6.14 Summary of Ecological Functions and Benefits

Under the proposed mitigation approach, these temporary impacts could be offset by applying temporary mitigation value from variety of project combinations (Table 6-17). The specific application of mitigation toward temporary or permanent impacts should match the species, stock, life stage, and habitat function, respectively.

Table 6-17. Proposed Mitigation Sites and Their Compensatory Value

	Mitigation Type (mitigation acreage applied to one or the other category, not both)		
Mitigation Site	**Permanent Mitigation Credits (acres)[a]**		**Temporary Mitigation Credit (acre-years)[b]**
Seward 1	0.38		6.26
Seward 2	0.05		0.85
Seward 3	0.14		2.23
Seward 4	1.09		19.37
Magnuson 1	0.12	**OR**	1.88
Magnuson 2	0.20		2.89
Taylor Creek	0.38		5.20
S. Lake WA	1.75		28.68
Cedar/ Elliott	1.67		22.18
Bear	4.55		67.21
East Approach	0.60		11.91
TOTALS	**10.91**		**168.64**

[a] Table E-3 shows calculation detail
[b] Table E-2 shows calculation detail

6.14.1. Mitigation for Temporary Impacts

Temporary project impacts that require compensatory mitigation include partial shading, fill, and increased predator fish habitat from the construction work bridges and falsework. These temporary impacts will bear the largest effect on juvenile Chinook as they migrate towards the Ship Canal in the shallow nearshore, where these work bridges are proposed to occur (see Section 4.3).

Based on a review of project impacts and available mitigation types, WSDOT is currently proposing using the restoration projects at Seward Park, Magnuson Park, and Taylor Creek to offset temporary impacts (Table 6-18). The mitigation actions will benefit survival of juvenile Chinook by increasing habitat function along their migratory path toward the Ship Canal. These projects will also benefit adult coho and sockeye, in terms of suitability of spawning habitat. Most of the juvenile rearing habitat restoration will benefit the juvenile Chinook originating from the Cedar River (i.e., Seward Park, Taylor Creek). Magnuson Park will benefit the North Lake Washington and Issaquah/ Sammamish stocks. This allocation of compensatory mitigation is proportional to the higher exposure of the Cedar River stocks to

the temporary work bridge impacts. While some of the North Lake Washington and Issaquah/ Sammamish stocks may encounter the temporary work bridges during outmigration, most will outmigrate through the Ship Canal without straying south into the work zone.

The assignment of mitigation sites to specific impact categories (permanent or temporary) has not been finalized, and could change pending finalization of the suite of mitigation sites and/or input from regulatory agencies. A summary of the compensatory mitigation value of these projects is presented in Appendix E, Table E-1. As described in Section 5.4 and Appendix E, the mitigation value is based on plan view acreages of mitigation actions. The plan view acreages are weighted by (1) relative fish use, (2) project type, and (3) discounts for the temporal lag of project function.

6.14.2. Mitigation for Permanent Impacts

A wide range of habitat restoration projects are proposed to address potential impacts to different salmonid species at various life stages during operation of the proposed SR 520, I-5 to Medina Project. Under the proposed mitigation approach, these permanent impacts could be offset by applying permanent mitigation value in a variety of project combinations Table 6-17). Based on a review of project impacts and available mitigation types, WSDOT is currently proposing using the South Lake Washington Shoreline, Cedar River/ Elliott Bridge, Bear Creek, and East Approach restoration projects to offset permanent (operational) impacts because the benefits include a wide range of species and life stages (Table 6-18). The assignment of mitigation sites to specific impact categories (permanent or temporary) has not been finalized, and could change pending finalization of the suite of mitigation sites and/or input from regulatory agencies. The mitigation accounting for each project is detailed in Appendix E, Table E-2.

Table 6-18. Proposed Mitigation Sites and Their Allocation to Permanent and Temporary Impacts

Mitigation Site	Mitigation Actions	Species/ Life Stage Addressed	Permanent Mitigation Credit (acres)	Temporary Mitigation Credit (acre-years)
Seward Park 1	Shoreline enhancement + hard structure removal, riparian restoration	Chinook (juvenile rearing/ feeding, juvenile migration),	0	6.26
Seward Park 2	Shoreline enhancement (gravel supplementation)	Chinook (juvenile rearing/ feeding, juvenile migration), Sockeye (spawning, rearing/feeding)	0	0.85
Seward Park 3	Shoreline enhancement (gravel supplementation), riparian restoration	Chinook (juvenile rearing/ feeding, juvenile migration),	0	2.23
Seward Park 4	Shoreline enhancement (gravel supplementation)	Sockeye (spawning)	0	19.37
Magnuson Park 1	Shoreline Enhancement + Hard Structure Removal, Riparian Restoration	Chinook (Juvenile Rearing/ Feeding, Juvenile Migration),	0	1.88
Magnuson Park 2	Shoreline Enhancement + Hard Structure Removal	Chinook (Juvenile Rearing/ Feeding, Juvenile Migration),	0	2.89
Taylor Creek	Channel and Delta Restoration, Riparian + Floodplain Restoration	Chinook (Rearing/ Feeding) Sockeye (Spawning, Rearing/ Feeding), Coho (Spawning, Rearing/ Feeding)	0	5.20

Mitigation Site	Mitigation Actions	Species/ Life Stage Addressed	Permanent Mitigation Credit (acres)	Temporary Mitigation Credit (acre-years)
South Lake Washington Shoreline Restoration	Shoreline Enhancement + Hard Structure Removal, Riparian Restoration, Dolphin Removal	Chinook (Juvenile Rearing/ Feeding, Juvenile Migration) Sockeye (Juvenile Rearing/ Feeding)	1.75	0
Bear Creek	Stream Enhancement, Riparian Restoration	Chinook (Rearing/ Feeding) Sockeye (Rearing/ Feeding) Coho (Rearing/ Feeding)	4.55	0
Cedar River/ Elliott Bridge	River Margin and Aquatic Off-channel Creation, Riparian + Floodplain Restoration	Chinook (Spawning, Rearing/ Feeding) Sockeye (Spawning, Rearing/ Feeding) Coho (Spawning, Rearing/ Feeding) Steelhead (Spawning, Rearing/ Feeding)	1.67	0
East Approach	Shoreline enhancement (gravel supplementation, bulkhead removal), riparian enhancement	Sockeye (Spawning) Chinook (Juvenile Rearing/ Feeding, Juvenile Migration)	0.60	0

6.14.3. Comparison of Impacts and Mitigation

According to the impact and mitigation–assessment framework (Tables 4-2 and 4-3), the SR 520, I-5 to Medina Project's proposed mitigation actions compensates for both permanent and temporary impacts (Table 6-19). Although the final dispensation of permanent and temporary mitigation credit assignment to individual sites has not been finalized, the current site assignment, as discussed above, and the variety and quantity of proposed mitigation is adequate to compensate for both temporary and permanent project impacts.

The mitigation value to the focal fish and their survival at various life stages are commensurate with potential impacts to the same species and life stages, as modeled in Figure 6-14. Although the impacted habitat features (see model in Figure 4-1) and mitigation habitat features (see model in Figure 6-14) differed in type and spatial location, the project's mitigation targeted the same species, stocks, and life stages that were impacted (Section 4.1; Table 6-1). Because the temporary and permanent impacts are likely to affect juveniles migrating toward the Ship Canal, most compensatory mitigation actions are designed to benefit juvenile survival. In addition, these restoration projects are intended to enhance spawning success of all focal species in order to address the concern of unanticipated project effects on adults migrating from the Ship Canal into the lake. The proposed plan provides an excess of compensatory mitigation. Any unknown project impacts that are identified in the future will be mitigated, as appropriate.

Table 6-19. Total Impact and Mitigation Metrics after Application of the Mitigation Framework

	Permanent (Acres)	Temporary (Acre-Years)
Impacts	7.43	17.04
Mitigation	8.56	38.66

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Figure 6-14. Conceptual Model of Mitigation Benefits

Population Metric/Endpoint	Survival and growth of fry and pre-smolts	Survival, growth, and fitness of smolts	Spawner Recruitment	Successful reproduction
Salmonid Life History Stage	**Juvenile Rearing/Feeding**	**Juvenile Migration**	**Adult Migration**	**Spawning**
Primary Habitat Functions	• **Provide food sources** • Provide suitable water quality • **Provide predator protection** • Provide high-flow refugia	• Provide suitable water quality • **Provide predator protection** • **Provide open migration corridors**	• Provide suitable water quality • **Provide open migration corridors**	• Provide suitable water quality • **Provide spawning habitat**
Affected Habitat Features	• **Gradual sloped bank** • **Suitable sediment** • **Vegetative cover** • **Prey input** • Removal of predator habitat and toxic material • LWD recruitment • **Pools** • **Off-channel**	• Removal of predator habitat and toxic material • **Gradual sloped bank** • **Suitable sediment** • **Vegetative cover** • **Floodplain connectivity** • **Channel complexity**	• **Floodplain connectivity** • **Channel complexity** • **Scour pools**	o **Suitable substrate** o **Bank stability** • **Floodplain connectivity** • **Channel complexity**

** Bold text denotes those metrics with a substantial effect.*

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7. Mitigation Goals, Objectives, and Performance Standards

WSDOT uses goals and objectives to guide mitigation design and construction. Goals and objectives typically are based on area or function. Goals describe the overall intent of mitigation efforts; objectives describe individual components of the mitigation site in detail. Performance standards are the benchmarks that define success for each objective and direct adaptive management. These standards describe specific on-site characteristics that indicate whether the mitigation site meets an objective. They also guide the management of the mitigation site. Performance standards are also used to evaluate compliance with regulatory permits during the monitoring period. Contingency plans describe what actions can be taken to correct site deficiencies.

WSDOT uses an adaptive management process to improve mitigation success and correct site deficiencies that are observed during monitoring. Adaptive management is a process through which monitoring results may initiate changes to mitigation and maintenance activities, or monitoring protocols. Mid-course corrections may be necessary if monitoring data show the site is developing in ways that were not anticipated during design and permitting of the project. Information from ongoing monitoring further directs subsequent site management activities. WSDOT will monitor the site for up to 10 years and perform maintenance, as necessary, to achieve the mitigation performance standards. As part of the adaptive management process, mid-course corrections may be necessary if the site develops in ways that were not anticipated during design and permitting of the project. These mid-course corrections require coordination with regulators, and may, in some cases, require negotiation of revised performance standards.

7.1 Goals

The SR 520, I-5 to Medina Project will use a comprehensive mitigation plan to compensate for permanent aquatic impacts by restoring 2.57 acres of shoreline, 18.66 acres of riparian/ floodplain habitat, and 3.86 acres of stream and off-channel habitat. This mitigation plan will compensate for temporary aquatic impacts by restoring 2.53 acres of lacustrine shoreline/ stream habitat, 2.47 acres of riparian/ floodplain habitat. This mitigation plan will be sufficient to meet federal, state, and local regulatory requirements.

7.2 Objectives

7.2.1. Seward Park 1

Off-site compensatory mitigation at Seward Park Project 1 will provide the following:

SEW1_1: *Enhance 0.39 acre of shoreline habitat by removing bulkheads and riprap, excavating the shoreline to a gradual grade, and installing appropriate-sized gravel and LWD.*

SEW1_2: *Enhance 0.40 acre of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.2.2. Seward Park 2

Off-site compensatory mitigation at Seward Park Project 3 will provide the following:

SEW2_1: *Enhance 0.06 acre of shoreline habitat by covering angular cobble and sand with appropriately sized gravel.*

7.2.3. Seward Park 3

Off-site compensatory mitigation at Seward Park Project 2 will provide the following:

SEW3_1: *Enhance 0.18 acre of shoreline habitat by covering angular cobble with appropriately sized gravel.*

SEW3_2: *Enhance 0.23 acre of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.2.4. Seward Park 4

Off-site compensatory mitigation at Seward Park Project 4 will provide the following:

SEW4_1: *Enhance 1.36 acres of shoreline habitat by covering sand and cobble with appropriately sized gravel.*

7.2.5. Magnuson Park 1

Off-site compensatory mitigation at Magnuson Park Project 1 will provide the following:

MAG1_1: *Enhance 0.13 acre of shoreline habitat by removing concrete rubble, excavating the shoreline to a gradual grade, and installing appropriate-sized gravel and LWD.*

MAG1_2: *Enhance 0.37 acres of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.2.6. Magnuson Park 2

Off-site compensatory mitigation at Magnuson Park Project 2 will provide the following:

MAG2_1: *Enhance 0.14 acre of shoreline habitat by removing bulkheads and concrete rubble.*

MAG2_2: *Create 0.04 acre of stream channel by excavating a new outlet that will function as an outlet for the Seattle Parks Department Habitat Improvement Area wetland complex.*

MAG2_3: *Enhance 0.73 acre of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.2.7. Taylor Creek

Off-site mitigation will take place at Taylor Creek, between the Lake Washington shoreline and Rainier Avenue SW. The off-site compensatory mitigation will provide the following:

TAY1*: Restore 0.15acre of stream habitat by relocating and reconfiguring the existing stream channel, and installing appropriate-sized gravel and LWD.*

TAY2: *Enhance 0.74 acre of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

TAY3: *Restore 0.74 acre of floodplain habitat by removing historical fill, structures, asphalt, concrete, utilities, underground storage tanks, etc.*

TAY4: *Restore 0.08 acre of the Taylor Creek delta, temporarily, by re-sloping the delta to a configuration that is passable by adult salmon during the managed low lake level.*

7.2.8. South Lake Washington Shoreline Restoration (DNR Parcel)

Off-site mitigation will take place at four locations at the South Lake Washington Shoreline Restoration (DNR Parcel). The off-site compensatory mitigation will provide the following:

DNR1: *Enhance 1.74 acres of shoreline habitat through removal of a corrugated sheet metal flume, rubble, shoreline excavation to attain a gradual grade, and installation of appropriate-sized gravel.*

DNR2: *Enhance 2.51 acres of riparian habitat, where invasive weeds will be removed and native vegetation will be installed, where 1.92 acres will be planted with trees and shrubs, 0.59 acres will be planted with just shrubs, and wetlands plants will be planted, as determined by the planting plan.*

7.2.9. Cedar River/ Elliott Bridge Reach

Off-site mitigation will take place at the Elliott Bridge reach mitigation site. The off-site compensatory mitigation will provide the following:

***CED1**: Restore 3.47 acres of floodplain habitat, where existing levees will be removed, areas behind the levees excavated to appropriate grades, and the natural hydrologic processes restored along the Cedar River.*

***CED2:** Create 0.70 acre (approximately 500 linear feet) of off-channel rearing habitat and riverine marginal habitat. Install an engineered logjam (ELJ) at the mouth of the channel and LWD habitat features along the right bank of the channel.*

***CED4:** Enhance 3.47 acres of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.2.10. Bear Creek

Off-site mitigation will take place at the Bear Creek mitigation site. The off-site compensatory mitigation will provide the following:

***BEAR1:** Restore 12.62 acres of floodplain habitat through removal of existing levees, excavation within areas behind the levees to appropriate grades, and restoration of natural hydrologic processes along Bear Creek.*

***BEAR2:** Enhance 12.62 acres of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

***BEAR3:** Restore 3.16 acres of stream habitat by relocating existing stream channel, stabilizing stream banks, and installing appropriate-sized gravel and LWD.*

7.2.11. East Approach

Off-site mitigation will take place at the east approach site. The off-site compensatory mitigation will provide the following:

***SOCK1:** Enhance 0.75 acre of sockeye salmon beach-spawning habitat through installation of spawning gravel offshore.*

***SOCK2:** Enhance 0.08 acre of shoreline habitat through removal of bulkheads and riprap, excavation of the shoreline to a gradual grade, and installation of appropriate-sized gravel and LWD.*

***SOCK3:** Enhance 0.06 acre of riparian habitat through removal of invasive vegetation and installation of native tree and shrub vegetation.*

7.3 Performance Standards

The performance standards described below provide benchmarks for measuring the progress of the mitigation sites' goals and objectives. Mitigation activities are intended to meet these

performance standards within 10 years. Methods to monitor each performance standard are described in general terms.

Performance standards describe measurable attributes that can be used to evaluate success in meeting the goals and objectives of a compensatory mitigation project. Performance measures are used to guide site management activities during the monitoring period. Success standards are benchmarks measured during the final year of monitoring (Year 5 or 10) that are used to help evaluate compliance with regulatory requirements. Performance measures will be used to verify that the mitigation is on track to achieve the success standards.

Performance standards and contingency plans will be organized by objectives that re-occur in the array of mitigation sites proposed in this plan. The mitigation projects and their objectives are summarized in Table 7-1.

Table 7-1. Generalized Project Objectives

Mitigation Site	Objective			
	Shoreline Enhancement (Lacustrine)	Stream Restoration	Riparian Restoration	Floodplain Restoration
Seward Park 1	X		X	
Seward Park 2	X			
Seward Park 3	X		X	
Seward Park 4	X			
Magnuson Park 1	X		X	
Magnuson Park 2	X	X	X	
Taylor Creek	X	X	X	X
South Lake Washington Shoreline Restoration (DNR Parcel)	X		X	
Cedar River		X	X	X
Bear Creek		X	X	X
East Approach	X		X	

7.3.1. Shoreline Enhancement (Lacustrine) Performance

The shoreline enhancement performance standards document and verify that the shoreline features are established according to the standards specified during the design. The shoreline

restoration performance standards also ensure that the shoreline features are functioning as intended. These shoreline performance standards directly relate to Objectives SEW1_1, SEW2_1, SEW3_1, SEW4_1, MAG1_1, MAG2_1, TAY4, DNR1, SOCK 1 and SOCK2. Lacustrine habitat measurements should occur in year 1 and in subsequent years as defined in the performance standards. Lake Washington is managed by the USACE at "high" and "low" surface water elevations during different times of the year. LWD habitat measurements should occur in May, when surface water elevations are high. Substrate particle size measurements should be made between November- January, when surface water elevations are low.

Performance Standards

Year 1

- As-built condition is consistent with the project design elements, including hard structure removal, site grading plan, gravel supplementation specifications, and installed habitat features.

Year 3

- The slope of the enhanced shoreline habitat is at or below 15% grade, as measured from low lake level to the high lake level elevation to a 1-m depth. The LWD structures are hydraulically engaged within the wetted portion of the lakes (at high lake level).

- At least 80% of placed LWD pieces are retained within the project limits.

- At the shoreline substrate enhancement sites (not including the deep water gravel installation at the east approach, Seward 2 or Seward 4 sites), median substrate particle size (D50) is less than or equal to 49 mm or no greater than an 80% increase above the initial D_{50} (whichever is greater). The initial D50 is measured during the as-built gravel installation. The D50 will be estimated based on pebble counts in each area of gravel supplementation, respectively. The b-axis of substrate particles will be measured along transects from the high water level to the waterward extent of substrate enhancement. Transects will be spaced along shoreline every 30 meters, and only in the area of substrate enhancement. The D50 at deep water gravel installation sites (at east approach, Seward 2 or Seward 4) will be estimated by visual inspection or grab samples from the water surface.

Year 5

- The slope of the enhanced shoreline habitat is at or below 15% grade, as measured from low lake level to the high lake level elevation to a 1-m depth. The LWD structures are engaged within the wetted portion of the lakes (at high lake level).

- At the shoreline substrate enhancement sites (not including the deep water gravel installation at the east approach, Seward 2 or Seward 4 sites), median substrate particle size (D50) is less than or equal to 49 mm or no greater than an 80% increase above the initial D_{50} (whichever is greater). The initial D50 is measured during the as-built gravel installation. The D50 will be estimated based on pebble counts in each area of gravel supplementation, respectively. The b-axis of substrate particles will be measured along transects from the high water level to the waterward extent of substrate enhancement. Transects will be spaced along shoreline every 30 meters, and only in the area of substrate enhancement. The D50 at deep water gravel installation sites (at east approach, Seward 2 or Seward 4) will be estimated by visual inspection or grab samples from the water surface.

- At least 50% of placed LWD is retained within the project limits.

7.3.2. Stream Restoration Performance

The performance standards for stream restoration document and verify that the stream features are established according to the criteria specified during the design. The stream restoration performance standards also assure that the stream features are functioning as intended. These stream restoration performance standards directly relate to Objectives MAG2_2, TAY1, CED2, and BEAR3.

Performance Standards

Year 1

- As-built condition is consistent with the project design elements, including hard structure removal, site grading plan, and installed habitat features.

Year 3

- Stream habitat is accessible to adult and juvenile fish, specifically at the Cedar River side channel, the lower reach of Taylor Creek, and the off-channel habitat at Bear Creek. The connection point to deeper and adjacent water must be at least 0.5 feet deep during seasonal low-water periods (late summer and early fall for the Cedar River and Bear Creek; early fall for the lower reach of Taylor Creek).

- The channel does not show signs of headcutting or avulsion. Headcutting will be measured by a thalweg bankfull depth profile of the new aquatic habitat features, as

compared to as-built installation. Signs of avulsion will be determined by mapping the shoreline and noting areas of erosion into the stream bank. If detected, an analysis will be conducted in order to determine if the geomorphic process is detrimental to aquatic habitat or acceptable.

- The LWD and ELJ structures are hydraulically engaged within the wetted portion of the streams (as measured during the late summer or early fall low-flow period).
- The in-stream structures (LWD and ELJ) remain intact and are either 1) providing cover, 2) trapping sediment, or 3) scouring a pool.
- At least 80% of placed LWD is retained within the project limits.

Year 5

- Stream habitat is accessible to adult and juvenile fish, specifically at the Cedar River side channel, the lower reach of Taylor Creek, and the off-channel habitat at Bear Creek. The connection point to deeper and adjacent water must be at least 0.5 feet deep during seasonal low-water periods (late summer and early fall for the Cedar River and Bear Creek; early fall for the lower reach of Taylor Creek).
- The channel does not show signs of headcutting or avulsion. Headcutting will be measured by a thalweg bankfull depth profile of the new aquatic habitat features, as compared to as-built installation. Signs of avulsion will be determined by mapping the shoreline and noting areas of erosion into the stream bank. If detected, an analysis will be conducted in order to determine if the geomorphic process is detrimental to aquatic habitat or acceptable.
- The LWD and ELJ structures are engaged within the wetted portion of the streams (at low water).
- The in-stream structures (LWD and ELJ) remain intact and are either 1) providing cover, 2) trapping sediment, or 3) scouring a pool.
- At least 60% of placed LWD is retained within the project limits.

7.3.3. Riparian Restoration Performance

The riparian performance standards document the establishment of a plant community that (1) stabilizes shoreline or stream banks, and (2) provides fish cover. The riparian performance standards directly relate to Objectives SEW1_2, SEW3_2, MAG1_2, MAG2_3, TAY2, DNR2, CED4, and BEAR2. Wetland vegetation performance standards will apply to the wetland planting zone at the Cedar River/Elliott Bridge Reach sites (objectives CED4 and DNR2) as defined in “Wetland Vegetation” performance standards (Section 6.1.3) in the SR

520, I-5 to Medina: Bridge Replacement and HOV Project Draft Final Wetland Mitigation Report (WSDOT 2011a).

Performance Standards

Year 1

- As-built condition is consistent with the planting plan.
- Native woody species (planted and volunteer) achieve an average density of at least four plants per 100 square feet in the overall riparian zone and a density of 6 plants per 100 square feet within 10 feet of the shoreline.

Year 3

- Native woody species (planted and volunteer) achieve an average density of at least four plants per 100 square feet in the overall riparian zone and a density of 6 plants per 100 square feet within 10 feet of the shoreline.

Year 5

- Cover of native woody species (planted and volunteer) is at least 30% in the riparian zone.

Year 7

- Cover of native woody species (planted and volunteer) is at least 40% in the riparian zone.

All years

- Washington State and King County listed Class A Noxious Weeds indentified on the site are eradicated.
- King County listed Class B and C Weeds identified on the site are controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants. If Japanese knotweed is found at the mitigation site during monitoring, WSDOT (or its designated representatives) will promptly remove the stems above ground and chemically treat it to facilitate elimination of roots and rhizomes below ground.
- Noxious weeds listed by King County as Non-Designate including reed canarygrass, non-native blackberries, and Scot's broom do not exceed 25% aerial cover in riparian zones.

Year 10

- Cover of native woody species (planted and volunteer) is at least 50% in the riparian zone.

7.3.4. Floodplain Restoration Performance

The floodplain restoration performance standards document the establishment of a plant community that (1) provides habitat for native wildlife, (2) allows for regular inundation above the OHWM, and (3) provides vegetative roughness to slow floodwaters and allow the deposition of sediment and associated pollutants. The buffer woody vegetation performance standards directly relate to Objectives TAY3, CED1, and BEAR1.

Performance Standards

Year 1

- As-built condition is consistent with the grading, planting, and habitat structure elements of the project design.

Year 1 and Year 3

- Native woody species (planted and volunteer) achieve an average density of at least four plants per 100 square feet in the floodplain.

Year 5

- Cover of native woody species (planted and volunteer) is at least 30% in the floodplain.

Year 7

- Cover of native woody species (planted and volunteer) is at least 40% in the floodplain.

All years

- Washington State and King County listed Class A Noxious Weeds identified on the site are eradicated.

- King County listed Class B and C Weeds identified on the site are controlled. Control of noxious weeds means to prevent all seed production and to prevent the dispersal of all propagative parts capable of forming new plants. If Japanese knotweed is found at the mitigation site during monitoring, WSDOT (or its designated representatives) will promptly remove the stems above ground and chemically treat it to facilitate elimination of roots and rhizomes below ground.

- Noxious weeds listed by King County as Non-Designate including reed canarygrass, non-native blackberries, and Scot's broom do not exceed 25% aerial cover in floodplain.

Year 10

- Cover of native woody species (planted and volunteer) is at least 50% in the floodplain.

7.4 Monitoring

WSDOT staff (or its designated representatives) will monitor the mitigation site for 10 years after installation. If all the performance standards are achieved in less than 10 years, WSDOT may terminate monitoring with approval of the review agencies.

Quantitative monitoring will be completed and documented 1, 3, 5, 7, and 10 years after initial acceptance of the mitigation construction. The site should be evaluated during the summer following plant installation to assess survival rates and document the presence of non-native invasive species. Engineered stream channels and structures will be monitored during years 1, 3, 5, and 7 to verify that their habitat and hydraulic elements are functioning as intended. The WSDOT HQ Monitoring Program (or its designated representatives) will also complete informal (qualitative) assessments of the mitigation sites in years 2, 4, 6, 8, and 9 for adaptive management purposes only.

Quantitative monitoring will be designed to determine if the performance standards have been met. Monitoring reports will be submitted to the recipients listed in Table 7-2 by the month of April following the formal monitoring activities conducted the previous year.

Table 7-2. Monitoring Report Recipients

Permitting Agency or Organization
U.S. Army Corps of Engineers
Washington State Department of Ecology
WDFW
City of Seattle

WSDOT has established a comprehensive set of monitoring methods used to monitor mitigation sites. The actual methods used to monitor each site are documented in annual monitoring reports prepared by WSDOT's Monitoring Program based in the Environmental Services Office in Olympia, Washington, or its designated representatives.

Contingency Plans

WSDOT anticipates that the mitigation goals will be accomplished with the construction and installation of the mitigation design shown on the grading and planting plans. Contingency actions, however, may be needed to correct unforeseen problems. Contingency revisions typically require coordination with the permitting agencies.

As necessary, contingency measures (site management or revisions to performance standards with permitting agency agreement) will be implemented to meet performance measures and standards.

7.5 Site Management

WSDOT (or its designated representatives) will manage the sites annually for the first 10 years. Site management activities shall include noxious weed control and may include mulching, fertilizing, supplemental watering, maintaining access, repairing damage from vandals, correcting erosion or sedimentation problems, or picking up litter. During the first year, supplemental watering of installed vegetation may occur during July, August, and September to ensure, at a minimum, the equivalent of normal rainfall levels and no periods of drought (no rainfall or watering) longer than 3 weeks.

Reed canarygrass dominates the watershed and suppression/control of this invasive plant will require careful site preparation and active site management. While complete elimination of reed canarygrass from the mitigation site may not be possible, it should be managed sufficiently to ensure survival of the native planted species until they can effectively compete.

8. References

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Appendix A

Compensatory Mitigation Site Photos

Figure A-1. Seward Project 1, existing bulkhead. View is to the northeast.

Figure A-2. Seward Park Project 3. View is to the NNE.

Figure A-3. Seward Park Project 3. Angular Cobble.

Figure A-4. Magnuson Park Project 1 shoreline has very little riparian vegetation and an actively eroding vertical bank.

Figure A-5. Magnuson Park Project 2 existing shoreline.

Figure A-6. Taylor Creek delta.

Figure A-7. Taylor Creek existing shoreline.

Figure A-8. Taylor Creek, just upstream of the delta. Note the channel confinement with placement of boulders, the adjacent asphalt parking area, and upstream culvert. Also note the abundant gravel bedload.

Figure A-9. DNR Parcel, looking east toward the undeveloped shoreline. The end of the flume is located on the left side of the photo.

Figure A-10. DNR Parcel, looking east at the opening of the flume.

Figure A-11. DNR Parcel looking south toward Boeing plant.

Figure A-12. The narrow floodplain bench on the right bank of the Elliott Reach, Cedar River.

Figure A-13. Levee with riprap on the right bank of the Elliott Reach, Cedar River.

Figure A-14. Cedar River, levee and riprap on right (north) bank.

Figure A-15. Bear Creek low gradient riffle and armored stream banks near mouth.

Figure A-16. Southern riparian buffer of Bear Creek. SR 520 in background.

Figure A-17. WSDOT shoreline at the East Approach Gravel Supplementation project area.

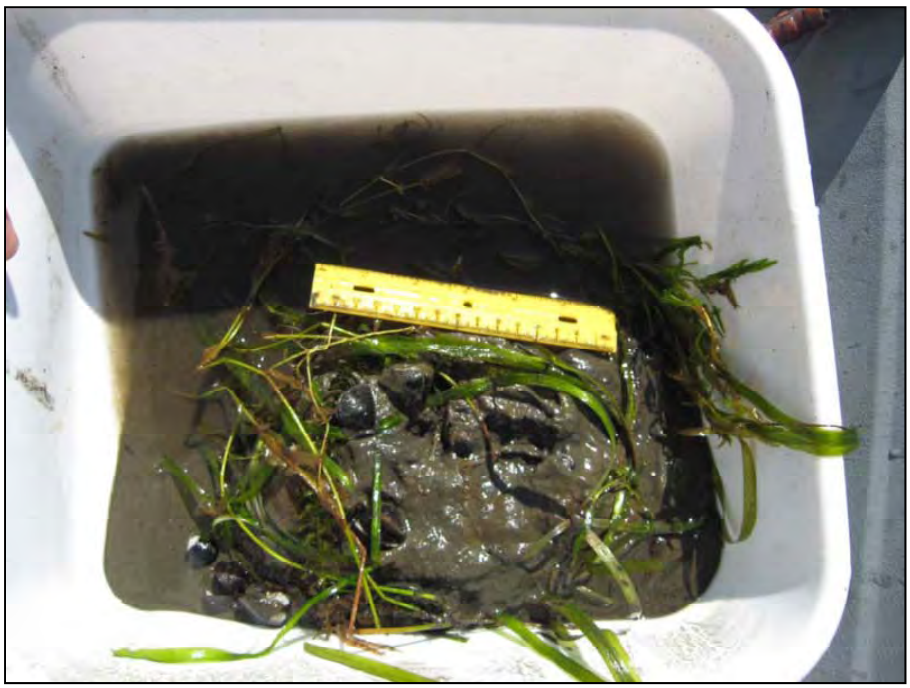

Figure A-18. Existing substrate in the East Approach project area targeted for gravel supplementation.

