locations that are approved by DEQ, and calibration requirements for a turbidimeter. At a minimum, a measurement must be taken every four hours when there will be in-water construction work.
        i. The representative background point will be monitored and recorded at a relatively undisturbed area approximately 100 feet upcurrent from the in-water disturbance to establish background turbidity levels for each monitoring cycle. Background turbidity, location, date, and time must be recorded for each observation prior to monitoring downstream.
        ii. The compliance point will be monitored and recorded the project area that is at a location distance from the project area of ten times the wetted stream width. The compliance point turbidity, location, date, and time must be recorded for each observation.
    b. Results from the compliance points must be compared to the background levels taken during each monitoring interval. The allowable water quality exceedance level for turbidity is ≤5 NTU. If the difference between the compliance point and background level is >5 NTU, the Applicant or their Contractor must modify the BMPs and continue to monitor every 4hours. If turbidity levels are not in exceedance after the 2nd monitoring interval (4 hours from observed exceedance), work may continue with appropriate monitoring. If the second monitoring interval (4 hours from observed exceedance) is still >5 NTU, then work must stop until turbidity levels return to background and Applicant or their Contractor shall notify DEQ of the exceedances.
    c. The applicant must make available copies of daily logs for turbidity monitoring to DEQ upon request. The log must include calibration documentation (if using an instrument); background nephelometric turbidity units or observation; compliance point NTUs or observation; comparison of the points in NTUs or narrative; and the location, date; and time for each reading. Additionally, a narrative must be prepared discussing all exceedances with subsequent monitoring, actions taken, and the effectiveness of the actions.
2. Engineered Log Jam Monitoring: Monitoring shall be conducted during or following high-water events to ensure the Dunn Creek Spit Instream Habitat Enhancement project is functioning as intended. At a minimum, large woody debris placements shall be monitored during and/or after two-year flow events for a minimum of five years following project completion to ensure the integrity of the anchors. If individual pieces have moved or become loose, they should be re-anchored. Objectives of monitoring include:
    - evaluating the structural integrity of installed structures;
    - evaluating structures relative to objectives of fish habitat;
    - measuring and surveying (topographically and photographically) any changes to banks and bed of stream; and
    - measuring hydraulic and hydrologic impacts of the project.

Public Safety Conditions:

1. Engineered Log Jam Safety: The Applicant shall complete the Washington Department of Natural Resources Public Safety Checklist for Woody Debris Projects (revised July 23, 2013) to detail the mitigation measures and obtain DEQ approval of required actions within 30 days from 401 certification issuance. http://www.dnr.wa.gov/Publications/aqr_safety_checklist_lwd.docx

2. Warning Signs: Warning signs for public safety shall be required at the Mid-Channel Bar Boulder Placement site.

Timing Requirement Conditions:

1. This certification is valid for two years from 401 certification issuance.

DEQ certifies that this project in its current form and conditions will not violate water quality standards. Certification of this proposal does not authorize the Applicant to exceed applicable state water quality standards.

Please contact Water Protection Bureau Staff at (406) 444-3080, if you have questions.

Sincerely,

Jon Kenning
Bureau Chief
Water Protection Bureau
Department of Environmental Quality

cc: Joshua Baltz – USACE
Todd Tillinger – USACE
Christina Schroeder – USACE
Becky Limhe – Lincoln Conservation District
Mike Hensler – Montana Fish Wildlife and Parks

Appendix F: Public Comment Letters

Comment Letter – Travis Lee

From: Travis Lee
To: Hadley, Hannah F NWS
Subject: [EXTERNAL] Kootenai project comment
Date: Saturday, May 02, 2015 10:38:29 AM

I am in favor of the multi-phase project that has been planned for the upper Kootenai River. It has been a long time coming for a project such as this. Habitat enhancement is much needed as there is little to no natural features in the streambed. Woody debris provides cover for fish and a place for bugs to live and grow. this fishery has been steadily getting better the last 3-5 years and this will give it the boost it needs for truly great fishing. This plan is top-notch and I would like to see it come to fruition. Let the work begin!! Thank you Travis Lee 1

Sent from Windows Mail

Response to Comment 1:

Comment noted.

