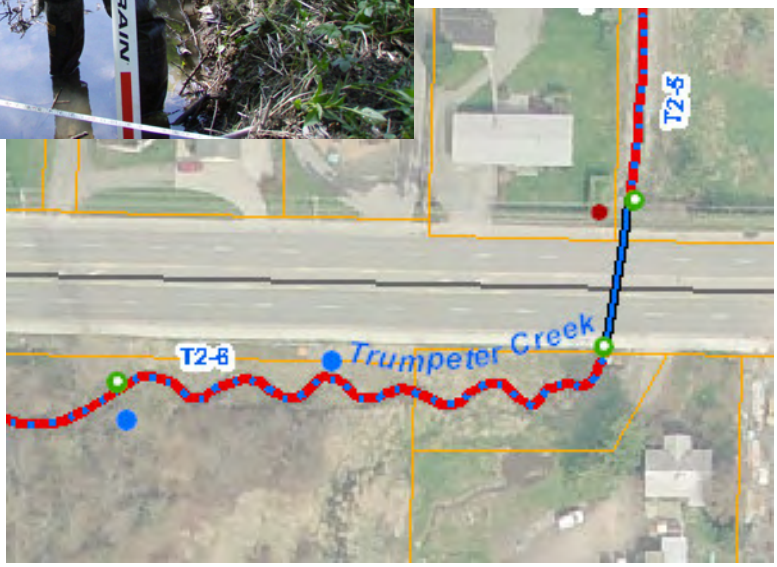
City of Mount Vernon

2008 Stream Survey Maps

Kulshan Creek
Trumpeter Creek
Maddox Creek



Data collected by WSP Environment & Energy Seattle, WA
2008

Data Summarized and Presented by City of Mount Vernon
January, 2009

TABLE OF CONTENTS

Introduction

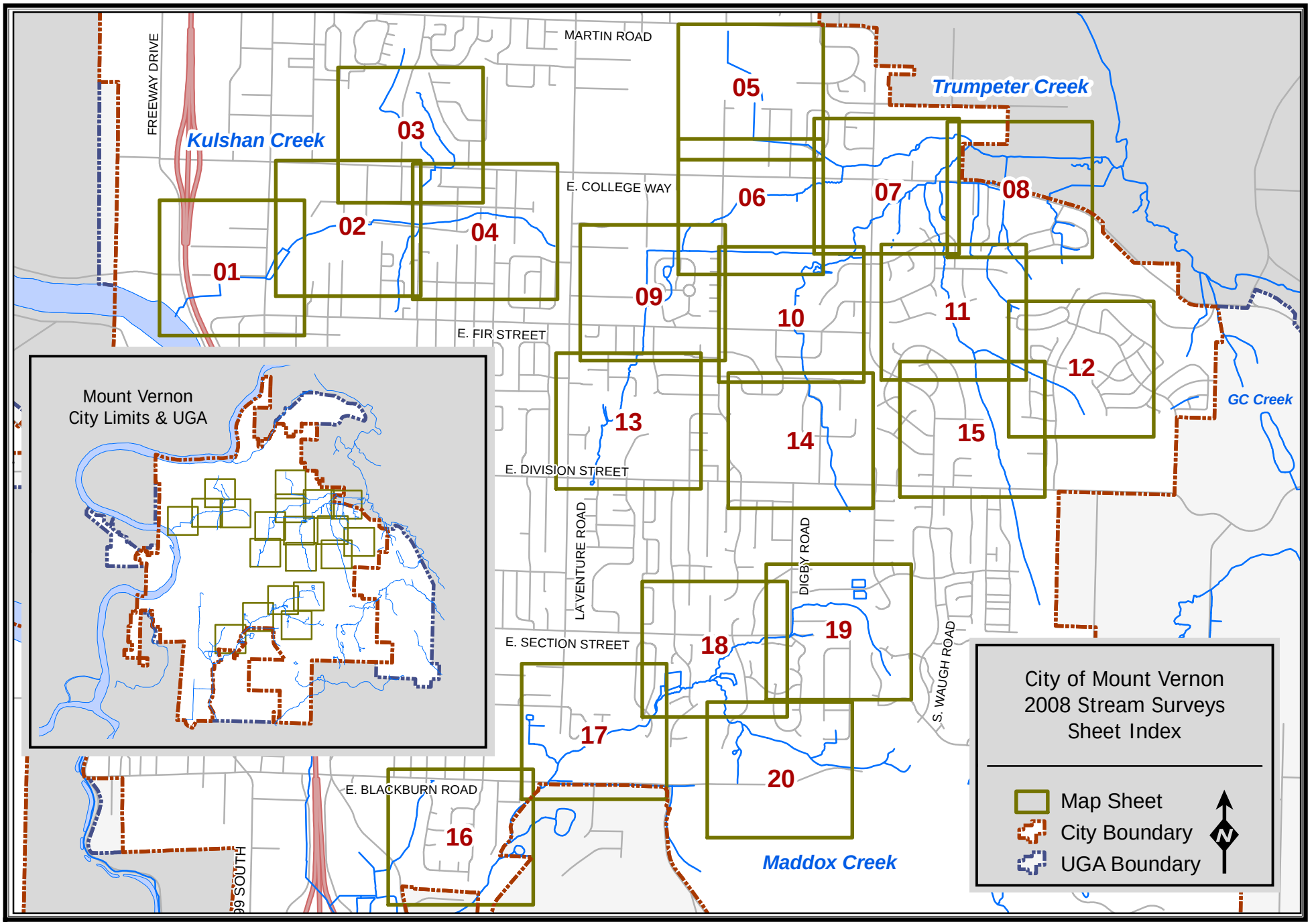
The purpose of these maps is to display data collected by WSP Environment & Energy during stream surveys performed from May through August of 2008. The WSP surveys identified stream reaches in the Kulshan, Maddox, and Trumpeter systems, and specific details may be found in WSP's Description of Methods document in Appendix A.

Much of the data presented in these maps originates from The City of Mount Vernon's Streams_with_Classification GIS shapefile, which was created from prior research for the City's critical areas studies. Other stream line data may originate from unknown sources, but has been verified and edited to the best of our ability using Mount Vernon 2007 aerial photographs. The Streams_with_Classification data was modified in the following ways:

1. Stream lines were edited when aerial photographs and WSP GPS data clearly indicated the stream should be in a different location nearby.
2. Stream lines not previously represented were added using WSP GPS points of surveyed stream features and reaches.
3. Non-contiguous stream line segments were snapped to adjacent segments to create new continuous segments, and then contiguous stream line segments with identical attributes were merged with one another.
4. The lengths of all stream line segments were re-calculated.

Care was taken throughout this editing process to ensure that while adding new stream data, attributes of the previous dataset were not lost. The resulting dataset is located at M:\ArcView Shapefiles\Critical Areas\Streams_wClass_wReach.shp.

In addition to the data presented here, further information from the WSP stream walking is available. The City of Mount Vernon has measurements and graphs of stream cross sections at each reach, along with photographs documenting the stream walking project. This additional information may be obtained from the City of Mount Vernon in the original WSP report and is also located on the City of Mount Vernon network at M:\ArcView Shapefiles\Critical Areas\WSP_data.


MARTIN ROAD
FREEWAY DRIVE
Kulshan Creek
Trumpeter Creek
E. COLLEGE WAY
E. FIR STREET
E. DIVISION STREET
E. SECTION STREET
E. BLACKBURN ROAD
LA VENTURE ROAD
DIGBY ROAD
S. WAUGH ROAD
GC Creek
Maddox Creek
01
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07
08
09
10
11
12
13
14
15
16
17
18
19
20
Mount Vernon
City Limits & UGA
City of Mount Vernon
2008 Stream Surveys
Sheet Index
Map Sheet
City Boundary
UGA Boundary
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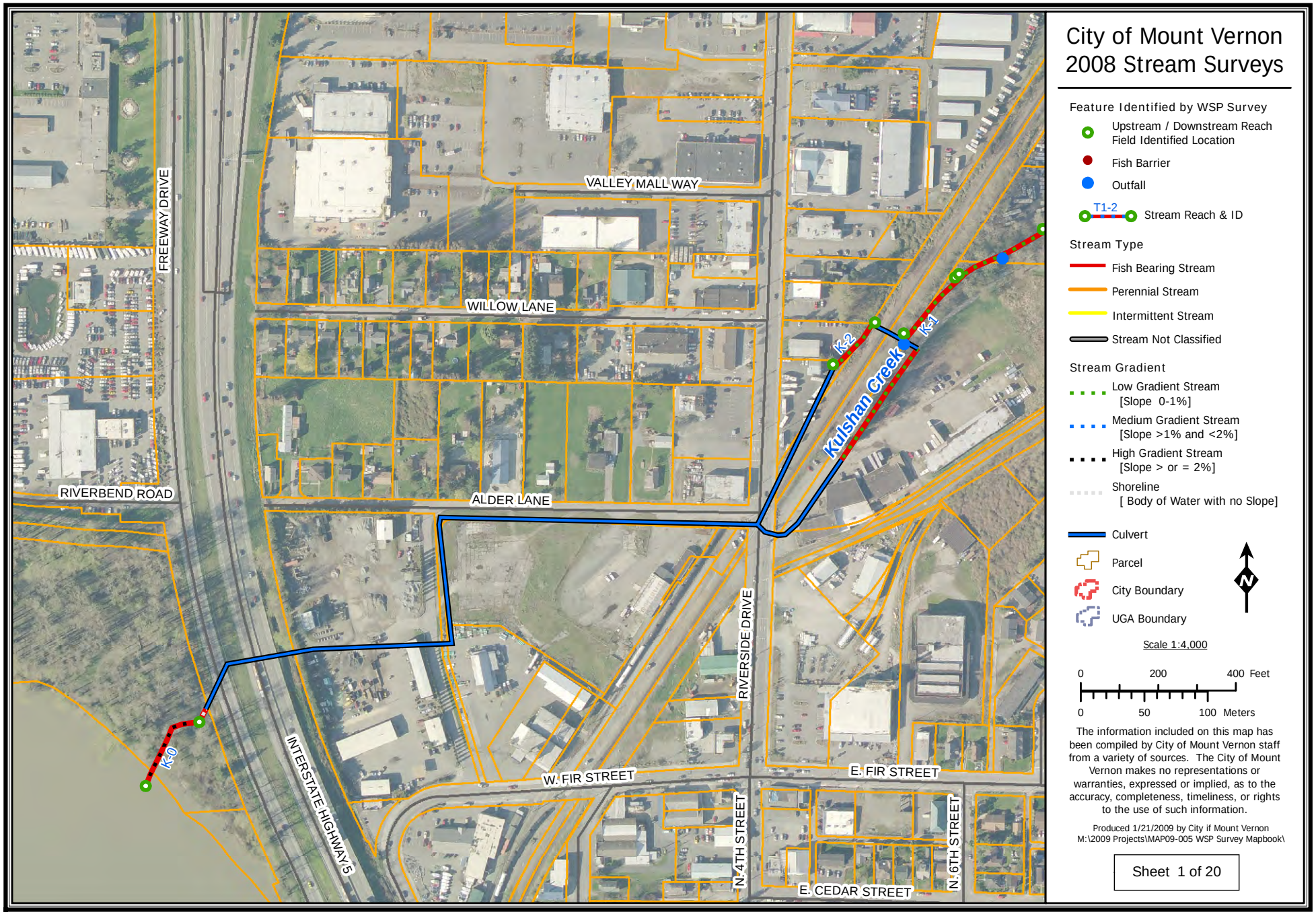

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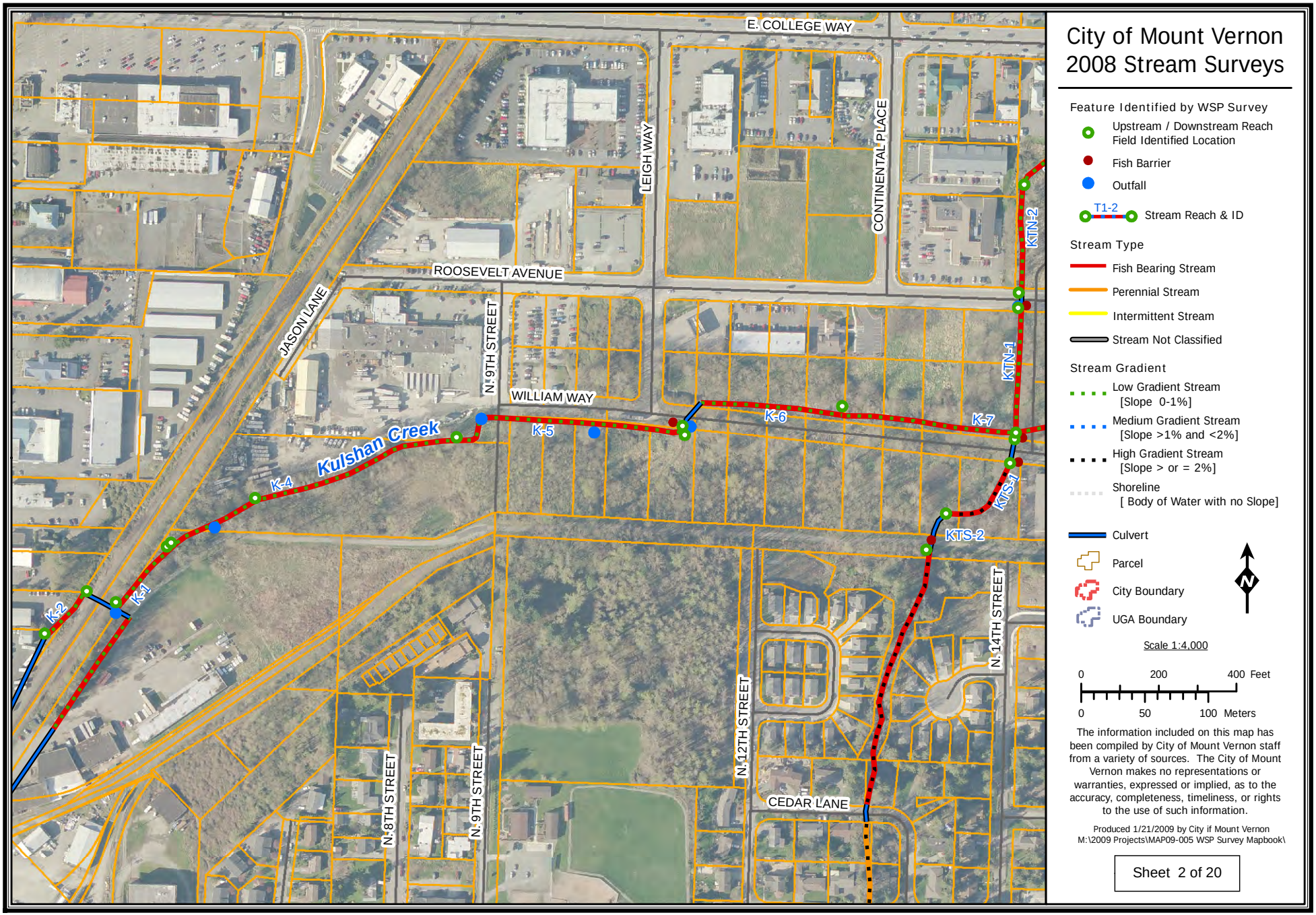
Sheet 1 of 20



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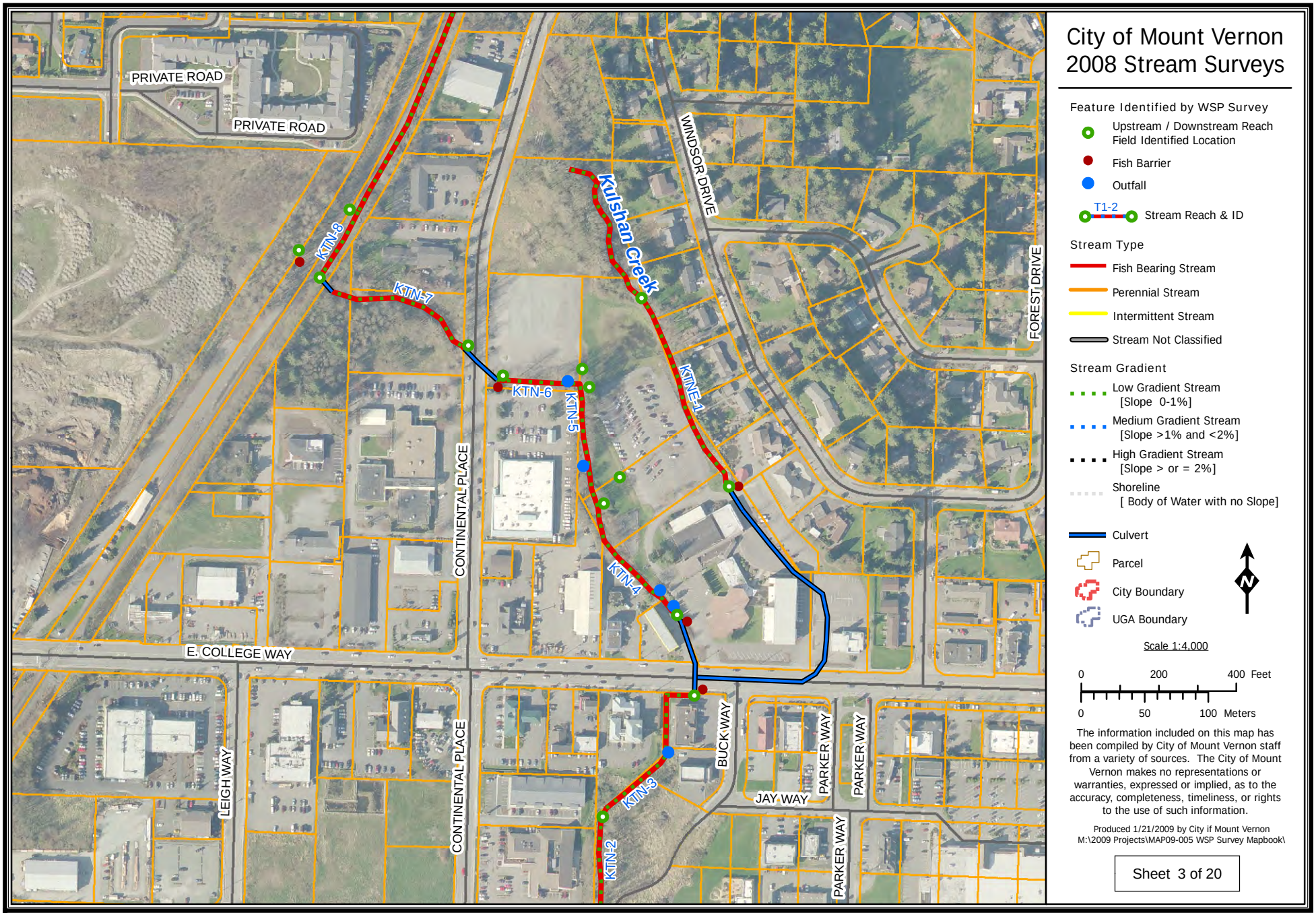

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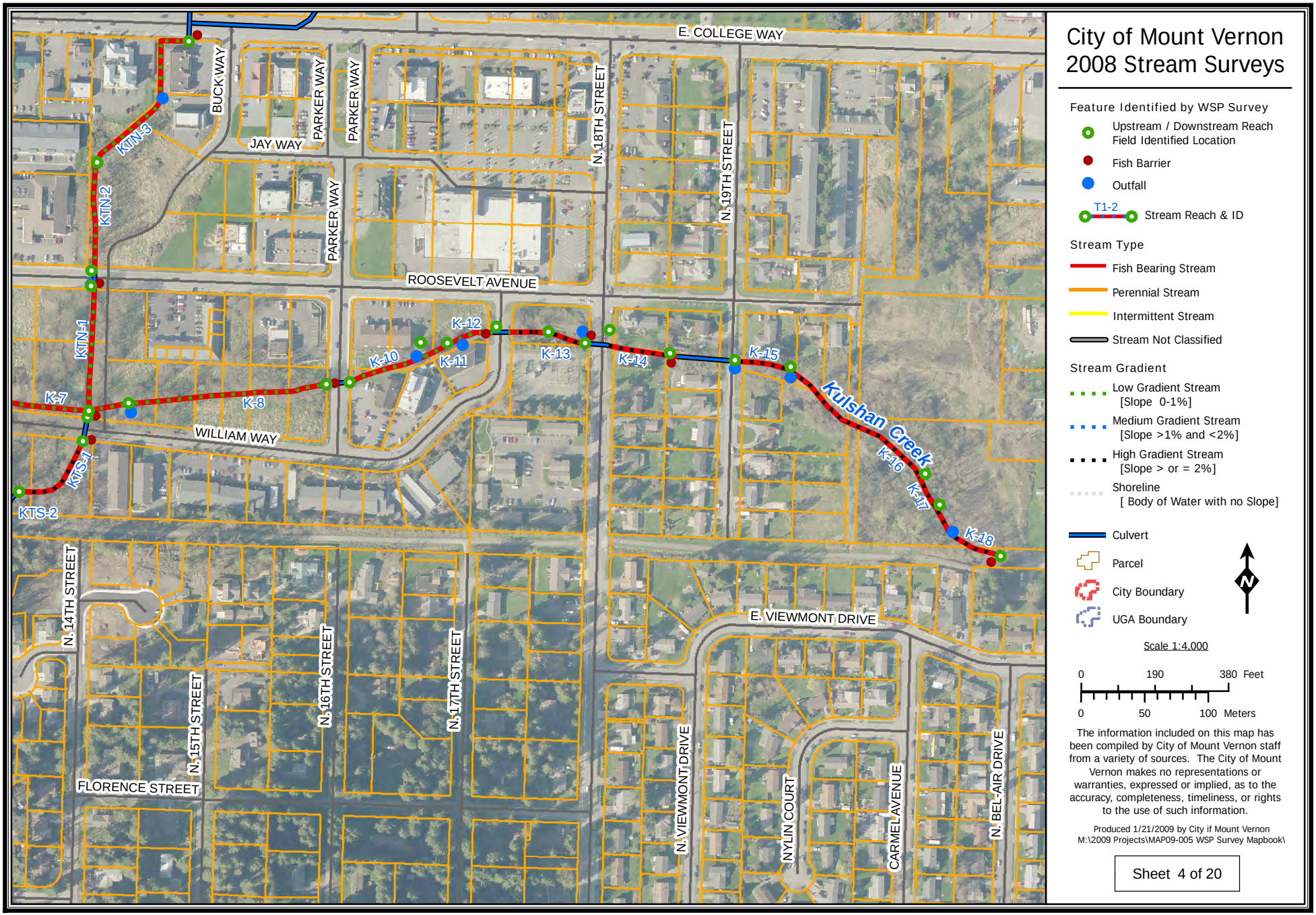

