



PONDERAY UNDERCROSSING TECHNICAL ANALYSIS FEASEILTY STUDY REPORT

PONDERAY, IDAHO

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Executive Summary

The Pend d'Oreille Bay Trail (POBT) is a scenic pathway that connects three communities along the shoreline of Lake Pend Oreille (Figure 1). Due to the location of the Burlington Northern Santa Fe Railway Company and the Montana Rail Link Railroad mainline tracks on the west shoreline, direct pedestrian access is prevented from the City of Ponderay to the POBT. Previous studies have indicated that providing vehicular and pedestrian access to the POBT could be a potential economic benefit to the municipal area. As a result, the Idaho Department of Environmental Quality and the Friends of the Pend d'Oreille Bay Trail has retained AECOM to conduct a technical analysis for improved access from Ponderay, Idaho to the west shore of Lake Pend Oreille, a popular recreation destination for the bordering communities of Sandpoint, Ponderay, and Kootenai, Idaho.

This report contains the results of a preliminary engineering technical study that has been conducted for a shared use path to cross under the BNSF railroad tracks between SH-200 and the Pend d'Oreille Bay Trail. The primary goal of this study is to present the findings for the feasibility of constructing a path that crosses beneath the BNSF tracks and present preliminary cost estimates for the design and construction activities. This information is to assist with the preparation of an application for TIGER grant funding.

As a result of studying three alternatives with different bridge configurations, the estimated project costs ranged from \$6,574,657 to \$9,876,435. These costs include contingencies, and design and construction fees.

1 Introduction

AECOM was retained by the Idaho Department of Environmental Quality (IDEQ) and the Friends of the Pend d'Oreille Bay Trail to conduct a feasibility study for improved access from Ponderay, Idaho to the west shoreline of Lake Pend Oreille, a popular recreation destination for the bordering communities of Sandpoint, Ponderay, and Kootenai, Idaho (Figure 1). Currently, the Pend d'Oreille Bay Trail (POBT), which follows 1.4 miles of shoreline between the three communities, is not accessible from the City of Ponderay due to the presence of railroad tracks operated by the Burlington Northern Santa Fe Railway Company (BNSF) and the Montana Rail Link (MRL) Railroad, located between the City of Ponderay and the POBT. Providing a safe and authorized connection between the City of Ponderay and the POBT has been identified as a high priority for this area (Harmony, 2015). Connectivity between the City of Ponderay and the POBT has also been identified as a potential economic benefit for the municipal area (Harmony, 2015).

Previous studies have been done to support a new crossing to connect SH-200 and the POBT. In 2012, a concept study was completed for several proposed crossing locations of the BNSF railroad tracks near an existing gully to the east of Oak Avenue which is approximately 1000 feet north of the Harbison property. The 2012 concept study concluded that the most cost-effective crossing of the tracks would be an undercrossing and, due to its location, only required a small amount of roadway/pathway construction. This study also introduces a need to reconstruct Railroad Avenue due to the lowering that is needed to cross beneath the BNSF. In 2015, a land capability summary report was developed to evaluate the feasibility of two potential railroad crossing locations and future pending development of the area below the railroad grade near Brownfields Zones 4 and 5. The land capability summary report documented existing geotechnical and environmental data collected for use in the technical feasibility analysis of potential railroad crossing options for this project.

This purpose of this study is to investigate the feasibility of constructing an undercrossing at two locations shown in Figure 3. Location A is to have access from SH-200 across the Harbison Property. This crossing location would provide for a shared access roadway to be utilized by vehicles, bicycles, and pedestrians.

A second location near Oak Avenue, Location B, was to be analyzed for the construction of a pedestrian and bicycle access only. However this location eliminated from further consideration due to potential impacts to residential properties and unstable soil conditions in and around the gully.

2 Design Criteria and Considerations

The following documents were used as a basis for the design criteria in this feasibility report:

- Roadway Design: *A Policy on Geometric Design of Highways and Streets*, 6th Ed., AASHTO, 2011.
- *Americans with Disabilities Act (ADA) of 1990*, Pub. L. No. 101-336, 104 Stat. 328, 1990.
- Railroad Structure Design: *Manual for Railway Engineering*, AREMA, 2014.
- Highway Structure Design: *LRFD Bridge Design Specifications*, 7th Ed., AASHTO, 2014.
- AECOM. 2015. *Ponderay Undercrossing Technical Analysis Land Capability Summary Report*. Prepared for the Idaho Department of Environmental Quality and The Trust for Public Land. September 2015.

2.1 Roadway Design Criteria

- Design speed is 15 mph.
- To comply with the Americans with Disabilities Act (ADA), grades on sidewalks and bike paths cannot exceed 5-percent without landings or 8.33-percent with landings.
- Maximum roadway grade is 5-percent.
- Minimum pathway width for the bicycle trail is 10 feet.
- Minimum lane width for vehicle access is 12 feet, measured to the face of curb.
- Access for emergency vehicles requires a minimum 14 feet high by 12 feet wide opening.

2.2 Railroad Design Criteria

- BNSF Railway owns a 400 feet right-of-way through the vicinity of the project and leases the westerly 375 feet to Montana Rail Link (MRL). Consultation with MRL has indicated the following requirements which will need to be confirmed during final design:
 - *Future Build-Out:* Provide one main line track (existing), two controlled siding tracks (one existing and one future), and one House Track (existing).
 - *During Construction:* Provide one main line track and one siding track.
 - *Access Road:* Railroad Avenue on the west side of the project will serve as the access road and a separate access road on the bridge will not be required.
- Minimum vertical clearances for underpass structures (roads under railway):

Structure Type	Required Vertical Clearance
Steel Superstructure	16'-6"
Concrete Superstructure	17'-6"

- Requirements for overpass structures (highways over railway):
 - *Vertical Clearance:* Minimum vertical clearance is 23'-6".
 - *Lateral Clearance:* Minimum lateral clearance from track centerlines of 12 feet (with crash protection) but preferably 25 feet to obstructions, such as piers or abutments.
 - *Pier and Abutment Placement:* Prefer to locate abutments and approach embankments outside the railroad right-of-way. If not possible, new bridge structure must accommodate future tracks.

2.3 Path/Road Typical Section

Options for path width and configuration were presented and discussed. The following is a summary of the discussion:

1. Typical Section Width General Discussion:
 - a. The design speed is to be 15 mph.

- b. The theme of the typical section is “narrower is better.” Narrow path widths will promote low speeds.
 - c. Roadway standards are to be based on the City of Ponderay Standards. The Independent Highway District function for the City streets is limited to maintenance activities.
 - d. The City is currently developing their standard typical sections, the sections developed for this project will be incorporated into their standards.
 - e. The City’s vision for this project is to develop a roadway that is one paved surface that is for shared use by vehicles, bicycles, and pedestrians. The City’s vision for a typical section at Location A would be two 12 foot wide lanes for shared use. Pedestrian safety is important, so the group discussed the need for a sidewalk.
 - f. Surface drainage will need to be accommodated in a curb or swale alongside the paved path.
2. Two sections were settled on to be used for the study and alternative development and are shown in Figure 4. These typical sections will accomplish the City’s desire for a narrow shared use path while providing safety for pedestrians by providing a sidewalk.
 - a. Option 1 is a 32 foot wide section consisting of two 12-foot lanes to be used by vehicles and bicycles with an 8’ wide sidewalk on one side only for pedestrians. Curb and gutter will be used to convey surface drainage. The measurement for the lane width is to the face of curb.
 - b. Option 2 is a 43 foot wide section with two 12-foot lanes, a 5 foot sidewalk and 4 foot bike lane on one side, and a 10 foot path on the other side.
 3. The pedestrian only typical section (one option for Location A) will consist of a 12 foot wide path with shy distance and room for surface drainage curbs or swales.

3 Alternatives Considered

In accordance with the Scope of Work, the feasibility study was based upon evaluating three alternatives:

- Alternative 1: Vehicle/Pedestrian and emergency vehicles crossing at Location A;
- Alternative 2: Pedestrian crossing only at Location A;
- Alternative 3: Vehicle/Pedestrian crossing at Location A and a pedestrian only crossing at Location B. The pedestrian only crossing at Location B was eliminated from further consideration. See Section 3.2 for a more in-depth discussion.

Background and conceptual design information can be found in the *Ponderay Undercrossing Technical Analysis Land Capability Summary Report (2015)*.

3.1 Alternative 1: Vehicle/Pedestrian and emergency vehicles crossing at Location A

Location A will provide access to the Pend d’Oreille Bay Trail via a new shared use path from SH-200 across the Harbison property. This location provides the main access to the Pend d’Oreille Bay Trail and will function as access to future development along the lake shore.

The alignment for the road is based upon placing the centerline of the road on the southern property line of the Hoot Owl Café at SH-200, and running perpendicular to SH-200 towards the BNSF railroad tracks. The

path/road proceeds toward the lake at a minimum grade of 0.5% which steepens to a maximum of a 5% grade to lower the grade to cross beneath the railroad tracks. The grade through the undercrossing structure flattens out to minimize the height difference of either side of the structure. The grade to the circular drop off area adjacent to the lake has been set to a maximum of 2% to 3% to reduce sliding in winter conditions. With the flat grades across the circular loop road, there will be a 15 foot vertical difference between the loop and the existing Pend d'Oreille Bay trail. A ramp connection to the bay trail will be necessary to connect the new shared use path/road to the existing trail. The vertical difference can be accommodated by constructing a retaining wall or a system of terraced walls.

Railroad Avenue parallels the northwestern side of the BNSF tracks and is within the BNSF right-of-way. Initially it was assumed that Railroad Avenue alignment would be maintained within the right of way and would cross over the top of the proposed railroad undercrossing structure. However, the City prefers that Railroad Avenue not cross over the structure and to have the street elevation be lowered to an at grade intersection with the shared use path/road. Sloped embankments are recommended along the sides of the roadways as the grade is lowered below existing ground except where adjacent developed properties exist. Retaining walls will be needed, primarily along Railroad Avenue to protect the existing developed properties.

As indicated in Section 2.3, two different typical sections were used in this alternative. Option 1 (Figure 4, top) will provide two lanes of traffic and a combined sidewalk on one side for a total width of 32 feet while Option 2 (Figure 4, bottom) provides a total width of 43 feet and sidewalks on both sides.

3.2 Alternative 2: Pedestrian crossing only at Location A

A pedestrian only crossing at Location A would use a 14 foot wide section under the railroad tracks. This alternative was studied considering full vehicle access from SH-200 to Railroad Avenue using a typical section width of 43 feet (Figure 4, bottom) and a 14 foot wide pedestrian only path from Railroad Avenue to the existing POBT at Location A (Figure 5, top). Even though this is a pedestrian only crossing, it will have sufficient width and height to provide emergency vehicle access. The proposed improvements to Railroad Avenue will be the same as Alternative 1.

3.3 Alternative 3: Vehicle/Pedestrian crossing at Location A and a pedestrian only crossing at Location B

An option to have a main crossing that would be shared by vehicles, bicycles, and pedestrians at Location A along with a secondary access point at Location B for bicycles and pedestrians only. An alignment was developed for a pedestrian crossing at Location B that would follow the edge of the existing gully that extends from the end of Oak Avenue and flows into Lake Pend Oreille. The goal for this alignment was to minimize excavation necessary to cross beneath the BNSF tracks. This crossing quickly became unfeasible due to the proximity of existing residential properties. To prevent substantial acquisition of right-of-way from the neighborhood, tall retaining walls would be required, both to protect the existing properties, and to create a 10 foot wide ledge for the path alongside the existing gully. The area in and around the gully consists of highly erodible soils and the area has historically experienced sloughing. Due to the need for extensive retaining walls and the likelihood of unstable soil conditions in and around the existing gully, it has been determined that the construction of a pedestrian undercrossing at Location B would not be feasible.

This alternative was not considered further because Location B is not feasible. This alternative without Location B included is the same as Alternative 2.

4 Structures

A bridge crossing the railroad tracks is proposed to provide access from SH-200 to Lake Pend Oreille. The feasibility study considered a crossing of the proposed entrance road over the railroad tracks and also an undercrossing of the railroad tracks. See Section 2 for Railroad Design Criteria used in this study.

4.1 Overcrossing

One issue with the overcrossing is due to the height of the structure above the ground to provide adequate clearance above the railroad tracks which cause an excessive approach length on the lake side. Another issue with an overcrossing would be mitigating potential settlements on the high approach fills on the lake side. As a result, the overcrossing was not considered a feasible option in this study.

4.2 Proposed Undercrossing

4.2.1 Single Span Structure

Girder Bridge Option: A single span bridge with vertical abutment walls would be proposed with a width of 60'-0" (Figure 16). The span lengths considered in the study were based on the Typical Sections discussed in Section 2.3 (Figures 4 and 5). The following span lengths were used for each Alternative:

ALTERNATIVE	SPAN LENGTH
Alternative 1 (Option 1)	36'-0"
Alternative 1 (Option 2)	48'-0"
Alternative 2	18'-0"

The width will also allow for three tracks to meet the ultimate build-out of MRL. Railroad Avenue serves as the access road and is not required on the bridge. The abutment retaining walls are expected cast-in-place concrete supported on concrete drilled shaft foundations (Figure 17) due to a requirement in the BNSF Guidelines that MSE walls are not allowed within 50'-0" of an active track. The exposed surfaces abutment walls and the exterior beams could have architectural treatments including colored concrete and formliners as required.

BEBO Arch Bridge Option: An alternative single span bridge is a precast concrete BEBO arch span (Figure 18). An advantage to this structure type is that it could be installed in approximately 2 months as compared to 4 months for the conventional precast concrete structure. The width of the structure would be approximately 140'-0" long and would be extended to the limits where MSE walls could be used to catch the fills to avoid using the heavily reinforced concrete retaining walls supported on drilled shafts which are expensive as compared to the BEBO arch bridge. Design costs are included in the BEBO arch bridge line item. Due to the poor soils at this site, it is assumed the BEBO arch bridge will be supported on a concrete cap beam with driven steel piles.