Comment Letter – Montana Fish, Wildlife & Parks

Mike E. Hensler MFWP
385 Fish Hatchery RD
Libby, MT 59923
(406) 293-4161
FAX 293-2235
mhensler@mt.gov
Ref: MH32.15
Date: 32.15

hannah.f.hadley@usace.army.mil

SUBJECT: Kootenai River Project

Ms. Hadley;

Thank you for the opportunity to comment on the Kootenai River project. My comments will be for the Dunn Creek bank stabilization, Site 2 (the Dunn Creek split instream habitat enhancement project) and Site 4 (The mid-channel bar site plan). Montana Fish, Wildlife & Parks applauds the US Army Corps of Engineers' (ACOE) concept to improve habitat conditions downstream of Libby Dam, especially the establishment of large woody debris (LWD) that no longer recruits to that portion of the river and have heard that other projects may be initiated in the future.

Montana Fish, Wildlife & Parks (MFWP) Fisheries personnel monitor that portion of Kootenai River (among others) for population trends. Currently, the Dam to Fisher section has the highest densities of rainbow trout and bull trout compared to all other estimate sections (can provide you with information if necessary); influences from dam operations (kokanee entrainment, etc) and complex habitat in the form of riffles/runs/pools and large boulders likely have led to the relatively high population numbers of all size classes to very large rainbow trout. Therefore adding structures in the form of LWD and/or boulders to improve habitat should serve to improve/increase trout numbers and size structure and not merely shift trout use. Additionally, the large rainbow trout population is considered genetically unique (reference if necessary) from the downstream population and care should be taken to insure that project structures do not interfere with the limited spawning habitat that exists in this section of river. When thinking about placement of structures for habitat and excellent site to review for context is the log island upstream of Osprey Landing. It is most visible and low flows but creates high quality habitat/cover (as seen during electrofishing surveys) upstream, downstream and adjacent to the structure, it maintains its complex overhead cover at all flows (contact me if you would like to visit the site). It is a wonderful example of how LWD can create and maintain quality holding cover; we have captured rainbow and cutthroat trout and bull trout in and around this structure. 1

That said; I have comments specific to each of the chosen sites:

3.2.1.1 Site 1: Mid-channel bar boulder placement.

- Not a lot of information given about this particular project; though I understand it is an attempt to decrease through shear the amount of *Didymosphenia geminata* in that area of the Kootenai River. 2
- I have seen projects where boulders placed like this have sunk into the surrounding gravels; did COE accomplish any coring to determine the depth of the gravels? Should that be a concern? 3
- The boulders are shown as placed very regularly in a pattern that would be close to parallel to low flow vectors and slightly skewed to high flows. Is there a reason for this as opposed to random or some other pattern? 4
- What is the reason for rocks as opposed to LWD in combination with boulders? 5
- Boulders slightly submerged during high flows may be a boating hazard. 6
- This site appears to have very similar conditions to the LWD Island near Osprey Landing. 7

3.2.2 Bank Stabilization

- From the letter to Mark Baumler, Ph.D. dated Oct 6, 2014 states "… The current stabilization effort is proposed just south of the newly delineated site boundary. Stabilization efforts at this location essentially prevent the river from continuing to erode the bank before it reaches the archaeological site. The purpose of the stabilization project is to provide a long term, durable minimal-maintenance solution that curtails incremental erosion and prevents catastrophic losses of an eligible cultural site…" 8
- I could not find in the information in the EA that shows the extent of the erosion at Dunn Creek since the construction of Libby Dam. My impression is that it is a pretty slow process that has likely decreased since dam construction. The high powerhouse flows of 25 – 27 kcfs appear to affect only the toe of the slope. 9
- If the erosion is mostly in the form of calving and a slow but steady process, it seems that the proposed hard engineered riprap fix for the site is overkill and an unnecessary step to protect an archaeological site. Softer engineering like sloping the banks as proposed, laying a soil stabilizing carpet and planting native riparian/upland species would be less expensive and could be equally effective. 10
- I am not familiar with the technique of placing root wad clusters perpendicular to flow, though it has been my experience that perpendicular logs form less potential habitat than those angled upstream to flow. 11
- What is the significance of root wads placed at OHW and is that the OHW for Dunn Creek or Kootenai River? 12
- It has been my experience that root wads placed above scour depth not only do not decrease erosive forces but may actually increase erosion by forming complex flow vectors upstream/downstream/above and below the structure as ACOE has suggested for the 3.2.1.2 project. If they are placed within a rock-contained pool, they will not likely lead to high quality habitat for trout. 13