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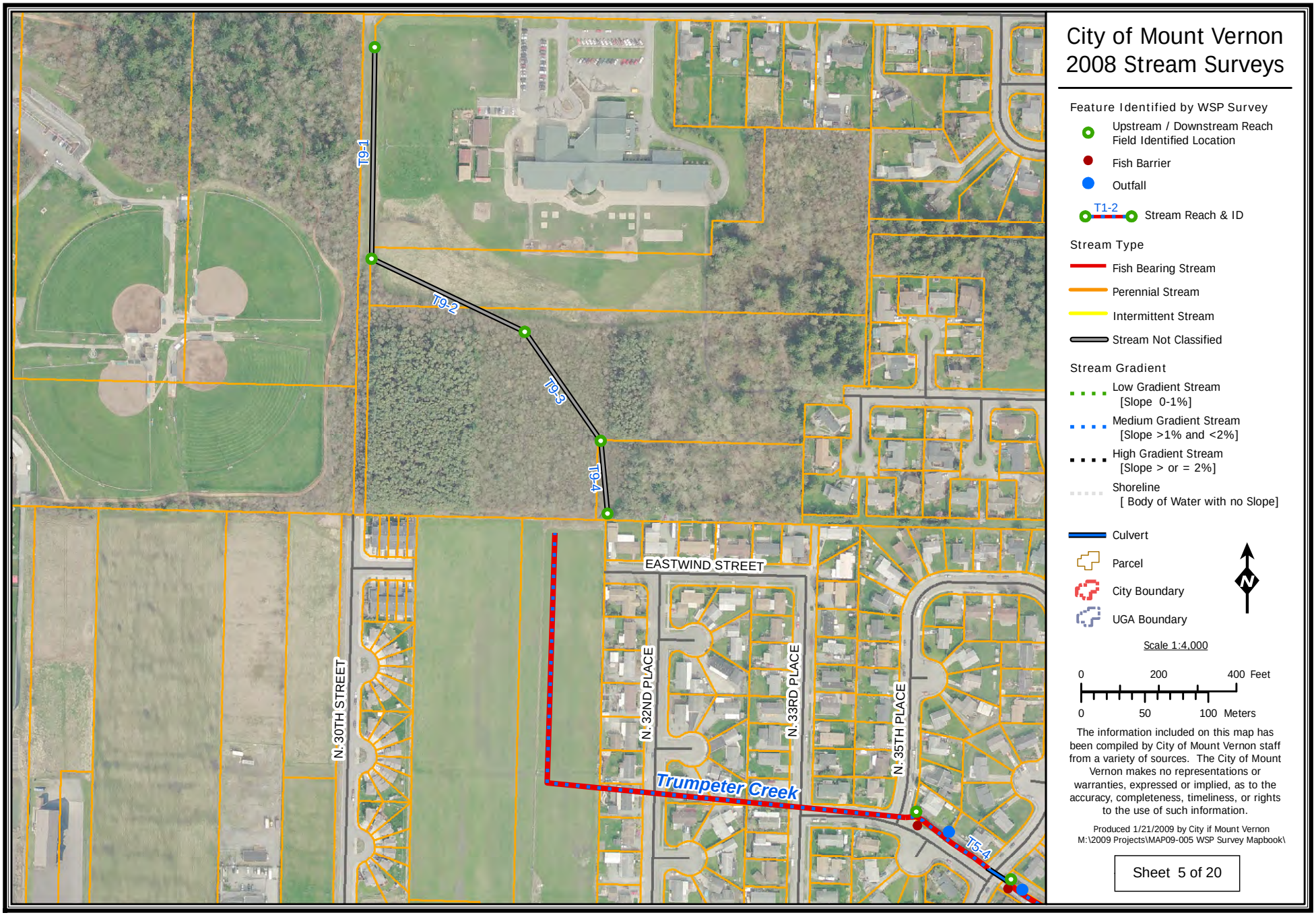

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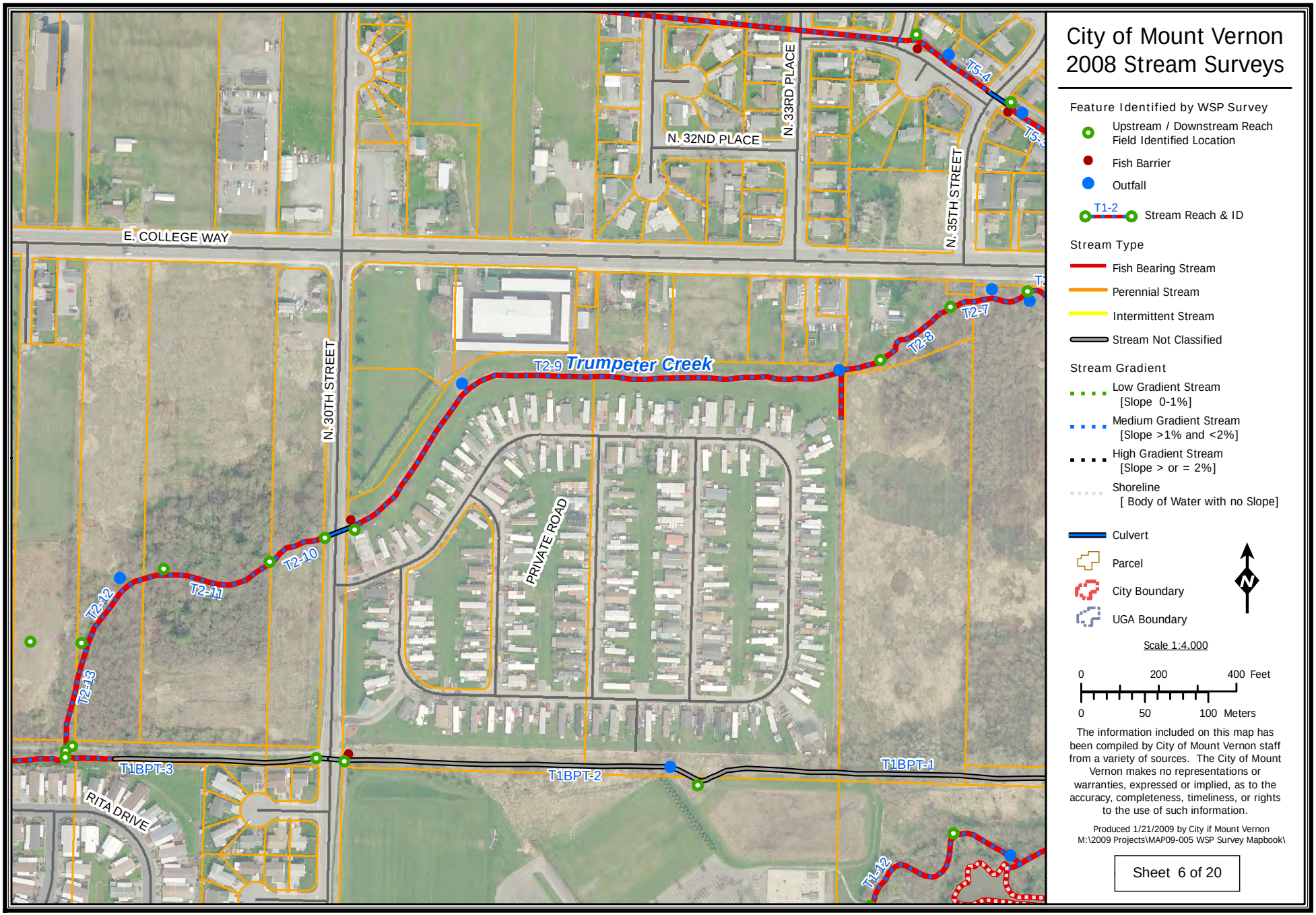

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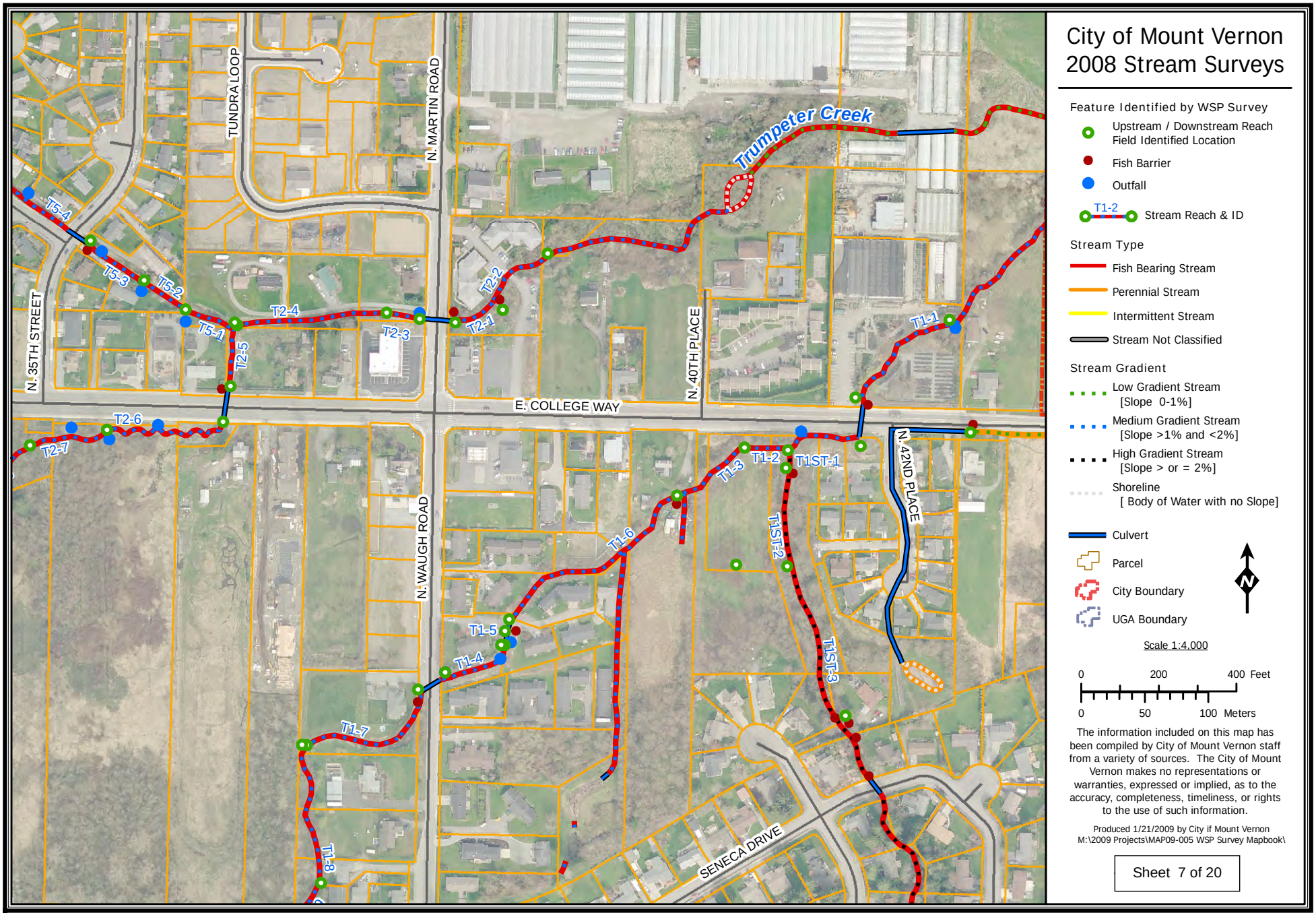
Sheet 6 of 20



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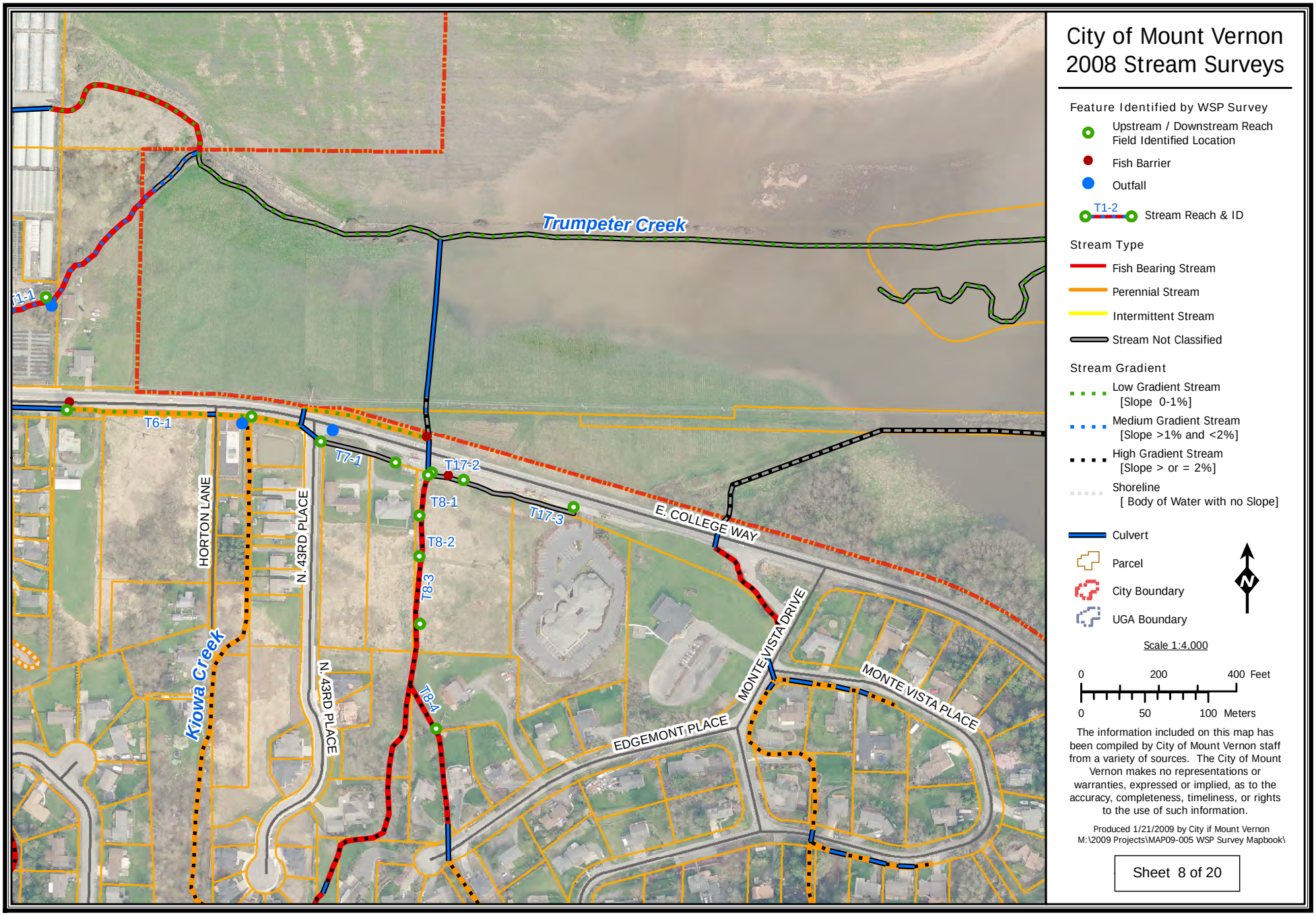

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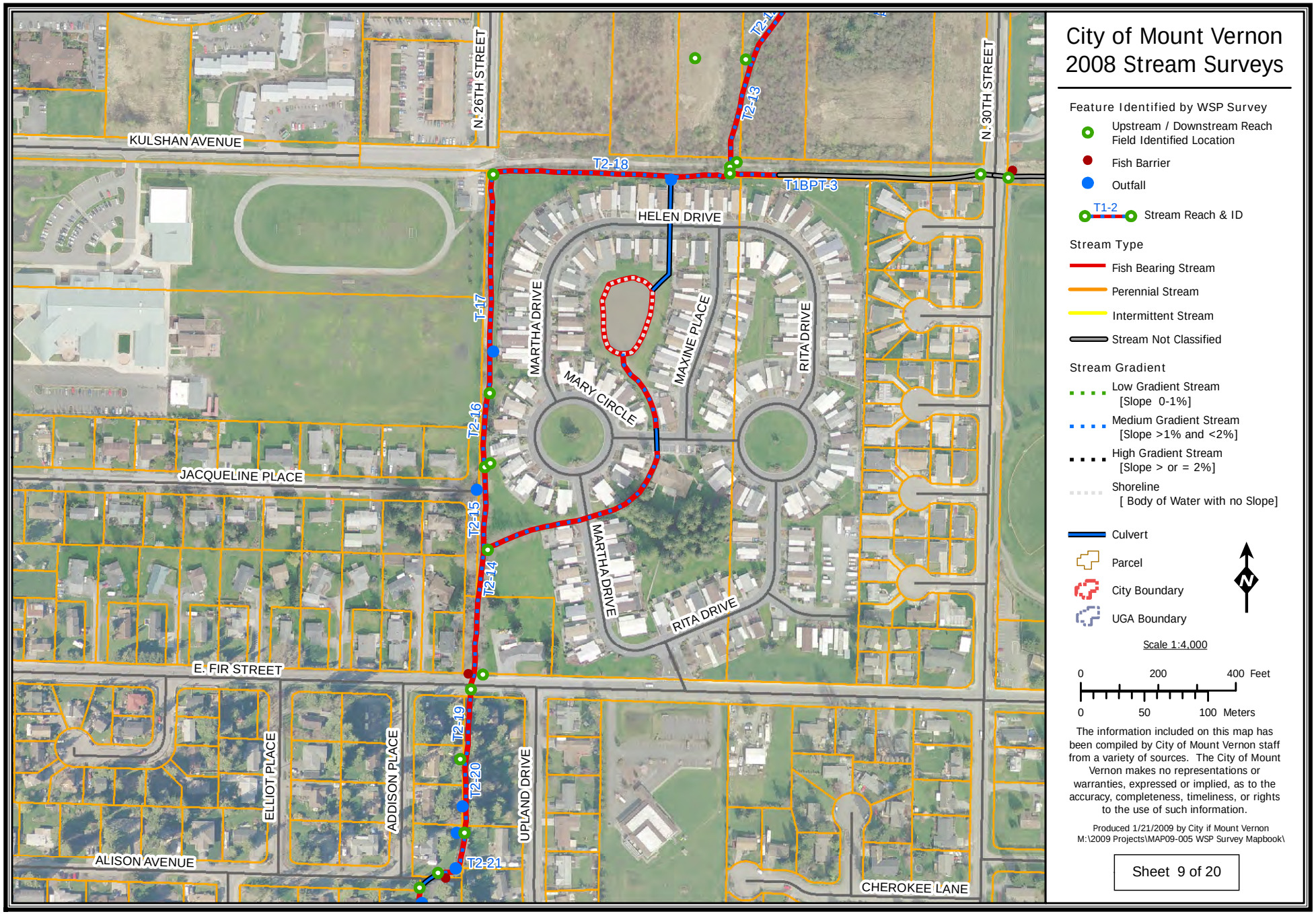
Sheet 8 of 20



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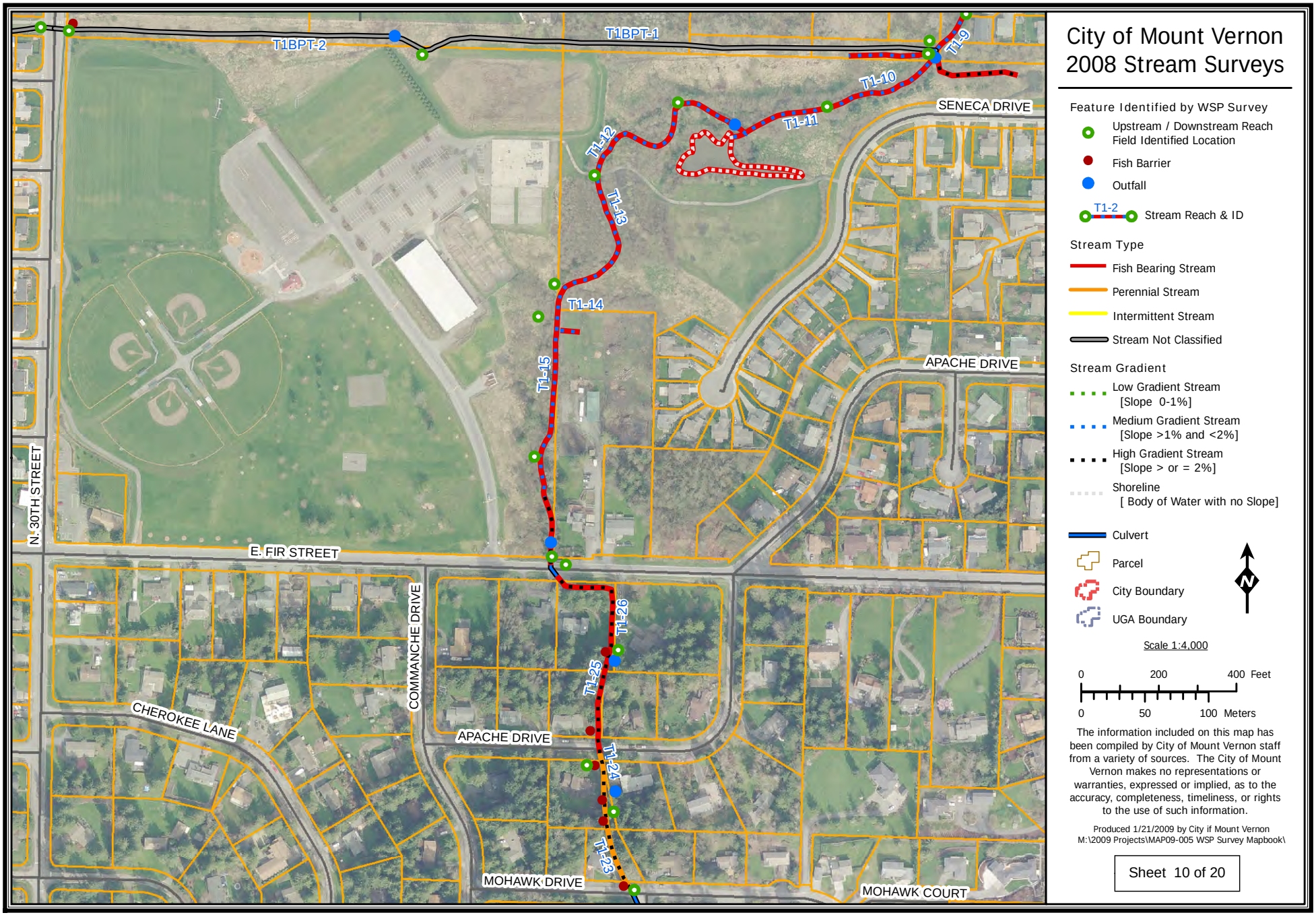

