City of Veneta

Stormwater Capital Improvement Plan
March, 2005

The City of Veneta Stormwater Capital Improvement Plan (CIP) forecasts the City's stormwater capital needs over a 15 year period based on the 1999 City of Veneta Drainage Master Plan and the Comprehensive Plan's goals to conserve open space and protect natural and scenic resources. In 15 years, it is expected that the City's infrastructure will be extended to its Urban Service Boundary as depicted in the 1999 Veneta Public Facilities Plan and that more development will occur in the areas designated Rural Residential.

The Stormwater CIP is a plan for construction, land acquisition, and preservation of public stormwater infrastructure in the City's Urban Growth Boundary. This plan proposes projects to alleviate flooding in existing drainage channels, to increase system capacity for future development, and includes three pilot projects designed with elements to conserve open space, improve water quality, and protect and enhance wetland areas.

The Stormwater CIP totals approximately $3.5 million in projects of which approximately $804,900 are eligible to be funded from Systems Development Charges (SDCs). Eligibility for SDC funding is determined by the amount of flow attributed to new growth. For example, if current flow is 15 cubic feet per second and future flow is 20 cubic feet per second, the percentage of the capital project eligible for SDC funding is 25% (20-15/20 = 25%).

Funding for Stormwater CIP projects will come from SDCs, stormwater fees, and grant money, if available. If grant money is used for projects identified as SDC eligible, the SDC funding will be adjusted accordingly. For each year of this CIP, projects will be prioritized based on anticipated funding levels, community input, and emerging development areas.

CIP Development and Review

This CIP was developed by a group consisting of City staff, Lane Council of Government staff, the City's Engineer at Weber Elliott Engineers, P.C., and consultants from URS Corporation.

On February 14, 2005, notice was sent to persons on our interested parties list and to the West Lane News and the Register Guard newspapers of the intent to adopt the Stormwater CIP on March 14, 2005. The Planning Commission will review the CIP on March 7, and public comment is invited. Written comment will be accepted until March 11.

The Council may modify the plan and list at any time. If a system development charge will be increased by a proposed modification of the list to include a capacity increasing capital improvement, as referenced in Section 6(2) of Ordinance 452, the City shall provide at least thirty (30) days notice of the proposed plan modification to persons who have requested written notice under Section 15(2) of Ordinance 452. A hearing on such proposed plan modifications will be held if the City receives a written request for such a hearing within seven (7) days of the

Updated Stormwater Capital Improvement Plan - Prepared and edited by Stormwater Management Plan Team February 14, 2005

MARCH 8, 2005

Project Number	Location	Description	Timeline	Capacity % SDC	Design & Build Costs	Easement Costs* (2)	Permitting Costs (1)	Total 2005 Costs	SDC Costs
1	Baker Lane A1.4 - 191CFS	Existing two culverts @ 18" plus 34" and 22" culvert system subject to flooding. Improve culvert approach and clear channel approach and exit.	2006 to 2015	9.7	$92,000	N.A.	$16,800	$108,800	$10,554
2	Fern Ridge Library A2.1 20 CFS	Add an 18 inch pipe for 70 feet under Territorial Highway. Provide additional capacity for development impacts. ODOT is the only permitting agency. Technique includes boring under highway.	2010 to 2020	8.7	$17,500	N.A.	$2,500	$20,000	$1,740
3	Territorial Crossing 500 feet south of Bolton	Stormwater Management Facility for flow modulation and possible wetland mitigation on the existing drainage channel on Department of Forestry property. Manage the incremental increase in stormwater from pre-development to post-development condition without a signficiant increase in flow out of the facility. See "ODF	2008 to 2020	21	$36,000	$37,600	$6,300	$79,900	$16,779
	A3.2 24 CFS	Stormwater management Facility Concept Weber Elliott 11/04" (see attached)							
4	SW Neighborhood Area Regional Detention Facility	Provide additional detention storage for flood control and water quality within Southwest Area Plan development. Western Hills concept by URS --C.I.P. #3 (see attached)	2006 to 2010	100	$252,900	$173,000	$4,300	$430,200	$430,200
5	East Bolton Road 800 feet South of Pine Street A4.3 - 58 CFS	Add culvert to existing capacity. Note that the Tait Subdivision added partial capacity.The capacity noted here is for future development needs. Requires 2 - 24 inch culverts or frame culvert. Minor Wetland impacts with widening. Wetland permits required	2006 to 2015	24	$13,755	N.A.	$6,500	$20,255	$4,861
6	Oak Island Between Perkins and Cherry	Replace three existing driveway culverts along Oak Island Drive with bridges. Construct on-channel backwater areas along Oak Island Drive for improving water quality. Construct off-channel backwater area west of the channel and east of the teepee burner site for flow attenuation and settling of particulates. Teepee Burner Concept by URS C.I.P #1 (see attached)**	2008 to 2020	2	$945,300	$43,500	$4,300	$993,100	$18,906
7	Oak Island East to City Limits A5.4 51 CFS	Construct on-channel backwater areas for improving water quality. Construct off-channel storage for detention and settling. Provide landscaping for stream habitat and a trail for recreational use. Creek in Lot 9 Concept by URS C.I.P. #2 (see attached)**	2006 to 2010	2	$715,500	$394,200	$2,500	$1,112,200	$14,310
8	Oak Island	Add 27 inch squashed Culvert crossing for Oak Island Drive. Provide for improved channel	R	2	$29,800	N.A.	$0	$29,800	$596
	A5.3 51 CFS	approach. (Note: This project completed in year 2001 - Reimbursable portion of SDC)**			$34,800	N.A.	$18,800	$53,600	$1,072
9	Oak Island East	Add 27 inch squashed Culvert crossing for Cherry Street. Provide for improved channel	R						
	A5.3 51 CFS	approach. (Note: Culvert Installed in year 2003. Reimbursable portion of SDC)**							
10	Sertic North	Easements for drainage north of Sertic Road. Improve maintenance	2006 to 2020	8	-	$6,670	$4,300	$10,970	$878
	B1.2 88 CFS	Access	2006 to 2020	10	$12,400	N.A.	$2,500	$14,900	$1,490
11	8th Street Drain Crossing	Add 60 feet of 18 inch culvert across 8th Street between Sertic and							
	B4.1 39 CFS	Hunter. Establish ROW as part of street improvement project	2006 to 2020	21	$156,555	$10,000	$16,500	$183,055	$38,442
12	Territorial Highway: North Drainage Way - D1.2 70 CFS	Provide 36 inch concrete culvert pipe to improve drainage north of Highway 126. Project includes ditch widening coordinate with Territorial Highway Intersection Changes	2006 to 2020	49	$10,400	$4,000	$5,500	$19,900	$9,751
13	Jeans Road Crossing	Add 21 inch concrete culvert pipe 50 feet to improve drainage across	2006 to 2020	0	$10,200	N.A.	$3,600	$13,800	$0
	G1.1 25 CFS	Jeans Road.	2010 to 2020	18	$14,800	$22,000	$2,500	$39,300	$7,074
14	Huston Road Crossing: North	Replace existing 12 inch drain pipe in Huston Road with 18 inch							
	of Highway 126 - H1.1 7 CFS	Work will require County permits.	2006 to 2020	18	$8,610	N.A.	$800	$9,410	$1,694
15	East Hunter Avenue	Add 24 inch concrete culvert pipe to improve drainage							
	J1.1 17 CFS	Approximately 50 feet of culvert required. Obtain Easement	2010 to 2020	50	$52,000	N.A.	$4,300	$56,300	$28,150
16	Huston Road Crossing: South	Add 24 inch concrete culvert pipe to improve drainage							
	J1.2 22 CFS	Approximately 50 feet of culvert required.	2005 to 2010	50	$36,900	N.A.	$0	$36,900	$18,450
17	Pine Street Extension	Provide Frame Culvert Wetland crossing for street connection. 36 foot wide by 12 foot frame culvert. Wetland delineation and permit secured by developer. City completing ESEE analysis and review.							
18	Stormwater Management Plan Ph. 1	Assessment of capacity, plans, issues and policy	2004 to 2005	100	$150,000	N.A.	$0	$150,000	$150,000
19	Stormwater Management Plan Ph. 2	Reassessment of capacity, plans, issues and policy. Preliminary Engineering. Modeling	2005 to 2009	50	$100,000	NA	NA	$100,000	$50,000
		Concept refinement. Public hearings and input.	R						
20	Mapping and Stormwater Hydrology	1997 city-wide topographic maping and hydrologic modeling of drainages. Reimbursable portion of SDC.						$3,482,390	$804,946

Notes:

Data Source: 1999 Veneta Drainage Master Plan System Flow Hydrology

Where flow is greater than 50 CFS frame culverts are recommended to minimize impact to wetland habitat and optimize potential for wildlife corridor

ACOE National Permits are assumed acceptable for projects 2 - 5, 11, 14 - 16 due to the nature of existing facilities and minimal wetland impact.

Capacity SDC is assigned by the amount of flow attributed to new growth, i.e. if current flow is 15 cfs and future flow is 20 cfs. %SDC = 5/20 or 25%