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Appendix B

Grading Profiles

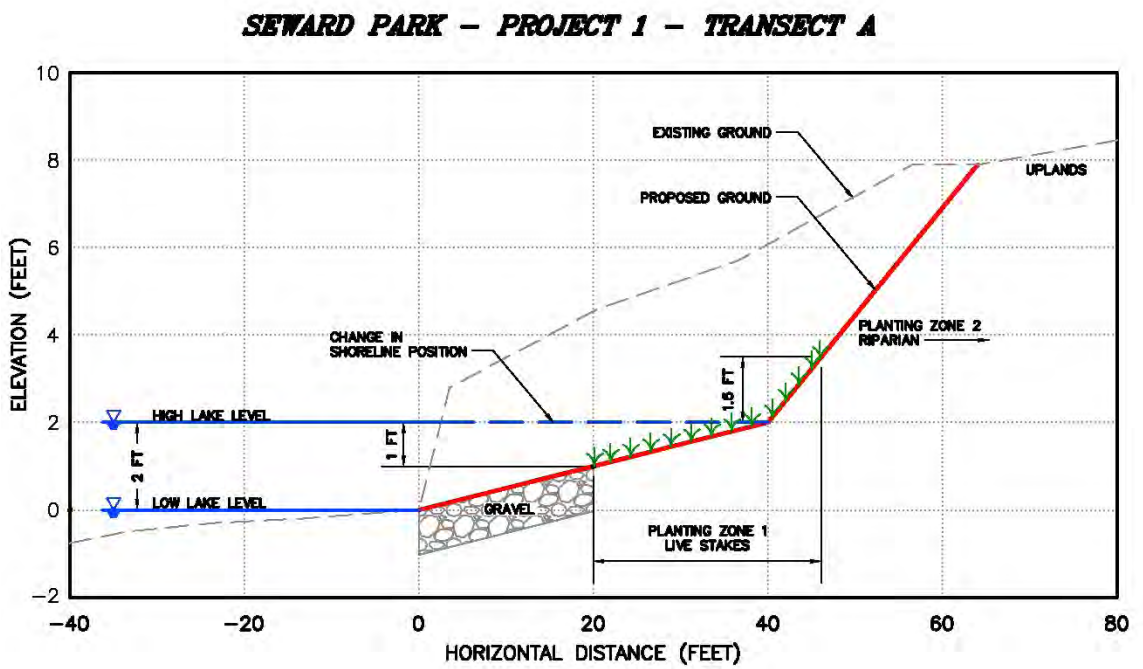

Figure B-1. Seward Park Project 1, Transect A

EXISTING	
Slope of in-water reach (%)	2
PROPOSED	
From Low to High Lake Level (%)	5
From High Lake Level to Upland (%)	25
Change in Shoreline Position (ft)	37

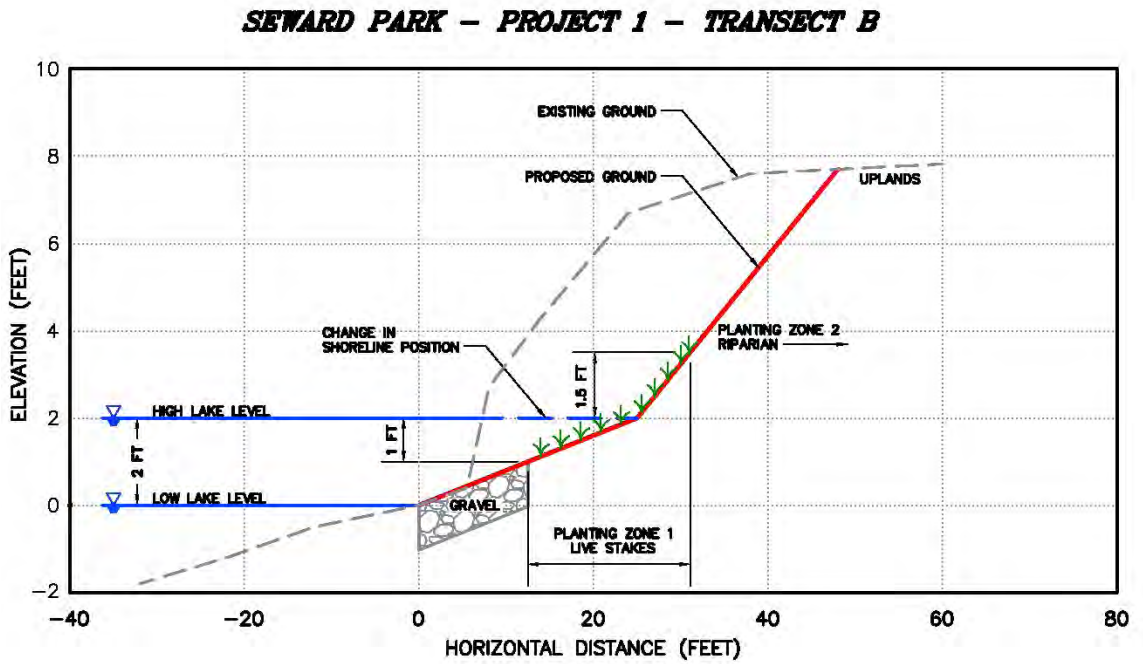

Figure B-2. Seward Park Project 1, Transect B

EXISTING	
Slope of in-water reach (%)	6
PROPOSED	
From Low to High Lake Level (%)	8
From High Lake Level to Upland (%)	25
Change in Shoreline Position (ft)	18

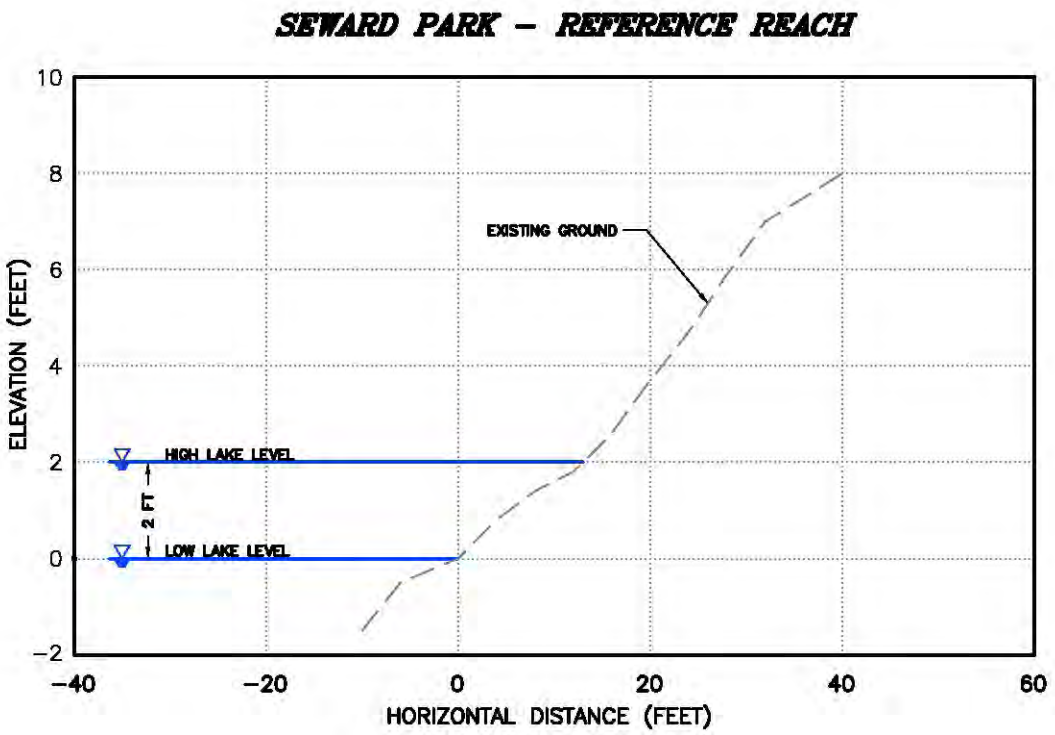

Figure B-3. Seward Park Project 1, Reference Reach

EXISTING	
Slope of in-water reach (%)	15.0
Slope of non-wetted reach (%)	20.0

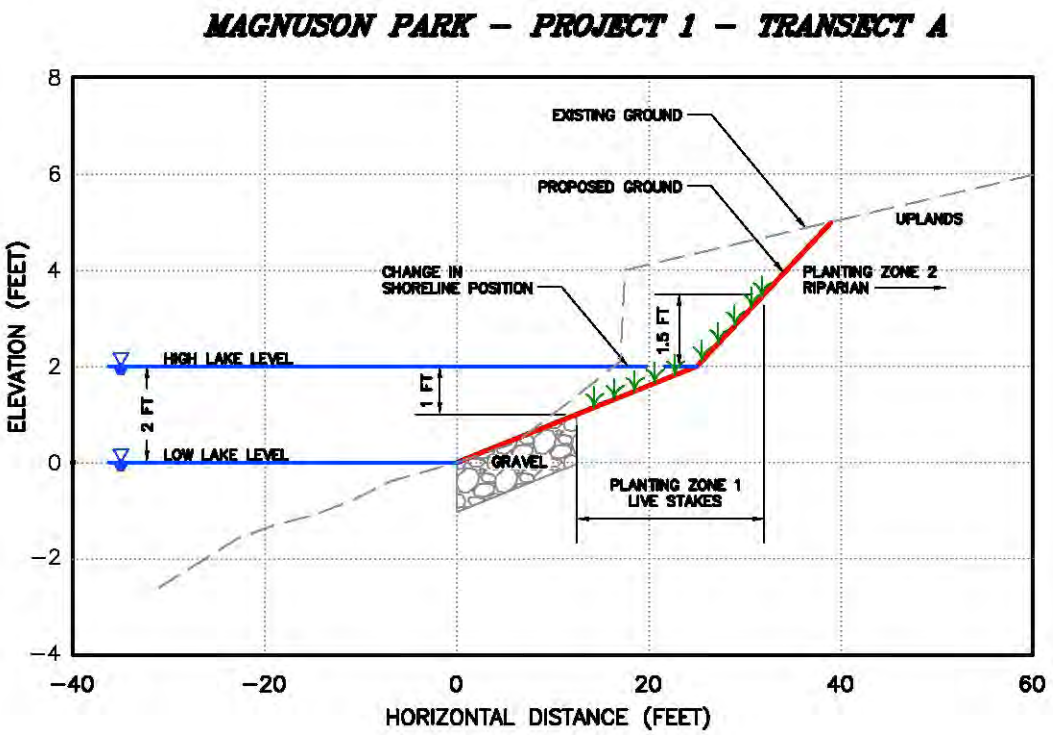

Figure B-4. Magnuson Park Project 1, Transect A

EXISTING	
Slope of in-water reach (%)	8
Slope of non-wetted reach (%)	13
PROPOSED	
From Low to High Lake Level (%)	8
From High Lake Level to Upland (%)	21
Change in Shoreline Position (ft)	8

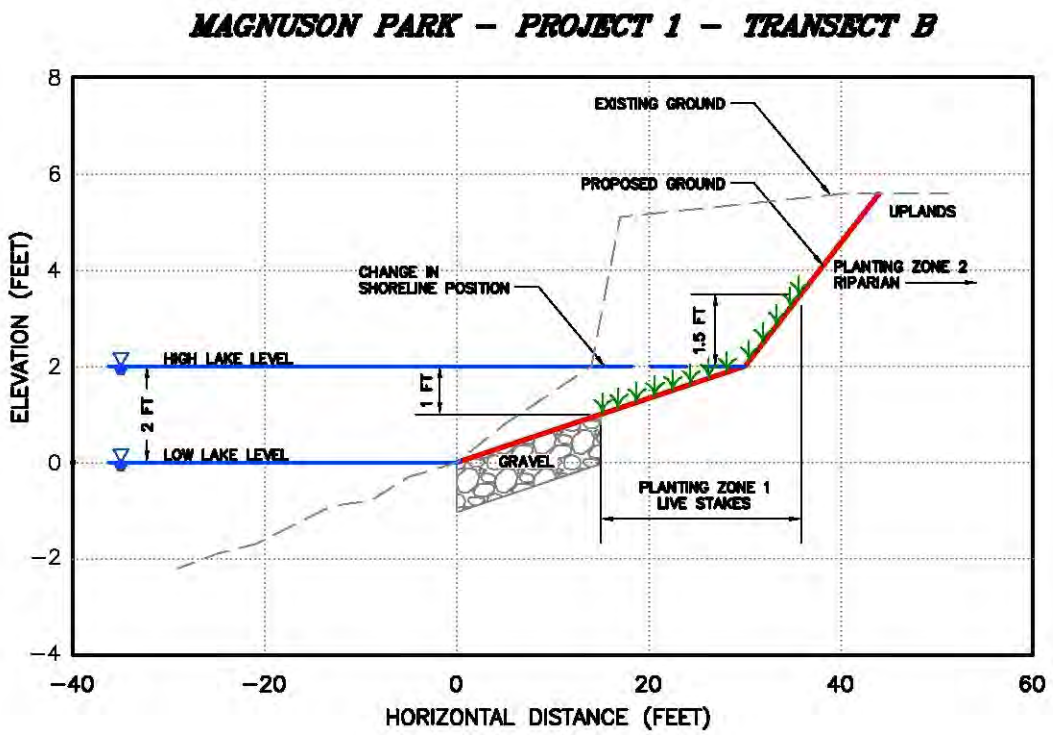

Figure B-5. Magnuson Park Project 1, Transect B

EXISTING	
Slope of in-water reach (%)	8
Slope of non-wetted reach (%)	14
PROPOSED	
From Low to High Lake Level (%)	7
From High Lake Level to Upland (%)	25
Change in Shoreline Position (ft)	16

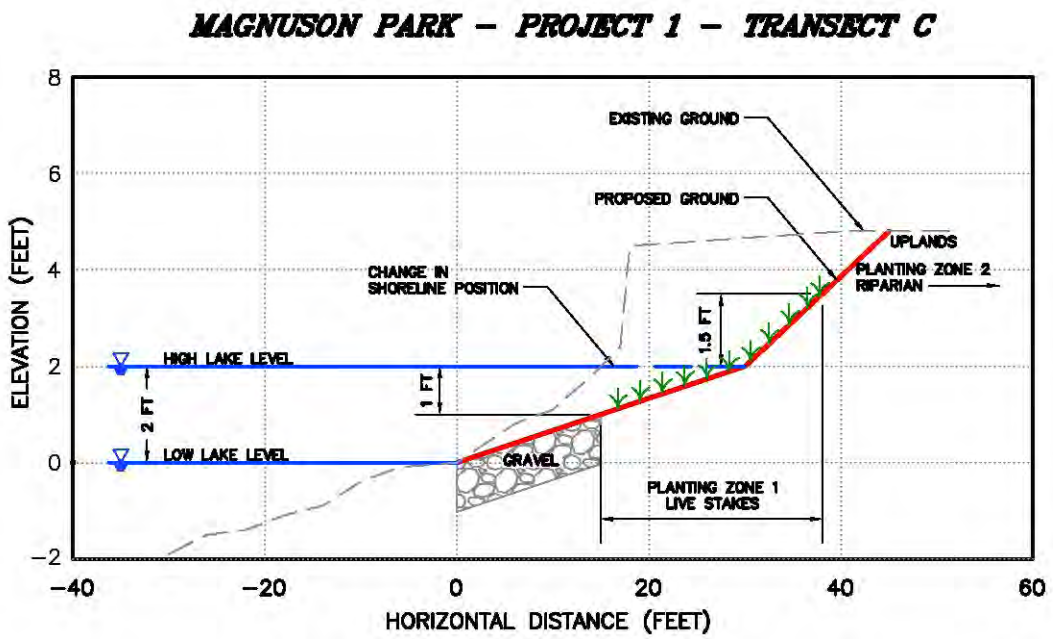

Figure B-6. Magnuson Park Project 1, Transect C

EXISTING	
Slope of in-water reach (%)	6
Slope of non-wetted reach (%)	12
PROPOSED	
From Low to High Lake Level (%)	7
From High Lake Level to Upland (%)	25
Change in Shoreline Position (ft)	15

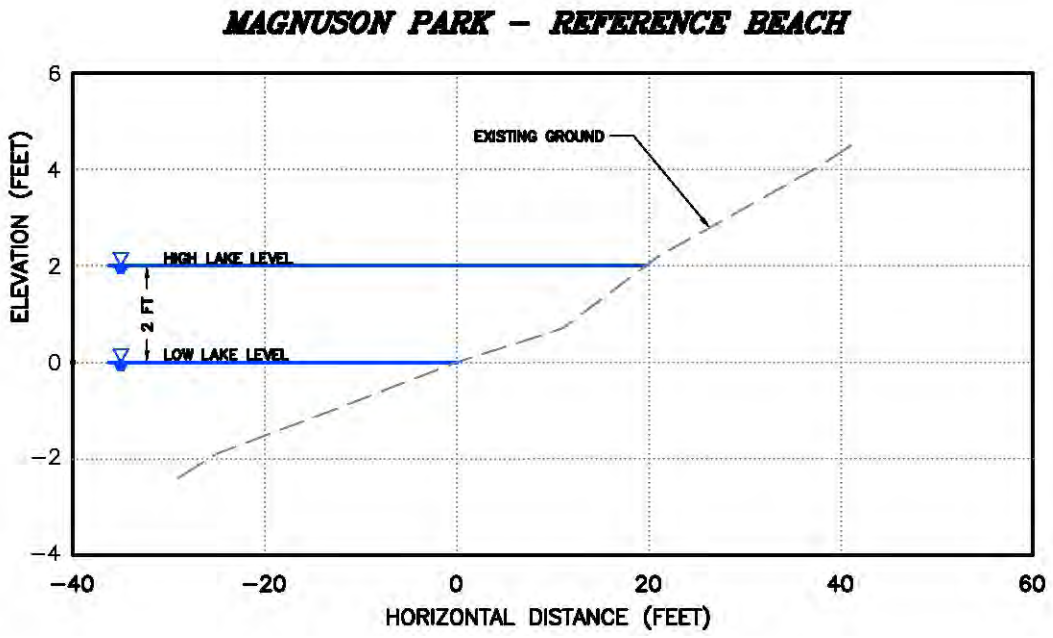

Figure B-7. Magnuson Park, Reference Reach

EXISTING	
Slope of in-water reach (%)	8.3
Slope of non-wetted reach (%)	11.0

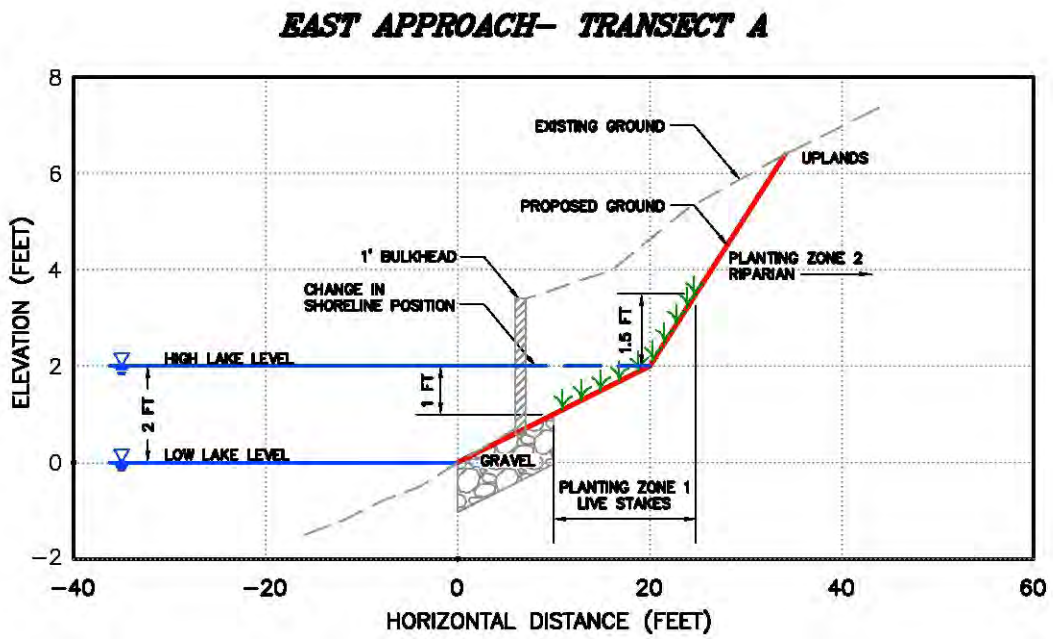

Figure B-8. East Approach Project, Transect A

EXISTING	
Slope of in-water reach (%)	9.4
Slope of non-wetted reach (%)	18.8
PROPOSED	
From Low to High Lake Level (%)	10.0
From High Lake Level to Upland (%)	31.4
Change in Shoreline Position (ft)	12.9

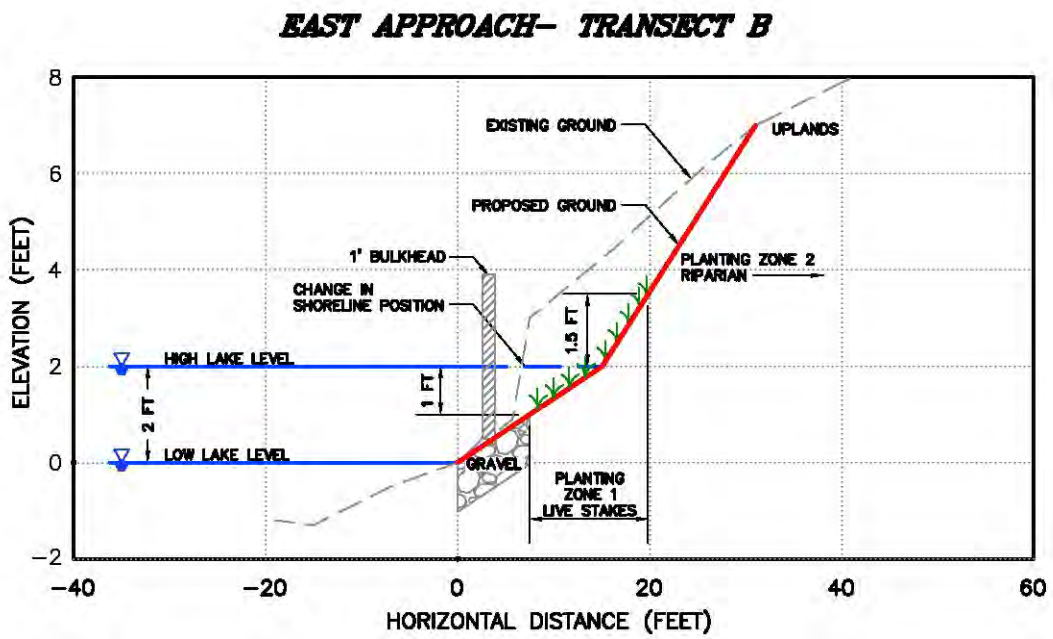

Figure B-9. East Approach Project, Transect B

EXISTING	
Slope of in-water reach (%)	6.3
Slope of non-wetted reach (%)	22.6
PROPOSED	
From Low to High Lake Level (%)	13.3
From High Lake Level to Upland (%)	31.3
Change in Shoreline Position (ft)	8.4

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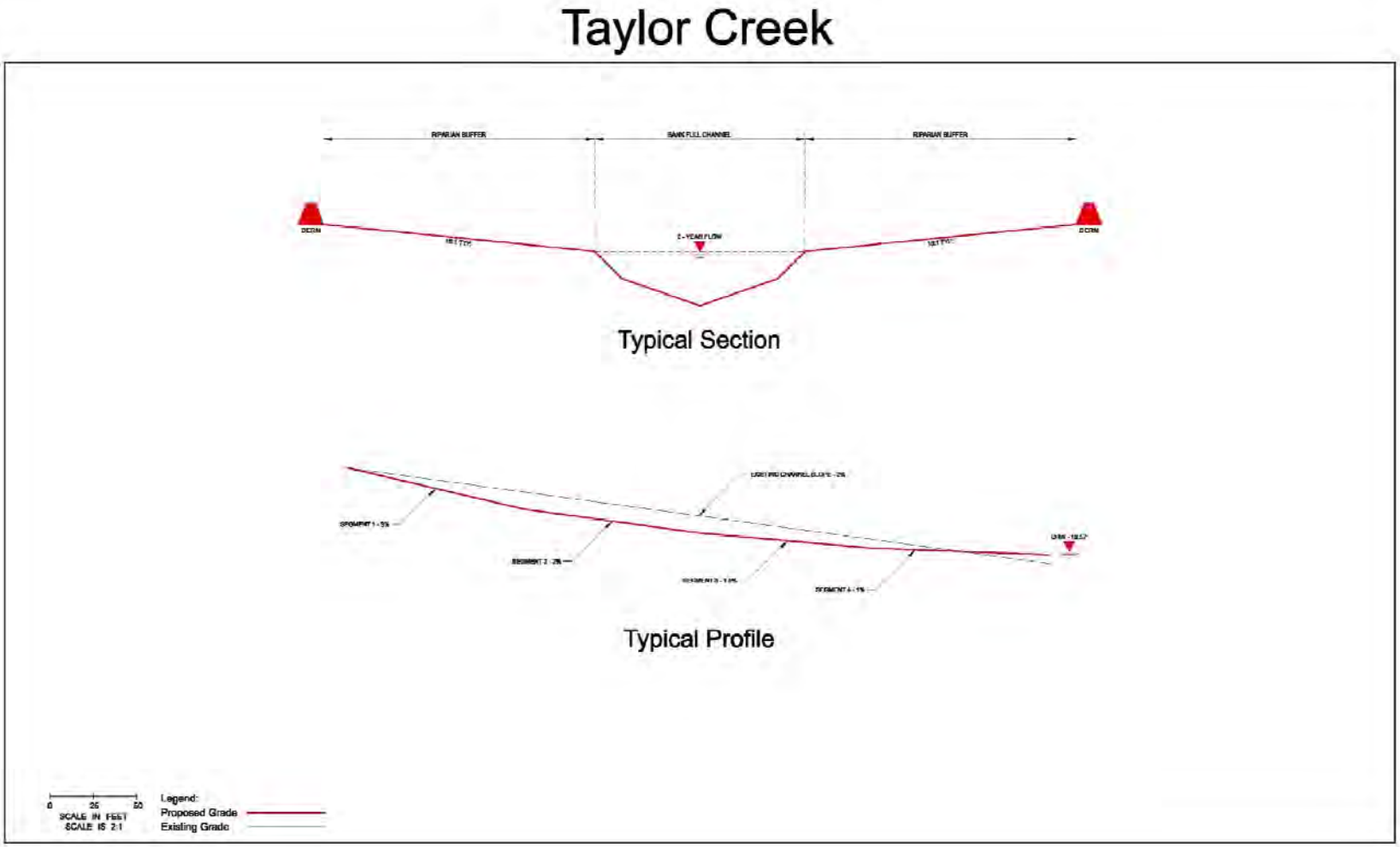

Figure B-10. Taylor Creek Project, Typical

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Cedar River / Elliott Bridge Site

Figure B-11. Cedar River/ Elliott Bridge Site Grading Plan

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Cedar River / Elliott Bridge Site

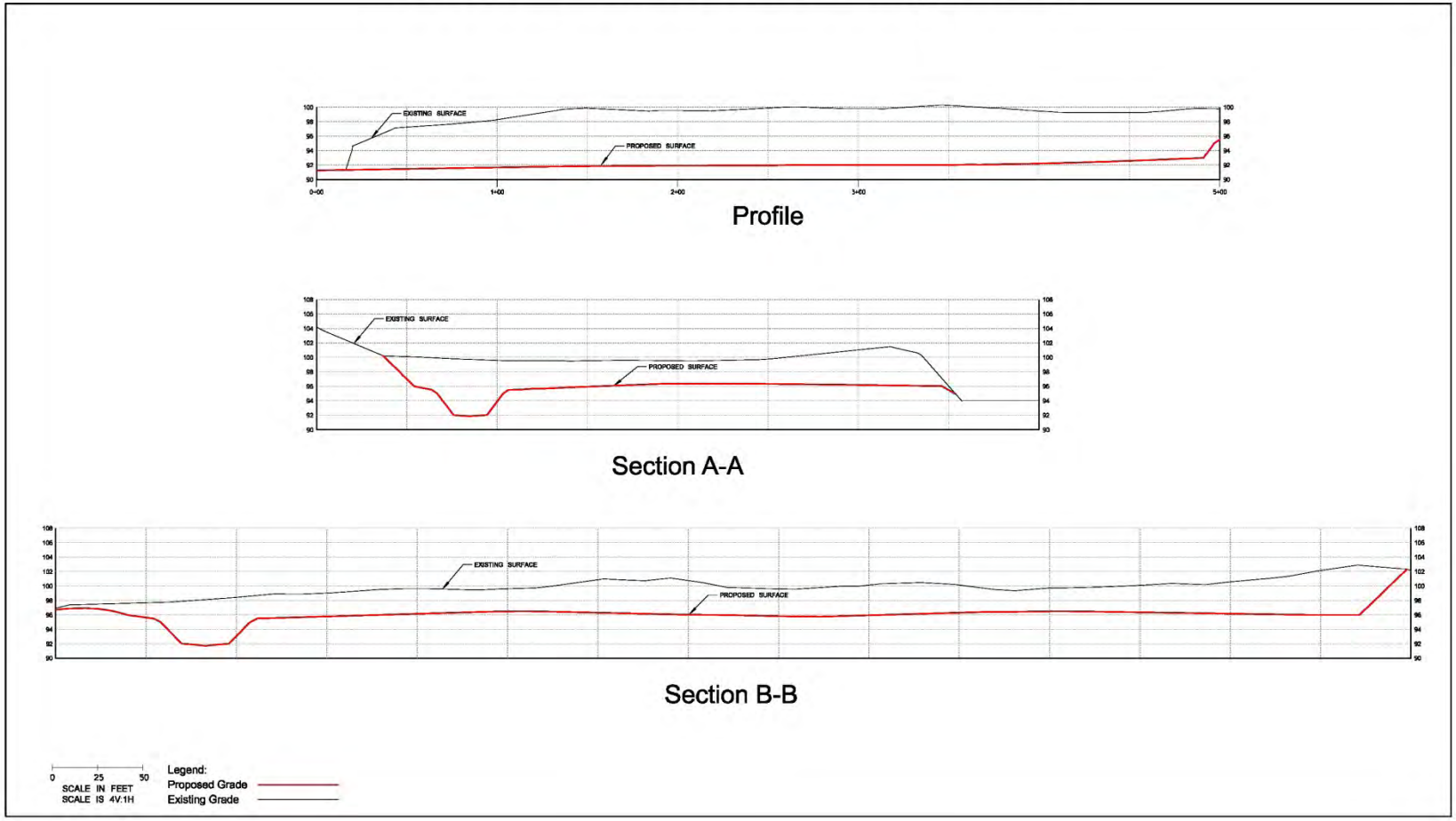

Figure B-12. Cedar River, Elliot Bridge Project, Typical

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Appendix C

Riparian Planting Palette

Riparian plantings at the Lake Washington aquatic mitigation sites will be largely composed of versatile and robust woody species. At sites used for other uses (e.g. parks), temporary fencing, signage, or other exclusion methods will be used to prevent damaging plantings. A typical species list is shown in Table C-1. The list includes canopy and shrub communities, and includes species that quickly develop a high amount of biomass. Planting at the Elliott Bridge mitigation site is more diverse due to the objectives of creating a complex wetland mosaic and an upland buffer component in the floodplain. A typical wetland species list is shown in Table C-2 and the upland buffer list is shown in Table C-3

Table C-1. Proposed Typical Planting List for Riparian Areas at Lake Washington Mitigation Sites

Common Name	Scientific Name	Size and Condition	Plant Spacing (in feet on center)
Zone 1 – Shoreline Fringe			
Scouler's willow	*Salix scouleriana*	Live Stake	1'
Sitka willow	*Salix sitchensis*	Live Stake	1'
Red-osier dogwood	*Cornus sericea*	Live Stake	1'
Zone 2 – Riparian			
Salmonberry*	*Rubus spectabilis*	#1 Container	4'
Red-osier dogwood*	*Cornus sericea*	#1 Container	4'
Pacific ninebark*	*Physocarpus capitatus*	#1 Container	4'
Sitka willow*	*Salix sitchensis*	#1 Container	4'
Nootka rose	*Rosa nutkana*	#1 Container	4'
Vine maple	*Acer circinatum*	#1 Container	4'
Beaked hazelnut	*Corylus cornuta*	#1 Container	4'
Oceanspray	*Holodiscus discolor*	#1 Container	4'
Common snowberry	*Symphoricarpos albus*	#1 Container	4'
Red alder*	*Alnus rubra*	#1 Container	10'
Black cottonwood	*Populus balsamifera ssp.*	#1 Container	10'
Douglas-fir	*Pseudotsuga menziesii*	#1 Container	10'
Sitka spruce*	*Picea sitchensis*	#1 Container	10'

* Best planted in close proximity to water.