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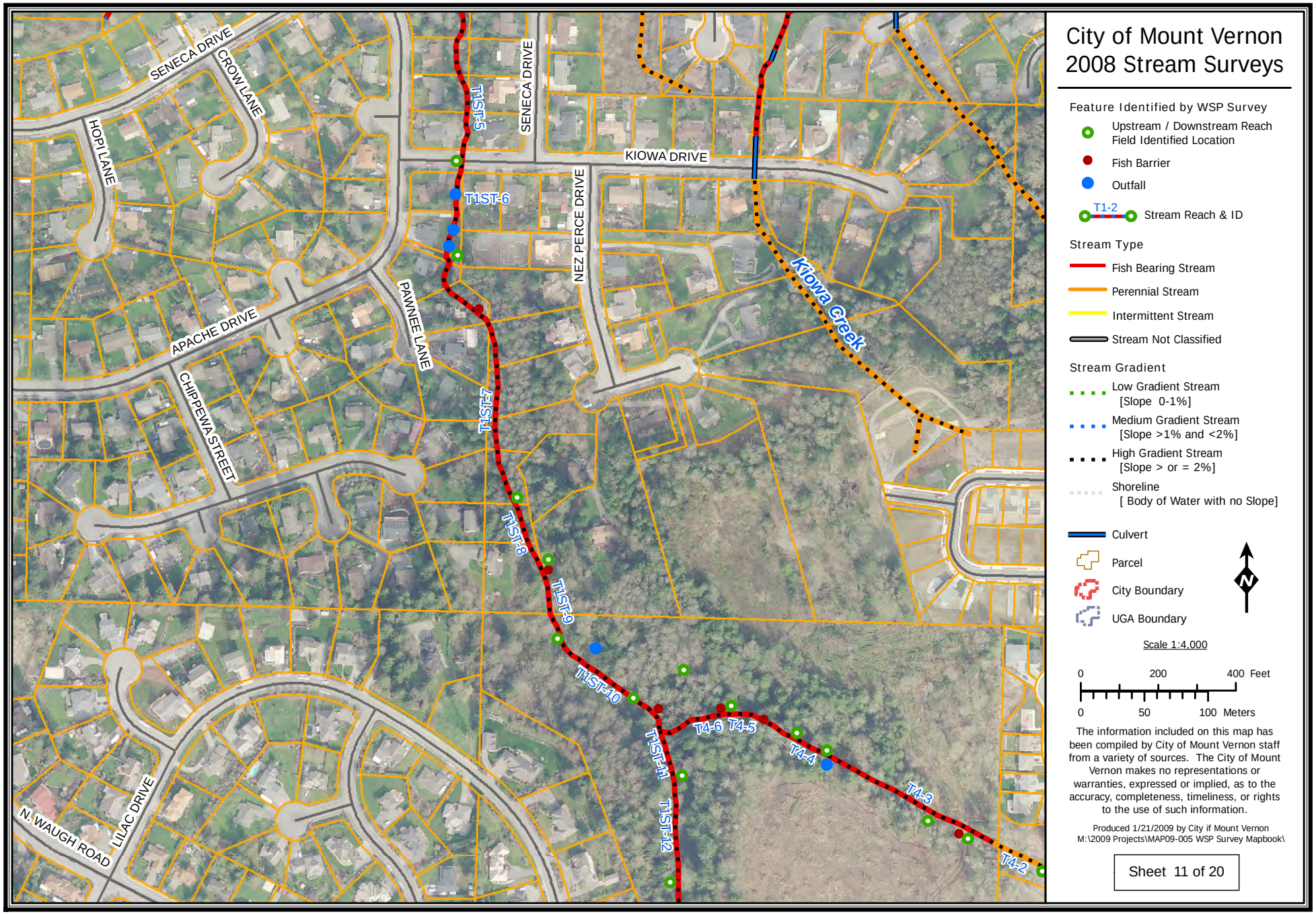
Sheet 10 of 20



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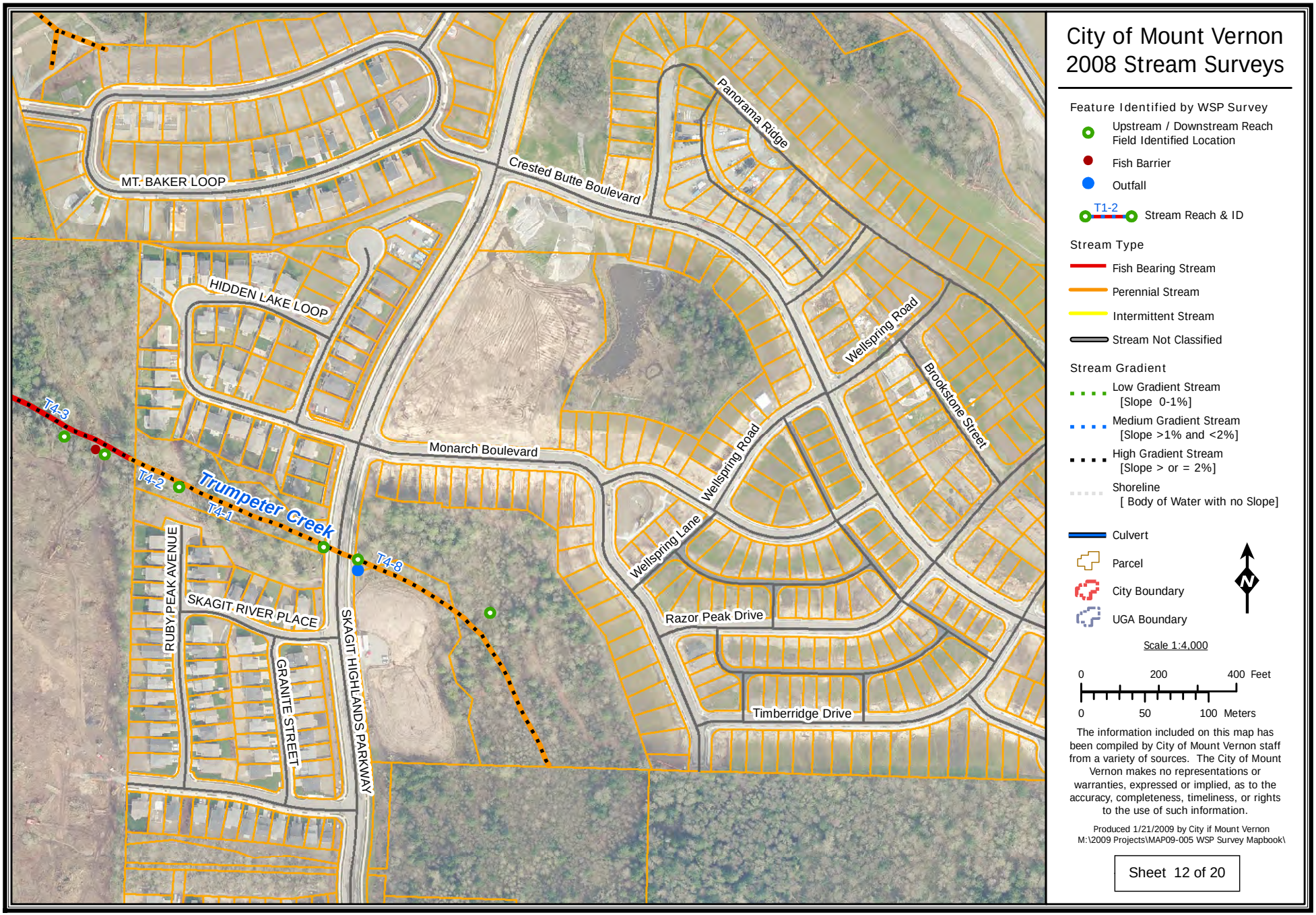

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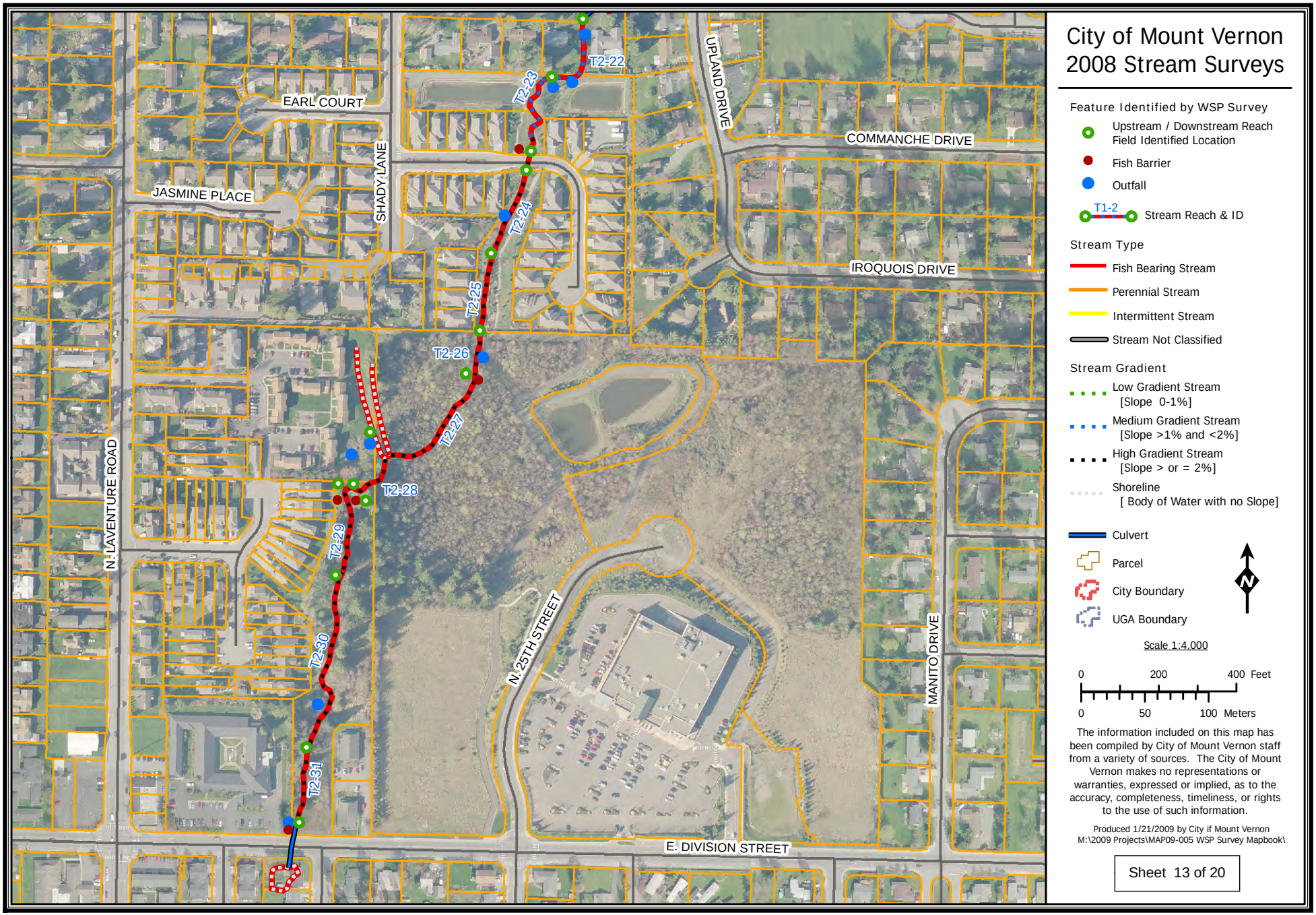

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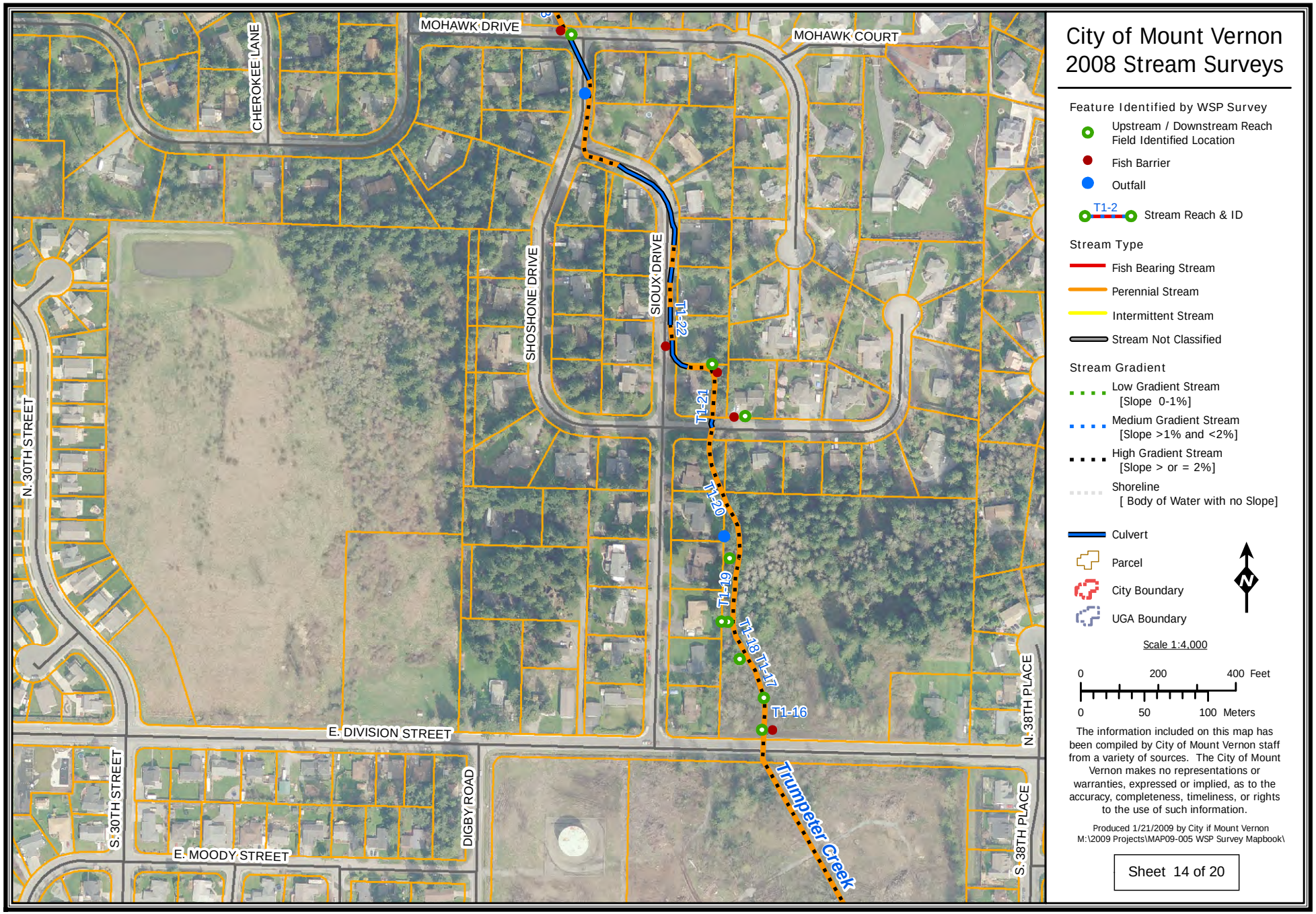

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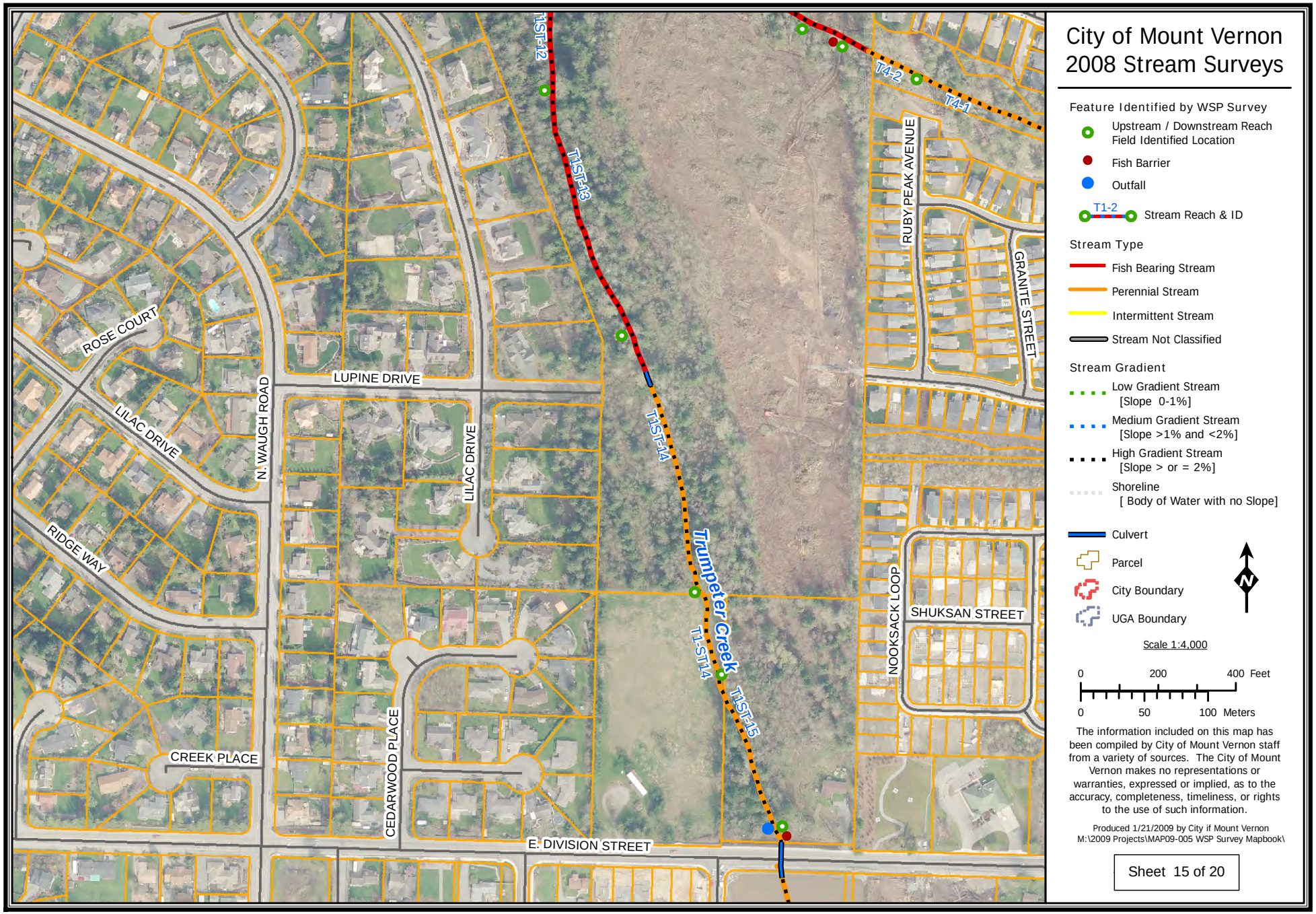

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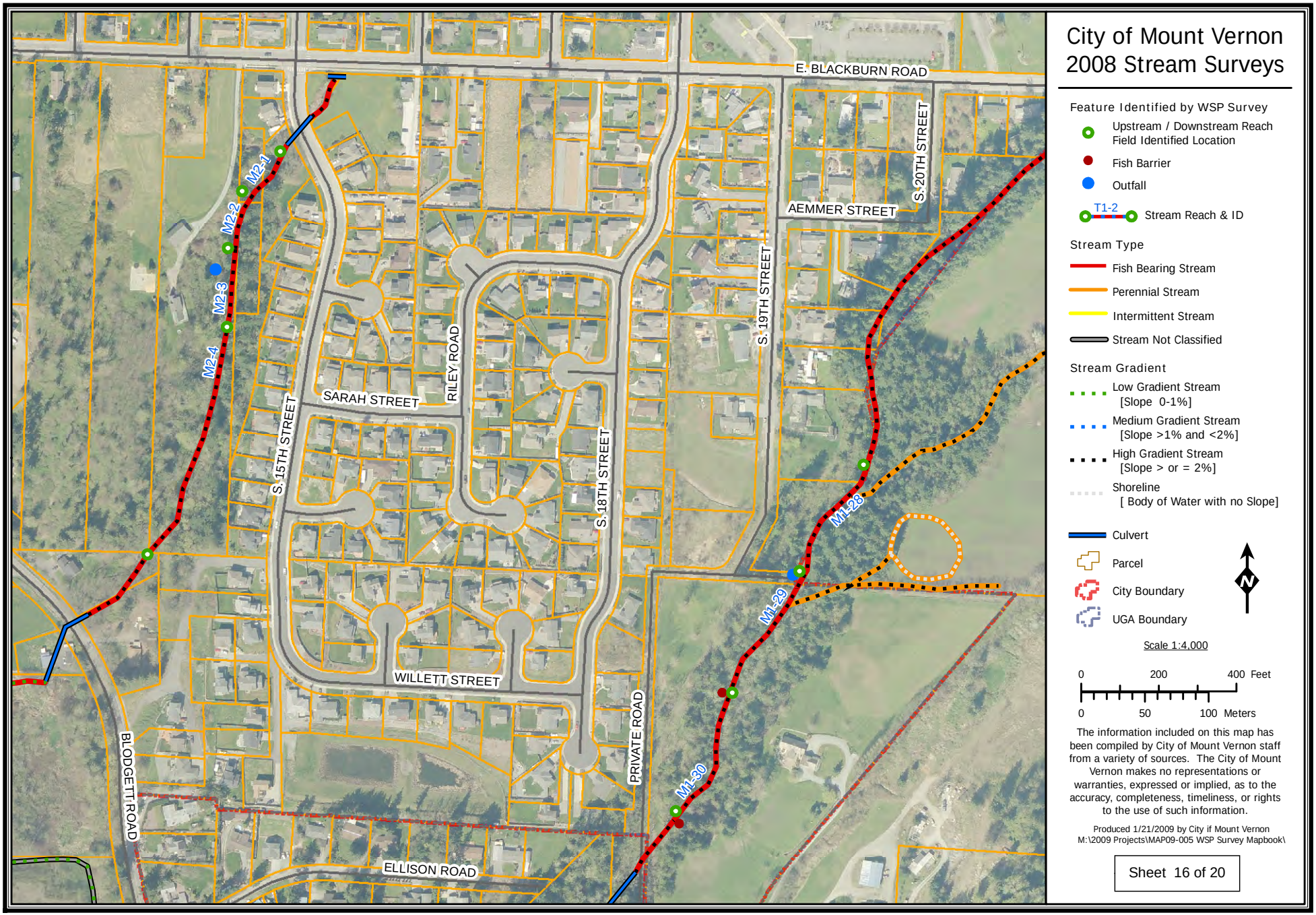