*Easement costs estimated 12/9/2004

**Basin has a relatively high existing flooding problem that would be addressed with this project.

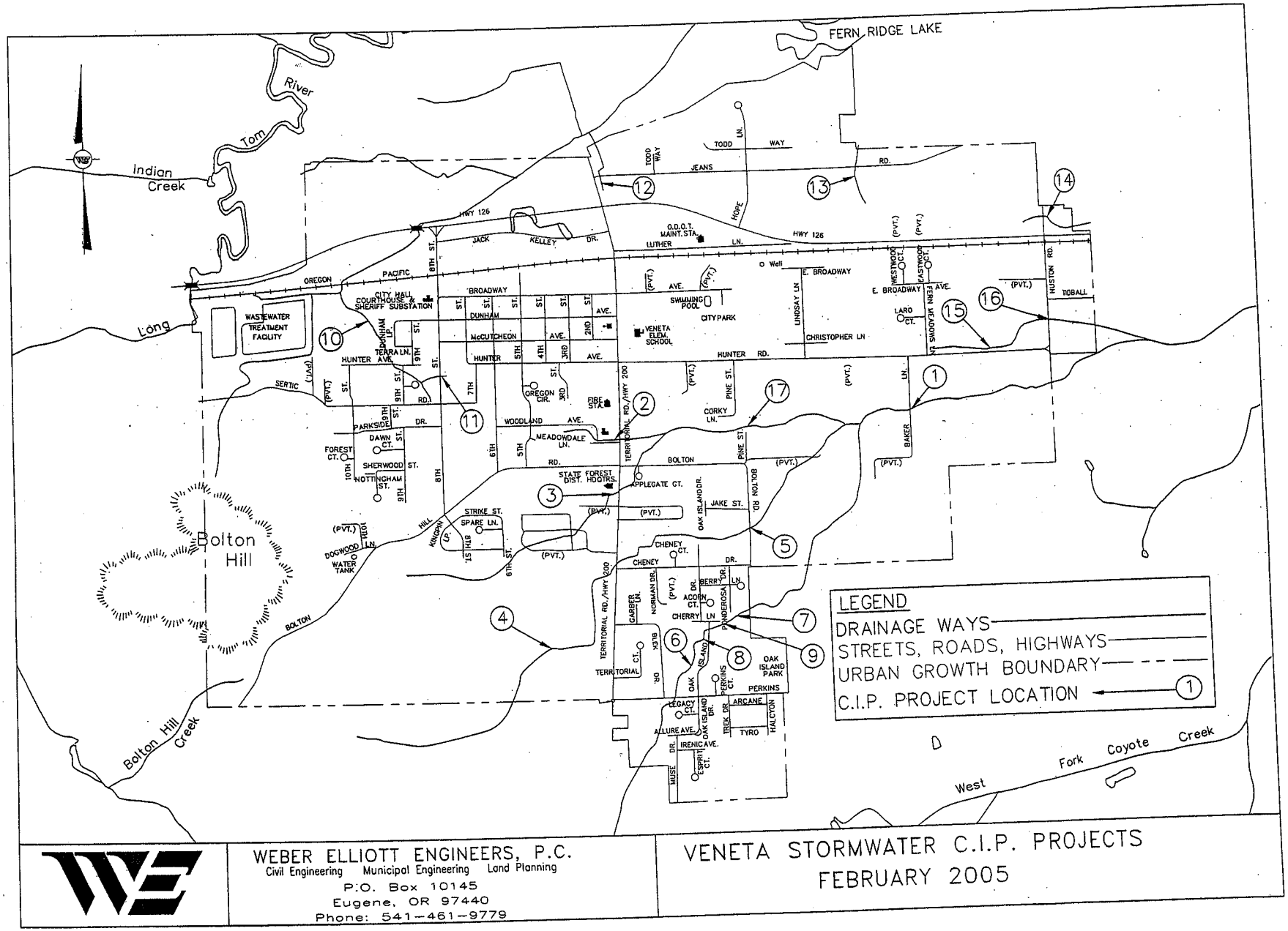
R = Reimbursable

Nummerical Notes:

1 - Permitting Costs estimate delination, confirmation, agency concordance, and mitigation banking investment.

2 - Easement Costs at $4/square foot - Includes estimates for legal, survey, appraisal and acqusition.

N.A. - Work in Existing or Acquired Rights of Way



WEBER ELLIOTT ENGINEERS, P.C.
Civil Engineering Municipal Engineering Land Planning
P.O. Box 10145
Eugene, OR 97440
Phone: 541-461-9779

VENETA STORMWATER C.I.P. PROJECTS
FEBRUARY 2005

City of Veneta

Stormwater Capital Improvement Plan
March, 2005

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date the proposed modification is scheduled for adoption. If no such request is received within this time period, a hearing is not required, but may be held in the Council's sole discretion.

Following adoption of the CIP by the City Council, the *SDC Costs* from the CIP spreadsheet will become the basis for a Stormwater Systems Development Charge. Projects with a timeline beginning in 2006 will be prioritized and a few of those projects will become part of the FY05/06 Budget.

MEMO

FROM: Weber Elliott Engineers

DATE: **11/2/2004**

TO: **Margaret Boutell**
City of Veneta – Community Services Director
88184 8th Street
Veneta, OR 97487

CC:

RE: **OREGON DEPARTMENT OF FORESTRY: Stormwater Management Feature**

Job Number: 04-44

This memo describes the basic assumptions and performance parameters for the preliminary design of a stormwater management facility located south of the Oregon Forestry Department facilities in Veneta, Oregon.

Background:

This is a preliminary assessment of a type of stormwater management facility that could be located in a drainage basin designated basin 3.2 in the drainage master plan. The basin collects drainage from Bolton Hill to the west, through the Bowling Green Subdivision and across the Territorial Sports Fields to a small culvert that crosses Territorial Highway from west to east. The basin encompasses 48 acres and has a slope of approximately 0.5 percent as the basin approaches Territorial Highway. The basin has a time of concentration for the 10 year frequency storm of 59 minutes.

Assumptions:

It was assumed that the facility would manage the pre-development 10 year storm with a swale velocity of less than one foot per second. It was also assumed that the stormwater management feature would efficiently manage the incremental increase in stormwater from the pre-development condition to the post development condition without a significant change in the flow out of the facility.

Assessment of Feasibility Cost

Weber Elliott Engineers, P.C.
JTE
11/2/2004
Job No: 04-44

Flow Modulation Facility and Possible Wetland Mitigation site.

Problem: Prepare feasibility cost estimate for stormwater management facility at Oregon Department of Forestry Site: Veneta Oregon.

Location: 500 feet South of Bolton Hill Road intersection with Territorial Highway. Basin 3.2 in Storm Water Study

Given:

10 yr. Storm Q:	15 cfs
10 yr Storm Future:	19 cfs
Future Time of Concentration:	59 minutes
Basin Size:	48 Acres
Slope near highway:	0.005 feet/foot

Assume:

No Land Costs - Donated by State of Oregon.
facility manages 4 cfs (19 - 15)

Time of Concentration = 59 min.	59 Minutes
Laging leg of hydrograph = 1.6	94.4 Minutes
Total Hydrograph Time:	153.4 Minutes
Excavation requirements:	1.5 Feet

Design:

Time Storm exceeds 15 cfs	27 Minutes = Minimum Detention
Minimum Detention Volume:	3240 Cubic Feet. (Area Under Hydrograph Curve)
Assume depth:	1 depth
Facility Length:	200 feet
Width:	16.2 feet
Basic Swale:	30 Feet Wide - assumes 1 fps at 15 cfs.
Total Width	47 feet
Size	9400 Square Feet
Size	0.22 Acres

Assessment of Feasibility Cost

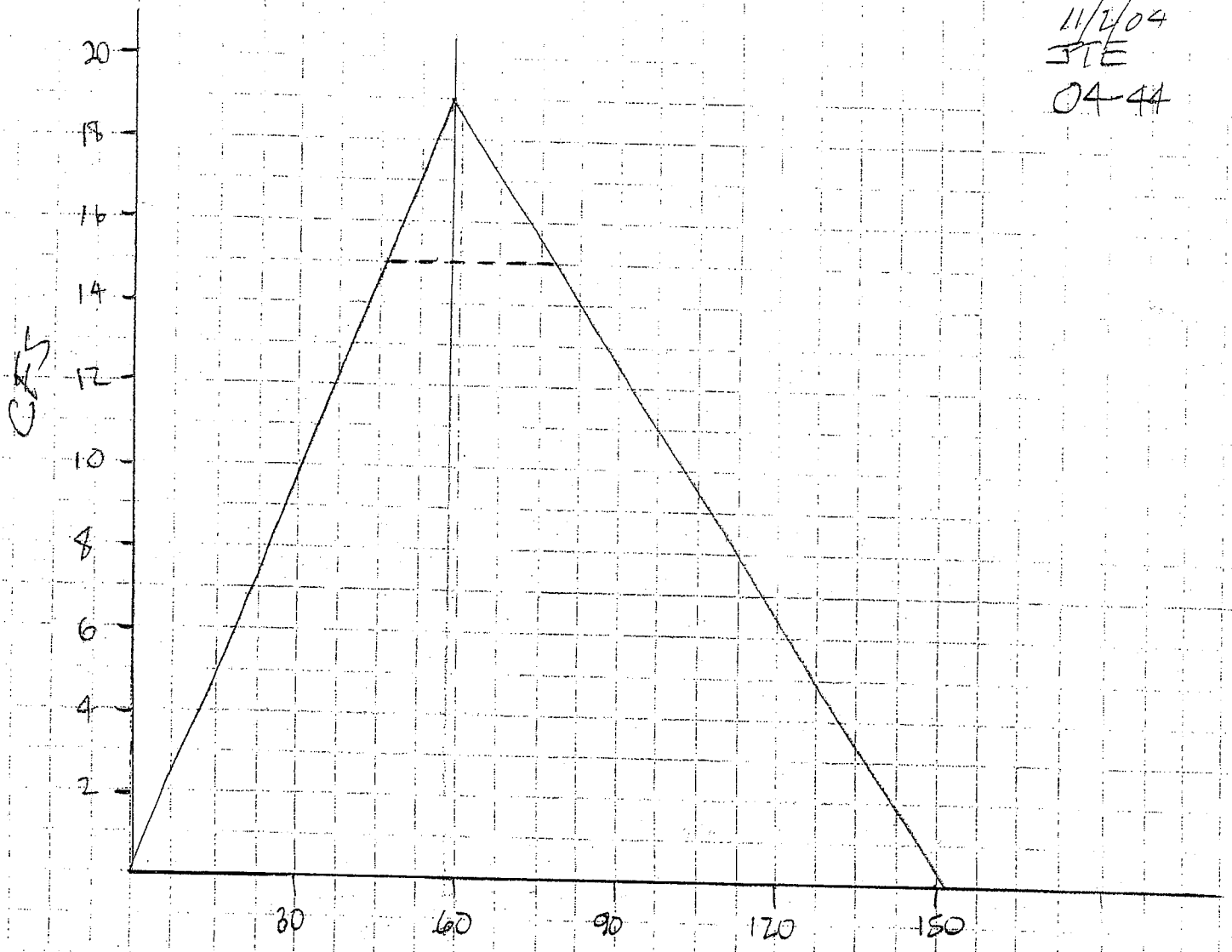
Weber Elliott Engineers, P.C.
JTE
11/2/2004
Job No: 04-44

Flow Modulation Facility and Possible Wetland Mitigation site.