4.2.2 Three Span Structure

A three span bridge would be proposed with a width of 60'-0" (Figure 19). The span lengths considered in the study were based on the Typical Sections discussed in Section 2.3 (Figures 4 and 5). The following span lengths were used for each Option:

ALTERNATIVE	SPAN LENGTHS
Alternative 1 (Option 1)	30'-6", 36'-0", 30'-6"
Alternative 1 (Option 2)	30'-6", 48'-0", 30'-6"
Alternative 2	30'-6", 18'-0", 30'-6"

The width will also allow for three tracks to meet the ultimate build-out of MRL. Railroad Avenue serves as the access road and is not required on the bridge. This structure is similar to the single span alternative (Span 2 is the same as the single span bridge length) and in place of the vertical abutment walls, side spans are provided with abutment slopes. The width of the piers and abutment pile caps are 60'-0". An advantage to this structure as compared to the single span girder bridge is that the vertical wingwalls beyond the limits of the structure are eliminated. The abutment slopes will be graded to match into the embankment. The exposed surfaces of exterior beams could have architectural treatments including colored concrete and formliners as required.

4.2.3 Structure Types Considered

For both the single span and three span alternatives, steel girders or prestressed concrete beams were considered. Both structure types are acceptable with the BNSF Guidelines for railroad underpasses. A final structure type will be determined during the final design phase.

4.2.4 Retaining Walls

BNSF Guidelines indicate MSE walls are not allowed within 50'-0" of an active track. Any retaining walls beyond this limit will use MSE walls. To meet architectural features, the panels can be fabricated with formliner treatments. The walls can also be offset to provide a terraced effect. Due to settlement issues at the roundabout, it is expected geofill will be used.

Retaining wall requirements are different depending on which bridge option is used and a brief discussion follows.

- *Single-Span Girder Bridge.* The structure will require high concrete abutment wall to support the beams. Tall concrete wing walls will be required adjacent to the abutments to meet railroad requirements. Beyond 50'-0" of an active track, MSE walls will be used to retain the fills.
- *BEBO Arch Bridge.* The structure will be extended to beyond 50'-0" of the active tracks such that MSE walls will be used to retain the fills and tall concrete wing walls will not be required.

- *Three-Span Bridge.* The structure does not require high concrete abutment walls because the ground between the abutment and the pier is sloped. This embankment will be graded to match MSE walls to retain the fills.

The preliminary cost estimate in Section 11 was developed using this approach.

4.2.5 Constructability

To construct the new bridge crossing, a temporary shoo-fly will be required. An abbreviated construction sequence is as follows:

- Construct temporary shoo-fly track.
- Shift railroad traffic to the temporary track.
- Construct the new bridge.
- Shift the railroad traffic back to the permanent track.
- Remove the shoo-fly track.
- Complete the remainder of construction.

5 Environmental Issues

A site visit was performed on May 26th and 27th, 2016 to verify aspects of existing biological, hydrological, and other data. The site visit also confirmed the observations from the desktop study as summarized in the *Ponderay Undercrossing Technical Analysis Land Capability Summary Report (2015)*. No additional findings were noted during the site visit. The results of this report will be used as the basis for a future study to design vehicular and pedestrian access from SH-200 to the POBT. The study area (Figures 2 and 3) incorporates portions of Brownfields Zones 4 and 5 and the adjoining parcels located between SH-200 and the west shoreline of Lake Pend Oreille. AECOM reviewed relevant existing data pertinent to the study area. Based on the compiled information, anticipated conditions and possible constraints have been identified as follows:

- Long-term settlement issues may be possible due to thick clay layers and the presence of a high water-table.
- Concentrations of arsenic, mercury, cadmium and lead have been found in the top soil layers in Zone 4 and would require clean-up activities.
- No properties outside of Brownfields Zones 1 through 5, including the Harbison property and the railroad right-of-way have documented or reported outstanding environmental issues and remediation is not anticipated on local parcels.
- Long-term drainage systems will most likely need to be engineered to manage the release of stormwater in the presence of the high water table.
- Potential wetlands are frequent in the project area. Official wetland delineation will be required to determine the extent of project impacts on wetlands. The U.S. Army Corps of Engineers (USACE) will need to determine if potentially impacted wetlands are jurisdictional.
- A site-specific cultural resource inventory should be conducted in the future once the preferred alignments have been selected.

- Impacts to seeps or surface water features would require a joint stream channel alteration permit from the Idaho Department of Water Resources, Idaho Department of Lands and the USACE.

The *Ponderay Undercrossing Technical Analysis Land Capability Summary Report (2015)* will be amended with the findings and observations from the May 26th and 27th, 2016 site visit and re-issued under separate cover.

6 Right-of-Way Considerations

The BNSF right-of-way is 400 feet wide, with the westerly 375 feet being leased to MRL. The proposed rail underpass will need to be coordinated with both MRL and BNSF and will require an easement from BNSF. An easement area of approximately 4.6 acres will be required from the BNSF Railroad to accommodate the proposed improvements for Alternative 1. Approximately 4.5 acres will be required for Alternative 2.

The Harbison parcel provides the necessary right-of-way for the new shared use path to reach the BNSF undercrossing. Approximately 0.54 acres of right-of-way will need to be acquired from the Hoot Café parcel and the parcels to the south of the café between US-200 and the western edge of the Harbison parcel for the Harbison Access Road.

7 Utilities

No public utilities exist at the proposed railroad crossings. Any railroad communications utilities running parallel to the railroad tracks will need to be maintained. The railroad requires a space of 6 feet below the top of rail be reserved for existing and future railroad utilities.

Installation of new public utilities will need to be coordinated with the final design of the shared use path to accommodate future development along the lakeshore. The cost of the installation of these utilities is not anticipated to be the responsibility of this project. This project will require electrical service to power pathway lighting. This power service for the lighting will be a project cost.

8 Drainage

No storm water drainage facilities exist at the project site. The project will include provisions for the construction of storm water facilities to capture and treat run-off prior to its release into Lake Pend d'Oreille. The stormwater collection will be a combination of an underground conduit system with storm drain pipes and the use of underground infiltration systems.

9 Railroad Operations Analysis

Currently the BNSF and Montana Rail Link railroad companies use Railroad Avenue for their access to maintain their tracks. The proposed improvements include realigning and paving Railroad Avenue to a new alignment adjacent to the western edge of the railroad property. This new location for Railroad Avenue is not expected to interfere with Montana Rail Link's plans for the addition of a future track and new siding spur lines. The future track locations are shown on Figure 20. The railroad has indicated that they would continue to use Railroad Avenue for their maintenance activities.

Train traffic will not be hindered since the Harbison Access Road/Path will cross beneath the tracks, providing for a grade separated crossing with the railroad tracks. However, a railroad shoofly detour for the two existing tracks will need to be constructed so that train operations through the project area will be able to continue during construction. Once the new bridge is in place for the underpass, the shoofly tracks will be removed. Coordination will be required with the railroads for placing the shoofly tracks and switching train traffic between the existing tracks and the temporary shoofly tracks.

10 Summary

This report presents the findings of the study for a new path and underpass crossing of BNSF to provide access to the Pend d'Oreille Bay Trail. This report has been prepared for the Idaho Department of Environmental Quality and the Friends of the Pend d'Oreille Bay Trail to be used as planning document for the future development of this project. It is intent that the new roadway promotes slow speed traffic and be pedestrian and bicyclist friendly. Since there is a likelihood that development of the shoreline may occur over time, the road should be able to accommodate delivery trucks, trash collection trucks, and emergency vehicles. The typical sections presented in this report are capable of accommodating anticipated users of this roadway.

The project must also provide for the continued use of Railroad Avenue. Railroad Avenue is used by both the railroad for maintenance activities and the general public for access to adjacent private properties.

The following is a listing of the major project components:

- Shared use paved road from SH-200 to the Pend d'Oreille Bay Trail.
- Undercrossing Bridge beneath the BNSF Railroad Tracks.
- Realignment of Railroad Avenue to have an at grade intersection with the new roadway from SH-200. Railroad Ave. is to be two 12-foot lanes with roadside swales for drainage.
- A piped storm drain system to accommodate runoff from the new roadway conveying it to an infiltration system or treatment facility for subsequent release to the environment.
- Retaining walls as necessary to retain adjacent private properties.

11 Preliminary Cost Estimate

Preliminary cost estimates are provided for Alternative 1 (Options 1 and 2) and Alternative 2. A preferred alternative has not been selected at this time. Preliminary costs for a single span girder bridge, a single span "BEBO" arch bridge, and a three span bridge have been tabulated and are included in the estimate. It is assumed that the approach roadway costs are similar for all three alternatives.

For the majority of the items, the estimated unit costs are based on the Idaho Transportation Department's (ITD) 2015 Average Unit Price Report and ITD Bridge Manual. This information was further refined to concentrate on projects located in ITD District 1, (Northern Idaho) and with similar quantities to determine each individual unit cost.

The estimated cost for construction includes a 25% contingency to account for details that will be developed during final design. Costs to complete the design and for construction management were estimated at 10% of

the construction costs. In addition, an allowance for change orders during construction is also included and estimated using 5% of construction costs.

The major construction items are summarized for Alternative 1 (Options 1 and 2) and Alternative 2 below:

Alternative 1 (Option 1) Construction Costs

- Harbison Access Road Construction – SH-200 to BNSF Railroad Tracks

Road Improvements	\$536,000
Landscaping	\$ 62,000
Retaining Walls	\$390,000
Subtotal:	\$988,000

- Harbison Access Road Loop Construction – BNSF Tracks to Pend d’Oreille Bay Trail

Road Improvements	\$405,000
Retaining Walls	\$312,000
Subtotal:	\$717,000

- Undercrossing Bridge Construction with Wingwalls and Railroad Shoofly

Single Span Bridge and Wingwalls	\$2,435,820
Three Span Bridge	\$1,440,000
BEBO Arch Bridge	\$ 940,000
Temporary RR Shoofly	\$ 528,000

- Railroad Ave. Construction

Road Improvements	\$884,000
Landscaping	\$195,000
Retaining Walls	\$251,000
Subtotal:	\$1,330,000

- Total Project Cost Estimate: Alternative 1 (Option 1)

Single Span Bridge Alternative

Estimated Construction Cost	\$5,998,494
Contingency	\$1,499,623
Design Engineering	\$749,811
Construction Oversight and Contingency	\$1,124,717

Estimated Project Grand Total: \$9,372,645

Three Span Bridge Alternative

Estimated Construction Cost	\$5,002,673
Contingency	\$1,250,668
Design Engineering	\$625,334
Construction Oversight and Contingency	\$938,001
Estimated Project Grand Total:	\$7,816,677

BEBO Arch Bridge Alternative

Estimated Construction Cost	\$4,502,673
Contingency	\$1,125,668
Design Engineering	\$562,834
Construction Oversight and Contingency	\$844,251
Estimated Project Grand Total:	\$7,035,427

Alternative 1 (Option 2) Construction Costs

- Harbison Access Road Construction – SH-200 to BNSF Railroad Tracks

Road Improvements	\$686,000
Landscaping	\$ 62,000
Retaining Walls	\$390,000
Subtotal:	\$1,138,000

- Harbison Access Road Loop Construction – BNSF Tracks to Pend d’Oreille Bay Trail

Road Improvements	\$497,000
Retaining Walls	\$312,000
Subtotal:	\$809,000

- Undercrossing Bridge Construction with Wingwalls and Railroad Shoofly

Single Span Bridge and Wingwalls	\$2,515,820
Three Span Bridge	\$1,520,000
BEBO Arch Bridge	\$1,080,000
Temporary RR Shoofly	\$ 528,000

- Railroad Ave. Construction

Road Improvements	\$884,000
Landscaping	\$195,000
Retaining Walls	\$251,000
Subtotal:	\$1,330,000

- Total Project Cost Estimate: Alternative 1 (Option 2)

Single Span Bridge Alternative

Estimated Construction Cost	\$6,320,918
Contingency	\$1,580,229
Design Engineering	\$ 790,114
Construction Oversight and Contingency	\$1,185,172
Estimated Project Grand Total:	\$9,876,435

Three Span Bridge Alternative

Estimated Construction Cost	\$5,325,198
Contingency	\$1,331,300
Design Engineering	\$665,650
Construction Oversight and Contingency	\$998,475
Estimated Project Grand Total:	\$8,320,623

BEBO Arch Bridge Alternative

Estimated Construction Cost	\$4,885,198
Contingency	\$1,221,300
Design Engineering	\$610,650
Construction Oversight and Contingency	\$915,975
Estimated Project Grand Total:	\$7,633,123

Alternative 2 Construction Costs

- Harbison Access Road Construction – SH-200 to BNSF Railroad Tracks

Road Improvements	\$590,000
Landscaping	\$ 62,000
Retaining Walls	\$390,000
Subtotal:	\$1,042,000

- Harbison Access Road Loop Construction – BNSF Tracks to Pend d’Oreille Bay Trail

Road Improvements	\$326,000
Retaining Walls	\$312,000
Subtotal:	\$638,000

- Undercrossing Bridge Construction with Wingwalls and Railroad Shoofly

Single Span Bridge and Wingwalls	\$2,305,820
Three Span Bridge	\$1,310,000
BEBO Arch Bridge	\$ 670,000
Temporary RR Shoofly	\$ 528,000

- Railroad Ave. Construction

Road Improvements	\$884,000
Landscaping	\$195,000
Retaining Walls	\$251,000
Subtotal:	\$1,330,000

- Total Project Cost Estimate: Alternative 3

Single Span Bridge Alternative

Estimated Construction Cost	\$5,843,600
Contingency	\$1,460,900
Design Engineering	\$ 730,450
Construction Oversight and Contingency	\$1,095,675
Estimated Project Grand Total:	\$9,130,625

Three Span Bridge Alternative

Estimated Construction Cost	\$4,847,780
Contingency	\$1,211,945
Design Engineering	\$605,972
Construction Oversight and Contingency	\$908,959
Estimated Project Grand Total:	\$7,574,657