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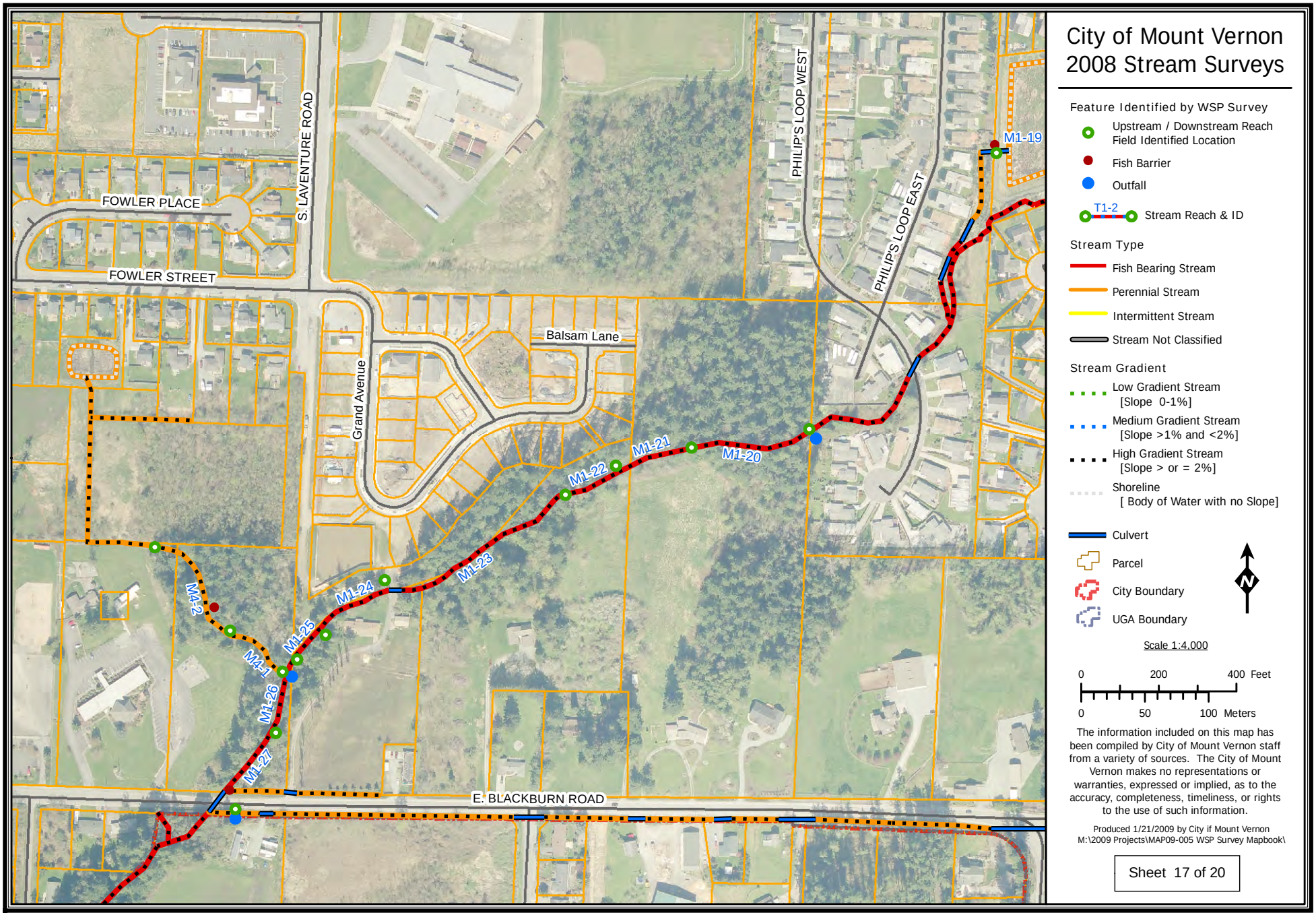

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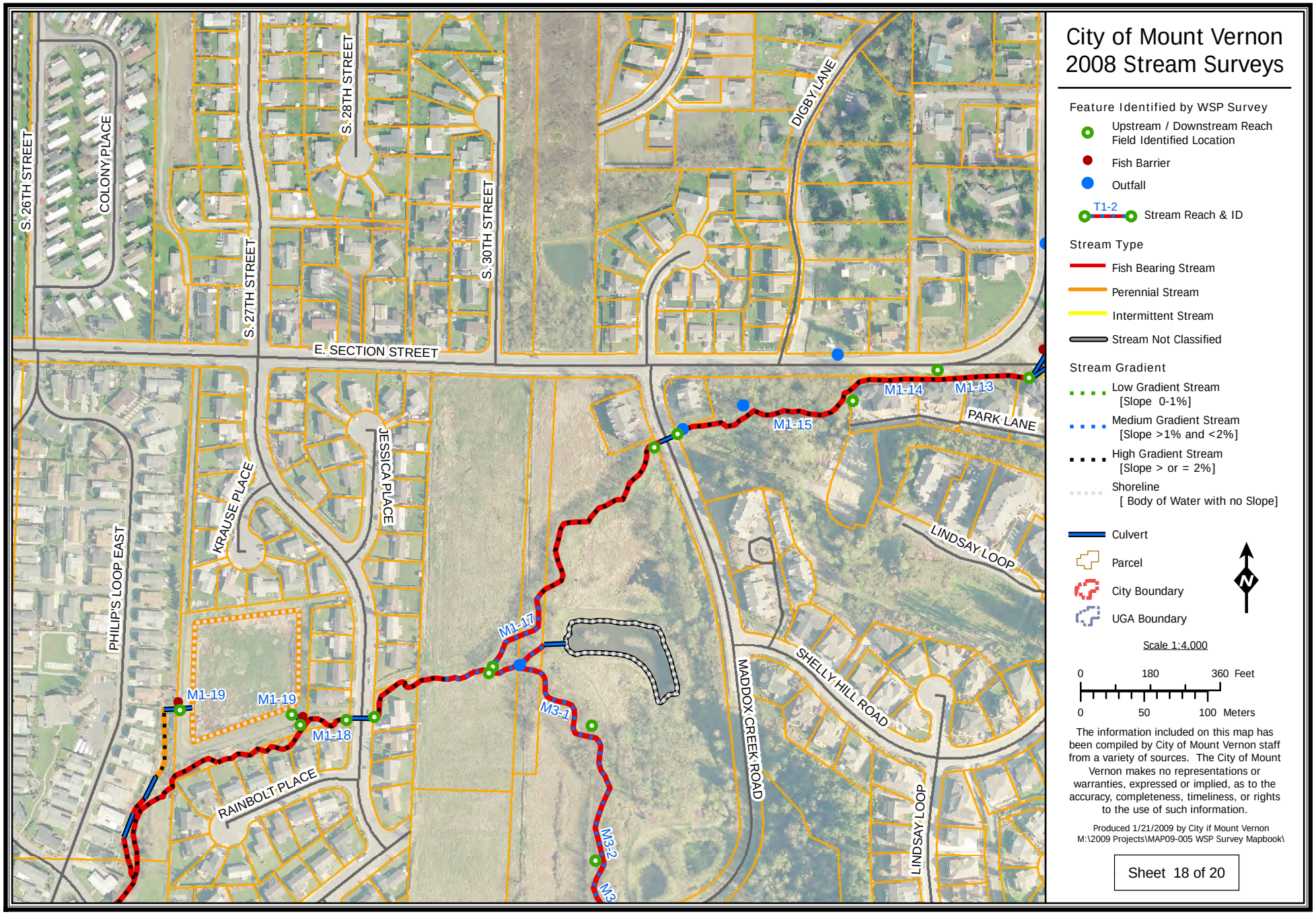
S. 26TH STREET
COLONY PLACE
S. 28TH STREET
S. 27TH STREET
S. 30TH STREET
DIGBY LANE
E. SECTION STREET
PARK LANE
M1-13
M1-14
M1-15
JESSICA PLACE
KRAUSE PLACE
PHILIP'S LOOP EAST
LINDSAY LOOP
M1-17
M3-1
M1-19
M1-19
M1-18
RAINBOLT PLACE
MADDOX CREEK ROAD
SHELLY HILL ROAD
LINDSAY LOOP
M3-2
M3
City of Mount Vernon
2008 Stream Surveys
Feature Identified by WSP Survey
Upstream / Downstream Reach
Field Identified Location
Fish Barrier
Outfall
T1-2
Stream Reach & ID
Stream Type
Fish Bearing Stream
Perennial Stream
Intermittent Stream
Stream Not Classified
Stream Gradient
Low Gradient Stream
[Slope 0-1%]
Medium Gradient Stream
[Slope >1% and <2%]
High Gradient Stream
[Slope > or = 2%]
Shoreline
[Body of Water with no Slope]
Culvert
Parcel
City Boundary
UGA Boundary
N
Scale 1:4,000
0
180
360 Feet
0
50
100 Meters
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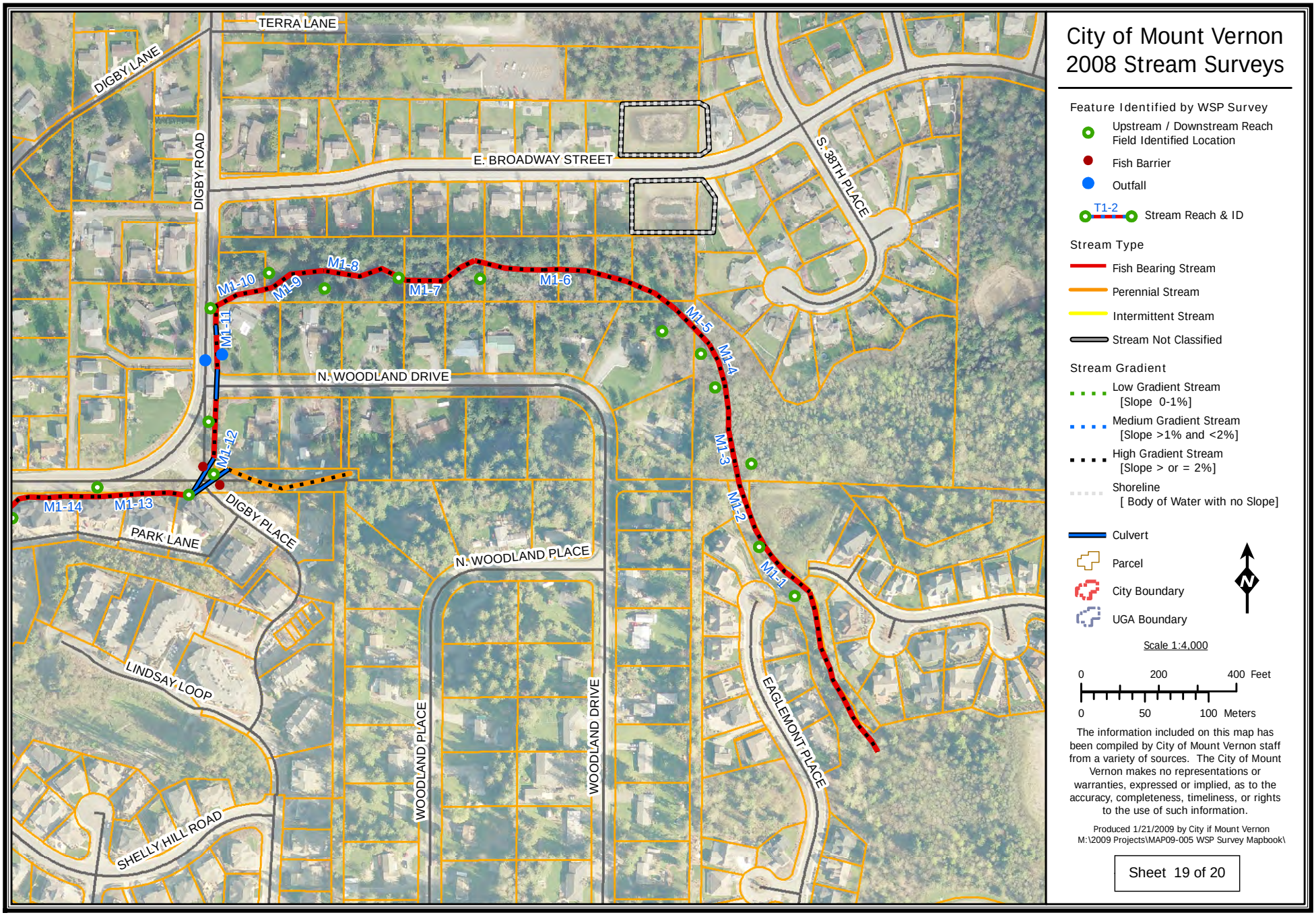
Sheet 18 of 20



City of Mount Vernon 2008 Stream Surveys

Feature Identified by WSP Survey

- Upstream / Downstream Reach Field Identified Location
- Fish Barrier
- Outfall
- T1-2 Stream Reach & ID

Stream Type

- Fish Bearing Stream
- Perennial Stream
- Intermittent Stream
- Stream Not Classified

Stream Gradient

- Low Gradient Stream [Slope 0-1%]
- Medium Gradient Stream [Slope >1% and <2%]
- High Gradient Stream [Slope > or = 2%]
- Shoreline [Body of Water with no Slope]

- Culvert
- Parcel
- City Boundary
- UGA Boundary

N

Scale 1:4,000

0 200 400 Feet

0 50 100 Meters

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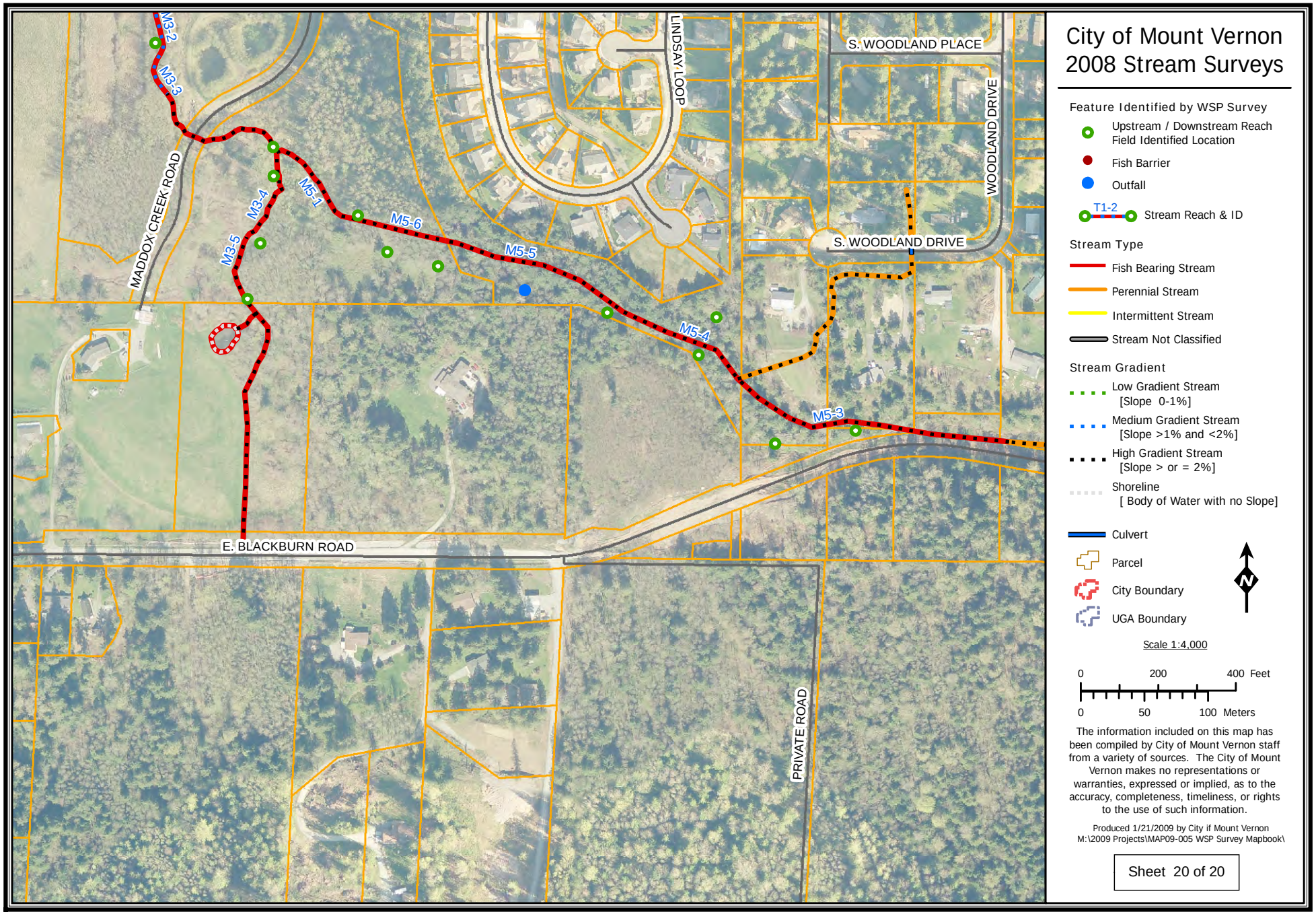

City of Mount Vernon 2008 Stream Surveys

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0 200 400 Feet

0 50 100 Meters

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Kulshan Creek Data

Data Sheet ID	Sub-basin	Sampling Date	Stream Location	Method of Reach Selection Upstream	Method of Reach Selection Downstream	Montgomery-Buffington Classification	Stream Gradient (%)	OHW Channel Width (ft)	OHW Channel Depth (ft)	Flood Prone Width (ft)	Side Channel Slope (LB)	Side Channel Slope (RB)
K-0	Kulshan	5/12/2008	At mouth of Kulshan Creek and Lions Park	Culvert	Natural Feature	Dune Ripple	<1	18	?	>100	100	100
K-1	Kulshan	5/7/2008	Riverside St at railroad tracks	Natural Feature	Culvert	Plane bed	<1	21.5	1.8	35	32	16
K-10	Kulshan	5/9/2008	Upstream of K-8	DNS	Culvert	Plane bed	<.5%	15.3	2.2	35	32	32
K-11	Kulshan	5/9/2008	Upstream of K-10	Natural Feature	Natural Feature	Plane bed	2	20.8	1.8	40	35	25
K-12	Kulshan	5/9/2008	Kulshan Creek and Willow Way	Culvert	Natural Feature	Plane bed	DNS	20.8	1.8	40	35	25
K-13	Kulshan	5/9/2008	Upstream of K-12	Culvert	Culvert	Step pool	2	19.5	3	30	55	40
K-14	Kulshan	5/9/2008	Upstream of K-13	Culvert	Culvert	Uncertain	0.5	DNS	DNS	DNS	DNS	DNS
K-15	Kulshan	5/9/2008	Upstream of K-14	Natural Feature	Culvert	Pool riffle	5	14	1.8	43	24	20
K-16	Kulshan	5/9/2008	Upstream of K-15	Natural Feature	Natural Feature	Pool riffle	?	7.7	1.4	35	34	22
K-17	Kulshan	5/12/2008	Upstream of K-16	Natural Feature	Natural Feature	Step pool	1	9.7	1.5	32	27	27
K-18	Kulshan	5/12/2008	Just south of trail next to LaVenture	Culvert	Natural Feature	Step pool	5	10.9	1.8	14	45	68
K-2	Kulshan	5/8/2008	Off Riverside Dr next to train tracks at culvert	Culvert	Culvert	Pool riffle	0.5	12.4	2.2	DNS	47	46
K-3	Kulshan	5/8/2008	Upstream of K2	Natural Feature	Natural Feature	Plane bed	0.5	27.8	2.2	45	19	16
K-4	Kulshan	5/8/2008	Chicken farm reach	Natural Feature	Natural Feature	Plane bed	0.5	28.5	3.1	32	42	35
K-5	Kulshan	5/8/2008	Off of Leigh Way east of chicken factory	Culvert	Natural Feature	Plane bed	2	14.8	2.4	25	32	34
K-6	Kulshan	5/8/2008	Upstream of chicken farm	Natural Feature	Culvert	Plane bed	<0.5	35.8	3.3	115	12	12
K-7	Kulshan	5/8/2008	Upstream of K-6	Culvert	Natural Feature	Plane bed	0.5	36.2	2.8	106	7	5
K-8	Kulshan	5/8/2008	Upstream of Culvert at apartment complex on LB	Culvert	Culvert	Plane bed	0.5	27.5	3.1	75	31	14
KTN-1	Kulshan	5/8/2008	Starts at confluence of KTN?KTS and Kulshan Creek at culvert	Culvert	Other - confluence with Kulshan Creek	Plane bed	1	22.9	2.1	48	31	25
KTN-2	Kulshan	5/8/2008	Upstream from KTN-1 at Williams Rd	Natural Feature	Culvert	Plane bed	<1	18.5	1.65	28	35	30
KTN-3	Kulshan	5/8/2008	Between College and Williams Way, near Buck Way	Culvert - under College Way	Natural Feature	Plane bed	<1	22	4	40	35	35
KTN-4	Kulshan	5/9/2008	Upstream of KTN-3	DNS	Culvert	Plane bed	<1	23.8	2.2	30	22	15
KTN-5	Kulshan	5/9/2008	Upstream of KTN-4 at city building near church	Culvert	Natural Featuer	Plane bed	<1	16.8	1.9	21	55	45
KTN-6	Kulshan	5/9/2008	Upstream of KTN-5, ends in front of city building	Culvert	Natural Feature	DNS	<1	16.3	2.3	23	41	40
KTN-7	Kulshan	5/9/2008	Upstream of KTN-6 ending at RR tracks	Culvert	Culvert	Plane bed	<1	34.4	2.3	44	5	10
KTN-8	Kulshan	5/9/2008	Upstream of KTN-7	Natural Feature	Culvert	N/A - ditched	1	7.3	1.8	20	30	20
KTNE-1	Kulshan	5/9/2008	In Church parking next to City building	Natural Feature	Culvert	Plane bed	1	7	1.5	12.3	40	25
KTS-1	Kulshan	5/8/2008	South of K-7 at apartment complex	Other - restoration grade control structure	Culvert	Plane bed	2	17.3	2.2	80	20	12
KTS-2	Kulshan	5/8/2008	DNS	Culvert	Other - grade control structure	Pool riffle	15	27	1.6	N/A culvert road crossing	N/A	N/A

