Reichhardt & Ebe
ENGINEERING INC

TRANSMITTAL SHEET

Date sent: Monday, April 23, 2012

Sent to: All Plan Holders

Deliver to: Project Estimator

Transmission sent from: Reichhardt & Ebe Engineering

Number of pages including this page: 68

CONFIRMATION OF RECEIPT OF ADDENDUM

PROJECT: Main Street Improvements (Douglas to Church)

Please complete the following form and fax or email back to Reichhardt & Ebe Engineering, Inc. 360-354-0407 or sheutink@recivil.com as soon as possible.

Have you received Addendum No. 2 for the above-mentioned project?

☐ **YES, we received Addendum No. 2**

Signed: _____ **Dated:** _____

Company name (Please Print): _____

Please fax back to Reichhardt & Ebe Engineering, Inc. at 360-354-0407 or email back to sheutink@recivil.com

PH 360.354.3687 FX 360.354.0407 423 Front Street, Lynden, WA 98264
PH 360.855.1713 FX 360.855.1164 813 Metcalf Street, Sedro-Woolley, WA 98284

REICHHARDT & EBE ENGINEERING, INC.
CONSULTING ENGINEERS

TRANSMITTAL

TO:	FROM:
ALL BIDDERS	Luis Ponce, P.E.
COMPANY:	DATE: 4/23/12
FAX NUMBER:	TOTAL NO. OF PAGES INCLUDING COVER: 67
PHONE NUMBER:	SENDER'S PHONE NUMBER: (360) 855-1713
RE: City of Ferndale Addendum 2 Main Street Improvements (Douglas to Church) ST2012--01	SENDER'S FAX NUMBER: (360) 354-0407

ADDENDUM 2

MAIN STREET IMPROVEMENTS
(DOUGLAS TO CHURCH)
ST2012--01

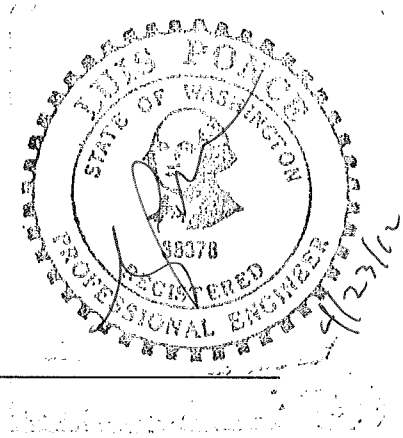
To the attention of all bidders for the above project:

Please find the enclosed Addendum for the above referenced project.

The enclosed ADDENDUM is to be considered as much a part of the Contract Documents as if it were included in the body of the plans and specifications, and will be incorporated in and made a part of the contract when awarded and when formally executed.

The Bidder shall acknowledge in writing, on the bid form, this addendum in order to have the bid considered.

Luis Ponce, P.E.



423 FRONT STREET
LYNDEN, WASHINGTON 98264
360-354-3687

ADDENDUM NO. 2
To the Contract Provisions for
CITY OF FERNDALE, WASHINGTON
MAIN STREET IMPROVEMENTS
(DOUGLAS TO CHURCH)
ST2012--01

ITEM 1

The Bid Proposal Form is replaced in its entirety with the attached **REVISED BID PROPOSAL FORM.** Only bids submitted on the **REVISED BID PROPOSAL FORM** will be considered responsive.

Bid Proposal Form, ITEM NO. 12, the quantity for 'Roadway Excavation Incl. Haul' has been increased as the volume of the top 6-inches of topsoil along Main Street is included in this bid item.

Bid Proposal Form, ITEM NO. 16, the quantity for 'Structure Excavation Class A Incl. Haul' has been decreased.

Bid Proposal Form, ITEM NO. 62, 'Relocate Existing Cluster Mailbox Incl. Foundation'. The referenced specification section has been corrected.

Bid Proposal Form, ITEM NO. 79, 'Gravel Base'. The referenced specification section has been corrected.

Bid Proposal Form, ITEM NO. 90, the quantity for 'Concrete Inlet' has been increased.

Bid Proposal Form, ITEM NO. 92, the quantity for 'Catch Basin Type II, 60 In. Diam.' has been increased.

Bid Proposal Form, ITEM NO. 92A, 'Catch Basin Type II, 54 In. Diam.' has been added to the Bid Proposal Form.

Bid Proposal Form, ITEM NO. 93, the quantity for 'Catch Basin Type II, 48 In. Diam.' has been decreased.

Bid Proposal Form, ITEM NO. 94, the quantity for 'Catch Basin Type 1L' has been increased.

Bid Proposal Form, ITEM NO. 95, the quantity for 'Catch Basin Type 1' has been increased.

Bid Proposal Form, ITEM NO. 103, 'Gravel Base'. The referenced specification section has been corrected.

Bid Proposal Form, ITEM NO. 116A, 'Ductile Iron Sewer Pipe 18 In. Diam.' has been added to the Bid Proposal Form.

Bid Proposal Form, ITEM NO. 164, the quantity for 'Catch Basin Type 2, 60 In. Diam.' has been decreased.

Bid Proposal Form, ITEM NO. 192, 'Streambed Aggregate Mix'. The unit of measurement has been corrected.

ITEM 2

Plan Sheet 19

The existing SDCB located at the southwest corner of Eagle Place and Main Street shall be removed.

ITEM 3

Plan Sheet 27

The stationing shown on 'Wall 1 Structural Earth Wall Keystone' profile is along the wall alignment, not the Main Street alignment.

ITEM 4

Plan Sheet 30

20' lengths of 18" ductile iron sewer pipe is called out in the detail "SANITARY SEWER PIPE SUPPORT DETAIL". 18' lengths of 18" ductile iron sewer pipe are acceptable.

ITEM 5

SD4 and SD 5 shall be Type 2, 54 In. Diam. SD15 shall be Type 2, 60 In. Diam.

ITEM 6

Page 78, lines 31-37 are deleted and revised to read:

Section 1-07.6 is supplemented with the following:

(September 20, 2010)
The Contracting Agency has obtained the below-listed permit(s) for this project. A copy of the permit(s) is attached as an appendix for informational purposes. All contacts with the permitting agency concerning the below-listed permit(s) shall be through the Engineer. The Contractor shall obtain additional permits as necessary. All costs to obtain and comply with additional permits shall be included in the applicable bid items for the work involved. Copies of these permits are required to be onsite at all times.

*** HPA***
*** NPDES Construction Stormwater General Permit ***
*** Corps NWP Ref # NWS-2012-57 and drawings; NWP 12, Utility Line Activities authorizes wetland fill for the installation of utility lines; NWP 14, Linear Transportation Projects, authorizes the wetland and tributary fill for road widening; and NWP 43, Stromwater Management Facilities, authorizes wetland fill for construction of a stromwater facility (all in federal Register, March 12, 2007 vol.72, No.47). A Department of Ecology individual 401 Water Quality Certification and coastal Zone Management Act consistency will not be required as depicted in Ecology letter (dated April 3, 2012). ***

ITEM 7

Page 90, lines 34-46 and page 91, lines 1-7 are deleted and revised to read:

Order of Work

Culvert Replacement
Culvert Replacement work, between approximately STA 22+30 to STA 24+50, as shown on the Plans, shall not begin until 7/15/12. Any earlier start date for Culvert Replacement work shall be approved by the Engineer prior to beginning any work. Culvert Replacement work shall be substantially completed within 15 working days. The work in this Section includes, but is not limited to:

- Installing traffic control devices
- Installing erosion control fencing
- Clearing and grubbing
- Removal of structures and obstructions
- Installing stream bypass
- Structure excavation
- Utility (storm, sanitary, water main) installation and testing
- Culvert installation
- Backfilling and compaction
- Block wall installation
- Roadway gravel base
- Grading
- Temporary fencing installation
- Removal of detour route and detour route signing
- Open road to traffic

ITEM 8

Page 91, lines 9-26 are deleted and revised to read:

Pond Construction
The proposed pond is located east of SD1 (SD 1 is shown on Plan Sheet 56, Regional Pond Storm Conveyance, approximate STA 2+19. The proposed pond location is also shown on

the Plan Sheet 46). Pond Construction work shall not begin until 8/1/12. Any earlier start date for Pond Construction work shall be approved by the Engineer prior to beginning any work. Pond Construction work shall be substantially completed within the working days noted in Time for Completion Section 1-08.5. The work in this Section includes, but is not limited to:

- Installing traffic control devices
- Installing high visibility fencing
- Installing erosion control devices
- Clearing and grubbing
- Removal of structures and obstructions
- Pond excavation and embankment
- Construction and testing of utilities
- Installing gabion mattresses
- Grading
- Construction of maintenance road
- Construction of landscape and landscape restoration
- Removal of erosion control and high visibility fencing

ITEM 9

Page 99, 2-01.5 Payment, is supplemented with the following:

The removal and disposal of the top 6-inches of topsoil along Main Street shall be measured and paid under the bid item "Roadway Excavation Incl. Haul".

ITEM 10

Page 121, lines 30-31 are deleted and revised to read:

No specific unit of measurement will apply to the lump sum item 'Inverted 3 Sided Box Culvert'.

ITEM 11

Page 123, lines 11-34 are deleted and revised to read:

1. Visual inspection.

2. Compressive strength from 2500 psi to 5800 psi.

3. Manufacturer's Certificate of Compliance in accordance with Section 1-06.3.

4. Copies of results from tests conducted on the lot of blocks produced for this project by the concrete block fabricator in accordance with the quality control program required by the structural earth wall manufacturer.

The blocks shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength conforms to the 28-day requirements, and when all other acceptability requirements specified above are met.

ITEM 12

Page 125, lines 29-30 are deleted and revised to read:

Crushed surfacing top course used for the block walls will be measured and paid in accordance with Section 4-04.4.

ITEM 13

Page 126, 7-04.2 Materials is supplemented with the following:

The Stormwater Pond outfall pinch valve shall be Tideflex Series TF-1 Check Valve or approved equal.

ITEM 14

DIVISION 5
SURFACE TREATMENTS AND PAVEMENTS

5-04.3(3)A Material Transfer Device/Vehicle
Section 5-04.3(3)A is supplemented with the following:

A material transfer device or vehicle (MTD/V) is not required for this project.

ITEM 15

Page 139, lines 35-36 are deleted and revised to read:

Reducing Valve (PRV)" shall be full pay for all work to install the meter boxes, meter setter, gate valve, service connection, including but not limited to, excavating, tapping the

ITEM 16

Page 145, Section 8-02.3(4)B, Topsoil Type B is supplemented with the following:

The Contactor shall remove the top 18" of topsoil that contains reed canarygrass (RCG) root mass. The Contractor shall remove the RCG from the topsoil and dispose of the RCG at no expense to the Contracting Agency in accordance with Section 2-03.3(7) C. The remaining topsoil shall be stockpiled and placed in accordance with this section.

ITEM 17

Page 148, lines 36-39 are deleted and revised to read:

Planting Stormwater Pond
A one year guarantee of the planted material is required. These guidelines are not meant to be exhaustive but present the typical requirements. 80% survival of planted material after the first year is required.

ITEM 18

Page 156, line 45 is deleted.

ITEM 19

Page 157, lines 32-33 are deleted and revised to read:

subgrade. Washed rock shall be considered incidental to this bid item

ITEM 20

Section 8-14.5 is supplemented with the following:

"Cement Conc. Curb Ramp Type ___", per each
The unit Contract price per each for "Cement Concrete Curb Ramp Type____" shall be full pay for installing the curb ramp as specified, including the "Detectable Warning Surface" and leveling and grading subgrade. Washed rock, and cement concrete pedestrian curb, shall be considered incidental to this bid item

ITEM 21

Page 171, lines 35-36 are deleted and revised to read:

The wetland seed mix shall be applied to the rate of:

- 250 lbs per acre of hydroseed mulch when applied along Main Street roadside.
- 100 lbs per acre of hydroseed mulch when applied along the Stormwater Pond access road.

ITEM 22

Appendix H, HPA. The 'WORK START' date for Location #1 and Location #2 shall be July 15, 2012.

ITEM 23

The following Appendix is added to the Contract Documents:

Appendix I - Corps NWP Ref # NWS-2012-57
Appendix J - Geotechnical Data Report - Ferndale Regional Stormwater Detention Facility

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
		Schedule A - Civil Items		
1	1 LS	Mobilization 1-07	$ LS	
2	1 FA	Minor Changes 1-04	$ FA	30,000.00
3	1 LS	Spill Prevention, Control, and Countermeasures (SPCC) Plan 1-07	$ LS	
4	5,500 HR	Flaggers and Spotters 1-10	$ per HR	$
5	700 HR	Other Traffic Control Labor 1-10	$ per HR	$
6	1 LS	Project Temporary Traffic Control 1-10	$ LS	
7	1 LS	Clearing and Grubbing 2-01	$ LS	
8	1 LS	Removal of Structures and Obstructions 2-02	$ LS	
9	550 CY	Removing Portland Cement Concrete Pavement 2-02	$ per CY	$
10	6,100 LF-IN	Saw-cut ACP 2-02	$ per LF-IN	$
11	200 LF-IN	Saw-cut PCC 2-02	$ per LF-IN	$
12	11,750 CY	Roadway Excavation Incl. Haul 2-03	$ per CY	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
13	1,500 CY	Unsuitable Foundation Excavation Incl. Haul 2-03	$ per CY	$
14	750 CY	Embankment Compaction 2-03	$ per CY	$
15	100 M.GAL	Water 2-07	$ per M.GAL	$
16	1,300 CY	Structure Excavation Class A Incl. Haul 2-09	$ per CY	$
17	1 LS	Shoring or Extra Excavation Cl. A 2-09	LS	$
18	19,300 SY	Construction Geotextile for Subgrade Separation 2-12	$ per SY	$
19	1 FA	Selected Grading - Stream 2-13	FA	$ 20,000.00
20	24,000 Ton	Gravel Base 4-02	$ per Ton	$
21	1,750 Ton	Crushed Surfacing Top Course 4-04	$ per Ton	$
22	4,400 Ton	HMA Class 1/2" PG 64-22 5-04	$ per Ton	$
23	4,150 Ton	HMA Class 1" PG 64-22 5-04	$ per Ton	$
24	1 Calc	Job Mix Compliance Price Adjustment 5-04	$ 0.00 per Calc	$0.00

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
25	1 Calc	Compaction Price Adjustment 5-04	$ 0.00 per Calc	$0.00
26	1 Calc.	Asphalt Cost Price Adjustment 5-04	$ 15,0000 per Calc.	$ 15,000.00
27	700 SY	Planing Bituminous Pavement 5-04	$ per SY	$
28	400 CY	Gravel Backfill for Wall 6-02	$ per CY	$
29	1 LS	Inverted 3 Sided Box Culvert 6-02	LS	$
30	300 LF	Pedestrian Railing 6-06	$ per LF	$
31	855 SF	Structural Earth Wall, Keystone 6-13	$ per SF	$
32	625 SF	Structural Earth Wall, Ultrablock 6-13	$ per SF	$
33	1 FA	Erosion/Water Pollution Control 8-01	FA	$ 15,000.00
34	1 LS	ESC Lead 8-01	LS	$
35	140 HR	Street Cleaning 8-01	$ per HR	$
36	40 EA	Inlet Protection 8-01	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
37	150 LF	Check Dam 8-01	$ per LF	$
38	340 SY	Stabilized Construction Entrance 8-01	$ per SY	$
39	3,500 LF	Silt Fence 8-01	$ per LF	$
40	1 LS	SWPP Plan Preparation 8-01	LS	$
41	5,000 SY	Seeded Lawn Installation 8-02	$ per SY	$
42	1 FA	Landscape Restoration 8-02	FA	$ 25,000.00
43	600 CY	Topsoil Type A 8-02	$ per CY	$
44	5,900 LF	Cement Conc. Traffic Curb & Gutter 8-04	$ per LF	$
45	120 LF	Cement Conc. Pedestrian Curb 8-04	$ per LF	$
46	820 SY	Cement Conc. Driveway 8-06	$ per SY	$
47	25 HUND	Raised Pavement Markers, Type 1 8-09	$ per HUND	$
48	5 HUND	Raised Pavement Markers, Type 2 8-09	$ per HUND	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
49	5 EA	Flexible Guide Post 8-10	$ per EA	$
50	100 LF	Temporary Fencing 8-12	$ per LF	$
51	2,170 SY	Cement Conc. Sidewalk 8-14	$ per SY	$
52	345 SY	Cement Conc. Sidewalk with Raised Edge 8-14	$ per SY	$
53	120 SY	Cement Conc. Sidewalk Thickened Edge 8-14	$ per SY	$
54	110 SY	C.I.P. Monolithic Wall Cap and Sidewalk 8-14	$ per SY	$
55	3 EA	Sidewalk Ramp Type Single Direction A 8-14	$ per EA	$
56	2 EA	Sidewalk Ramp Type Single Direction B 8-14	$ per EA	$
57	10 EA	Sidewalk Ramp Type Parallel A 8-14	$ per EA	$
58	1 EA	Sidewalk Ramp Type Parallel B 8-14	$ per EA	$
59	1 EA	Sidewalk Ramp Type Combination 8-14	$ per EA	$
60	4 EA	Mailbox Support, Type 1 8-18	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
61	4 EA	Mailbox Support, Type 2 8-18	$ per EA	$
62	1 EA	Relocate Existing Cluster Mailbox Incl. Foundation 8-18	$ per EA	$
63	1 FA	Lighted Sign Relocate 8-20	FA	$ 5,000.00
64	1 LS	Permanent Signing 8-21	LS	$
65	20 EA	Plastic Traffic Arrow 8-22	$ per EA	$
66	6,500 LF	Paint Line 8-22	$ per LF	$
67	110 LF	Plastic Stop Bar, 18-Inch 8-22	$ per LF	$
68	21 EA	Plastic Traffic Letter 8-22	$ per EA	$
69	650 SF	Plastic Crosswalk Stripe 8-22	$ per SF	$
70	35 EA	Pothole Existing Underground Utility 8-30	$ per EA	$
71	1 FA	Repair Existing Public and Private Facilities 8-31	FA	$ 25,000.00
72	170 CY	Streambed Aggregate Mix 8-32	$ per CY	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
73	50 CY	Streambed Boulder 8-32	$ per CY	$
74	1 LS	Temporary Stream Bypass System 8-33	LS	$

Total Schedule A $ _____

Schedule B - Storm Drain Items

75	33 EA	Remove Drainage Structures and Manholes 2-02	$ per EA	$
76	2,700 CY	Structure Excavation Class B Incl. Haul 2-09	$ per CY	$
77	20,000 SF	Shoring or Extra Excavation Class B 2-09	$ per SF	$
78	100 CY	Controlled Density Fill 2-09	$ per CY	$
79	6,000 Ton	Gravel Base 4-02	$ per Ton	$
80	340 LF	Corrugated Poly Storm Sewer Pipe, 36 In. Diam. 7-04	$ per LF	$
81	56 LF	Solid Wall PVC Storm Sewer Pipe 36 In. Diam. 7-04	$ per LF	$
82	1,420 LF	Corrugated Poly Storm Sewer Pipe, 24-Inch Diam. 7-04	$ per LF	$
83	315 LF	Corrugated Poly Storm Sewer Pipe, 18 In. Diam. 7-04	$ per LF	$
84	12 LF	Solid Wall PVC Storm Sewer Pipe 12 In. Diam. 7-04	$ per LF	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
85	1,270 LF	Corrugated Poly Storm Sewer Pipe, 12 In. Diam. 7-04	$ per LF	$
86	625 LF	Ductile Iron Storm Sewer Pipe 12 In. Diam. 7-04	$ per LF	$
87	4,000 LF	Testing Storm Sewer Pipe 7-04	$ per LF	$
88	1 EA	36 In. Diam. Inline Check Valve 7-04	$ per EA	$
89	1 EA	12 In. Diam. Inline Check Valve 7-04	$ per EA	$
90	14 EA	Concrete Inlet 7-05	$ per EA	$
91	2 EA	Catch Basin Type II, 72 In. Diam. 7-05	$ per EA	$
92	6 EA	Catch Basin Type II, 60 In. Diam. 7-05	$ per EA	$
92A	2 EA	Catch Basin Type II, 54 In. Diam. 7-05	$ per EA	$
93	10 EA	Catch Basin Type II, 48 In. Diam. 7-05	$ per EA	$
94	2 EA	Catch Basin Type IL 7-05	$ per EA	$
95	16 EA	Catch Basin Type 1 7-05	$ per EA	$
96	4 EA	Solid Locking Frame and Cover 7-05	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
97	1 LS	Adjustment to Finished Grade 7-05	LS	$
98	350 CY	Removal of Unsuitable Material Incl. Haul 7-08	$ per CY	$
99	500 TON	Quarry Spalls 8-15	$ per TON	$
100	15 EA	Pothole Existing Underground Utility 8-30	$ per EA	$