Table C-2. Proposed Typical Planting List for Wetland Areas at Elliott Bridge Mitigation Site

Common Name	Scientific Name	Indicator Status	Size and Condition	Plant Spacing (in feet on center)
Water's Edge Planting				
Live Stakes				
Scouler's willow	*Salix scouleriana*	FAC	Live Stake	1'
Sitka willow	*Salix sitchensis*	FACW	Live Stake	1'
Scrub-shrub Wetland Planting				
Black twinberry	*Lonicera involucrata*	FAC+	#1 Container	4'
Peafruit rose	*Rosa pisocarpa*	FAC	#1 Container	4'
Salmonberry*	*Rubus spectabilis*	FAC+	#1 Container	4'
Red-osier dogwood	*Cornus sericea*	FACW+	#1 Container	4'
Pacific ninebark	*Physocarpus capitatus*	FACW-	#1 Container	4'
Scouler's willow	*Salix scouleriana*	FAC	#1 Container	4'
Sitka willow	*Salix sitchensis*	FACW	#1 Container	4'
Emergents				
Sawbeak sedge	*Carex stipata*	OBL	Plug	2'
Slough sedge	*Carex obnupta*	OBL	Plug	2'
Creeping spikerush	*Eleocharis palustris*	OBL	Plug	2'
Baltic rush	*Juncus balticus*	FACW+	Plug	2'
Daggerleaf rush	*Juncus ensifolius*	FACW	Plug	2'
Skunk cabbage*	*Lysichiton americanum*	OBL	Plug	2'
Small fruited bulrush	*Scirpus microcarpus*	OBL	Plug	2'
Hardstem bulrush	*Schoenoplectus acutus*	OBL	Plug	2'
Forested Riparian Wetland Planting				
Trees				
Red alder**	*Alnus rubra*	FAC	4', B&B	12'
Oregon ash	*Fraxinus latifolia*	FACW	4', B&B	12'
Sitka spruce*	*Picea sitchensis*	FAC	4', B&B	12'
Black cottonwood	*Populus balsamifera ssp.*	FAC	4', B&B	12'
Pacific willow	*Salix lucida var. lasiandra*	FACW+	4', B&B	12'
Western red cedar*	*Thuja plicata*	FAC	4', B&B	12'
Shrubs				
Red-osier dogwood	*Cornus sericea*	FACW+	#1 Container	4'
Black twinberry	*Lonicera involucrata*	FAC+	#1 Container	4'

Common Name	Scientific Name	Indicator Status	Size and Condition	Plant Spacing (in feet on center)
Nootka rose	*Rosa nutkana*	FAC	#1 Container	4’
Salmonberry	*Rubus spectabilis*	FAC+	#1 Container	4’
Emergents				
Skunk cabbage	*Lysichiton americanum*	OBL	Plug	2’
Water parsley	*Oenanthe sarmentosa*	OBL	Plug	2’

* Species to be planted in shaded areas or as secondary planting into established canopy.

Table C-3. Proposed Typical Planting List for Upland Buffer Areas at the Elliott Bridge Reach Mitigation Site

Common Name	Scientific Name	Indicator Status	Size and Condition	Plant Spacing (in feet on center)
Upland Forested				
Trees				
Big leaf maple	*Acer macrophyllum*	FACU	4’, B&B	12’
Red alder	*Alnus rubra*	FAC	4’, B&B	12’
Black cottonwood	*Populus balsamifera ssp. trichocarpa*	FAC	4’, B&B	12’
Bitter cherry	*Prunus emarginata*	FACU	4’, B&B	12’
Douglas-fir	*Pseudotsuga menziesii*	FACU	4’, B&B	12’
Cascara*	*Rhamnus purshiana*	FAC-	4’, B&B	12’
Western red cedar*	*Thuja plicata*	FAC	4’, B&B	12’
Shrubs				
Black hawthorn	*Crataegus douglasii*	FAC	#1 Container	4’
Vine maple*	*Acer circinatum*	FAC-	#1 Container	4’
Serviceberry	*Amelanchier alnifolia*	FACU	#1 Container	4’
Salal	*Gaultheria shallon*	FACU	#1 Container	4’

Common Name	Scientific Name	Indicator Status	Size and Condition	Plant Spacing (in feet on center)
Beaked hazelnut*	*Corylus cornuta*	FACU	#1 Container	4’
Oceanspray	*Holodiscus discolor*	NL	#1 Container	4’
Oregon Grape	*Mahonia nervosa*	FACU	#1 Container	4’
Indian plum*	*Oemleria cerasiformis*	FACU	#1 Container	4’
Baldhip rose	*Rosa gymnocarpa*	FACU	#1 Container	4’
Nootka rose	*Rosa nutkana*	FAC	#1 Container	4’
Thimbleberry	*Rubus parviflorus*	FAC-	#1 Container	4’
Red Elderberry	*Sambucus racemosa*	FACU	#1 Container	4’
Common snowberry	*Symphoricarpos albus*	FACU	#1 Container	4’

* Species to be planted in shaded areas or as secondary planting into established canopy.

Appendix D

Magnuson Park Fish Distribution Data

Table D-1. Magnuson Park Fish Distribution Data[a].

Date	Year	Location	Time	Time	Water Temperature (Deg C)	Depth (ft)	Chinook Wild Fry	Chinook (Hatchery)	Sockeye Fry	Sockeye Presmolts	Coho Smolts Wild	Coho Smolts Hatchery	Cutthroat
7-Mar	1999	N.Sandpoint	1255	1300	8.5	27,27,27	0	0	0	0	0	0	0
15-Mar	1999	N.Sandpoint	823	828	6.9	20,25,20	0	0	0	0	0	0	0
4-Apr	1999	N.Sandpoint	857	903	9.6	27,25,24	0	0	0	1	0	0	2
5-Apr	1999	N.Sandpoint	1705	1710	8	26,26,24	0	0	0	0	0	0	0
8-May	1999	N.Sandpoint	1130	1135	12.3	30,28,25	1	0	0	7	5	6	6
13-Jun	1999	N.Sandpoint	1315	1320	14.8	25,25,22	0	0	0	0	0	0	8
15-Jun	1999	N.Sandpoint	1530	1535		26,26,26	1	3	0	0	0	0	0
26-Feb	2000	Sand Point	1450	1501	6.9	6,23	2	ND	0	0	0	0	0
26-Feb	2000	Sand Point	1335	1341	6.9	6,30	0	ND	0	0	0	0	0
2-Mar	2000	Sand Point	1930	1936	7	7,21,30	0	ND	0	2	0	0	0
2-Mar	2000	Sand Point	1955	2001	7	7,21,30	0	ND	0	0	0	0	0
16-Mar	2000	Sand Point	945	950	7	6,16,21	0	ND	0	0	0	0	0
22-Mar	2000	Sand Point	2125	2130	8.3	7,25,34	0	ND	0	3	0	0	0
6-Apr	2000	Sand Point	1205	1210	9		0	ND	1	0	0	0	0
12-Apr	2000	Sand Point	2250	2255	7.8	7,7,16	0	ND	0	3	0	0	0
27-Apr	2000	Sand Point	900	905	9	7,30,28	0	ND	0	0	0	0	0
4-May	2000	Sand Point	155	200	10	17,26,29	0	ND	0	4	3	19	0
17-May	2000	Sand Point	1005	1010	12.2	7,15,23	0	ND	0	0	4	1	2
25-May	2000	Sand Point	30	35	13.8	12,30,35	5	ND	0	0	0	1	3
8-Jun	2000	Sand Point	1035	1040	14.3	17,20,24	33	ND	0	5	5	0	0
2-Aug	2000	Sand Point	840	845	19.8	27,32	0	ND	0	0	0	0	0

[a] Fresh, NOAA Fisheries, NWFSC, unpublished data

ND= No Data; Hatchery Chinook were not marked during that year; All Chinook were categorized as wild

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Appendix E

Mitigation Value Calculations

The overall approach to mitigation accounting is described in this excerpt from Section 5.5 "Mitigation Framework". Figure E-1 (Figure 5-1 in the report) summarizes the process. The Fish Function Modifier (FFM) criteria are shown in Table E-1.

Since on-site, in-kind opportunities were not feasible, WSDOT sought off-site mitigation opportunities that addressed the same functions and values that could be affected by the project. Aquatic functions and values were defined in terms of the following fish species and their life history requirements:

- Fall Chinook
- Sockeye
- Coho
- Steelhead

The spatial locations of project impacts and mitigation sites were classified in terms of their importance to these species, and assigned a score commensurate to their value to the focal fish. These Fish Function Modifier scores were assigned to impact and mitigation sites, in the form of a 0-1 weighting factor. Section 4.1 describes criteria and rationale for the Fish Function Modifier scoring (Table E-1). The acreage of a given mitigation action is multiplied by the applicable Fish Function Modifier score (Figure 5-1, Figure E-1). Next, the mitigation acreage (adjusted by Fish Function Modifier score) is weighted in terms of the "Project Type" score (Figure 5-1, Figure E-1).

Using this framework, all in-water mitigation activities (riprap removal, shoreline grading, levee removal, dredging) were assigned a Project Type score of 1.0. A score of 1.0 is indicative of the direct and immediate aquatic benefits that these projects produce. Riparian and floodplain restoration projects received a score of 0.2, to recognize the delay in achieving full function/and or the indirect nature of these projects to functioning aquatic habitat. While riparian function along the shoreline may directly benefit fish (e.g., fish cover), the functional value becomes indirect farther from the shoreline (e.g., pollutant filtration, shading, etc.). Floodplains provide indirect fish benefits by attenuating flood flows, performing water quality functions, maintaining riverine wetlands, providing off-channel salmonid habitat, and providing the opportunity for dynamic channel creation over time. Mitigation areas that improve both riparian and floodplain functions received a Project Type score of 0.4 to reflect the additive value of riparian and floodplain functions. After adjusting the mitigation acreages by Fish Function Modifier and Project Type scores, the adjusted acreage can be applied to permanent impacts (see Section 4.1).

If the adjusted mitigation acreage is applied to temporary impacts instead of permanent impacts, an additional step is required. Temporary impacts are calculated in terms of weighted acre-years (see Section 4.1). Restoration actions that are intended to mitigate for these temporary impacts must also be valued in terms of their temporal contribution to aquatic functions and values. The acreage of each mitigation action (adjusted by Fish Function Modifier and Project Type scores) is multiplied by the percent aquatic function that the project provides on an annual basis for the first 18 years after project completion. For example, if a mitigation project was completed in 2012, temporary mitigation credit will be counted until 2030 (18 years). A total of 18 years was selected as an intermediate timeframe in which ecological functions could be realized and become established, yet credits would not be overstated by extending the timeframe out into perpetuity.

Projects that have full and immediate benefits are multiplied by 1.0 (i.e., 100% function) for all 18 years. Projects that take time to realize full function are multiplied by an increasing proportion (i.e., percent function) over time. Riparian restoration projects are assumed to realize 10% function during years 1 through 5, 50% function during years 6 through 10, and 100% function thereafter. The acre-years for all 18 years are summed to yield a total mitigation value that can be credited toward temporary impacts.

Figure E-1. Process for Determining Value of Mitigation Actions

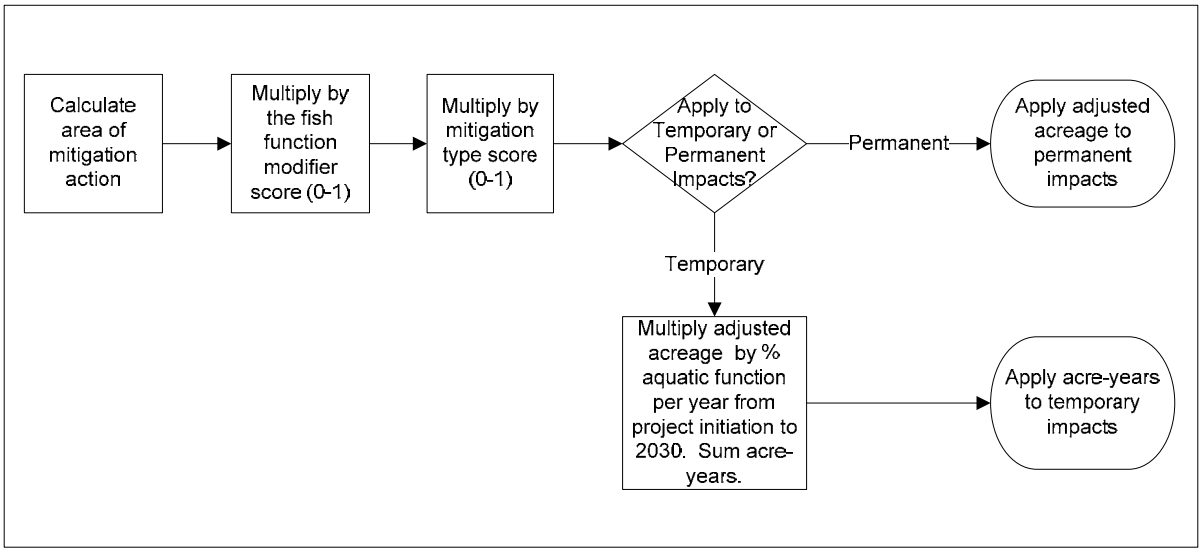

Table E-1. Proposed Scaling Factors and Criteria

Fish Function Modifier Score	Fish Function Modifier Criteria	Proposed Mitigation Sites Within Each Category
1 – Very High	Aquatic sites that are defined as critical migration or rearing areas for multiple species and stocks of juvenile salmon, or that serve as critical migration areas for multiple species and stocks of returning adults.	
0.8 – High	Aquatic sites that are known to support documented spawning of at least one salmonid species, or Aquatic sites that serve as migration or rearing areas of considerable importance for one or more species of juvenile salmon, or that serve as migration areas of considerable importance for returning adults.	Seward 1 Seward 4 Taylor Creek So. Lake WA Restoration Cedar River/ Elliott Reach Bear Creek East Approach
0.6 – Moderate	Aquatic sites that do not support salmon spawning, and where juvenile migration or rearing areas for juvenile salmonid species occurs, but where fish density, or temporal distribution of fish is lower compared to that of other sites.	Seward 2 Seward 3 Magnuson 1 Magnuson 2
0.1 – Low	Aquatic sites that do not support salmon spawning, and that have low or nominal use by salmonids for migration or rearing.	

The following sections are also presented in the "Mitigation Site Existing Conditions and Fish Use" sections in Chapter 6 of the mitigation plan. These sections justify the assignment of FFM values used in mitigation accounting, as shown in Tables E-2 and E-3.

Seward 1 (Section 6.2.2)

Fish use along the southwest shoreline of Seward Park (a natural shoreline area adjacent to Seward 1) is documented in Tabor et al. (2006). During snorkel surveys in 2003 (April 7–May 6), a total of 76 Chinook salmon were observed and their abundance was higher on each date than at any other site in Seward Park (Tabor et al. 2006). On two of these three surveys, more Chinook salmon were observed along this shoreline than at the other sites combined. Only six Chinook salmon were observed in this area during the last two surveys in 2003 (May 22 and June 10) and their abundance was similar to that at other sites in Seward Park. The high abundance of Chinook salmon at this site is likely due to better habitat conditions, specifically the sand substrate and gradual slope and the site is closer to the Cedar River than other Seward Park sites. Given the high use by Chinook juveniles in this area, Seward 1 fits the "high" FFM definition of "aquatic sites that serve as migration or rearing areas of considerable importance for one or more species of juvenile salmon". Therefore, Seward 1 has an FFM score of 0.8.

Seward 2 (Section 6.3.2)

The Seward 2 shoreline is used by migrating juvenile Chinook, primarily from the Cedar River. Although this segment of shoreline is along their primary migration path, the density of juvenile Chinook is not as high as at the southeastern extremity of the park (Tabor et al. 2006).

Historical records document sockeye spawning along this specific segment of the Seward Park nearshore (WDFW map records; K. Buchanan, Fish Biologist, WDFW, Olympia, Washington. July 26, 2004. Pers. Comm.). During a 1999 snorkel survey along the Seward Park shoreline, the presence of adult sockeye carcasses at various locations on the Seward Park shoreline throughout October, November, and December indicated that beach spawning was occurring (City of Seattle 2001). Therefore, this project area meets the 0.8 FFM criterion of being an "aquatic site that is known to support documented spawning of at least one salmonid species", and is assigned an FFM of 0.8.

Seward 3 (Section 6.4.2)

The Seward 3 shoreline is used by migrating juvenile Chinook, primarily from the Cedar River. Although this segment of shoreline is along their primary migration path, the Chinook juveniles may not be as dependent on shallow littoral areas as they are earlier in their life history. Therefore, this project area does not meet the 0.8 FFM criterion of being a "migration or rearing areas of considerable importance for one or more species of juvenile salmon", and is assigned an FFM of 0.6.

Seward 4 (Section 6.5.2)

The Seward 4 shoreline is assumed to be used by migrating juvenile Chinook from the Cedar River, although this segment of shoreline has never been snorkeled for juvenile Chinook fish use. Historical records document sockeye spawning along this specific segment of the Seward Park nearshore (WDFW map records; K. Buchanan, Fish Biologist, WDFW, Olympia, Washington. July 26, 2004. Pers. Comm.). During a 1999 snorkel survey along the Seward Park shoreline, the presence of adult sockeye carcasses at various locations on the Seward Park shoreline throughout October, November, and December indicated that beach spawning was occurring (City of Seattle 2001). Therefore, this project area meets the 0.8 FFM criterion of being an "aquatic site that is known to support documented spawning of at least one salmonid species", and is assigned an FFM of 0.8.

Magnuson 1 and 2 (Section 6.6.2)

The Magnuson Park shoreline is likely used by juvenile Chinook from the North Lake Washington tributaries and the Sammamish/Issaquah Creek system as they migrate toward the Ship Canal. The shoreline segments with shallow water and cover are used by the juvenile Chinook for rearing, foraging, and refugia. North Lake Washington Chinook juveniles have bimodal migration timing, with some 0+ juveniles migrating out of their natal streams toward the lake as newly emerged fry (35–40 millimeter [mm] fork length) in early spring and others as smolts (85–95 mm fork length) in late May–June (Seiler et al. 2003). The early fry may use the Magnuson Park shoreline and other nearshore areas in Lake Washington for rearing, foraging, and migration. The larger Chinook juveniles reside in waters between 3 and 18 feet deep during the day, primarily over sand-gravel substrates. These larger juveniles will use the shoreline features for fish cover on an infrequent basis (King County 2005). Fish distribution data collected by (Fresh, NOAA Fisheries, NWFSC, unpublished data) are presented in Appendix D. These data indicate low densities of wild Chinook fry and other juvenile salmonids along the Magnuson Park shoreline during the early and late spring. Because the densities of juvenile migration or rearing areas for juvenile Chinook are thought to occur, but fish density or temporal distribution of fish is likely lower are relatively compared to that of other sites in the south lake, the Magnuson Project 1and 2 scores a “Moderate” FFM score of 0.6 in terms of the juvenile rearing criterion (Table 4-1).

Historical records document sockeye spawning along the Magnuson Park nearshore at Sand Point, to the north of Magnuson Projects 1 and 2 (WDFW map records; K. Buchanan, Fish Biologist, WDFW, Olympia, Washington. July 26, 2004. pers. comm.). Sockeye fry originating from adults spawning on the Magnuson Park shoreline may use the littoral zone of Magnuson Park for very early rearing. Since sockeye spawning has not been documented in either specific project area, both projects score a “Moderate” FFM score of 0.6, in terms of the spawning criterion.

Taylor Creek (Section 6.8.5)

The proposed channel will be more complex, much less confined, and will attenuate sediment transport to the delta relative to the existing condition. This proposed condition will benefit multiple fish uses (Table 6-10). Fish passage into the stream would improve with a reduction in delta accretion processes. Coho and sockeye will have suitable spawning habitat in the riffle habitat and rearing habitat in the pools and margins. Pools associated with large, woody debris (LWD) will be particularly beneficial for coho and sockeye rearing. Chinook and sockeye fry will benefit from rearing and feeding in the delta, shoreline fringe, and the vegetated margins of the creek. Because the site is a migratory and rearing area of considerable importance for juvenile Chinook salmon, and coho and sockeye spawning occurs in the project area, the mitigation areas have an FFM score of 0.8.

South Lake WA Shoreline Restoration (Section 6.9.2)

The project area is most heavily used by Chinook fry that migrate through the site from the Cedar River toward the Ship Canal. The Chinook fry primarily use the portions of shoreline that contain naturally-sloped beach, though this shoreline is degraded from the presence of riprap and lack of native vegetation. High levels of Chinook fry/smolt use have been documented on the site (Tabor et al. 2004a; Tabor et al. 2006). Sockeye fry are known to use the shallow littoral zone in South Lake Washington, especially during the early stages of rearing. Because this site is located adjacent to the mouth of the Cedar River, it is likely that sockeye fry are present in the project area during early rearing. Given the high use by Chinook juveniles in this area, South Lake WA Shoreline Restoration project fits the "high" FFM definition of "aquatic sites that serve as migration or rearing areas of considerable importance for one or more species of juvenile salmon". Therefore, this project has an FFM score of 0.8.

Cedar River/ Elliott Reach (Section 6.10.2)

This reach provides spawning habitat for all focal species: Chinook, sockeye, coho, and steelhead (WDFW and WWTIT 1994). Sockeye spawning is particularly heavy along the left (south) bank, upstream of the levee. This reach also functions as juvenile and adult migratory habitat for the four species listed above. Although side- and off-channel habitat does not currently exist in the project area because of past development, adjacent side- and off-channel habitat occurs naturally and is likely used by all four species. Given the known spawning and potential high use of the project area for rearing by Chinook, coho, and steelhead juveniles, The Elliott Reach of the Cedar River fits the "high" FFM definition of "aquatic sites that serve as migration or rearing areas of considerable importance for one or more species of juvenile salmon". Therefore, this project area has an FFM score of 0.8.

Bear Creek (Section 6.11.2)

Bear Creek is a major producer of salmon in WRIA 8. Chinook, coho, and sockeye all spawn in Bear Creek upstream of the mitigation area. In the mitigation area, Bear Creek is used by salmonids as a migration and rearing corridor, but not for spawning. Given the high use of the project area for rearing by Chinook, and coho juveniles, Bear Creek fits the "high" FFM definition of "aquatic sites that serve as migration or rearing areas of considerable importance for one or more species of juvenile salmon". Therefore, Bear Creek has an FFM score of 0.8.

East Approach (Section 6.12.2)

The site has been identified in the past as a sockeye spawning area based on historical WDFW map records (Kurt Buchanan, Biologist, WDFW, Olympia, WA, July 26, 2004, pers. comm.). This sockeye spawning area is one of more than 85 shoreline spawning areas identified in Lake Washington on maps provided by WDFW (Kurt Buchanan, Biologist, WDFW, Olympia, WA, July 26, 2004, pers. comm.). Therefore, this project area meets the 0.8 FFM criterion of being an

“aquatic site that is known to support documented spawning of at least one salmonid species”, and is assigned an FFM of 0.8.

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Table E-2. Potential Value of Compensatory Mitigation Sites to Offset Temporary Impacts.

	Mitigation Action	Acreage	Fish Function Modifier	Fish Function Modified Acreage	Mitigation Type Modifier	Mitigation Type Modified Acreage	Duration (Years)[a]	Proportion of Full Function[b]	Mitigation Credit (Acre-Year)
Seward 1	Shoreline Enhancement + Hard Structure Removal	0.39	0.80	0.31	1.0	0.31	1	0.8	0.25
						0.31	17	1.0	5.30
	Riparian Restoration	0.40	0.80	0.32	0.2	0.06	5	0.1	0.03
						0.06	5	0.5	0.16
						0.06	8	1.0	0.51
								Subtotal	**6.26**
Seward 2	Spawning Gravel Supplementation	0.06	0.80	0.05	1.0	0.05	1	0.8	0.04
						0.05	17	1.0	0.82
								Subtotal	**0.85**
Seward 3	Shoreline Enhancement	0.18	0.60	0.11	1.0	0.11	1	0.8	0.09
						0.11	17	1.0	1.84
	Riparian Restoration	0.23	0.60	0.14	0.2	0.03	5	0.1	0.01
						0.03	5	0.5	0.07
						0.03	8	1.0	0.22
								Subtotal	**2.23**
Seward 4	Spawning Gravel Supplementation	1.36	0.80	1.09	1.0	1.09	1	0.8	0.87
						1.09	17	1.0	18.50
								Subtotal	**19.37**
Magnuson 1	Shoreline Enhancement + Hard Structure Removal	0.13	0.60	0.08	1.0	0.08	1	0.8	0.06
						0.08	17	1.0	1.33
	Riparian Restoration	0.37	0.60	0.22	0.2	0.04	5	0.1	0.02
						0.04	5	0.5	0.11
						0.04	8	1.0	0.36
								Subtotal	**1.88**
Magnuson 2	Shoreline Enhancement + Hard Structure Removal	0.14	0.60	0.08	1.0	0.08	1	0.8	0.07
						0.08	17	1.0	1.43
	Stream Creation	0.04	0.60	0.02	1.0	0.02	1	0.8	0.02
						0.02	17	1	0.41
	Riparian Restoration	0.73	0.6	0.438	0.2	0.09	5	0.1	0.04
						0.09	5	0.5	0.22
						0.09	8	1	0.70
								Subtotal	**2.89**
Taylor Creek	Channel Restoration	0.15	0.8	0.12	1.0	0.12	1	0.8	0.10
						0.12	17	1.0	2.04
	Delta Re-sloping	0.08	0.8	0.06	0.4	0.03	1	0.8	0.02
						0.03	17	1.0	0.44
	Riparian + Floodplain Restoration	0.74	0.8	0.59	0.4	0.24	5	0.1	0.12
						0.24	5	0.5	0.59

	Mitigation Action	Acreage	Fish Function Modifier	Fish Function Modified Acreage	Mitigation Type Modifier	Mitigation Type Modified Acreage	Duration (Years)[a]	Proportion of Full Function[b]	Mitigation Credit (Acre-Year)
						0.24	8	1.0	1.89
								Subtotal	**5.20**
South Lake Washington Shoreline Restoration (DNR Parcel)	Shoreline Enhancement + Hard Structure Removal	1.74	0.8	1.39	1	1.39	1	0.8	1.11
						1.39	17	1.0	23.66
	Riparian Restoration	1.92	0.8	1.54	0.2	0.31	5	0.1	0.15
						0.31	5	0.5	0.77
						0.31	8	1.0	2.46
	Riparian Restoration- Shrubs	0.59	0.8	0.47	0.1	0.05	5	0.1	0.02
						0.05	5	0.5	0.12
						0.05	8	1.0	0.38
								Subtotal	**28.68**
Cedar River/ Elliott Bridge	River Margin and Aquatic Off-channel Creation	0.7	0.8	0.56	1	0.56	1	0.8	0.45
						0.56	17	1.0	9.52
	Riparian + Floodplain Restoration	3.47	0.8	2.78	0.4	1.1	5	0.1	0.56
						1.1	5	0.5	2.78
						1.1	8	1.0	8.88
								Subtotal	**22.18**
Bear Creek	Stream Enhancement	3.16	0.8	2.53	1	2.53	1	0.8	2.02
						2.53	17	1.0	42.98
	Riparian Restoration	12.62	0.8	10.10	0.2	2.02	5	0.1	1.01
						2.02	5	0.5	5.05
						2.02	8	1.0	16.15
								Subtotal	**67.21**
East Approach Gravel Supplementation	Spawning Gravel Supplementation + Shoreline Enhancement + hard Structure Removal	0.83	0.8	0.664	1	0.66	1	0.8	0.53
						0.66	17	1.0	11.29
	Riparian Restoration	0.05	0.8	0.040	0.2	0.01	5	0.1	0.00
						0.01	5	0.5	0.02
						0.01	8	1.0	0.06
								Subtotal	**11.91**
					Total Potential Permanent Mitigation				**168.64**

[a] The Duration refers to the period of time that an area is providing ecological function. For mitigation accounting purposes, the only the first 18 years of habitat function are counted. Multiple rows of duration periods may occur for a given mitigation action in order to make distinctions in expected ecological function (1-100%) over time.

[b] The Proportion of Full Function refers to the percent of ecological function (0- 100%) that is assigned to a given duration period. Percent function was converted to proportions.

Table E-3. Potential Value of Compensatory Mitigation Sites to Offset Permanent Impacts.