Data Sheet ID	Entrenchment Ratio (OHW/OHW Depth)	Channel Quality Right Bank	Channel Quality Left Bank	Bank Stability rating (4 = stable, 1 = unstable)	Dominant Substrate	Large Wood Present (Y/N)	Number of Pieces of Large Wood	Number of Key Pieces (>20" Dia.) of Large Wood	Dominant Veg. Community Type Right Bank	Dominant Veg. Community Left Bank	Vegetation Quality Right Bank	Vegetation Quality Left Bank
K-0	DNS	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-1	11.9	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	4	0	Deciduous Forest	Deciduous Forest	Native	Native
K-10	7.0	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-11	11.6	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	3	0	Scrub shrub	Scrub shrub	Mixed	Mixed
K-12	11.6	Leveed	Leveed	4	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub	Non-native	Non-native
K-13	6.5	Leveed	Leveed	3	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub	Non-native	Non-native
K-14	DNS	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	N	0	0	Emergent	Emergent	Non-native	Non-native
K-15	7.8	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-16	5.5	Not artificially hardened	Not artificially hardened	3	Pebble	N	0	0	Deciduous Forest	Deciduous Forest	Native	Native
K-17	6.5	Not artificially hardened	Not artificially hardened	3	Pebble	Y	1	0	Deciduous Forest	Deciduous Forest	Native	Mixed
K-18	6.1	Not artificially hardened	Not artificially hardened	2	Cobble	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-2	5.6	Leveed	Leveed	3	Gravel	N	0	0	Scrub shrub	Scrub shrub	Non-native	Non-native
K-3	12.6	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	5	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-4	9.2	Leveed	Leveed	3	Sand/silt/clay	Y	1	0	Scrub shrub	Deciduous Forest	Mixed	Mixed
K-5	6.2	Leveed	Leveed	2	Sand/silt/clay	Y	9	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
K-6	10.8	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	5	0	Deciduous Forest	Emergent	Deciduous Forest	Emergent
K-7	12.9	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	4	0	Scrub shrub	Emergent	Mixed	Non-native
K-8	8.9	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	2	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
KTN-1	10.9	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	2	1	Deciduous Forest	Emergent	Mixed	Mixed
KTN-2	11.2	Leveed	Leveed	4	Sand/silt/clay	Y	3	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
KTN-3	5.5	Leveed	Leveed	?	Sand/silt/clay	Y	1	0	Emergent	Emergent	Non-native	Non-native
KTN-4	10.8	Leveed	Rip rap lined	3	Sand/silt/clay	Y	2	0	Deciduous Forest	Emergent	Mixed	Non-native
KTN-5	8.8	Leveed	Leveed	3	Sand/silt/clay	Y	4	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
KTN-6	7.1	Leveed	Leveed/ Rip rap lined	3	Sand/silt/clay	Y	2	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed
KTN-7	15.0	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	10	2	Deciduous Forest	Deciduous Forest	Mixed	Mixed
KTN-8	4.1	Leveed	Leveed	4	Sand/silt/clay	Y	1	0	Deciduous Forest	Emergent	Mixed	Mixed
KTNE-1	4.7	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Scrub-Shrub	Deciduous Forest	Mixed	Mixed
KTS-1	7.9	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	5	1	Deciduous Forest	Deciduous Forest	Native	Native
KTS-2	16.9	Rip rap lined	Rip rap lined	4	Gravel/pebble	N	0	0	Deciduous Forest	Deciduous Forest	Native	Native

Kulshan Creek Data

Data Sheet ID	Width of Contiguous Forest Canopy in Buffer Right Bank (ft)	Width of Contiguous Forest Canopy in Buffer Left Bank (ft)	Non-Native Species Present	Canopy Cover over Stream Channel (%)	Fish Observed (Y/N)	Residual Pools (#)	Fish Barriers Observed (Y/N)	Fish Habitat Remarks	Stormwater Outfalls Observed (#)
K-0	>150	>150	RUDI (30%), PHAR (5%)	52	N	0	N	none	0
K-1	0-30	30-150	HEHE (5%)	94	N	?	N	none	1
K-10	30-150	30-150	RUDI (30%), PHAR (50%)	80	Y	1	N	none	0
K-11	0	0	RUDI (70%)	70	N	1	N	none	0
K-12	0	0	RUDI (100%)	0	N	1	N	none	1
K-13	0	0	RUDI (90%), PHAR (10%)	5	Y	3	N	none	1
K-14	0	0	RUDI (5%), PHAR (5%)	5	N	0	N	Possible barrier at downstream culvert	0
K-15	30-150	30-150	RUDI (90%), PHAR (5%)	90	N	2	N	none	2
K-16	30-150	>150	ILAQ (1%)	80	N	0	N	none	1
K-17	30-150	>150	HEHE (10%), ILAQ (<1%)	80	N	0	N	none	0
K-18	0-30	30-150	RUDI (40%), POJA (5%), HEHE (10%)	60	N	1	Y	none	0
K-2	0	0	RUDI (85%)	10	N	1	N	none	0
K-3	30-150	30-150	RUDI (20%), PHAR (24%), HEHE (30%)	45	N	0	N	none	0
K-4	30-150	30-150	RUDI (80%), PHAR (5%), POJA (1%)	25	N	0	N	concrete chicken pad is a sediment source	0
K-5	0-30	30-150	RUDI (5%), PHAR (10%), ILAQ (<1%)	65	N	2	N	none	3
K-6	0	30-150	RUDI (5%), PHAR (80%)	8	N	2	N	none	1
K-7	30-150	0-30	RUDI (5%), PHAR (85%)	5	N	0	N	none	0
K-8	0-30	30-150	RUDI (10%), RULA (5%), PHAR (90%), ILAQ (1%)	50	N	0	N	none	1
KTN-1	30-150	0-30	PHAR (90%)	25	N	0	N	Poor water quality - stagnant	1
KTN-2	0-30	0-30	RUDI (10%), PHAR (15%), ILAQ (1%)	80	N	0	N	none	0
KTN-3	0-30	0-30	RUDI (5%), PHAR (90%)	5	N	0	Y	Poor water quality - stagnant	1
KTN-4	0-30	0	RUDI (15%), PHAR (90%)	10	N	0	N	Stagnant water	2
KTN-5	0-30	0-30	RUDI (20%), PHAR (50%), ILAQ (1%)	85	N	0	N	Stagnant water	1
KTN-6	0-30	0-30	RUDI (5%, PHAR (10%), ILAQ (10%)	85	N	?	N	Poor water quality	1
KTN-7	>150	>150	RUDI (5%), PHAR (10%), ILAQ (10%)	75	N	0	Y	Stagnant water	0
KTN-8	>150	0	RUDI (15%), PHAR (80%)	70	N	0	Y	Poor water quality	0
KTNE-1	0-30	30-150	RUDI (70%), PHAR (30%)	90	N	0	Y	Water quality	0
KTS-1	30-150	30-150	RUDI, PHAR	65	N	0	N	none	1
KTS-2	30-150	30-150	none	30	N	0	Y	Potential fish barrier due to steep gradient	0

Kulshan Creek Data

Data Sheet ID	Remarks	Upstream UTM Easting	Upstream UTM Northing	Upstream UTM Error (+/-)	Downstream UTM Easting	Downstream UTM Northing	Downstream UTM Error (+/-)	Investigators
K-0	Incised reach	548733	5364171	17'	N/A	N/A	DNS	SS, AM, SO
K-1	straight section	549317	5364537	24'	549278	5364492	DNS	KK, SS
K-10	none	550240	5364706	35'	550185	5364673	DNS	SS, KK, MM, AM
K-11	none	550261	5364706	DNS	550240	DNS	DNS	SS, KK, MM, AM
K-12	Reach ends at william way, totally covered by blackberries	550299	5364720	DNS	550261	5364706	DNS	SS, KK, MM, AM
K-13	End of reach upstream at 18th St.	550369	5364709	DNS	550340	5364717	DNS	SS, KK, MM, AM
K-14	none	550436	5364703	DNS	550388	5364720	DNS	SS, KK, MM, AM
K-15	Upstream from 19th St	550531	5364695	DNS	550487	5364699	27'	SS, KK, MM, AM
K-16	Tributary downstream near end of reach	550639	5364614	DNS	550531	5364695	DNS	SS, KK, MM, AM
K-17	none	550651	5364590	DNS	550639	5364614	23'	SS, AM, SO
K-18	none	550700	5364551	24'	550651	5364590	DNS	SS, AM, SO
K-2	none	549255	5364500	DNS	549223	5364466	DNS	SS, KK, MM
K-3	extensive sediment deposition just downstream from chicken coops	549385	5364577	DNS	549320	5364540	DNS	SS, KK, MM
K-4	reach follows along chicken factory	549385	5364577	DNS	549542	5364629	18'	SS, KK, MM
K-5	All along chicken farm - ends east of chicken farm at Leigh Road and Culvert	549719	5364643	DNS	549542	5364629	DNS	SS, KK, MM
K-6	Channel narrowly incised, but wide open floodplain.	549844	5364662	35'	549721	5364636	26'	SS, KK, MM
K-7	5 city lots. Ends upstream at culvert and confluence with 2 tributaries	549980	5364640	22'	549844	5364662	36'	SS, KK, MM
K-8	Large woody debris jam causing back up upstream, midway along reach. Lower portion of reach is very narrow and incised, a glide.	550167	5364671	DNS	550012	5364652	21'	SS, KK, MM
KTN-1	none	549980	5364743	18'	549981	5364645	60'	SS, KK, MM
KTN-2	none	549982	5364840	22'	549980	5364755	16'	SS, KK, MM
KTN-3	none	DNS	DNS	DNS	549982	5364840	DNS	SS, KK, MM
KTN-4	none	549976	5365086	13'	550036	5365000	15'	SS, KK, MM, AM
KTN-5	none	549962	5365177	27'	549988	5365107	DNS	SS, KK, MM, AM
KTN-6	none	549894	5365184	DNS	549956	5365191	DNS	SS, KK, MM, AM
KTN-7	Large ponded area.	549748	5365257	DNS	549866	5365207	14'	SS, KK, MM, AM
KTN-8	none	549770	5365311	29'	549731	5365278	43'	SS, KK, MM, AM
KTNE-1	Stream channel choked by non native vegetation.	550001	5365248	DNS	550074	5365102	DNS	SS, KK, MM, AM
KTS-1	An ephemeral tributary enters reach at UTM 10U 549973E 5364605N +/- 28'	549928	5364580	28'	549977	5364621	DNS	KK, SS, MM
KTS-2	Reach is entirely constructed gabion/rip rap lined with two large wood pieces placed across channel. Gravel has been installed.	549919	5364566	21'	549928	5364580	28'	KK, SS, MM

Maddox Creek Data

Data Sheet ID	Sub-basin	Sampling Date	Stream Location	Method of Reach Selection Upstream	Method of Reach Selection Downstream	Montgomery-Buffington Classification	Stream Gradient (%)	OHW Channel Width (ft)	OHW Channel Depth (ft)	Flood Prone Width (ft)
M1-1	Maddox	6/16/2008	Off of trail between north ends of Dogwood Pl. and Eaglemont Dr.	Culvert	Culvert	Pool riffle	1.5	5.5	0.4	9.2
M1-10	Maddox	6/18/2008	Downstream of M1-10, ends west of Broadway and Digby	Natural Feature	Natural Feature	Pool riffle	3	7	0.7	15
M1-11	Maddox	6/18/2008	Downstream of M1-10	Natural Feature	Natural Feature	Pool riffle	7	2.5	0.6	6
M1-12	Maddox	6/18/2008	Downstream of M1-11	Natural Feature	Culvert	Pool riffle	4	6.4	0.8	12
M1-13	Maddox	6/18/2008	Downstream of M1-12 at Digby Place	Culvert	Natural Feature	Pool riffle	4	4.8	0.6	10
M1-14	Maddox	6/18/2008	Downstream of M1-13	Natural Feature	Natural Feature	Step pool	9	6	0.9	13
M1-15	Maddox	6/18/2008	Downstream of M1-14	Natural Feature	Culvert	Pool riffle	2	6.8	1	13
M1-16	Maddox	6/18/2008	Downstream of M1-15 with the upstream end at Maddox Creek Rd	Culvert	Natural Feature	Pool riffle	1	17	1.3	24
M1-17	Maddox	6/18/2008	Downstream of M1-16 at confluence with tributary. Ends at 27th Street	Natural Feature	Culvert	N/A Glide	1	3.4	1.5	44
M1-18	Maddox	6/18/2008	Downstream of M1-17. Starts at 27th Street	Culvert	Culvert	Pool riffle	1	5.5	1.3	10
M1-19	Maddox	6/18/2008	Downstream of M1-18 across trail	Culvert	Culvert	N/A wetland complex	<1	N/A	N/A	N/A
M1-2	Maddox	6/16/2008	Downstream of M1-1	Culvert	Other - bridge	Pool riffle	6	1.9	0.5	2.9
M1-20	Maddox	6/19/2008	At fence upstream approximately 1/2 mile from La Venture Rd	Other - Fence	Natural Feature	Pool riffle	3	7	0.7	14
M1-21	Maddox	6/19/2008	Downstream of M1-20	Natural Feature	Natural Feature	Pool riffle	3	5.5	1	15
M1-22	Maddox	6/19/2008	Downstream of M1-21	Natural Feature	Natural Feature	Pool riffle	1	8.8	1.5	40
M1-23	Maddox	6/19/2008	Downstream of M1-22	Natural Feature	Culvert	Pool riffle	4	6.6	0.8	12
M1-24	Maddox	6/19/2008	Downstream of M1-23 at bridge over creek near development	Culvert	Natural Feature	Pool riffle	5	6.2	0.9	11
M1-25	Maddox	6/19/2008	Downstream of M1-24	Natural Feature	Natural Feature	Pool riffle	8	6.2	0.6	11
M1-26	Maddox	6/19/2008	Downstream of M1-26	Natural Feature	Natural Feature	Pool riffle	3	6.4	1.4	8
M1-27	Maddox	6/19/2008	Downstream of M1-26 ending at E Blackburn Rd	Natural Feature	Culvert	Pool riffle	3	8.7	0.8	10
M1-28	Maddox	6/19/2008	Dowstream of M1-27	Natural Feature	Natural Feature	Pool riffle	2	10	0.9	14
M1-29	Maddox	6/19/2008	Downstream of M1-28	Natural Feature	Natural Feature	Pool riffle	5	9.2	0.9	12
M1-3	Maddox	6/17/2008	Downstream of M1-2 starts at bridge	Other - bridge	Natural Feature - Confluene with small trib/wetland complex	Pool riffle	3	5.5	0.8	>50
M1-30	Maddox	6/19/2008	Downstream of M1-29	Natural Feature	Culvert	Pool riffle	2	12.8	0.8	20
M1-4	Maddox	6/17/2008	Downstream of M1-3	Natural Feature	Natural Feature	Pool riffle	2	4.9	0.6	16
M1-5	Maddox	6/17/2008	Downstream of M1-4	Natural Feature	Natural Feature	Pool riffle	1	6.6	0.7	24
M1-6	Maddox	6/18/2008	Downstream of M1-5	Natural Feature	Natural Feature	Pool riffle	3	10.6	0.8	22
M1-7	Maddox	6/18/2008	Downstream of M1-6	Natural Feature	Natural Feature	Pool riffle	2	4.6	0.7	16
M1-8	Maddox	6/18/2008	Downstream of M1-7	Natural Feature	Natural Feature	Pool riffle	4	5.6	0.8	?
M1-9	Maddox	6/18/2008	Downstream of M1-8	Natural Feature	Natural Feature	Pool riffle	1.5	3.1	0.8	42
M2-1	Maddox	6/20/2008	At 15th and Blackburn Rd, which is the headwaters of the branch	Culvert	Natural Feature	Step pool	14	6.3	1.2	8
M2-2	Maddox	6/20/2008	Downstream of M2-1	Natural Feature	Natural Feature	Step pool	12	7.3	0.8	12
M2-3	Maddox	6/20/2008	Downstream of M2-2	Natural Feature	Natural Feature	Step pool	9	7.8	1.1	16'
M2-4	Maddox	6/20/2008	Downstream of M2-3	Natural Feature	DNS	DNS	DNS	DNS	DNS	DNS
M3-1	Maddox	6/20/2008	At confluence with M1 reach, south of Maddox Cr. Rd	Natural Feature	Natural Feature	N/A Glide	2	6	1.1	14
M3-2	Maddox	6/20/2008	Upstream of M3-1	Natural Feature	Natural Feature	Pool riffle	2	2.6	0.7	7
M3-3	Maddox	6/20/2008	Upstream of M3-2	Natural Feature	Natural Feature	Pool riffle	2	6.5	0.9	12
M3-4	Maddox	6/20/2008	Upstream of M3-3	Natural Feature	Natural Feature	Pool riffle	3	5.7	0.9	11
M3-5	Maddox	6/20/2008	Upstream of M3-4	Other - barbed wire fence	Natural Feature	Pool riffle	2	DNS	DNS	DNS
M4-1	Maddox	6/20/2008	At confluence with M1 near LaVenture Rd	Natural Feature	Natural Feature	Pool riffle	1	4.3	0.7	5
M4-2	Maddox	6/20/2008	Upstream of M4-1	Natural Feature	Natural Feature	Pool riffle	2	4.7	0.8	6
M5-1	Maddox	8/14/2008	At downstream confluence with M3	Natural Feature	Natural Feature	Pool riffle	10	2.5	1.5	10
M5-3	Maddox	8/14/2008	Headwaters above slope wetland.	Natural Feature	Natural Feature	Pool riffle	15	2.8	0.5	51
M5-4	Maddox	8/14/2008	Downstream of M5-3	Natural Feature	Natural Feature	Pool riffle	5	DNS	DNS	DNS
M5-5	Maddox	8/14/2008	Downstream of M5-4	Natural Feature	Natural Feature	Pool riffle	12	4.2	0.4	DNS
M5-6	Maddox	8/14/2008	Downstream of M5-5	Natural Feature	Natural Feature	Pool riffle	DNS	1.5	0.8	DNS
M6-1	Maddox	8/14/2008	Headwaters ephemeral tributary off of Shelby Hill Road draining into M5	Natural Feature	Natural Feature	DNS	35	DNS	DNS	DNS

Data Sheet ID	Side Channel Slope (LB)	Side Channel Slope (RB)	Entrenchment Ratio (OHW/OHW Depth)	Channel Quality Right Bank	Channel Quality Left Bank	Bank Stability rating (4 = stable, 1 = unstable)	Dominant Substrate	Large Wood Present (Y/N)	Number of Pieces of Large Wood	Number of Key Pieces (>20" Dia.) of Large Wood	Dominant Veg. Community Type Right Bank	Dominant Veg. Community Left Bank
M1-1	22	16	13.8	Not artificially hardened	Rip rap lined	4	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest
M1-10	16	18	10.0	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Deciduous Forest	Deciduous Forest
M1-11	37	55	4.2	Ditched/Leveed	Ditched/Leveed	4	Pebble	N	0	0	Emergent	Emergent
M1-12	31	15	8.0	Rip rap lined	Rip rap lined	4	Pebble	N	0	0	Deciduous Forest	Emergent
M1-13	60	46	8.0	Rip rap lined	Rip rap lined	4	Pebble	N	0	0	Deciduous Forest	Scrub-shrub
M1-14	39	35	6.7	Rip rap lined	Rip rap lined	4	Pebble	N	0	0	Deciduous Forest	Deciduous Forest
M1-15	36	25	6.8	Not artificially hardened	Not artificially hardened	2	Pebble	Y	6	1	Deciduous Forest	Deciduous Forest
M1-16	21	18	13.1	Not artificially hardened	Not artificially hardened	3	Gravel	Y	16	2	Deciduous Forest	Deciduous Forest
M1-17	47	65	2.3	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	1	0	Emergent	Emergent
M1-18	45	38	4.2	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub
M1-19	N/A	N/A	N/A	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Emergent	Emergent
M1-2	70	35	3.8	Not artificially hardened	Not artificially hardened	2	Gravel	N	0	0	Deciduous Forest	Deciduous Forest
M1-20	40	24	10.0	Not artificially hardened	Not artificially hardened	3	Pebble	Y	6	0	Conifer Forest	Conifer Forest
M1-21	45	50	5.5	Not artificially hardened	Not artificially hardened	3	Gravel	Y	3	0	Conifer Forest	Conifer Forest
M1-22	25	45	5.9	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	N	0	0	Conifer Forest	Conifer Forest
M1-23	22	20	8.3	Not artificially hardened	Not artificially hardened	3	Gravel	Y	11	3	Conifer Forest	Conifer Forest
M1-24	34	27	6.9	Rip rap lined	Rip rap lined	3	Sand/silt/clay	N	0	0	Conifer Forest	Conifer Forest
M1-25	45	40	10.3	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	3	1	Conifer Forest	Conifer Forest
M1-26	25	100	4.6	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	7	2	Conifer Forest	Conifer Forest
M1-27	32	36	10.9	Not artificially hardened	Not artificially hardened	3	Pebble	Y	9	1	Conifer Forest	Conifer Forest
M1-28	18	20	11.1	Not artificially hardened	Not artificially hardened	3	Pebble	Y	3	0	Conifer Forest	Conifer/Deciduous
M1-29	35	43	10.2	Not artificially hardened	Not artificially hardened	3	Cobble	Y	7	0	Conifer Forest	Conifer Forest
M1-3	17	25	6.9	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	2	1	Deciduous Forest	Deciduous Forest
M1-30	27	34	16.0	Not artificially hardened	Not artificially hardened	3	Pebble	Y	6	0	Conifer Forest	Conifer/Deciduous
M1-4	12	15	8.2	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	1	1	Deciduous Forest	Deciduous Forest
M1-5	15	25	9.4	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	1	0	Deciduous Forest	Deciduous Forest
M1-6	5	7	13.3	Not artificially hardened	Not artificially hardened	3	Gravel	Y	7	2	Conifer/Deciduous	Conifer/Deciduous
M1-7	27	20	6.6	Not artificially hardened	Not artificially hardened	2	Gravel	Y	3	1	Conifer Forest	Conifer Forest
M1-8	15	?	7.00	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	1	1	Conifer/Deciduous	Conifer/Deciduous
M1-9	9	17	3.9	Not artificially hardened	Not artificially hardened	4	Gravel	N	0	0	Emergent	Emergent
M2-1	92	85	5.3	Rip rap lined	Rip rap lined	1	Boulder	N	0	0	Deciduous Forest	Deciduous Forest
M2-2	150	75	9.1	Not artificially hardened	Not artificially hardened	1	Sand/silt/clay	Y	8	2	Conifer/Deciduous	Conifer/Deciduous
M2-3	85	60	7.1	Not artificially hardened	Not artificially hardened	2	Cobble	Y	5	0	Conifer/Deciduous	Conifer/Deciduous
M2-4	DNS	DNS	DNS	Not artificially hardened	Not artificially hardened	DNS	DNS	Y	>5	?	Conifer/Deciduous	Conifer/Deciduous
M3-1	35	35	5.5	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	4	0	Deciduous Forest	Deciduous Forest
M3-2	25	33	3.7	Not artificially hardened	Not artificially hardened	3	Pebble	Y	10	0	Deciduous Forest	Deciduous Forest
M3-3	55	30	7.2	Not artificially hardened	Not artificially hardened	3	Gravel	Y	17	0	Deciduous Forest	Deciduous Forest
M3-4	44	33	6.3	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Deciduous Forest	Deciduous Forest
M3-5	DNS	DNS	DNS	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Deciduous Forest	Deciduous Forest
M4-1	99	105	6.1	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest
M4-2	85	55	5.9	Not artificially hardened	Not artificially hardened	2	Gravel	N	0	0	Conifer Forest	Conifer Forest
M5-1	12	25	1.7	Not artificially hardened	Not artificially hardened	3	Pebble	N	0	0	Deciduous Forest	Deciduous Forest
M5-3	45	30	5.6	Not artificially hardened	Not artificially hardened	4	Gravel	Y	>1	0	Conifer Forest	Conifer Forest
M5-4	DNS	DNS	DNS	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	>5	0	Conifer/Deciduous	Deciduous Forest
M5-5	28	15	10.5	Not artificially hardened	Not artificially hardened	4	Gravel	Y	1	0	Conifer Forest	Conifer Forest
M5-6	DNS	DNS	1.9	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest
M6-1	DNS	DNS	DNS	Not artificially hardened	Not artificially hardened	DNS	DNS	DNS	DNS	DNS	DNS	DNS