Total Schedule B $ _____

Schedule C - Sanitary Items

101	1,000 CY	Structure Excavation Class B Incl. Haul 2-09	$ per CY	$
102	9,400 SF	Shoring or Extra Excavation Class B 2-09	$ per SF	$
103	2,500 TON	Gravel Base 4-02	$ per TON	$
104	1 EA	Manhole 48 In. Diam. Type 1 7-05	$ per EA	$
105	1 EA	Manhole 60 In. Diam. Type 1 7-05	$ per EA	$
106	4 EA	Manhole 48 In. Diam. Type 3 7-05	$ per EA	$
107	1 EA	Manhole 84 In. Diam. Type 3 7-05	$ per EA	$
108	2 EA	Solid Locking Frame and Cover 7-05	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
109	4 EA	Connect to Existing Manhole 7-05	$ per EA	$
110	1 LS	Adjustment to Finished Grade 7-05	LS	$
111	100 CY	Removal of Unsuitable Material Incl. Haul 7-08	$ per CY	$
112	210 LF	PVC Sanitary Sewer Pipe, 6 In. Diam. 7-17	$ per LF	$
113	35 LF	PVC Sanitary Sewer Pipe, 8 In. Diam. 7-17	$ per LF	$
114	615 LF	PVC Sanitary Sewer Pipe, 12 In. Diam. 7-17	$ per LF	$
115	200 LF	PVC Sanitary Sewer Pipe, 18 In. Diam. 7-17	$ per LF	$
116	70 LF	Bridge Supported D.I. for Sanitary Sewer Pipe,18 In. Diam. 7-17	$ per LF	$
116A	50 LF	Ductile Iron Sewer Pipe, 18 In. Diam. 7-17	$ per LF	$
117	700 LF	Testing Sewer Pipe 7-17	$ per LF	$
118	180 TON	Quarry Spalls 8-15	$ per TON	$
119	10 EA	Pothole Existing Underground Utility 8-30	$ per EA	$

Subtotal Sanitary Sewer $ _____

Sales Tax @ 8.7% (Schedule C) $ _____

Total Schedule C (Including Tax) $ _____

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
		Schedule D - Water Main Items		
120	1,300 LF-IN	Sawcut ACP 2-02	$ per LF-IN	$
121	640 Ton	Gravel Base 4-02	$ per Ton	$
122	1 LS	Adjustment to Finished Grade 7-05	LS	$
123	295 LF	D.I. Pipe for Water Main 8 In. Diam. 7-09	$ per LF	$
124	725 LF	D.I. Pipe for Water Main 12 In. Diam. 7-09	$ per LF	$
125	8 EA	Stovepipe Watermain, 12 In. Diam. 7-09	$ per EA	$
126	10 EA	Connect to Existing Watermain 12 In. Diam. 7-09	$ per EA	$
127	1 EA	Connect to Existing Watermain 8 In. Diam. 7-09	$ per EA	$
128	2 EA	Blow off Assembly 7-09	$ per EA	$
129	1 LS	Testing Water Main 7-09	LS	$
130	1 EA	Gate Valve, 8 In. 7-12	$ per EA	$
131	9 EA	Gate Valve, 12 In. 7-12	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
132	9 EA	Tapping Sleeve and Gate Valve Assembly, 12 In. x 8 In. 7-12	$ per EA	$
133	1 EA	Tapping Sleeve and Gate Valve Assembly, 12 In. x 6 In. 7-12	$ per EA	$
134	1 EA	Tapping Sleeve and Gate Valve Assembly, 8 In. x 6 In. 7-12	$ per EA	$
135	9 EA	Hydrant Assembly 7-14	$ per EA	$
136	13 EA	Service Connection 3/4 In. Diam. 7-15	$ per EA	$
137	4 EA	Service Connection 1 In. Diam. 7-15	$ per EA	$
138	2 EA	Service Connection 1 1/2 In. Diam. 7-15	$ per EA	$
139	15 EA	Pressure Reducing Valve (PRV) 7-15	$ per EA	$
140	15 EA	Pothole Existing Underground Utility 7-30	$ per EA	$

Subtotal Water Main $ _____

Sales Tax @ 8.7% (Schedule D) $ _____

Total Schedule D (Including Tax) $ _____

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
		Schedule E - Conveyance and Pond		
141	1 LS	Mobilization 1-07	$ LS	
142	1 LS	Contract Bond Extension 1-03	$ LS	
143	1 FA	Minor Changes 1-04	$ FA	20,000.00
144	1 LS	Spill Prevention, Control, and Countermeasures (SPCC) Plan 1-07	$ LS	
145	1 LS	Project Temporary Traffic Control 1-10	$ LS	
146	1 LS	Clearing and Grubbing 2-01	$ LS	
147	1 LS	Removal of Structures and Obstructions 2-02	$ LS	
148	900 LF-IN	Sawcut ACP 2-02	$ per LF-IN	$
149	6,000 CY	Unsuitable Foundation Excavation Incl. Haul 2-03	$ per CY	$
150	16,100 CY	Pond Excavation Incl. Haul 2-03	$ per CY	$
151	9,000 CY	Pond Embankment Compaction 2-03	$ per CY	$
152	50 M.GAL	Water 2-07	$ per M.GAL	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
153	5,000 CY	Structure Excavation Class B Incl. Haul 2-09	$ per CY	$
154	21,850 SF	Shoring or Extra Excavation Class B 2-09	$ per SF	$
155	250 SY	Construction Geotextile for Soil Separation 2-12	$ per SY	$
156	5,100 TON	Gravel Base 4-02	$ per TON	$
157	660 TON	Crushed Surfacing Top Course 4-04	$ per TON	$
158	290 TON	HMA CL. 1/2 In. PG 64-22 5-04	$ per TON	$
159	10 LF	Corrugated Polyethylene Storm Sewer Pipe, 24 In. Diam 7-04	$ per LF	$
160	3,080 LF	Corrugated Polyethylene Storm Sewer Pipe, 36 In. Diam 7-04	$ per LF	$
161	3,060 LF	Testing Storm Sewer Pipe 7-04	$ per LF	$
162	1 EA	36 In. Diam. Pinch Valve 7-04	$ per EA	$
163	1 EA	Pond Outlet Control Structure Catchbasin 7-05	$ per EA	$
164	12 EA	Catch Basin Type 2, 60 In. Diam. 7-05	$ per EA	$
165	1 EA	Catch Basin Type 2, 72 In. Diam. 7-05	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
166	1 EA	Storm Sewer Debris Barrier 36 In. Diam. 7-05	$ per EA	$
167	500 CY	Removal of Unsuitable Material Incl. Haul 7-08	$ per CY	$
168	170 SY	Stabilized Construction Entrance 8-01	$ per SY	$
169	100 HR	Street Cleaning 8-01	$ per HR	$
170	1,450 LF	Orange Silt Fence 8-01	$ per LF	$
171	500 LF	Silt Fence 8-01	$ per LF	$
172	1 FA	Landscape Restoration 8-01	FA	$ 2,000.00
173	1 FA	Erosion/Water Pollution Control 8-01	FA	$ 10,000.00
174	4,900 SY	Seeded Lawn Installation 8-02	$ per SY	$
175	7,500 SY	Wetland Seed Installation 8-02	$ per SY	$
176	125 CY	Topsoil Type A 8-02	$ per CY	$
177	1,130 CY	Topsoil Type B 8-02	$ per CY	$
178	2,127 EA	Pond Planting, Marsh speedwell 8-02	$ per EA	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
179	2,127 EA	Pond Planting, Water parsley 8-02	$ per EA	$
180	2,127 EA	Pond Planting, Spike rush 8-02	$ per EA	$
181	2,127 EA	Pond Planting, Broadleaf arrowhead 8-02	$ per EA	$
182	2,127 EA	Pond Planting, Slough sedge 8-02	$ per EA	$
183	7,656 EA	Pond Planting, Small Fruited Bulrush 8-02	$ per EA	$
184	7,656 EA	Pond Planting, Water plantain 8-02	$ per EA	$
185	7,656 EA	Pond Planting, Burreed 8-02	$ per EA	$
186	4,253 EA	Pond Planting, Hardstem Bulrush 8-02	$ per EA	$
187	4,253 EA	Pond Planting, Softstem Bulrush 8-02	$ per EA	$
188	2 EA	Access Control Pipe Gate 8-12	$ per EA	$
189	650 TON	Quarry Spalls 8-15	$ per TON	$
190	50 LF	Paint Line 8-22	$ per LF	$

BID PROPOSAL FORM
City of Ferndale
Main Street Improvements (Douglas to Church)

ITEM NO.	APPROX. QUANTITY	ITEM	UNIT PRICE	TOTAL
191	50 SY	Gabion Mattresses 8-24	$ per SY	$
192	10 CY	Streambed Aggregate Mix 8-32	$ per CY	$
193	12 CY	Streambed Boulder 8-32	$ per CY	$
194	5 EA	Pothole Existing Underground Utility 8-30	$ per EA	$
195	1 FA	Repair Public and Private Facilities 8-31	FA	$ 15,000.00

Total Schedule E $ _____

Total Schedule A, B, C, D, and E (Including Sales Tax) $ _____

APPENDIX I
CORPS NWP Ref # NWS-2012-57
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DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

March 16, 2012

Regulatory Branch

City of Ferndale
Ms. Janice Marlega
Post Office Box 936
Ferndale, Washington 98248

Reference: NWS-2012-57
Ferndale, City of

Dear Ms. Marlega:

We have reviewed your application to place fill in 0.21 of an acre of wetlands and 0.12 of an acre of tributaries (ditches) associated with Schell Creek at Ferndale, Washington. Based on the information you provided to us, Nationwide Permit (NWP) 12, Utility Line Activities authorizes wetland fill for the installation of utility lines, NWP 14, Linear Transportation Projects, authorizes the wetland and tributary fill for road widening, and NWP 43, Stormwater Management Facilities, authorizes wetland fill for construction of a stormwater facility (all in Federal Register, March 12, 2007 Vol. 72, No. 47), as depicted on the enclosed drawings dated February 21, 2012. In order for this NWP authorization to be valid, you must ensure the work is performed in accordance with the enclosed *Nationwide Permit12, 14, and 43, Terms and Conditions* and the following special conditions:

a. The permittee must install and maintain sediment and erosion controls during construction at the site until all disturbed soils have been revegetated or otherwise stabilized

b. All temporary fill and structures installed for stream bypass and fish exclusion must be removed upon completion of the culvert replacement work in Schell Creek.

c. You shall implement and abide by the mitigation plan, "*Wetland Mitigation Plan: Ferndale Main Street- Church Road Improvements Project*," dated February 2012 and as modified by the permit special conditions. Mitigation shall be constructed before or concurrent with the work authorized by the permit.

d. A long-term management plan to include identification of the responsible party(s), the management/maintenance activities, funding mechanisms, and reporting schedule, must be submitted within 60 days of the date of this letter and prior to starting the work for review and approval by the Corps.

e. A status report on the implementation of the authorized work and on the construction of the mitigation shall be submitted annually to the U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch by October 31st each year until mitigation construction is complete as determined by the Corps. This report must prominently display the reference number NWS-2012-57.

f. An as-built mitigation construction report and as-built drawings of the mitigation area(s) shall be submitted upon completion of mitigation construction, in lieu of the status report described in Special Condition "b." This report must be submitted to the U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch for review and approval and must prominently display the reference number NWS-2012-57. The year mitigation construction is completed, as determined by the Corps, represents Year 0 for mitigation monitoring.

g. Mitigation monitoring reports shall be submitted annually for monitoring years 1, 2, 3, 5, 7, and 10 to the U.S. Army Corps of Engineers (Corps), Seattle District, Regulatory Branch by December 31st of each monitoring year. Year 1 monitoring will occur at least one year after completion of the mitigation site(s) as determined by the Corps. All reports must prominently display the reference number NWS-2012-57.

h. To ensure the long-term protection of the mitigation site, you must record a copy of this Department of the Army permit and a description of the mitigation area identified in the final mitigation plan with the Registrar of Deeds or other appropriate official charged with maintaining records on real property. Proof of this recorded documentation must be submitted to the U.S. Army Corps of Engineers, Seattle District, Regulatory Branch within 60 days from the date of permit issuance.

i. Your responsibility to complete the required compensatory mitigation as set forth in Special Conditions "c" through "h" will not be considered fulfilled until you have demonstrated mitigation success and have received written verification from the U.S. Army Corps of Engineers Seattle District, Regulatory Branch.

We are unable to determine whether or not your project requires individual Water Quality Certification and/or a Coastal Zone Management consistency determination response from the Washington State Department of Ecology (Ecology). Before you may proceed with the work authorized by this NWP, you must contact the following Ecology office regarding these requirements:

Nationwide Permit Coordinator
Department of Ecology, SEA Program
Post Office Box 47600
Olympia, Washington 98504-7600
Telephone (360) 407-6068.

If more than 180 days pass without Ecology responding to your individual WQC and CZM consistency determination concurrence request, your requirement to obtain an individual WQC and CZM consistency determination response becomes waived. You may then proceed to construction.

For this project, the Federal Highways Administration is the Federal lead agency responsible for compliance with Section 7 of the Endangered Species Act, the Magnuson-Stevens Fishery Conservation and Management Act, and Section 106 of the National Historic Preservation Act. For the purpose of this Department of the Army authorization, the Corps has determined that this project will comply with the requirements of the above laws.

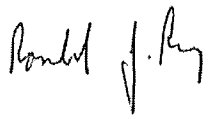
We have prepared and enclosed a *Preliminary Jurisdictional Determination* (JD), which is a written indication that wetlands and waterways within your project area may be waters of the United States. Such waters will be treated as jurisdictional waters of the U.S. for purposes of computation of impact area and compensatory mitigation requirements associated with your permit application. If you believe the Preliminary JD is inaccurate, you may request an Approved JD, which is an official determination regarding the presence or absence of waters of the U.S. If one is requested, please be aware that we may require the submittal of additional information to complete an approved JD and work authorized in this letter may not occur until the approved JD has been finalized.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked on March 18, 2012. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before March 18, 2012, you will have until March 18, 2013 to complete the activity under the present terms and conditions of this NWP.

Upon completing the authorized work, you must fill out and return the enclosed *Certificate of Compliance with Department of the Army Permit* form. Thank you for your cooperation during the permit process. We are interested in your experience with our Regulatory Program and encourage you to complete a customer service survey form. This form and information about our program is available on our website at http://www.nws.usace.army.mil/ select Regulatory, Regulatory / Permits.

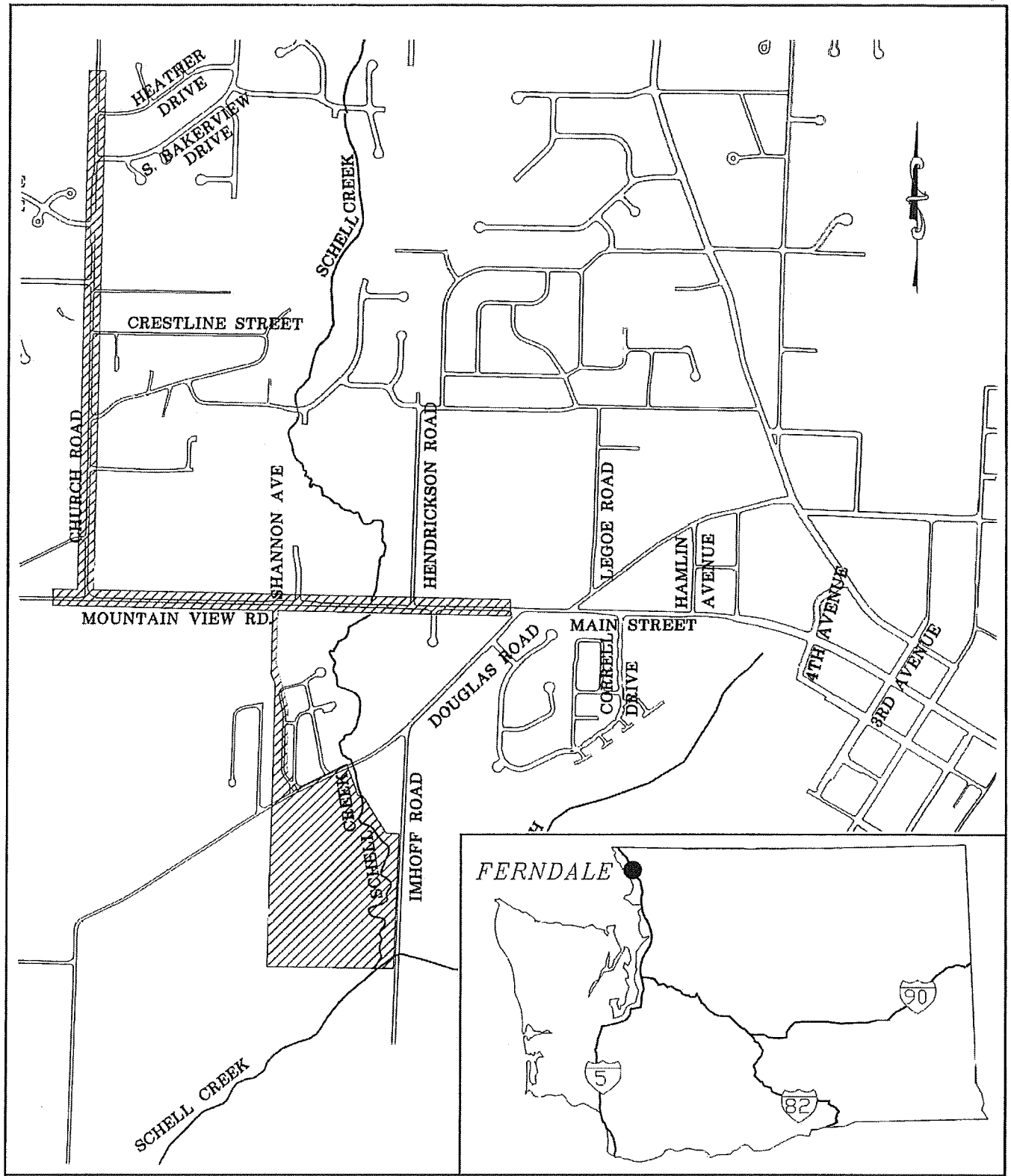
A copy of this letter without enclosures will be furnished to Mr. Ross Widener of Widener and Associates at 10108 32nd Avenue West, Suite D, Everett, Washington 98204. If you have any questions about this letter, please contact me at (360) 734-3156 or via email at randel.j.perry@usace.army.mil.