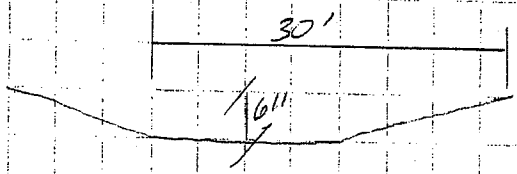
Preliminary Cost Estimate

ITEM	UNIT	QUANT.	UNIT COST	TOTAL COST
CONSTRUCTION STAKING/SURVEYING	L.S.	1	600	$600
MOBILIZATION - BONDS AND INSURANCE	L.S.	1	1200	$1,200
TRAFFIC MANAGEMENT	L.S.	ALL	250	$250
TEMPORARY SIGNS	SQ.FT.	16	21	$336
INLET PROTECTION	EACH	2	65	$130
SILT FENCE	LIN.FT.	60	12	$720
SEEDING	ACRE	0.22	1840	$405
PLANTING AND COVER	PLANTS	35	90	$3,150
CLEARING AND GRUBBING	ACRE	0.22	1850	$407
EXCAVATION	CU.YD.	525	5.6	$2,940
EXCAVATION HAULING	CU.YD.	525	1.8	$945
SWALE DRESSING	CU.YD.	30	15	$450
12-INCH REIN. CONC. CULV. PIPE IN PLACE	LIN.FT.	24	32	$768
CONCRETE INLETS, TYPE CG-3	EACH	2	960	$1,920
STRUCTURAL CONCRETE,CLASS 3300	CU.YD.	4	400	$1,600
			CONSTRUCTION CONTINGENCY	$1,582
			BASIC CONSTRUCTION TOTAL	$17,403
			ENGINEERING:	$8,400
			ADMINISTRATIVE AND PERMITS	$4,200
			PROJECT CONTINGENCY	$6,001
			TOTAL CONSTRUCTION COSTS:	$36,003

11/4/04
JTE
04-44



Simple Design Parameters



Channel Open
15 cfs @ 1 fps
→ 15 ft²

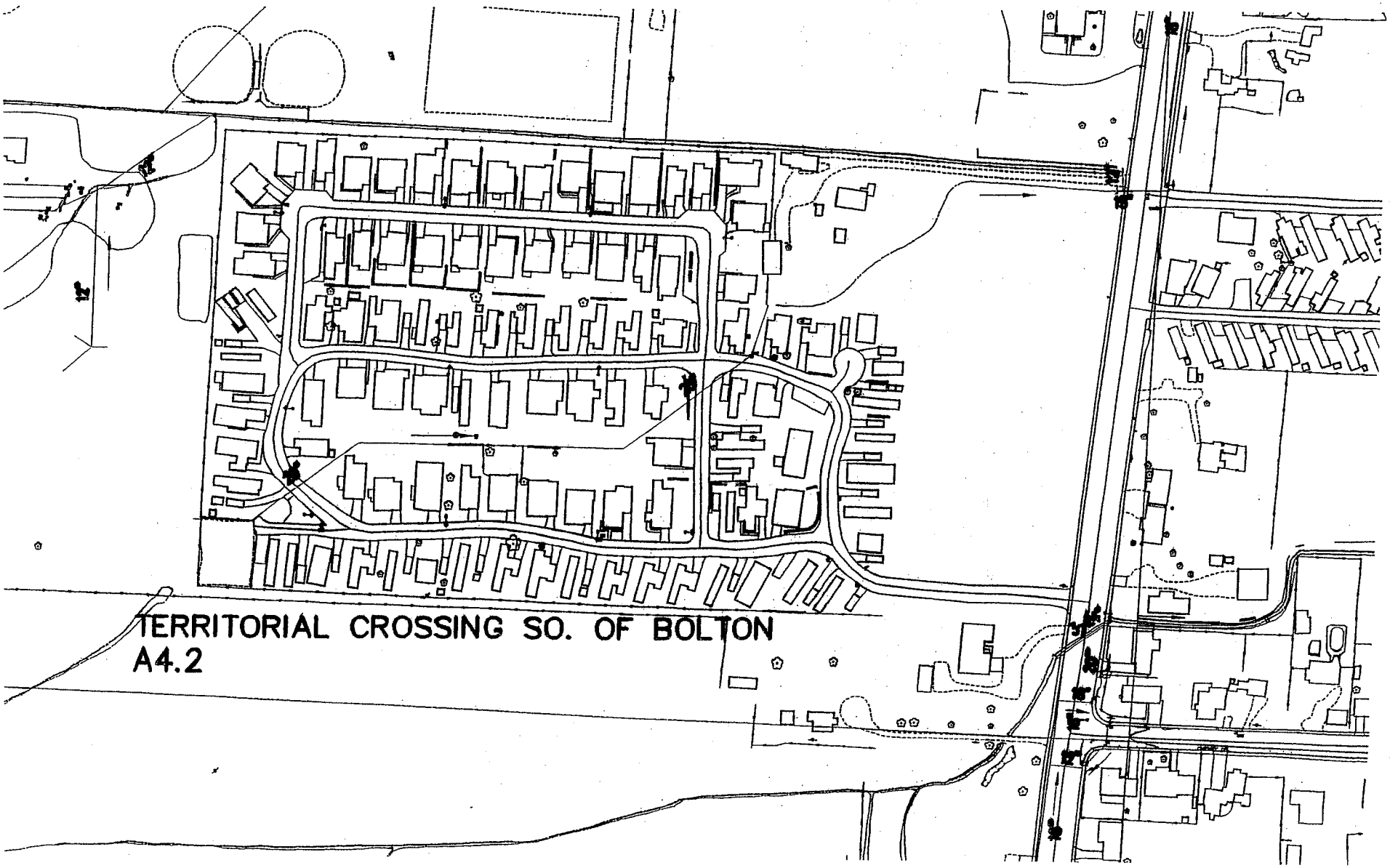
30' x 0.5 x 1 fps = 15 cfs

30' x 200 for Swale
+ 16½' x 200 for Overflow Cap

Area = 200 x 47

Assume 1.5' x 47 x 200 = 14,100 ft³ 525 c.y.

1"=200'±



TERRITORIAL CROSSING SO. OF BOLTON
A4.2

PROJECT SUMMARY SHEET

Project Title: Creek at Teepee Burner (CIP #1)

Problem Description: Based on the 1999 master plan, flooding is anticipated at multiple locations on the channel that flows between Perkins Road and Cherry Street. In addition, runoff from developed areas carries pollutants such as sediments, metals, nutrients, bacteria and hydrocarbons.

Project Description: Construct the following projects to provide conveyance improvements, off channel storage, and water quality improvements (see Figure 1).

- Replace three existing driveway culverts along Oak Island Dr. with bridges.
- Construct on-channel backwater areas along Oak Island Dr. for improving water quality.
- Construct off-channel backwater area west of the channel and east of the teepee burner site for flow attenuation and settling of particulates.

Project Benefits:
- Expected to eliminate overtopping of driveway culverts along the creek (see Figures 2 and 3), and improve stormwater quality through processes of biological uptake, filtration, and settling of suspended particulates and associated pollutants. It should be noted that the increases in channel capacity are mostly offset by the increase in roughness associated with vegetating the channel for water quality benefits. Based on anecdotal information, flooding along the street occurs mostly due to backup from downstream and is not associated with channel capacity along Oak Island Drive (see CIP #2).
- Expected to provide some relief to flooding that is occuring upstream on Blek Dr.

Estimated Costs:

Construction Cost	$ 773,325
Site Acquisition	required
Engineering & Administration	$ 231,998
Capital Project Implementation	$ 1,005,323
Annual Maintenance	TBD

Note: Does not include costs related to permitting (i.e., 1200C, 404 and DSL).

Maintenance Requirements: Only minimal maintenance should be required after the landscape is established. Maintenance activities would include occasional weeding to control noxious weeds or replanting and periodic sediment removal.

Assumptions: Quarter-acre site on the east side of the long driveway on the teepee burner site is completely converted to meandered channel for off-stream treatment and flow attenuation. We assumed 200 feet of area adjacent to and east of the channel along Oak Island Dr. could be converted to an enhanced stream edge. All driveway culverts are converted to bridges. Detention storage is not provided. Flow attenuation is accomplished through some increased capacity of the channel.

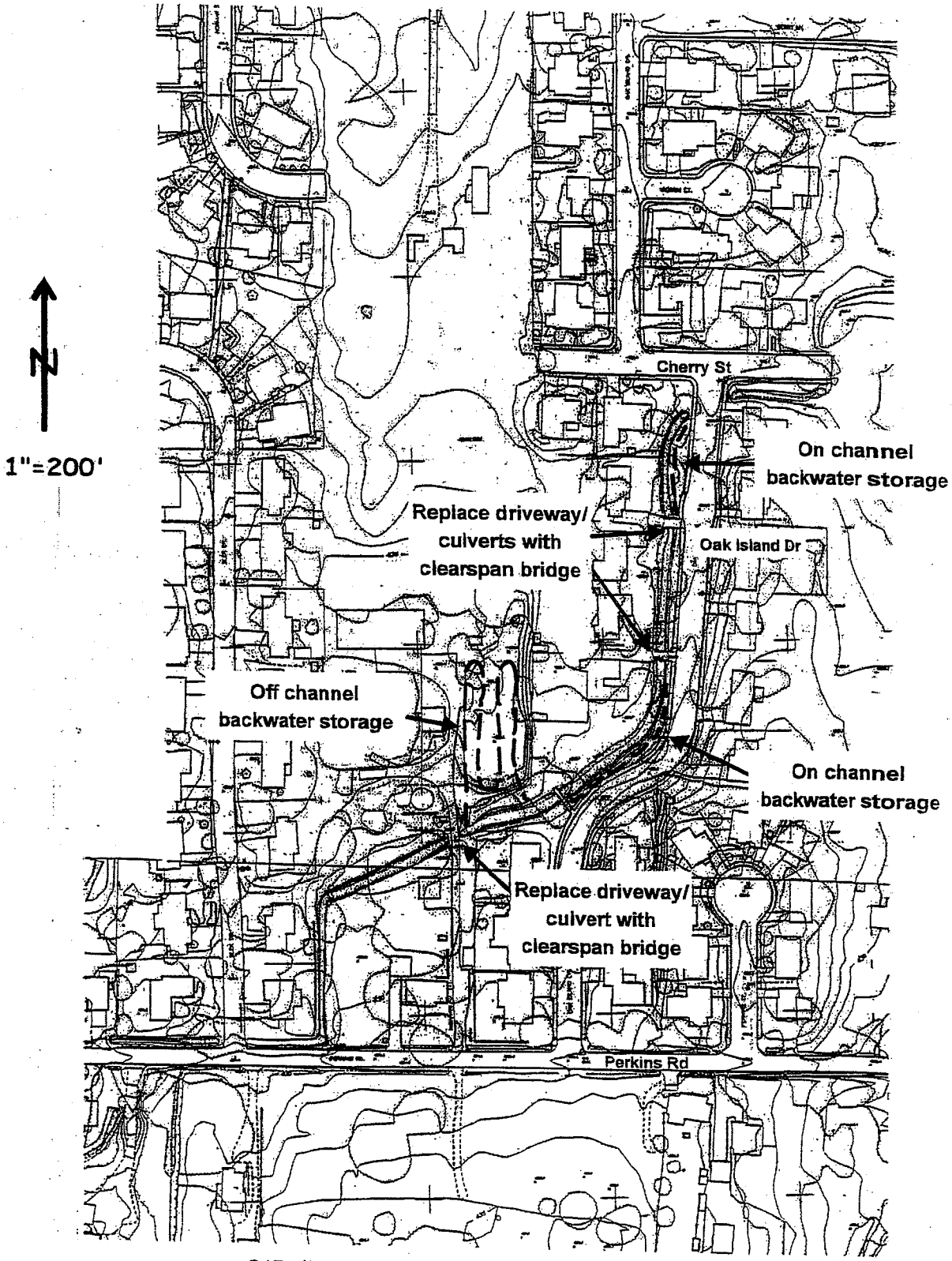
Project Cost Estimate
Creek at Teepee Burner (CIP #1)
City of Veneta, OR