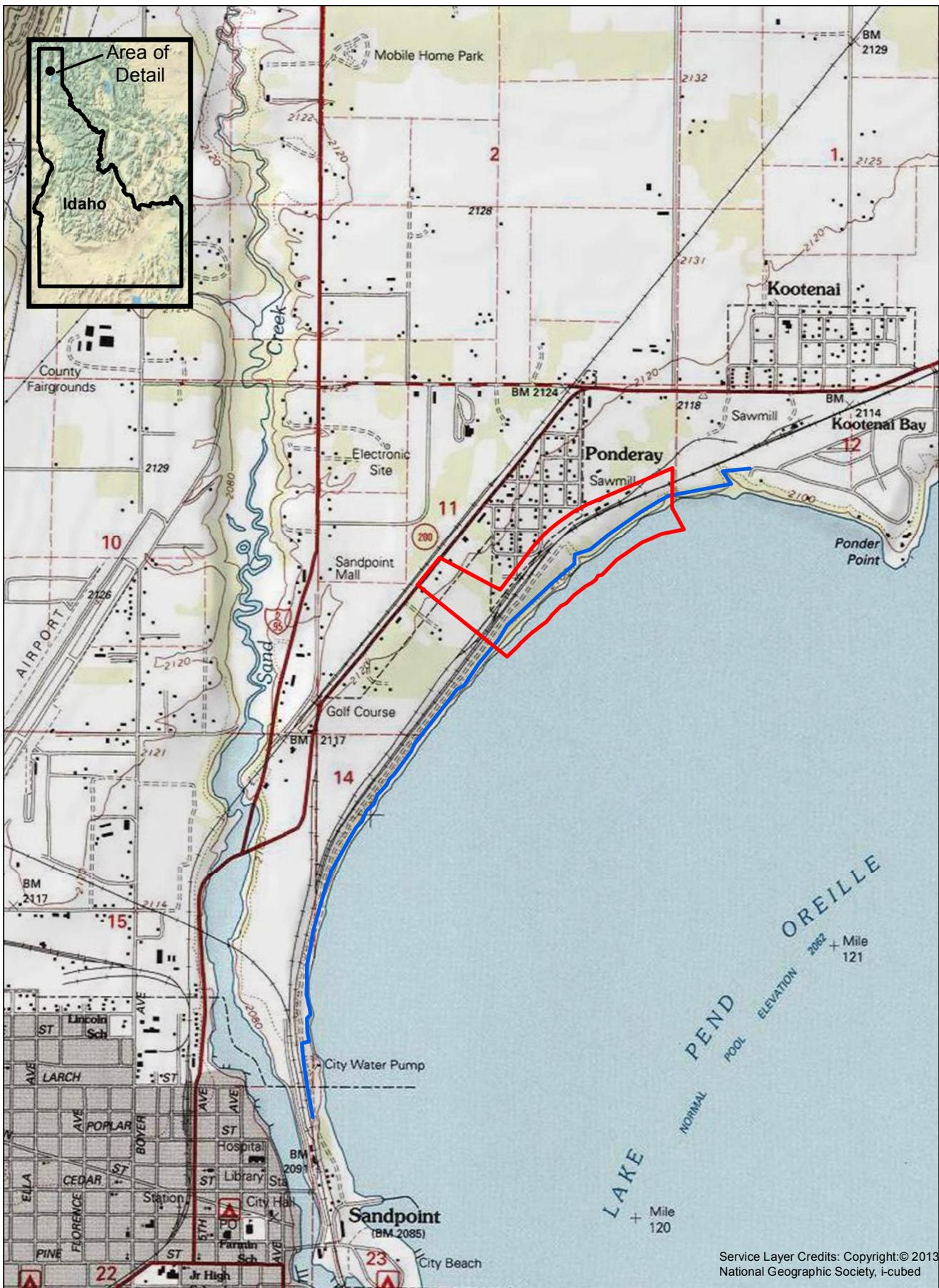
BEBO Arch Bridge Alternative

Estimated Construction Cost	\$4,207,780
-----------------------------	-------------

Contingency	\$1,051,945
Design Engineering	\$525,972
Construction Oversight and Contingency	\$788,959
Estimated Project Grand Total:	\$6,574,657

Detailed cost estimates for Alternative 1 (Options 1 and 2) and Alternative 2 using the Single Span Bridge costs are provided in Appendix 2. A detailed cost estimate for the Three Span Bridge and BEBO Arch Bridge options are similar but were not provided.

Appendix 1: Figures



Service Layer Credits: Copyright: © 2013 National Geographic Society, I-cubed

Legend

- Pend d'Oreille Bay Trail
- Study Area

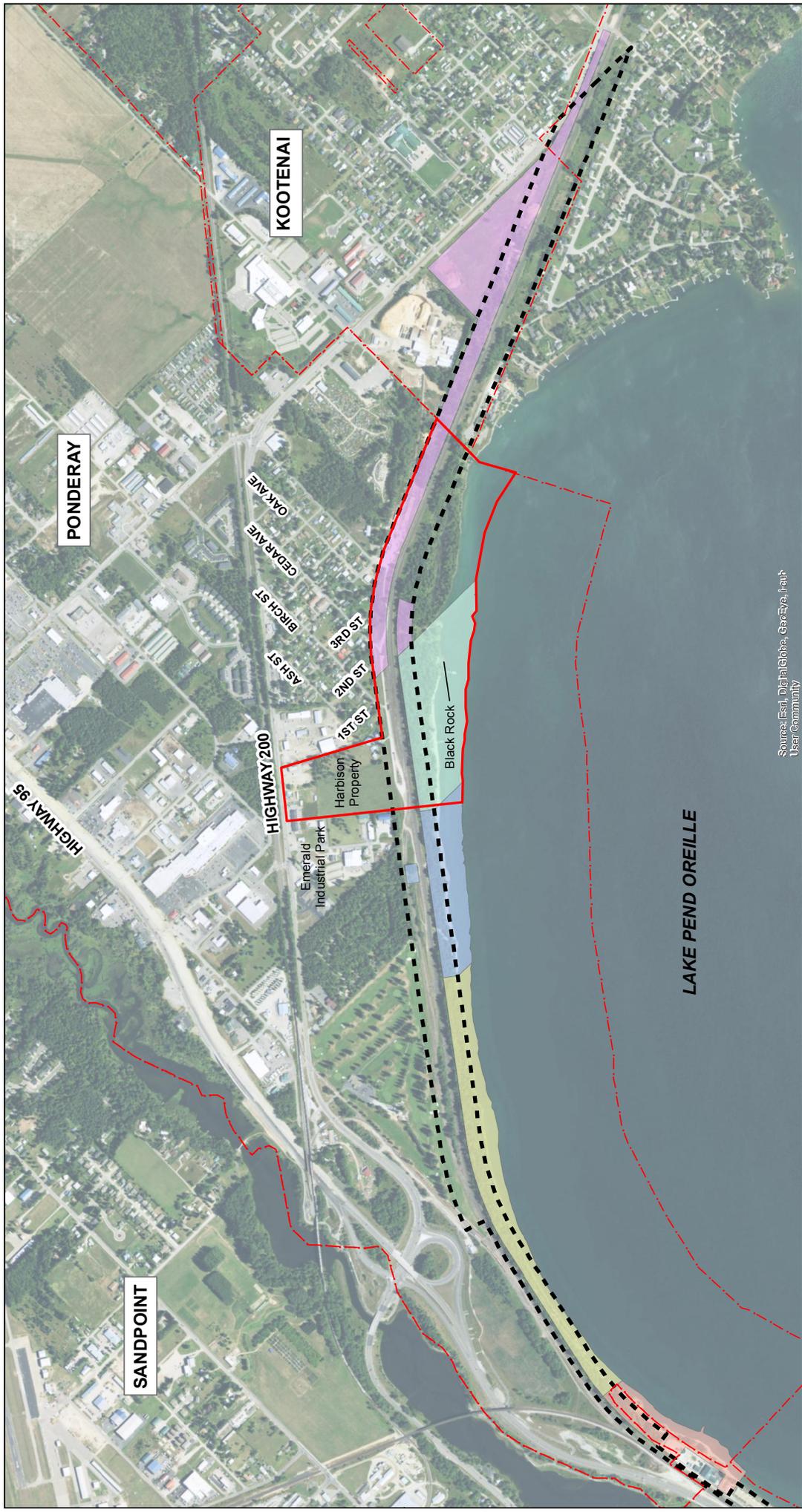


0 0.25 0.5 1 Miles

Pend d'Oreille Bay Trail Project Vicinity Map

February 2017

Figure 1



Source: Esri, DigitalGlobe, GeoEye, Earth-User Community

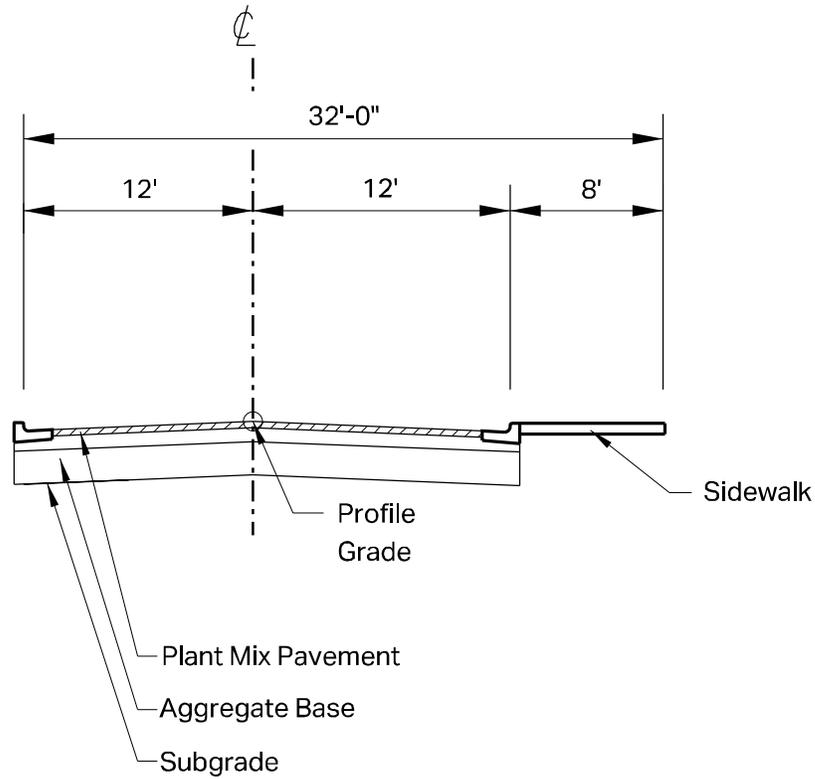
**Pend d'Oreille Bay Trail
Project Location Map**

February 2017
Figure 2

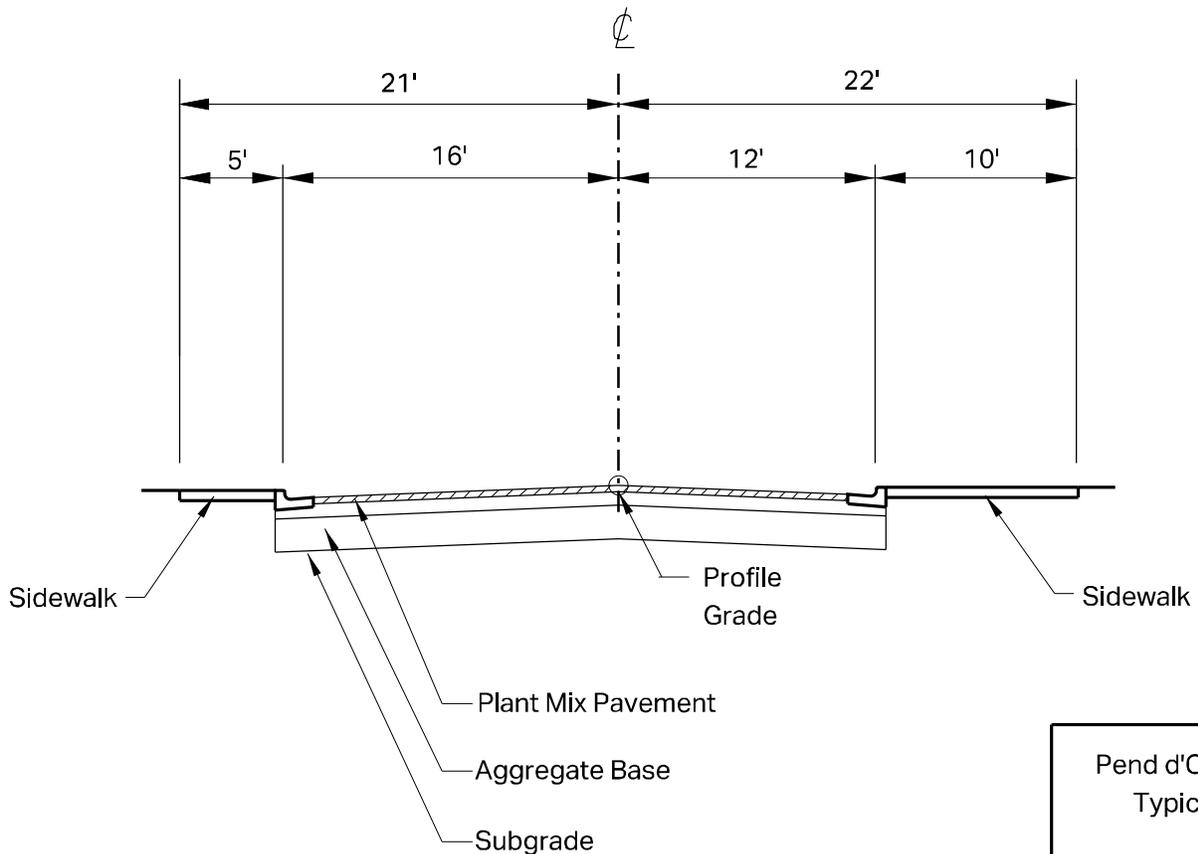
- IDEQ Brownfields Zone**
- ZONE 1 Humbird Landing
 - ZONE 2 Beach Shack Area
 - ZONE 3 Ponderay Coal Dock
 - ZONE 4 Panhandle Smelting & Refining Company
 - ZONE 5 Kootenai Access Area