Sincerely,



Randel Perry, Project Manager
North Puget Sound Section

Enclosures



=PROJECT SITE

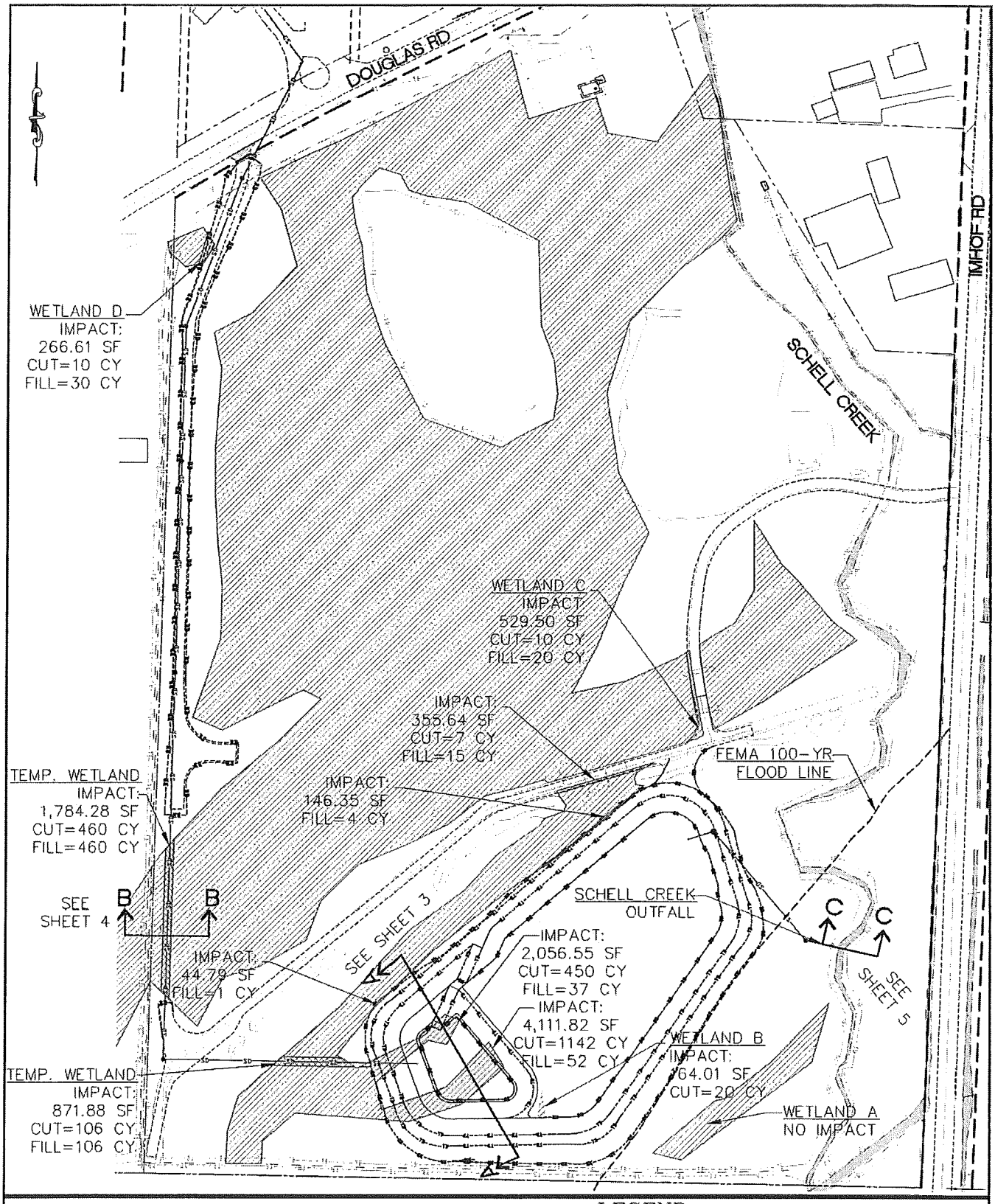
REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	1 OF 13
DATE:	1-3-12
DATUM:	NGVD29

VICINITY MAP

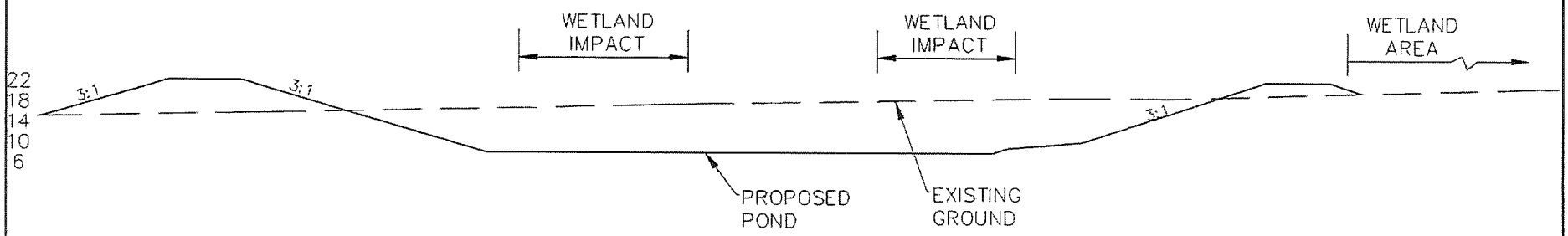
0 500 1000

1 inch = 1000 ft.

SECTION 30, 31, TWP. 38 N., RGE. 2 E., W.M.



Amended February 23, 2012

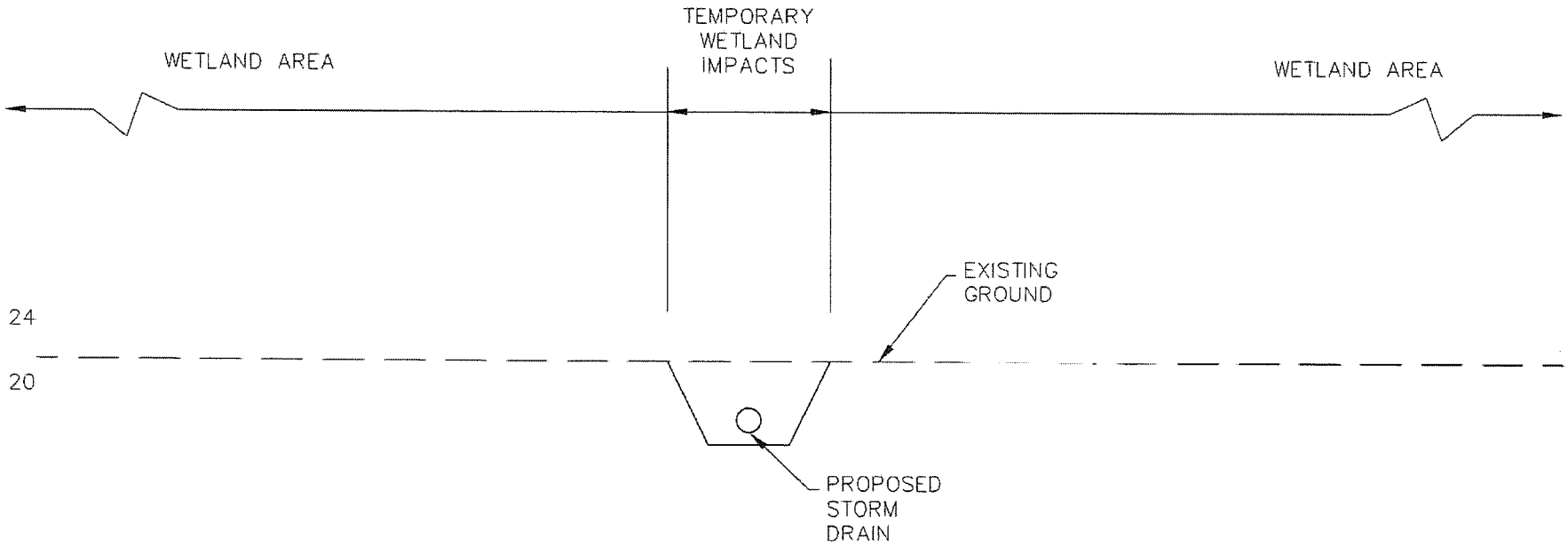


CROSS SECTION A-A
(AS SHOWN ON SHEET 2)

SCALE:
H: 1"=30' / V: 1"=30'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	3 OF 13
DATE:	2-18-12
DATUM:	NGVD29

Amended February 23, 2012

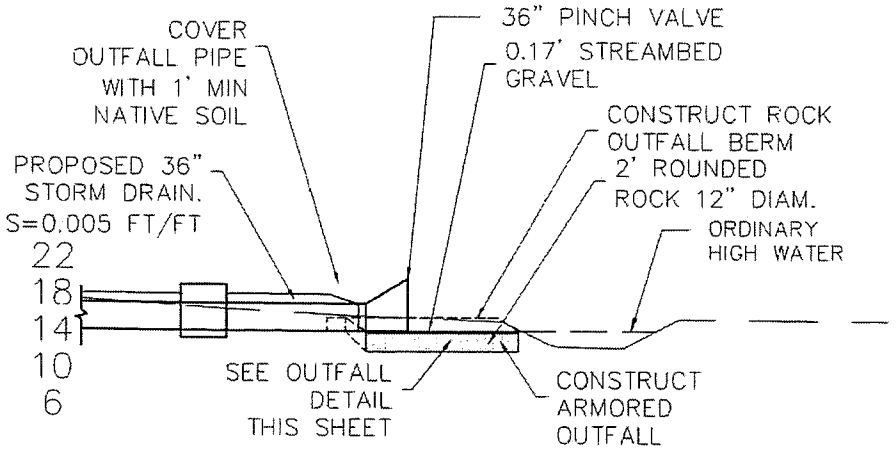


CROSS SECTION B-B
(AS SHOWN ON SHEET 2)

SCALE:
H: 1"=10' / V: 1"=10'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	4 OF 13
DATE:	2-18-12
DATUM:	NGVD29

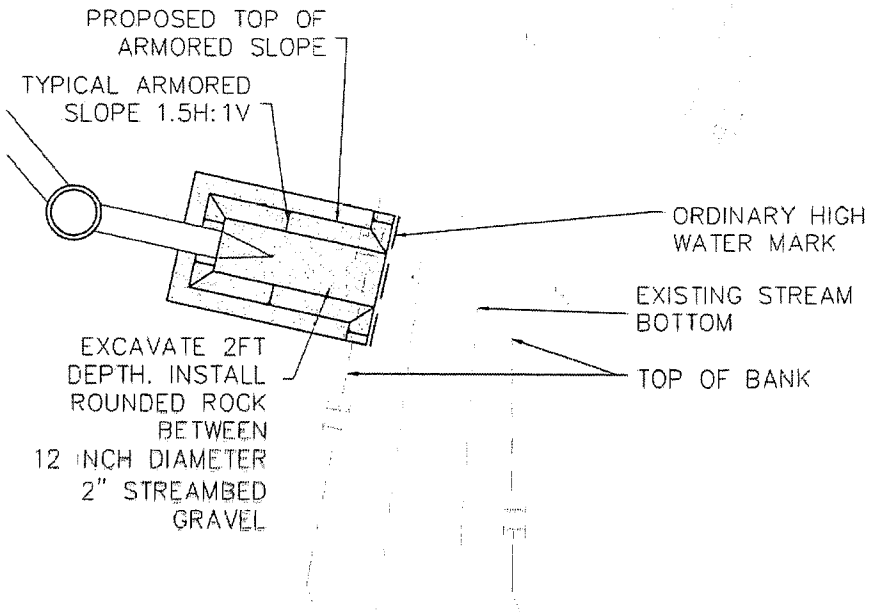
Amended February 23, 2012



CROSS SECTION C-C
(AS SHOWN ON SHEET 2)

SCALE:
H: 1"=20' / V: 1"=20'

NO IMPACTS WITHIN
ORDINARY HIGH WATER

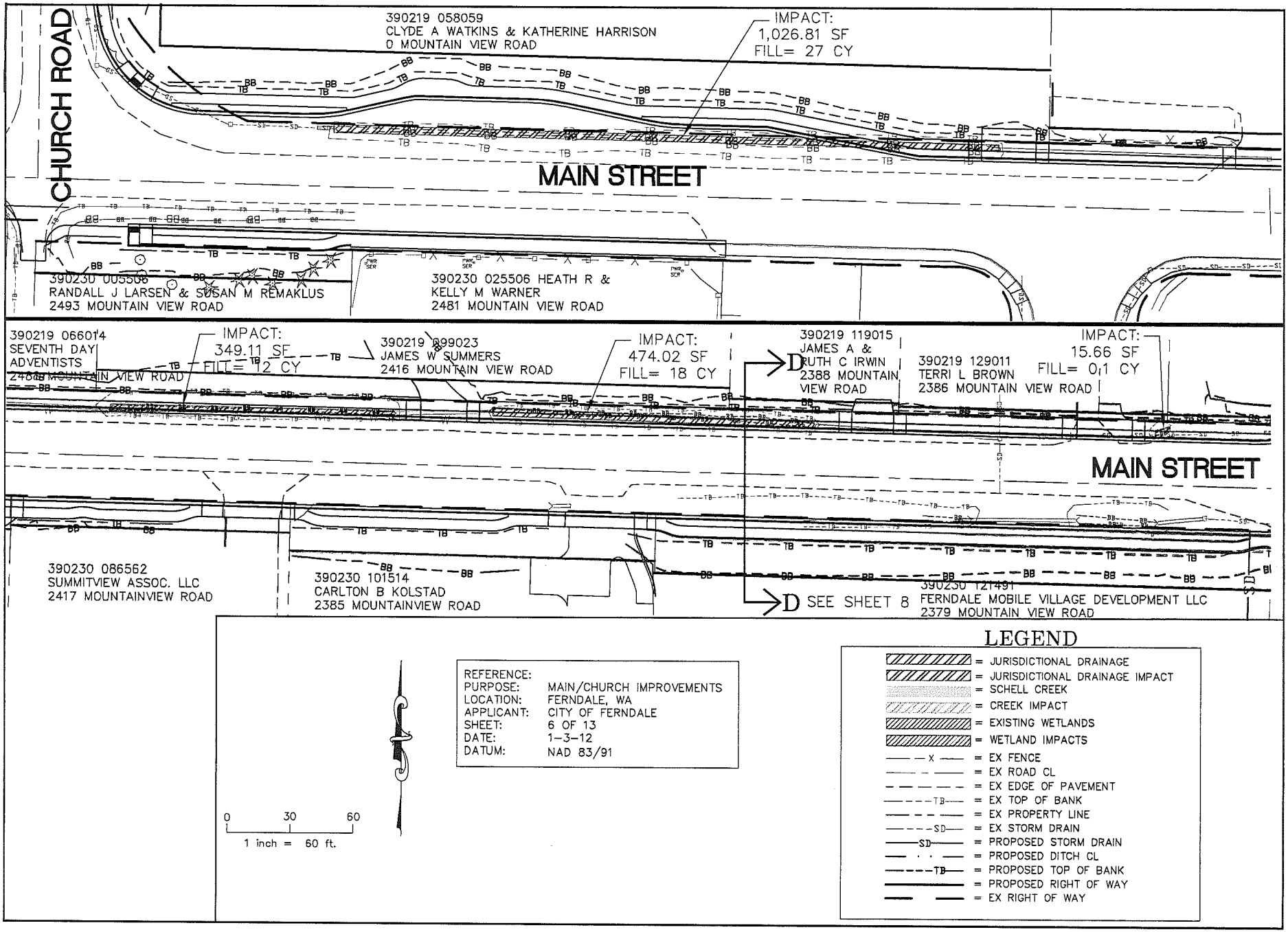


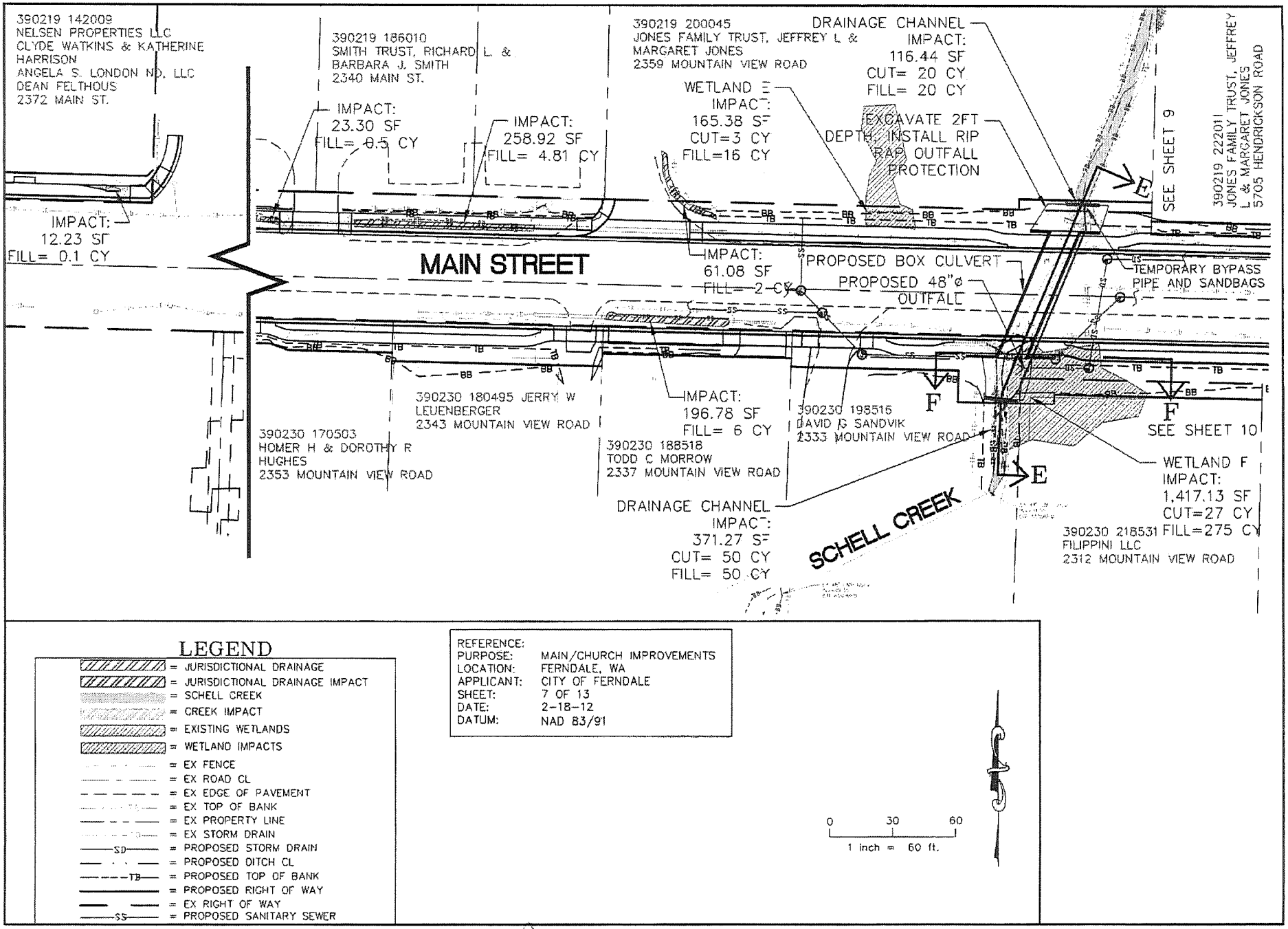
OUTFALL DETAIL

SCALE:
H: 1"=20'

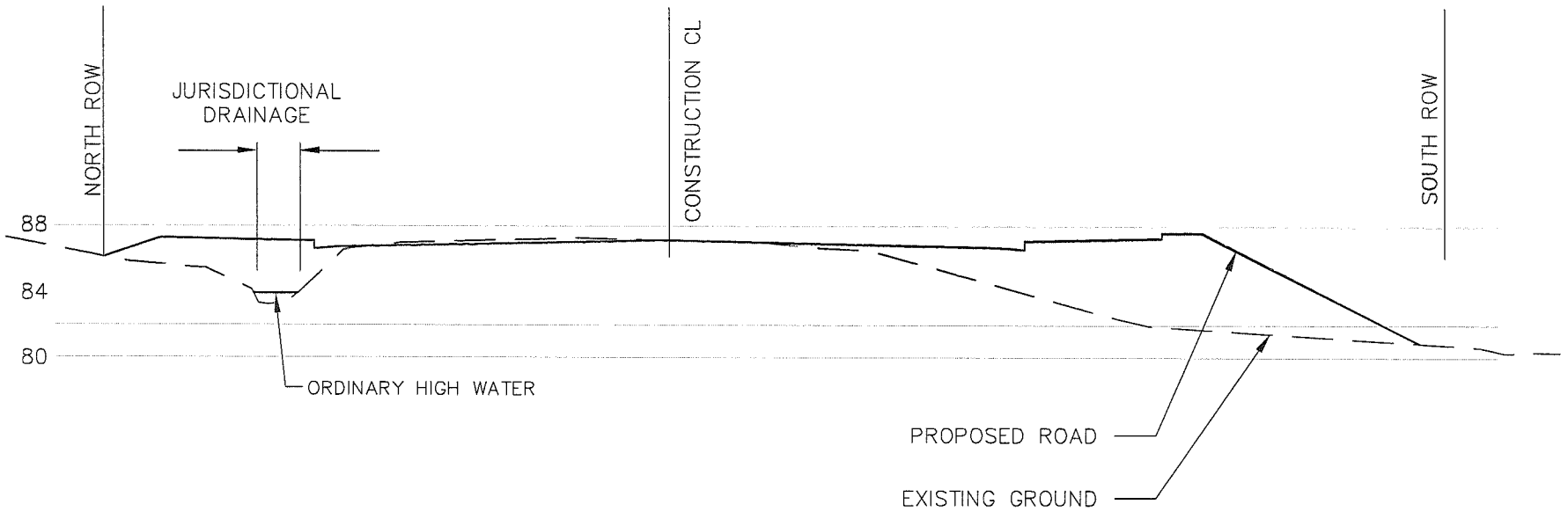
REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	5 OF 13
DATE:	2-21-12
DATUM:	NGVD29

Amended February 23, 2012


CHURCH ROAD
390219 058059
CLYDE A WATKINS & KATHERINE HARRISON
0 MOUNTAIN VIEW ROAD
IMPACT:
1,026.81 SF
FILL= 27 CY
MAIN STREET
390230 005506
RANDALL J LARSEN & SUSAN M REMAKLUS
2493 MOUNTAIN VIEW ROAD
390230 025506 HEATH R &
KELLY M WARNER
2481 MOUNTAIN VIEW ROAD
390219 066014
SEVENTH DAY
ADVENTISTS
2488 MOUNTAIN VIEW ROAD
IMPACT:
349.11 SF
FILL= 12 CY
390219 099023
JAMES W SUMMERS
2416 MOUNTAIN VIEW ROAD
IMPACT:
474.02 SF
FILL= 18 CY
390219 119015
JAMES A &
RUTH C IRWIN
2388 MOUNTAIN
VIEW ROAD
390219 129011
TERRI L BROWN
2386 MOUNTAIN VIEW ROAD
IMPACT:
15.66 SF
FILL= 0.1 CY
MAIN STREET
390230 086562
SUMMITVIEW ASSOC. LLC
2417 MOUNTAINVIEW ROAD
390230 101514
CARLTON B KOLSTAD
2385 MOUNTAINVIEW ROAD
D SEE SHEET 8
390230 121491
FERNDALE MOBILE VILLAGE DEVELOPMENT LLC
2379 MOUNTAIN VIEW ROAD
0 30 60
1 inch = 60 ft.
REFERENCE:
PURPOSE: MAIN/CHURCH IMPROVEMENTS
LOCATION: FERNDALE, WA
APPLICANT: CITY OF FERNDALE
SHEET: 6 OF 13
DATE: 1-3-12
DATUM: NAD 83/91
LEGEND
= JURISDICTIONAL DRAINAGE
= JURISDICTIONAL DRAINAGE IMPACT
= SCHELL CREEK
= CREEK IMPACT
= EXISTING WETLANDS
= WETLAND IMPACTS
= EX FENCE
= EX ROAD CL
= EX EDGE OF PAVEMENT
= EX TOP OF BANK
= EX PROPERTY LINE
= EX STORM DRAIN
= PROPOSED STORM DRAIN
= PROPOSED DITCH CL
= PROPOSED TOP OF BANK
= PROPOSED RIGHT OF WAY
= EX RIGHT OF WAY