Date: November 12, 2004

Item	Description	Quantity	Unit	Unit Price	Subtotal	Total
1	**MOBILIZATION (5%)**	1	LS	$29,500	$29,500	**$29,500**
2	**TRAFFIC CONTROL**	80	HRS	$32	$2,560	**$2,560**
3	**DEMOLITION & CLEARING**					
	Clearing, Grubbing, and Haul (included under #4 below)	0.00	AC	$12,000	$0	
	Demo & haul existing driveways	3	EA	$500	$1,500	**$1,500**
4	**BACKWATER STORAGE***					
	Off-channel area (teepee burner site)	400	LF	$820	$328,000	
	On-channel areas	200	LF	$900	$180,000	**$508,000**
5	**EROSION CONTROL (for bridge construction)**					
	Water Pollution / Erosion Control	1	LS	$3,000	$3,000	
	Silt Fencing	300	LF	$7	$2,100	**$5,100**
6	**STRUCTURES**					
	~~Driveway Bridge~~	~~3~~	~~EA~~	~~$20,000~~	~~$60,000~~	~~**$60,000**~~
7	**LANDSCAPE ESTABLISHMENT (3 Years)**	1	LS	$12,000	$12,000	**$12,000**
	SUB TOTAL					**$618,660**
	25% CONTINGENCY					$154,665
	TOTAL CONSTRUCTION COSTS					**$773,325**
	SITE ACQUISITION COSTS					**required**
	ENGINEERING / ADMINISTRATION (30%)					**$231,998**
	TOTAL ESTIMATED CAPITAL PROJECT IMPLEMENTATION COSTS					**$1,005,323**
	ANNUAL MAINTENANCE					TBD

Removed March 8

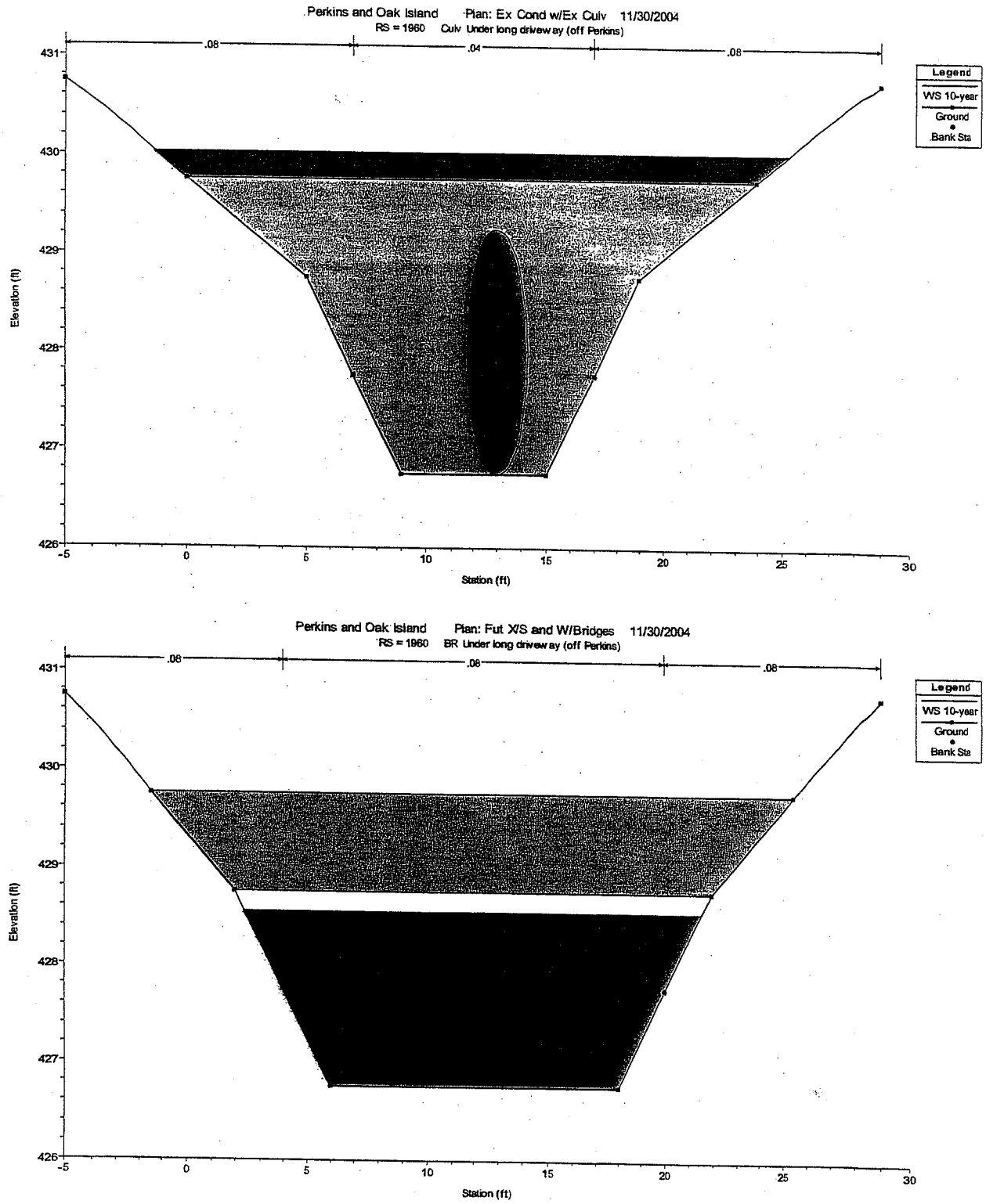
* = Cost includes planting, erosion control, and clearing and grubbing.



CIP #1 - Channel near Oak Island Drive between Perkins Road and Cherry Street

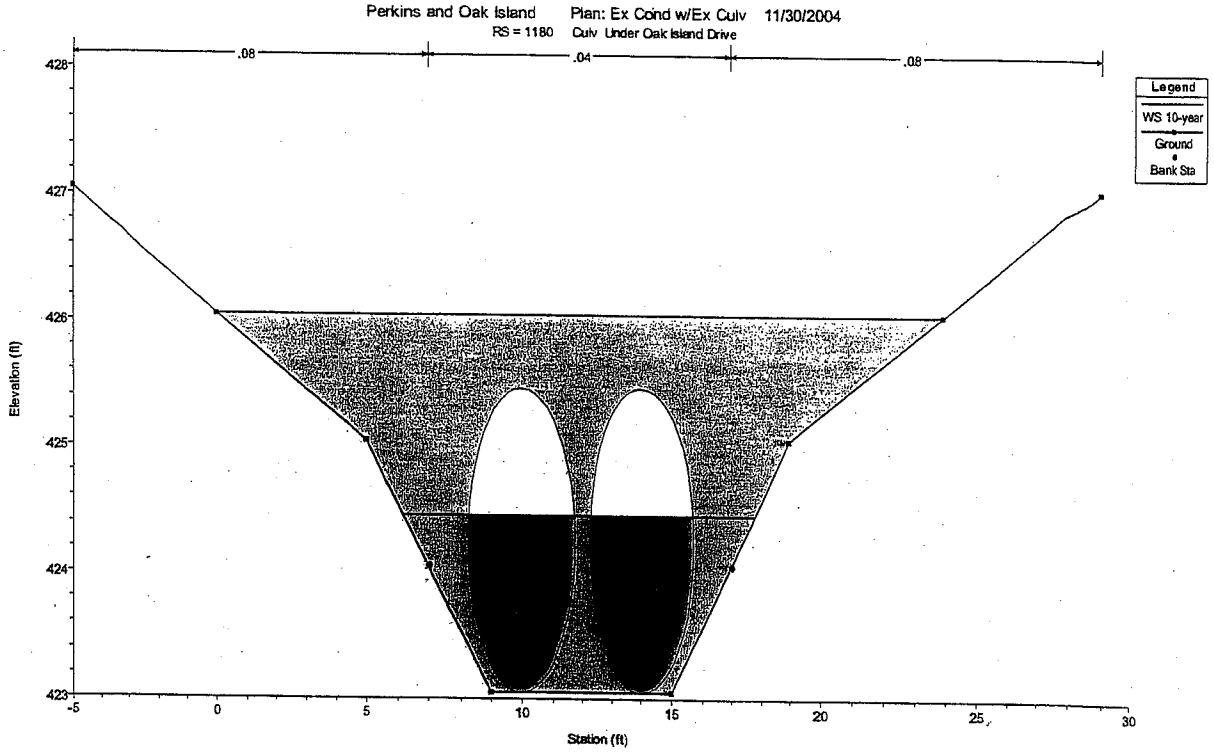
Figure 1

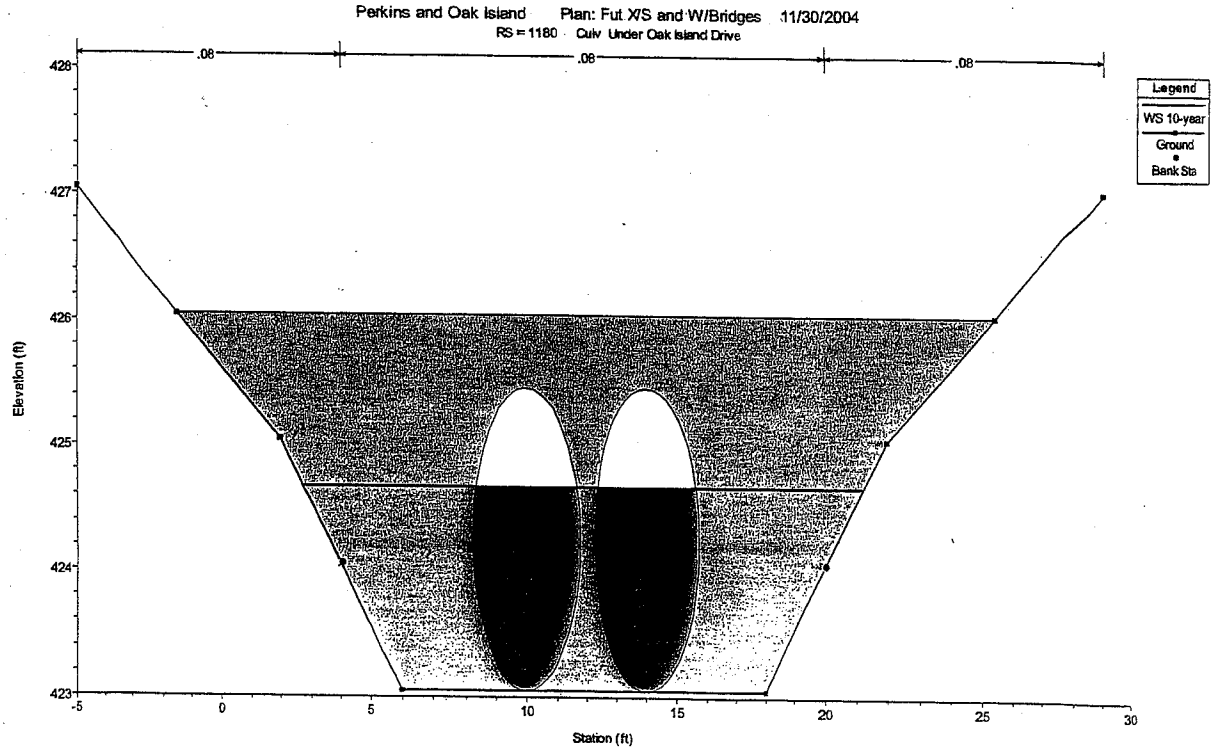
FIGURE 2



Simple bridge to provide access to teepee burner on current driveway assumes one-foot thickness and same top chord elevation.