- Legend**
- Study Area
 - City Boundaries
 - Railroad Right-of-Way

Harbison Access Road Alternative 1 - Option 1



Harbison Access Road Alternative 1 - Option 2

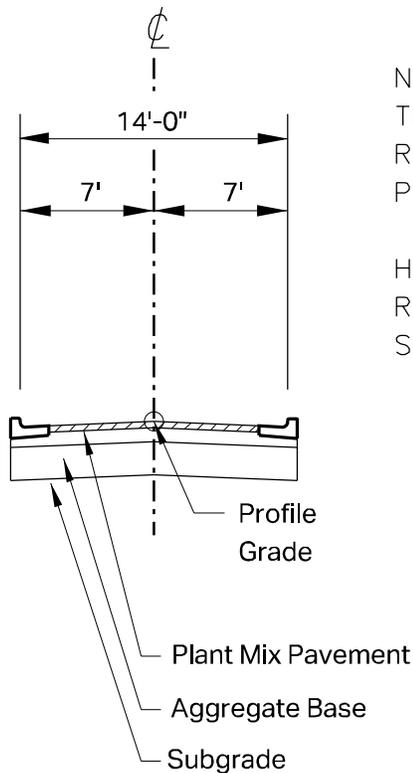


Pend d'Oreille Bay Trail
Typical Sections

Figure 4

Harbison Access Road

Alternative 2

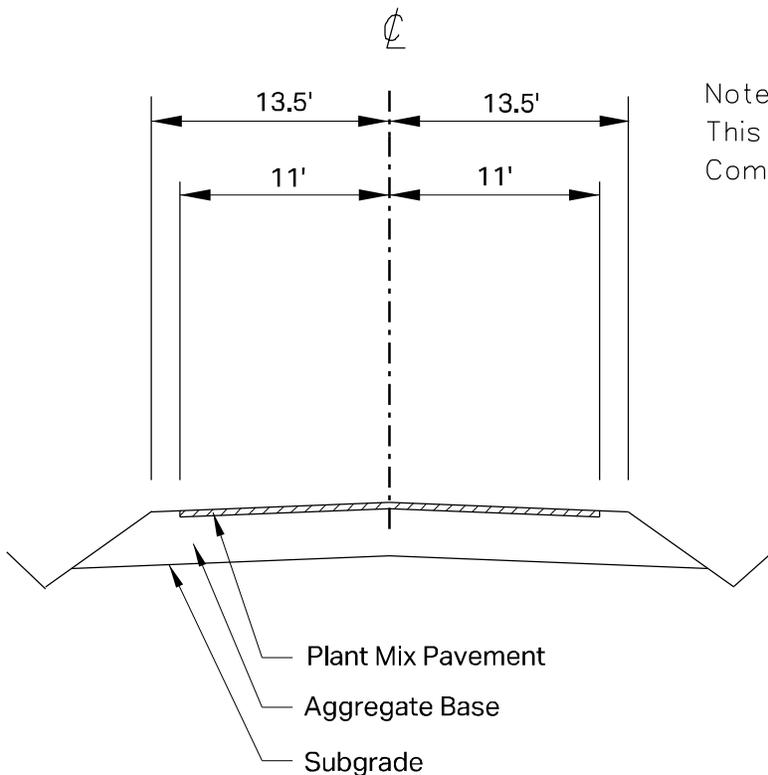


Note:

This Typical Section is used from Railroad Avenue to the Lakeside Pend d'Oreille Trail.

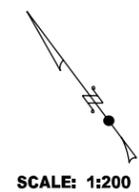
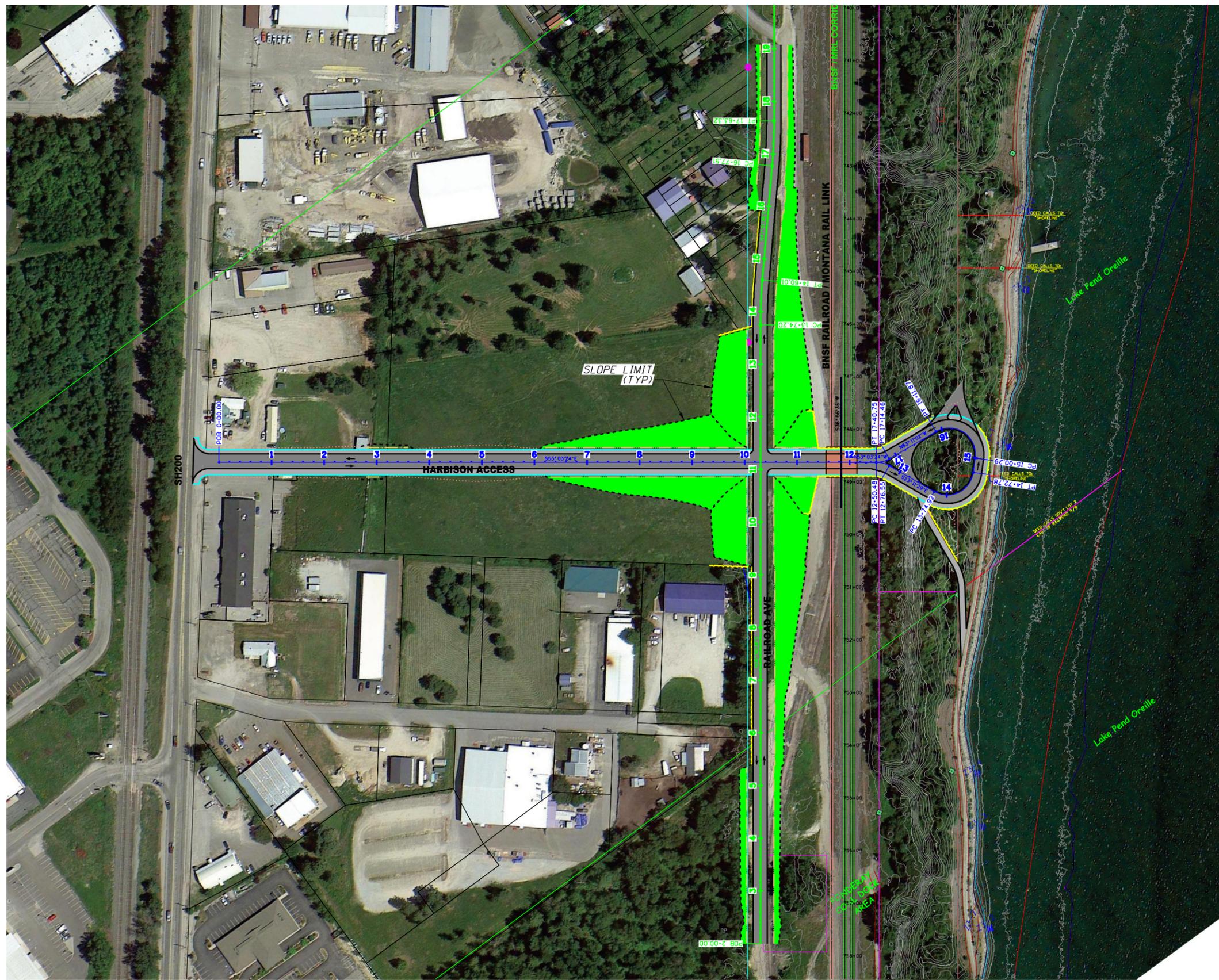
Harbison Access Road from US-200 to Railroad Avenue uses the Alt.1 Option 2 Section.

Railroad Avenue



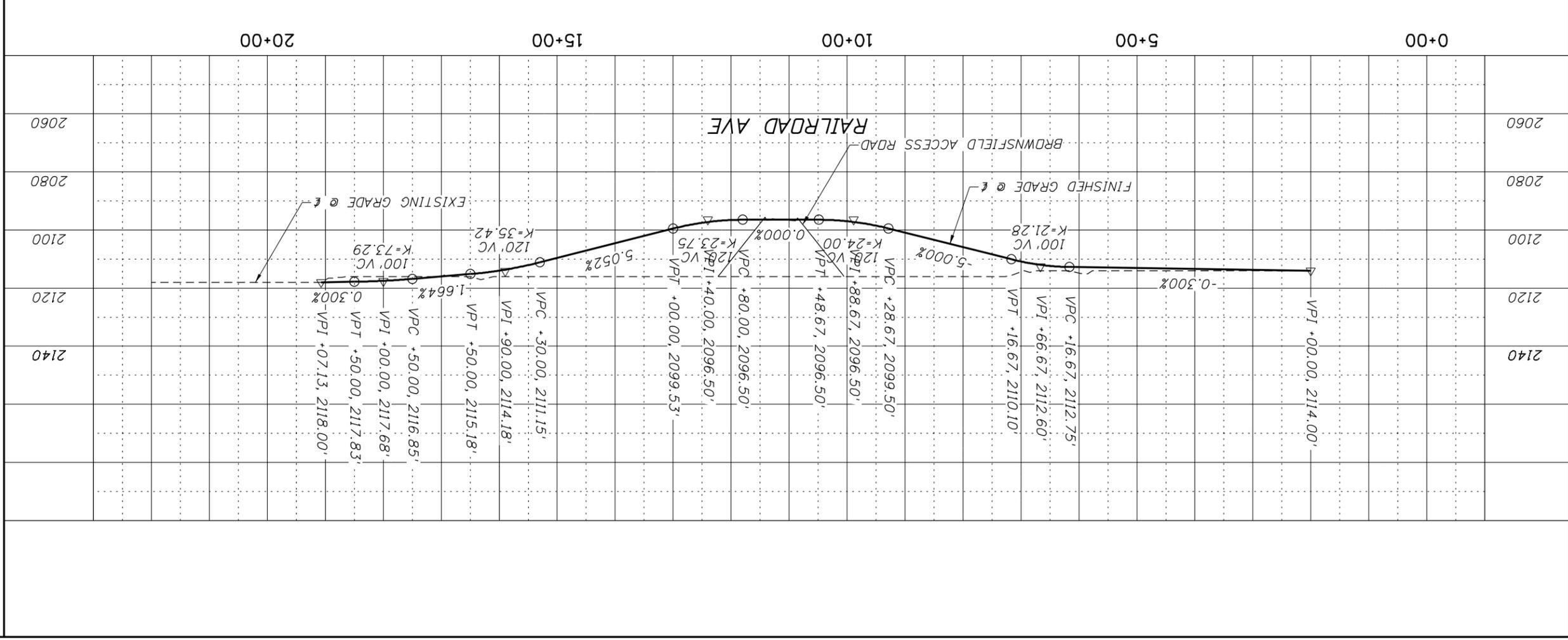
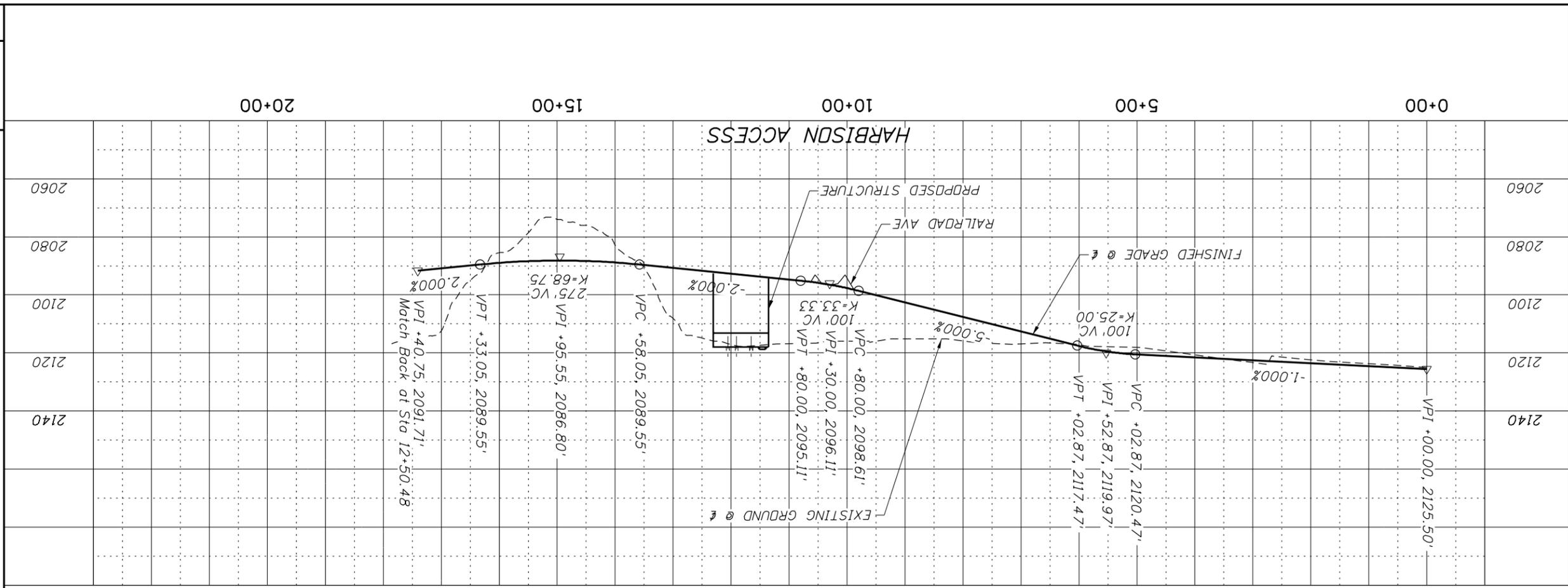
Note:

This Typical Section is Common to all Alternatives



PRELIMINARY DESIGN
 PEND D'OREILLE BAY TRAIL
 VEHICLE / PEDESTRIAN USE
 FIGURE 6








 SCALE: 1:100

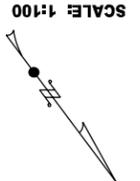
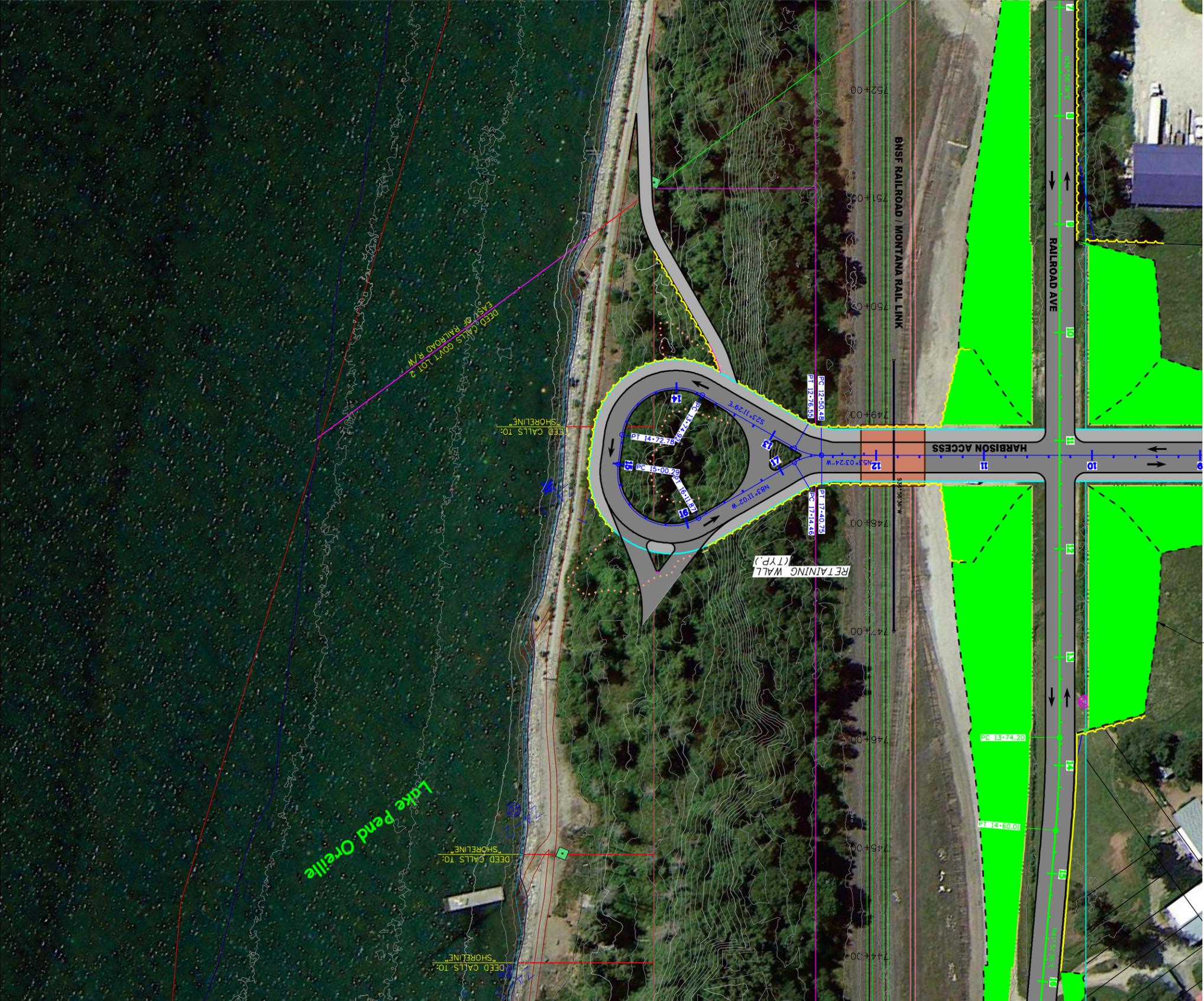
PRELIMINARY DESIGN

PEND D'OREILLE BAY TRAIL

VEHICLE / PEDESTRIAN USE

FIGURE 8

AECOM



Like Pond Orelle

DEED CALLS TO: "SHORELINE"

DEED CALLS TO: "SHORELINE"

DEED CALLS TO: "SHORELINE"

DEED CALLS TO: EAST OF RAILROAD 3/4 W

SLOPE LIMIT (TYP.)

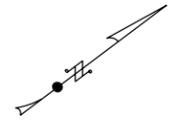
RETAINING WALL (TYP.)

BNSF RAILROAD / MONTANA RAIL LINK

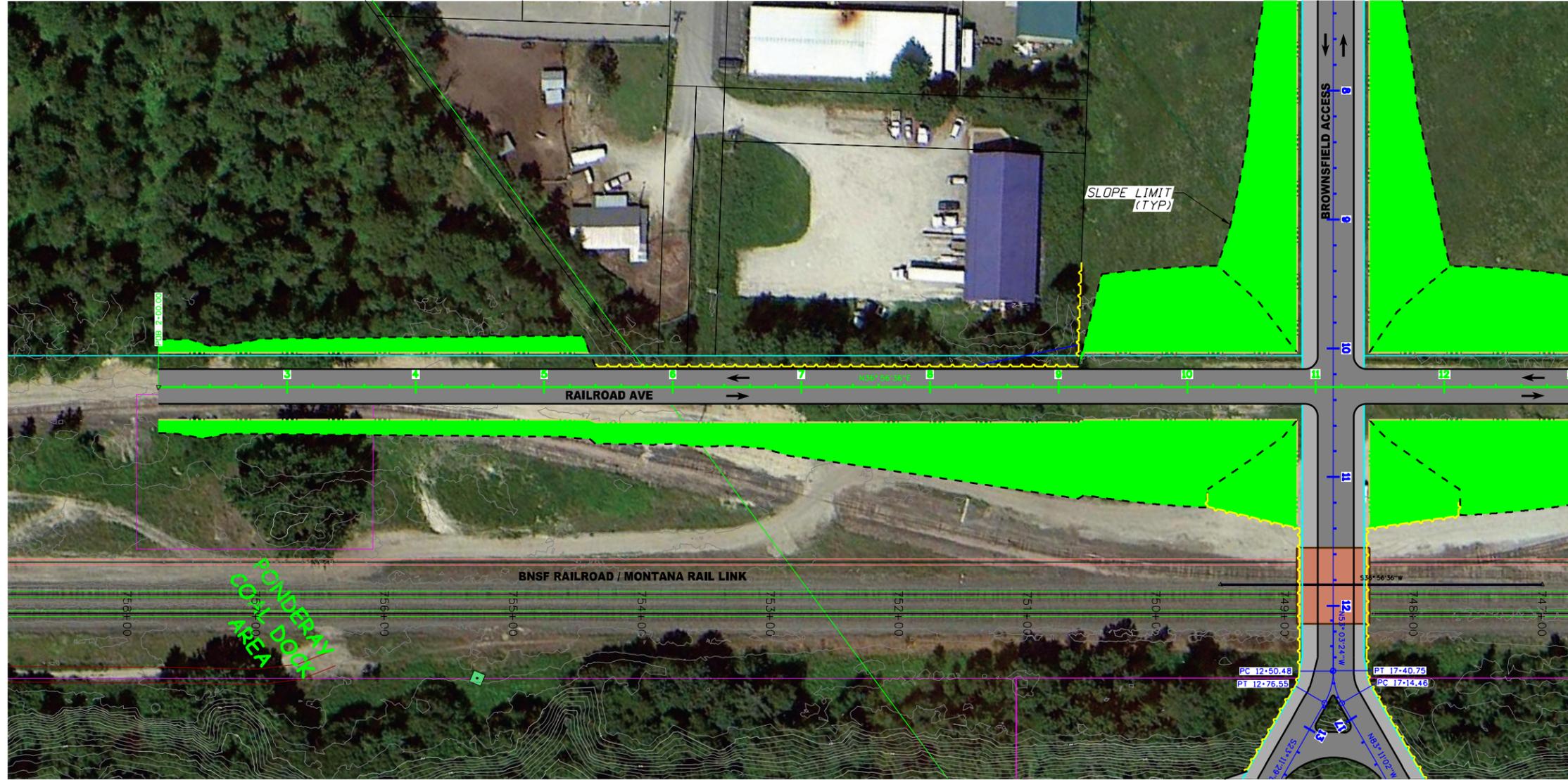
RAILROAD AVE

HARRISON ACCESS

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SCALE: 1:100



PRELIMINARY DESIGN

PEND D'OREILLE BAY TRAIL

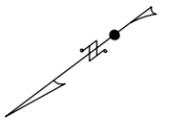
VEHICLE / PEDESTRIAN USE

FIGURE 10

AECOM



SCALE: 1:100



PRELIMINARY DESIGN

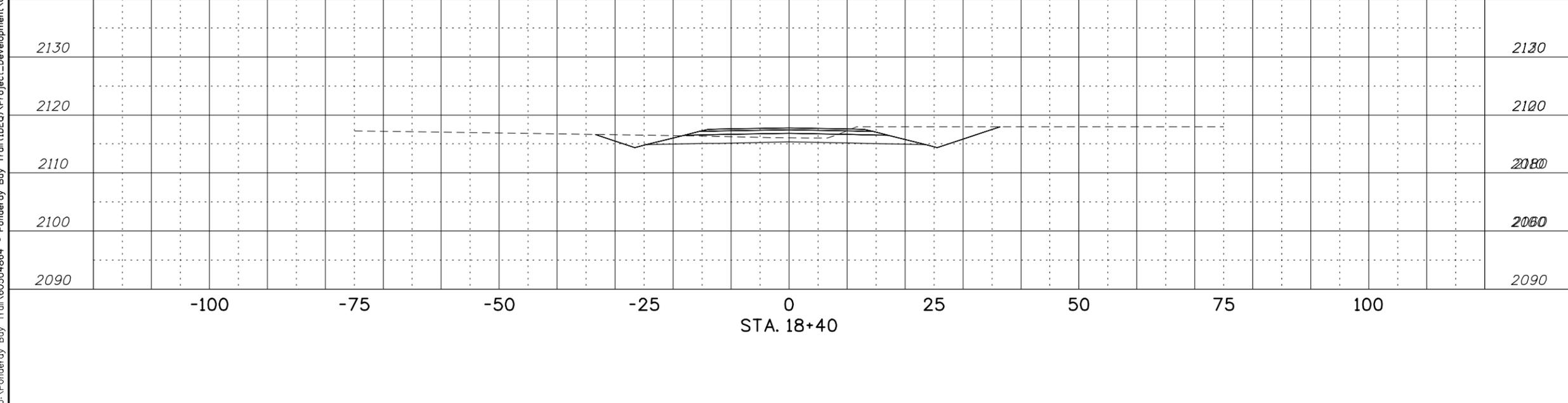
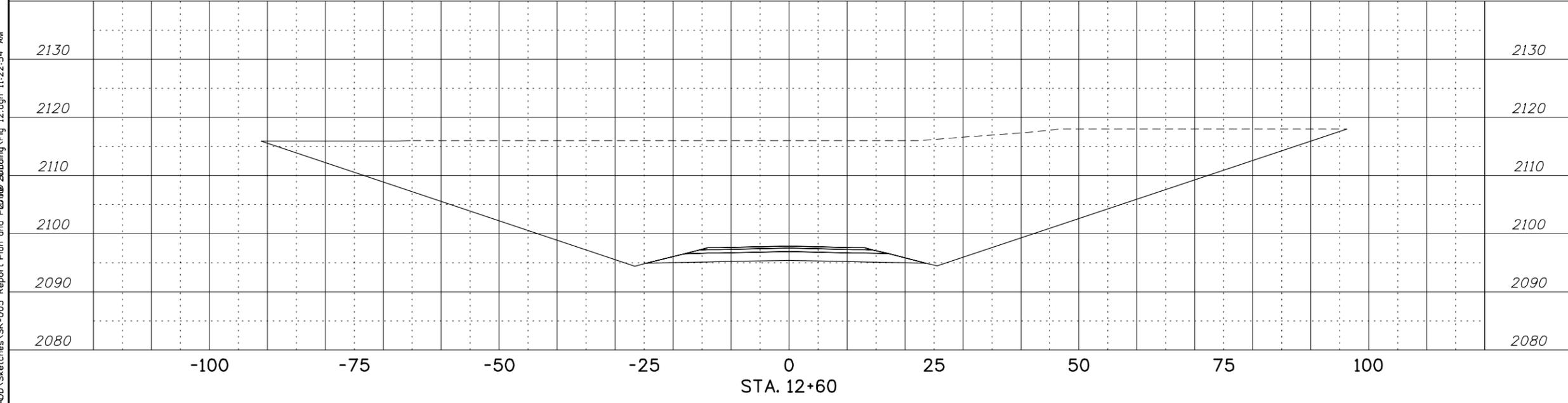
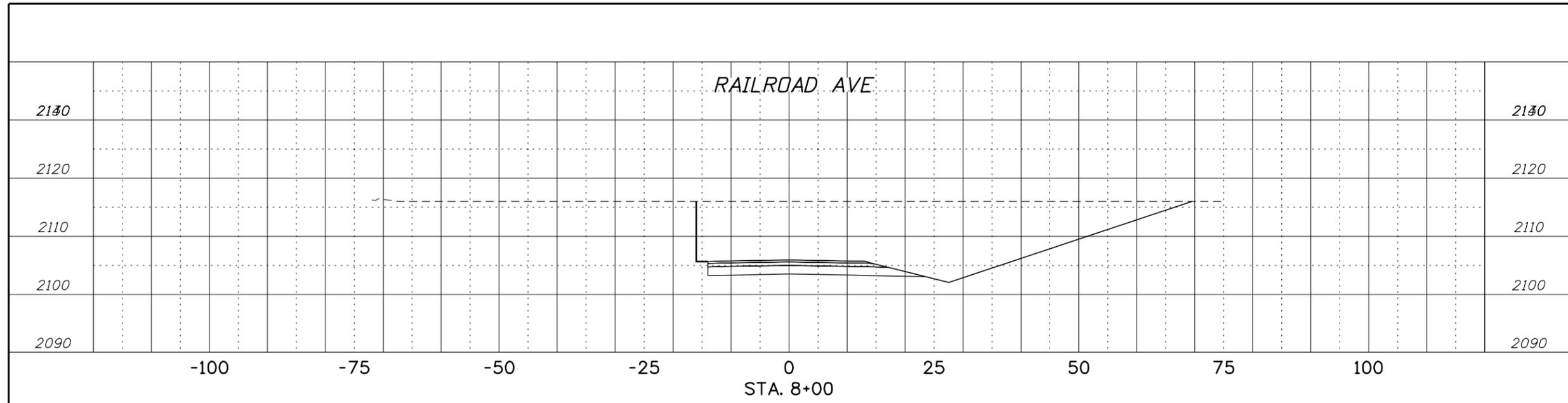
PEND FOR REILLE BAY TRAIL