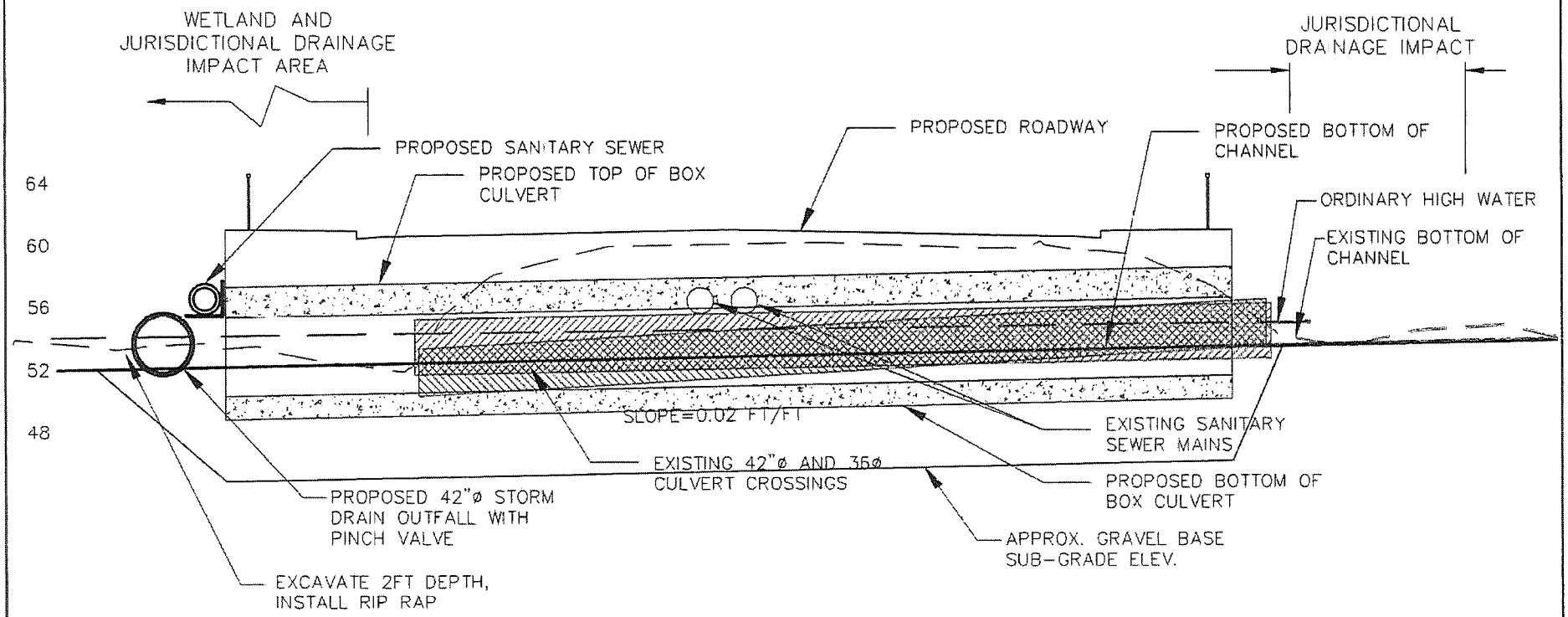
Amended February 23, 2012



CROSS SECTION D-D
(AS SHOWN ON SHEET 6)

SCALE:
H: 1"=10' / V: 1"=10'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	8 OF 13
DATE:	1-3-12
DATUM:	NGVD29

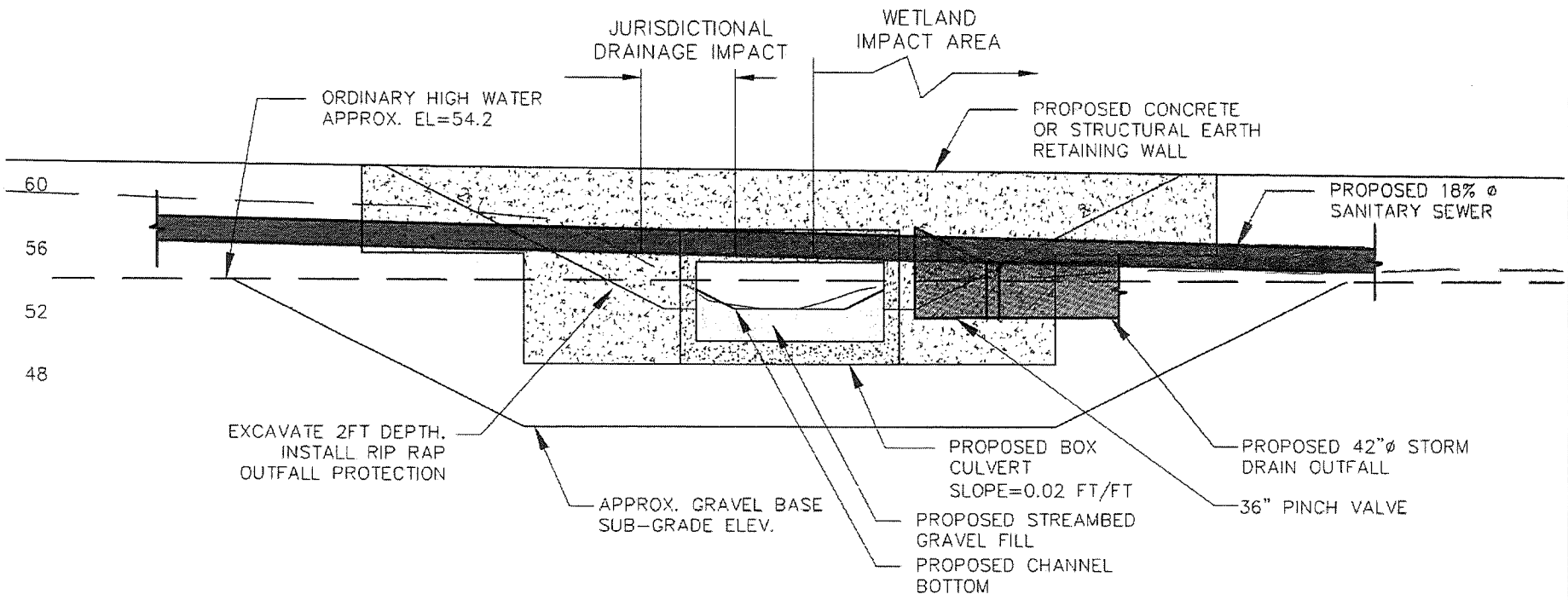


CROSS SECTION E-E
(AS SHOWN ON SHEET 7)

SCALE:
H: 1"=10' / V: 1"=10'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	9 OF 13
DATE:	2-18-12
DATUM:	NGVD29

Amended February 23, 2012

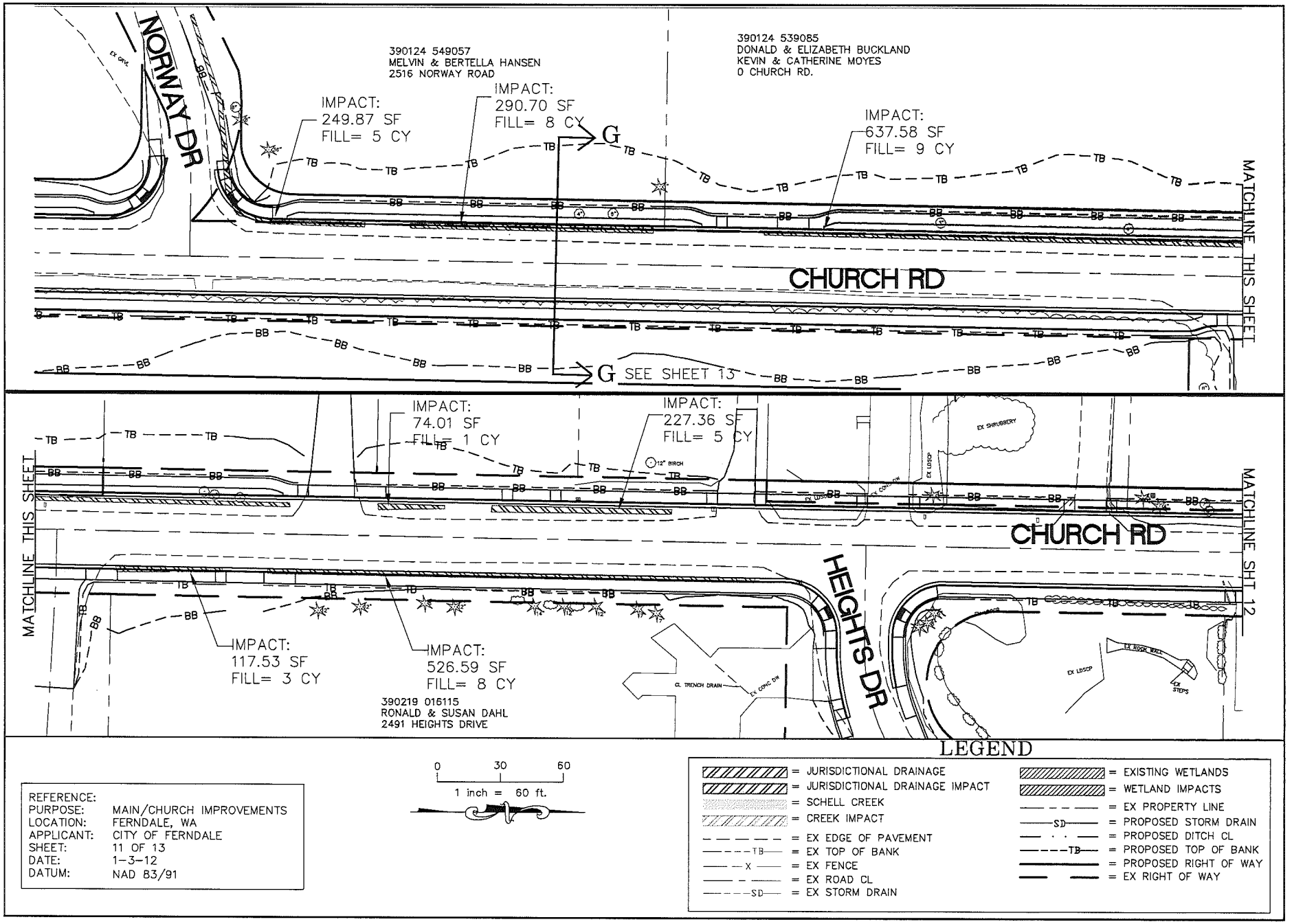


CROSS SECTION F-F
(AS SHOWN ON SHEET 7)

SCALE:
H: 1"=10' / V: 1"=10'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	10 OF 13
DATE:	2-18-12
DATUM:	NGVD29

Amended February 23, 2012

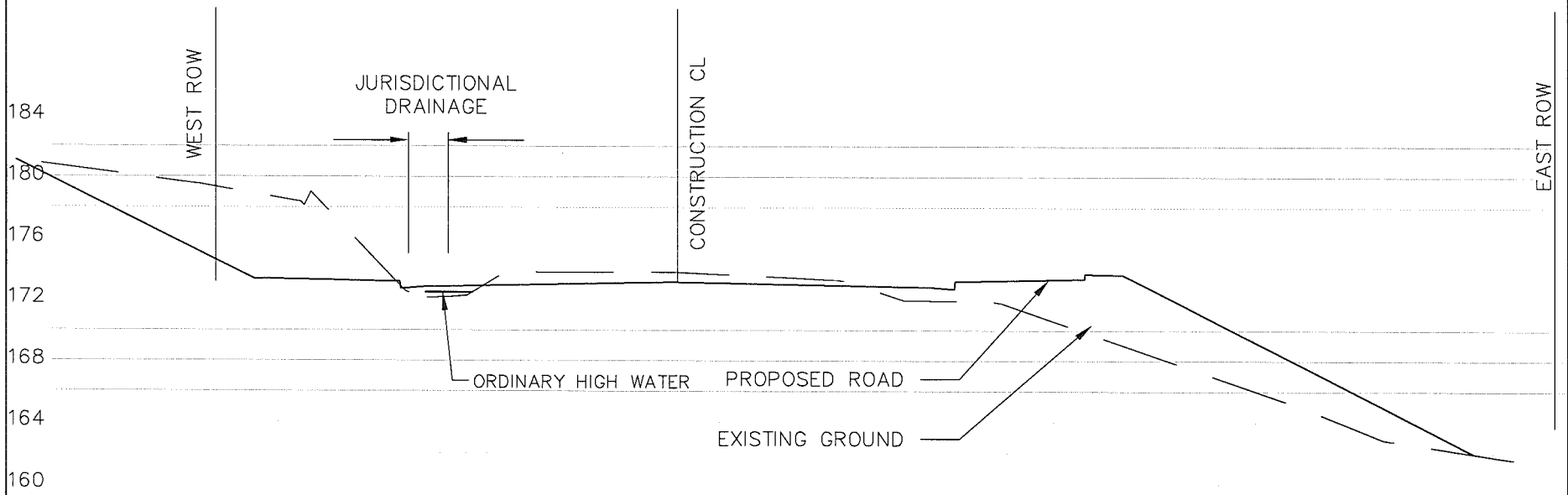


REFERENCE:
PURPOSE: MAIN/CHURCH IMPROVEMENTS
LOCATION: FERNDALE, WA
APPLICANT: CITY OF FERNDALE
SHEET: 11 OF 13
DATE: 1-3-12
DATUM: NAD 83/91

0 30 60
1 inch = 60 ft.

LEGEND

- = JURISDICTIONAL DRAINAGE
- = JURISDICTIONAL DRAINAGE IMPACT
- = SCHELL CREEK
- = CREEK IMPACT
- = EX EDGE OF PAVEMENT
- TB = EX TOP OF BANK
- X = EX FENCE
- = EX ROAD CL
- SD = EX STORM DRAIN
- = EXISTING WETLANDS
- = WETLAND IMPACTS
- = EX PROPERTY LINE
- SD = PROPOSED STORM DRAIN
- = PROPOSED DITCH CL
- TB = PROPOSED TOP OF BANK
- = PROPOSED RIGHT OF WAY
- = EX RIGHT OF WAY



CROSS SECTION G-G
(AS SHOWN ON SHEET 11)

SCALE:
H: 1"=10' / V: 1"=10'

REFERENCE:	
PURPOSE:	MAIN/CHURCH IMPROVEMENTS
LOCATION:	FERNDALE, WA
APPLICANT:	CITY OF FERNDALE
SHEET:	13 OF 13
DATE:	1-3-12
DATUM:	NGVD29

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

April 3, 2012

Ms. Janice Marlega
City of Ferndale
P.O. Box 936
Ferndale, Washington 98248

RE: U.S. Army Corps of Engineers Reference # NWS-2012-57, Main Street Church Road Improvements Project, City of Ferndale, Whatcom County, Washington

Dear Ms. Marlega:

On March 22, 2012, the Department of Ecology (Ecology) received the U.S. Army Corps of Engineers' letter dated March 16, 2012, approving coverage under Nationwide Permits (NWPs) #12, 14, and 43 for the above project. Ecology has determined that the above project meets the requirements for Washington State 401 Water Quality Certification and Coastal Zone Management Act Consistency under NWPs 12, 14, and 43. Therefore, an individual 401 certification will not be required for this project and you may proceed as directed by the Corps.

Any changes to your project that would impact water quality should be submitted in writing to Ecology before work begins for additional review.

This letter does not exempt you from other requirements of federal, state, and local agencies.

Please contact me at 425-649-7168 or susan.meyer@ecy.wa.gov if you have any questions regarding this letter.

Sincerely,

Susan Meyer

Susan Meyer, Wetland Specialist
Shorelands and Environmental Assistance Program

SDM:cja

e-cc: Randel Perry, Corps of Engineers
Ross Widener, Widener and Associates

APPENDIX J

GEOTECHNICAL DATA REPORT - FERNDALE REGIONAL STORMWATER DETENTION FACILITY

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REPORT
GEOTECHNICAL ENGINEERING SERVICES
FERNDALE REGIONAL STORMWATER
DETENTION FACILTY
FERNDALE, WASHINGTON

MARCH 7, 2007

FOR
RONALD T. JEPSON & ASSOCIATES

GeoEngineers

File No. 9201-002-00

GeoEngineers

March 7, 2007

Ronald T. Jepson & Associates
222 Grand Avenue, Suite C
Bellingham, WA 98225

Attention: Ben Wasson, P.E.

Subject: Report
Geotechnical Engineering Services
Ferndale Regional Stormwater Detention Facility
Ferndale, Washington
File No. 9201-002-00

We are pleased to submit three copies of our report, "Geotechnical Engineering Services, Ferndale Regional Stormwater Detention Facility, Ferndale, Washington." Our geotechnical services were completed in general accordance with our proposal dated September 14, 2006, which was authorized by you on September 18, 2006. Preliminary results of our study were discussed with the design team as information became available.

We appreciate the opportunity to work you on this project. Please call if you have any questions regarding this report.

Sincerely,

GeoEngineers, Inc.

J. Robert Gordon, PE
Principal

SWC:JRG:ims
BELL: P:\9\9201002\Working\920100200R.doc

Report
Geotechnical Engineering Services
Ferndale Regional Stormwater Detention Facilty
Ferndale, Washington
File No. 9201-002-00

March 7, 2007

Prepared for:

Ronald T. Jepson & Associates
222 Grand Avenue, Ste C
Bellingham, Washington 98225

Attention: Ben Wasson, P.E.

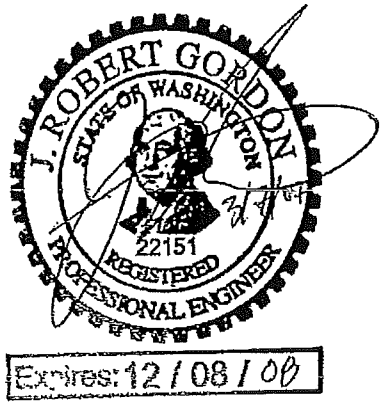
Prepared by:

GeoEngineers, Inc.
600 Dupont Street
Bellingham, Washington 98225
(360) 647-1510

GeoEngineers, Inc.

Sean W. Cool, PE
Geotechnical Project Engineer

J. Robert Gordon, PE
Principal



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List of Figures

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Page No.

APPENDICES

REPORT
GEOTECHNICAL ENGINEERING SERVICES
FERNDALE REGIONAL STORMWATER DETENTION FACILITY
FERNDALE, WASHINGTON
FOR
RONALD T. JEPSON & ASSOCIATES

INTRODUCTION AND SCOPE

This report presents the results of our geotechnical services for the proposed Ferndale Regional Stormwater Detention Facility to be located along Imhoff Road in Ferndale, Washington. A vicinity map showing the project location is provided in Figure 1 and the site and proposed pond geometry are shown in the Site and Exploration Plan, Figure 2. Our understanding of the project is based on the drawings provided, conversations with Ben Wasson of Ronald T. Jepson & Associates and Ron Fisher of Goldstar Enterprises, Inc., and our experience on similar projects and previous projects in the site area.

The purpose of our geotechnical engineering services was to explore subsurface soil and groundwater conditions at the site as a basis for presenting geotechnical conclusions and recommendations for dam embankment and pond design and construction. Our scope of services included excavating twelve test pits, completing laboratory testing on the samples obtained from the explorations, and providing geotechnical conclusions and recommendations for dam and pond design and construction. Our specific scope of services is described in our proposal for the project dated September 14, 2006.

PROJECT DESCRIPTION

The project will consist of constructing a large stormwater detention facility at the site to serve residential development in the project vicinity. The detention pond will be roughly 800 feet by 450 feet in plan dimension and have the capacity to store on the order of 30 acre-feet of water. Impoundments with water greater than 10 acre-feet at the embankment crest require design in accordance with Washington State's dam safety requirements as outlined in WAC 173-175 and as presented in the Washington State Department of Ecology (DOE) Dam Safety Guidelines.