FIGURE 3





One tenth foot increase attributable to increased resistance due to full (width and length) channel water quality implementation

PROJECT SUMMARY SHEET

Project Title: Creek in Lot 9 (CIP #2)

Problem Description: Based on the 1999 master plan, flooding is anticipated at multiple locations on the channel that flows east of Cherry Street downstream to E Bolton Hill Rd. Based on anecdotal information, this water also backs up to Oak Island Drive producing local street flooding. In addition, runoff from developed areas carries pollutants such as sediments, metals, nutrients, bacteria and hydrocarbons.

Project Description: Construct the following projects to provide conveyance improvements, off-channel detention, and water quality improvements (see Figures 4, 5 and 6).

- Construct on-channel backwater areas for improving water quality.
- Construct off-channel storage for detention and settling. Pond will include maintenance access. See Figures 5 and 6 for examples.
- Provide landscaping for stream habitat and a trail for recreational use to connect to recreational facilities east of the greenway (see Figure 6).

Project Benefits:

- Expected to reduce private property flooding along the creek and improve water quality through processes of biological uptake, filtration, and settling of suspended particulates and associated pollutants.
- Provides enhanced recreational functions.
- Expected to reduce the frequency of channel maintenance requirements.

Estimated Costs

Construction Cost	$ 550,375
Site Acquisition	required
Engineering & Administration	$ 165,113
Capital Project Implementation	$ 715,488
Annual Maintenance	required

Note: Does not include costs related to permitting (i.e., 1200C, 404 and DSL).

Maintenance Requirements: Detention Pond: Inspect and clean inlet and outlet, maintain vegetation, inspect sediment loading, remove sediment, remove debris, inspect separation berm.

Channel backwater areas: Little required after landscape establishment. Occasional weeding to control noxious weeds or replanting.

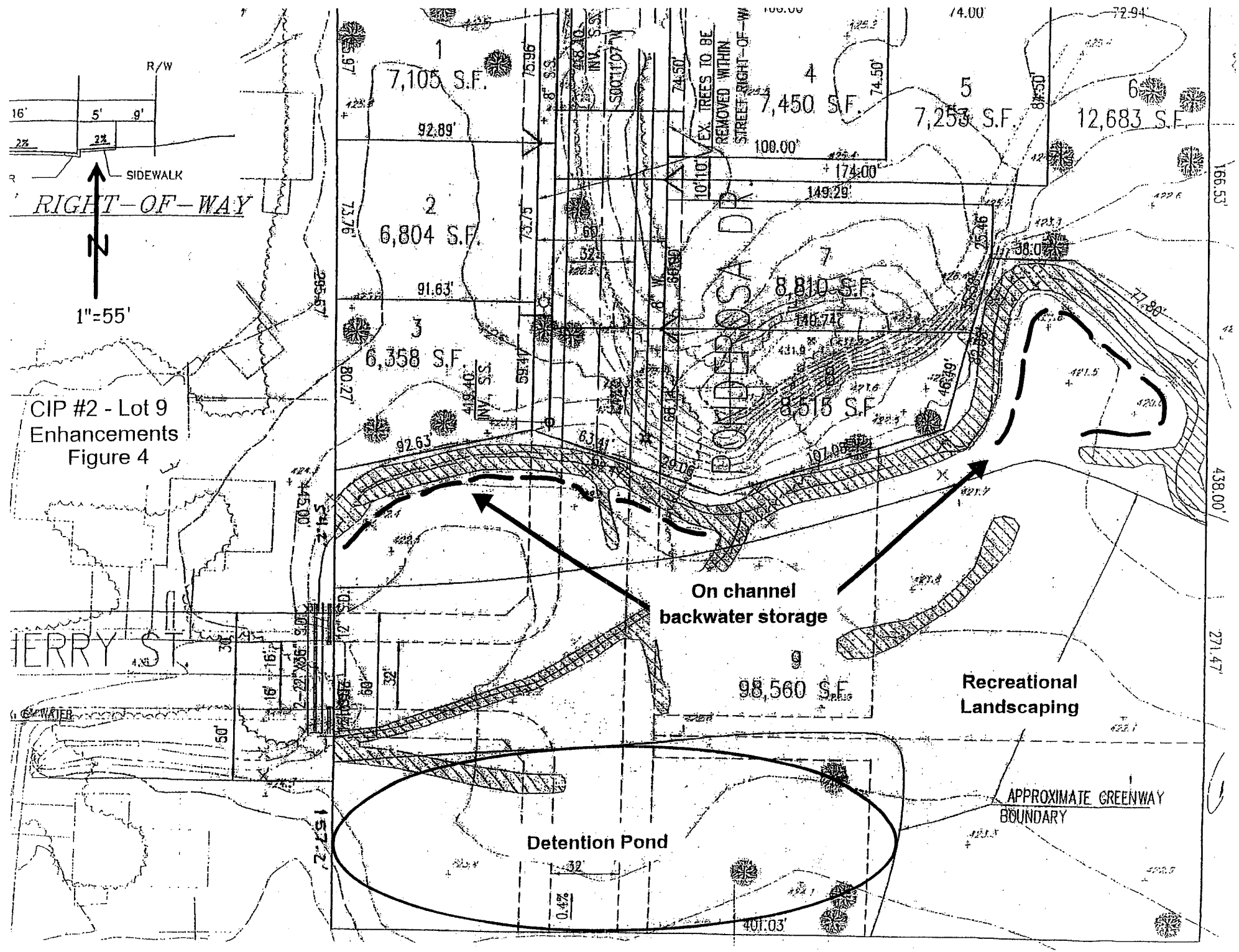
Assumptions: Pond is one acre and 4 ft deep. 200 feet of culvert would be needed to get water to and from the stream (to pond). Half of 600 feet between Cherry St. and E. Bolton Hill Rd. is converted to enhanced stream edge on one side. Additional unspecified landscaping would be provided within Lot 9 to enhance recreational uses.

Project Cost Estimate
Creek in Lot 9 (CIP #2)
City of Veneta, OR

Date: November 12, 2004

Item	Description	Quantity	Unit	Unit Price	Subtotal	Total
1	**MOBILIZATION (5%)**	1	LS	$21,000	$21,000	**$21,000**
2	**TRAFFIC CONTROL**	80	HRS	$32	$2,560	**$2,560**
3	**DEMOLITION & CLEARING**					
	Clearing, Grubbing, and Haul (included under #5 below).	0.00	AC	$12,000	$0	
	Temporary Tree Protection Fence	320	LF	$7	$2,240	**$2,240**
4	**EARTHWORK**					
	Excavation	6,500	CY	$13	$84,500	
	Embankment	1,100	CY	$4	$4,400	
	Other pond work	1	LS	$10,000	$10,000	**$98,900**
5	**BACKWATER STORAGE***					
	On channel areas	300	LF	$820	$246,000	**$246,000**
6	**EROSION CONTROL**					
	Water Pollution / Erosion Control	1	LS	$10,000	$10,000	
	Silt Fencing	800	LF	$7	$5,600	**$15,600**
7	**STRUCTURES**					
	Inlet structure	1	EA	$10,000	$10,000	
	Outlet structure	1	EA	$10,000	$10,000	
	Piping	200	LF	$50	$10,000	**$10,000**
8	**LANDSCAPE FOR RECREATIONAL USE**	1	LS	$20,000	$20,000	**$20,000**
9	**LANDSCAPE ESTABLISHMENT (3 Years)**	1	LS	$24,000	$24,000	**$24,000**
	SUB TOTAL					**$440,300**
	25% CONTINGENCY					$110,075
	TOTAL CONSTRUCTION COSTS					**$550,375**
	SITE ACQUISITION COSTS					**required**
	ENGINEERING / ADMINISTRATION (30%)					**$165,113**
	TOTAL CAPITAL PROJECT IMPLEMENTATION COSTS					**$715,488**
	ANNUAL MAINTENANCE					**required**

* = Cost includes planting, erosion control, and clearing and grubbing.


CIP #2 - Lot 9
Enhancements
Figure 4
1"=55'
RIGHT-OF-WAY
SIDEWALK
On channel
backwater storage
Recreational
Landscaping
Detention Pond
APPROXIMATE GREENWAY
BOUNDARY
7,105 S.F.
6,804 S.F.
6,358 S.F.
7,450 S.F.
8,810 S.F.
8,515 S.F.
98,560 S.F.
12,683 S.F.
HERRY ST