Data Sheet ID	Vegetation Quality Right Bank	Vegetation Quality Left Bank	Width of Contiguous Forest Canopy in Buffer Right Bank (ft)	Width of Contiguous Forest Canopy in Buffer Left Bank (ft)	Non-Native Species Present	Canopy Cover over Stream Channel (%)	Fish Observed (Y/N)	Residual Pools (#)	Fish Barriers Observed (Y/N)	Fish Habitat Remarks
M1-1	Mixed	Mixed	0-30	0-30	RUDI (2%), PHAR (20%)	85	N	0	Y	none
M1-10	Mixed	Mixed	0-30	0-30	RUDI (10%), RULA (1%), PHAR (5%), ILAQ (1%)	70	N	0	N	none
M1-11	Non-native	Non-native	0	0	PHAR (80%)	0	N	0	N	none
M1-12	Mixed	Non-native	0-30	0	RUDI (5%), POJA (80%), PHAR (1%)	20	N	1	Y	none
M1-13	Mixed	Mixed	0-30	0-30	RUDI (30%), POJA (10%), PHAR (40%)	65	N	0	N	none
M1-14	Mixed	Mixed	0-30	0-30	RUDI (2%), PHAR (10%)	90	N	2	N	none
M1-15	Mixed	Mixed	0-30	0-30	RUDI (5%), PHAR (2%)	90	N	2	N	none
M1-16	Mixed	Mixed	0-30	0-30	RUDI (5%), PHAR (10%)	85	N	3	N	none
M1-17	Mixed	Mixed	0	0	RUDI (5%), RULA (5%), PHAR (90%)	5	N	0	N	none
M1-18	Non-native	Non-native	DNS	DNS	RUDI (60%), PHAR (20%)	10	N	2	Y	none
M1-19	Native	Native	0	0	PHAR (10%)	0	N	N/A	Y	wetland
M1-2	Mixed	Mixed	30-150	30-150	RUDI (30%)	75	N	0	N	none
M1-20	Native	Native	>150	>150	ILAQ (1%)	80	Y	5	N	none
M1-21	Native	Native	30-150	30-150	RULA (1%)	90	N	4	N	none
M1-22	Native	Native	30-150	30-150	ILAQ (1%)	50	N	2	Y	none
M1-23	Native	Native	30-150	30-150	ILAQ (1%)	55	N	3	N	none
M1-24	Mixed	Mixed	30-150	30-150	RUDI (2%), RULA (1%), PHAR (1%), HEHE (5%), ILAQ (2%)	50	N	4	N	none
M1-25	Native	Mixed	>150	30-150	RUDI (3%), RULA (1%), HEHE (2%), ILAQ (1%)	?	N	1	N	none
M1-26	Native	Native	30-150	30-150	RUDI (1%), ILAQ (1%)	85	N	2	N	none
M1-27	Native	Native	30-150	30-150	ILAQ (1%)	80	N	0	N	none
M1-28	Native	Native	30-150	30-150	RUDI (1%), RULA (2%), HEHE (2%)	70	Y	4	N	salmonid fry
M1-29	Native	Native	30-150	30-150	none	95	N	6	Y	none
M1-3	Native	Native	>150	>150	RUDI (10%)	70	N	0	N	none
M1-30	Native	Native	30-150	30-150	ILAQ (1%)	75	Y	4	Y	none
M1-4	Mixed	Mixed	30-150	30-150	RUDI (15%)	65	N	0	N	none
M1-5	Native	Native	30-150	0-30	ILAQ (1%)	65	N	0	N	none
M1-6	Native	Native	30-150	0-30	HEHE (1%)	70	N	0	N	none
M1-7	Native	Native	30-150	30-150	none	85	N	1	N	none
M1-8	Native	Native	30-150	30-150	RUDI (10%), PHAR (1%)	50	N	0	N	none
M1-9	Mixed	Native	30-150	30-150	RUDI (20%), RULA (2%)	5	N	0	N	none
M2-1	Non-native	Non-native	0-30	0-30	RUDI (60%), POJA (10%)	85	N	3	N	Extremely degraded, steep gradient
M2-2	Mixed	Mixed	30-150	30-150	RUDI (5%)	75	N	3	N	none
M2-3	Mixed	Mixed	30-150	30-150	RUDI (40%), ILAQ (2%)	75	N	2	N	none
M2-4	Mixed	Mixed	30-150	30-150	RUDI (80%)	DNS	DNS	DNS	DNS	DNS
M3-1	Mixed	Mixed	0-30	0-30	RUDI (2%), RULA (1%), PHAR (15%)	85	N	0	N	none
M3-2	Native	Native	0-30	0-30	RUDI (2%), RULA (1%), PHAR (5%)	80	N	3	N	none
M3-3	Mixed	Mixed	0-30	0-30	RUDI (5%), RULA (2%), PHAR (1%), ILAQ (1%)	90	Y	5	N	Fish appeared eel-like, probably a lamprey.
M3-4	Mixed	Mixed	30-150	30-150	RUDI (10%), RULA (3%)	70	N	1	N	none
M3-5	Mixed	Mixed	0-30	>150	RUDI (70%), RULA (10%), PHAR (5%), ILAQ (1%)	65	N	3	N	none
M4-1	Mixed	Mixed	30-150	30-150	RUDI (70%), RULA (10%)	30	N	1	N	none
M4-2	Mixed	Native	>150	30-150	RUDI (5%), RULA (2%), PHAR (1%)	60	N	0	Y	none
M5-1	Mixed	Mixed	>150	>150	RUDI (20%), RULA (20%), PHAR (5%)	90	N	0	Y	seasonally dry
M5-3	Mixed	Mixed	>150	0-30	RUDI (30%), RULA (5%)	80	N	0	N	Trickle of flow
M5-4	Native	Mixed	>150	30-150	RUDI (20%), RULA (5%), PHAR (5%)	85	N	0	N	none
M5-5	Native	Native	30-150	>150	RUDI (5%)	95	N	0	N	none
M5-6	Native	Native	>150	>150	RUDI (5%)	90	N	0	N	none
M6-1	DNS	DNS	DNS	DNS	DNS	DNS	N	0	Y	Ephemeral tributary

Data Sheet ID	Stormwater Outfalls Observed (#)	Remarks	Upstream UTM Easting	Upstream UTM Northing	Upstream UTM Error (+/-)	Downstream UTM Easting	Downstream UTM Northing	Downstream UTM Error (+/-)	Investigators
M1-1	0	Headwaters of Maddox Creek. There may be a little more creek upstream, but it is very difficult to access. There are two similar channels on either side of a walking path.	552481	5362438	16'	552452	5362476	18'	SS, MM
M1-10	0	none	552061	5362680	28'	552016	5362651	22'	SS, AM
M1-11	2	none	552016	5362651	22'	552017	5362562	23'	SS, AM
M1-12	0	none	552017	5362562	23'	552022	5362521	26'	SS, AM
M1-13	0	none	552003	5362504	20'	551931	5362508	26'	SS, AM
M1-14	0	none	551931	5362508	26'	551865	5362482	27'	SS, AM
M1-15	2	none	551865	5362482	27'	551728	5362452	15'	SS, AM
M1-16	0	LWD and pebbles have been placed in reach for restoration. One small trib enters midway down reach.	551710	5362441	16'	551588	5362265	13'	SS, AM
M1-17	0	Reach is in a grass field	551588	5362265	13'	551496	5362223	14'	SS, AM
M1-18	0	none	551474	5362220	15'	551438	5362215	18'	SS, AM
M1-19	0	Stream channel flows into and becomes large depressional wetland dominated by Typha Latifolia	551431	5362223	15'	551343	5362224	17'	SS, AM
M1-2	0	none	552452	5362476	18'	552444	5362541	21'	SS, MM
M1-20	1	none	551202	5362003	24'	551110	5361986	32'	SS, AM, MM
M1-21	0	none	551110	5361986	32'	551051	5361970	23'	SS, AM, MM
M1-22	0	Pair of Great Horned Owls observed perched in tree next to stream	551051	5361970	23'	551012	5361946	21'	SS, AM, MM
M1-23	0	none	551012	5361946	21'	550872	5361875	18'	SS, AM, MM
M1-24	0	none	550872	5361875	18'	550827	5361831	20'	SS, AM, MM
M1-25	0	Channel is incised with a clay bed.	550827	5361831	20'	550805	5361811	26'	SS, AM, MM
M1-26	0	Side tributary enters at UTM 10u 550803E 5361786N +/- 23'	550805	5361811	26'	550790	5361753	27'	SS, AM, MM
M1-27	0	none	550790	5361753	27'	550760	5361692	13'	SS, AM, MM
M1-28	0	Tributary enters at UTM 10u 550558E 5361373N +/- 19'	550552	5361395	19'	550504	5361310	19'	SS, AM, MM
M1-29	1	none	550504	5361310	19'	550454	5361213	21'	SS, AM, MM
M1-3	0	none	552444	5362541	21'	552414	5362600	17'	SS, MM
M1-30	0	Ends at culvert, which is presumed to be line of city limits.	550454	5361213	21'	550412	5361119	27'	SS, AM, MM
M1-4	0	none	552414	5362600	17'	552402	5362626	22'	SS, MM
M1-5	0	none	552402	5362626	22'	552359	536251	23'	SS, MM
M1-6	0	none	552371	5362643	25'	552227	5362680	27'	SS, AM
M1-7	0	none	552227	5362680	25'	552163	5362679	22'	SS, AM
M1-8	0	none	552163	5362679	22'	552105	5362669	25'	SS, AM
M1-9	0	none	552105	5362669	25'	552061	5362680	28'	SS, AM
M2-1	0	Degraded, rip rap in channel.	550087	5361628	21'	550058	5361596	21'	SS, AM
M2-2	0	Severely incised with unstable side slopes	550058	5361596	21'	550048	5361551	29'	SS, AM
M2-3	1	none	550048	5361551	29'	550049	5361489	22'	SS, AM
M2-4	DNS	Stream was inaccessible below the upstream limit. It was very thick with blackberries in the channel, and the steep side channel slopes made travelling around impossible.	550049	5361489	22'	DNS	DNS	DNS	SS, AM
M3-1	1	Tributary from pond enters at UTM 10u 551602E 5362272N +/- 21'	551667	5362221	33'	551585	5362260	21'	SS, AM
M3-2	0	100% alder canopy with no conifers. Adjacent fields are phalaris dominated wetlands.	551673	5362115	29'	551667	5362221	33'	SS, AM
M3-3	0	Extensive large wood placement in channel as grade control structures and for bank armouring.	551769	5362013	17'	551673	5362115	29'	SS, AM
M3-4	0	Tributary enters reach at UTM 10u 551769E 5361982N +/- 18'	551760	5361960	16'	551769	5362013	17'	SS, AM
M3-5	0	The cross section was not measured because there were extensive blackberries.	551751	5361916	15'	551760	5361960	16'	SS, AM
M4-1	1	Reach is severely incised down to a clay bottom.	550752	5361832	22'	550794	5361801	22'	SS, AM
M4-2	0	none	550691	5361896	33'	550752	5361832	22'	SS, AM
M5-1	0	Ephemeral stream	551836	5361984	31'	551768	5362036	32'	SS, KK
M5-3	0	The stream becomes a slope wetland above this reach, flow is subsurface.	552232	5361826	24'	552169	5361814	18'	SS, KK
M5-4	0	none	552169	5361814	18'	552034	5361913	23'	SS, KK
M5-5	0	Trickle of flow	552034	5361913	23'	551900	5361946	26'	SS, KK
M5-6	0	Assumed to connect to M5-1 via slope wetland through thick blackberries. Kate found creek drops into subsurface channel.	551900	5361946	26'	551860	5361956	21'	SS, KK
M6-1	0	none	552120	5361912	24'	552107	5361882	28'	SS, KK

Data Sheet ID	Sub-basin	Sampling Date	Stream Location	Method of Reach Selection Upstream	Method of Reach Selection Downstream	Montgomery-Buffington Classification	Stream Gradient (%)	OHW Channel Width (ft)	OHW Channel Depth (ft)	Flood Prone Width (ft)
T1-1	Trumpeter	5/12/2008	Off College Way near 42nd Place, northwest of nursery	Culvert	Property Boundary	Pool riffle	3	6.8	2.1	50
T1-10	Trumpeter	5/15/2008	W of Seneca St	Natural Feature	Natural Feature	Pool riffle	2	6	0.7	16
T1-11	Trumpeter	5/15/2008	In Bakerview Park	Natural Feature	Natural Feature	Pool riffle	1	7.2	1.1	36
T1-12	Trumpeter	5/15/2008	In Bakerview Park	Culvert (bridge)	Natural Feature	Pool riffle	<0.5	8.4	1.4	14
T1-13	Trumpeter	5/15/2008	Bridge at Bakerview Park	Natural Feature	Culvert	Pool riffle	1	12.3	0.9	23
T1-14	Trumpeter	5/15/2008	Bakerview Park	Other	Other	Pool riffle	2	7.6	1.5	20
T1-15	Trumpeter	5/15/2008	South end of Bakerview Park	Culvert	Other	Pool riffle	1	6.7	0.7	19
T1-16	Trumpeter	5/19/2008	N of East Division Street	Culvert	Natural Feature	Pool riffle	5	5.3	0.7	13
T1-17	Trumpeter	5/19/2008	North of Division Street	Natural Feature	Natural Feature	Pool riffle	3	5.9	0.5	>50
T1-18	Trumpeter	5/19/2008	Upstream of T1-18	Natural Feature	Ditch	Pool riffle	8	5.2	0.5	15
T1-19	Trumpeter	5/19/2008	Upstream of T1-20	Ditch	Natural Feature	N/A Ditch	4	6	2.4	N/A
T1-2	Trumpeter	5/13/2008	South of College Way and plant nursery	Natural feature	Culvert	Pool riffle	1	13.9	2	26
T1-20	Trumpeter	5/19/2008	East of Sioux and Shoshone	Natural Feature	Culvert	Pool riffle	2	3.4	0.4	15
T1-21	Trumpeter	5/19/2008	East of Sioux and Shoshone	Culvert	fence across channel	Pool riffle	4	5.3	0.75	19
T1-22	Trumpeter	5/19/2008	Upstream of T1-23	Fence	Culvert	Pool riffle	5	?	?	6'
T1-23	Trumpeter	5/19/2008	At Mohawk and Shoshone	Culvert	Natural Feature	Step Pool	10	6.4	0.5	16
T1-24	Trumpeter	5/19/2008	Upstream of T1-25	Natural Feature	Culvert	Step Pool	16	7.7	0.7	10
T1-25	Trumpeter	5/19/2008	North of Apache St	Culvert	Natural Feature	Plan bed	6	6.3	0.7	9
T1-26	Trumpeter	5/19/2008	South of Bakerview Park	Natural Feature	Culvert	Pool riffle	3	3.9	1	14
T1-3	Trumpeter	5/13/2008	South of College Way and N 40th Place	Culvert	Natural Feature	dune ripple (incised)	< 0.5	16	3.2	25
T1-4	Trumpeter	5/13/2008	East of Waugh Rd by culvert	Culvert	Natural Feature	dune ripple (incised)	< 0.5	8.5	2	22
T1-5	Trumpeter	5/13/2008	Upstream of T1-6	Natural Feature	Culvert	dune ripple (incised)	< 0.5	9	2.1	27
T1-6	Trumpeter	5/13/2008	East of Waugh Rd	Culvert	Natural Feature	dune ripple (incised)	< 0.5	N/A	N/A	N/A
T1-7	Trumpeter	5/14/2008	West of Waugh Rd, South of College Way	Natural Feature	Culvert	Pool riffle	1	8.8	1.9	19
T1-8	Trumpeter	5/14/2008	Upstream of T1-7	Other - Placed grade control structure (log)	Natural Feature	Pool riffle	2	10.4	1.4	22
T1-9	Trumpeter	5/15/2008	East of Bakerview Park	Natural Feature	Natural Feature	Pool riffle	2	11.5	1.5	20
T1BPT-1	Trumpeter	5/15/2008	Along northern boundary of Bakerview Park	Other - concrete wall with open space	Natural feature - confluence with Trumpeter mainstem	N/A Ditch	1	8.5	1.6	>50
T1BPT-2	Trumpeter	5/15/2008	North end of Bakerview Park	Culvert	Other	N/A Ditch	1	2.8	0.7	10
T1BPT-3	Trumpeter	5/15/2008	West of Bakerview park	Natural Feature - confluence with Logan Creek	Culvert	N/A Ditch	<1	5	2	?
T1ST-1	Trumpeter	5/13/2008	South of nursery on College Way	Natural Feature	Natural Feature	Pool riffle	4	8.8	1.6	15
T1ST-10	Trumpeter	5/14/2008	Upstream of T1ST-9	Natural Feature	Natural Feature	Step pool	4	9.3	0.8	13
T1ST-11	Trumpeter	5/14/2008	Upstream of T1ST-10	Natural Feature	Natural Feature	Step pool	15	no measurement	no measurement	no measurement
T1ST-12	Trumpeter	5/14/2008	Above large wood cascade	Natural Feature	Natural Feature	Step pool	8	3.8	0.3	6
T1ST-13	Trumpeter	5/14/2008	Upstream of T1ST-12	Culvert	Natural Feature	Step pool/ Bedrock	8	3.8	0.7	17
T1ST-14	Trumpeter	5/14/2008	At culvert at development project north of Division St.	Other - barbed wire fence with property boundary	Culvert	Uncertain	1	7.3	0.7	uncertain - adjacent wetland complex
T1ST-15	Trumpeter	5/19/2008	North of Division Street	Culvert	Other - barbed wire fence and property line	Pool riffle	4	7.3	0.7	64
T1ST-2	Trumpeter	5/13/2008	Upstream of T1ST-1	Natural Feature	Natural Feature	Pool riffle	4	7.1	1.6	14
T1ST-3	Trumpeter	5/13/2008	Upstream of T1ST-2	Natural Feature	Natural Feature	Pool riffle	4	9.1	1.7	16
T1ST-5	Trumpeter	5/13/2008	Ends at Seneca and Apache	Culvert	Culvert	Pool riffle	3	10.8	1.7	20
T1ST-6	Trumpeter	5/13/2008	South of Seneca St and Apache	Natural Feature	Culvert	Cascade	5	9	1	16
T1ST-7	Trumpeter	5/13/2008	Upstream of T1ST-6	Natural Feature	Natural Feature	Step pool	7	7.2	1	19.5
T1ST-8	Trumpeter	5/14/2008	By treehouse upstream of Kiowa Drive	Natural Feature	Natural Feature	Plane bed	5	7.8	1.1	10
T1ST-9	Trumpeter	5/14/2008	Upstream of Kiowa St	Natural Feature	Natural Feature	Step pool	6	9.3	1	13