The plan provided shows the pond to be partially excavated below the existing site grades on the north side and an embankment constructed on the south side, raised about 8 feet above existing site grades. The maximum berm cross-section occurs along the southwest portion of the pond embankment. Based on the conceptual design available at the time of this report, the critical pond elevations at the maximum berm cross-section are as follows:

Pond Feature	Elevation (ft)
Lowest Existing Ground Inside Pond	16
Lowest Ground Elevation, Base of Embankment	14
Proposed Pond Bottom	14
Bottom of Live Storage Elevation	14
Maximum Storage Elevation (assumed for berm stability only)	22
Top of Berm on South Side of Pond	22

IMPOUNDING BARRIER CLASSIFICATION

For the purpose of this evaluation, we have assumed that the pond berm meets the size classification of small dam with barrier hydraulic height of less than15 feet. Due to the intermittent nature and limited duration of reservoir exceeding levels above the dead storage elevation, we have assumed that the pond berm meets the reservoir operation classification of intermittent operation where the duration of normal high pool condition is insufficient for steady state seepage or saturated flow conditions to develop in the barrier, foundation, and abutments. It is our opinion that the downstream hazard potential of the completed structure is low with no population at risk, minimal economic loss to inhabited structures or agriculture and no environmental damage resulting from failure. Accordingly, we have assumed a "Design Step 1" for the geotechnical components of design. The Design Step was applied to the recurrence interval of seismic activity used in barrier stability analyses.

Size Classification	Small
Operation Classification	Intermittent
Hazard Potential	Low
Design Step	1

SITE CONDITIONS

SURFACE CONDITIONS

The project site is located within a broad, gently sloping to flat-lying area on the margins of the Nooksack River flop plain in Ferndale, Washington. The current land use is an agricultural site used for hay. The site is bordered to the east by Imhoff Road. A drainage area, vegetated with medium to large trees and shrubs, is located between Imhoff Road and the site area. A large residential project is underway to the west of the property. Residences are located north of the project area. A field with tall grasses and blackberry brambles is located to the south. A large mound of organic debris was located along the southwest section of the site at the time of our field observations.

GEOLOGY

We reviewed a U.S. Geologic Survey (USGS) geologic map for the project area, "Geologic Map of Western Whatcom County, Washington" by Don J. Easterbrook (1976). The project vicinity is mapped as alluvial deposits, terrace deposits, and Bellingham (glaciomarine) Drift.

The alluvial deposits consist of silt, sand, and gravel deposited in the Nooksack River floodplain. This unit is generally well stratified and sorted. The thickness can range from a few feet to 200 feet. The terrace deposits consist of well sorted and well stratified sand and gravel. The thickness of this unit is usually approximately 15 feet thick. The alluvial deposits and terrace deposits overly the Bellingham Drift. The Bellingham Drift consists of glaciomarine drift which is an unsorted, unstratified silt and clay with varying amounts of sand, gravel, cobbles and occasional boulders. Bellingham Drift is derived from sediment melted out of floating glacial ice that was deposited on the sea floor. This material locally contains shells and wood. Glaciomarine drift was deposited during the Everson Interstade approximately 11,000 to 12,000 years ago. This material is typically soft to medium stiff and has low shear strength high compressibility characteristics but can also be stiff to hard in the upper 5 to 15 feet as a result of desiccation or localized consolidation due to the grounding of glacial ice.

SUBSURFACE EXPLORATIONS

Subsurface soil and groundwater conditions were evaluated by excavating twelve test pits. Test pits TP-5 and TP-7 were field located but not excavated because of the uniformity of subsurface conditions. The test pits were completed to depths ranging from 11½ to 14 feet below the existing ground surface (bgs). The test pits were completed on September 18, 2006, using a track-mounted excavator provided by the owner. The approximate locations of the explorations are shown in Figure 2. Details of the field exploration program, laboratory testing, and the test pit logs are presented in Appendix A.

Subsurface Conditions

A topsoil layer consisting of brown silty fine sand was encountered in all twelve test pits. The thickness of the topsoil ranges from approximately ½ to 1½ feet. Light gray, medium stiff to stiff, fine sandy silt was encountered beneath the surficial topsoil. In test pit TP-4, a rust-brown fine to medium sand with silt was encountered to a depth of 3 feet bgs. These near-surface soils are interpreted to be alluvium or terrace deposits. The Bellingham glaciomarine drift unit was encountered at depths of 2 to 3 feet bgs. This unit typically consisted of stiff, gray-brown silty clay to clayey silt with varying amounts of sand and/or gravel. In test pits TP-4, TP-6, and TP-11, the drift grades to stiff, gray-brown clay at 10½, 9, and 10 feet respectively. In TP-4 and TP-11, clay with silt was encountered. In TP-6, clay with occasional fine gravel was observed. At some locations the glaciomarine drift graded to medium stiff with depth.

Groundwater Conditions

Groundwater seepage was not encountered within the depth of our explorations. Perched groundwater conditions typically develop within the upper, weathered soil horizons, or within more permeable sandy zones within the drift. The less permeable underlying unweathered silt or clay prevents vertical infiltration of the groundwater. Perched groundwater conditions tend to be more prevalent during the wetter times of the year and may not exist during the summer/early fall months. The regional groundwater table is interpreted to be slightly below the ground surface of the alluvial floodplain to the south, and at or near the elevation of the Nooksack River located to the east of the project site. Groundwater conditions should be expected to vary as a function of season, precipitation, and other factors.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

It is our opinion that subsurface conditions at the site are suitable for the proposed stormwater detention pond construction, provided the recommendations contained herein are incorporated into the project design. Typical stormwater detention pond construction will be suitable in most instances because of the limited height of the pond embankment and low downstream risk. The onsite glaciomarine drift will provide suitable material for homogeneous earthfill embankment construction but some of the material may require some moisture conditioning to achieve suitable compaction. Due to the fine grained nature of the embankment soils, we have recommended a slightly flatter outside berm gradient and sufficient erosion protection on the top and sides of the berm.

SITE SEISMICITY

The site is located within the Puget Sound region, which is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca and North American plates. The Juan de Fuca plate is subducting beneath the North American plate. It is thought that the resulting deformation and breakup of the Juan de Fuca plate might account for the deep focus earthquakes in the

region. Hundreds of earthquakes have been recorded in the Puget Sound area. In recent history, four of these earthquakes were large events: (1) in 1946, a Richter magnitude 7.2 earthquake occurred in the Vancouver Island, British Columbia area; (2) in 1949, a Richter magnitude 7.1 earthquake occurred in the Olympia area; (3) in 1965, a Richter magnitude 6.5 earthquake occurred between Seattle and Tacoma; and (4) in 2001, a Richter magnitude 6.8 earthquake occurred near Olympia.

Research is presently underway regarding historical large magnitude subduction-related earthquake activity along the Washington and Oregon coasts. Geologists are reporting evidence that suggests several large magnitude earthquakes (Richter magnitude 8 to 9) have occurred in the last 1,500 years, the most recent of which occurred about 300 years ago. No earthquakes of this magnitude have been documented during the recorded history of the Pacific Northwest. There are no known faults in proximity to the project site.

EMBANKMENT GEOMETRY AND ZONING

The proposed pond berm cross section is a homogeneous type earthfill embankment with 3H:1V (horizontal:vertical) interior slopes and 2½ H:1V maximum exterior slopes. The proposed embankment slopes are consistent with the recommended slopes for small homogeneous earthfill dams on stable foundations, constructed with silty (ML) or clayey (CL) soils, as outlined in the U.S. Bureau of Reclamation Design of Small Dams (1973). We recommend a crest width of 12 feet which is in general accordance the Bureau of Reclamations recommendations (W = H/5+10) and greater than the Dam Safety Guidelines quantity (W = 2*H½+3). For the purposes of this report the embankment height is defined as the height above the lowest existing ground surface at the toe of the embankment.

Earthfill Type	Homogeneous
Interior Slope	3H:1V
Exterior Slope	2½H:1V
Crest Width	12 feet
Cutoff/Keyway Trench Width	1.5*H (6 ft minimum)
Cutoff/Keyway Trench Depth	0.5*H (2 ft minimum)
Cutoff/Keyway Side Slopes	1H:1V

The recommended cutoff/keyway trench width and depth are after removal of any pervious granular deposits encountered at the ground surface. The recommended width and sideslopes are based in part on constructability with self-propelled heavy duty compactors, and on reducing arching of soils during trench compaction. A generalized embankment cross section is provided in Figure 3.

Based on the intermittent operation classification, it is our opinion that steady-state seepage will not develop at the high pool elevation. Therefore, we conclude that and that seepage control with a chimney drain, blanket drain, or toe drain will not be required as discussed in Dam Safety Guidelines, Volume 4, Chapter 3.3.

SEEPAGE CONTROL

At the time of this report, insufficient design had been completed to prepare specific recommendations regarding seepage control. As previously stated, it is our opinion that design features such as chimney drains, blanket drains, or toe drains are not deemed necessary to for control of embankment seepage. Other sources of seepage, such along conduit penetrations, would presumably be controlled by low

permeability soil collars around pipes. The native silty/clayey site soils will provide suitable low permeability pipe bedding. At the downstream end of the pipe, it may be necessary to configure the last few feet of the outfall so that it would allow seepage to emerge in a manner that would minimize any erosion of the embankment fill. Additional recommendations could be provided if necessary after further design of the pond and conduits has occurred.

EMBANKMENT EROSION CONTROL

We recommend that the newly constructed pond embankment be constructed to resist erosion on the side slopes and at the crest. The DOE Dam Safety Guidelines suggest that most earthen dams be protected from wave erosion with a rip-rap blanket that extends from the berm crest several feet below the normal low water line. Due to the small size of the dam, we conclude that other erosion control measures to protect from wave action are also acceptable. The Dam Safety Guidelines suggest that erosion protection on the outside slope and at the slope crest may consist of native vegetative grass or sparse shallow rooted trees or low growing brush, provided the vegetation does not hinder inspection of the berm. If the pond berm will be used for vehicular access, the crest should be protected with a layer of granular surfacing to resist erosion and rutting.

In our opinion, vegetation can be established to provide suitable erosion protection on the inside and outside of the pond embankment. The structural fill used to construct the new embankment will not provide a good growing medium for new vegetative cover. Therefore we recommend that a 6-inch layer of topsoil be placed at the face of the new embankment. The topsoil must be protected against erosion from runoff. This is typically done by hydroseeding the slopes and allowing the vegetation to become established. It is unlikely that the topsoil will remain in place long enough for vegetation to establish and provide adequate erosion protection. It is also our experience that if hydroseeding is completed after about September 15, there is not sufficient time for germination and adequate growth before the wet season begins. Therefore, we recommend that an erosion control product be applied unless the geotechnical engineer agrees that vegetation is adequately established before the wet season.

BARRIER STATIC STABILITY

Global stability analyses were preformed on the critical section of the embankment at the maximum embankment height along the south berm. A computer slope stability program was used to determine factors of safety for the global stability of the berm section under static conditions. The limit equilibrium based computer stability program was used to randomly generate and evaluate circular failures within the area of interest on both internal and external berm surfaces using the simplified Bishop's method of slices. Three cases were evaluated in the following sections. Soil parameters for the pond embankment and native soils are provided below. The strength parameters are conservative values based on many years of experiences and previous laboratory testing of the glaciomarine drift soils.

Soil Unit	Unit Weight (pcf)	Friction Angle (deg)	Cohesion (psf)
Reworked glaciomarine drift	120	0	800
Stiff undisturbed glaciomarine drift	125	0	1250
Medium stiff undisturbed glaciomarine drift	120	0	800

Case 1 – End of Construction

This case models the end of construction conditions prior to filling the pond. The existing groundwater table was assumed to be below the proposed pond bottom. The pond berm was assumed to be well-compacted sandy silt and clay constructed over medium stiff to stiff glaciomarine drift. The analyses

indicate that the global stability under static conditions has a minimum factor of safety in excess of 5 for the inside and outside of the pond berm. The recommended minimum factor of safety is 1.3 for this condition.

Case 2 – Steady-State Seepage with Maximum Storage Pool

In our opinion steady-state seepage will likely not develop in the pond berm and modeling this case is a conservative estimate of pond stability. The phreatic surface modeled in the stability analysis was estimated based on typical geometry of steady-state conditions in a homogenous embankment. Detailed hydrologic modeling to determine this surface was not conducted. The analyses indicate that the global stability under static conditions has a minimum factor of safety in excess of 5 on the inside and outside of the pond berm. The recommended minimum factor of safety is 1.5 for this condition.

Case 3 – Sudden Drawdown from Maximum Pool

As with Case 2, it is our opinion that steady-state seepage will likely not develop in the pond berm. This case, however, represents conditions on the inside of the pond berm fairly well, where saturated conditions may have developed on the inner portion of the berm during a temporary high pool stage. The analyses indicate that the global stability under static conditions has a minimum factor of safety in excess of 5 on the inside and outside of the pond berm. The recommended minimum factor of safety is 1.0 for this condition.

BARRIER SEISMIC STABILITY

The potential effect of seismic loading on the global stability of the embankment was analyzed assuming a peak horizontal ground acceleration of 0.24g for a seismic event with a probability of exceedance of 10 percent in a 50 year period (USGS 2002) representing a 1-in-475 year event (approximately Design Step 1). The horizontal forces developed during earthquake shaking were represented by a "pseudo-static" seismic coefficient, k_h. The horizontal acceleration used in seismic stability analysis for natural soil slopes is typically assumed to be approximately one-half of the free-field acceleration. Accordingly, the seismic coefficient used in our stability analysis of the berm was 0.12g. Pseudo-static seismic analysis was only conducted on Case 2 as described above. Case 1 and Case 3 are temporary/infrequent conditions unlikely to be present in the pond berm at the same time as an earthquake. However, the very high static safety factors indicate the seismic response will also have adequate safety factors.

Case 2 – Steady-State Seepage with Maximum Storage Pool

In our opinion steady-state seepage will likely not develop in the pond berm and modeling this case is a conservative estimate of pond stability. The analyses indicate that the global stability under seismic conditions had a minimum factor of safety in excess of 5 on the inside of the pond berm and 4.1 on the outside of the pond berm. It is common geotechnical practice to use a minimum factor of safety of 1.1 for global slope stability under seismic conditions.

Embankment Deformation

Due to the relatively low height of the pond berm, and clayey embankment material, it is our opinion that any embankment deformation under a seismic event will be minor and that this analysis is not necessary.

Seismically Induced Soil Liquefaction

Hazards associated with earthquake induced soil liquefaction are considered negligible in the project vicinity. Soils susceptible to soil liquefaction include loose, generally granular soils below the water

table. The stiff, fine-grained nature of the native soils encountered in our explorations is not susceptible to liquefaction. We have evaluated deeper explorations in the project vicinity indicating that the glaciomarine drift unit is very thick. Other earthquake hazards, such as earthquake induced lateral spreading and earthquake-induced landsliding are also considered negligible at the site.

EARTHWORK RECOMMENDATIONS AND SPECIFICATIONS

SITE PREPARATION AND EARTHWORK

The pond berm bearing footprint should be prepared by removing all significant accumulations of organics. The organic rich topsoil encountered in the site explorations was typically less than 18 inches thick. For planning purposes, we also recommend including removal of the light gray, inorganic, medium stiff sandy silt terrace deposit within the embankment footprint. However, depending on conditions encountered at the time of construction, portions of this unit may be of suitable density/consistency to be left in place. It may also be possible to scarify and recompact this unit. Prior to placement of any structural fill, the exposed subgrade under the berm footprint should be recompacted to a dense and unyielding condition and proof rolled with a loaded dump truck, large self-propelled vibrating roller, or equivalent piece of equipment. The purpose of this effort is to identify possible loose or soft soil deposits, recompact the soil exposed during site excavation activities, and establish a stable subgrade for the proposed pond embankment.

Proof rolling should be carefully observed by qualified geotechnical personnel. Areas exhibiting significant deflection, pumping, or over-saturation that cannot be readily compacted should be overexcavated to firm soil. Overexcavated areas should be backfilled with compacted embankment material placed in accordance with subsequent recommendations for structural fill. During periods of wet weather, proof rolling could damage the exposed subgrade. Under these conditions, qualified geotechnical personnel should observe subgrade conditions to determine if proof rolling is feasible.

KEYWAY/CUT-OFF TRENCH CONSTRUCTION

After stripping existing topsoil and prior to construction of the pond embankment, a suitable keyway should be excavated along the alignment of the pond berm. The keyway should be excavated into undisturbed native glaciomarine drift typically encountered 2 to 3 feet below existing site grades. The depth of the keyway should be approximately one-half of the berm height and extend a minimum of two feet into the stiff portion of the glaciomarine drift. Where berm heights are lower, such a where the berm meets the existing slope, the minimum key depth should be 2 feet. We recommend a minimum keyway width of approximately 1½ times the embankment height. We recommend a minimum keyway width of 6 feet with side slopes not steeper than 1H:1V to allow for suitable compaction.

EMBANKMENT FILL AND COMPACTION

Embankment structural fill used to construct the pond berm must be properly placed and compacted. In general, non-organic portions of the native glaciomarine drift should be feasible for use in embankment construction provided the material has a proper moisture content prior to placement and compaction. Any cobbles or other material greater than about 6 inches in diameter should be removed if the existing onsite soil is to be reused for structural fill. Excavated site material containing topsoil, wood, trash, organic material, or construction debris will not be suitable for reuse as structural fill and should be properly disposed offsite or placed in nonstructural areas. The organic topsoil encountered in the site explorations was typically less than 18 inches thick.

Based on the current design, the pond berm will be constructed of onsite, reworked glaciomarine drift placed in a manner to create a homogeneous (unzoned) earthfill dam. Glaciomarine drift encountered during the exploration program typically consisted of sandy clayey silt to sandy silty clay with nominal gravel content. According to the Department of Ecology *Stormwater Management Manual* (2005), the berm embankment should be constructed of soils with roughly the following characteristics per the United States Department of Agriculture's Textural Triangle (i.e. the portion of the sample passing the U.S. No. 10 sieve): a minimum of 20% silt and clay, a maximum of 60% sand, a maximum of 60% silt, with nominal gravel and cobble content. The glaciomarine drift soils encountered during our exploration program generally met these criteria as shown in Figures A-14 through A-16 (63 to 100% fines).

Stability of the berm will depend on creating a homogeneous mass without zones of preferential seepage. Accordingly, if excavation of site soils to be used in the embankment construction encounters zones of soil that have limited fines content, the soil should be separated out and not used or thoroughly mixed with other onsite soils to create a homogeneous mixture that meets the above gradation criteria. If insufficient site soil is available onsite, imported embankment fill should be evaluated prior to construction to ensure it meets the above guidelines and is compatible with onsite soils.

Moisture contents of the soil samples recovered from the test pits extending into the glaciomarine drift were typically in the range of 20 to 30 percent of the dry weight. Based on previous experience, the optimum moisture content is likely in the range of 12 to 16 percent. Therefore, the moisture contents of most of the soil samples were at or above the estimated ranges of optimum moisture contents. Accordingly, portions of the site soils may require aeration to achieve suitable compaction if used as structural fill within the pond berm. Typically, those soils with a moisture content greater than 3 to 5 precent over optimum will need to be aerated.

Structural fill for the pond embankment should be placed in horizontal lifts approximately 8 to 10 inches in loose thickness and thoroughly compacted. All structural fill for the pond embankment should be compacted to between 90 and 92 percent of the maximum dry density, as determined using test method ASTM D 1557, modified Proctor. For berm construction the embankment soils should be placed and compacted within about -1 to +5 percent of the optimum moisture, with +1 to +3 percent being preferred. Soil outside of this range of moisture should be moisture conditioned as necessary prior to compaction.

Compaction may be achieved with either a large vibratory smooth drum roller or a sheepsfoot roller. A sheepsfoot roller is typically desirable for embankment compaction of fine-grained material because of the kneading action provided along with the pressure. Smooth drum rollers will be appropriate for finish grading and to seal the site prior to inclement weather. The appropriate lift thickness will depend on the material and the compaction equipment being used. Loose lift thicknesses of 8 to 10 inches are typical when using a smooth drum roller. When using a sheepsfoot roller, the lift thickness should not exceed the length of the projections on the roller. We recommend that the suitability of fill gradation, lift thickness, and compaction be regularly tested during construction of the pond berm. A construction inspection plan is provided in the following section.