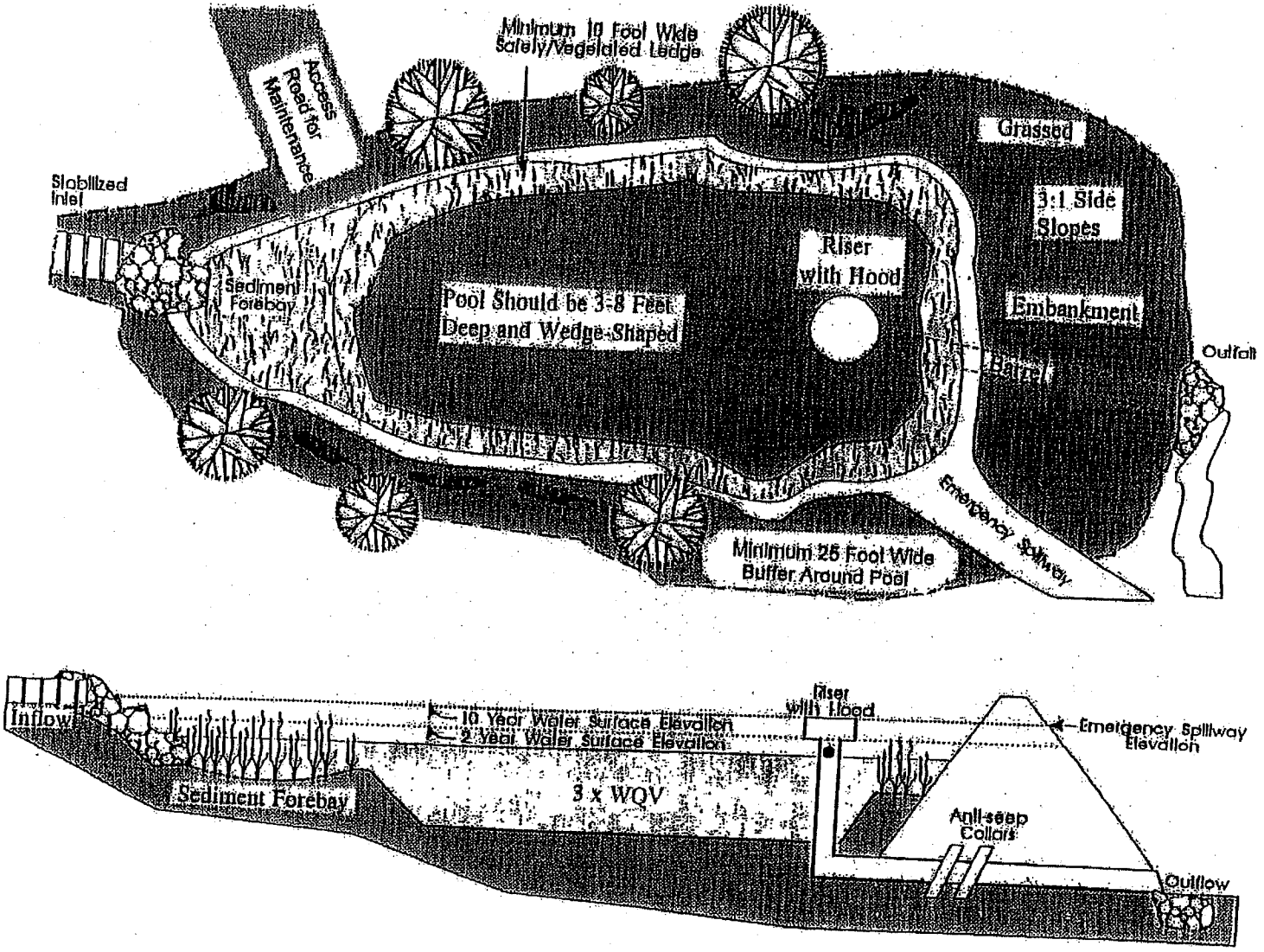

Minimum 10 Foot Wide Safety/Vegetated Ledge
Access Road for Maintenance
Stabilized Inlet
Grassed
3:1 Side Slopes
Riser with Hood
Sediment Forebay
Pool Should be 3-8 Feet Deep and Wedge-Shaped
Embankment
Barrel
Outfall
Emergency Spillway
Minimum 25 Foot Wide Buffer Around Pool
Inflow
10 Year Water Surface Elevation
2 Year Water Surface Elevation
Riser with Hood
Emergency Spillway Elevation
Sediment Forebay
3 x WQV
Anti-seep Collars
Outflow

Figure 5

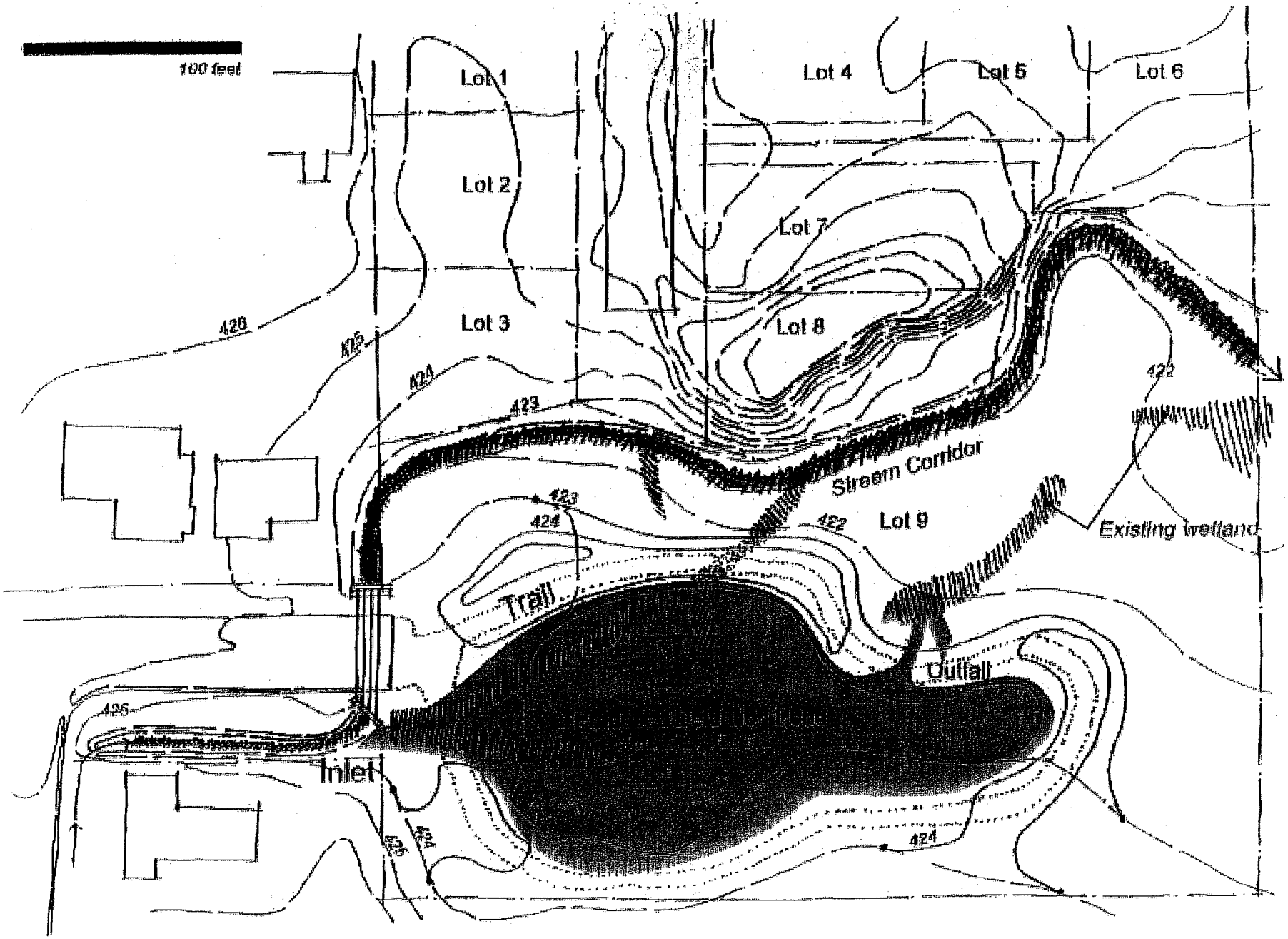

100 feet
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6
Lot 7
Lot 8
Lot 9
426
425
424
423
422
Stream Corridor
Existing Wetland
Trail
Outfall
Inlet

Figure 6

PROJECT SUMMARY SHEET

Project Title: **Runoff from Western Hills (CIP #3)**

Problem Description: Increased post-development runoff from steep slopes in western hills cannot adequately be controlled or maintained at pre-development levels through conventional means (i.e., detention and/or infiltration). The culvert at Territorial Crossing 1,150 ft. south of Bolton Rd. is expected to be under capacity at build-out.

Project Description: Construct the following projects to provide storage and water quality improvements.
- Provide additional detention storage for flood control and water quality within Southwest Area Plan development

Project Benefits: - Reduces private property flooding, provides water quality benefits through processes of settling of particulates and associated pollutants and could potentially eliminate the need for the Territorial Culvert replacement.

Estimated Costs

Construction Cost	$	194,550
Site Acquisition	may be required	
Engineering & Administration	$	58,365
Capital Project Implementation	$	252,915
Annual Maintenance Costs		required

Note: Does not include costs related to permitting (i.e., 1200C).

Maintenance Requirements: Detention Pond: Inspect and clean inlet and outlet, maintain vegetation, inspect sediment loading, remove sediment, remove debris, inspect separation berm.

Cascades: Inspect and clean storm drain system, inspect and remove sediments and debris, inspect weirs.

Assumptions: - Approximately 2 acre-feet of storage is required to account for increased runoff due to development in upstream basin areas draining into the Southwest Area Plan development. It should be noted that the storage was sized based on the area within the City and West of the SAP draining into the SAP site (i.e., approximately 35 acres). The basin areas draining into south side of the SAP was not included as this area is included outside of the UGB and therefore un-developable. If the developer in the upstream area is able to implement a cascade-style street (see attached example from Seattle Public Utilities), this is recommended and would provide excess storage for additional flood protection in addition to providing additional open-space and habitat functions.

- It is assumed that storage would be provided along the course of drainage that flows from west to east in the northern portion of the SAP. Specifically, lots #55 - #59 and lots #77 - #80 were considered.

- The developer in the upstream area would be responsible for increasing the capacity of the culvert that directs drainage from their site under Bolton Rd. and onto the SAP.

- Most of storage (4 acre feet) can be obtained from SAP (potential sites would be lots 55-62, 77-80, and lot 3) . The number of lots that would be needed would be based on the depth of the ponds and the pond depths would be based on groundwater elevations). The remainder of the storage (1 acre-foot) would occur in the cascades on the new development west of the SAP.

- Planting design by a landscape architect would be needed in advance of site development. The plant list would need to be developed by the saturation zone to ensure low maintenance plant materials (i.e., adapted to summer drought and winter rains).

- Traffic control and storm drainage system costs will be included in construction of the new development west of the SAP.

Project Cost Estimate
Runoff from Western Hills (CIP #3)
City of Veneta, OR

Date: November 12, 2004

Item	Description	Quantity	Unit	Unit Price	Subtotal	Total
1	**MOBILIZATION (5%)**	1	LS	$6,500	$6,500	**$6,500**
2	**DEMOLITION & CLEARING**					
	Clearing, Grubbing, and Haul	2.00	AC	$12,000	$24,000	
	Temporary Tree Protection Fence	320	LF	$7	$2,240	**$26,240**
3	**EARTHWORK**					
	Excavation	3,300	CY	$13	$42,900	
	Embankment	400	CY	$4	$1,600	
	Other pond work	1	LS	$20,000	$20,000	
	Planting	1	LS	$20,000	$20,000	**$84,500**
4	**EROSION CONTROL**					
	Water Pollution / Erosion Control	1	LS	$10,000	$10,000	
	Silt Fencing	1,200	LF	$7	$8,400	**$18,400**
5	**STRUCTURES**					
	Inlet structure	1	EA	$10,000	$10,000	
	Outlet structure	1	EA	$10,000	$10,000	**$20,000**
	SUB TOTAL					**$155,640**
	25% CONTINGENCY					$38,910
	TOTAL CONSTRUCTION COSTS					**$194,550**
	SITE ACQUISITION					**may be required**
	ENGINEERING / ADMINISTRATION (30%)					**$58,365**
	TOTAL CAPITAL PROJECT IMPLEMENTATION COSTS					**$252,915**
	ANNUAL MAINTENANCE					**required**

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- Yard System
- Water System
- **>> Drainage & Sewer System**

110th Cascade Project

SPU and Seattle Department of Transportation replaced the existing ditch and culvert system along 4 blocks of Northwest 110th Street, between Greenwood Avenue North and Third Avenue Northwest in the Piper's Creek Watershed with a "Cascade" model natural drainage system.

The project is a series of stair-stepped natural pools that slow damaging stormwater flows, reduce flooding, and trap pollutants before they reach Piper's Creek. Stormwater flow from approximately 21 acres is managed through this natural infrastructure.

Benefits of design

A "Cascade" prototype is a natural drainage design utilized on steep, residential streets. This design:

- Manages high volumes of stormwater from many acres of watershed area (5 to 50 acres).
- Provides excellent water quality benefits.
- Slows stormwater velocity before reaching the creek.
- Locates swales on one side of the roadway.
- Locates a sidewalk on the opposite side of the roadway.
- Adds extensive tree and shrub cover.