	Mitigation Action	Acreage	Fish Function Modifier	Fish Function Modified Acreage	Mitigation Type Modifier	Mitigation Credit (acres)
Seward 1	Shoreline Enhancement + Hard Structure Removal	0.39	0.8	0.3	1.00	0.31
	Riparian Restoration	0.40	0.8	0.3	0.20	0.06
					Subtotal	**0.38**
Seward 2	Spawning Gravel Supplementation	0.06	0.8	0.05	1.00	0.05
					Subtotal	**0.05**
Seward 3	Shoreline Enhancement	0.18	0.6	0.11	1.00	0.11
	Riparian Restoration	0.23	0.6	0.14	0.20	0.03
					Subtotal	**0.14**
Seward 4	Spawning Gravel Supplementation	1.36	0.8	1.1	1.00	1.09
					Subtotal	**1.09**
Magnuson 1	Shoreline Enhancement + Hard Structure Removal	0.13	0.6	0.08	1.00	0.08
	Riparian Restoration	0.37	0.6	0.22	0.20	0.04
					Subtotal	**0.12**
Magnuson 2	Shoreline Enhancement + Hard Structure Removal	0.14	0.6	0.08	1.00	0.08
	Stream Channel	0.04	0.6	0.02	1.00	0.02
	Riparian Restoration	0.73	0.6	0.44	0.20	0.09
					Subtotal	**0.20**
Taylor Creek	Channel Restoration	0.15	0.8	0.12	1.0	0.12
	Delta Re-Sloping	0.08	0.8	0.06	0.40	0.03
	Riparian + Floodplain Restoration	0.74	0.8	0.59	0.40	0.24
					Total	**0.38**
South Lake Washington Shoreline Restoration (DNR Parcel)	Shoreline Enhancement + Hard Structure Removal	1.74	0.8	1.39	1.00	1.39
	Riparian Restoration	1.92	0.8	1.54	0.20	0.31
	Riparian Restoration- Shrubs	0.59	0.8	0.47	0.10	0.05
	Remove 3 Dolphins (7 creosote piles per dolphin)	0	0.8	0.00	1.0	0.00
					Total	**1.75**
Cedar River/ Elliott Bridge	River Margin and Aquatic Off-channel Creation	0.7	0.8	0.56	1.0	0.56
	Riparian + Floodplain Restoration	3.47	0.8	2.78	0.40	1.11
					Subtotal	**1.67**
Bear Creek	Stream Enhancement	3.16	0.8	2.53	1.00	2.5
	Riparian Restoration	12.62	0.8	10.10	0.20	2.0
					Subtotal	**4.55**
East Approach Gravel Supplementation	Spawning Gravel Supplementation	0.75	0.8	0.60	1	0.60
	Shoreline Enhancement + Hard Structure Removal	0.08	0.8	0.06	0.2	0.01
	Riparian Restoration	0.05	0.8	0.05	0.2	0.01
					Subtotal	**0.60**
		Total Potential Permanent Mitigation				**10.91**

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Appendix F

Agency Comment/Page Revision Index

Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

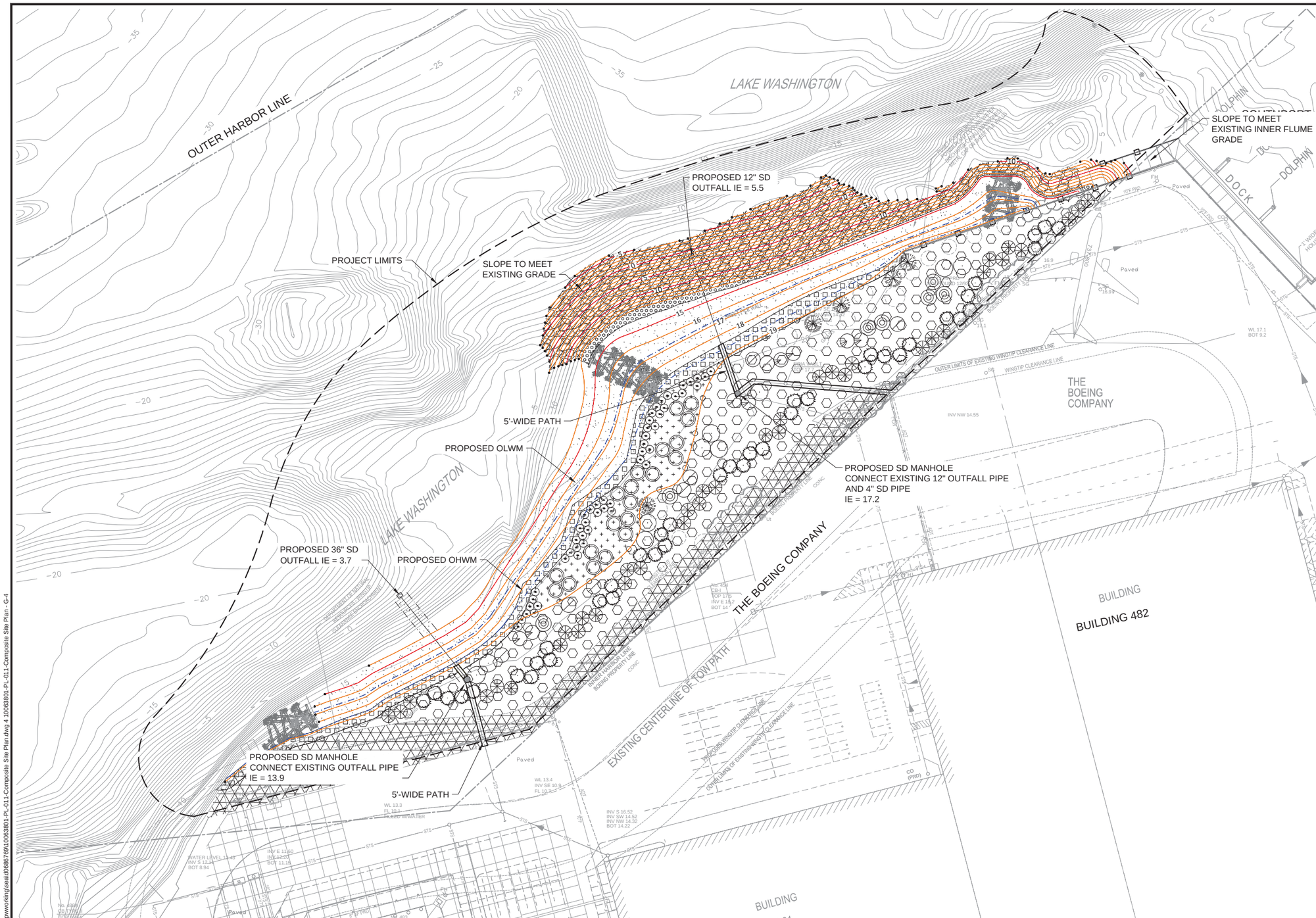
I-5 to Medina: Bridge Replacement and HOV Project

Document Name:	SR 520 Bridge Replacement and HOV Project JARPA Comments
Document Lead:	
Comment Source:	Final Wetland Mitigation Report (FWMP) & Final Aquatic Mitigation Plan

Comment No.	Comment Reference	Document and Page Reference	Line No. (if applicable)	Comment	Response	Erratta Replacement Sheet(s)
2	Corps	FWMR - 11	Fig. 2	Thank you for adding the project delivery schedule by design phase. This partially fulfills comment #4 in the previous comment letter dated September 13, 2011. Please add what the wetland and aquatic impacts will be per design phase.	The impacts by project delivery schedule detailed in Figure 2 will be incorporated into Table 1 of the Final Wetland Mitigation Report with clarifying language added to correlate the impacts to the project delivery phase. An analogous table will replace the existing Table 6-16 in the Final Aquatic Mitigation Plan.	FAMP - 220
4	Corps	FWMR - 74	Table 10	The wetland mitigation site construction schedule does not match the construction schedule presented in the final aquatic mitigation report for the Elliot Bridge Reach site (page 219, Table 6-15). Please revise	The table will be revised for consistency with the FAMP.	FAMP - 219
16	Corps	FAMP-16	23-24	This is the first mention of temporary drilled shafts/columns. Will the columns be steel piles of cast-in-place concrete? If the temporary shafts/columns are cast-in-place concrete, this would be regulated by the Corps and the impacts and permit drawings would need to be updated. This description of how the work bridges would be constructed is inconsistent with Section 2.3.5 Work Bridges presented in the JARPA Attachment E Project Description SR 520, I-5 to Medina: Bridge Replacement and HOV Project dated December 2011.	The temporary drilled shafts, which are described on page 2-73 of JARPA Attachment E, will be cast-in-place concrete. The permit drawings and impact numbers will be updated to reflect the extent of the temporary benthic fill. Please note that this construction activity is not associated with the work bridges, and would be done consistently with the description of drilled shaft construction found in Section 2.3.8 of JARPA Attachment E. The short-term temporary shade associated with the deck widening will also be disclosed and accounted for in the impacts. Impact numbers and discussion updated accordingly through report.	FAMP - ES-4 FAMP - 16 FAMP - 90 FAMP - 95; Table 4-2 FAMP - 96/97; Table 4-3 FAMP - 98 FAMP - 225; Table 6-19
17	Corps	FAMP - 27	2nd par.	The text states that Pier #1 will be constructed within a cofferdam. No temporary impacts are shown on the permit drawings or specifically called out in the text. Please confirm there will be no temporary impacts beyond the permanent impact footprint for Pier #1 construction.	Pier 1 will be constructed in a cofferdam which will result in impacts to the benthic habitat. The permit drawings and the text will be updated to detail the extent of benthic fill. Because this represents a discrepancy with how impacts are categorized in the Final Aquatic Mitigation Plan, the footing in the the impact tables 4-2 and 4-3 will need to be footnoted appropriately.	FAMP - 95; Table 4-2 FAMP - 96/97; Table 4-3
19	Corps	FAMP - 236	Last par.	The Elliott Bridge Reach site also will have wetland vegetation performance standards that will apply. Please add that to the 3rd sentence.	The performance standards of the Elliot Bridge Reach site will incorporate by reference the wetland performance standards outlined in the FWMP for the site (Section 6.1.3).	FAMP - 236-237

Attachment A

South Lake Washington Shoreline Restoration, 95% Design Submittal



LEGEND:

- INNER HARBOR LINE / PROPERTY BOUNDARY
- PROJECT LIMITS
- WINGTIP EASEMENT
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STORM DRAIN LINE
- PROPOSED CONTOUR
- PROPOSED OHWM
- PROPOSED OLWM
- EXISTING WETLAND
- EXISTING TREE TO REMAIN
- EXISTING NATIVE SHRUBS
- PROPOSED STORM DRAIN LINE, MANHOLE, AND OUTFALL
- WETLAND RESTORATION PLANTING
- MIXED DECIDUOUS / CONIFER RIPARIAN COMMUNITY
- JUTE MATTING OVER TOPSOIL
- STREAMBED COBBLES
- QUARRY SPALLS FOR ARMORED SLOPE
- COARSE SAND/PEA GRAVEL OVERLAY
- CONIFER WINDROW TO BLOCK LIGHT FROM SOUTH
- NATIVE SHRUB COMMUNITY (PROPOSED SPECIES MEET WINGTIP CLEARANCE REQUIREMENTS)
- PROPOSED CONIFEROUS TREE (SEE PLANT SCHEDULE)
- PROPOSED DECIDUOUS TREE (SEE PLANT SCHEDULE)
- ENGINEERED LOG JAM
- EXISTING FLUME WALL TO REMAIN

0 50 100
SCALE IN FEET

NOTES:

1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 83 FEET.
2. VERTICAL DATUM: NAVD88
3. SURVEY PROVIDED BY DHA SURVEYORS, OCTOBER 2010.
4. BATHYMETRY PROVIDED BY BUSH ROED & HITCHINGS, 2001.

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WASHINGTON STATE DEPARTMENT OF Natural Resources

kpff Consulting Engineers

REVISIONS

REV	DATE	BY	APP'D	DESCRIPTION

DESIGNED BY: SMALL / SPOONER
DRAWN BY: SPOONER
CHECKED BY: SMALL / HUMMEL
APPROVED BY: HUMMEL
SCALE: AS SHOWN
DATE: NOVEMBER 2011

SOUTH LAKE WASHINGTON SHORELINE RESTORATION

COMPOSITE SITE PLAN

G-4

SHEET NO. 4 OF 14

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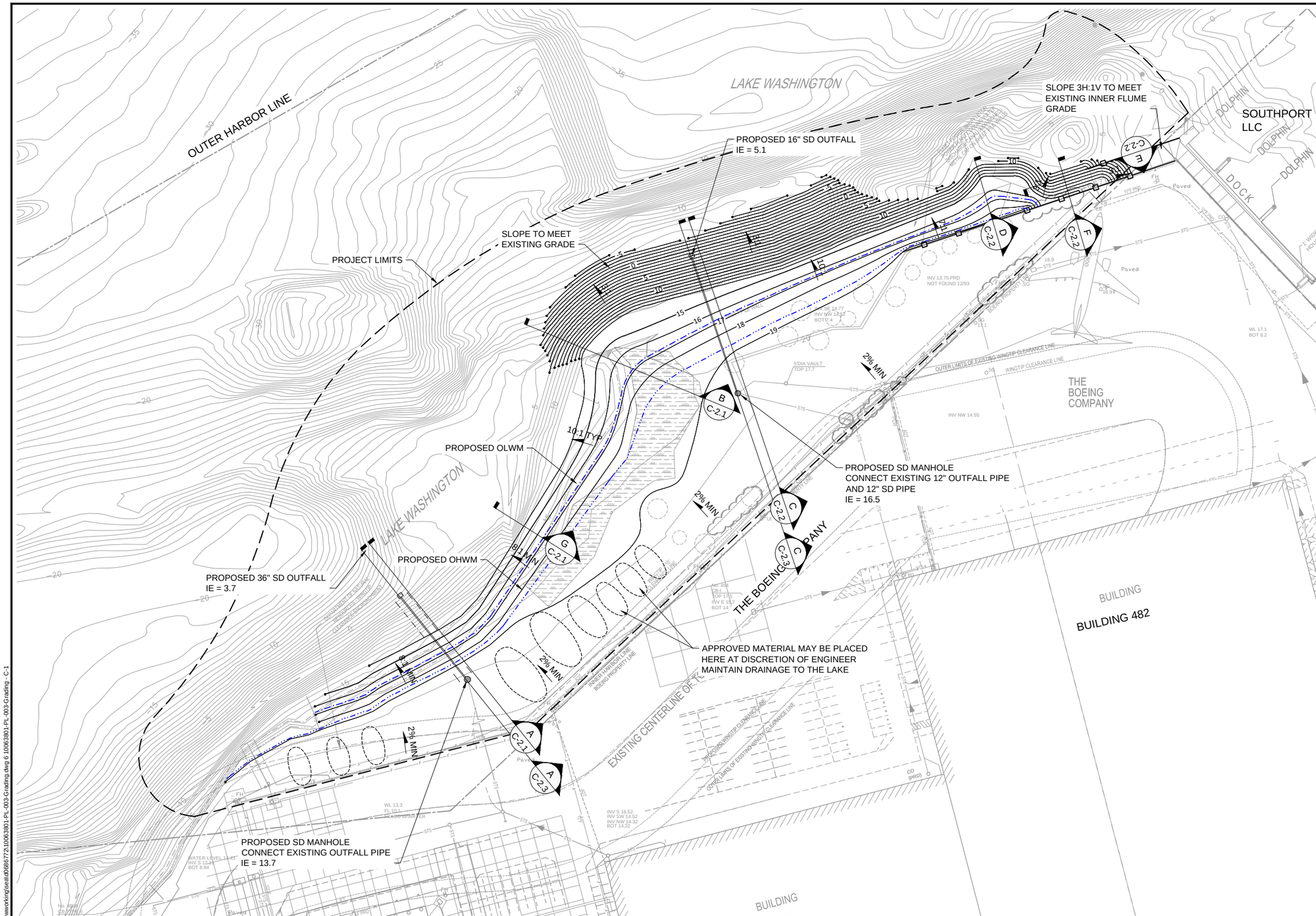

LEGEND:

- INNER HARBOR LINE / PROPERTY BOUNDARY
- PROJECT LIMITS
- WINGTIP EASEMENT
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING STORM DRAIN LINE
- PROPOSED CONTOUR
- EXISTING OHWM (18.7)
- EXISTING OLWM (16.7)
- PROPOSED OHWM
- PROPOSED OLWM
- EXISTING WETLAND
- EXISTING TREE TO REMAIN
- EXISTING NATIVE SHRUBS
- AREA FOR POTENTIAL PLACEMENT OF APPROVED MATERIAL
- PROPOSED STORM DRAIN LINE, MANHOLE, AND OUTFALL
- SECTION LINE

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SCALE IN FEET

NOTES:

1. HORIZONTAL DATUM: WASHINGTON STATE PLANE NORTH ZONE, NAD 83 FEET.
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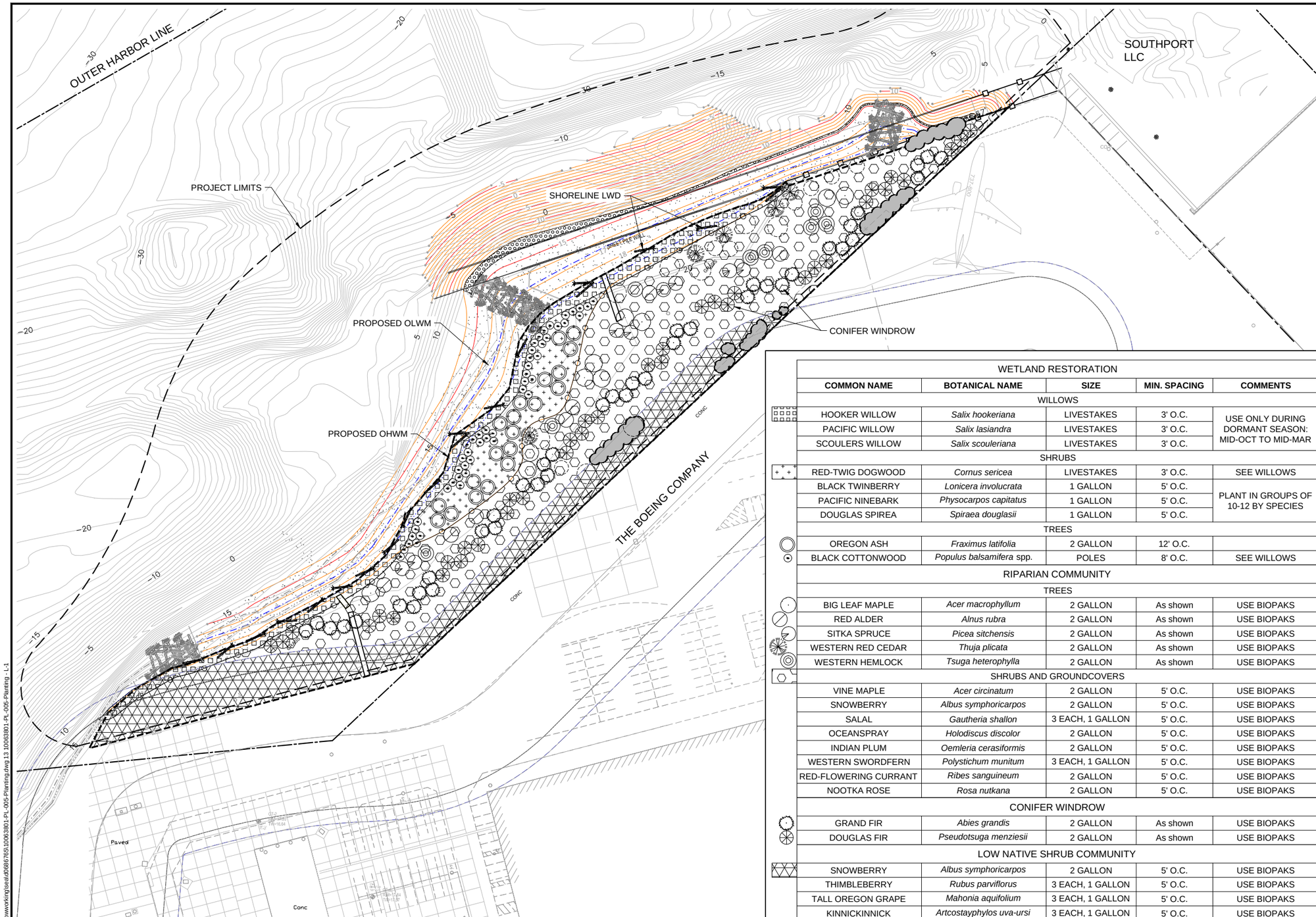
DATE: NOVEMBER 2011

SOUTH LAKE WASHINGTON SHORELINE RESTORATION

GRADING PLAN

C-1

SHEET NO. 6 OF 14



WETLAND RESTORATION				
COMMON NAME	**BOTANICAL NAME**	**SIZE**	**MIN. SPACING**	**COMMENTS**
WILLOWS				
HOOKER WILLOW	*Salix hookeriana*	LIVESTAKES	3' O.C.	USE ONLY DURING DORMANT SEASON: MID-OCT TO MID-MAR
PACIFIC WILLOW	*Salix lasiandra*	LIVESTAKES	3' O.C.	
SCOULERS WILLOW	*Salix scouleriana*	LIVESTAKES	3' O.C.	
SHRUBS				
RED-TWIG DOGWOOD	*Cornus sericea*	LIVESTAKES	3' O.C.	SEE WILLOWS
BLACK TWINBERRY	*Lonicera involucrata*	1 GALLON	5' O.C.	PLANT IN GROUPS OF 10-12 BY SPECIES
PACIFIC NINEBARK	*Physocarpos capitatus*	1 GALLON	5' O.C.	
DOUGLAS SPIREA	*Spiraea douglasii*	1 GALLON	5' O.C.	
TREES				
OREGON ASH	*Fraximus latifolia*	2 GALLON	12' O.C.	
BLACK COTTONWOOD	*Populus balsamifera* spp.	POLES	8' O.C.	SEE WILLOWS
RIPARIAN COMMUNITY				
TREES				
BIG LEAF MAPLE	*Acer macrophyllum*	2 GALLON	As shown	USE BIOPAKS
RED ALDER	*Alnus rubra*	2 GALLON	As shown	USE BIOPAKS
SITKA SPRUCE	*Picea sitchensis*	2 GALLON	As shown	USE BIOPAKS
WESTERN RED CEDAR	*Thuja plicata*	2 GALLON	As shown	USE BIOPAKS
WESTERN HEMLOCK	*Tsuga heterophylla*	2 GALLON	As shown	USE BIOPAKS
SHRUBS AND GROUNDCOVERS				
VINE MAPLE	*Acer circinatum*	2 GALLON	5' O.C.	USE BIOPAKS
SNOWBERRY	*Albus symphoricarpos*	2 GALLON	5' O.C.	USE BIOPAKS
SALAL	*Gautheria shallon*	3 EACH, 1 GALLON	5' O.C.	USE BIOPAKS
OCEANSPRAY	*Holodiscus discolor*	2 GALLON	5' O.C.	USE BIOPAKS
INDIAN PLUM	*Oemleria cerasiformis*	2 GALLON	5' O.C.	USE BIOPAKS
WESTERN SWORDFERN	*Polystichum munitum*	3 EACH, 1 GALLON	5' O.C.	USE BIOPAKS
RED-FLOWERING CURRANT	*Ribes sanguineum*	2 GALLON	5' O.C.	USE BIOPAKS
NOOTKA ROSE	*Rosa nutkana*	2 GALLON	5' O.C.	USE BIOPAKS
CONIFER WINDROW				
GRAND FIR	*Abies grandis*	2 GALLON	As shown	USE BIOPAKS
DOUGLAS FIR	*Pseudotsuga menziesii*	2 GALLON	As shown	USE BIOPAKS
LOW NATIVE SHRUB COMMUNITY				
SNOWBERRY	*Albus symphoricarpos*	2 GALLON	5' O.C.	USE BIOPAKS
THIMBLEBERRY	*Rubus parviflorus*	3 EACH, 1 GALLON	5' O.C.	USE BIOPAKS
TALL OREGON GRAPE	*Mahonia aquifolium*	3 EACH, 1 GALLON	5' O.C.	USE BIOPAKS
KINNICKINNICK	*Artcostayphylos uva-ursi*	3 EACH, 1 GALLON	5' O.C.	USE BIOPAKS

LEGEND:

- INNER HARBOR LINE / PROPERTY BOUNDARY
- PROJECT LIMITS
- WINGTIP EASEMENT
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- PROPOSED CONTOUR
- EXISTING OHWM (18.7)
- EXISTING OLWM (16.7)
- PROPOSED OHWM
- PROPOSED OLWM
- EXISTING TREE
- EXISTING NATIVE SHRUBS
- WETLAND RESTORATION PLANTING
- MIXED DECIDUOUS / CONIFER RIPARIAN COMMUNITY
- CONIFER WINDROW TO BLOCK LIGHT FROM SOUTH
- NATIVE SHRUB COMMUNITY (PROPOSED SPECIES MEET WINGTIP CLEARANCE REQUIREMENTS)
- PROPOSED CONIFEROUS TREE (SEE PLANT SCHEDULE)
- PROPOSED DECIDUOUS TREE (SEE PLANT SCHEDULE)
- SHORELINE LWD
- ENGINEERED LOG JAM
- EXISTING FLUME WALL TO REMAIN
- HERBIVORY ENCLOSURE

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SCALE IN FEET

NOTES:

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2. VERTICAL DATUM: NAVD88
3. SURVEY PROVIDED BY DHA SURVEYORS, OCTOBER 2010.
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WASHINGTON STATE DEPARTMENT OF Natural Resources

kpff Consulting Engineers

REVISIONS

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DESIGNED BY: SMALL / SPOONER
DRAWN BY: SPOONER
CHECKED BY: SMALL / HUMMEL
APPROVED BY: HUMMEL
SCALE: AS SHOWN
DATE: NOVEMBER 2011

SOUTH LAKE WASHINGTON SHORELINE RESTORATION

PLANTING PLAN

L-1

SHEET NO. 13 OF 14

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Attachment B

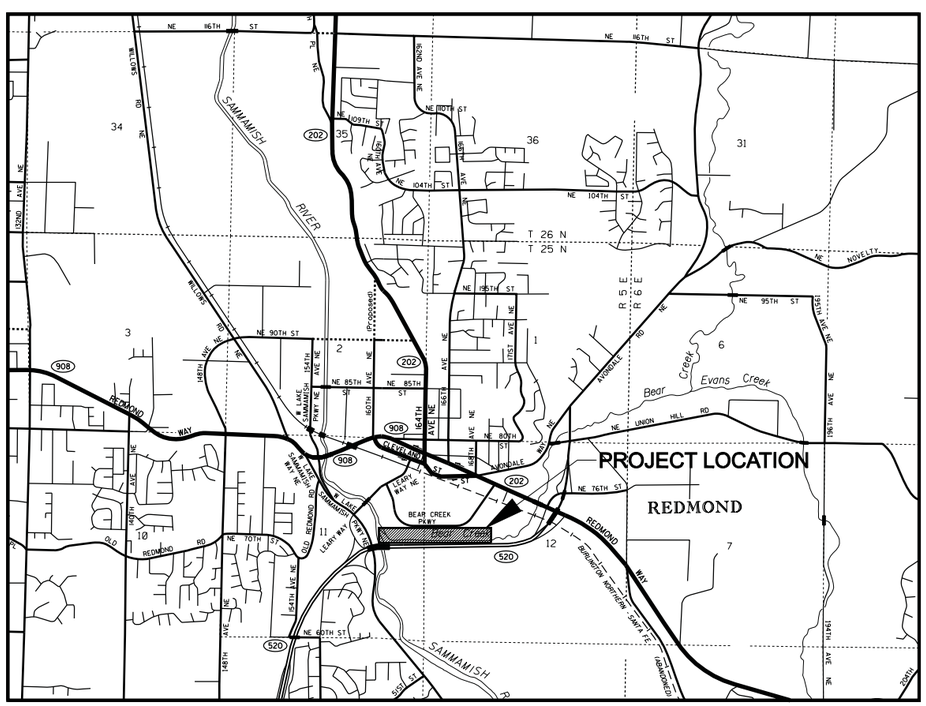
Bear Creek Rehabilitation PS&E Design Plan, 90% Design Submittal

CITY OF REDMOND

BEAR CREEK REHABILITATION
PS&E DESIGN PLAN

PROJECT NO. 100407 / 96-SD-22

90% SUBMITTAL



VICINITY MAP

N

2000 1000 0 2000

SCALE IN FEET

APPROVED FOR CONSTRUCTION:

RONALD D. GRANT, P.E.
CITY ENGINEER

DATE

INDEX OF DRAWINGS

SHEET No	PLAN REFERENCE No	TITLE
1	CV1	COVER, VICINITY MAP & INDEX
2	GN1	GENERAL NOTES & DETAILS
3	KM1	KEY MAP
4-9	AL1-AL6	ALIGNMENT & PROJECT CONTROL PLAN
10-15	EC1-EC6	T.E.S.C. & DEMOLITION PLAN
16	EC7	T.E.S.C. NOTES
17	EC8	T.E.S.C. DETAILS
18	EC9	TREE REMOVAL TABLE
19-24	GR1-GR6	GRADING & HABITAT PLAN
25-28	GR7-GR10	TYPICAL SECTIONS
29-31	GR11-GR13	GRADING DETAILS
32-36	GR14-GR18	HABITAT DETAILS
37-40	SP1-SP4	STREAM CHANNEL PROFILE
41	TP1	TRAIL PROFILE
42-43	SDP1-SDP2	STORM DRAINAGE PROFILE
44-49	PL1-PL6	PLANTING PLAN
50	PL7	PLANTING SCHEDULE
51	PL8	PLANTING NOTES & DETAILS
52-57	IR1-IR6	IRRIGATION PLAN
58	IR7	IRRIGATION DETAILS
59-62	ST1-ST4	STAGING PLANS

MARCH 2010

CityofRedmond
WASHINGTON

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

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LEGEND

LINETYPES

SURFACE FEATURES:

EXISTING FEATURE LINETYPES	DESCRIPTION
	BUILDING FOOTPRINT
OHW	ORDINARY HIGH WATER
	WATER COURSE FLOWLINE
	FENCE
	GUARDRAIL
	WETLAND PERIMETER
	RAILROAD
D	STORM DRAIN LINE
	RETAINING WALL
	CURB/PAVEMENT/SIDEWALK
	TRAIL EDGE
	CHANNELIZATION
	CONTOUR (INTERVAL)
	CONTOUR (INDEX)
	WSDOT / CITY RIGHT OF WAY
	WETLAND BOUNDARY
	PROPERTY LINE
	CONSTRUCTION EASEMENT LINE

DESIGN FEATURE LINETYPES	DESCRIPTION
	LIMIT OF WORK BOUNDARY
	HIGH VISIBILITY FENCE
	SILT FENCE
	TEMPORARY CHAIN LINK CONSTRUCTION FENCE
	PROPOSED STREAM CENTERLINE
CUT CUT	CUT LINE
	CONTOUR (INTERVAL)
	CONTOUR (INDEX)
	EDGE PAVEMENT
	CLEARING LIMIT
	DITCH WITH DIRECTION OF FLOW

SYMBOLS

SURFACE FEATURES

SYMBOL EXIST.	SYMBOL PROP.	DESCRIPTION
		MAIL BOX
		RIP RAP
		ROCK FACING
		SHRUB
		GENERAL SIGN
		TREE (Conifer)
		TREE (Deciduous)
		YARD LIGHT
		WETLAND
		SIGNIFICANT TREE TO BE REMOVED

TRAFFIC SIGNS

	SINGLE POST
	DOUBLE POST
	TRAFFIC SIGNAL POLE
	TRAFFIC SIGNAL POLE W/ LUMINAIRE
	TRAFFIC SIGNAL SUPPORT POLE

DRAINAGE

SYMBOL EXIST.	SYMBOL PROP.	DESCRIPTION
		SAN. SEWER CLEAN OUT
		SAN. SEWER MANHOLE
		STORM DRAIN CATCH BASIN
		STORM DRAIN CULVERT
		STORM DRAIN MANHOLE
		STORM DRAIN INLET PROTECTION

WATER

SYMBOL EXIST.	SYMBOL PROP.	DESCRIPTION
		WATER METER
		WATER MANHOLE
		FIRE HYDRANT

THE EXISTING TOPOGRAPHIC AND PHYSICAL FEATURES SHOWN ON THESE PLANS ARE BASED ON GIS MAPPING FROM THE CITY OF REDMOND, ELECTRONIC FIELD SURVEY DONE BY DEA, BASE MAPPING FROM WSDOT AND CITY OF REDMOND. THIS WAS THE INFORMATION AVAILABLE AT THE TIME OF PLAN PREPARATION. ACTUAL CONDITIONS MAY BE DIFFERENT,THE CONTRACTOR MAY ENCOUNTER VARIATIONS BETWEEN ACTUAL CONDITIONS AND THOSE SHOWN. THESE VARIATIONS WILL NOT BE THE BASIS FOR A CLAIM OR EXTRA COMPENSATION.

THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR DEA. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL KINDS OF DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.

ABBREVIATIONS

ACP	ASPHALT CONCRETE PAVEMENT	DIA	DIAMETER	NTS	NOT TO SCALE	RT	RIGHT
ASPH	ASPHALT	DIP	DUCTILE IRON PIPE	NW	NORTHWEST	S	SLOPE
ATB	ASPHALT TREATED BASE	DR	DRIVE	OC	ON CENTER	SD	STORM DRAIN
AVE	AVENUE	DW	DRIVEWAY	P.C.	POINT OF CURVE	SE	SOUTHEAST
BC	BEAR CREEK	E	EAST	PCSSP	PLAIN CONCRETE STORM SEWER PIPE	SS	SANITARY SEWER
CB	CATCH BASIN	ECC	EXTRUDED CONCRETE CURB	P.I.	POINT OF INTERSECTION	ST	STREET
CC	CONCRETE CURB	EOP	EDGE OF PAVEMENT	PL	PROPERTY LINE	STA	STATION
CFS	CUBIC FEET PER SECOND	FC	FACE OF CURB	POB	POINT OF BEGINNING	STD	STANDARD
CLR	CLEARANCE	FL	FLOWLINE	POE	POINT OF ENDING	S/W	SIDEWALK
COR	CITY OF REDMOND	GRVL	GRAVEL	PP	POWER POLE	SW	SOUTHWEST
CONC	CONCRETE	GV	GAS VALVE	PRC	POINT OF REVERSE CURVE	TC	TOP OF CURB
CONST	CONSTRUCTION	LT	LEFT	P.T.	POINT OF TANGENT	TPED	TELEPHONE PEDESTAL
CPP	CORRUGATED PLASTIC PIPE	LF	LINEAR FEET	PVC	POLYVINYL CHLORIDE	TS	TRAFFIC SIGNAL
CPEP	CORRUGATED POLYETHYLENE PIPE	MH	MAN HOLE	RAD	RADIUS	UP	UTILITY POLE
CSBC	CRUSHED SURFACING BASE COURSE	N	NORTH	RCP	REINFORCED CONCRETE PIPE	VLT	VAULT
CSTC	CRUSHED SURFACING TOP COURSE	NE	NORTHEAST	RDWY	ROADWAY	WV	WATER VALVE
D	DEEP	NOM	NOMINAL	R/W	RIGHT-OF-WAY	W	WEST
				RPM	RAISED PAVEMENT MARKING		

GENERAL NOTES

1. ALL WORK AND MATERIALS SHALL CONFORM TO CITY OF REDMOND STANDARD SPECIFICATIONS AND DETAILS, 3/1/2010.
2. A PRE-CONSTRUCTION MEETING WITH THE CONSTRUCTION DIVISION SHALL BE COMPLETED AND ALL PERMITS ISSUED PRIOR TO CONSTRUCTION.
3. LOCATIONS SHOWN OF EXISTING UTILITIES ARE APPROXIMATE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE CORRECT LOCATIONS TO AVIOD DAMAGE OR DISTURBANCE. THE DESIGN ENGINEER SHALL REDESIGN THE PROJECT AS NECESSARY TO ACCOMMODATE OR ADJUST ANY CONFLICTING UTILITIES.
4. ALL SURVEYING OF CLEARING LIMITS AND CONSTRUCTION STAKING SHALL BE DONE BY A LICENSED CIVIL ENGINEER OR LICENSED LAND SURVEYOR.
5. ALL GROUND COVER SHALL REMAIN UNDISTURBED OUTSIDE OF CLEARING LIMITS.
6. THE TEMPORARY EROSION/SEDIMENTATION CONTROLS (TESC) SHALL BE INSTALLED, INSPECTED BY THE CITY INSPECTOR, AND OPERATING BEFORE ANY GRADING OR EXTENSIVE LAND CLEARING. THESE CONTROLS SHALL BE SATISFACTORILY MAINTAINED DURING CONSTRUCTION. ADDITIONAL EROSION/SEDIMENTATION CONTROL MEASURES MAY BE REQUIRED BY THE CITY INSPECTOR.
7. KEEP OFF-SITE STREETS CLEAN AT ALL TIMES. FLUSHING STREETS SHALL NOT BE ALLOWED. ALL STREETS IMPACTED BY THE CONTRACTOR'S ACTIVITIES OR MATERIAL FROM THE SITE SHALL BE SWEPT.
8. TREES TO REMAIN SHALL BE MARKED WITH FLAGGING AND FENCED 5 FEET OUTSIDE OF THE DRIP LINE WHEN ADJACENT TO AREAS TO BE CLEARED.
9. TRUCK AND VEHICULAR WHEEL WASHES SHALL BE REQUIRED IF DEEMED NECESSARY BY THE CITY.