Embankment Fill Soil	USDA - 20% min silt/clay; 60% max sand; 60% max silt
Lift Thickness	8 to 10 Inch Loose Lifts or Length of Sheepsfoot Projections
Compaction	90 to 92% Modified Proctor (ASTM D1557)
Moisture Condition	-1 to + 5 % Optimum

WET WEATHER EARTHWORK

As described above, the onsite soils are moisture sensitive and over optimum. The silty and clayey soil at the site is particularly susceptible to degradation during wet weather. As a result, it may be difficult or impossible to maintain proper moisture content of the site soils during the wet season. If fill is to be placed or earthwork is to be performed in wet weather or under wet conditions, the contractor may reduce soil disturbance by:

- Limiting the site of areas that are stripped of topsoil and left exposed.
- Accomplishing earthwork in small sections.
- Limiting construction traffic over unprotected soil.
- Sloping excavated surfaces to promote runoff.
- Limiting the size and type of construction equipment used.
- Removing wet surficial soil prior to commencing fill placement each day.
- Sealing the exposed ground surface by rolling with a smooth drum compactor or rubber-tire roller at the end of each working day.
- Providing upgradient perimeter ditches or low earthen berms and using temporary sumps to collect runoff and prevent water from ponding and damaging exposed subgrades.
- We recommend full-time construction monitoring by GeoEngineers if earthwork proceeds during in wet weather because of quality control difficulties using local clayey soils.

DESIGN REVIEW AND CONSTRUCTION INSPECTION PLAN

GeoEngineers recommends that a geotechnical engineer familiar with the project design review the earthwork portions of the design drawings and specifications. The purpose of the review is to verify that the recommendations presented in this report have been properly interpreted and incorporated in the design and specifications.

We recommend that geotechnical construction monitoring services be provided. These services should include observation and testing by geotechnical personnel during fill placement/compaction activities and subgrade preparation operations to verify that design subgrade conditions are obtained beneath the proposed pond berm. The purpose of these services would be to observe compliance with the design concepts, specifications, and recommendations of this report, and in the event subsurface conditions differ from those anticipated before the start of construction, provide revised recommendations appropriate to the conditions revealed during construction. GeoEngineers would be pleased to provide these services for you.

At a minimum, GeoEngineers recommends the following construction inspection during earthwork portions of embankment construction.

Prior to construction	**Moisture-density relationship testing (Proctor test) on 3 to 5 samples of embankment material to establish maximum dry density.**
Minimum twice daily	Inspection and evaluation of subgrade conditions during stripping within the berm embankment.
Minimum twice daily	Evaluation of keyway construction.
Continuous	Monitoring, density testing, and documentation during initial keyway and embankment compaction. Assist with establishing loose lift thickness, number of passes with compaction equipment, and need for moisture conditioning.
Minimum once daily or as necessary	Monitoring, density testing, and documentation after initial compaction methods are established.
As necessary	Re-evaluation of embankment fill materials and erosion protection after completion.

LIMITATIONS

We have prepared this report for the exclusive use of Ronald T. Jepson & Associates and their authorized agents for the proposed Ferndale Regional Stormwater Detention Facility in Ferndale, Washington.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to the appendix titled Report Limitations and Guidelines for Use for additional information pertaining to use of this report.

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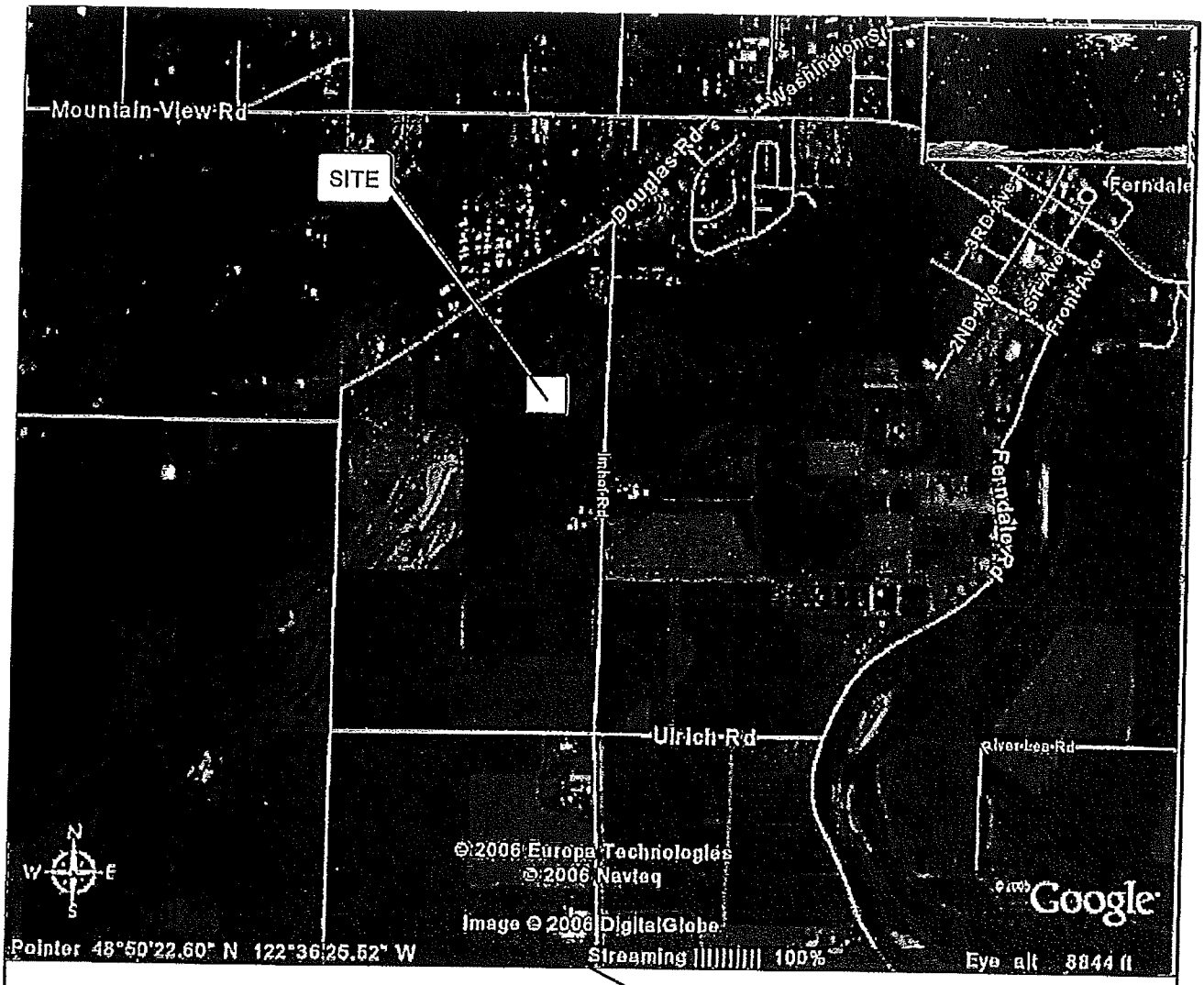

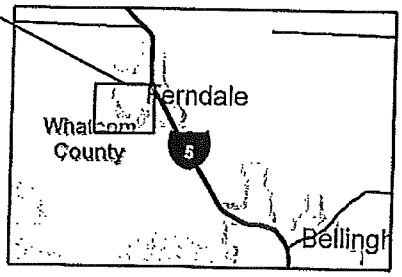

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SCALE APPROXIMATE

Notes:

1. All locations and features shown are approximate.
2. This drawing is for informational purposes. It is intended to assist in showing features discussed in an attached document. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Vicinity Map

Ferndale Regional Stormwater Detention Facility
Ferndale, Washington

GeoEngineers | Figure 1

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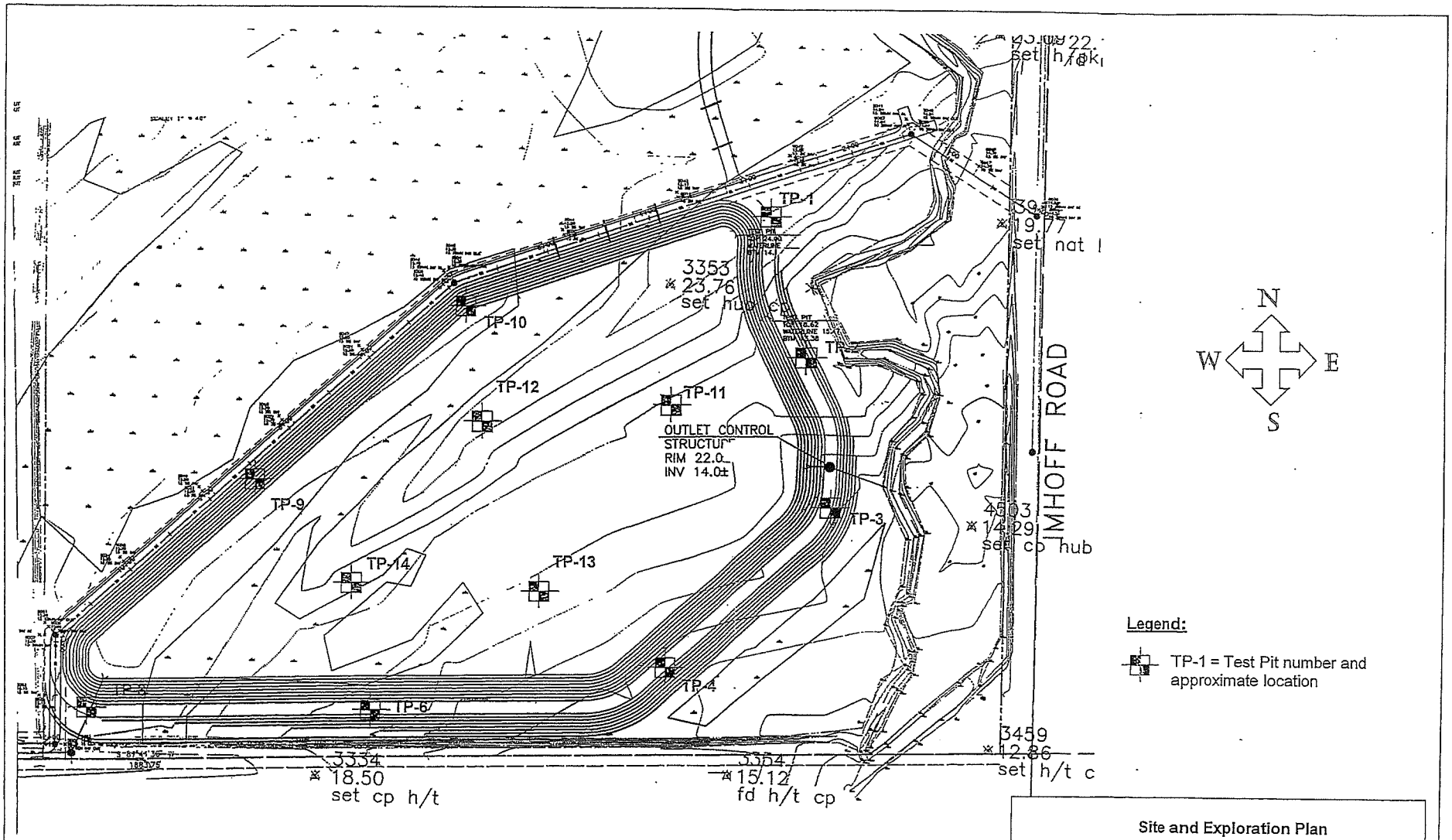

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Reference: Base drawing provided by Ronald T. Jepson & Associates, Bellingham, Washington

Site and Exploration Plan

Ferndale Regional Stormwater Detention Facility
Ferndale, Washington

GeoEngineers | Figure 2

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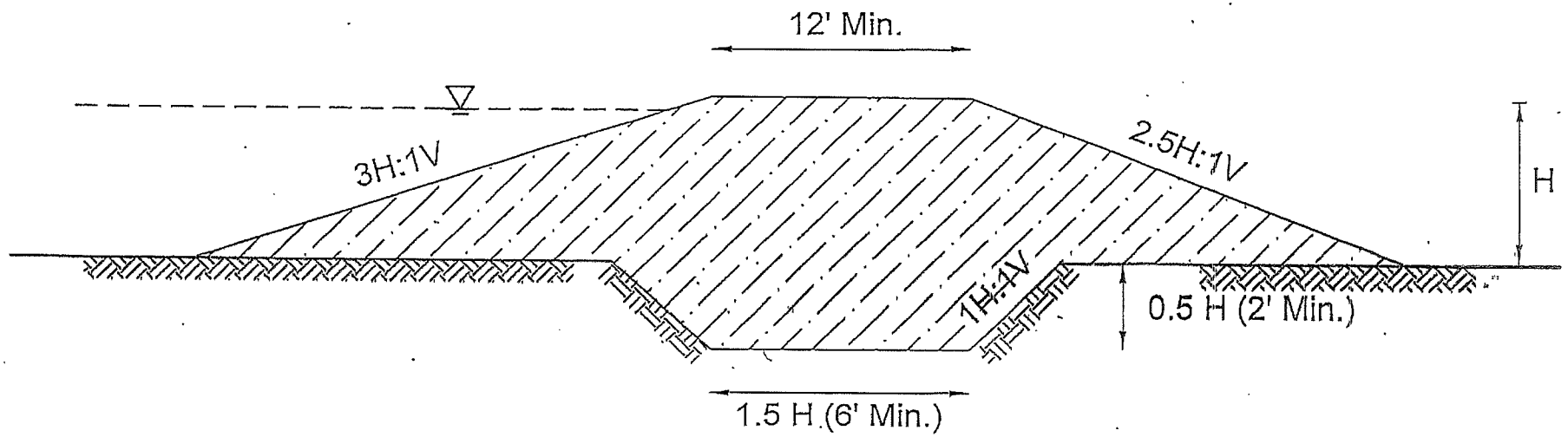

Not to Scale

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Drawing by GeoEngineers, Inc.

Typical Pond Embankment Cross Section

Ferndale Regional sotrmwater Detention Facility, Ferndale, Washington

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Figure 3

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APPENDIX A
FIELD METHODS AND LABORATORY TESTING

APPENDIX A
FIELD METHODS AND LABORATORY TESTING

FIELD EXPLORATIONS

Subsurface conditions for the proposed detention facility were explored by excavating twelve test pits (TP-1 - TP-4, TP-6, and TP-8 - TP-14). Two additional test pits (TP-5 and TP-7) were field located but not excavated because of the uniformity of subsurface conditions. The test pits were completed using an excavator supplied by the owner. The approximate locations of the explorations are shown in the Site and Exploration Plan, Figure 2. The locations of the explorations were determined by pacing and measuring from existing features using a 100-foot measuring tape. Therefore, the locations shown in Figure 2 should be considered approximate.

Soil samples were obtained from the bucket of the excavator and the sidewalls of the test pits. The samples were placed in plastic bags to maintain the moisture content and transported back to our laboratory for analysis and testing.

The test pits were continuously monitored by an engineering geologist from our firm who examined and classified the soils encountered, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each exploration. Soils encountered were classified visually in general accordance with ASTM D-2488-90, which is described in Figure A-1. An explanation of the symbols for the test pits is also shown in Figure A-1.

The logs of the test pits are presented in Figures A-2 through A-13. The exploration logs are based on our interpretation of the field and laboratory data and indicate the various types of soils encountered. It also indicates the depths at which these soils or their characteristics change, although the change might actually be gradual. If the change occurred between sample intervals the contact was interpreted.

LABORATORY TEST RESULTS

Representative laboratory testing was completed on selected samples from the explorations. The testing consisted of moisture content determinations and particle size analyses. The results of the laboratory tests are summarized on the test pit logs and on the Sieve Analysis Results, figures A-14 through A-16.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES
				SP	POORLY-GRADED SANDS, SAND-GRAVEL MIXTURES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	CC	Cement Concrete
	AC	Asphalt Concrete
	CR	Crushed Rock/ Quarry Spalls
	TS	Topsoil/ Forest Duff/Sod

- Measured groundwater level in exploration, well, or piezometer
- Groundwater observed at time of exploration
- Perched water observed at time of exploration
- Measured free product in well or piezometer

Graphic Log Contact

- Distinct contact between soil strata or geologic units
- Approximate location of soil strata change within a geologic soil unit

Material Description Contact

- Distinct contact between soil strata or geologic units
- Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

- 2.4-inch I.D. split barrel
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

A "P" indicates sampler pushed using the weight of the drill rig.

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE A-1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 23

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0	☒	1		SM	Brown silty fine sand with rootlets (medium dense, moist) (topsoil)	16	
					ML	Light gray fine sandy silt (medium stiff to stiff, moist) (alluvium/terrace deposits)		
		☒	2				14	
					ML/CL	Gray-brown sandy clayey silt to silty clay with occasional gravel (stiff, moist) (glaciomarine drift)		
20		☒	3				24	
	5					- becomes very stiff, blocky		
		☒	4					
15								
		☒	5				23	SA, %F=68
	10							
		☒	6					
10						No groundwater seepage observed No caving observed		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6 GTTPIT P:\9\9201002\00\WORKING\9201002 00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-1

GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-2
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 18.5

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0	☒	1		SM	Brown silty fine sand with rootlets (medium dense, moist)		
					ML	Light gray fine sandy silt (stiff, moist) (alluvium/terrace deposits)		
		☒	2				9	
					ML/CL	Gray-brown fine sandy clayey silt to silty clay and occasional gravel (stiff, moist) (glaciomarine drift)		
		☒	3				20	
15								
	5							
		☒	4			- clay content increases	17	
10								
		☒	5			- becomes moist to wet, no apparent seepage		
	10							
		☒	6				20	
5						No groundwater seepage observed No caving observed		
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V:\S_GTTPIT P:\9\9201002\00\WORKING\9220100200 TP-GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-2

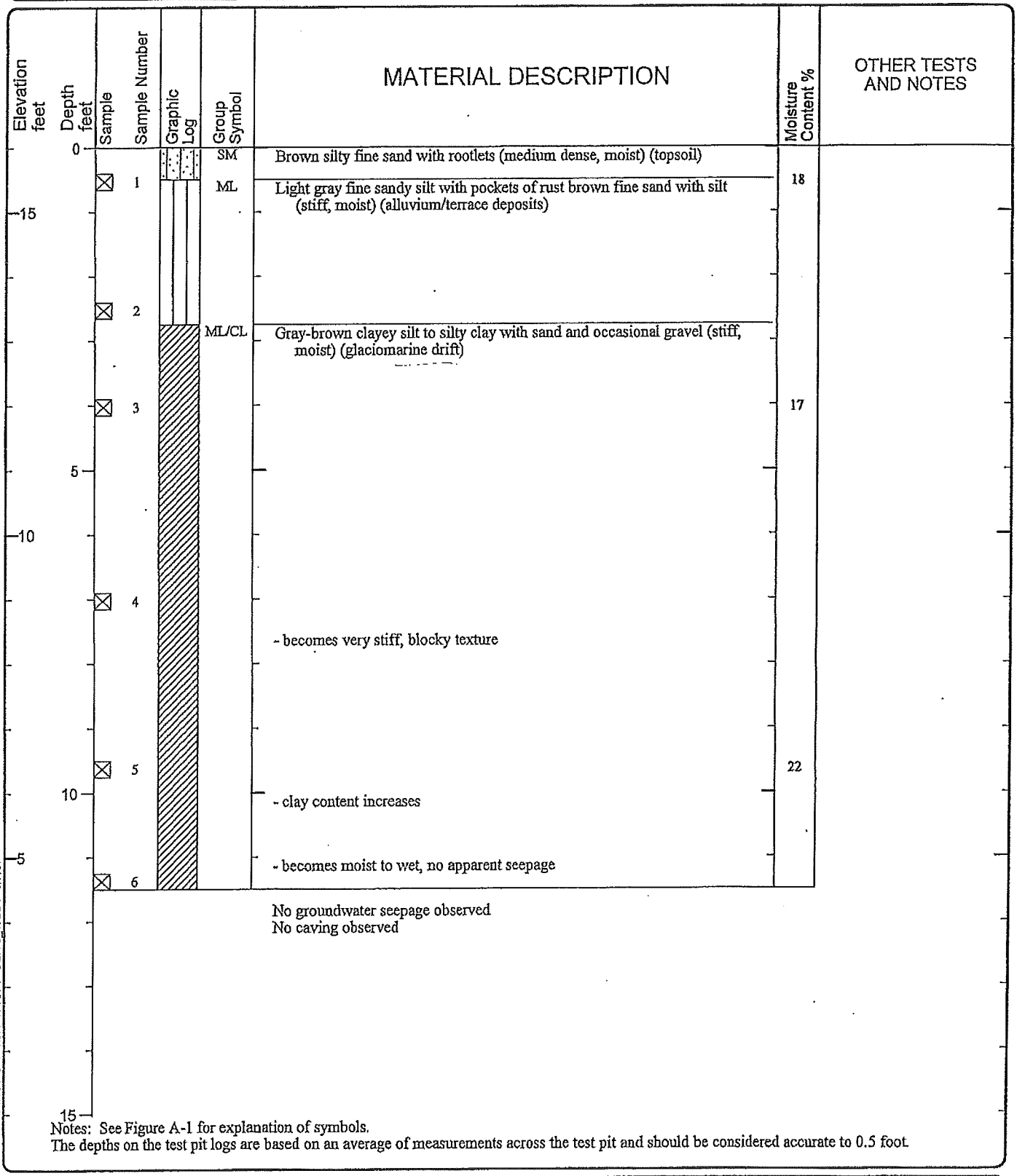
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-3
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 16