3.2.1.2 Site 2: Dunn Creek Spit instream habitat enhancement.

- This is the most complicated structure of the three proposals. The document states that the site was chosen due to "…a desire to maximize the amount of flow that impinges in the logjams to create large permanent pools along the left bank upstream of the boat launch". 14
- This is one of the highest velocity areas in the Kootenai River downstream of Libby Dam and the flow vectors are not consistent with Dam releases. The flow vector inconsistencies may cause some highly erosive forces to the stream bank between the structures. 15
- It is well known that there is no recruitment of gravels to the Kootenai River downstream of Libby Dam; any substantial substrate movement is minimal unless flow releases substantially exceed full powerhouse capacity, so it is very likely that the structures proposed will maintain pools. I did not find (though it may be there) in the document where ACOE identified the shear stress necessary to maintain pools created by a formidable woody debris jam (FWDJ) similar to those proposed. With this information ACOE might find that a FWDJ could be placed in any number of lower flow areas that have less potential for failure. 16
- With higher velocity flows, the structures might in fact create deeper pools than those proposed to be constructed (see above). If Maximum scour depth is not accurately measured and integrated into the structure, debris jams can scour much deeper than expected and undermine the integrity of the structure. 17
- Rainbow trout are more likely to use relatively lower flow at LWD interface than relatively high flow at LWD interface (referenced above). The proposed structures should be considered high flow at LWD interface. 18
- Rainbow trout have spawned regularly in the immediate area of the uppermost structure. 19

Finally, it has been stated in public forums that MFWP is a partner/cooperator in this project. That is not a true statement; in fact I have not been contacted since the original on-site more than a year ago which was to view proposed sites that are not in this EA. Unless otherwise stated, it is my responsibility with MFWP, in consultation with others, to review stream projects (private or public) in the Kootenai River drainage. 20

Thank you again for the opportunity to comment on this EA and please contact me if you have any questions.

Sincerely,
Mike E. Hensler
Fisheries Management Biologist

/meh

Response to Comment 1:

The intent of the project is not to shift trout use, it is primarily to provide cover for the existing population in a reach of the river that is currently devoid of aforementioned LWD, and to increase habitat for primary and secondary food production for trout and other species. We have consulted with several individuals, including FWP staff, regarding rainbow trout spawning in the area. Although the upstream structure is near known redd locations, area biologists (dam staff, MT FWP staff) have determined that the project is not expected to prevent or preclude spawning activity once installed.

Response to Comment 2:

The primary intent of the Mid-Channel Bar Boulder project is not to decrease through shear the amount of *Didymosphenia geminata* in that area of the Kootenai River. The intent related to Didymo is to create areas of velocity that prevents Didymo infestation locally, not to remove it via shear. We have removed much of the Didymo language from our documents to clarify this intent.

Response to Comment 3:

Coring was not completed. Scour calculations were used to design the project. The calculations predict a maximum scour of 1/2 to 2/3 boulder height. Boulders are 4 to 6 ft in width. Settling into gravels will not be problematic and the boulders are expected to continue to function and provide the desired habitat. Adaptive management can be used to reconfigure boulders, if needed.

Response to Comment 4:

The pattern shown reflects the minimum spacing. The intent is to walk the site prior to boulder placement with the project fishery biologist and hydraulic engineers and locate boulders in a random pattern ensuring that the minimum spacing shown in the plans is observed.