90% SUBMITTAL

Supervisor	J. GAGE	3/2010				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By	A. SCHMIDTMAN	3/2010					WASH			
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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Phone: 425.519.6500

CityofRedmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GENERAL NOTES & DETAILS

GN1

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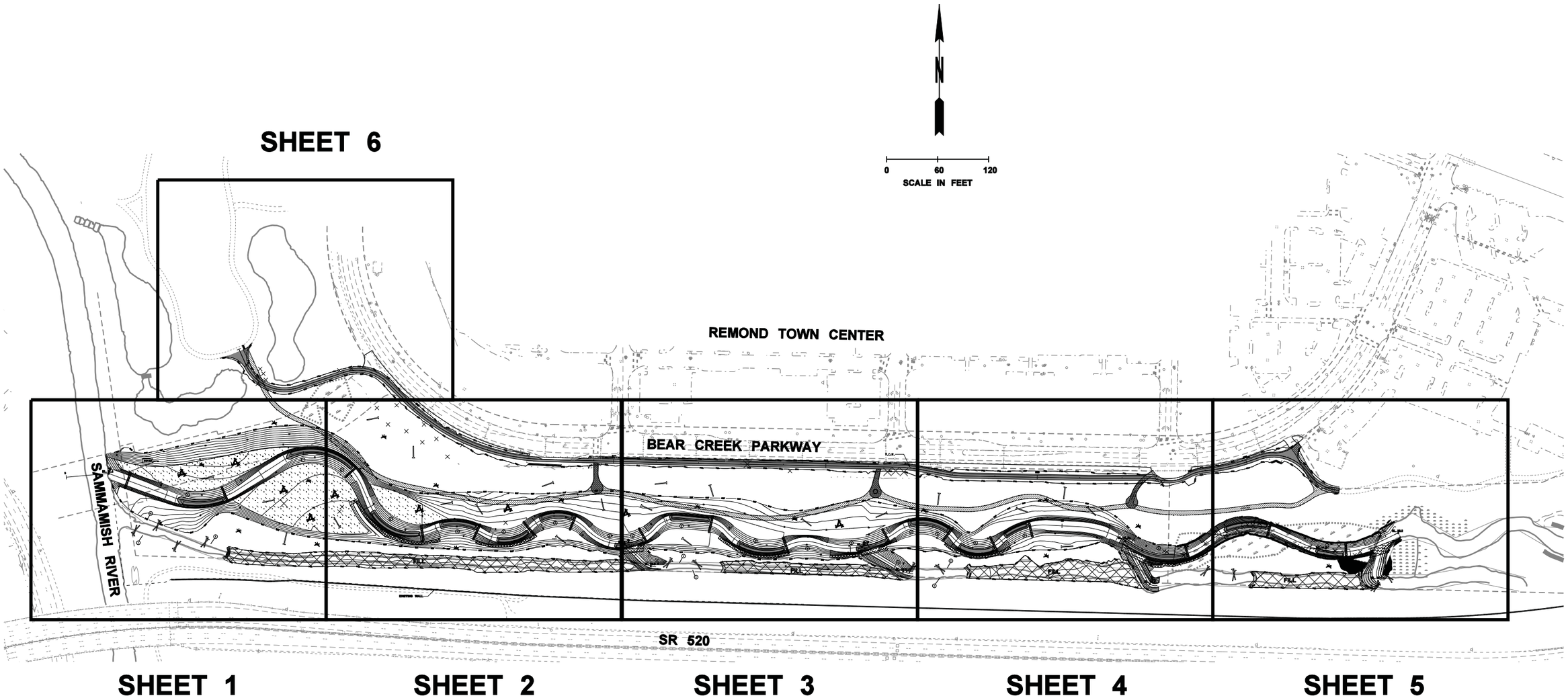

						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor	J. GAGE	3/2010					WASH			
Designed By	A. SCHMIDTMAN	3/2010								
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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CityofRedmond
WASHINGTON

BEAR CREEK REHABILITATION PROJECT

KEY MAP

KM1

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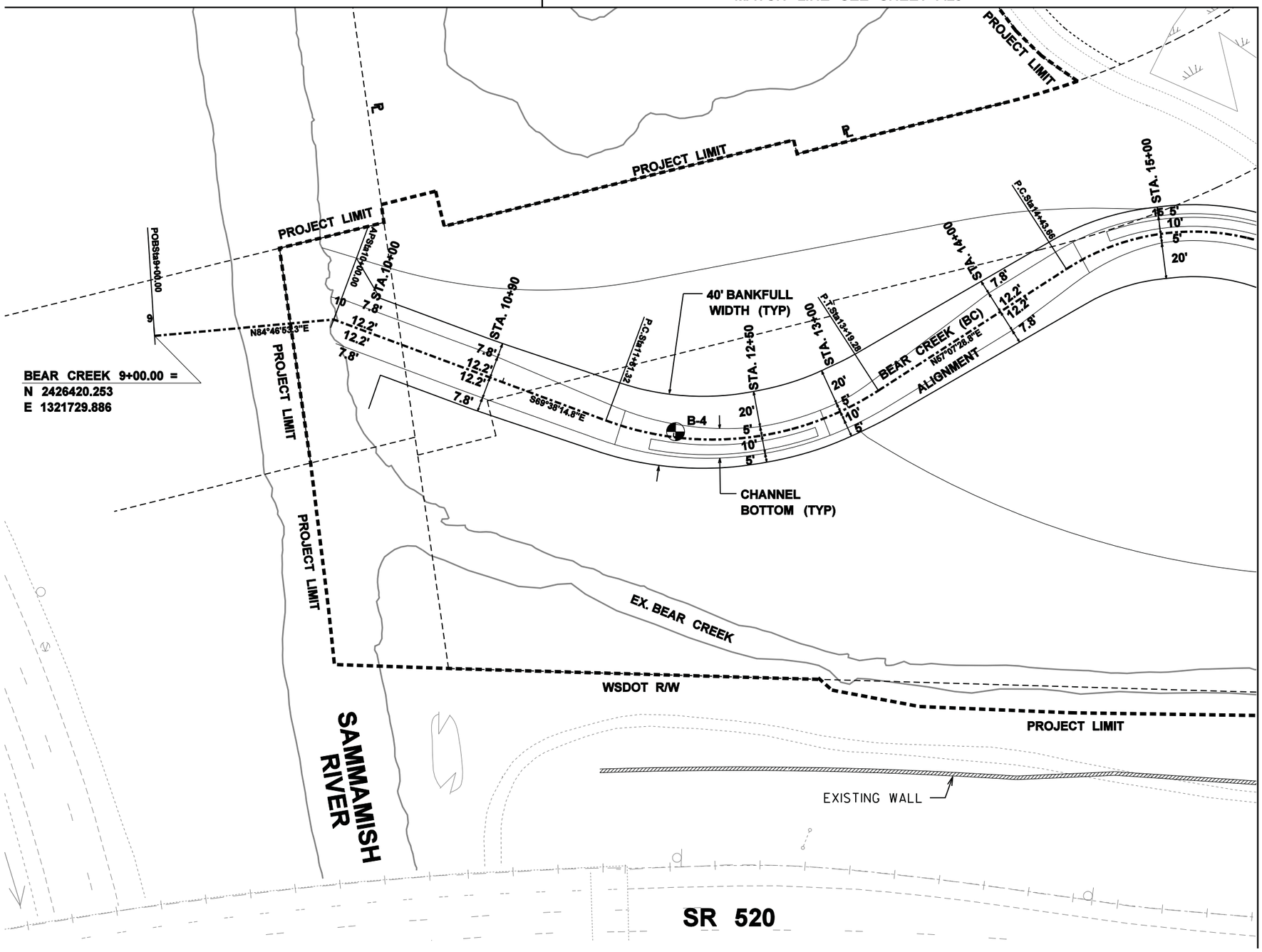

MATCH LINE SEE SHEET AL2

CURVE DATA					
P.I. STATION	DELTA	RADIUS	TANGENT	LENGTH	S
BC 12+46.52	53°14'16.4"	170.00	85.20	157.96	-
BC 15+97.69	99°40'25.6"	130.00	154.03	226.15	-

DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

LEGEND

BORING

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			
			REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL1

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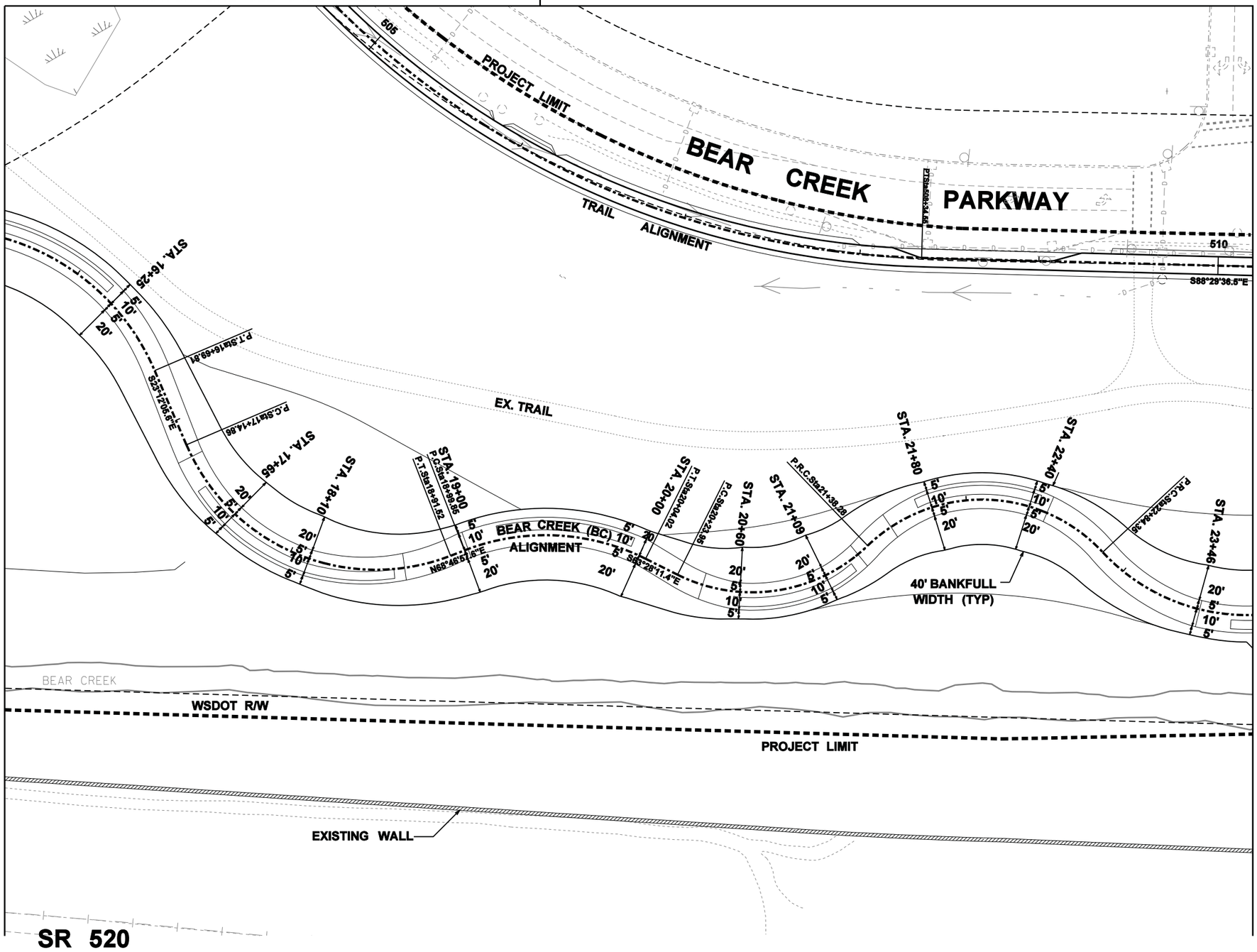
MATCH LINE SEE SHEET AL6



CURVE DATA					
P.I. STATION	DELTA	RADIUS	TANGENT	LENGTH	S
TRAIL 506+62.16	43°20'58.3"	480.00'	190.77'	363.16'	0.02
BC 18+25.94	88°00'56.8"	115.00'	111.08'	176.65'	-
BC 19+55.17	47°44'51.0"	125.00'	55.32'	104.16'	-
BC 20+89.59	70°25'54.2"	93.00'	65.64'	114.32'	-
BC 22+31.85	90°58'12.9"	92.00'	93.57'	146.07'	-

DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By	A. SCHMIDTMAN	3/2010					WASH			
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL2

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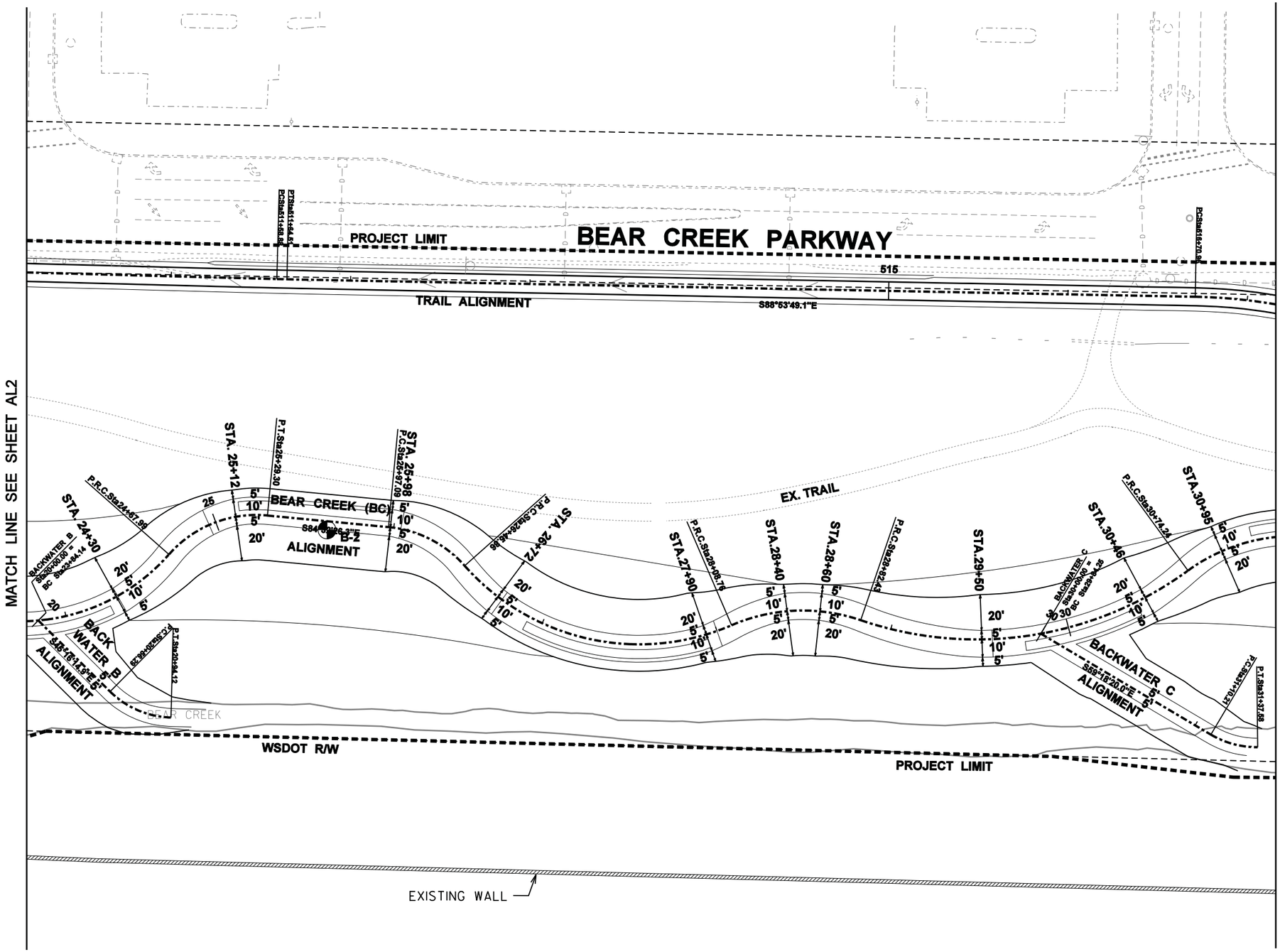

CURVE DATA					
P.I. STATION	DELTA	RADIUS	TANGENT	LENGTH	S
TRAIL 511+61.70	00°24'12.6"	800.00'	2.81'	5.63'	0.02
TRAIL 516+95.24	09°15'11.9"	300.00'	24.27'	48.46'	0.02
BC 24+05.77	95°39'14.8"	110.00'	121.42'	183.64	-
BC 25+01.13	54°02'41.1"	65.00'	33.15'	61.31'	-
BC 26+22.68	42°59'18.2"	65.00'	25.59'	48.76'	-
BC 27+39.95'	71°47'39.4"	130.00'	94.09'	162.89'	-
BC 28+47.35	42°12'34.6"	100.00'	38.59'	73.67'	-
BC 29+86.42	54°56'58.0"	200.00'	104.00'	191.80'	-
BACKWATER B 20+76.16	43°21'31.9"	50.00'	19.88'	37.84	-
BACKWATER C 31+24.25	31°21'32.8"	50.00'	14.04'	27.37	-

DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

LEGEND

BORING

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor	J. GAGE	3/2010					WASH			
Designed By	A. SCHMIDTMAN	3/2010								
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL3

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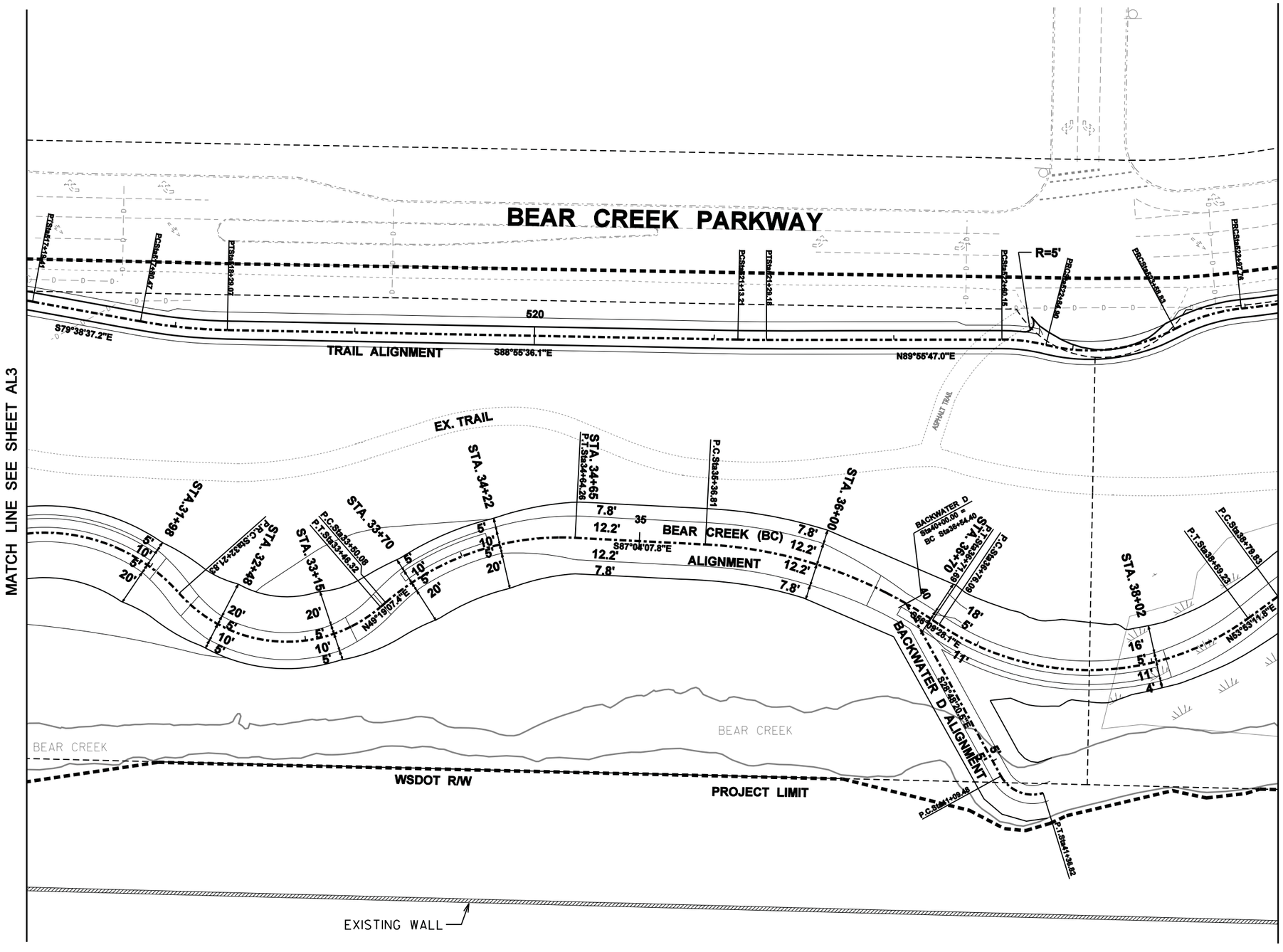
CURVE DATA					
P.I. STATION	DELTA	RADIUS	TANGENT	LENGTH	S
TRAIL 518+04.82	09°16'59.0"	300.00'	24.35'	48.60'	0.02
TRAIL 521+21.19	01°08'36.9"	800.00'	7.98'	15.96'	0.02
TRAIL 522+72.59	14°10'40.0"	100.00'	12.44'	24.75'	0.02
TRAIL 523+23.65	42°21'42.9"	100.00'	38.75'	73.94	0.02
TRAIL 523+78.54	22°15'07.8"	100.00'	19.71'	38.23'	0.02
BC 31+65.17	84°33'48.6"	100.00'	90.93'	147.59'	-
BC 33+00.66	89°09'30.4"	80.00'	78.83'	124.48'	-
BC 34+10.09	43°36'44.8"	150.00'	60.01'	114.77'	-
BC 36+05.93'	30°54'39.7"	250.00'	69.12'	134.87'	-
BC 37+81.03	69°57'20.1"	150.00'	104.94'	183.14'	-
BACKWATER D 41+25.77	78°19'42.0"	20.00'	16.29'	27.34'	-



DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010				REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Designed By	A. SCHMIDTMAN	3/2010					WASH			
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL4

SHEET OF SHEETS

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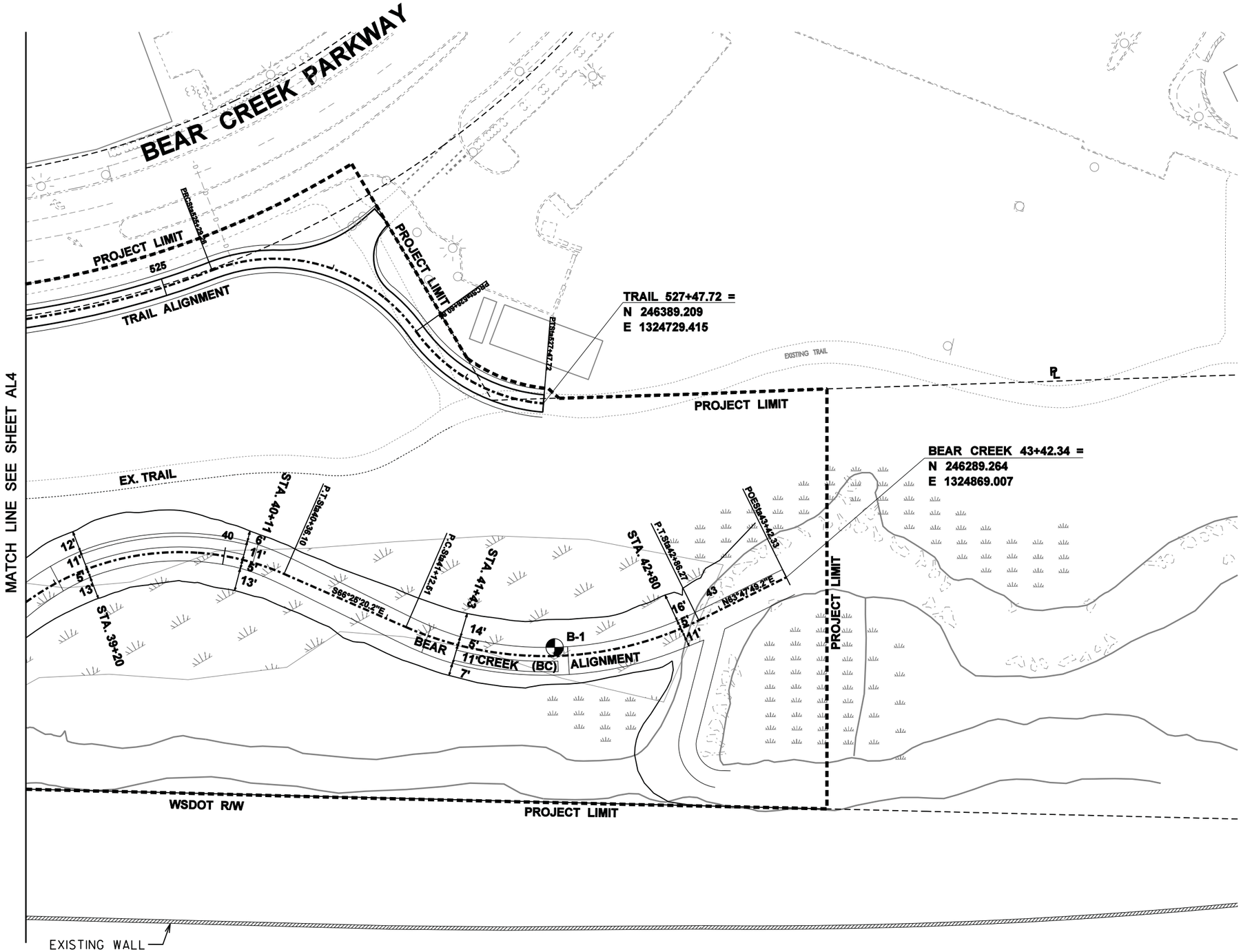
CURVE DATA					
P.I. STATION	DELTA	RADIUS	TANGENT	LENGTH	S
TRAIL 524+63.89	15°04'10.6"	500.00'	66.14'	131.51'	0.02
TRAIL 526+06.56	75°23'44.4"	100.00'	77.28'	131.69'	0.02
TRAIL 527+07.24	49°46'09.3"	100.00'	46.39'	86.86'	0.02
BC 39+85.89	59°41'28.0"	150.00'	86.06'	156.27'	-
BC 42+05.30	49°46'50.5"	200.00'	92.79'	173.76'	-



DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

LEGEND

BORING

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

MATCH LINE SEE SHEET AL4

						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor	J. GAGE	3/2010					WASH			
Designed By	A. SCHMIDTMAN	3/2010								
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL5

SHEET OF SHEETS

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CURVE DATA					
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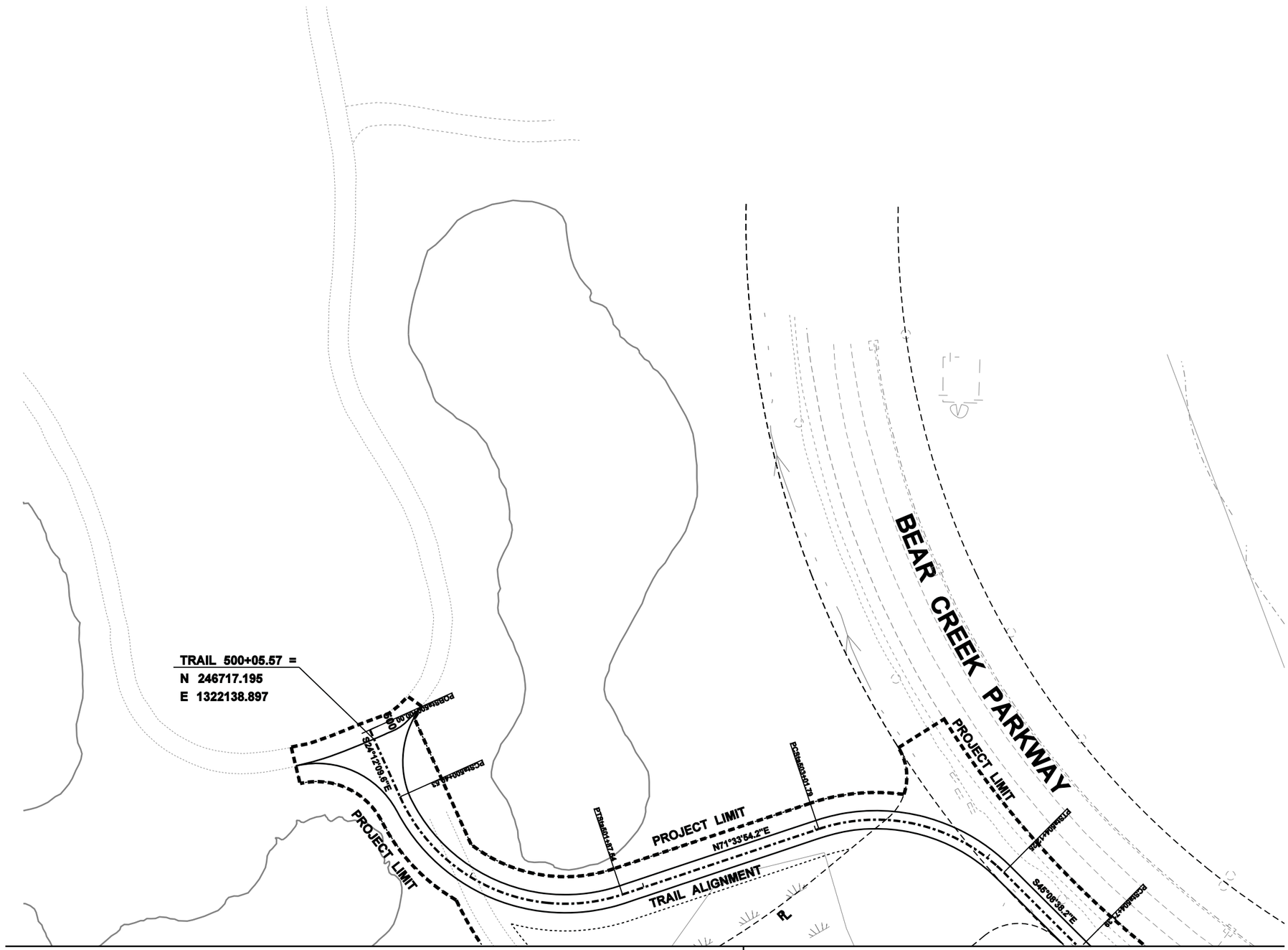
TRAIL 501+30.94	84°13'56.2"	100.00'	90.41'	147.01'	0.02
TRAIL 503+63.42	63°17'27.7"	100.00'	61.63'	110.46'	0.02



DATUM

HORIZONTAL: (NAD) 83 (91) WA
VERTICAL: (NAVD) 88

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			
			REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