No groundwater seepage observed
No caving observed

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002\00\WORKING\9201002\00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-3

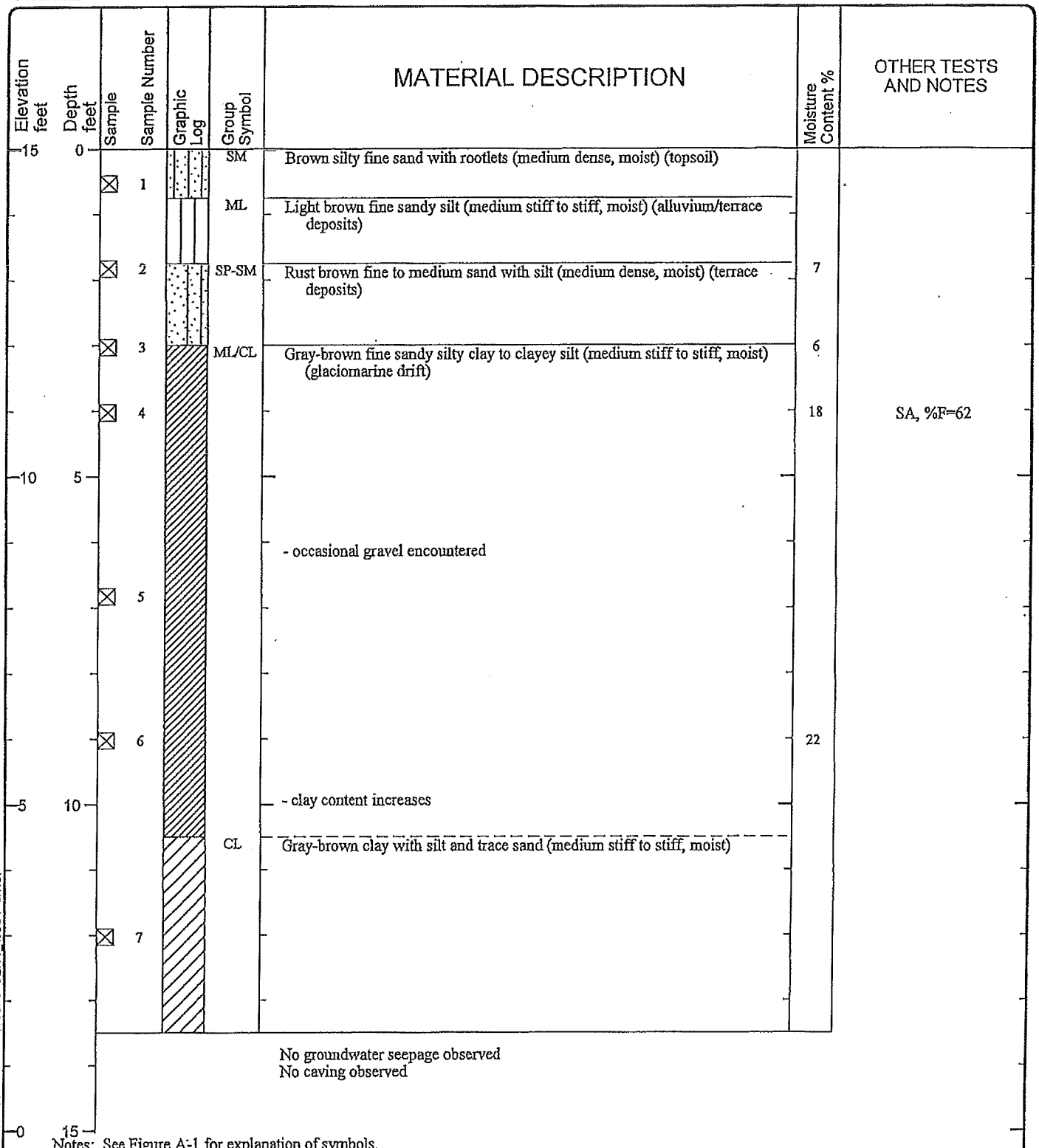
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-4
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 15



No groundwater seepage observed
No caving observed

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002\00\WORKING\9201002\00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-4

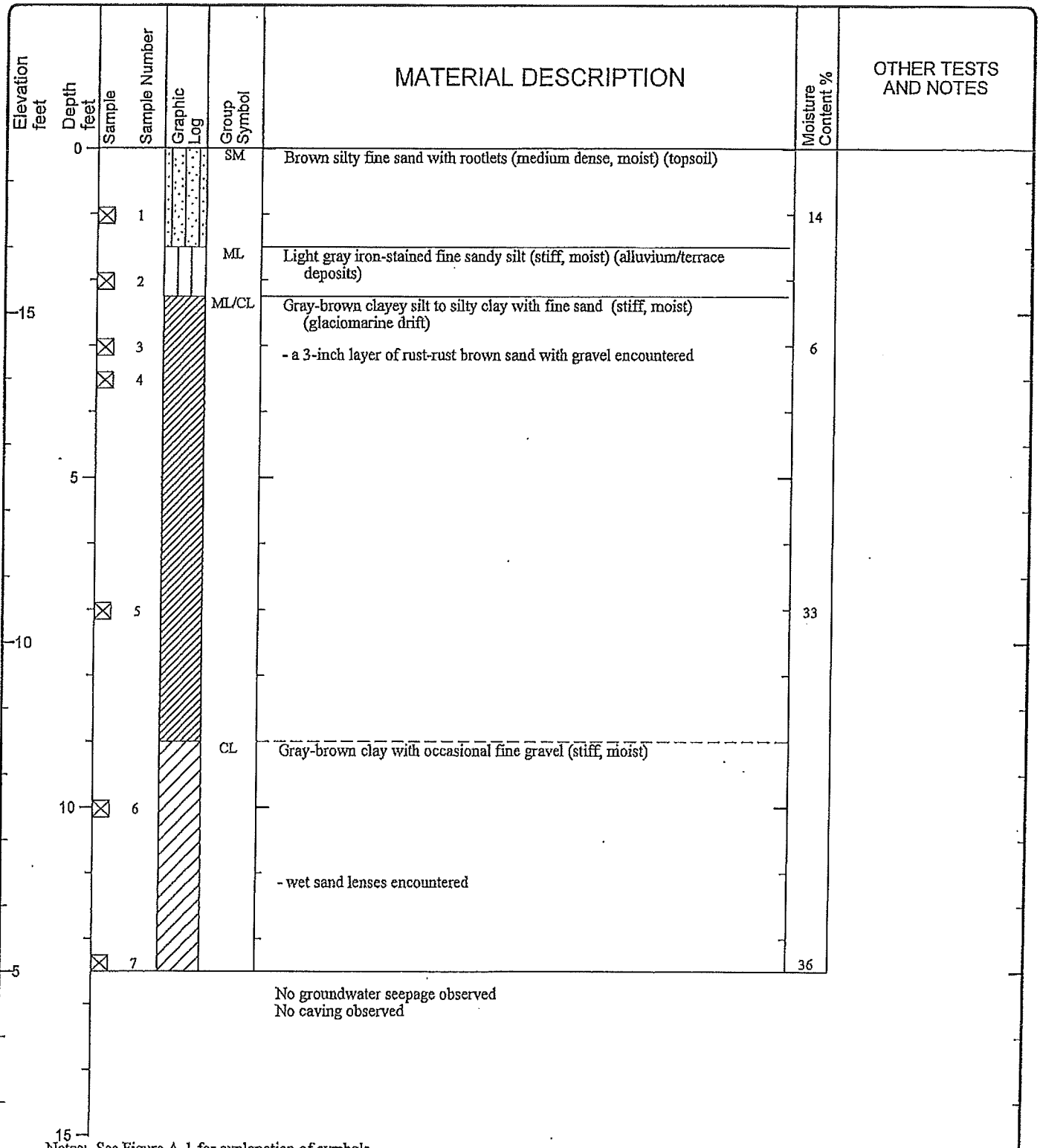
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-5
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 17.5



Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT_P:\9\9201002\00\WORKING\9201002 00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-6

GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-6
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 20.5

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
20	0	☒	1		SM	Brown silty fine sand with roots (medium dense, moist) (topsoil)		
					ML	Light gray fine sandy silt (medium stiff, moist) (alluvium/terrace deposits)		
		☒	2		ML/CL	Gray-brown clayey silt to silty clay with fine sand (stiff to very stiff, moist) (glaciomarine drift)	16	
		☒	3					
15	5	☒	4				29	SA, %F=93
		☒	5					
10	10	☒	6			- blocky texture	29	
		☒	7			- becomes moist to wet, grades with fine sand lenses, becomes medium stiff to stiff		
						No groundwater seepage observed No caving observed		
5	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V5_GTTPIT P:\9\9201002\00\WORKING\9201002 00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-8

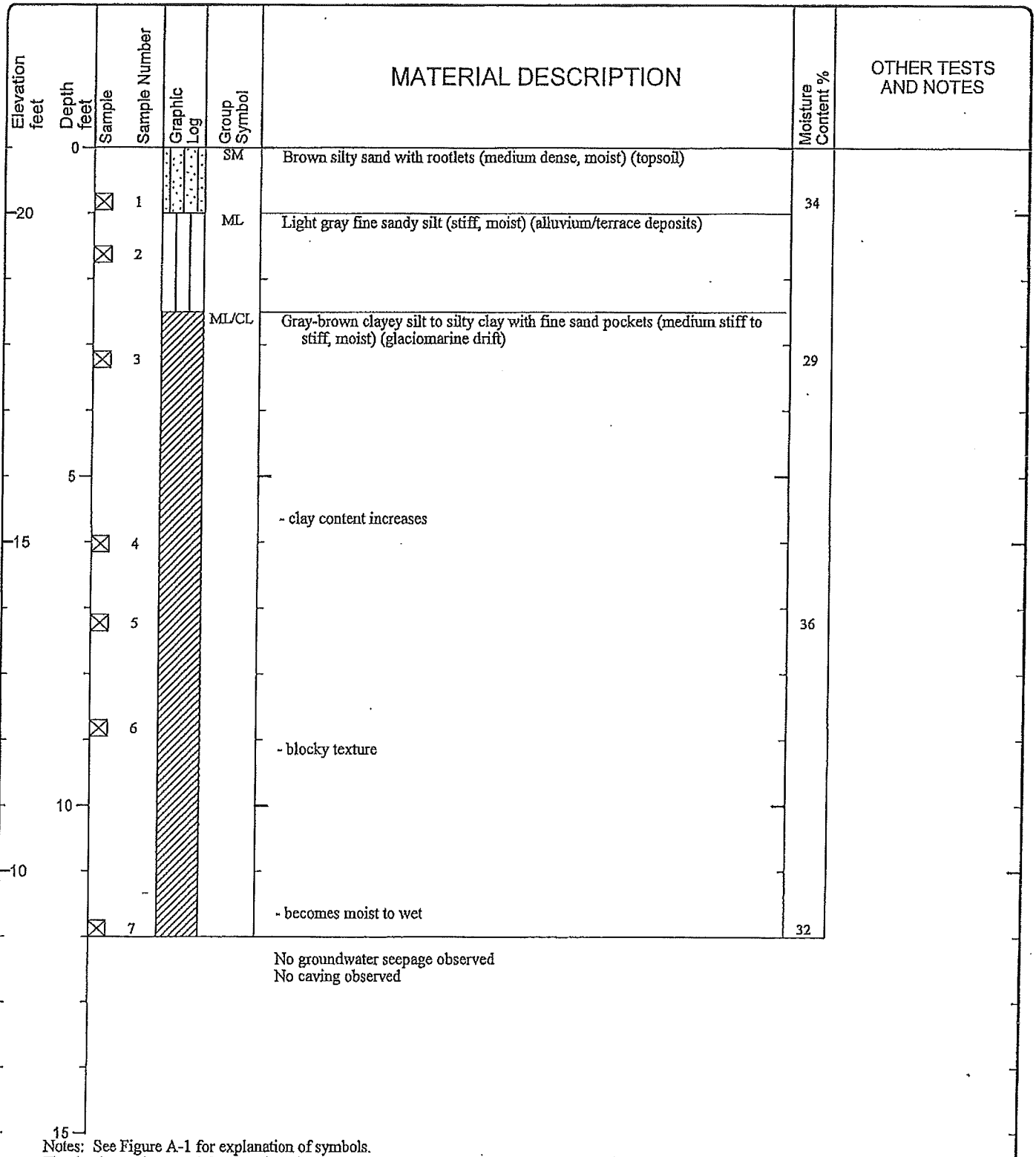
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-7
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 21



Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002\00\WORKING\9201002\00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-9

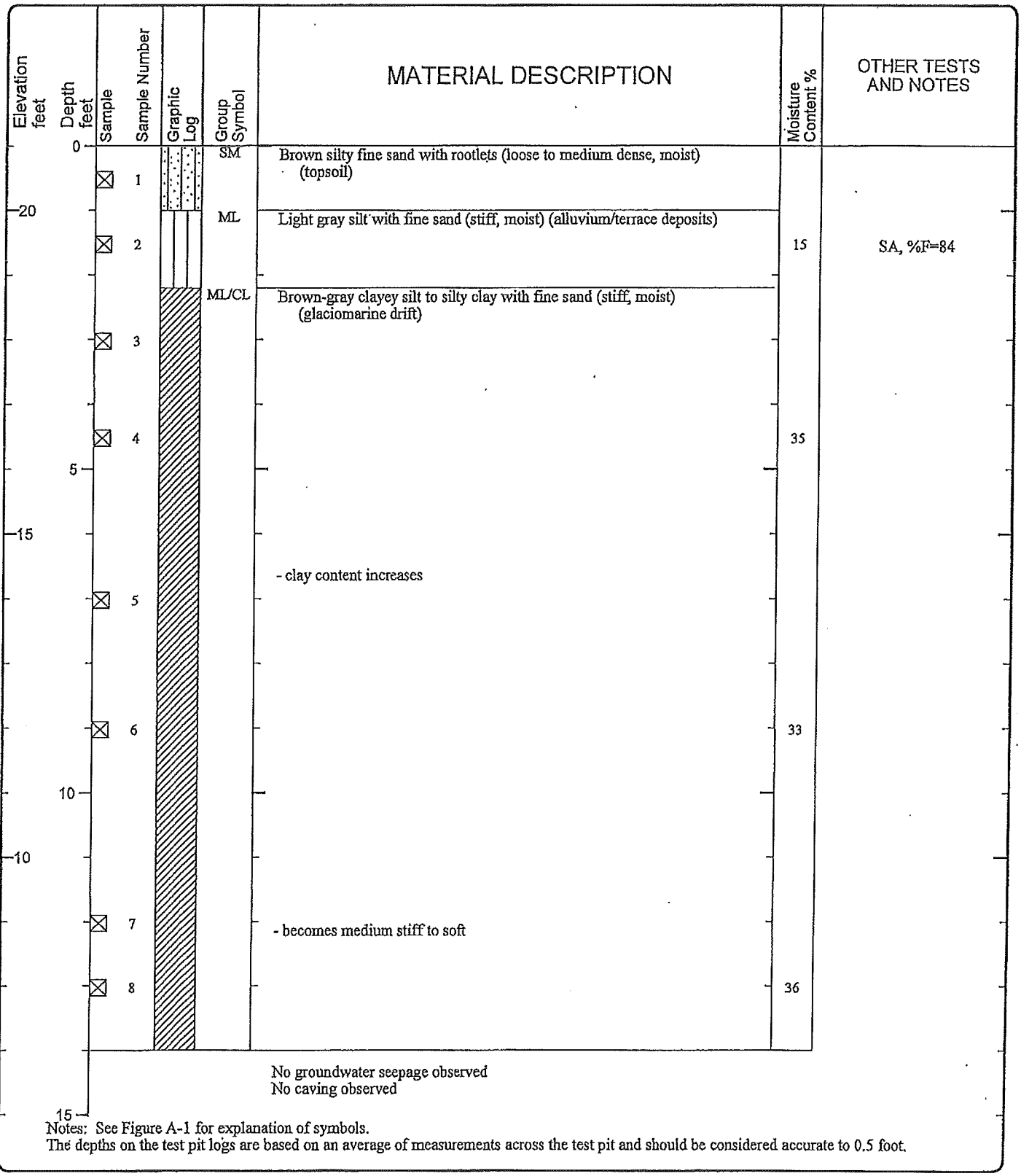
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-8
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 21



Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9920100200\WORKING\9920100200 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-10

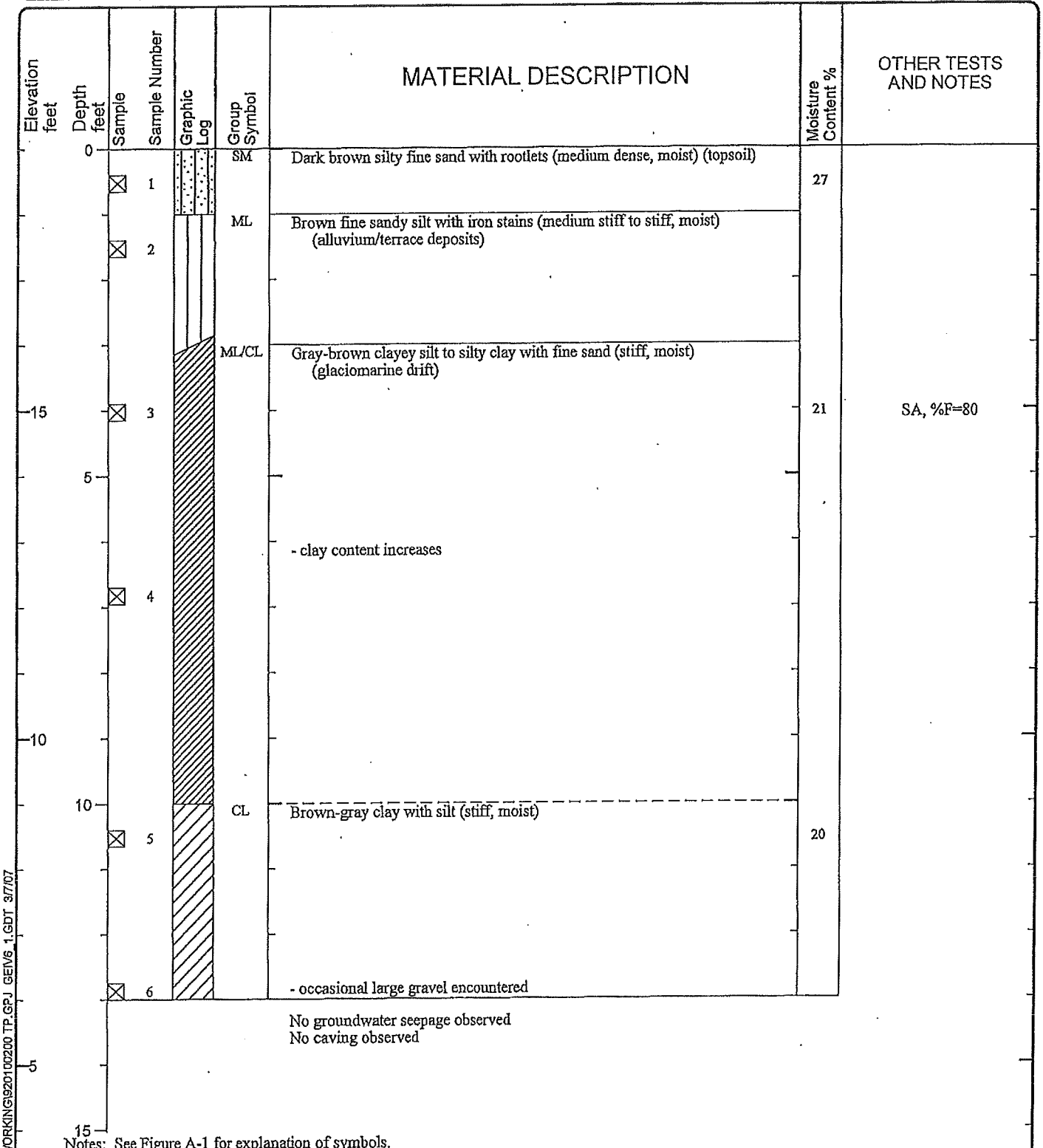
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-9
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 19



Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002\00\WORKING\9201002 00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-11