VEHICLE / PEDESTRIAN USE

FIGURE 11

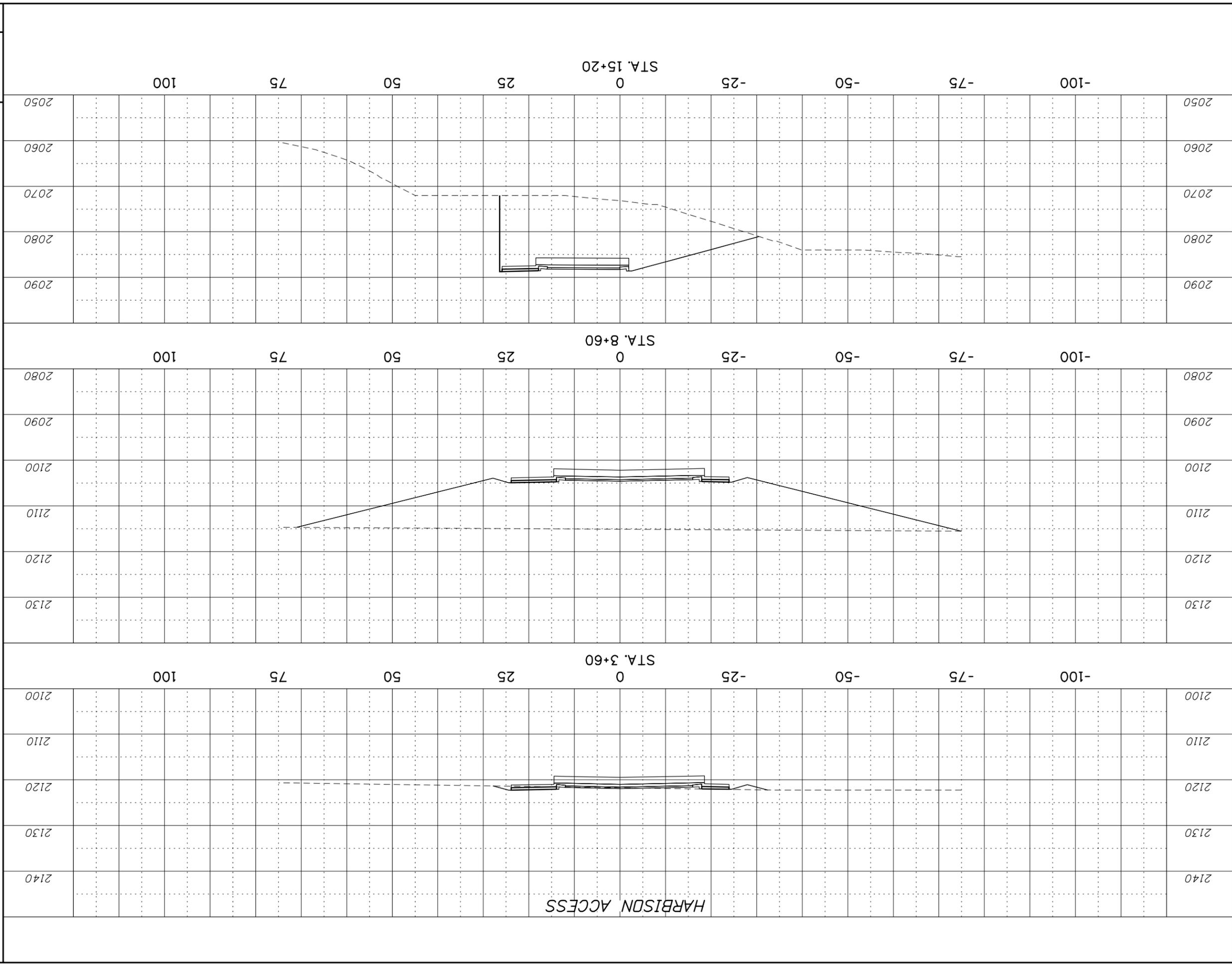


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PRELIMINARY DESIGN
 PEND D'OREILLE BAY TRAIL
 VEHICLE / PEDESTRIAN USE
 FIGURE 12



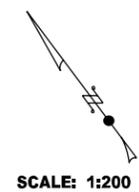
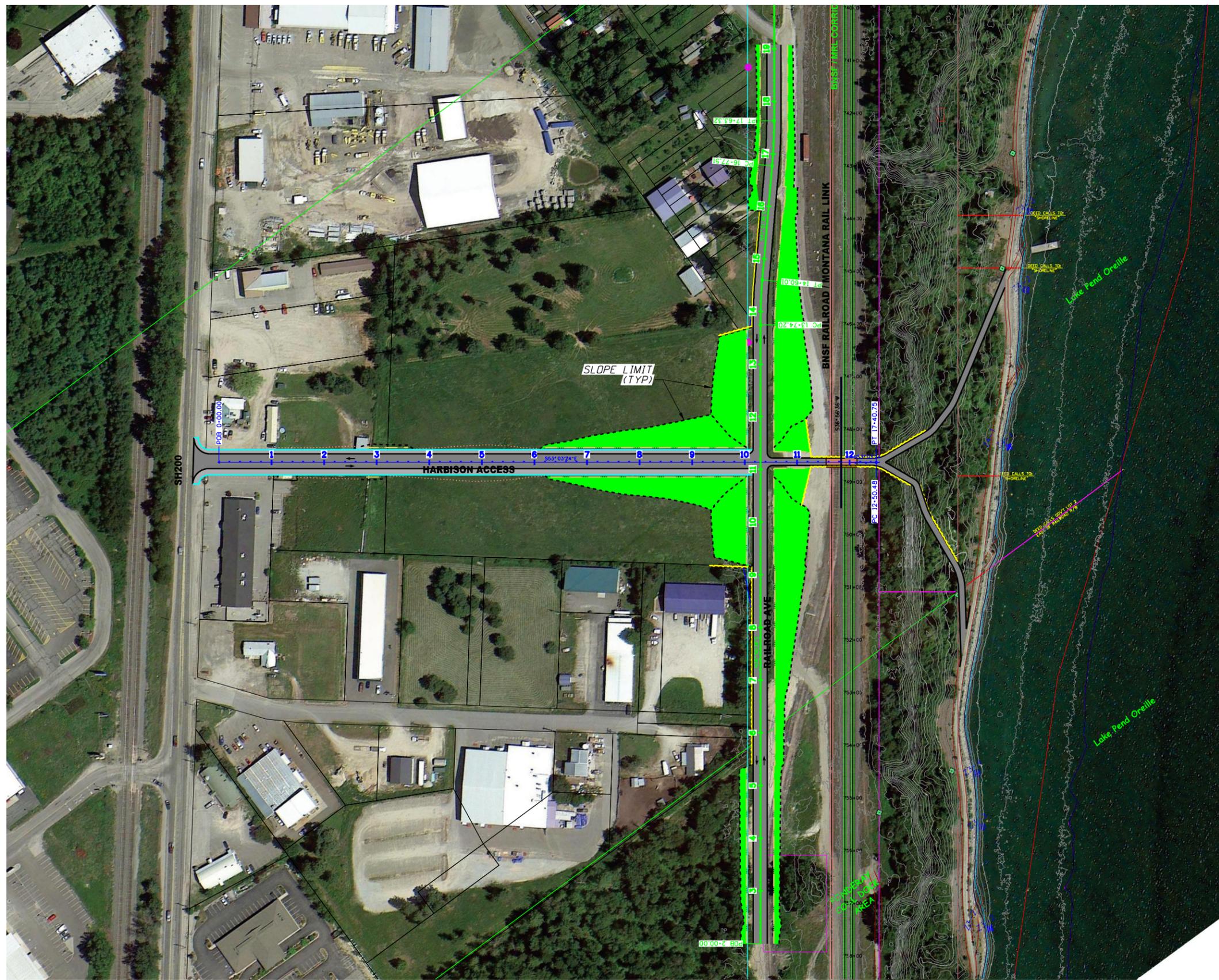


HARRISON ACCESS

PRELIMINARY DESIGN

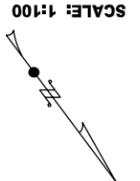
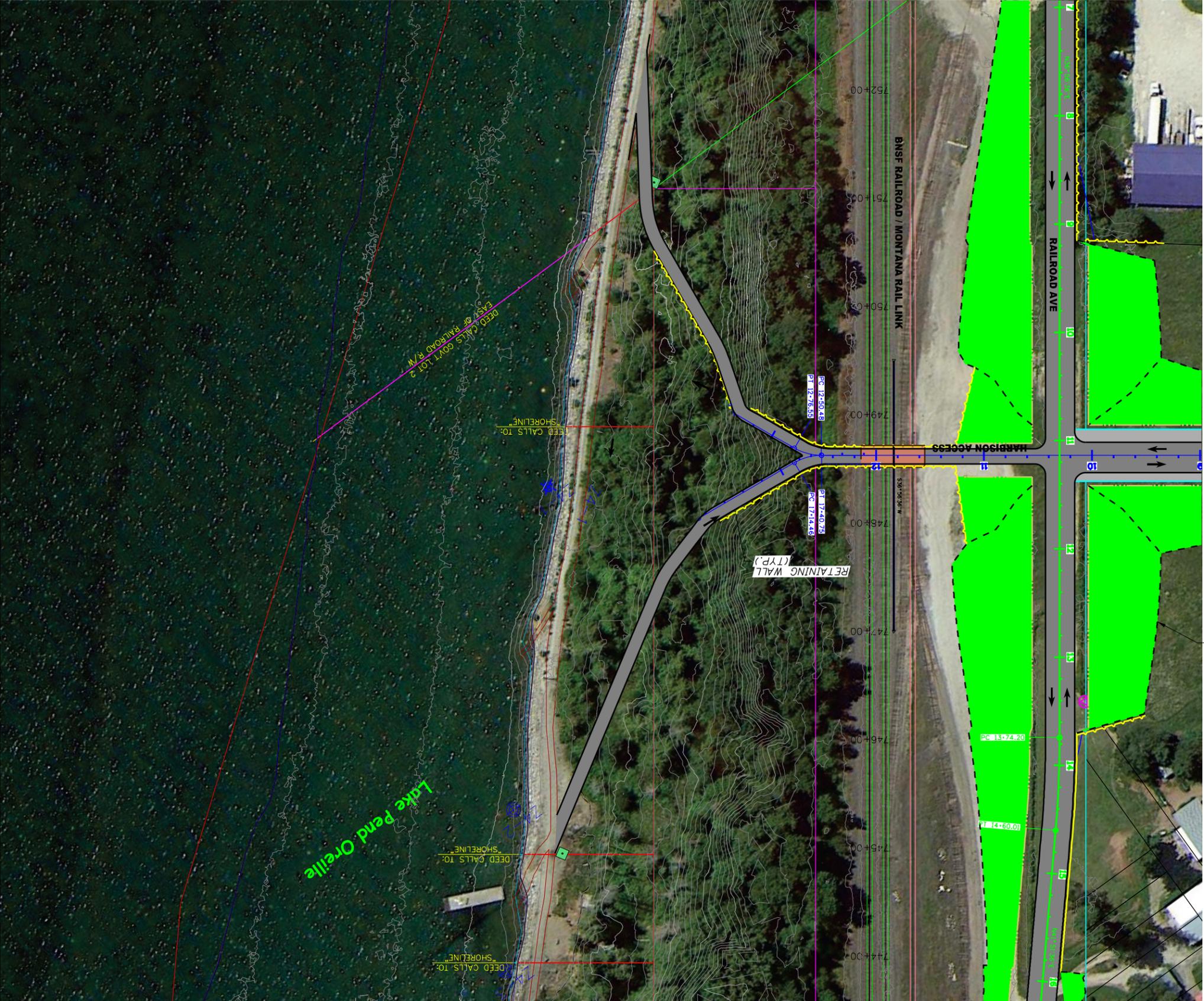
PEND O'REILLY BAY TRAIL
VEHICLE / PEDESTRIAN USE
FIGURE 13