ALIGNMENT & PROJECT CONTROL PLAN

AL6

SHEET OF SHEETS

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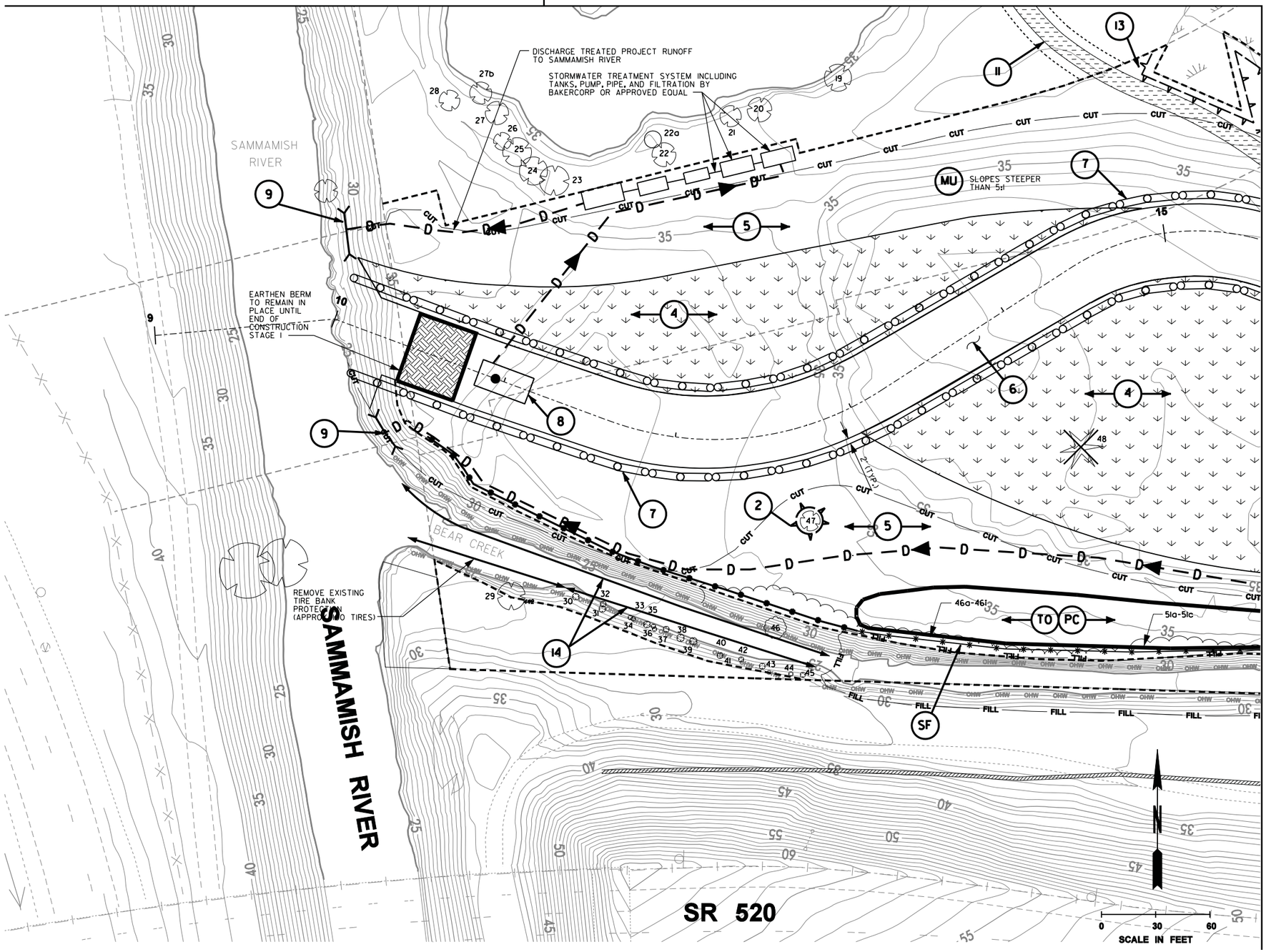
MATCH LINE SEE SHEET EC6



MATCH LINE SEE SHEET EC2

LEGEND

- STORM DRAIN INLET PROTECTION (COR STANDARD PLAN 1-7)
- CLEARING LIMITS
- HIGH VISIBILITY FENCE (COR STANDARD PLAN 1-15)
- SILT FENCE (SEE SHEET EC8 FOR DETAIL)
- TEMPORARY CHAIN LINK CONSTRUCTION FENCE
- TEMPORARY DEWATERING PIPE
- STRAW WATTLE
- TEMPORARY SHEET PILE (SEE DETAIL SP4)
- SIGNIFICANT TREE TO BE REMOVED
- 19 TREE INVENTORY (SEE SHEET EC9)
- WETLAND HYDROSEED MIX SEE PLANTING PLANS
- EARTHEN BERM (SEE DEATIL SP4)
- TRAIL REMOVAL
- CONSTRUCTION ENTRANCE
- NEW TRAIL

TESC CODES

- CE STABILIZED CONSTRUCTION ENTRANCE
- IP STORM DRAIN INLET PROTECTION
- PC PLASTIC COVERING
- SF FILTER FABRIC SILT FENCE
- DC DUST CONTROL
- TO TOPSOILING / STOCKPILE
- MU MULCH AND/OR MATTING

CONSTRUCTION NOTES

1. INSTALL SILT FENCE 1.0' INSIDE CLEARING LIMITS WHERE SHOWN PER CITY OF REDMOND STD. DRAWING 502
2. PROTECT TREE WITH HIGH VISIBILITY FENCE
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE WHERE SHOWN PER CITY OF REDMOND STD. DRAWING 503.
4. APPLY WETLAND HYDROSEED MIX AFTER CLEARING AND GRADING. SEE HYDROSEED MIX ON SHEET EC7
5. APPLY UPLAND HYDROSEED MIX AFTER CLEARING AND GRADING TO ALL DISTURBED AREAS NOT RECEIVING WETLAND HYDROSEED. (SEE HYDROSEED MIX ON SHEET EC7)
6. INSTALL BANK PROTECTION LEVELS 1, 2, & 3 AND STREAMBED GRAVEL AFTER CLEARING AND GRADDING. SEE GR1-GR6 FOR LOCATIONS
7. INSTALL STRAW WATTLE PER WSDOT STD. PLAN 1-30.30-00
8. INSTALL CONSTRUCTION STORMWATER SUMP WITH CATCH BASIN TYPE 2 - 48 IN. DIAM. PER DETAIL. SEE SHEET EC8
9. INSTALL TEE DIFFUSER FOR TREATED PROJECT RUNOFF DISCHARGE PER DETAIL, SHEET EC8
10. INSTALL TEMPORARY CHAIN LINK CONSTRUCTION FENCE A MINIMUM OF 5' FROM EDGE OF TRAIL. PROVIDE GATES AT CONSTRUCTION ENTRANCES
11. REMOVE EXISTING TRAIL
12. REMOVE ART FEATURE AND FOUNDATION. SALVAGE TO OWNER
13. INSTALL HIGH VISIBILITY FENCE TO PROTECT SENSITIVE AREAS
14. REMOVE EXISTING RIPRAP
15. REMOVE EXISTING STORM DRAIN PIPE
16. RELOCATE EXISTING SIGN

90% SUBMITTAL

			REVISION	BY	APP'D
Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
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Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

T.E.S.C. & DEMOLITION PLAN

EC1

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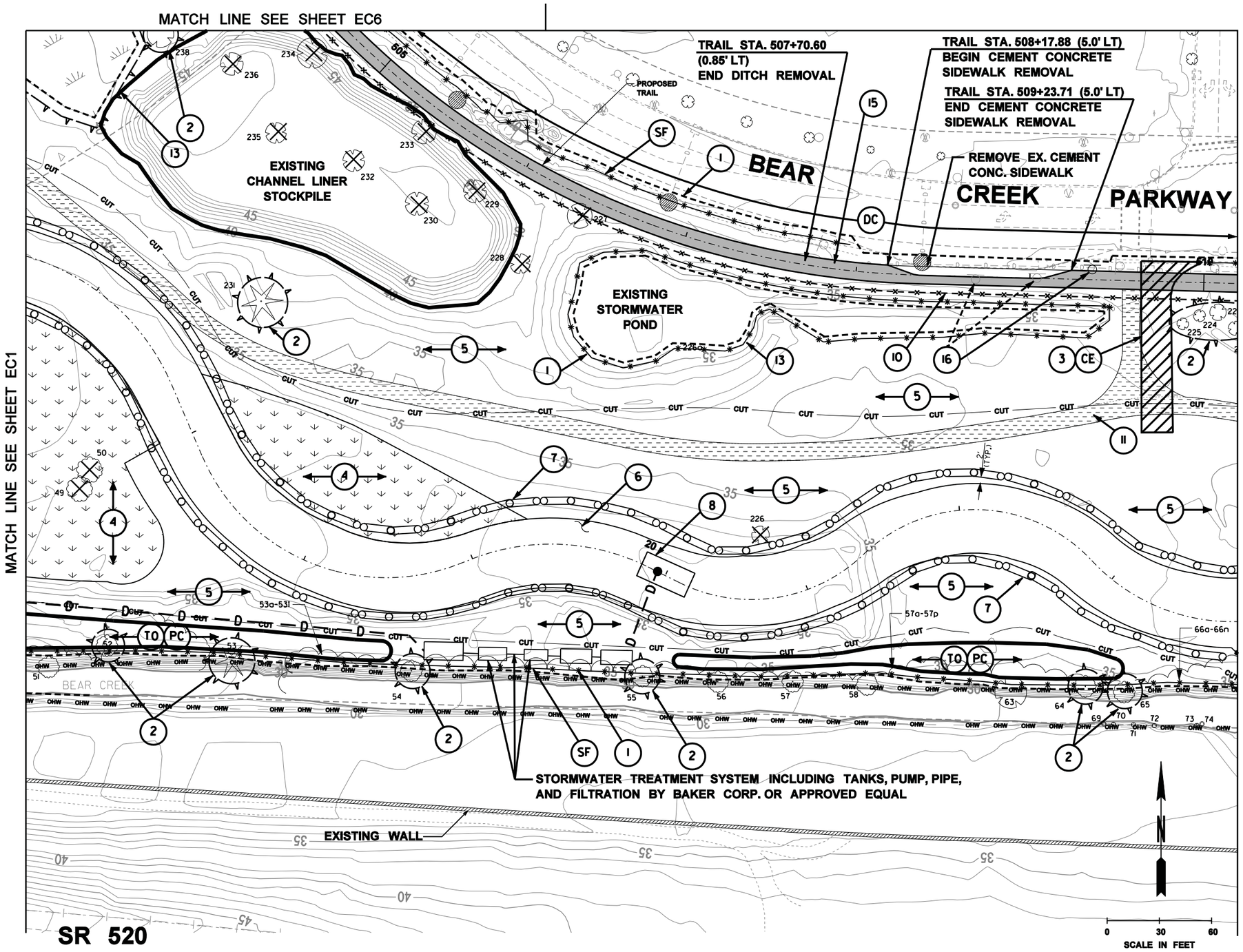

LEGEND

- STORM DRAIN INLET PROTECTION (COR STANDARD PLAN 1-7)
- CLEARING LIMITS
- HIGH VISIBILITY FENCE (COR STANDARD PLAN 1-15)
- SILT FENCE (SEE SHEET EC8 FOR DETAIL)
- TEMPORARY CHAIN LINK CONSTRUCTION FENCE
- TEMPORARY DEWATERING PIPE
- STRAW WATTLE
- TEMPORARY SHEET PILE (SEE DETAIL SP4)
- SIGNIFICANT TREE TO BE REMOVED
- 19 TREE INVENTORY (SEE SHEET EC9)
- WETLAND HYDROSEED MIX SEE PLANTING PLANS
- EARTHEN BERM (SEE DEATIL SP4)
- TRAIL REMOVAL
- CONSTRUCTION ENTRANCE
- NEW TRAIL

TESC CODES

- CE STABILIZED CONSTRUCTION ENTRANCE
- IP STORM DRAIN INLET PROTECTION
- PC PLASTIC COVERING
- SF FILTER FABRIC SILT FENCE
- DC DUST CONTROL
- TO TOPSOILING / STOCKPILE
- MU MULCH AND/OR MATTING

CONSTRUCTION NOTES

1. INSTALL SILT FENCE 1.0' INSIDE CLEARING LIMITS WHERE SHOWN PER CITY OF REDMOND STD. DRAWING 502
2. PROTECT TREE WITH HIGH VISIBILITY FENCE
3. INSTALL STABILIZED CONSTRUCTION ENTRANCE WHERE SHOWN PER CITY OF REDMOND STD. DRAWING 503.
4. APPLY WETLAND HYDROSEED MIX AFTER CLEARING AND GRADING. SEE HYDROSEED MIX ON SHEET EC7
5. APPLY UPLAND HYDROSEED MIX AFTER CLEARING AND GRADING TO ALL DISTURBED AREAS NOT RECEIVING WETLAND HYDROSEED. (SEE HYDROSEED MIX ON SHEET EC7)
6. INSTALL BANK PROTECTION LEVELS 1, 2, & 3 AND STREAMBED GRAVEL AFTER CLEARING AND GRADDING. SEE GR1-GR6 FOR LOCATIONS
7. INSTALL STRAW WATTLE PER WSDOT STD. PLAN 1-30.30-00
8. INSTALL CONSTRUCTION STORMWATER SUMP WITH CATCH BASIN TYPE 2 - 48 IN. DIAM. PER DETAIL, SEE SHEET EC8
9. INSTALL TEE DIFFUSER FOR TREATED PROJECT RUNOFF DISCHARGE PER DETAIL, SHEET EC8
10. INSTALL TEMPORARY CHAIN LINK CONSTRUCTION FENCE A MINIMUM OF 5' FROM EDGE OF TRAIL, PROVIDE GATES AT CONSTRUCTION ENTRANCES
11. REMOVE EXISTING TRAIL
12. REMOVE ART FEATURE AND FOUNDATION. SALVAGE TO OWNER
13. INSTALL HIGH VISIBILITY FENCE TO PROTECT SENSITIVE AREAS
14. REMOVE EXISTING RIPRAP
15. REMOVE EXISTING STORM DRAIN PIPE
16. RELOCATE EXISTING SIGN

90% SUBMITTAL

			REVISION	BY	APP'D
Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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BEAR CREEK REHABILITATION PROJECT

T.E.S.C. & DEMOLITION PLAN

EC2

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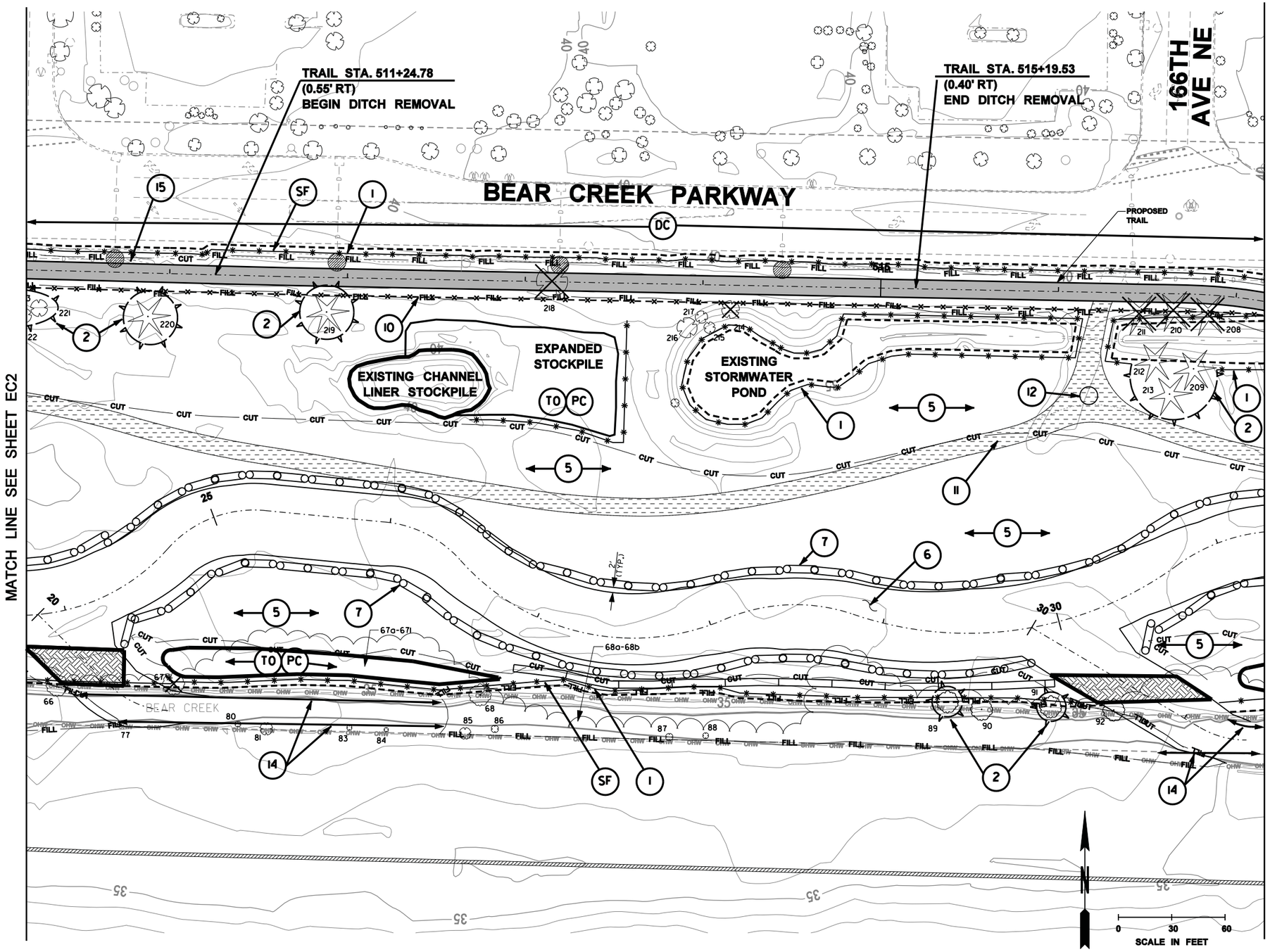

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EC3

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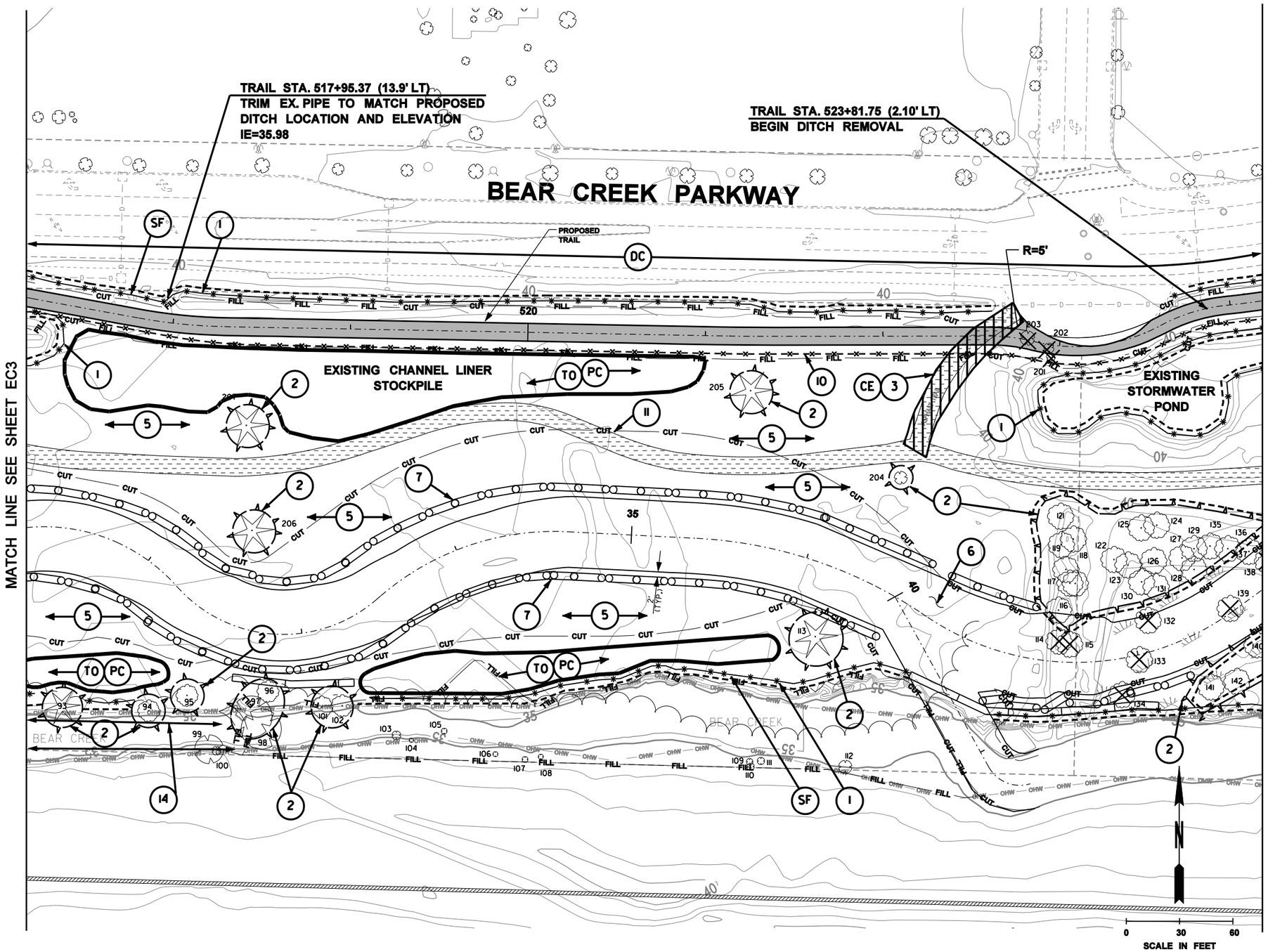

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EC4

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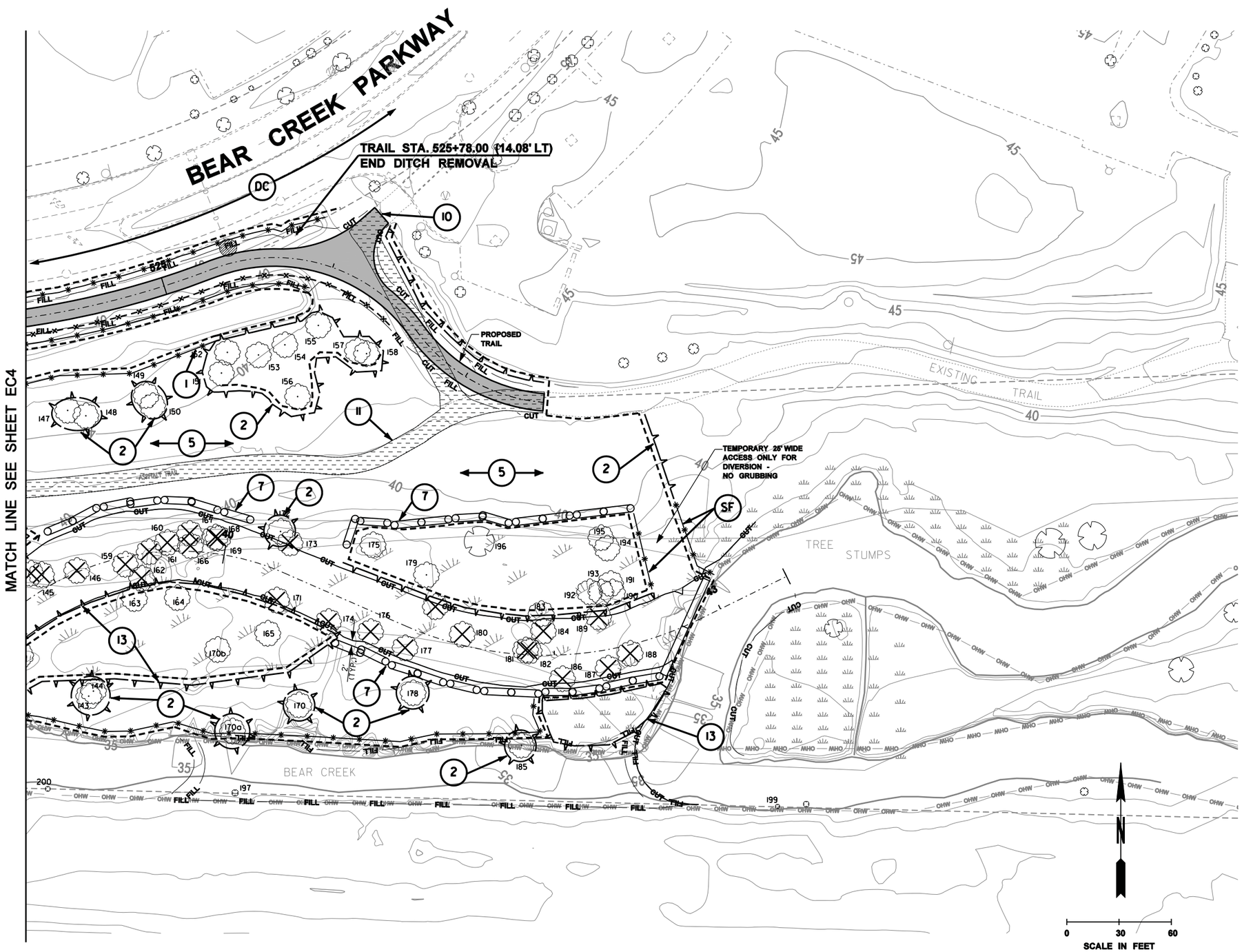

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EC5

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T.E.S.C. & DEMOLITION PLAN

EC6

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EROSION CONTROL NOTES

1. THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, AND MAINTENANCE OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS APPROVED.
2. THE WORKLIMIT BOUNDARY SHOWN ON THE GRADING PLAN SHALL BE CLEARLY FLAGGED OR FENCED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE WORKLIMIT BOUNDARY SHALL BE PERMITTED. THE WORKLIMIT BOUNDARY SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
3. THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED PRIOR TO OR IN CONJUNCTION WITH ALL CLEARING AND GRADING SO AS TO ENSURE THAT THE TRANSPORT OF SEDIMENT TO SURFACE WATERS, DRAINAGE SYSTEMS, AND ADJACENT PROPERTIES IS MINIMIZED.
4. THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED (E.G. ADDITIONAL SUMP PUMPS, RELOCATION OF DITCHES AND SILT FENCES, ETC.) AS NEEDED FOR UNEXPECTED STORM EVENTS AND MODIFIED TO ACCOUNT FOR CHANGING SITE CONDITIONS.
5. THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CERTIFIED EROSION AND SEDIMENT CONTROL LEAD (CESCL) OR DESIGNEE AND MAINTAINED AS NECESSARY TO ENSURE CONTINUED PROPER FUNCTIONING. WRITTEN RECORDS SHALL BE KEPT OF WEEKLY REVIEWS OF THE ESC FACILITIES DURING CONSTRUCTION. REVIEWS AND MONITORING SHALL BE CONDUCTED IN ACCORDANCE WITH 2005 WASHINGTON STATE DEPARTMENT OF ECOLOGY'S STORMWATER MANAGEMENT MANUAL FOR WESTERN WASHINGTON.
6. PROJECT GRADING SHALL BE DIVIDED INTO FOUR SEGMENTS HAVING EQUAL AREAS THAT SHALL BE APPROVED BY THE ENGINEER. EACH SEGMENT SHALL BE GRADED THEN SHALL RECEIVE FINAL HYDROSEED MIXTURE AND MULCH AS SHOWN ON T.E.S.C. AND DEMOLITION PLANS WITHIN TWENTY-FOUR (24) HOURS OF COMPLETION OF GRADING. EACH SEGMENT SHALL BE GRADED, HYDROSEEDED, AND MULCHED IN SUCCESSION. IRRIGATION OF HYDROSEEDED AREAS SHALL BE PROVIDED IF WEATHER CONDITIONS WARRANT OR AS APPROVED BY ENGINEER.
7. ANY AREA NEEDING ESC MEASURES THAT DO NOT REQUIRE IMMEDIATE ATTENTION, SHALL BE ADDRESSED WITHIN FIFTEEN (15) DAYS.
8. THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN TWENTY FOUR (24) HOURS FOLLOWING A STORM EVENT.
9. AT NO TIME SHALL MORE THAN ONE (1) FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED AFTER CONSTRUCTION GRADING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.
10. STABILIZED CONSTRUCTION ENTRANCES AND ROADS SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
11. WHERE MULCH FOR TEMPORARY EROSION CONTROL IS REQUIRED, IT SHALL BE APPLIED AT A MINIMUM THICKNESS OF 2 TO 3 INCHES.
12. EROSION CONTROL MATTING SHALL BE INSTALLED ON ALL AREAS THAT ARE STEEPER THAN 5:1 SLOPE PRIOR TO HYDROSEEDING.
13. TRACK WALK ALL CUT AND FILL SLOPES AT COMPLETION OF EACH DAY OF GRADING.
14. THESE MEASURES ARE MINIMUM REQUIREMENTS, IF THEY ARE NOT EFFECTIVE, OTHER MEASURES WILL BE REQUIRED. INDICATORS OF THE NEED FOR ADDITIONAL CONTROLS INCLUDE BUT ARE NOT LIMITED TO: FAILURE OF PROJECT RUNOFF TO MEET WATER QUALITY REQUIREMENTS, SLOPE FAILURES, DOWNSTREAM SEDIMENT DEPOSITS, SITE EROSION OR LACK OF EROSION CONTROL FACILITY MAINTENANCE.
15. DEWATERING DEVICES SHALL DISCHARGE INTO LOCATIONS SHOWN ON PLANS.
16. CONTRACTOR SHALL SWEEP THE ENTIRE ROADWAY WITHIN THE ENTIRE PROJECT LIMITS WITH A STREET SWEEPER ON A DAILY BASIS DURING CONSTRUCTION AND MORE OFTEN AS DIRECTED BY THE ENGINEER.
17. STREAM ISOLATION CURTAINS SHALL

CONSTRUCTION SEQUENCE

1. CONDUCT THE PRECONSTRUCTION MEETING.
2. FLAG OR FENCE CONSTRUCTION LIMITS.
3. POST SIGN WITH NAME AND PHONE NUMBER OF ESC (EROSION/SEDIMENTATION CONTROL) SUPERVISOR.
4. INSTALL CATCH BASIN PROTECTION.
5. GRADE AND INSTALL CONSTRUCTION ENTRANCE.
6. GRADE BERM FOR SILT FENCE.
7. INSTALL PERIMETER PROTECTION (SILT FENCE, ETC.).
8. GRADE AND STABILIZE CONSTRUCTION ROADS.
9. MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH CITY OF REDMOND STANDARDS AND MANUFACTURER'S RECOMMENDATIONS.
10. RELOCATE SURFACE WATER CONTROLS AND EROSION CONTROL MEASURES OR INSTALL NEW MEASURES SO THAT AS SITE CONDITIONS CHANGE, THE EROSION AND SEDIMENT CONTROL IS ALWAYS IN ACCORDANCE WITH THE CITY OF REDMOND EROSION AND SEDIMENT CONTROL STANDARDS.
11. COVER ALL AREAS THAT WILL BE UNWORKED FOR MORE THAN SEVEN DAYS DURING THE DRY SEASON OR TWO DAYS DURING THE WET SEASON WITH MECHANICALLY BONDED FIBER MATRIX MULCH.
12. STABILIZE ALL AREAS THAT REACH FINAL GRADE WITHIN TWENTY FOUR (24) HOURS.
13. SEED AREAS SHOWN ON PLAN AFTER GRADING IS COMPLETE.
14. UPON COMPLETION OF THE PROJECT, ALL DISTURBED AREAS MUST BE STABILIZED AND BMP'S REMOVED IF APPROPRIATE.