Data Sheet ID	Side Channel Slope (LB)	Side Channel Slope (RB)	Entrenchment Ratio (OHW/OHW Depth)	Channel Quality Right Bank	Channel Quality Left Bank	Bank Stability rating (4 = stable, 1 = unstable)	Dominant Substrate	Large Wood Present (Y/N)	Number of Pieces of Large Wood	Number of Key Pieces (>20" Dia.) of Large Wood	Dominant Veg. Community Type Right Bank	Dominant Veg. Community Left Bank
T1-1	37	34	3.24	Not artificially hardened	Not artificially hardened	2	Gravel	N	0	0	Deciduous forest	Emergent
T1-10	16	13	8.57	Not artificially hardened	Not artificially hardened	3	Pebble	Y	7	6	Conifer/Deciduous	Deciduous Forest
T1-11	10	22	6.55	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	8	2	Deciduous Forest	Conifer/Deciduous
T1-12	35	35	6.00	Not artificially hardened	Not artificially hardened	3	Sand/silt/clay	Y	7	3	Deciduous Forest	Deciduous Forest
T1-13	21	22	13.67	Not artificially hardened	Not artificially hardened	3	Pebble	Y	7	3	Deciduous Forest	Deciduous Forest
T1-14	28	53	5.07	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	4	2	Scrub Shrub	Deciduous Forest
T1-15	12	24	9.57	Rip rap lined	Not artificially hardened	3	Pebble	Y	3	2	Emergent	Deciduous Forest
T1-16	6	6	7.57	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub
T1-17	8	7	11.80	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	1	0	Deciduous Forest	Deciduous Forest
T1-18	5	8	10.40	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Conifer Forest	Conifer Forest
T1-19	47	47	2.50	Leveed	Leveed	2	Pebble	N	0	0	Conifer Forest	Conifer Forest
T1-2	24	25	6.95	Not artificially hardened	Not artificially hardened	2	Gravel	Y	9	0	Deciduous forest	Scrub shrub
T1-20	DNS	DNS	8.50	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Conifer Forest	Conifer Forest
T1-21	28	13	7.07	Not artificially hardened	Not artificially hardened	2	Gravel	N	0	0	Conifer Forest	Conifer Forest
T1-22	33	110	?	Rip rap lined	Rip rap lined	2	Gravel	N	0	0	Emergent	Emergent
T1-23	27	55	12.80	Not artificially hardened	Not artificially hardened	2	Cobble	N	0	0	Conifer Forest	Conifer Forest
T1-24	55	vertical	11.00	Not artificially hardened	Not artificially hardened	2	Pebble	Y	2	0	Scrub Shrub	Scrub Shrub
T1-25	72	80	9.00	Not artificially hardened	Not artificially hardened	2	Pebble	N	0	0	Conifer forest	Conifer forest
T1-26	23	33	3.90	Leveed	Leveed	4	Gravel	N	0	0	Scrub shrub	Scrub shrub
T1-3	27	29	5.00	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Scrub Shrub	Deciduous Forest
T1-4	38	36	4.25	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Scrub Shrub
T1-5	50	50	4.29	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub
T1-6	N/A	N/A	N/A	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Emergent
T1-7	30	30	4.63	Rip rap lined	Rip rap lined	4	Cobble	Y	1	0	Deciduous Forest	Deciduous Forest
T1-8	20	25	7.43	Rip rap lined	Rip rap lined	4	Pebble	Y	7	0	Deciduous Forest	Deciduous Forest
T1-9	20	23	7.67	Not artificially hardened	Not artificially hardened	3	Pebble	Y	8	4	Deciduous Forest	Decidous Forest
T1BPT-1	45	35	5.31	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Emergent	Emergent
T1BPT-2	40	40	4.00	Leveed	Leveed	4	Sand/silt/clay	N	0	0	Emergent	Emergent
T1BPT-3	?	?	2.50	Leveed	Leveed	4	DNS	N	0	0	Emergent	Emergent
T1ST-1	28	30	5.50	Not artificially hardened	Not artificially hardened	3	Pebble	N	0	0	Scrub shrub	Deciduous Forest
T1ST-10	25	23	11.63	Not artificially hardened	Not artificially hardened	4	Pebble	Y	13	6	Deciduous Forest	Conifer/Deciduous
T1ST-11	35	34	N/A	Not artificially hardened	Not artificially hardened	4	Cobble	Y	13	3	Conifer/Deciduous	Conifer/Deciduous
T1ST-12	40		12.67	Not artificially hardened	Not artificially hardened	3	Cobble	Y	9	2	Conifer Forest	Conifer/Deciduous
T1ST-13	70	70	5.43	Not artificially hardened	Not artificially hardened	4	Cobble	Y	Many	Many	Conifer Forest	Conifer Forest
T1ST-14	10	15	10.43	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	10	1	Conifer/Deciduous	Conifer/Deciduous
T1ST-15	2	4	10.43	Not artificially hardened	Not artificially hardened	3	Gravel	Y	3	0	Deciduous Forest	Deciduous Forest
T1ST-2	38	49	4.44	Not artificially hardened	Not artificially hardened	2	Pebble	N	0	0	Deciduous Forest	Deciduous Forest
T1ST-3	32	46	5.35	Not artificially hardened	Not artificially hardened	2	Gravel	Y	4	0	Conifer/Deciduous	Deciduous Forest
T1ST-5	20	25	6.35	Not artificially hardened	Not artificially hardened	3	Gravel	N	0	0	Emergent	Conifer/Deciduous
T1ST-6	26	28	9.00	Not artificially hardened	Not artificially hardened	3	Cobble	N	0	0	Conifer Forest	Conifer Forest
T1ST-7	26	43	7.20	Not artificially hardened	Not artificially hardened	3	Cobble	Y	21	8	Conifer/Deciduous	Conifer/Deciduous
T1ST-8	40	50	7.09	Not artificially hardened	Not artificially hardened	3	Cobble	Y	2	0	Conifer/Deciduous	Conifer Forest
T1ST-9	35	30	9.30	Not artificially hardened	Not artificially hardened	2	Cobble	Y	5	0	Conifer/Decidous	Deciduous Forest

Data Sheet ID	Vegetation Quality Right Bank	Vegetation Quality Left Bank	Width of Contiguous Forest Canopy in Buffer Right Bank (ft)	Width of Contiguous Forest Canopy in Buffer Left Bank (ft)	Non-Native Species Present	Canopy Cover over Stream Channel (%)	Fish Observed (Y/N)	Residual Pools (#)	Fish Barriers Observed (Y/N)	Fish Habitat Remarks
T1-1	Non-native	Non-native	0-30	0	RUDI (5%), PHAR (40%)	55	Y	2	N	none
T1-10	Mixed	Mixed	30-150	>150	RUDI (1%), PHAR (20%), ILAQ (1%)	90	Y	3	N	none
T1-11	Mixed	Mixed	30-150	>150	PHAR (40%)	85	Y	2	N	none
T1-12	Mixed	Mixed	>150	0-30	RUDI (5%), PHAR (40%)	90	N	3	N	none
T1-13	Mixed	Mixed	30-150	30-150	RUDI (2%), PHAR (5%)	85	Y	3	N	none
T1-14	Non-native	Mided	0-30	30-150	RUDI (50%), PHAR (20%)	80	Y	3	N	none
T1-15	Mixed	Mixed	0-30	30-150	RUDI (20%), PHAR (10%)	65	N	0	N	none
T1-16	Mixed	Mixed	DNS	30-150	RUDI (20%), PHAR (10%)	0	N	0	Y	none
T1-17	Native	Native	>150	30-150	RUDI (1%)	90	N	0	N	none
T1-18	Native	Native	>150	0-30	RUDI (1%)	90	N	0	N	none
T1-19	Native	Mixed	>150	0-30	ornamentals (2%)	90	N	0	N	none
T1-2	Mixed	Non-native	30-150	0	RUDI (60%), PHAR (15%)	62	Y	2	N	none
T1-20	Native	Native	DNS	DNS	ILAQ (97%)	97	N	0	N	none
T1-21	Native	Mixed	0-30	0-30	HEHE (1%)	95	N	0	N	none
T1-22	Non-native	Non-native	0	0	RUDI (1%), PHAR (70%)	50	N	0	N	none
T1-23	Native	Native	30-150	0-30	none	94	N	0	Y	none
T1-24	Non-native	Non-native	0-30	0	RUDI (95%), HEHE (2%)	40	N	0	Y	none
T1-25	Native	Native	>150	>150	none	95	N	0	Y	none
T1-26	Non-native	Non-native	0	0	RUDI (5%), PHAR (10%), HEHE (40%)	5	N	0	Y	none
T1-3	Mixed	Non-native	30-150	0-30	RUDI (70%), PHAR (5%)	80	Y	1	N	fish observed were salmonid fry
T1-4	Mixed	Non-native	0-30	0-30	RUDI (50%), PHAR (10%)	70	N	0	N	none
T1-5	Non-native	Non-native	0-30	0-30	RUDI (90%)	80	N	0	N	none
T1-6	Mixed	Non-native	0-30	0-30	RUDI (90%), PHAR (10%)	80	N	0	N	none
T1-7	Mixed	Mixed	0-30	0-30	RUDI (5%), PHAR (60%)	75	N	2	Y	none
T1-8	Mixed	Mixed	0-30	0-30	RUDI (5%), PHAR (15%)	90	N	3	N	none
T1-9	Mixed	Mixed	0-30	>150	RUDI (2%), RULA (1%), PHAR (20%)	90	N	5	N	none
T1BPT-1	Mixed	Mixed	0-30	0-30	RUDI (5%), PHAR (80%)	50	N	0	N	none
T1BPT-2	Non-native	Mixed	0-30	0-30	RUDI (20%), PHAR (70%)	0	N	0	Y	none
T1BPT-3	Non-native	Non-native	0-30	0-30	RUDI (5%), PHAR (90%)	5	N	0	N	none
T1ST-1	Non-native	Mixed	30-150	30-150	RUDI (90%), PHAR (5%)	80	N	0	Y	Potential fish habitat
T1ST-10	Native	Native	>150	>150	none	80	N	1	Y	none
T1ST-11	Native	Native	>150	>150	none	95	Y	4	N	Salmonid fry observed in pool at upstream end of reach.
T1ST-12	Native	Native	>150	>150	none	90	N	4	N	none
T1ST-13	Native	Native	>150	>150	none	85	N	many	N	none
T1ST-14	Native	Native	30-150	30-150	none	85	N	1	N	none
T1ST-15	Native	Native	>150	30-150	RUDI (1%), RULA (1%), PHAR (1%)	95	N	1	Y	none
T1ST-2	Mixed	Mixed	30-150	0-30	RUDI (15%), PHAR (30%)	80	N	1	N	none
T1ST-3	Native	Mixed	30-150	30-150	RUDI (5%), PHAR (10%)	70	Y	3	N	none
T1ST-5	Native	Mixed	0	30-150	RUDI (10%), PHAR (40%), HEHE (5%)	25	N	1	N	none
T1ST-6	Native	Native	30-150	30-150	Some lawns	70	N	0	N	none
T1ST-7	Native	Native	>150	30-150	none	75	N	0	N	Stopped at Treehouse. Native vegetation community with a few suburban houses overlooking stream channel. Lots of large wood.
T1ST-8	Native	Native	>150	30-150	none	85	N	1	Y	none
T1ST-9	Native	Native	>150	>150	none	90	N	3	N	none

Data Sheet ID	Stormwater Outfalls Observed (#)	Remarks	Upstream UTM Easting	Upstream UTM Northing	Upstream UTM Error (+/-)	Downstream UTM Easting	Downstream UTM Northing	Downstream UTM Error (+/-)	Investigators
T1-1	1	none	552712	5364974	15'	552784	5365037	13'	SS, SO, AM
T1-10	1	Skagit Fisheries Enhancement Group restoration site in Bakerview Park.	552196	5364505	24'	552275	5364549	24'	SS, EA
T1-11	0	none	552079	5364505	20'	552196	5364505	24'	SS, EA
T1-12	0	none	552015	5364446	26'	552079	5364505	20'	SS, EA
T1-13	0	none	551986	5364360	20'	552015	5364446	26'	SS, EA
T1-14	0	none	551974	5364334	20'	551986	5364360	DNS	SS, EA
T1-15	4	none	551990	5364146	22'	551974	5364224	DNS	SS, EA
T1-16	0	none	552227	5363344	21'	552228	5363369	21'	SS, JW, DD, SM
T1-17	0	none	552228	5363369	23'	552208	5363399	23'	SS, JW, DD, SM
T1-18	0	none	552208	5363399	23'	552193	5363428	27'	SS, JW, DD, SM
T1-19	0	Stream is dry - a losing reach.	552193	5363428	DNS	552198	5363478	22'	SS, JW, DD, SM
T1-2	1	none	552626	5364932	21'	552717	5364936	37'	SS, SO, AM
T1-20	0	none	552198	5363428	DNS	552207	5363590	28'	SS, JW, DD, SM
T1-21	0	none	552207	5363590	DNS	552180	5363630	22'	SS, JW, DD, SM
T1-22	2	Stream becomes roadside ditch. Passes through culverts under driveways along reach. Number of culverts is 5.	552180	5363630	22'	552062	5363886	28'	SS, JW, DD, SM
T1-23	0	none	552062	5363886	28'	552044	5363947	28'	SS, JW, DD, SM
T1-24	0	none	552044	5363947	DNS	552022	5363983	35'	SS, JW, DD, SM
T1-25	0	none	552022	5363983	35'	552044	5364074	29'	SS, JW, DD, SM
T1-26	0	none	552044	5364074	DNS	552001	5364140	45'	SS, JW, DD, SM
T1-3	0	Ended reach at culvert due to trespassing concerns	552574	5364893	16'	552626	5364932	21'	SS, SO, AM
T1-4	1	none	552396	5364749	16'	552442	5364772	29'	SS, SO, AM
T1-5	3	none	552442	5364772	29'	552442	5364783	16'	SS, SO, AM
T1-6	0	Inaccessible downstream in NE direction from culvert due to blackberries and private property issues. Assumed to connect to T1-3 as low gradient, blackberry dominated, incised channel with fine sediment and no barriers.	552445	5364792	12'	552442	5364772	29'	SS, SO, AM
T1-7	0	none	552375	5364735	18'	552289	5364689	18'	SS, AM
T1-8	0	Restoration work has been done in channel. LWD is placed/cabled, pebbles are imported.	552303	5364581	20'	552289	5364689	18'	SS, AM
T1-9	0	none	552275	5364559	24'	552285	5364689	15'	SS, EA
T1BPT-1	0	none	551877	5364537	21'	552274	5364549	20'	SS, EA
T1BPT-2	1	none	551599	5364548	14'	551877	5364537	DNS	SS, EA
T1BPT-3	many	Outfalls observed past chain link fence draining mobile home community. Channel crosses fence at unknown point in blackberry thicket and runs along fence in mobile home community. It reimmerges at Logan Creek confluence at upstream end.	551385	5364554	16'	551577	5364550	14'	SS, EA
T1ST-1	0	none	552659	5364917	15'	552660	5364931	DNS	SS, SO, AM
T1ST-10	0	none	552960	5364095	39'	552860	5364117	32'	SS, AM
T1ST-11	0	Reach is characterized by the presence of many large wood pieces crossing the channel (larger ones are above OHW)	552961	5364012	25'	552960	5364095	39'	SS, AM
T1ST-12	0	none	552954	5363928	31'	552961	5364012	DNS	SS, AM
T1ST-13	0	Long reach due to homogeneity of reach. It is a high gradient stream with steep banks; a partially bedrock controlled channel. Native vegetation throughout. No barriers observed. So much large wood present, it was difficult to travel.	553020	5363737	30'	552961	5364012	DNS	SS, AM
T1ST-14	0	none	553083	5363537	21'	553020	5363737	30'	SS, AM
T1ST-15	0	none	553157	5363355	19'	553106	5363473	20'	SS, DM, JW, SM
T1ST-2	0	none	552622	5364840	DNS	552659	5364917	20'	SS, SO, AM
T1ST-3	0	none	552711	5364724	DNS	552662	5364840	23'	SS, SO, AM
T1ST-5	0	Ends at culvert under road	552770	5364490	20'	552711	5364724	24'	SS, SO, AM
T1ST-6	3	none	552773	5364416	30'	552770	5364490	20'	SS, SO, AM
T1ST-7	0	none	no reading		DNS	552773	5364416	DNS	SS, SO, AM
T1ST-8	0	none	552851	5364179	24'	552825	5364227	23'	SS, AM
T1ST-9	0	none	552860	5364117	32'	552851	5364179	24'	SS, AM

Data Sheet ID	Sub-basin	Sampling Date	Stream Location	Method of Reach Selection Upstream	Method of Reach Selection Downstream	Montgomery-Buffington Classification	Stream Gradient (%)	OHW Channel Width (ft)	OHW Channel Depth (ft)	Flood Prone Width (ft)	Side Channel Slope (LB)	Side Channel Slope (RB)	Entrenchment Ratio (OHW/OHW Depth)
T2-1	Trumpeter	5/19/2008	East of Martin Road	Culvert	Natural Feature	Pool riffle	<1	50	4.3	59	12	21	11.63
T2-10	Trumpeter	5/20/2008	West of 30th Place	Natural Feature	Culvert	Pool riffle	<1	12.9	2.6	>100	58	17	4.96
T2-11	Trumpeter	5/20/2008	Upstream of T2-10	Natural Feature	Natural Feature	Pool riffle	<1	14.2	2.3	107	26	26	6.17
T2-12	Trumpeter	5/20/2008	South of JJ Place and College Way	Natural Feature	Natural Feature	Pool riffle	1	8.2	2.5	86	27	35	3.28
T2-13	Trumpeter	5/20/2008	At trail west of 30th Place	Other - fence	Natural Feature	Pool riffle	<1	15.5	2.1	>100	24	32	7.38
T2-14	Trumpeter	5/20/2008	At Fir and Addison Place	Culvert	DNS	Pool riffle	<1	13	2.2	60	30	33	5.91
T2-15	Trumpeter	5/20/2008	Upstream of T2-14	Natural Feature	Natural Feature	Pool riffle	2	6.8	1	10	32	47	6.80
T2-16	Trumpeter	5/21/2008	North of Fir and next to mobile home park.	Natural Feature	Natural Feature	Pool riffle	<1	9.5	2.2	12	58	52	4.32
T2-17	Trumpeter	5/21/2008	Upstream of T2-16	Natural Feature	Natural Feature	Pool riffle	1	8.1	2.7	21	33	21	3.00
T2-18	Trumpeter	5/21/2008	East of school off LaVenture	Natural Feature	Other	Pool riffle	2	6.9	2.5	17	58	56	2.76
T2-19	Trumpeter	5/21/2008	South of Fir ST	Other - rip rap	Culvert	Pool riffle	2	10.3	1.5	15	50	34	6.87
T2-2	Trumpeter	5/19/2008	North of Martin/College Way	Natural Feature	Natural Feature	Pool riffle	<1	50	4.5	55	24	13	11.11
T2-20	Trumpeter	5/21/2008	Upstream of T2-19	Natural Feature	Other	Pool riffle	1	8.8	1.1	13	50	43	8.00
T2-21	Trumpeter	5/21/2008	Upstream of T2-20	Culvert	Natural Feature	Pool riffle	1.5	13.1	1.3	20	32	47	10.08
T2-22	Trumpeter	5/21/2008	Upstream of T2-21	Other	Culvert	Pool riffle	2	6.8	1.5	21	35	35	4.53
T2-23	Trumpeter	5/21/2008	Upstream of T2-22	Culvert	Natural Feature	Pool riffle	2	5.2	1.7	21	32	23	3.06
T2-24	Trumpeter	5/21/2008	Upstream of T2-23	Natural Feature	Culvert	Pool riffle	5	7.2	1.2	17	35	24	6.00
T2-25	Trumpeter	5/21/2008	Downstream of walking path	Other - bridge	Natural Feature	Pool riffle	3	6	1.1	19	?	23	5.45
T2-26	Trumpeter	5/21/2008	Upstream of walking path	Natural Feature	Other - bridge	Pool riffle	3	8	1.3	12	28	40	6.15
T2-27	Trumpeter	5/21/2008	Upstream of T2-26	Natural Feature	Natural Feature	Pool riffle	2.5	9.8	1.5	19	28	37	6.53
T2-28	Trumpeter	5/21/2008	North of Haggen on City Property	Natural Feature	Natural Feature	Step pool	7	10	2	12	49	74	5.00
T2-29	Trumpeter	5/21/2008	North of Division St	Natural Feature	Natural Feature	Pool riffle	3	8.7	1.2	13	36	54	7.25
T2-3	Trumpeter	5/20/2008	West of Martin Way	Natural Feature	Culvert	Pool riffle	1	26	3.7	41	31	22	7.03
T2-30	Trumpeter	5/21/2008	Upstream of T2-29	Natural Feature	Natural Feature	Pool riffle	3	7.6	1.3	16	28	33	5.85
T2-31	Trumpeter	5/21/2008	Upstream of T2-30	Culvert	Natural Featuer	Pool riffle	4	5.8	1.4	23	28	20	4.14
T2-4	Trumpeter	5/20/2008	West of Martin Way	Natural Feature	Natural Feature	Pool riffle	1	21.7	2.9	28	21	34	7.48
T2-5	Trumpeter	5/20/2008	Off College Way	Culvert	Natural Feature	Pool riffle	1	18.3	2.5	28	41	26	7.32
T2-6	Trumpeter	5/20/2008	South of College Way	Natural Feature	Culvert	Pool riffle	1	39.3	3.7	50	19	20	10.62
T2-7	Trumpeter	5/20/2008	Along College Way	Natural Feature	Natural Feature	Pool riffle	2	25	3.2	41	29	51	7.81
T2-8	Trumpeter	5/20/2008	South of College Way	Natural Feature	Natural Feature	Pool riffle	2	14.8	2.6	>50	29	39	5.69
T2-9	Trumpeter	5/20/2008	East of 30th St	Natural Feature	Natural Feature	Pool riffle	1	18.2	2.8	56	13	18	6.50
T4-1	Trumpeter	5/22/2008	West of Skagit Highlands Pkwy	Other - Bridge	Natural Feature	Pool riffle	1	14.4	0.8	44	18	17	18.00
T4-2	Trumpeter	5/22/2008	West of Skagit Highlands Pkwy	Other	Culvert	Pool riffle	1	17.9	0.7	29	14	17	25.57
T4-3	Trumpeter	5/22/2008	Downstream of T4-2	Culvert	Other	Step pool	24	6.6	0.7	12	95	50	9.43
T4-4	Trumpeter	5/22/2008	Downstream of T4-3	Other - Slope Failure	Natural Feature	Step pool	20	10.2	0.7	19	95	52	14.57
T4-5	Trumpeter	5/22/2008	Downstream of T4-4	Natural Feature	Natural Feature	Step pool	5	9	0.7	11	87	37	12.86
T4-6	Trumpeter	5/22/2008	Downstream of T4-5	Natural Feature	Natural Feature	Step pool	10	8.7	0.7	18	34	30	12.43
T4-8	Trumpeter	5/22/2008	East of Skagit Highlands Pkwy	Natural Feature	Culvert	Pool riffle	3	7.5	0.5	17	6	26	15.00
T5-1	Trumpeter	5/22/2008	West of Martin Road at confluence with Logan Creek	Natural Feature	Natural Feature	Pool riffle	3	5.3	1.1	9	55	17	4.82
T5-2	Trumpeter	5/22/2008	Upstream of T5-1	Natural Feature	Natural Feature	Pool riffle	4	9.4	1.7	14	23	42	5.53
T5-3	Trumpeter	5/22/2008	Upstream of T5-2	Culvert	Natural Feature	Pool riffle	3	13.8	2.3	20	33	35	6.00
T5-4	Trumpeter	5/22/2008	Near 34th Street	Culvert	Culvert	Pool riffle	4	3.2	1.3	14	31	24	2.46
T6-1	Trumpeter	5/17/2008	The upstream end of T6 is on College Way east of 42nd Place	Culvert	Culvert	N/A - ditch	1	6.6	1.2	9.9	36	46	5.50
T7-1	Trumpeter	6/17/2008	On the south side of College Way at N 43rd Place	Culvert	Culvert	N/A - ditched	<1	9	1.5	14	32	30	6.00
T7-2	Trumpeter	6/17/2008	Along College Way east of 43rd Place	Natural Feature	Culvert	Pool riffle	1	2.3	0.4	3.3	60	30	5.75
T7-3	Trumpeter	6/17/2008	Upstream of T7-2	Culvert	Natural Feature	Pool riffle-ditched	4	2.2	0.6	4	30	29	3.67
T8-1	Trumpeter	6/17/2008	The downstream end of this reach is at College Way just east of 43rd Place	Natural Feature	Natural Feature (confluence with T7)	Pool riffle	6	12.6	0.8	>100	1	10	15.8
T8-2	Trumpeter	6/17/2008	Upstream of T8-1	Natural Feature	Natural Feature (confluence with T7)	Pool riffle	7	4.6	1	8	37	54	4.6
T8-3	Trumpeter	6/17/2008	Upstream of T8-2	Natural Feature	Natural Feature (confluence with T7)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
T8-4	Trumpeter	6/17/2008	Upstream of T8-3	Natural Feature	Natural Feature	Pool riffle	1	4.6	0.6	DNS	DNS	DNS	7.7
T9-1	Trumpeter	6/17/2008	Nordic Landing development site at headwaters at 30th and Martin Rd near school.	Culvert	Natural Feature	N/A - ditch	1.5	2	0.8	8	61	33	2.5
T9-2	Trumpeter	6/17/2008	Downstream of T9-1	Natural Feature	Natural Feature	Pool riffle	1	5.3	1.2	11	33	38	4.4
T9-3	Trumpeter	6/17/2008	Downstream of T9-2	Natural Feature	Natural Feature	Pool riffle	3.5	2.5	1.5	30	DNS	95	1.7
T9-4	Trumpeter	6/17/2008	Downstream of T9-3	Natural Feature	Culvert	Pool riffle	2	12	1.7	26	30	36	7.1