AECOM



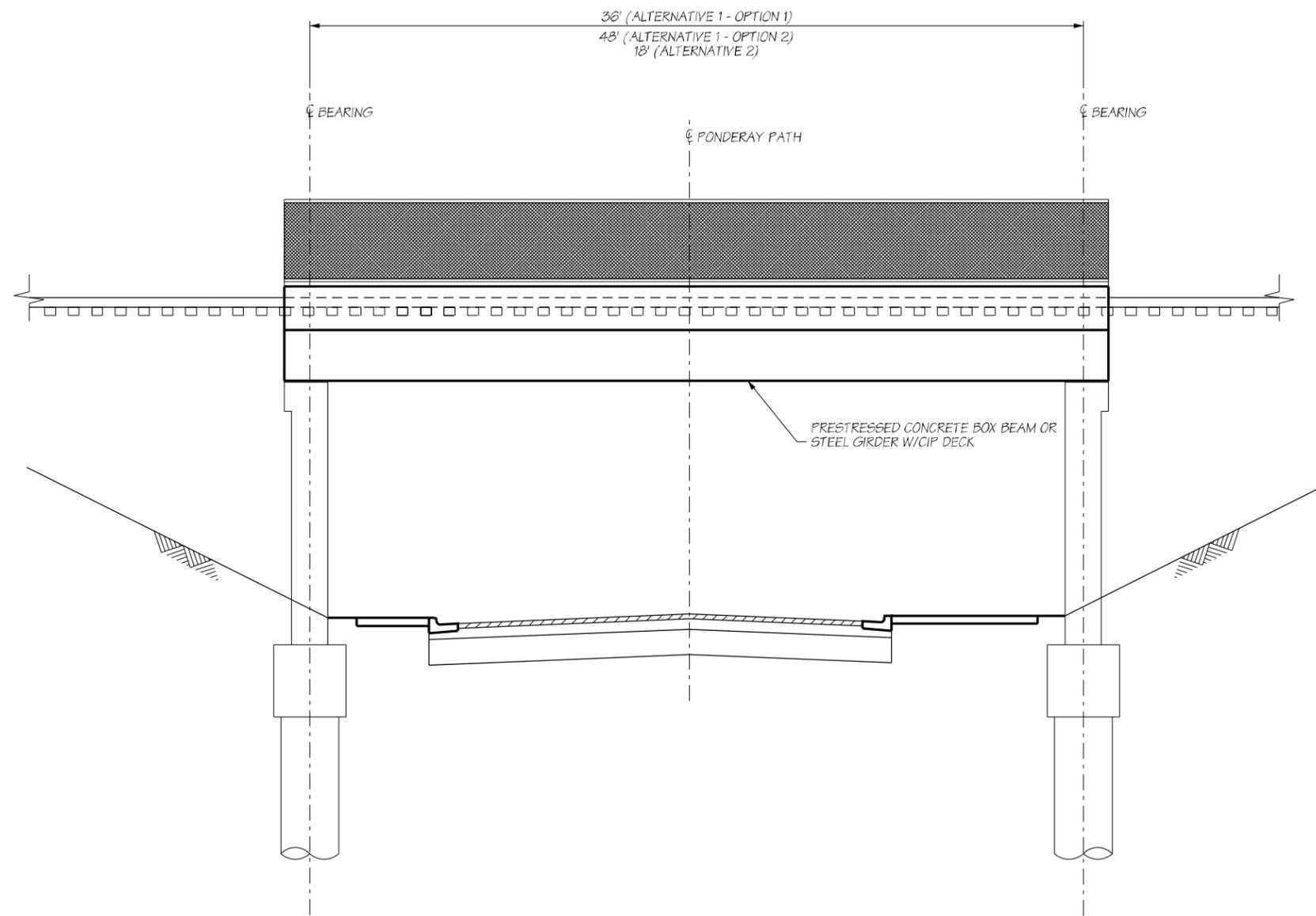
PRELIMINARY DESIGN
 PEND D'OREILLE BAY TRAIL
 14 FOOT UNDERCROSSING
 FIGURE 14





AECOM
PRELIMINARY DESIGN
PEND OREILLE BAY TRAIL
14 FOOT UNDERCROSSING
FIGURE 15

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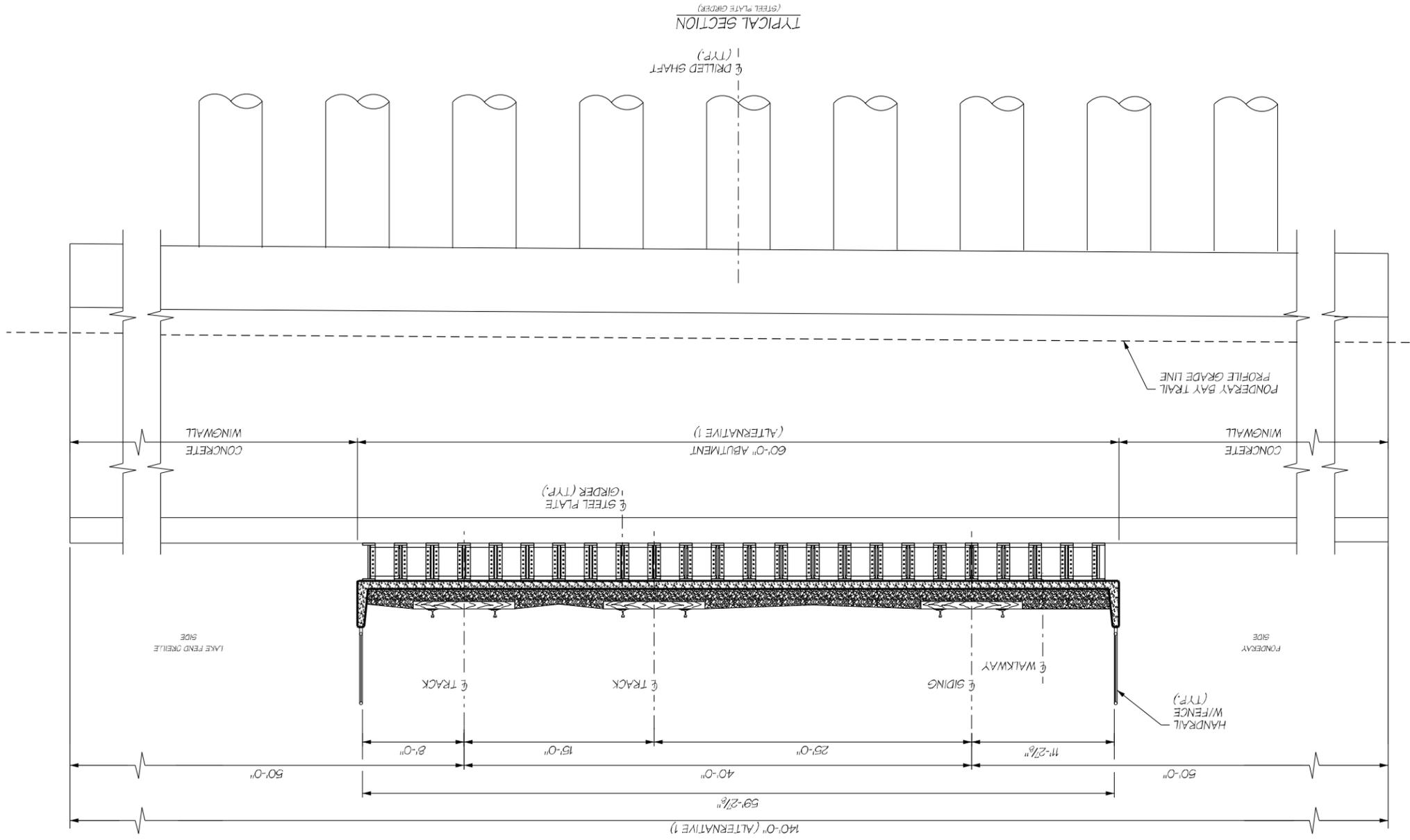


ELEVATION

PRELIMINARY DESIGN

PEND D'OREILLE BAY TRAIL
VEHICLE/PEDESTRIAN USE
ELEVATION-SINGLE SPAN BRIDGE

FIGURE 16

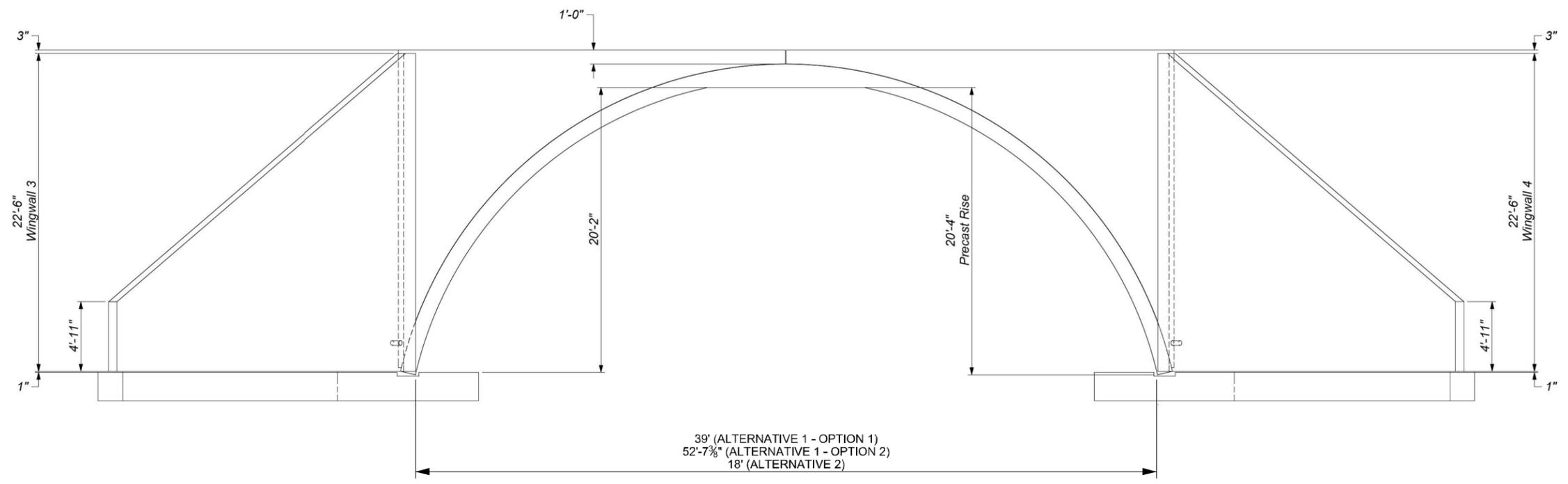


PRELIMINARY DESIGN

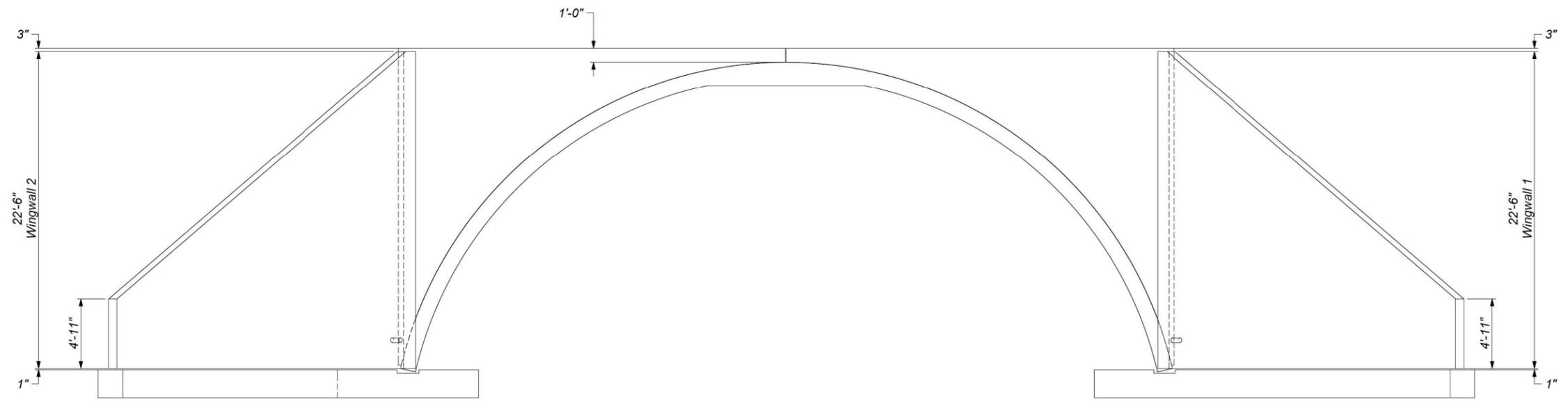
PEND O'REILLE BAY TRAIL
VEHICLE/PEDESTRIAN USE
ABUTMENT ELEVATION
SINGLE SPAN BRIDGE
FIGURE 17

AECOM

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DOWNSTREAM END ELEVATION



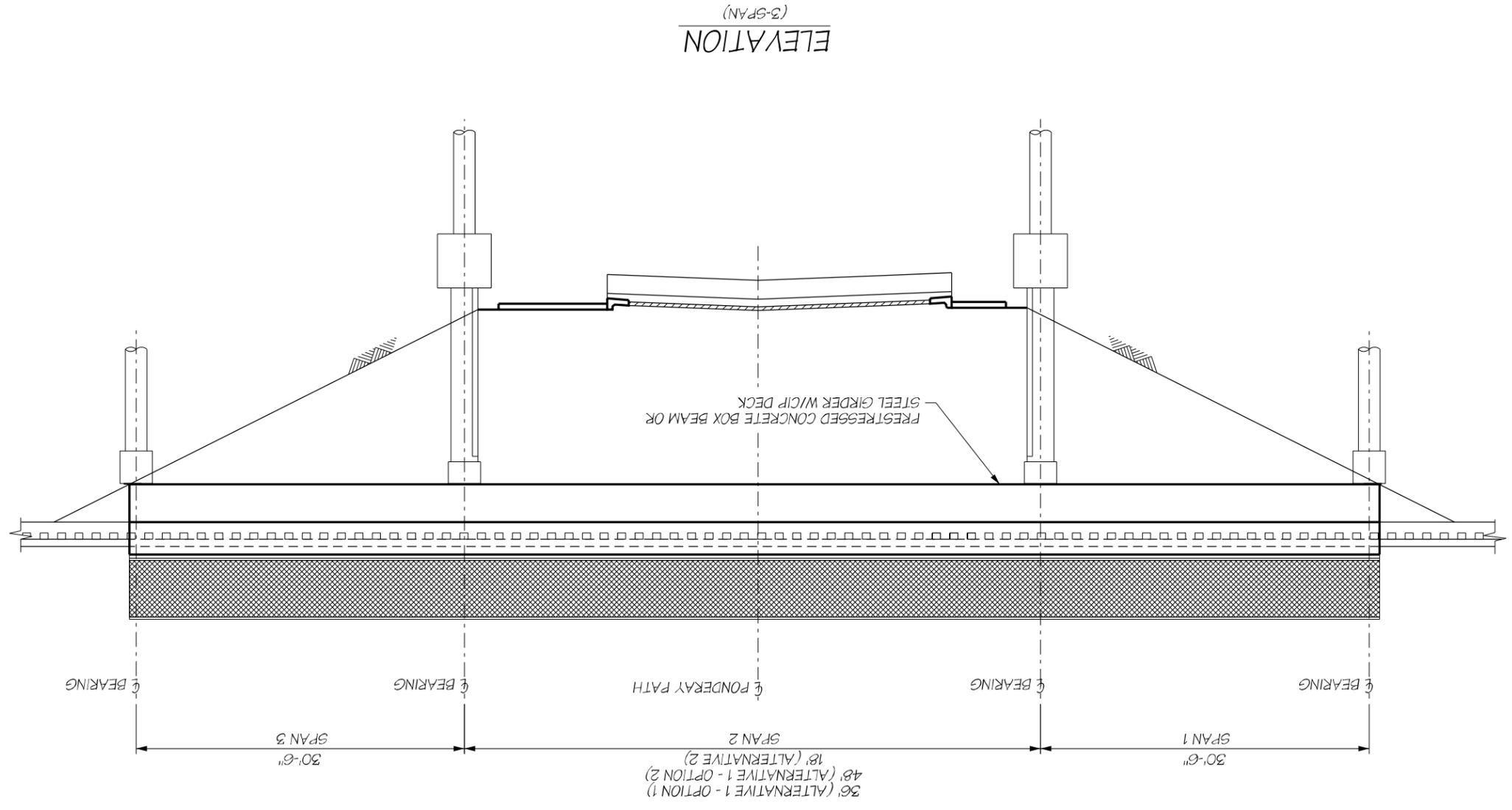
UPSTREAM END ELEVATION

PRELIMINARY DESIGN

PEND D'OREILLE BAY TRAIL
VEHICLE / PEDESTRIAN USE
BEBO ARCH BRIDGE

FIGURE 18





PRELIMINARY DESIGN

PEND O'REILLE BAY TRAIL
VEHICLE / PEDESTRIAN USE
ELEVATION-THREE SPAN BRIDGE

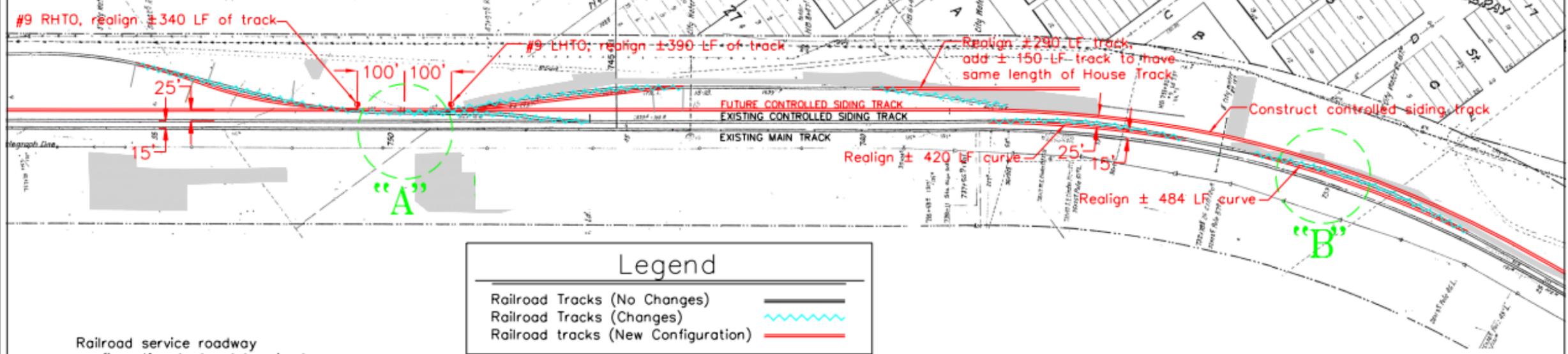
FIGURE 19

PRELIMINARY - FOR DISCUSSION PURPOSES

Background drawing is an excerpt from the Northern Pacific Railway Co. Kootenai Station Map dated June 8, 1934.