UPLAND HYDROSEED MIX

KIND/VARIETY	% BY WEIGHT	MIN. % GERM
BARCLAY PERENNIAL RYEGRASS	70%	90%
RED CREEPING FESCUE	20%	90%
HARD FESCUE	10%	90%

APPLICATION RATE:	120 LBS/ACRE
CANFOR WOOD CELLULOSE ECO-FIBER MULCH:	1,800 LBS/ACRE
NUTRICULTURE SEED STARTER FERTILIZER (16-45-7):	60 LBS/ACRE
CANFOR ECO-TAC GUAR TACKIFIER:	80 LBS/ACRE
STAY MOIST MOISTURE RETENTION AGENT	60 LBS/ACRE

WETLAND HYDROSEED MIX

KIND/VARIETY	% BY WEIGHT	MIN. % GERM
RICE CUTGRASS	45%	90%
WESTERN MANA GRASS	40%	90%
CANADA REED	10%	90%
SPIKE BENTGRASS	3%	90%
WOOL-GRASS	2%	90%

APPLICATION RATE:	50 LBS/ACRE
CANFOR WOOD CELLULOSE ECO-FIBER MULCH:	1,800 LBS/ACRE
FERTILIZER:	NA
CANFOR ECO-TAC GUAR TACKIFIER:	80 LBS/ACRE

RESTORATION HYDROSEED MIXES

SILT FENCE NOTES

1. THE FILTER FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO THE LENGTH OF THE BARRIER TO AVOID USE OF JOINTS. WHEN JOINTS ARE NECESSARY, FILTER CLOTH SHALL BE SPLICED TOGETHER ONLY AT A SUPPORT POST, WITH A MINIMUM OF 6-INCH OVERLAP, AND BOTH ENDS SECURELY FASTENED TO THE POST.
2. THE FILTER FABRIC FENCE SHALL BE INSTALLED ONLY WHEN IT CAN FOLLOW THE CONTOURS. THE FENCE POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART AND DRIVEN SECURELY INTO THE GROUND (MINIMUM OF 20 INCHES).
3. A TRENCH SHALL BE EXCAVATED, ROUGHLY 6 INCHES WIDE AND 6 INCHES DEEP, UPSLOPE AND ADJACENT TO THE WOOD POST TO ALLOW THE FILTER FABRIC TO BE BURIED.
4. WHEN STANDARD STRENGTH FILTER FABRIC IS USED, A WIRE MESH SUPPORT FENCE SHALL BE FASTENED TO THE UPSLOPE SIDE OF THE POSTS USING HEAVY DUTY WIRE STAPLES AT LEAST ONE INCH LONG, TIE WIRES OR HOG RINGS. THE WIRE SHALL EXTEND INTO THE TRENCH A MINIMUM OF 4 INCHES AND SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE.
5. THE STANDARD STRENGTH FILTER FABRIC SHALL BE STAPLED OR WIRED TO THE FENCE, AND 20 INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT EXTEND MORE THAN 36 INCHES ABOVE THE ORIGINAL GROUND SURFACE. FILTER FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE NATIVE BACKFILL MATERIAL ON BOTH SIDES OF FENCE TO CREATE A BEVEL SHAPE.
7. FILTER FABRIC FENCES SHALL REMAIN IN PLACE AFTER CONSTRUCTION. THEY WILL PREVENT FISH STRANDING IN THE EVENT OF A 100-YEAR STORM.
8. FILTER FABRIC FENCES SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL. ANY REQUIRED REPAIRS SHALL BE MADE IMMEDIATELY.
9. WHERE SHOWN ON THE PLAN A SOIL BERM OF 1' HIGH WILL BE CONSTRUCTED WITH A FILTER FABRIC FENCE ON TOP IN ORDER TO MAINTAIN AN ELEVATION AT THE TOP OF THE FILTER FABRIC FENCE 1' ABOVE THE 100-YEAR FLOOD ELEVATION. (SEE DETAIL BELOW)

GENERAL NOTES

1. UTILIZE EXISTING TRAIL FOR CONSTRUCTION ACCESS. CONSTRUCT ACCESS ON NORTH SIDE OF CUT LINE WHERE EXISTING TRAIL IS WITHIN GRADING AREA.
2. APPLY WETLAND HYDROSEED MIX TO WETLAND AREAS SHOWN TO PROVIDE EROSION CONTROL. SEE PLANTING PLANS PLI-PL6.
3. APPLY UPLAND HYDROSEED MIX TO REMAINDER OF PLANTING AREAS TO PROVIDE EROSION CONTROL. SEE PLANTING PLANS PLI-PL6.
4. CLEARING AND GRUBBING WITHIN BANKS OF BEAR CREEK SHALL BE COMPLETED AFTER COLLECTION AND REMOVAL OF FISH DOWNSTREAM OF EACH DIVERSION AND PRIOR TO FILLING EXISTING CHANNEL DOWNSTREAM OF EACH DIVERSION.
5. HYDROSEED EACH CHANNEL DOWNSTREAM OF EACH DIVERSION AFTER FILLING EXISTING CHANNEL. USE PERMANENT UPLAND HYDROSEED MIX SHOWN IN PLANTING PLANS. SEE SHEETS PLI-PL6.
6. DEWATER EACH POOL WITHIN PROPOSED STREAM CHANNEL WITH UTILITY PUMP AND PIPE. DIRECT FLOWS DOWNSTREAM TO DEWATERING SUMP LOCATIONS SHOWN ON PLANS.

90% SUBMITTAL

Supervisor	J. GAGE	3/2010	NTS
Designed By	A. SCHMIDTMAN	3/2010	
Checked By	J. ST. JOHN	3/2010	
Detailed By	D. OLSEN	3/2010	

REVISION | BY | APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005-3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

T.E.S.C. NOTES

EC7

SHEET OF SHEETS

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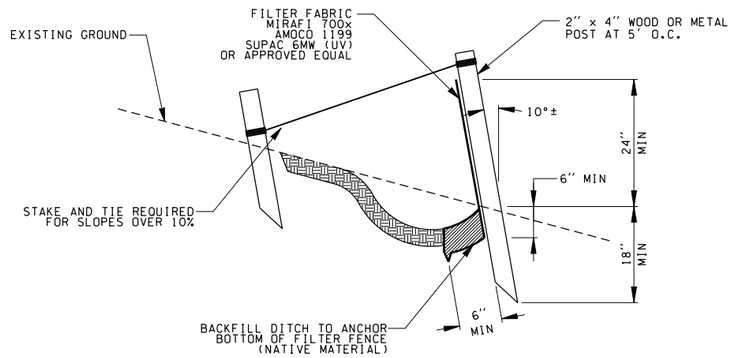
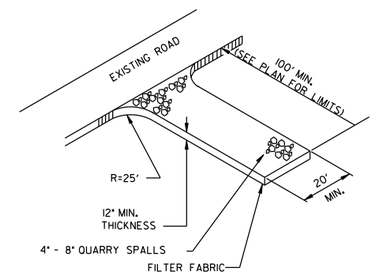


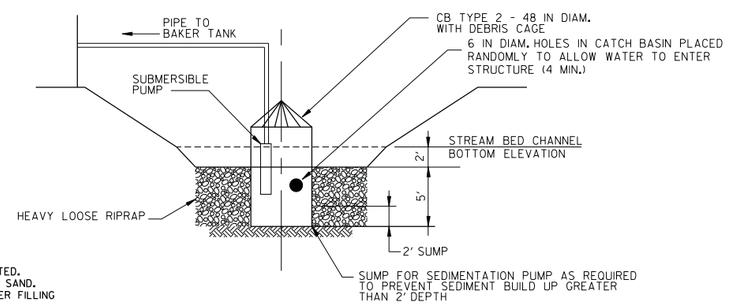
FILTER FABRIC FENCE - C.O.R. STD. DWG 502

NOT TO SCALE



STABILIZED CONSTRUCTION ENTRANCE - C.O.R. STD. DWG 503

NOT TO SCALE



NOTE:
REMOVE CATCH BASIN AFTER SITE WORK
AND STREAM CHANNEL EXCAVATION COMPLETED.
REPLACE VOID WITH CRUSHED SURFACING OR SAND.
FILL VOIDS IN RIPRAP AREA WITH SAND. AFTER FILLING
VOIDS, CONTINUE WITH STREAMBED CHANNEL
CONSTRUCTION PER PLAN.

CONSTRUCTION STORMWATER SUMP DETAIL

NOT TO SCALE

90% SUBMITTAL

						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor	J. GAGE	3/2010					WASH			
Designed By	A. SCHMIDTMAN	3/2010								
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

CityofRedmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

T.E.S.C. DETAILS

EC8

SHEET OF SHEETS

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Tree #	DBH (in.)	Scientific Name	Common Name	Significant (6"-30" DBH)	Landmark (>30" DBH)	Remove
1	42	*Pseudotsuga menziesii*	Douglas fir		X	
1a	8	*Salix sp.*	Willow	X		
1b	7	*Populus balsamifera*	Black cottonwood	X		
1c	8	*Populus balsamifera*	Black cottonwood	X		
1d	8	*Populus balsamifera*	Black cottonwood	X		
2	51	*Pseudotsuga menziesii*	Douglas fir		X	
2a	10	*Populus balsamifera*	Black cottonwood	X		
2b	8	*Populus balsamifera*	Black cottonwood	X		
3	8	*Thuja plicata*	Western red cedar	X		
4	10	*Populus balsamifera*	Black cottonwood	X		
5	12	*Populus balsamifera*	Black cottonwood	X		
6	10	*Pseudotsuga menziesii*	Douglas fir	X		
7	8	*Populus balsamifera*	Black cottonwood	X		
8	6	*Populus balsamifera*	Black cottonwood	X		
8a	6	*Populus balsamifera*	Black cottonwood	X		
9	7	*Thuja plicata*	Western red cedar	X		
10	35	*Pseudotsuga menziesii*	Douglas fir		X	
11	7	*Thuja plicata*	Western red cedar	X		
12	8	*Thuja plicata*	Western red cedar	X		X, S2
13	6	*Thuja plicata*	Western red cedar	X		X
14	6	*Acer macrophyllum*	Bigleaf maple	X		X
15	6	*Acer macrophyllum*	Bigleaf maple	X		X
16	7	*Acer macrophyllum*	Bigleaf maple	X		X
16a	6	*Acer macrophyllum*	Bigleaf maple	X		X
16b	7	*Acer macrophyllum*	Bigleaf maple	X		X
16c	6	*Acer macrophyllum*	Bigleaf maple	X		X
17	6	*Acer macrophyllum*	Bigleaf maple	X		
18	6	*Acer macrophyllum*	Bigleaf maple	X		
19	6	*Populus balsamifera*	Black cottonwood	X		
20	7	*Alnus rubra*	Red alder	X		
21	8	*Alnus rubra*	Red alder	X		
22	12, 12	*Alnus rubra*	Red alder	X		
22a	14	*Alnus rubra*	Red alder	X		
23	7	*Alnus rubra*	Red alder	X		
24	7	*Alnus rubra*	Red alder	X		
25	7	*Alnus rubra*	Red alder	X		
26	7	*Alnus rubra*	Red alder	X		
27	10	*Alnus rubra*	Red alder	X		
27a	12	*Alnus rubra*	Red alder	X		
28	8	*Populus balsamifera*	Black cottonwood	X		
29	37	*Sequoia sempervirens*	Coast redwood		X	
30	7, 9, 6	*Fraxinus latifolia*	Oregon ash	X		
31	9	*Fraxinus latifolia*	Oregon ash	X		
32	8	*Fraxinus latifolia*	Oregon ash	X		
33	6	*Fraxinus latifolia*	Oregon ash	X		
34	6	*Fraxinus latifolia*	Oregon ash	X		
35	9, 7	*Fraxinus latifolia*	Oregon ash	X		
36	6, 6	*Fraxinus latifolia*	Oregon ash	X		
37	6	*Fraxinus latifolia*	Oregon ash	X		
38	8	*Fraxinus latifolia*	Oregon ash	X		
39	10	*Fraxinus latifolia*	Oregon ash	X		
40	10	*Fraxinus latifolia*	Oregon ash	X		
41	8	*Fraxinus latifolia*	Oregon ash	X		
42	7	*Fraxinus latifolia*	Oregon ash	X		
43	6, 7, 8	*Fraxinus latifolia*	Oregon ash	X		
44	6	*Fraxinus latifolia*	Oregon ash	X		
45	7	*Fraxinus latifolia*	Oregon ash	X		
46	8, 15	*Acer macrophyllum*	Bigleaf maple	X		
46a	10	*Acer macrophyllum*	Bigleaf maple	X		
46b	8	*Acer macrophyllum*	Bigleaf maple	X		
46c	7	*Acer macrophyllum*	Bigleaf maple	X		
46d	10	*Acer macrophyllum*	Bigleaf maple	X		
46e	7	*Salix sp.*	Willow	X		
46f	7	*Fraxinus latifolia*	Oregon ash	X		
46g	7	*Fraxinus latifolia*	Oregon ash	X		
46h	7	*Fraxinus latifolia*	Oregon ash	X		
46i	7	*Fraxinus latifolia*	Oregon ash	X		
47	8	*Salix sp.*	Willow	X		
48	50	*Pseudotsuga menziesii*	Douglas fir		X	S1
49	16	*Populus balsamifera*	Black cottonwood	X		S1
50	16	*Populus balsamifera*	Black cottonwood	X		S1
51	16	*Populus balsamifera*	Black cottonwood	X		
51a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
51b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
51c	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
51d	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
52e	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
52	22	*Populus balsamifera*	Black cottonwood	X		
53	22	*Pseudotsuga menziesii*	Douglas fir	X		
53a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53c	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53d	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53e	6 to 10	*Fraxinus latifolia*	Oregon ash	X		

Tree #	DBH (in.)	Scientific Name	Common Name	Significant (6"-30" DBH)	Landmark (>30" DBH)	Remove
53f	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53g	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53h	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
53i	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
54	10,10	*Fraxinus latifolia*	Oregon ash	X		
55	6 to 10	Deciduous		X		
56	6 to 10	Deciduous		X		
57	6 to 10	Deciduous		X		
57a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57c	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57d	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57e	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57f	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57g	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57h	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57i	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57j	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57k	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57l	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57m	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57n	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57o	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
57p	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
58	22	Deciduous		X		
59		Not Used				
60		Not Used				
61		Not Used				
62		Not Used				
63	6 to 10	Deciduous		X		
64	6 to 10	Deciduous		X		
65	6 to 10	Deciduous		X		
66	6 to 10	Deciduous		X		
66a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66c	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66d	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66e	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66f	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66g	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66h	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66i	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66j	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66k	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66l	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66m	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
66n	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67	13	*Fraxinus latifolia*	Oregon ash	X		X, S2
67a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67c	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67d	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67e	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67f	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67g	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67h	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67i	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67j	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67k	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
67l	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
68	18	*Acer macrophyllum*	Bigleaf maple	X		
68a	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
68b	6 to 10	*Fraxinus latifolia*	Oregon ash	X		
69	6	*Fraxinus latifolia*	Oregon ash	X		
70	6	*Fraxinus latifolia*	Oregon ash	X		
71	6	*Fraxinus latifolia*	Oregon ash	X		
72	6, 6	*Fraxinus latifolia*	Oregon ash	X		
73	7	*Fraxinus latifolia*	Oregon ash	X		X
74	6	*Fraxinus latifolia*	Oregon ash	X		
75	7, 6	*Fraxinus latifolia*	Oregon ash	X		
76	6	*Fraxinus latifolia*	Oregon ash	X		
77	6	*Fraxinus latifolia*	Oregon ash	X		
78	6	*Fraxinus latifolia*	Oregon ash	X		
79	6	*Fraxinus latifolia*	Oregon ash	X		
80	10	*Fraxinus latifolia*	Oregon ash	X		
81	6, 8	*Fraxinus latifolia*	Oregon ash	X		
82	9, 17	*Fraxinus latifolia*	Oregon ash	X		
83	7	*Fraxinus latifolia*	Oregon ash	X		
84	6	*Fraxinus latifolia*	Oregon ash	X		
85	16	*Acer macrophyllum*	Bigleaf maple	X		
86	10, 10, 7	*Fraxinus latifolia*	Oregon ash	X		
87	6, 10	*Fraxinus latifolia*	Oregon ash	X		
88	8	*Populus balsamifera*	Black cottonwood	X		
89	19	*Acer macrophyllum*	Bigleaf maple	X		

Tree #	DBH (in.)	Scientific Name	Common Name	Significant (6"-30" DBH)	Landmark (>30" DBH)	Remove
90	15	*Fraxinus latifolia*	Oregon ash	X		
91	22	*Fraxinus latifolia*	Oregon ash	X		
92	19	*Fraxinus latifolia*	Oregon ash	X		
93	13	*Fraxinus latifolia*	Oregon ash	X		
94	21	*Fraxinus latifolia*	Oregon ash	X		
95	22	*Fraxinus latifolia*	Oregon ash	X		
96	14	*Fraxinus latifolia*	Oregon ash	X		
97	9, 8, 10	*Fraxinus latifolia*	Oregon ash	X		
98	20	Downed Deciduous				
99	20	Downed Deciduous				
100	12	*Fraxinus latifolia*	Oregon ash	X		
101	12	*Fraxinus latifolia*	Oregon ash	X		
102	15	*Fraxinus latifolia*	Oregon ash	X		
103	12	*Fraxinus latifolia*	Oregon ash	X		
104	6	*Fraxinus latifolia*	Oregon ash	X		
105	8	*Fraxinus latifolia*	Oregon ash	X		
106	7, 7	*Fraxinus latifolia*	Oregon ash	X		
107	8	*Fraxinus latifolia*	Oregon ash	X		
108	6, 7	*Fraxinus latifolia*	Oregon ash	X		
109	9	*Fraxinus latifolia*	Oregon ash	X		
110	10	*Fraxinus latifolia*	Oregon ash	X		
111	10, 10	*Fraxinus latifolia*	Oregon ash	X		
112	18	*Populus balsamifera*	Black cottonwood	X		
113	36	*Pseudotsuga menziesii*	Douglas fir		X	
114	15	*Populus balsamifera*	Black cottonwood	X		X, S2
115	12	*Crataegus sp.*	Hawthorn	X		X, S2
116	30	*Populus balsamifera*	Black cottonwood	X		
117	17	*Fraxinus latifolia*	Oregon ash	X		
118	15	*Fraxinus latifolia*	Oregon ash	X		
119	8, 8	*Fraxinus latifolia*	Oregon ash	X		
120	8, 8	*Fraxinus latifolia*	Oregon ash	X		
121		*Crataegus sp.*	Hawthorn	X		
122	6	*Alnus rubra*	Red alder	X		
123	6	*Alnus rubra*	Red alder	X		
124	9	*Alnus rubra*	Red alder	X		
125	10	*Alnus rubra*	Red alder	X		
126	7	*Alnus rubra*	Red alder	X		
127	7	*Alnus rubra*	Red alder	X		
128	7	*Alnus rubra*	Red alder	X		
129	7	*Alnus rubra*	Red alder	X		
130	7	*Alnus rubra*	Red alder	X		
131	8	*Alnus rubra*	Red alder	X		
132	6	*Alnus rubra*	Red alder	X		X
133	24	*Populus balsamifera*	Black cottonwood	X		X, S2
134	6	*Salix sp.*	Willow	X		X
135	8	*Alnus rubra*	Red alder	X		
136	7	*Alnus rubra*	Red alder	X		
137	8	*Crataegus sp.*	Hawthorn	X		
138	8	*Alnus rubra*	Red alder	X		X, S2
139	8	*Alnus rubra*	Red alder	X		X, S2
140	30	*Populus balsamifera*	Black cottonwood	X		
141	6	*Salix sp.*	Willow	X		
142	30	*Populus balsamifera*	Black cottonwood	X		
143	19	*Populus balsamifera*	Black cottonwood	X		
144	19	*Populus balsamifera*	Black cottonwood	X		
145	8	*Alnus rubra*	Red alder	X		X, S2
146	11	*Crataegus sp.*	Hawthorn	X		X
147	8	*Salix sp.*	Willow	X		
148	6	*Salix sp.*	Willow	X		
149	9	*Populus balsamifera*	Black cottonwood	X		
150	16	*Populus balsamifera*	Black cottonwood	X		
151	8	*Populus balsamifera*	Black cottonwood	X		
152	12	*Populus balsamifera*	Black cottonwood	X		
153	6	*Populus balsamifera*	Black cottonwood	X		
154	8, 11	*Populus balsamifera*	Black cottonwood	X		
155	6, 9	*Populus balsamifera*	Black cottonwood	X		
156	12	*Populus balsamifera*	Black cottonwood	X		
157	8, 11	*Populus balsamifera*	Black cottonwood	X		
158	12	*Populus balsamifera*	Black cottonwood	X		
159	7	*Alnus rubra*	Red alder	X		X
160	6	*Alnus rubra*	Red alder	X		X
161	6	*Alnus rubra*	Red alder	X		X
162	8	*Alnus rubra*	Red alder	X		X, S2
163	6	*Fraxinus latifolia*	Oregon ash	X		
164	10	*Salix sp.*	Willow	X		
165	6	*Populus balsamifera*	Black cottonwood	X		
166	7	*Alnus rubra*	Red alder	X		X
167	6	*Alnus rubra*	Red alder	X		X
168	6	*Alnus rubra*	Red alder	X		X
169	10	*Alnus rubra*	Red alder	X		X, S2
170	28	*Populus balsamifera*	Black cottonwood	X		
170a	36"	*Populus balsamifera*	Black cottonwood		X	
170b	4"	*Fraxinus latifolia*	Oregon ash			
171	20, 36	*Populus balsamifera*	Black cottonwood		X	X, S2

Tree #	DBH (in.)	Scientific Name	Common Name	Significant (6"-30" DBH)	Landmark (>30" DBH)	Remove
172	6, 11	*Alnus rubra*	Red alder	X		
173	9, 24, 26	*Populus balsamifera*	Black cottonwood	X		X, S2
174	10	*Alnus rubra*	Red alder	X		X, S2
175	18, 21	*Populus balsamifera*	Black cottonwood	X		
176	20	*Populus balsamifera*	Black cottonwood	X		X, S2
177	22	*Populus balsamifera*	Black cottonwood	X		X, S2
178	23	*Populus balsamifera*	Black cottonwood	X		
179	6	*Fraxinus latifolia*	Oregon ash	X		X
180	6	*Fraxinus latifolia*	Oregon ash	X		X
181	6	*Populus balsamifera*	Black cottonwood	X		X
182	14	*Populus balsamifera*	Black cottonwood	X		X, S2
183	6	*Fraxinus latifolia*	Oregon ash	X		
184	16, 18	*Populus balsamifera*	Black cottonwood	X		X, S2
185	24	*Populus balsamifera*	Black cottonwood	X		
186	30	*Populus balsamifera*	Black cottonwood	X		X, S2
187	18	*Populus balsamifera*	Black cottonwood	X		X, S2
188	22	*Populus balsamifera*	Black cottonwood	X		X, S2
189	10	*Populus balsamifera*	Black cottonwood	X		X, S2
190	12	*Populus balsamifera*	Black cottonwood	X		
191	22	*Populus balsamifera*	Black cottonwood	X		
192	10,11	*Populus balsamifera*	Black cottonwood	X		
193	7	*Populus balsamifera*	Black cottonwood	X		
194	6	*Alnus rubra*	Red alder	X		
195	10	*Alnus rubra*	Red alder	X		
196	1 to 3	*Crataegus sp.*	Hawthorn			
197	7, 9	*Fraxinus latifolia*	Oregon ash	X		
198	7	*Fraxinus latifolia*	Oregon ash	X		
199	6, 6, 6	*Fraxinus latifolia*	Oregon ash	X		
200	7	*Fraxinus latifolia*	Oregon ash	X		
201	10	*Pseudotsuga menziesii*	Douglas fir	X		X, S2
202	8	*Pseudotsuga menziesii*	Douglas fir	X		X, S2
203		Not Used				
204		Not Used				
205	38	*Pseudotsuga menziesii*	Douglas fir		X	
206	42	*Pseudotsuga menziesii*	Douglas fir		X	
207	48	*Pseudotsuga menziesii*	Douglas fir		X	
208	18	*ornamental*	Conifer	X		X, S2
209	20	*ornamental*	Conifer	X		
210	22	*ornamental*	Conifer	X		X, S2
211	12	*ornamental*	Conifer	X		X, S2
212	15	*ornamental*	Conifer	X		
213	18	*ornamental*	Conifer	X		
214	<3	*Salix sp.*	Willow			
215	N/A	Removed	Removed			
216	<3	*Salix sp.*	Willow			
217		Not Used				
218	15, 20	*Populus balsamifera*	Black cottonwood	X		X, S2
219	46	*Thuja plicata*	Western red cedar		X	
220	20, 28	*Pseudotsuga menziesii*	Douglas fir	X		
221	5	*Pseudotsuga menziesii*	Douglas fir			
222	<3	*Salix sp.*	Willow			
223	<3	*Salix sp.*	Willow			
224	3	*unknown*	Deciduous			
225	<3	*Salix sp.*	Willow			
226		Not Used				
226a	8, 6	*Populus balsamifera*	Black cottonwood	X		
227	10	*Thuja plicata*	Western red cedar	X		R1
228	10	*Thuja plicata*	Western red cedar	X		R1
229		Not Used				
230	10	*Thuja plicata*	Western red cedar	X		S1
231	40	*Pseudotsuga menziesii*	Douglas fir		X	
232	10	*Thuja plicata*	Western red cedar	X		S1
233	9	*Abies grandis*	Grand fir	X		R1
234		Not Used				
235	12	*Thuja plicata*	Western red cedar	X		S1
236	N/A	Downed Conifer	Downed Conifer			R1
237	6	*Thuja plicata*	Western red cedar	X		
238	7	*Thuja plicata*	Western red cedar	X		
239	8	*Thuja plicata*	Western red cedar	X		
		Subtotal Total Significant and Landmark Trees Removed				**57**
			Contingency (If Needed)			**10**
				GRAND TOTAL		**67**

LEGEND

R1 = Removed Prior Contract

S1 = Salvaged Prior Contract

S2 = Salvage Tree

90% SUBMITTAL

Supervisor	J. GAGE	3/2010	NTS
Designed By	A. SCHMIDTMAN	3/2010	
Checked By	J. ST. JOHN	3/2010	
Detailed By	D. OLSEN	3/2010	

REVISION | BY | APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			

JOB NUMBER

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

TREE REMOVAL TABLE

EC9

SHEET OF SHEETS

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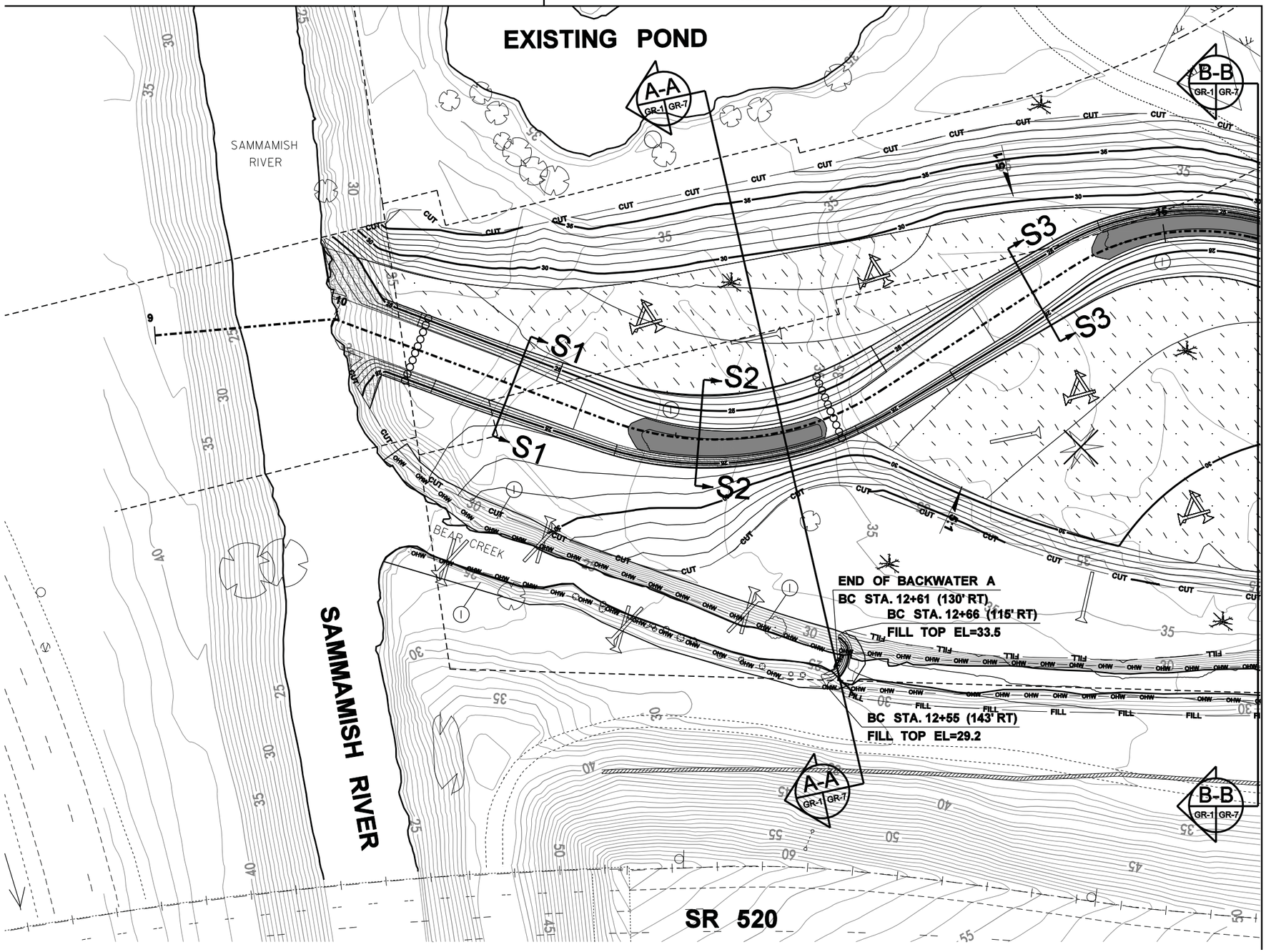
MATCH LINE SEE SHEET GR6



MATCH LINE SEE SHEET GR2

LEGEND

- EXISTING WALL
- RIGHT-OF-WAY (R.O.W.)
- OHW — EXISTING BEAR CREEK ORDINARY HIGH WATER MARK
- CUT — CUT LINE
- FILL — FILL LINE
- EXISTING CONTOUR
- PROPOSED MINOR CONTOUR
- 35 — PROPOSED MAJOR CONTOUR
- PROPOSED CENTER LINE
- PROPOSED DITCH W/ DIRECTION OF FLOW
- TREE OVERHANG
- FLOODPLAIN LOGJAM
- DOWN LOG
- STANDING SNAG
- POOL
- SIGNIFICANT TREE TO BE REMOVED
- BANK PROTECTION LEVEL 1
- BANK PROTECTION LEVEL 2
- BANK PROTECTION LEVEL 3
- LOG DEBRIS JAM
- NEW CHANNEL BED CONTROL SEE DETAIL ON SHEET GR13
- WETLAND CREATION SEE SECTIONS ON SHEET GR7 FOR LINER REQUIREMENTS
- GRAVEL PATH
- SELECTIVE PLACEMENT COVER LOGS SEE DETAIL ON SHEET GR16
- PROPOSED TRAIL
- CATCH BASIN, TYPE I
- PROPOSED STORM DRAIN PIPE/ DIRECTION OF FLOW

CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

0 30 60
SCALE IN FEET

90% SUBMITTAL

			REVISION	BY	APP'D
Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

DAVID EVANS AND ASSOCIATES INC.
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Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR1