Construction complete

The construction phase has been completed. The replanting and landscaping phase, which involves both sides of the street, took place between winter and spring of 2002-2003. Seattle Public Utilities will conducted ongoing monitoring of stormwater flow and velocity on the project.

Related Links

Pipers Creek- Creek Restoration

110th Cascade Pi
Table of Content

Introduction

Technical Informatior

Contract Specifica Div 0 (PDF File)

Scope (PDF File)

110th Cascade Plans (PDF File)

Community Update (PDF File)

Contract Specifici Div1-9 (PDF File)

Objectives & Goals (PDF File)

<< Back to Natura Drainage Systems

Customer Service
Call (206) 684-300(

NW 110th Project Goals and Objectives May 3, 2001

Where: Project area is in the NW portion of the city. Along NW 110th, from 3rd Avenue NW to Greenwood Ave NW. Project area is within right-of way only, and all work will be outside of street. The site has a combination of slopes, ranging from 1-8%.

Problem Statement: The 21-acre drainage basin collected and conveyed along 110th contributes high flows (18 cfs for the 25-year storm) and pollutants to Pipers Creek. Additionally the culvert under 3rd Ave NW experiences overtopping from flows from NW 110th.

Project Description: This project addresses local neighborhood drainage improvements. This project will redesign and configure the current asphalt lined drainage ditch and culvert system to address the objectives described below.

Objective: Provide alternative drainage improvements achieving water quantity, water quality benefits, while meeting stormwater conveyance and pedestrian and vehicle safety standards. Provide these improvements at minimum cost. Goals below are listed in decreasing order of priority.

Goal 1: Establish and adhere to Safety Standards
Maximum depth of standing water criteria: 1-foot
Maximum time of standing water: 24-hours after storm-event ends
Have SEATRAN explain vehicle recovery distance guidelines and follow if possible.

Achievement: Involve SDOT (formerly SEATran) throughout the design phase of the project and during construction for any changes.

Goal 2: Assure conveyance of 25-yr, 24-hr storm through full length of project, including culvert under 3d Ave NW.
Method: Assess conveyance capacity of culvert. If culvert is undersized, provide culvert replacement plan.

Achievement: Replaced culvert under 3rd Ave NW to assure conveyance of 25-year, 24-hour storm.

Goal 3: Provide Detention
Option A: Detain flows generated by full drainage basin to reduce 2-year, 24-hr storm to predeveloped forested till conditions. (Roughly 1-acre foot)
Option B: Provide maximum volume of detention during 2-year, 24-hr storm. At minimum detain flows from adjacent residence and street.
Method: Surface detention, detention pipes under surface system as cost allows

Achievement: (option B) The volume is roughly equivalent to detaining the flows from the street area adjacent the project (1603'*60', assuming 85% imperv.) to predeveloped forested conditions

Goal 4: Provide Water Quality Improvement as an added benefit

No set criteria of treating full water quality storm (6-month, 24-hr)

Method: Provide maintenance accessible sedimentation cells. Provide maximum vegetated flow path as site allows.

Achievement: Involved DWW Operations and Maintenance in the design, assuring a design that is serviceable by DWW crews.

Achievement: Provided 501 feet of swale length out of a total of 1063 feet of project length (which includes existing alleys, sidestreets, and driveways)

Achievement: Provided a total of 350 feet of the 501 foot total that is greater than or equal to the minimum width requirement of 7.5 feet for water quality.

Goal 5: Minimize project costs

Method: Design project to minimize construction costs.

Achievement: Use soil wrap walls, minimize pavement cuts and amount of pipe and hard structures, use grading to achieve construction of improvement that meets the quality/quantity goals.

Goal 6: Provide aesthetic improvements in project area without creating an "attractive nuisance"

Method: Uniform vegetation down length of project. Ask homeowners preference of grass versus a more "wild" native vegetation look. Use artistic flow control method, funded by "1% for art".

Achievement: Choices of numbers, species and sizes of plants to approximate the look of SEAStreet pilot.

Achievement: Use an artistic flow control method, with size and shape of ponds and transitions between them. Use "soil wrap" walls as a method of reducing costs and returning a more aesthetic look.

Did not utilize Seattle Arts Commission in the design process, project inception was too late for 2002 involvement by artist.

Goal 7: Maximize use of recycled materials

Method: Look for construction "waste" at scrap yards and by contacting other agencies. If post consumer products unavailable, contact manufactures for "seconds".

Achievement: Identified construction waste and seconds at Hanson Pipe in Tacoma pre-construction. However, during construction it was determined that new product was a superior choice.

Need to educate Construction Management and Drainage/Wastewater Design Engineers on the use of recycled "seconds" for structures in right-of-way, but not in the road section.

Goal 8: Involve community

Method: Communications staff work with design team to inform and solicit input from residents. 3-dimensional modeling of project if necessary. Involve volunteer cooridinator, Kathy Minch, for post construction events.

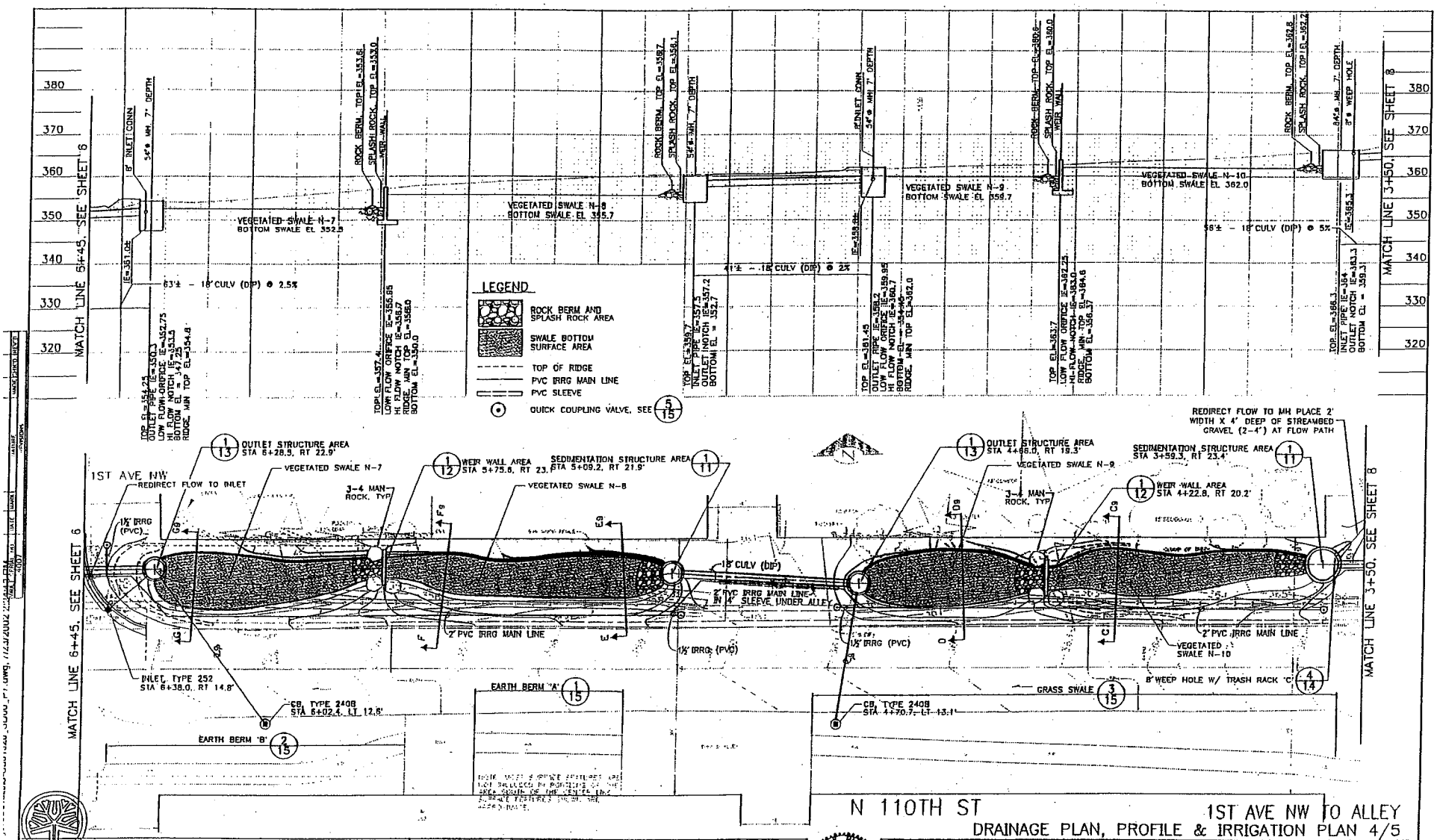
Achievement: Met with 100% of affected property owners one-on-one pre-construction. Held two community open-houses pre-construction, provided bi-weekly construction updates during construction. Involved watershed educator Beth Miller in community meetings and outreach.

Project Justification:

1. Improve management of high volume surface water entering sensitive receiving water.
2. Improve quality of urban runoff entering creek system
3. Use project as a pilot to evaluate improvements to the informal drainage system.
4. Address stormwater management problem that was identified under Greenwood preliminary engineering study and Piper Creek Phase 2 work.

Project Schedule:

1. Preliminary Engineering occurred in 2000
2. Design 2ndQ 2001 to 1stQ 2002
3. Project construction and completion Spring/Summer 2002



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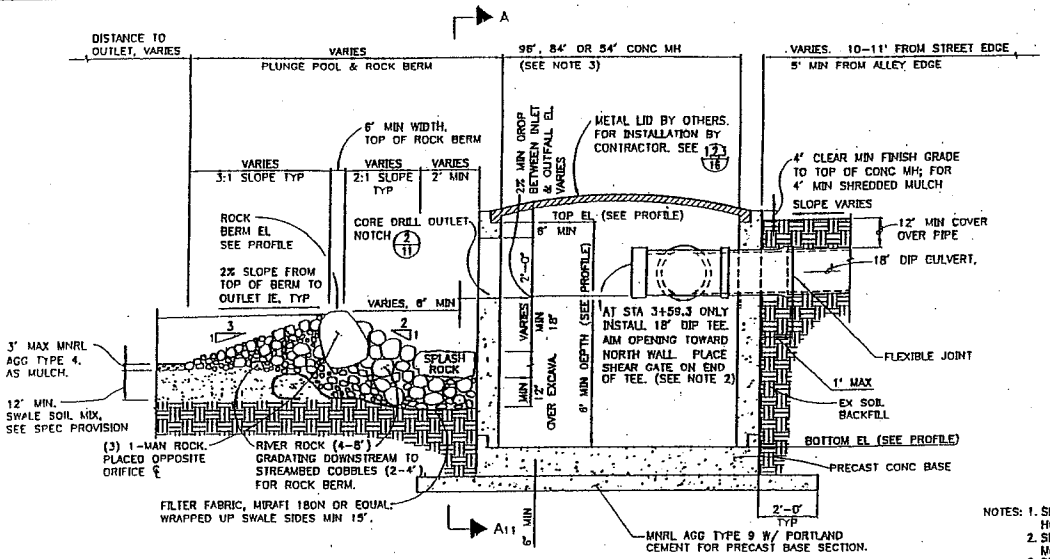
DIRECTOR OF FINANCE
SEATTLE, WASHINGTON 20