TO SANDPOINT, ID JCT.

TO HOPE, ID



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2/10/2017

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Verify scale!
This should be one-inch (1") on paper

OWN: NWB	DATE: 08-09-16	
CHK:	DATE:	
REV:		ENGINEERING DEPARTMENT
APPROVED:		Typical Future Railroad Track Layout to Accommodate Underpasses at Kootenai (MP 117)
DRAWING FILE: N:\NWB\4th Subd\Kootenai_MP117_ ...	SCALE: 1" = 200'	SHEET: 1 of 1

PRELIMINARY - FOR DISCUSSION PURPOSES

PRELIMINARY DESIGN
PEND D'OREILLE BAY TRAIL
MONTANA RAIL LINK
PRELIMINARY FUTURE TRACK LAYOUT

Figure 20



Appendix 2: Detailed Cost Estimates

Pend d' Oreille Bay Trail
Concept Cost Estimate Alternative 1 (Option 1)
32' width
March 10, 2017

Harbison Access Road - Station 0+00 to 12+50

Item	Unit	Quantity	Cost	Total
Excavation	CY	20716	\$ 10.00	\$ 207,164.57
Granular Borrow	CY	240	\$ 18.00	\$ 4,326.96
Plantmix	Ton	541	\$ 100.00	\$ 54,104.12
Aggrregate for Base	Ton	1658	\$ 21.00	\$ 34,826.08
Granular Sub-base	Ton	2553	\$ 13.00	\$ 33,182.80
Curb and Gutter	LF	2500	\$ 17.00	\$ 42,493.90
Sidewalk	SY	1110	\$ 35.00	\$ 38,859.00
Drainage	LS	1	\$ 75,746.70	\$ 75,746.70
Bike/Ped Rail	LF	410	\$ 65.00	\$ 26,681.20
MSE Retaining Walls	SF	9762	\$ 40.00	\$ 390,480.00
Traffic Control	LS	1	\$ 10,769.67	\$ 10,769.67
Subgrade Geotextile	SY	3471	\$ 2.00	\$ 6,942.89
Landscape	SF	24891	\$ 2.50	\$ 62,227.50
		Item Total =		\$ 987,805.39

Harbison Access Road - Station 12+50 to 17+40.75 (loop)

Item	Unit	Quantity	Cost	Total
Excavation	CY	10047	\$ 10.00	\$ 100,473.00
Granular Borrow	CY	3782	\$ 18.00	\$ 68,076.00
Plantmix	Ton	286	\$ 100.00	\$ 28,564.65
Aggrregate for Base	Ton	876	\$ 21.00	\$ 18,386.67
Granular Sub-base	Ton	1348	\$ 13.00	\$ 17,519.09
Curb and Gutter	LF	982	\$ 17.00	\$ 16,691.60
Sidewalk	SY	818	\$ 35.00	\$ 28,637.55
Drainage	LS	1	\$ 29,753.30	\$ 29,753.30
Bike/Ped Rail	LF	491	\$ 65.00	\$ 31,915.00
MSE Retaining Walls	SF	7797	\$ 40.00	\$ 311,880.00
Traffic Control	LS	1	\$ 4,230.33	\$ 4,230.33
Subgrade Geotextile	SY	1582	\$ 2.00	\$ 3,163.77
Geofoam	CY	700	\$ 82.00	\$ 57,400.00
		Item Total =	\$	716,690.97

Bridge Costs

Item	Unit	Quantity	Cost	Total
Bridge Wing Walls	SF	2907	\$ 260.00	\$ 755,820.00
Bridge	SF	0	\$ -	\$ 1,630,000.00
Temporary Shoring	LS	1	\$ 50,000.00	\$ 50,000.00
Rail Road Mainline Shoofly	LF	1600	\$ 220.00	\$ 352,000.00
Rail Road Siding Shoofly	LF	800	\$ 220.00	\$ 176,000.00
		Item Total =		\$ 2,963,820.00

Railroad Ave.

Item	Unit	Quantity	Cost	Total
Excavation	CY	56633	\$ 10.00	\$ 566,330.00
Plantmix	Ton	1148	\$ 100.00	\$ 114,781.05
Aggrregate for Base	Ton	2354	\$ 21.00	\$ 49,437.86
Granular Sub-base	Ton	6254	\$ 13.00	\$ 81,302.83
Bike/Ped Rail	LF	780	\$ 65.00	\$ 50,700.00
MSE Retaining Walls	SF	6275	\$ 40.00	\$ 251,000.00
Traffic Control	LS	1	\$ 10,000.00	\$ 10,000.00
Subgrade Geotextile	SY	5721	\$ 2.00	\$ 11,442.78
Landscape	SF	78073	\$ 2.50	\$ 195,182.50
		Item Total =		\$ 1,330,177.03

Sub Total =	\$ 5,998,493.38
Contigency (25%) =	\$ 1,499,623.35
Total Construction Costs =	\$ 7,498,116.73
Design Services (10%) =	\$ 749,811.67
Construction Services (10%) =	\$ 749,811.67
Change Order Contigency (5%) =	\$ 374,905.84
Total Estimate =	\$ 9,372,645.91

Pend d'Oreille Bay Trail

Concept Cost Estimate Alternative 1 (Option 2)

43' width

March 10, 2017

Harbison Access Road - Station 0+00 to 12+50

Item	Unit	Quantity	Cost	Total
Excavation	CY	27845	\$ 10.00	\$ 278,447.00
Granular Borrow	CY	323	\$ 18.00	\$ 5,815.80
Plantmix	Ton	727	\$ 100.00	\$ 72,720.59
Aggrregate for Base	Ton	2229	\$ 21.00	\$ 46,809.25
Granular Sub-base	Ton	3431	\$ 13.00	\$ 44,600.54
Curb and Gutter	LF	2500	\$ 17.00	\$ 42,493.90
Sidewalk	SY	2083	\$ 35.00	\$ 72,906.20
Drainage	LS	1	\$ 75,746.70	\$ 75,746.70
Bike/Ped Rail	LF	410	\$ 65.00	\$ 26,681.20
MSE Retaining Walls	SF	9762	\$ 40.00	\$ 390,480.00
Traffic Control	LS	1	\$ 10,769.67	\$ 10,769.67
Subgrade Geotextile	SY	4027	\$ 2.00	\$ 8,054.40
Landscape	SF	24891	\$ 2.50	\$ 62,227.50
		Item Total =		\$ 1,137,752.74

Harbison Access Road - Station 12+50 to 17+40.75 (loop)

Item	Unit	Quantity	Cost	Total
Excavation	CY	10047	\$ 10.00	\$ 100,473.00
Granular Borrow	CY	3782	\$ 18.00	\$ 68,076.00
Plantmix	Ton	286	\$ 100.00	\$ 28,564.65
Aggrregate for Base	Ton	876	\$ 21.00	\$ 18,386.67
Granular Sub-base	Ton	1348	\$ 13.00	\$ 17,519.09
Curb and Gutter	LF	982	\$ 17.00	\$ 16,691.60
Sidewalk	SY	818	\$ 35.00	\$ 28,637.55
Drainage	LS	1	\$ 29,753.30	\$ 29,753.30
Bike/Ped Rail	LF	491	\$ 65.00	\$ 31,915.00
MSE Retaining Walls	SF	7797	\$ 40.00	\$ 311,880.00
Traffic Control	LS	1	\$ 4,230.33	\$ 4,230.33
Subgrade Geotextile	SY	1582	\$ 2.00	\$ 3,163.77
Geofoam	CY	1828	\$ 82.00	\$ 149,877.78
		Item Total =	\$	809,168.75

Bridge Costs

Item	Unit	Quantity	Cost	Total
Bridge Wing Walls	SF	2907	\$ 260.00	\$ 755,820.00
Bridge	SF	3210	\$ 410.00	\$ 1,710,000.00
Temporary Shoring	LS	1	\$ 50,000.00	\$ 50,000.00
Rail Road Mainline Shoofly	LF	1600	\$ 220.00	\$ 352,000.00
Rail Road Siding Shoofly	LF	800	\$ 220.00	\$ 176,000.00
		Item Total =		\$ 3,043,820.00

Railroad Ave.

Item	Unit	Quantity	Cost	Total
Excavation	CY	56633	\$ 10.00	\$ 566,330.00
Plantmix	Ton	1148	\$ 100.00	\$ 114,781.05
Aggrregate for Base	Ton	2354	\$ 21.00	\$ 49,437.86
Granular Sub-base	Ton	6254	\$ 13.00	\$ 81,302.83
Bike/Ped Rail	LF	780	\$ 65.00	\$ 50,700.00
MSE Retaining Walls	SF	6275	\$ 40.00	\$ 251,000.00
Traffic Control	LS	1	\$ 10,000.00	\$ 10,000.00
Subgrade Geotextile	SY	5721	\$ 2.00	\$ 11,442.78
Landscape	SF	78073	\$ 2.50	\$ 195,182.50
		Item Total =		\$ 1,330,177.03

Sub Total =	\$ 6,320,918.51
Contigency (25%) =	\$ 1,580,229.63
Total Construction Costs =	\$ 7,901,148.14
Design Services (10%) =	\$ 790,114.81
Construction Services (10%) =	\$ 790,114.81
Change Order Contigency (5%) =	\$ 395,057.41
Total Estimate =	\$ 9,876,435.18

Pend d'Oreille Bay Trail

Concept Cost Estimate Alternative 2

43' width to RR Ave., 14' wide from RR. Ave. to Lake

March 10, 2017

Harbison Access Road - Station 0+00 to 10+40

Item	Unit	Quantity	Cost	Total
Excavation	CY	23167	\$ 10.00	\$ 231,667.90
Granular Borrow	CY	269	\$ 18.00	\$ 4,838.75
Plantmix	Ton	605	\$ 100.00	\$ 60,503.87
Aggrregate for Base	Ton	1855	\$ 21.00	\$ 38,945.30
Granular Sub-base	Ton	2854	\$ 13.00	\$ 37,107.65
Curb and Gutter	LF	2080	\$ 17.00	\$ 35,360.00
Sidewalk	SY	1733	\$ 35.00	\$ 60,666.67
Drainage	LS	1	\$ 75,746.70	\$ 75,746.70
Bike/Ped Rail	LF	410	\$ 65.00	\$ 26,681.20
MSE Retaining Walls	SF	9762	\$ 40.00	\$ 390,480.00
Traffic Control	LS	1	\$ 10,769.67	\$ 10,769.67
Subgrade Geotextile	SY	3351	\$ 2.00	\$ 6,702.22
Landscape	SF	24891	\$ 2.50	\$ 62,227.50
		Item Total =		\$ 1,041,697.43

Harbison Access Road - Station 10+40 to Lakeside Trail

Item	Unit	Quantity	Cost	Total
Excavation	CY	7042	\$ 10.00	\$ 70,421.53
Granular Borrow	CY	2650.8038	\$ 18.00	\$ 47,714.47
Plantmix	Ton	200	\$ 100.00	\$ 20,017.70
Aggrregate for Base	Ton	614	\$ 21.00	\$ 12,887.87
Granular Sub-base	Ton	945	\$ 13.00	\$ 12,278.93
Curb and Gutter	LF	2111	\$ 17.00	\$ 35,886.95
Sidewalk	SY	0	\$ 35.00	\$ -
Drainage	LS	1	\$ 29,753.30	\$ 29,753.30
Bike/Ped Rail	LF	491	\$ 65.00	\$ 31,915.00
MSE Retaining Walls	SF	7797	\$ 40.00	\$ 311,880.00
Traffic Control	LS	1	\$ 4,230.33	\$ 4,230.33
Subgrade Geotextile	SY	1760	\$ 2.00	\$ 3,520.00
Geofoam	CY	700	\$ 82.00	\$ 57,400.00
		Item Total =	\$	637,906.07

Bridge Costs

Item	Unit	Quantity	Cost	Total
Bridge Wing Walls	SF	2907	\$ 260.00	\$ 755,820.00
Bridge	SF	3210	\$ 410.00	\$ 1,500,000.00
Temporary Shoring	LS	1	\$ 50,000.00	\$ 50,000.00
Rail Road Mainline Shoofly	LF	1600	\$ 220.00	\$ 352,000.00
Rail Road Siding Shoofly	LF	800	\$ 220.00	\$ 176,000.00
		Item Total =		\$ 2,833,820.00

Railroad Ave.

Item	Unit	Quantity	Cost	Total
Excavation	CY	56633	\$ 10.00	\$ 566,330.00
Plantmix	Ton	1148	\$ 100.00	\$ 114,781.05
Aggrregate for Base	Ton	2354	\$ 21.00	\$ 49,437.86
Granular Sub-base	Ton	6254	\$ 13.00	\$ 81,302.83
Bike/Ped Rail	LF	780	\$ 65.00	\$ 50,700.00
MSE Retaining Walls	SF	6275	\$ 40.00	\$ 251,000.00
Traffic Control	LS	1	\$ 10,000.00	\$ 10,000.00
Subgrade Geotextile	SY	5721	\$ 2.00	\$ 11,442.78
Landscape	SF	78073	\$ 2.50	\$ 195,182.50
		Item Total =		\$ 1,330,177.03

Sub Total =	\$ 5,843,600.53
Contigency (25%) =	\$ 1,460,900.13
Total Construction Costs =	\$ 7,304,500.66
Design Services (10%) =	\$ 730,450.07
Construction Services (10%) =	\$ 730,450.07
Change Order Contigency (5%) =	\$ 365,225.03
Total Estimate =	\$ 9,130,625.82