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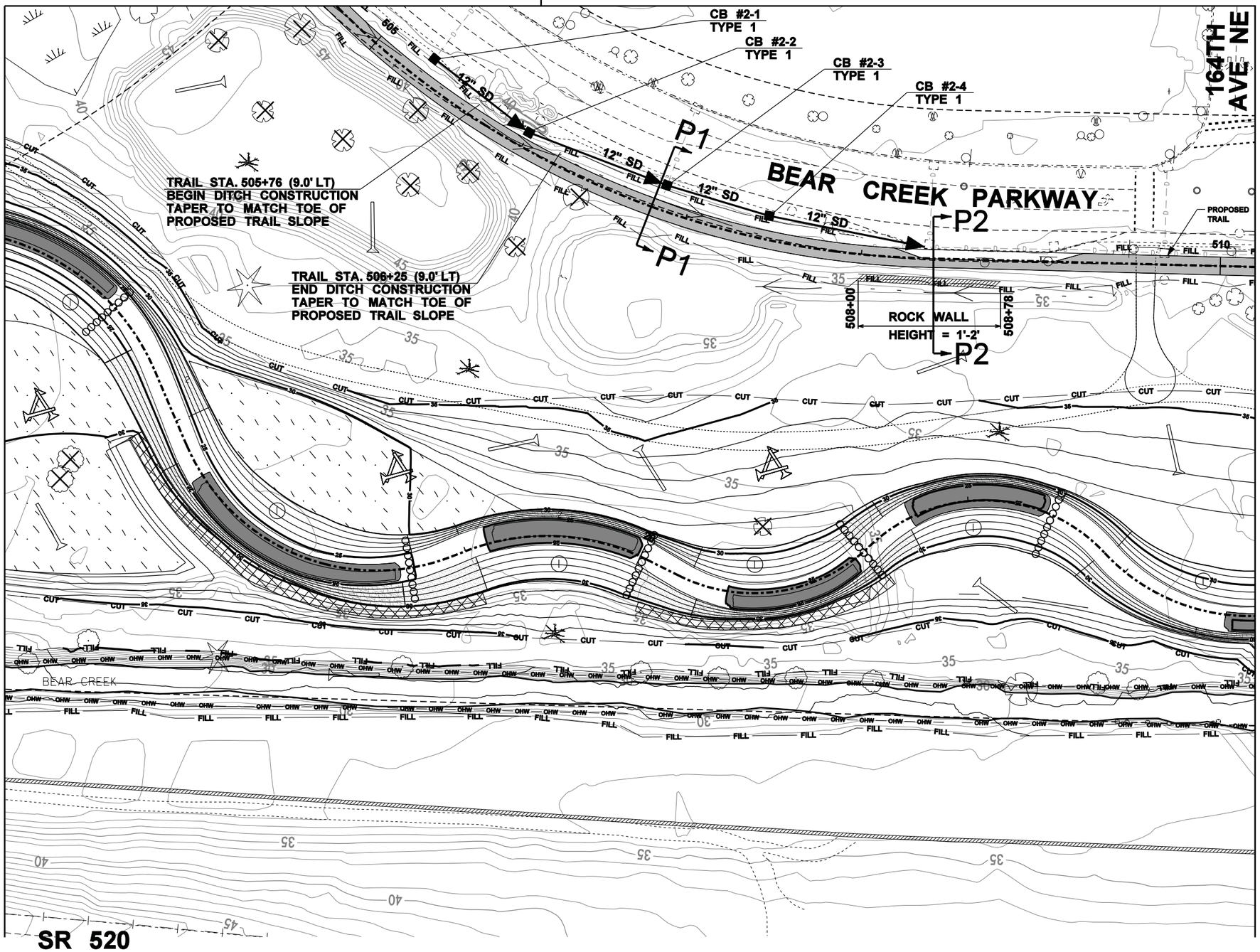
MATCH LINE SEE SHEET GR6

MATCH LINE SEE SHEET GR1

MATCH LINE SEE SHEET GR3



LEGEND

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CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

0 30 60
SCALE IN FEET

90% SUBMITTAL

			REVISION	BY	APP'D
Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR2

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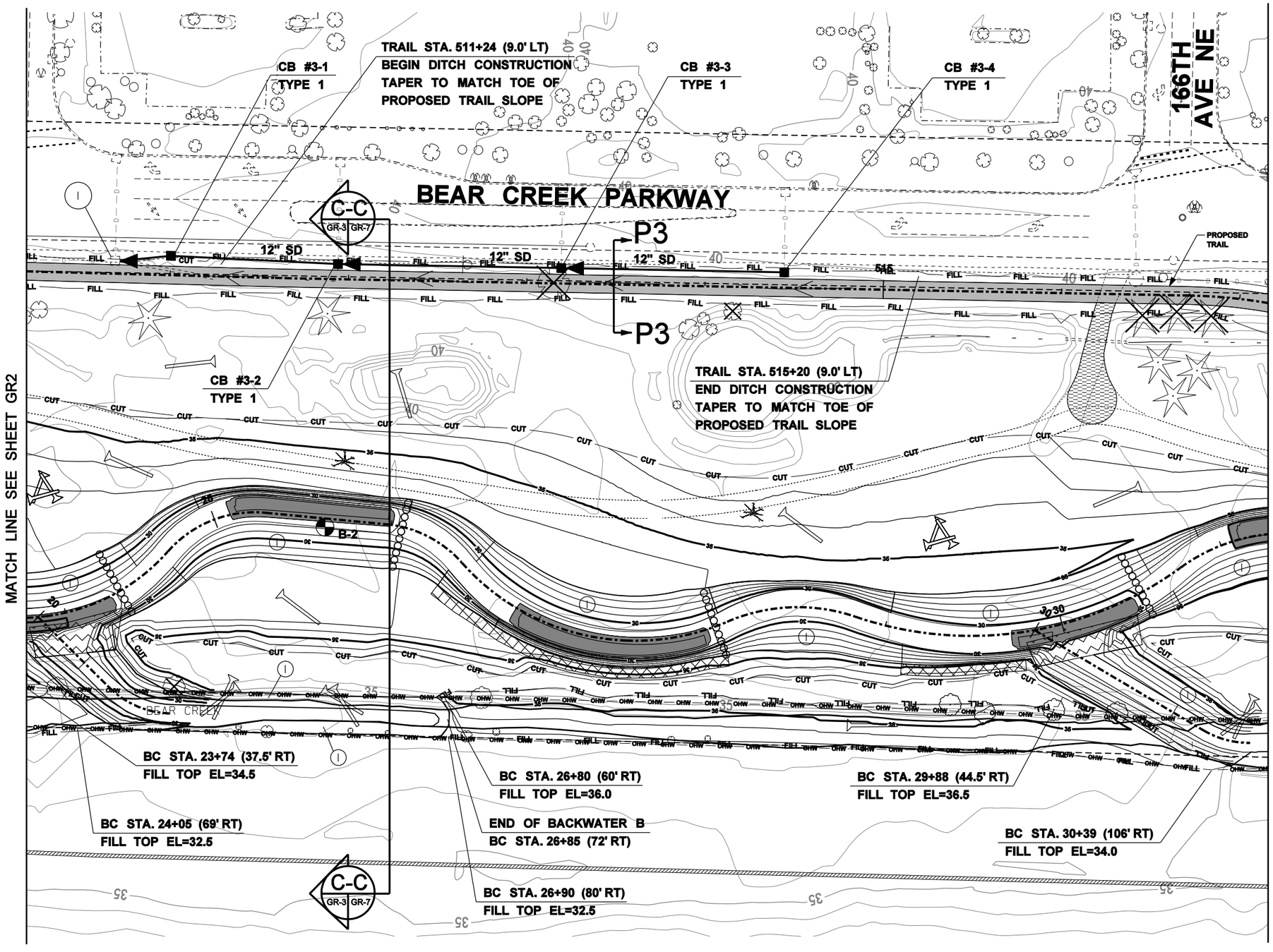

LEGEND

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- RIGHT-OF-WAY (R.O.W.)
- OHW — OHW: EXISTING BEAR CREEK ORDINARY HIGH WATER MARK
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- CATCH BASIN, TYPE I
- PROPOSED STORM DRAIN PIPE/ DIRECTION OF FLOW

CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

N

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010				
Designed By	A. SCHMIDTMAN	3/2010				
Checked By	J. ST. JOHN	3/2010				
Detailed By	D. OLSEN	3/2010				
			REVISION	BY	APP'D	

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR3

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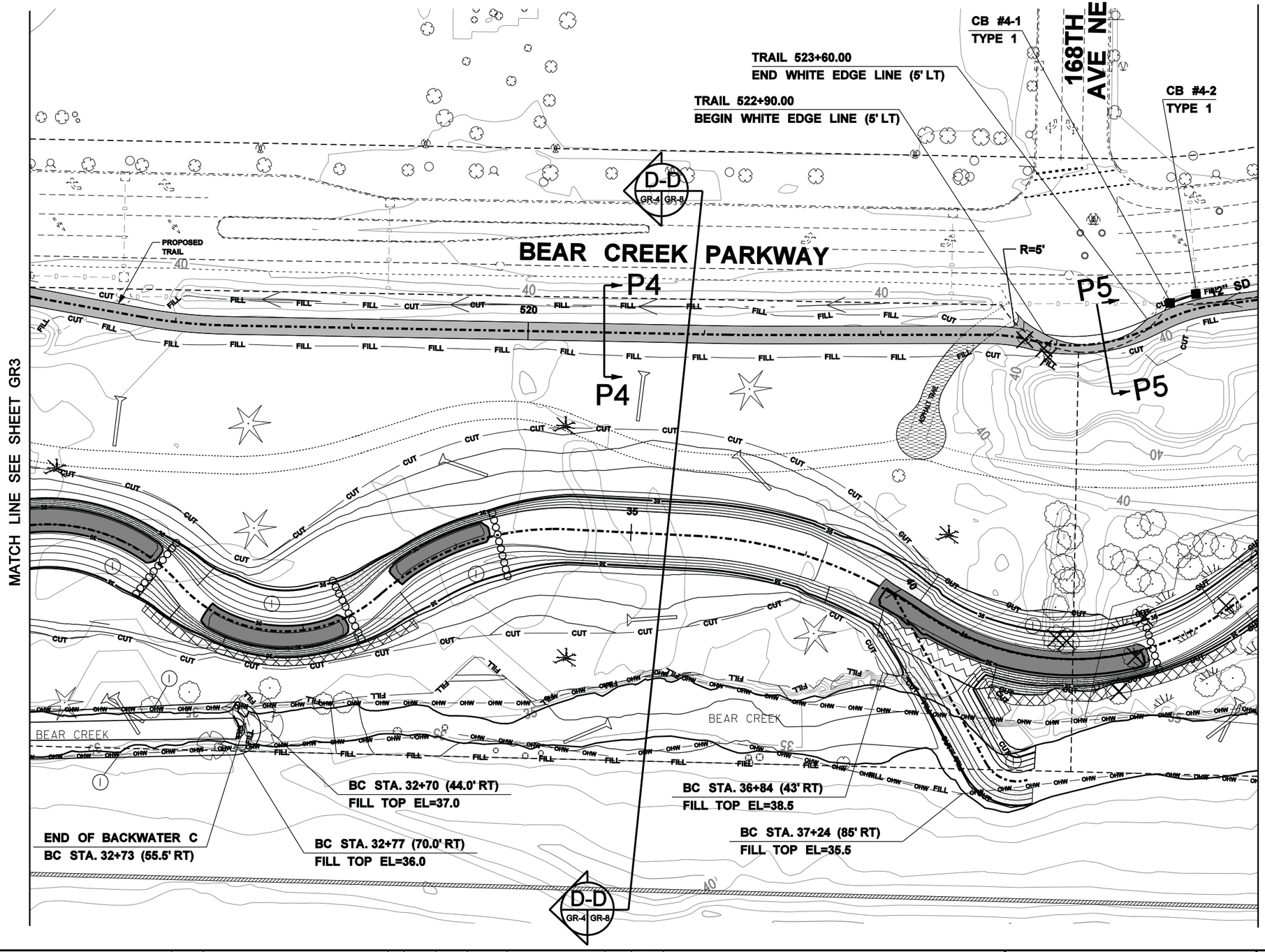

LEGEND

- EXISTING WALL
- RIGHT-OF-WAY (R.O.W.)
- OHW — EXISTING BEAR CREEK ORDINARY HIGH WATER MARK
- CUT — CUT LINE
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- PROPOSED STORM DRAIN PIPE/ DIRECTION OF FLOW

CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010	
Designed By	A. SCHMIDTMAN	3/2010	
Checked By	J. ST. JOHN	3/2010	
Detailed By	D. OLSEN	3/2010	
			REVISION

BY | APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR4

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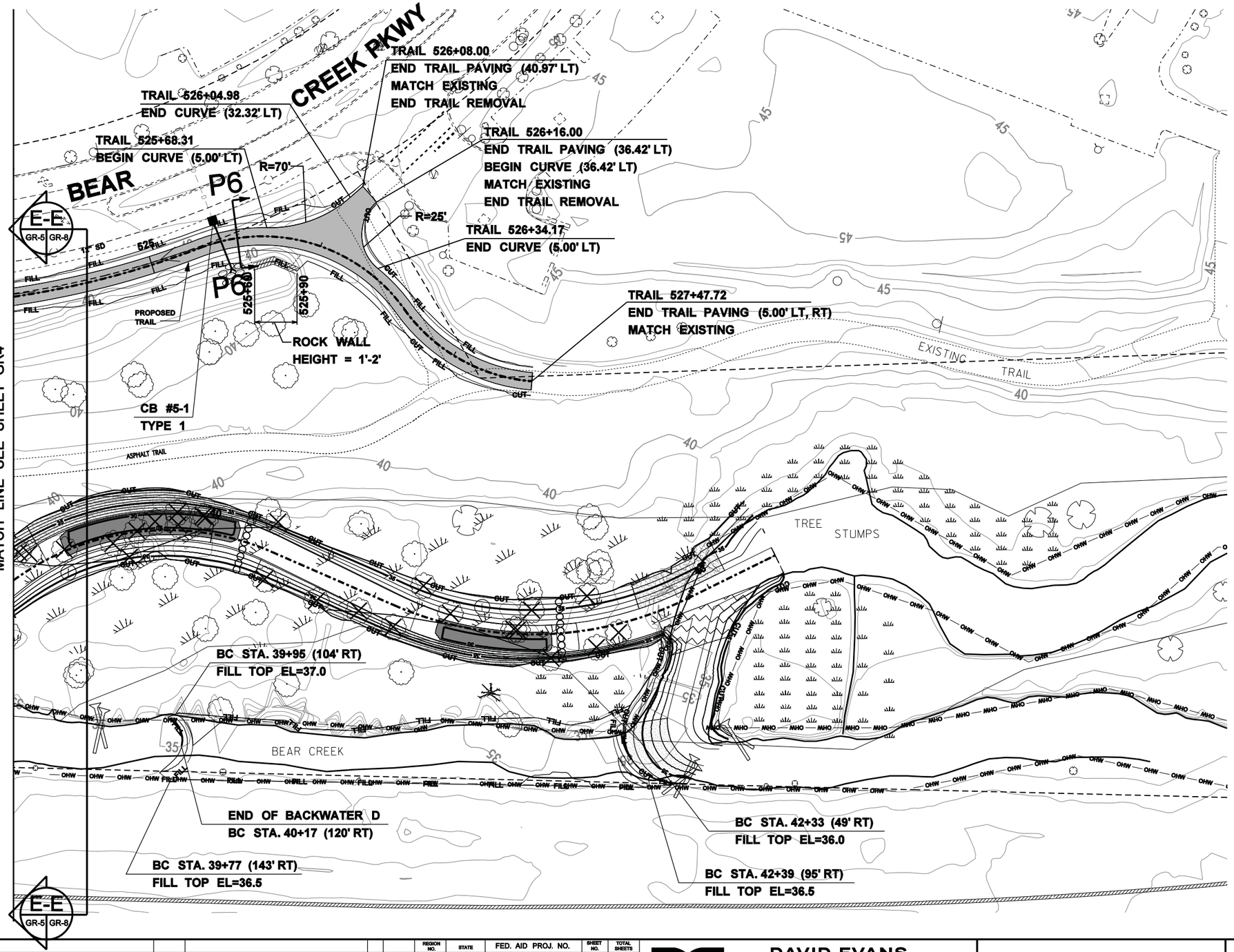

LEGEND

- EXISTING WALL
- RIGHT-OF-WAY (R.O.W.)
- OHW — OHW — EXISTING BEAR CREEK ORDINARY HIGH WATER MARK
- CUT — CUT LINE
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CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

0 30 60
SCALE IN FEET

90% SUBMITTAL

Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			
			REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

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415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR5

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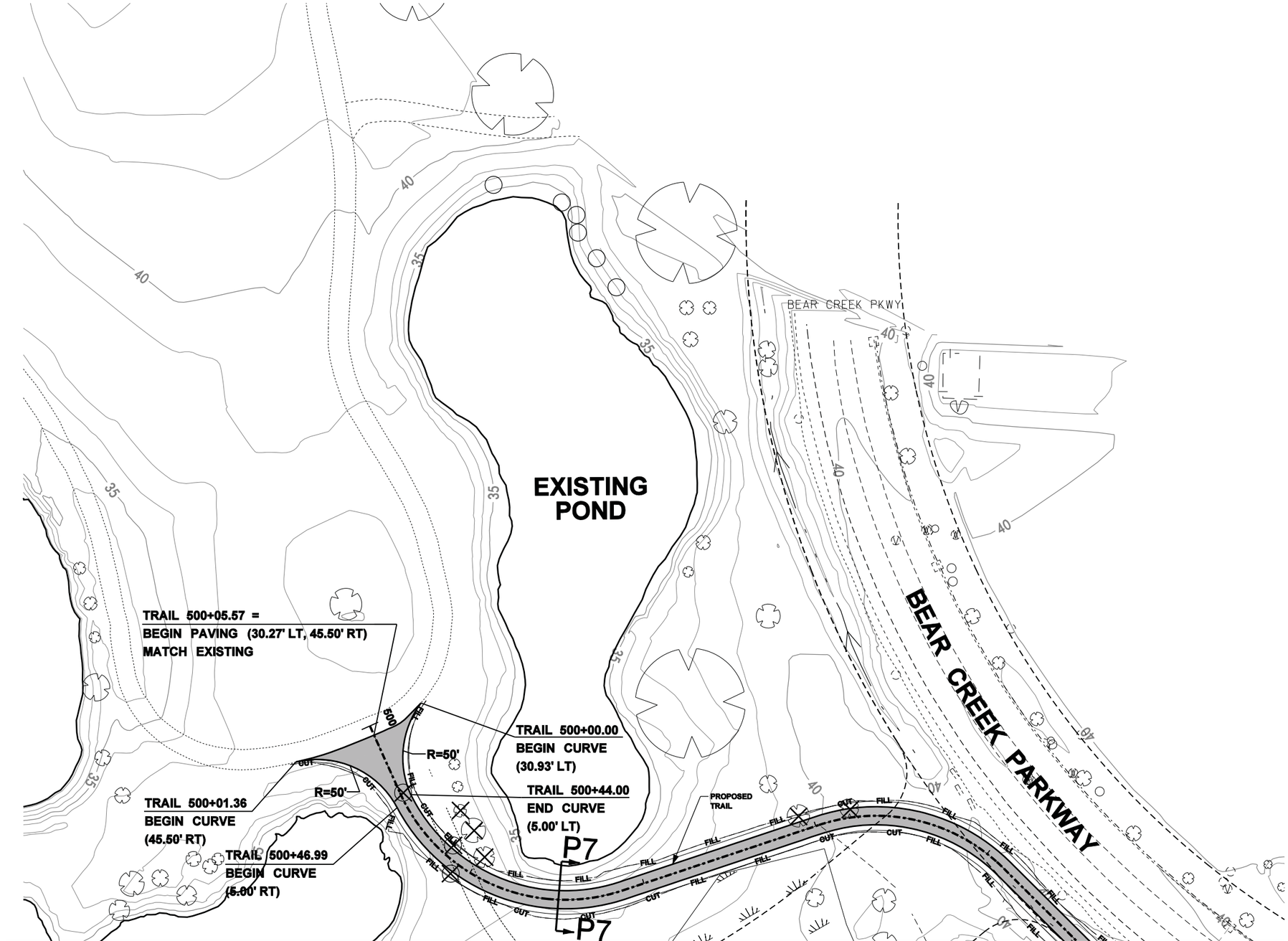

MATCH LINE SEE SHEET GR1

MATCH LINE SEE SHEET GR2

LEGEND

- EXISTING WALL
- RIGHT-OF-WAY (R.O.W.)
- OHW — OHW — EXISTING BEAR CREEK ORDINARY HIGH WATER MARK
- CUT — CUT LINE
- FILL — FILL LINE
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- PROPOSED TRAIL
- CATCH BASIN, TYPE I
- PROPOSED STORM DRAIN PIPE/ DIRECTION OF FLOW

90% SUBMITTAL

N

CONSTRUCTION NOTES

1. ADJUST EXISTING CATCH BASIN TO GRADE
2. CONSTRUCT DITCH

0 30 60
SCALE IN FEET

Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			
			REVISION	BY	APP'D

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

DAVID EVANS AND ASSOCIATES INC.
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Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

GRADING & HABITAT PLAN

GR6

SHEET OF SHEETS

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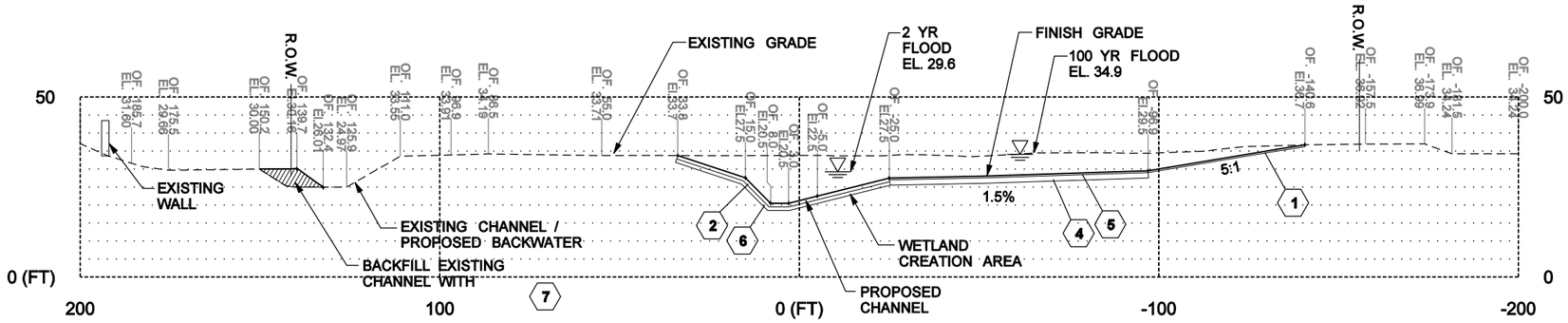
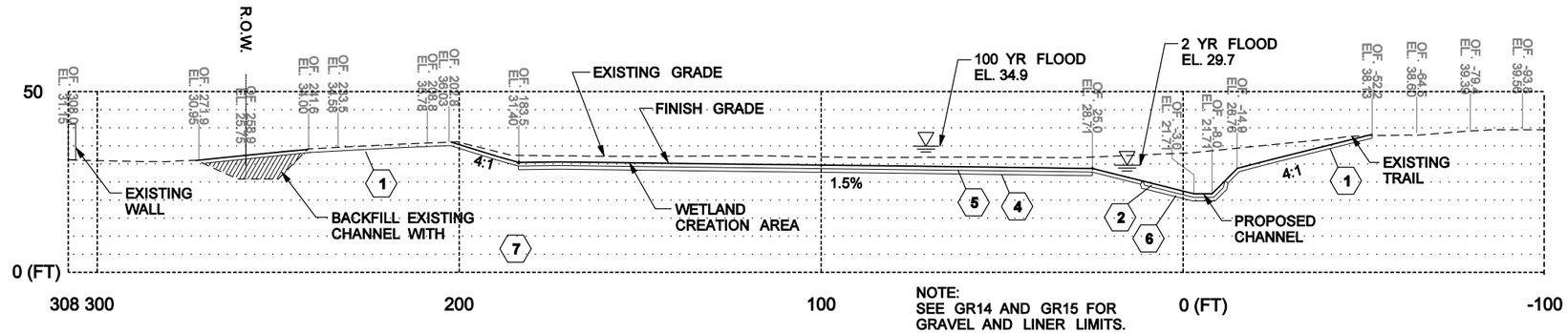


SECTION A-A - STA. 12+60

SCALE = V: 1"=40'
H: 1"=40'

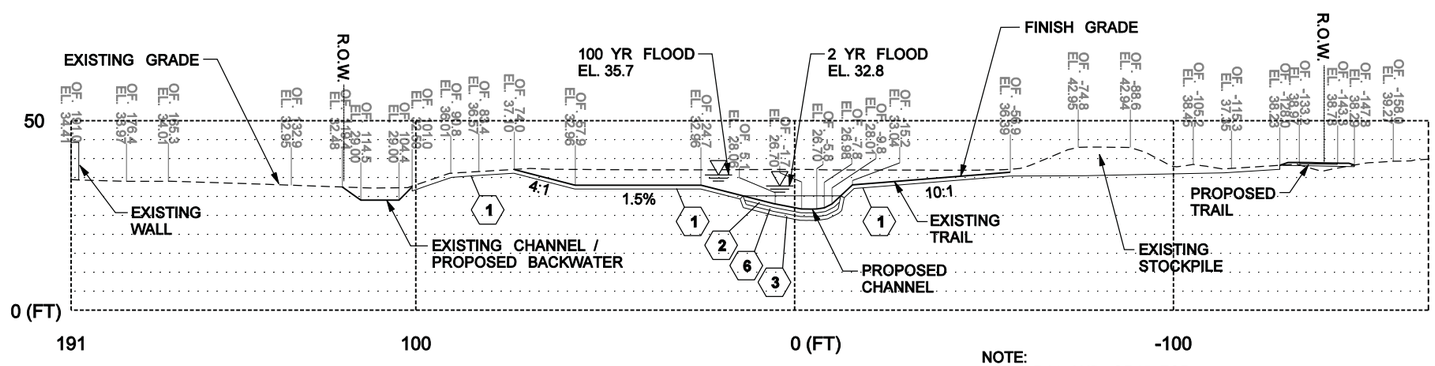
NOTE:
SEE GR14 AND GR15 FOR GRAVEL AND LINER LIMITS.



NOTE:
SEE GR14 AND GR15 FOR GRAVEL AND LINER LIMITS.

SECTION B-B - STA. 15+55

SCALE = V: 1"=40'
H: 1"=40'



NOTE:
SEE GR14 AND GR15 FOR GRAVEL AND LINER LIMITS.

SECTION C-C - STA. 26+00

SCALE = V: 1"=40'
H: 1"=40'

CONSTRUCTION NOTES:

1. 6" SOIL AMENDMENT TILLED INTO TOP 6" OF EXISTING SOIL TO FINISH GRADE.
2. 1' STREAMBED GRAVEL. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMITS.
3. 1' NATIVE SOIL LINER. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMITS.
4. 1.5' NATIVE SOIL LINER IN WETLAND CREATION AREA (TYP. ALL WETLANDS).
5. 6" SOIL AMENDMENT TILLED INTO TOP 6" OF NATIVE SOIL LINER TO FINISH GRADE (TYP. ALL WETLANDS).
6. 1' STREAMBED COBBLE. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMIT.
7. NATIVE SOIL LINER.

90% SUBMITTAL

			REVISION	BY	APP'D
Supervisor	J. GAGE	3/2010			
Designed By	A. SCHMIDTMAN	3/2010			
Checked By	J. ST. JOHN	3/2010			
Detailed By	D. OLSEN	3/2010			

REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
	WASH			
JOB NUMBER				

DAVID EVANS AND ASSOCIATES INC.
415 – 118th Avenue SE
Bellevue Washington 98005–3518
Phone: 425.519.6500

CityofRedmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

TYPICAL SECTIONS

GR7

SHEET OF SHEETS

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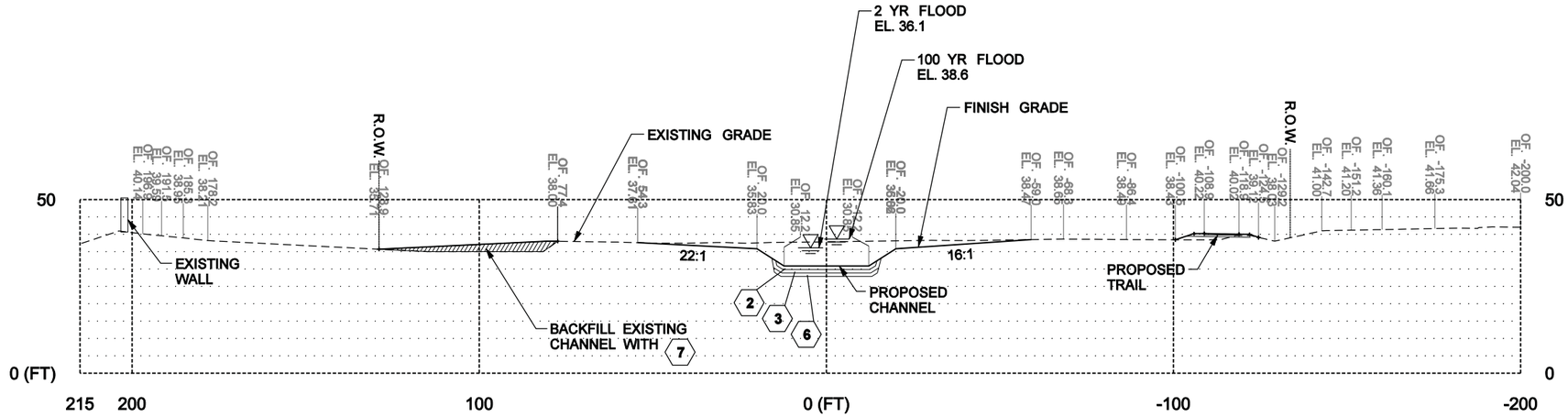
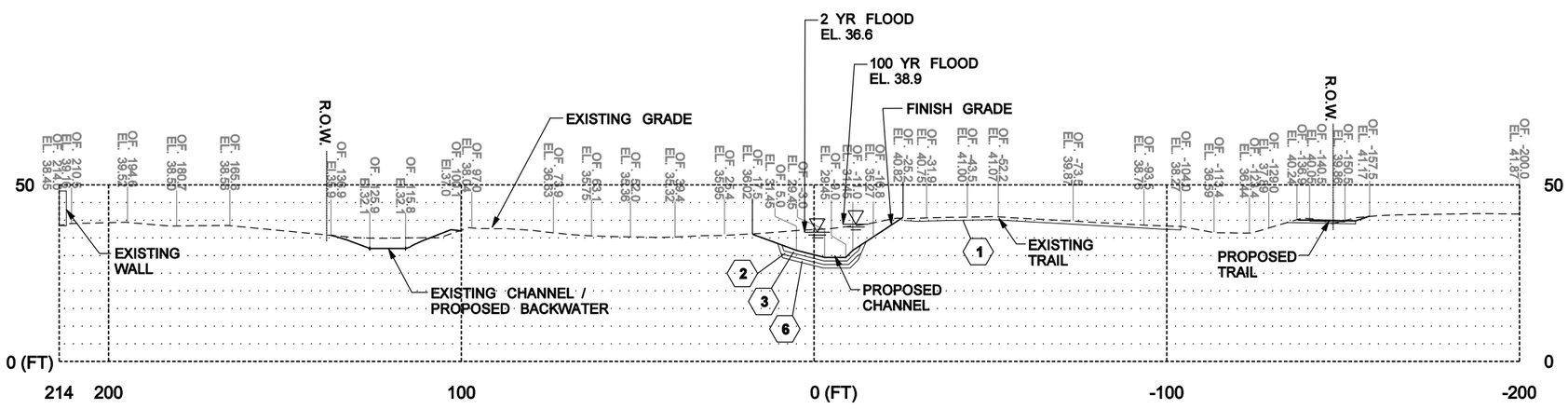


SECTION D-D - STA. 35+20

SCALE = V: 1"=40'
H: 1"=40'



SECTION E-E - STA. 39+50

SCALE = V: 1"=40'
H: 1"=40'

CONSTRUCTION NOTES:

1. 6" SOIL AMENDMENT TILLED INTO TOP 6" OF EXISTING SOIL TO FINISH GRADE.
2. 1' STREAMBED GRAVEL. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMITS.
3. 1' NATIVE SOIL LINER. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMITS.
4. 1.5' NATIVE SOIL LINER IN WETLAND CREATION AREA (TYP. ALL WETLANDS).
5. 6" SOIL AMENDMENT TILLED INTO TOP 6" OF NATIVE SOIL LINER TO FINISH GRADE (TYP. ALL WETLANDS).
6. 1' STREAMBED COBBLE. SEE STREAM SECTIONS ON GR14 AND GR15 FOR LIMIT.
7. NATIVE SOIL LINER.

90% SUBMITTAL

						REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO.	TOTAL SHEETS
Supervisor	J. GAGE	3/2010					WASH			
Designed By	A. SCHMIDTMAN	3/2010								
Checked By	J. ST. JOHN	3/2010				JOB NUMBER				
Detailed By	D. OLSEN	3/2010								
			REVISION	BY	APP'D					

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Bellevue Washington 98005–3518
Phone: 425.519.6500

City of Redmond WASHINGTON

BEAR CREEK REHABILITATION PROJECT

TYPICAL SECTIONS

GR8

SHEET OF SHEETS

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