Response to Comment 5:

The intent of this project is to add hydraulic complexity to the gravel bar. Through adaptive management, LWD could be added to the gravel bar in the future.

Response to Comment 6:

As mentioned in Section 3.2.1.1 of the Final Environmental Assessment, signs would be placed to alert boaters of the presence of the boulders.

Response to Comment 7:

The Corps is in the beginning phases of planning future projects to enhance and create in other similar areas. One possible site for an apex log jam similar to conditions at Osprey Landing is Moonshine Island which the Corps has identified for a potential future project.

Response to Comment 8:

Comment noted.

Response to Comment 9:

The condition of the Dunn Creek site before Libby Dam and the current rate of erosion are unknown. Based on the lack of bank vegetation and woody plant recruitment the erosion is still active, though is likely a slow process. High powerhouse flows affect the toe up to ordinary high water (OHW). The proposed action includes rock protection up to this elevation to protect against toe erosion, while a softer bioengineering approach is used for the upper bank.

Response to Comment 10:

The erosion is caused by scour of the toe which results in an over steepened bank and subsequential loss of the upper bank material. It is critical to stabilize the toe with a long term solution for a successful project. The rock is designed to be placed only where needed at the toe below OHW, while the upper bank is stabilized by softer engineering methods such as sloping the bank and planting grasses and native vegetation.

Response to Comment 11:

The design is based on the roughened rock toe design found in the Integrated Streambank Protection Guidelines available here: http://wdfw.wa.gov/publications/00046/wdfw00046.pdf.

Response to Comment 12:

Root wads were designed to be placed at OHW and ordinary low water to provide some variation in the design and areas of increased roughness at a variety of flows. The design OHW is controlled by backwater from the Kootenai River at the project location.

Response to Comment 13:

The root wads are designed to be roughening features. They slow velocities near the bank and keep the higher more erosive velocities pushed out further into the channel. Although they would create some localized scour on a natural bank this is not expected to damage the rock armored toe in the current design. The lower root wads are designed with preformed scour holes. These scour holes would have rock erosion protection on the bank side sloping down to the invert, and natural stream bed material on the creek side. It can be expected that these scour holes would stay scoured during high flows and may partially fill in with the natural sediment supplied from Dunn Creek on the receding side of a hydrograph.

Response to Comment 14:

Comment noted.

Response to Comment 15:

Erosion along the bar between the structures is unlikely due to the eddies and structures deflecting the currents off the bankline. If erosion occurs it will not be problematic as the structures are designed to resist the full force of the river under flood flows independent of each other.

Response to Comment 16:

This site was selected collaboratively by the Corps, River Design Group, Trout Unlimited and other stakeholders. The Corps agrees that clear water conditions will facilitate scour and that wood structures could successfully maintain pools at many locations along the river. Bed scour depths are determined from scour equations such as Froehlich's Abutment Scour equation. For practical reasons and expectations that the scour predictions are conservative given the bed materials, the Corps assumes that maximum scour at this site will not exceed 10 feet in depth. The project is designed to withstand this conservative estimate.

Response to Comment 17:

If scour is deeper than expected the structure will self settle as it has 450 cubic yards of imported and native streambed cobble pushing the wood down, and approximately 24 very large boulders in the core of the jams attached to wood that would also settle. The design safety factor is 2, which should be adequate to address unexpected scour. Based on the Corps' experience, pre-forming the pool, and using large mats of debris in front of the structure tied back in the core of the structure, the flow energy that creates or maintains the pool does not undercut the structural core of the jam.

Response to Comment 18:

Please see Response to Comment 1.

Response to Comment 19:

Please see Response to Comment 1.

Response to Comment 20:

The Corps has coordinated with biologists and technicians with MT FWP throughout the project's planning process, including site visits. In addition, the Corps had been working with MT FWP Mitigation staff and Kootenai Tribe of Idaho regarding the riparian plantings for this project.