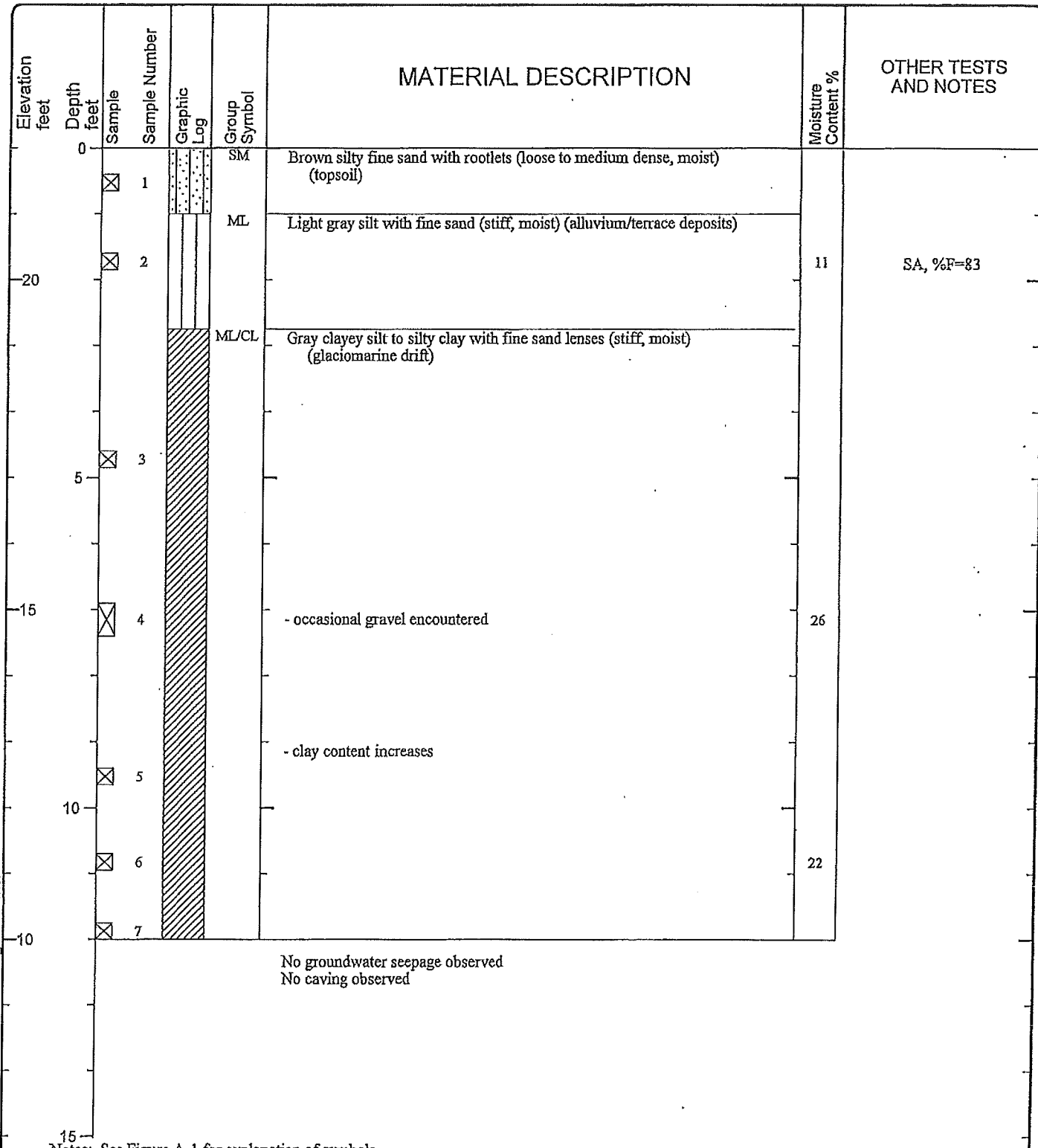
GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-10
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 22



Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002100\WORKING\9201002200 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-12

GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-11
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 18

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
	0	☒	1		SM	Brown silty fine sand with rootlets (medium dense, moist) (topsoil)	21	
					ML	Light gray fine sandy silt with iron staining (stiff, moist) (alluvium/terrace deposits)		
		☒	2					
15					ML/CL	Gray-brown clayey silt to silty clay with fine sand and occasional gravel (stiff, moist) (glaciomarine drift)		
		☒	3				21	SA, %F=82
	5							
		☒	4					
10								
	10					- clay content increases		
		☒	5				27	
						No groundwater seepage observed No caving observed		
-5								
	15							

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT_P:\9\9201002\00\WORKING\9201002200 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-13

GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

Figure: A-12
Sheet 1 of 1

Date Excavated: 9/18/2006 Logged by: A. Fickeisen

Equipment: Tracked Excavator Surface Elevation (ft): 20

Elevation feet	Depth feet	Sample	Sample Number	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	OTHER TESTS AND NOTES
20	0				SM	Brown silty fine sand with rootlets (loose to medium dense, moist) (topsoil)		
		☒	1		ML	Light gray silt with fine sand (stiff, moist) (alluvium/terrace deposits)		
		☒	2				24	%F=91
					ML/CL	Gray-brown clayey silt to silty clay with fine sand (stiff, moist) (glaciomarine drift)		
		☒	3					
15	5							
		☒	4			- becomes very stiff with occasional cobbles, blocky texture	28	
		☒	5			- increased clay content		
10	10							
		☒	6				34	
						- becomes medium stiff, sand lenses and occasional cobbles encountered		

No groundwater seepage observed
No caving observed

5 15

Notes: See Figure A-1 for explanation of symbols.
The depths on the test pit logs are based on an average of measurements across the test pit and should be considered accurate to 0.5 foot.

V6_GTTPIT P:\9\9201002\00\WORKING\9201002\00 TP.GPJ GEIV6_1.GDT 3/7/07

LOG OF TEST PIT TP-14

GeoEngineers

Project: Ferndale Southwest Regional Detention Facility
Project Location: Ferndale, Washington
Project Number: 9201-002-00

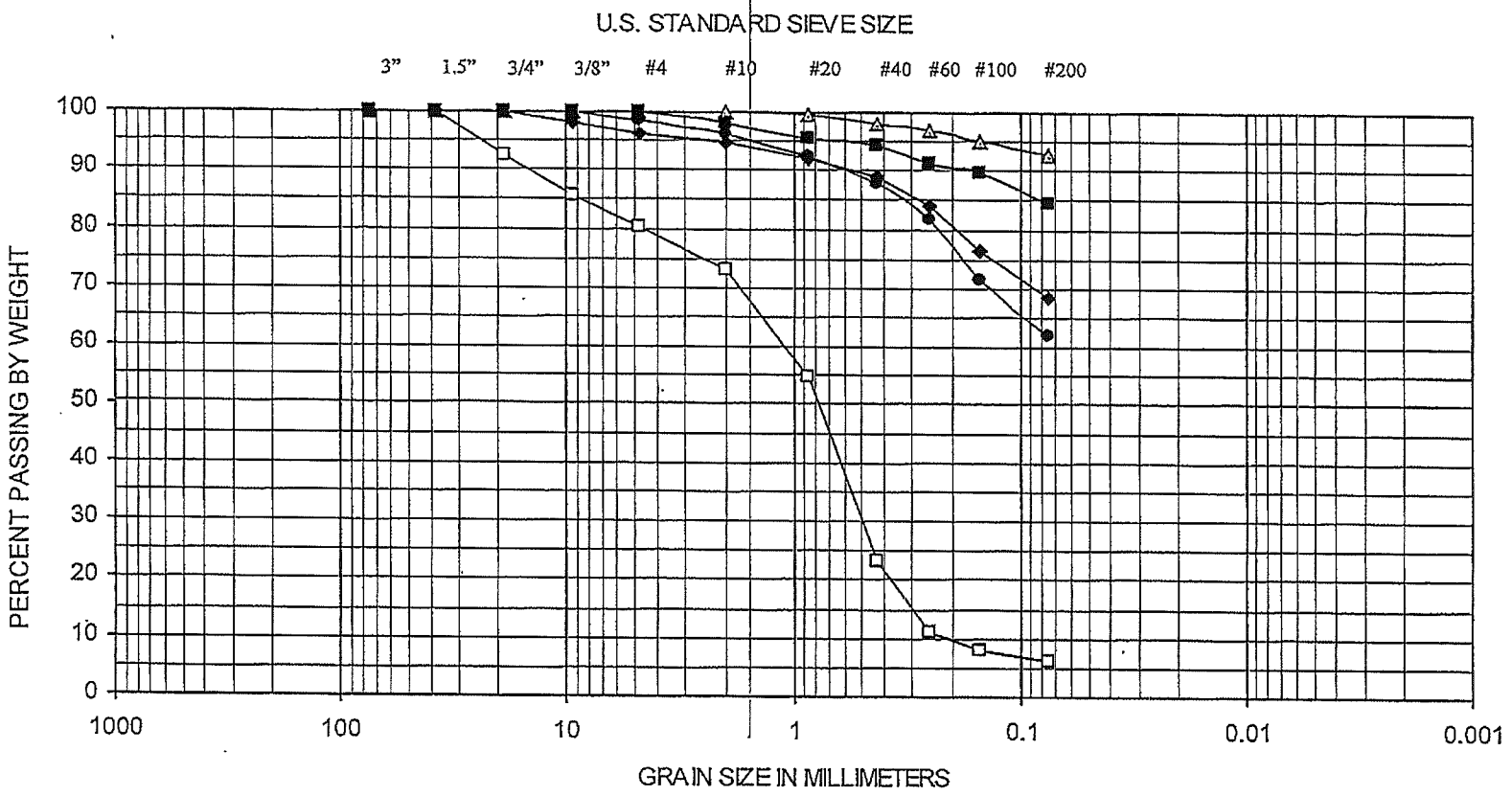
Figure: A-13
Sheet 1 of 1

9201-002-00 AF2 9-27-06 (Sieve.ppt)

GEOENGINEERS

SIEVE ANALYSIS RESULTS

FIGURE A-14



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

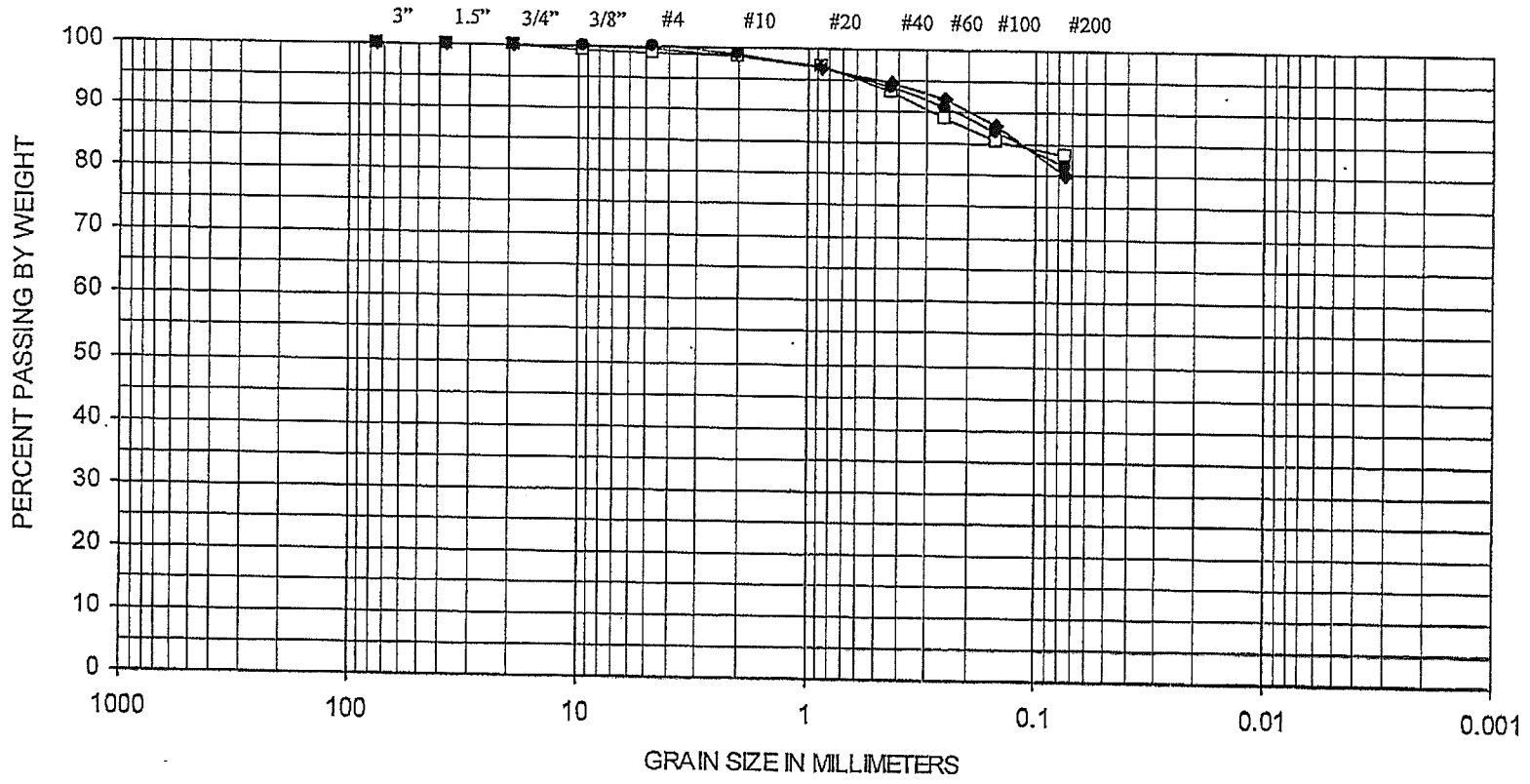
SYMBOL	DEPTH (FEET)	SOURCE	SOIL CLASSIFICATION
◆	9.5	TP-1	Gray-brown fine sandy silt/clay and occasional gravel (ML/CL)
□	3	TP-4	Gray-brown sand with gravel and silt (ML/CL)
●	4	TP-4	Gray-brown fine sandy silt/clay (ML/CL)
△	6.5	TP-8	Gray-brown silt/clay with fine sand (ML/CL)
■	1.5	TP-10	Light gray silt with fine sand (ML)

9201-002-00 AF2 9-27-06 (Sieve.ppt)

GEOENGINEERS

SIEVE ANALYSIS RESULTS

FIGURE A-15



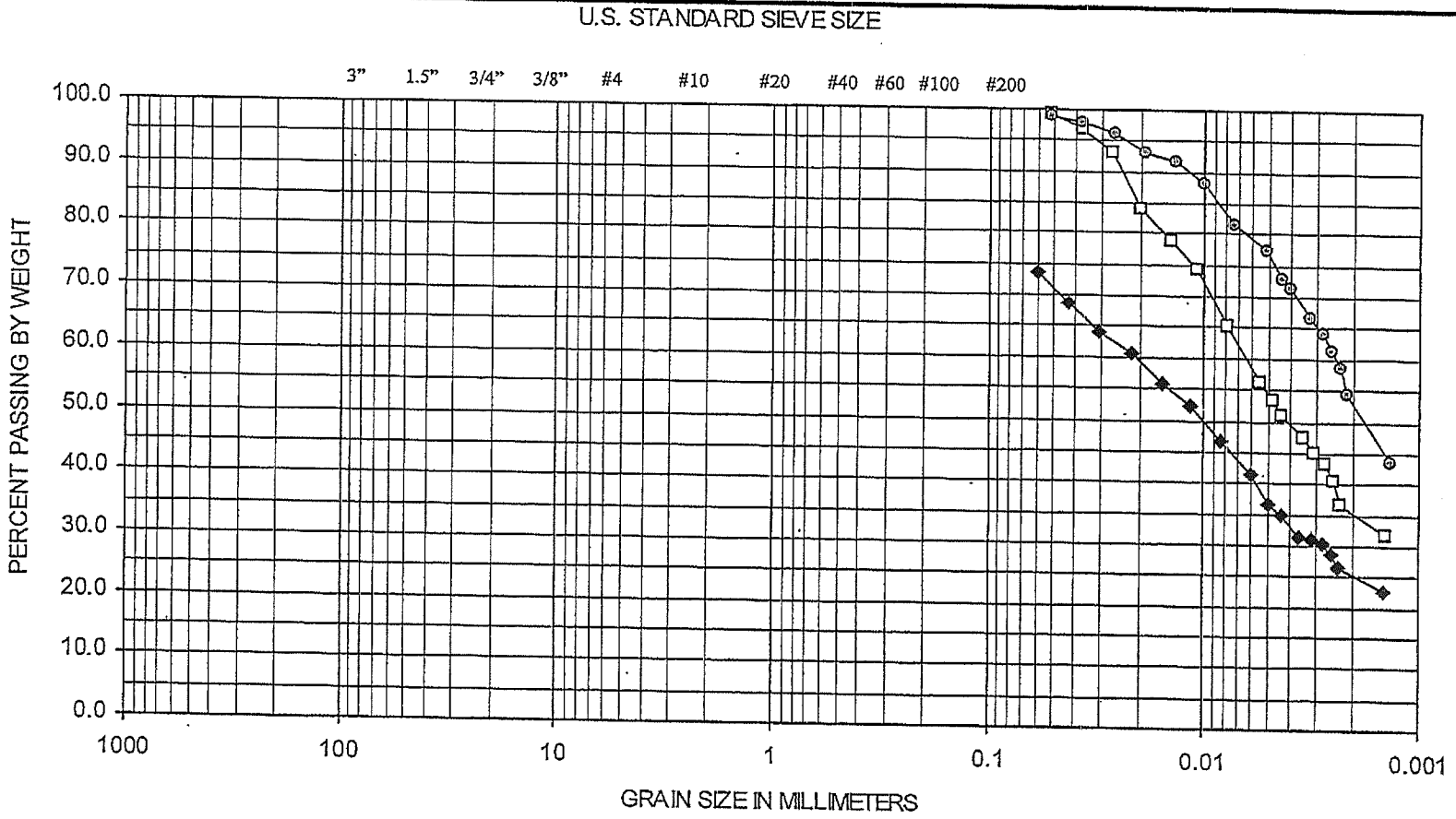
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	DEPTH (FEET)	SOURCE	SOIL CLASSIFICATION
◆	4	TP-11	Gray-brown silt/clay with fine sand (ML/CL)
□	1.7	TP-12	Light gray silt with fine sand (ML)
●	3.5	TP-13	Gray-brown silt/clay with fine sand (ML/CL)

GEOENGINEERS

HYDRODROMETER ANALYSIS RESULTS

FIGURE A-16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

SYMBOL	EXPLORATION NUMBER	DEPTH (ft)	SOIL CLASSIFICATION
◆	TP-3	3.0	Gray-brown sandy clayey silt (ML)
□	TP-6	7.0	Gray-brown clayey silt (ML)
⊙	TP-10	4.5	Gray-brown silty clay (CL)

GeoEngineers

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE

APPENDIX B
REPORT LIMITATIONS AND GUIDELINES FOR USE[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for the exclusive use of Ronald T. Jepson & Associates and their authorized agents. This report may be made available to other members of the design team. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, a geotechnical or geologic study conducted for a civil engineer or architect may not fulfill the needs of a construction contractor or even another civil engineer or architect that are involved in the same project. Because each geotechnical or geologic study is unique, each geotechnical engineering or geologic report is unique, prepared solely for the specific client and project site. Our report is prepared for the exclusive use of our Client. No other party may rely on the product of our services unless we agree in advance to such reliance in writing. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions. Within the limitations of scope, schedule and budget, our services have been executed in accordance with our Agreement with the Client and generally accepted geotechnical practices in this area at the time this report was prepared. This report should not be applied for any purpose or project except the one originally contemplated.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the proposed Ferndale Regional Stormwater Detention Facility in Ferndale, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

For example, changes that can affect the applicability of this report include those that affect:

- the function of the proposed structure;
- elevation, configuration, location, orientation or weight of the proposed structure;
- composition of the design team; or
- project ownership.

If important changes are made after the date of this report, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

[1] Developed based on material provided by ASFE, Professional Firms Practicing in the Geosciences; www.asfe.org .

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying a report to determine if it remains applicable.

MOST GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in this report. Our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the preliminary construction recommendations included in this report. These recommendations are not final, because they were developed principally from GeoEngineers' professional judgment and opinion. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers cannot assume responsibility or liability for this report's recommendations if we do not perform construction observation.

Sufficient monitoring, testing and consultation by GeoEngineers should be provided during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether or not earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective method of managing the risks associated with unanticipated conditions.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by other design team members can result in costly problems. You could lower that risk by having GeoEngineers confer with appropriate members of the design team after submitting the report. Also retain GeoEngineers to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering or geologic report. Reduce that risk by having GeoEngineers participate in pre-bid and preconstruction conferences, and by providing construction observation.

DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognize that separating logs from the report can elevate risk.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering or geologic report, but preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with GeoEngineers and/or to conduct additional study to obtain the specific types of information they need or prefer. A pre-bid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might an owner be in a position to give contractors the best information available, while requiring them to at least share the financial responsibilities stemming from unanticipated conditions. Further, a contingency for unanticipated conditions should be included in your project budget and schedule.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and to adjacent properties.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of biological pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of biological pollutants and no conclusions or inferences should be drawn regarding biological pollutants, as they may relate to this project. The term "biological pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.