CONTRACTING MANAGER

City of Seattle
Seattle Public Utilities
Chuck Clarke, Director

CARKEEK CASCADE
NW 110TH ST
(3RD AVE NW TO GREENWOOD AVE N)

JOB NO. PC C301320 P/W CO C301320
VAULT PLAN NO. 777-568
SHEET 7 OF 18

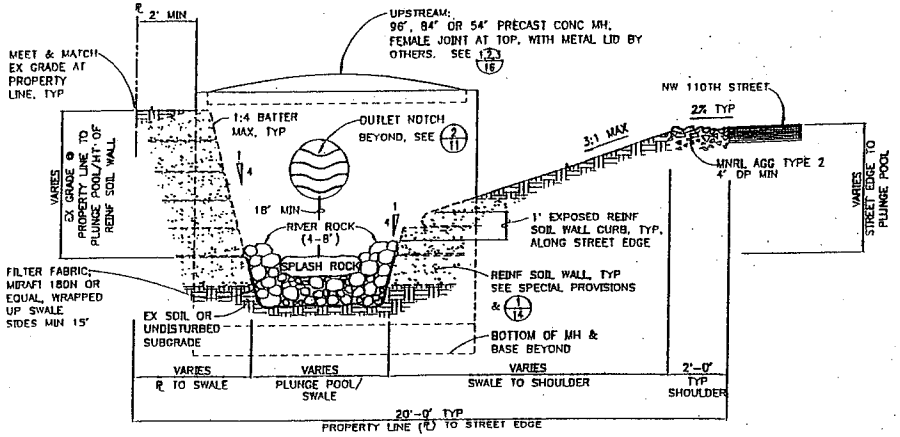


SEDIMENTATION STRUCTURE AREA (1 / 4,5,6,7&8)

PROFILE AT 96", 84", OR 54" MANHOLE TO SWALE

SCALE: 1"=2'-0"

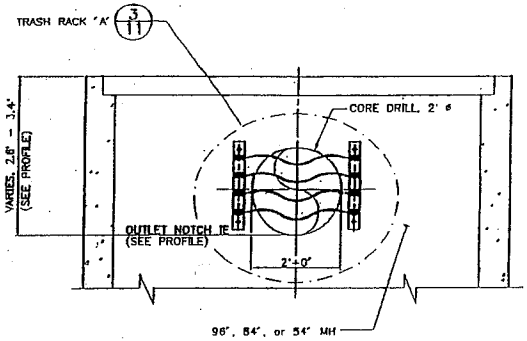
NOTES:
1. SPLASH ROCK SHALL BE MIN 30" IN ANY HORIZONTAL DIRECTION & MIN 6" DEEP.
2. SHEAR GATE SHALL BE WATERMAIN INDUSTRIES MODEL C-16 OR APPROVED EQ.
3. SEE SPECIFICATION FOR QUANTITY OF RECYCLED MAINTENANCE HOLE SECTIONS TO BE PROVIDED BY THE CITY FOR INSTALLATION BY CONTRACTOR.



SECTION A-A11

TYPICAL SWALE SECTION AT PLUNGE POOL (LOOKING UPSTREAM TO 96", 84" OR 54" MANHOLE)

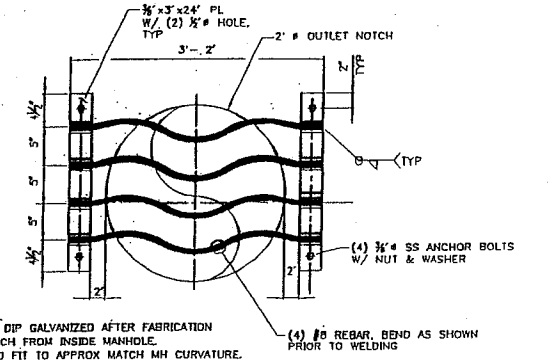
SCALE: 1"=2'-0"



OUTLET NOTCH, (2 / 11)

VIEW INSIDE 96", 84" OR 54" MH LOOKING DOWNSTREAM

SCALE: 3/4" = 1'-0"



NOTES:
1. HOT DIP GALVANIZED AFTER FABRICATION
2. ATTACH FROM INSIDE MANHOLE.
3. FIELD FIT TO APPROX MATCH MH CURVATURE.

TRASH RACK "A" ON 96", 84" OR 54" MH (3 / 11)

VIEW INSIDE MH LOOKING DOWNSTREAM

SCALE: 1 1/2"=1'-0"

DRAINAGE DETAILS

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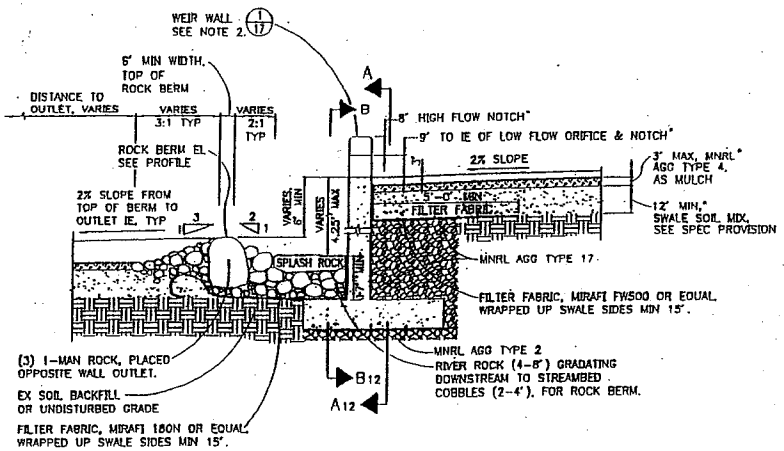
DESIGNED TC PG	REVISED:
CHECKED	DES. CONST.
DRAWN CPS	SEATRAN PROJ. MGR.
CHECKED	RECEIVED
	REVISED AS BUILT

City of Seattle
Seattle Public Utilities
Chuck Clarke, Director
ORDINANCE NO. APPROVED
FUNDS
SCALE: NOTED INSPECTOR'S BOOK

CARKEEK CASCADE
NW 110TH ST
(3RD AVE NW TO GREENWOOD AVE N)

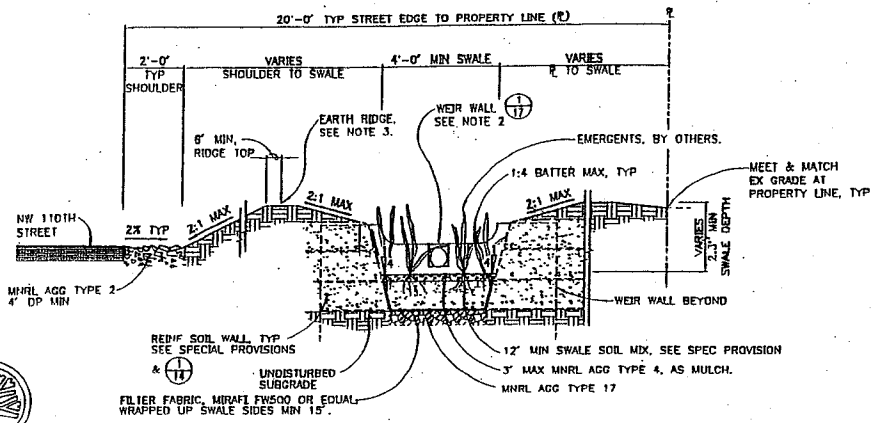
PC	C301320
R/W	
CO	C301320
VAULT PLAN NO.	777-568
SHEET	11 OF 17



NOTES:
1. SPLASH ROCK SHALL BE MIN 30" IN ANY HORIZONTAL DIRECTION & MIN 6" DEEP.
2. FOR MODIFIED WEIR WALL AREA @ STA 12+32.0 USE WEIR WALL "B" 1/18 AND ELIMINATED ITEMS W/ "*" MARKED.
3. EARTH RIDGE SHALL BE MADE OF EXISTING ONSITE SOIL AMENDED WITH DECOMPOSED ORGANIC MULCH (SEE SPECS)
4. PROVIDE JUTE MATTING OVER 4" MIN SHREDDED MULCH ON ALL SLOPES 2½ : 1 OR STEEPER.

WEIR WALL AREA PROFILE AT SWALE TO WEIR WALL (1&2, 4,5,7&8)

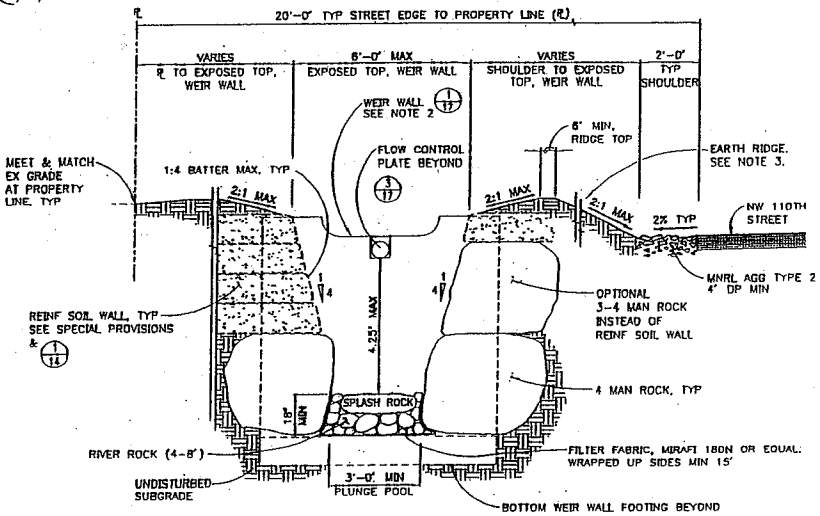
SCALE: 1"=2'-0"



SECTION A-A12

TYPICAL SWALE SECTION LOOKING DOWNSTREAM TO WEIR WALL

SCALE: 1"=2'-0"



SECTION B-B12

TYPICAL SWALE SECTION LOOKING UPSTREAM TO WEIR WALL

SCALE: 1"=2'-0"

DRAINAGE DETAILS

STATE OF WASHINGTON REGISTERED LANDSCAPE ARCHITECT

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REVIEWED: DES. CONST. SEATRAN PROJ. MGR.
RECEIVED
REVISED AS BUILT

ALL WORK DONE IN ACCORDANCE WITH THE CITY OF SEATTLE STANDARD PLANS AND SPECIFICATIONS AND OTHER ORDINANCES CALLED FOR IN NOTE 2 ON SHEET 2 OF THE PROJECT MANUAL.

EXPIRES 10-17-2008

City of Seattle
Seattle Public Utilities
Chuck Clarke, Director
ORDINANCE NO. APPROVED
PLATS
SCALE: NOTED INSPECTOR'S BOOK

CARKEEK CASCADE
NW 110TH ST
(3RD AVE NW TO GREENWOOD AVE N)

PC	C301320	
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