Data Sheet ID	Channel Quality Right Bank	Channel Quality Left Bank	Bank Stability rating (4 = stable, 1 = unstable)	Dominant Substrate	Large Wood Present (Y/N)	Number of Pieces of Large Wood	Number of Key Pieces (>20" Dia.) of Large Wood	Dominant Veg. Community Type Right Bank	Dominant Veg. Community Left Bank	Vegetation Quality Right Bank	Vegetation Quality Left Bank	Width of Contiguous Forest Canopy in Buffer Right Bank (ft)	Width of Contiguous Forest Canopy in Buffer Left Bank (ft)
T2-1	Rip rap lined	Rip rap lined	2	Sand/silt/clay	Y	1	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	0-30	0-30
T2-10	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	0-30	30-150
T2-11	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	4	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	30-150	>150
T2-12	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	>150	30-150
T2-13	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	>150	0-30
T2-14	Rip rap lined	Rip rap lined	3	Gravel	N	0	0	Emergent	Deciduous Forest	Mixed	Mixed	0	30-150
T2-15	Not artificially hardened	Rip rap lined	2	Sand/silt/clay	N	0	0	Emergent	Deciduous Forest	Non-native	Mixed	0	0-30
T2-16	Leveed	Leveed	3	Gravel	N	0	0	Emergent	Emergent	Non-native	Non-native	0	0
T2-17	Leveed	Leveed	3	Sand/silt/clay	N	0	0	Emergent	Scrub shrub	Non-native	Mixed	0	0-30
T2-18	Leveed	Leveed	3	Sand/silt/clay	N	0	0	Deciduous Forest	Mixed	Native	Mixed	0-30	0
T2-19	Not artificially hardened	Rip rap lined	3	Gravel	N	0	0	Conifer/Deciduous	Conifer/Deciduous	Mixed	Mixed	0-30	0-30
T2-2	Rip rap lined	Rip rap lined	3	Sand/silt/clay	Y	2	0	Deciduous Forest	Deciduos Forest	Mixed	Mixed	0-30	0-30
T2-20	Not artificially hardened	Not artificially hardened	2	Pebble	Y	1	0	Conifer/Deciduous	Conifer/Deciduous	Mixed	Mixed	30-150	0-30
T2-21	Leveed	Leveed	4	Cobble	N	0	0	Emergent	Scrub shrub	Mixed	Mixed	0-30	0-30
T2-22	Other- restoration	Other - restoration	4	Pebble	Y	7	4	Deciduous Forest	Conifer/Deciduous	Mixed	Mixed	0-30	0-30
T2-23	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	2	1	Deciduous Forest	Deciduous Forest	Mixed	Mixed	0-30	0-30
T2-24	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Conifer/Deciduous	Conifer/Deciduous	Mixed	Mixed	0-30	0-30
T2-25	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Conifer/Deciduous	Conifer/Deciduous	Mixed	Mixed	0-30	0-30
T2-26	Not artificially hardened	Not artificially hardened	3	Pebble	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	30-150	>150
T2-27	Not artificially hardened	Not artificially hardened	3	Cobble	Y	1	0	Deciduous Forest	Deciduous Forest	Native	Native	>150	30-150
T2-28	Not artificially hardened	Not artificially hardened	2	Cobble	N	0	0	Conifer Forest	Scrub shrub	Mixed	Non-native	>150	0-30
T2-29	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Scrub shrub	Conifer forest	Mixed	Mixed	>150	30-150
T2-3	Leveed	Leveed	4	Cobble	Y	1	0	Emergent	Emergent	Non-native	Non-native	0	0
T2-30	Not artificially hardened	Not artificially hardened	2	Pebble	Y	2	0	Scrub shrub	Scrub shrub	Non-native	Non-native	0-30	0-30
T2-31	Not artificially hardened	Not artificially hardened	2	Pebble	Y	1	0	Scrub shrub	DNS	Non-native	Non-native	0-30	0-30
T2-4	Leveed	Leveed	4	Pebble	Y	1	0	Emergent	Emergent	Non-native	Non-native	0	0
T2-5	Leveed	Leveed	4	Pebble	Y	1	0	Emergent	Emergent	Non-native	Non-native	0	0
T2-6	Leveed	Leveed	3	Pebble	Y	7	0	Scrub shrub	Scrub shrub	Mixed	Mixed	0-30	0-30
T2-7	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Scrub shrub	Mixed	Non-native	30-150	0
T2-8	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	Y	1	0	Deciduous Forest	Scrub shrub	Mixed	Mixed	>150	0-30
T2-9	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	4	0	Scrub shrub	Scrub shrub	Mixed	Mixed	0	0
T4-1	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	4	0	Conifer forest	Conifer/Deciduous Forest	Native	Native	30-150	30-150
T4-2	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	Y	5	3	Deciduous Forest	Deciduous Forest	Native	Native	0-30	0-30
T4-3	Not artificially hardened	Not artificially hardened	3	Cobble	Y	6	0	Conifer Forest	Conifer/Deciduous	Native	Native	30-150	30-150
T4-4	Not artificially hardened	Not artificially hardened	2	Cobble	Y	1	1	Conifer Forest	Conifer Forest	Native	Native	30-150	30-150
T4-5	Not artificially hardened	Not artificially hardened	2	Cobble	Y	Many	DNS	Conifer Forest	Conifer/Deciduous	Native	Native	>150	>150
T4-6	Not artificially hardened	Not artificially hardened	3	Cobble	Y	Many	DNS	Conifer/Deciduous	DNS	Native	Native	>150	>150
T4-8	Not artificially hardened	Not artificially hardened	4	Gravel	DNS	DNS	DNS	Conifer Forest	Conifer/Deciduous	Native	Native	30-150	0-30
T5-1	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Emergent	Scrub shrub	Non-native	Non-native	0	0
T5-2	Rip rap lined	Rip rap lined	4	Sand/silt/clay	N	0	0	Scrub shrub	Scrub shrub	Mixed	Mixed	0-30	0-30
T5-3	Leveed	Leveed	?	DNS	N	0	0	Emergent	Scrub shrub	Non-native	Non-native	0-30	0-30
T5-4	Rip rap lined/ Leveed	Leveed	?	DNS	N	0	0	Conifer Forest	Emergent	Mixed	Non-native	0-30	0
T6-1	Diched	Ditched	4	Sand/silt/clay	N	0	0	Scrub shrub	Emergent	Mixed	Non-native	0-30	0
T7-1	Leveed	Leveed	4	Sand/silt/clay	N	0	0	Emergent	Emergent	Mixed	Mixed	0	0
T7-2	Rip rap lined	Rip rap lined	4	Cobble	N	0	0	Emergent	Emergent	Non-native	Non-native	0	0
T7-3	Ditched/Leveed	Ditched/Leveed	4	Sand/silt/clay	N	0	0	Emergent	Emergent	Mixed	Mixed	0	0
T8-1	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Emergent	Emergent	Non-native	Non-native	0	0
T8-2	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Emergent	Scrub-shrub	Non-native	Mixed	0	0-30
T8-3	Not artificially hardened	Not artificially hardened	4	Sand/silt/clay	N	0	0	Emergent	Emergent	Non-native	Non-native	0	0
T8-4	Non-native	Mixed	4	Sand/silt/clay	N	0	0	Emergent	Deciduous Forest	Non-native	Mixed	0	0-30
T9-1	Leveed	Leveed	4	Sand/silt/clay	N	0	0	Emergent	Emergent	Mixed	Mixed	0	0
T9-2	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Deciduous Forest	Deciduous Forest	Mixed	Mixed	>150	0-30
T9-3	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Conifer/Deciduous Forest	Conifer/Deciduous Forest	Mixed	Mixed	>150	>150
T9-4	Not artificially hardened	Not artificially hardened	2	Sand/silt/clay	N	0	0	Conifer/Deciduous Forest	Deciduous Forest	Mixed	Mixed	30-150	>150

Data Sheet ID	Non-Native Species Present	Canopy Cover over Stream Channel (%)	Fish Observed (Y/N)	Residual Pools (#)	Fish Barriers Observed (Y/N)	Fish Habitat Remarks	Stormwater Outfalls Observed (#)	Remarks	Upstream UTM Easting	Upstream UTM Northing
T2-1	RUDI (5%), PHAR (10%)	75	Y	2	N	none	0	none	552396	5365024
T2-10	RUDI (30%), PHAR (5%)	75	N	2	N	none	0	none	551536	5364703
T2-11	RUDI (15%), ILAQ (21%)	80	N	2	N	none	0	none	551453	5364695
T2-12	RUDI (10%), RULA (2%), PHAR (40%)	85	N	0	N	none	0	none	551390	5364635
T2-13	RUDI (15%), PHAR (5%), ILAQ (10%)	80	N	2	N	none	0	none	551380	5364550
T2-14	RUDI (50%), POJA (1%), PHAR (5%)	80	N	2	N	none	0	none	551197	5364146
T2-15	RUDI (30%), PHAR (5%)	95	Y	0	N	none	1	Stream is a ditch	551198	5364244
T2-16	RUDI (1%), RULI (1%), PHAR (70%)	40	N	0	N	none	0	none	551194	5364309
T2-17	RUDI (5%), RULA (1%), PHAR (15%)	15	N	0	N	none	0	none	551196	5364367
T2-18	RUDI (10%), RULA (1%), PHAR (10%)	75	N	0	N	none	0	none	551194	5364539
T2-19	RUDI (2%), HEHE (10%), ILAQ (1%)	90	N	0	N	none	0	none	551181	5364079
T2-2	RUDI (5%), RULI (1%), PHAR (20%)	45	N	4	Y	none	0	none	552433	5365035
T2-20	RUDI (5%), HEHE (10%), ILAQ (1%)	70	N	0	N	none	1	none	551186	5364021
T2-21	RUDI (2%), PHAR (15%)	65	N	0	Y	none	1	none	551166	5363989
T2-22	RUDI (1%), PHAR (20%)	45	N	2	N	none	3	none	551129	5363931
T2-23	RUDI (2%), (RULA 1%), PHAR (15%)	7	N	2	N	Landowner reports seeing salmon carcasses	0	none	551114	5363872
T2-24	RUDI (1%), POJA (1%), PHAR (10%), ILAQ (1%)	45	Y	2	N	none	1	none	551085	5363791
T2-25	RUDI (1%), RULA (1%), PHAR (10%)	80	N	2	N	none	0	none	551078	5363730
T2-26	RUDI (40%), PHAR (5%)	70	N	2	Y	none	0	none	551068	5363696
T2-27	RUDI (10%), RULA (1%), PHAR (5%)	70	N	2	N	none	1	none	550994	5363648
T2-28	RUDI (25%), RULA (1%)	55	N	4	N	none	1	none	550992	5363594
T2-29	RUDI (40%), ILAQ (1%)	75	N	2	Y	none	0	none	550970	5363535
T2-3	RUDI (15%), PHAR (80%)	0	N	0	N	Murky water	1	none	552342	5365030
T2-30	RUDI (65%), PAHR (2%), ILAQ (1%)	35	N	3	N	none	3	none	550951	536399
T2-31	RUDI (90%), PHAR (1%)	65	N	3	Y	none			550947	5363340
T2-4	RUDI (5%), PHAR (90%)	2	N	0	N	none	0	none	552225	5365017
T2-5	RUDI (1%), PHAR (60%)	20	N	0	Y	none	0	none	552221	5364969
T2-6	RUDI (25%), PHAR (40%)	45	N	1	N	none	1	Restoration project - large wood installation.	552125	5364932
T2-7	RUDI (90%)	75	N	0	N	none	2	none	552065	5364918
T2-8	RUDI (50%), PHAR (5%)	85	N	1	N	none	0	none	552011	5364875
T2-9	PHAR (60%)	15	N	0	N	none	2	none	551602	5364730
T4-1	none	95	N	0	N	none	1	none	553361	5363901
T4-2	none	30	N	0	Y	none	0	none	553246	5363945
T4-3	none	98	N	0	N	none	0	none	553155	5363982
T4-4	none	69	N	0	N	possibly impassible due to steep gradient	0	none	553074	5364035
T4-5	none	98	N	0	Y	none	0	Reach has been recently subject to a massive debris flow. Associated with the T4-3 outfall slope failure.	553074	5364035
T4-6	none	91	N	0	N	none	0	Still in debris flow	552998	5364068
T4-8	RUDI (1%)	98	N	1	N	none	0	Headwaters at upper end of T4. Bed and bank begin to disappear and reach becomes slope wetland at upper end.	553493	5363853
T5-1	RUDI (40%), RULA (1%), PHAR (30%)	60	N	2	N	none	1	none	552184	5365028
T5-2	RUDI (50%), PHAR (15%)	15	N	0	N	none	0	none	552151	5365050
T5-3	RUDI (5%), PHAR (40%), HEHE (10%)	1	N	0	Y	none	1	none	552108	5365080
T5-4	RUDI (10%), PHAR (10%)	14	N	0	Y	none	0	Upstrea daylight end of creek. It is tight lined for 2 blocks then appears to originate in a large grass field.	552032	5365131
T6-1	PHAR (60%)	0	Y	0	Y	Many salmon fry observed	0	Upstream of T6 the reach goesinto a stormwater system. Downstream of T6 the reach goes into a pipe, which crosses College way and daylights in a field outside of the city limits.	552803	5364949
T7-1	PHAR (50%)	0	N	0	?	none	1	T7-1 runs as a ditch along College Way. It is drained under College Way to the north at both upstream and downstream ends.	553062	5364915
T7-2	PHAR (60%)	0	N	0	Y	Flow is subsurface	0	none	553116	5364903
T7-3	PHAR (40%)	0	N	0	N	none	0	Upstream is a drainage swale with no bed or bank features	553203	5364884
T8-1	PHAR (90%)	0	N	0	N	none	0	none	553082	5364874
T8-2	PHAR (80%)	30	N	0	N	none	0	Reach passes through phalaris dominated wetland.	553083	5364842
T8-3	PHAR (95%)	0	N	0	N	none	0	Reach is a slope wetland dominated by phalaris	553085	5364789
T8-4	PHAR (40%)	70	N	0	N	none	0	Upstream of T8-4 is the stream is high gradient flowing through back yards and manicured lawns. We stopped surveying due to private property concerns.	553100	5364707
T9-1	RUDI (25%), PHAR (25%)	0	N	0	N	none	1	Headwaters at Nordic landing with less that 0.5 cfs flow.	551590	5365719
T9-2	RUDI (20%), RULA (5%)	80	N	1	N	none	0	2 ephemeral tribs at 551593E 5365524N +- 17'	551592	5365553
T9-3	RUDI (5%), RULA (5%), HEHE (1%)	90	N	0	N	none	0	None	551714	5365499
T9-4	RUDI (20%), RULA (10%), HEHE (1%)	75	N	1	Y	none	0	Ephemeral trib at upstream point, potential fish barrier downstream end there is an HDPE culvert of unknown length, 2.9' dia. Culvert flows into field.	551776	5365415

Data Sheet ID	Upstream UTM Error (+/-)	Downstream UTM Easting	Downstream UTM Northing	Downstream UTM Error (+/-)	Investigators
T2-1	17'	552433	5365035	DNS	SS, DD, JW, SM
T2-10	23'	551579	5364723	20'	SS, DD, JW, SM
T2-11	23'	551536	5364703	DNS	SS, DD, JW, SM
T2-12	DNS	551453	5364695	23'	SS, DD, JW, SM
T2-13	15'	551350	5364635	23'	SS, DD, JW, SM
T2-14	DNS	551198	5364244	15'	SS, DD, JW, SM
T2-15	DNS	551198	5364312	15'	SS, DD, JW, SM
T2-16	18'	551196	5364367	19'	SS, DD, JW, SM
T2-17	DNS	551194	5364539	16'	SS, DD, JW, SM
T2-18	DNS	551380	5364545	15'	SS, DD, JW, SM
T2-19	25'	551188	5364134	16'	SS, DD, JW, SM
T2-2	DNS	552467	5365080	16'	SS, DD, JW, SM
T2-20	20'	551181	5364079	DNS	SS, DD, JW, SM
T2-21	20'	551186	5364021	DNS	SS, DD, JW, SM
T2-22	24'	551152	5363977	18'	SS, DD, JW, SM
T2-23	17'	551129	5363931	DNS	SS, DD, JW, SM
T2-24	20'	551111	5363857	17'	SS, DD, JW, SM
T2-25	20'	551085	5363791	DNS	SS, DD, JW, SM
T2-26	21'	551078	5363730	20'	SS, DD, JW, SM
T2-27	21'	551068	5363696	DNS	SS, DD, JW, SM
T2-28	21'	550994	5363648	21'	SS, DD, JW, SM
T2-29	18'	550982	5363607	DNS	SS, DD, JW, SM
T2-3	17'	552368	5365026	DNS	SS, DD, JW, SM
T2-30	16'	550970	5363607	DNS	SS, DD, JW, SM
T2-31	15'	550951	5363399	DNS	SS, DD, JW, SM
T2-4	13'	552342	5365030	DNS	SS, DD, JW, SM
T2-5	17'	552225	5365017	DNS	SS, DD, JW, SM
T2-6	DNS	552216	5364941	13'	SS, DD, JW, SM
T2-7	21'	552125	5364932	DNS	SS, DD, JW, SM
T2-8	18'	552065	5364918	DNS	SS, DD, JW, SM
T2-9	15'	552011	5364875	DNS	SS, DD, JW, SM
T4-1	21'	553246	5363945	14'	SS, DD, JW, SM
T4-2	DNS	553187	5363969	15'	SS, DD, JW, SM
T4-3	15'	553074	5364035	DNS	SS, DD, JW, SM
T4-4	23'	553050	5364048	25'	SS, DD, JW, SM
T4-5	DNS	552998	5364068	25'	SS, DD, JW, SM
T4-6	DNS	552921	5364072	25'	SS, DD, JW, SM
T4-8	22'	553388	5363892	17'	SS, DD, JW, SM
T5-1	18'	552223	5365019	23'	SS, DD, JW, SM
T5-2	19'	552184	5365028	DNS	SS, DD, JW, SM
T5-3	13'	552151	5365050	DNS	SS, DD, JW, SM
T5-4	15'	552108	5365080	DNS	SS, DD, JW, SM
T6-1	17'	552948	5364948	13'	SS, MM
T7-1	15'	553003	5364930	15'	SS, MM
T7-2	15'	553091	5364908	13'	SS, MM
T7-3	15'	553116	5364903	15'	SS, MM
T8-1	21'	553088	5364906	19'	SS, MM
T8-2	19'	553082	5364874	21'	SS, MM
T8-3	19'	553083	5364842	19'	SS, MM
T8-4	22'	553085	5364789	19'	SS, MM
T9-1	16'	551592	5365553	16'	SS, KK
T9-2	16'	551714	5365499	18'	SS, KK
T9-3	18'	551776	5365415	18'	SS, KK
T9-4	18'	551783	5365358	23'	SS, KK

Kulshan Creek And Maddox Creek Fish Barriers

Data Sheet ID	Sub-basin	Sampling Date	Type	Material	Shape	Diameter (ft)	Length (ft)	Height (ft)	Width (ft)	Drop (ft)	Pool Depth (ft)	Gradient (%)	Fish Barrier	Notes
DNS	Kulshan	5/8/2008	Culvert	CMP	Arch	N/A	67	5.75	10	N/A	N/A	DNS	No	Upstream of chicken farm. Natural/rip rap channel bottom.
DNS	Kulshan	5/8/2008	Culvert	DNS	Arch	N/A	60	5.25	9	N/A	N/A	DNS	No	Rip rap channel bed
K-12	Kulshan	5/9/2008	Culvert	CMP	Round	4	DNS	N/A	N/A	N/A	N/A	DNS	Uncertain	None
K-13	Kulshan	5/9/2008	Culvert	RCP	Round	3	DNS	N/A	N/A	N/A	N/A	DNS	Uncertain	Passes under 18th St.
K-14	Kulshan	5/9/2008	Culvert	CMP	Round	2.5	192	N/A	N/A	N/A	N/A	DNS	Uncertain	None
K-18	Kulshan	5/12/2008	Culvert	Steel	Round	2.4	DNS	N/A	N/A	1.5	2	65	Yes	None
K-8	Kulshan	5/8/2008	Culvert	Steel	Arch	N/A	60	DNS	8	N/A	N/A	DNS	Uncertain	Rip rap channel bed, located at Gentlemen Genes
KTN-1	Kulshan	5/8/2008	Culvert	CMP	Arch	N/A	65	4.25	8.25	N/A	N/A	DNS	Uncertain	Rip-rap/natural bed
KTN-3	Kulshan	5/8/2008	Culvert	CMP	Arch	N/A	>70	4.75	6	N/A	N/A	DNS	Uncertain	Crosses under College Way.
KTN-4	Kulshan	5/9/2008	Culvert	CMP	Arch	N/A	DNS	3.5	7.5	N/A	N/A	DNS	No	Tightlined south under College Way
KTN-5	Kulshan	5/9/2008	Culvert	CMP	Triple Arch	N/A	DNS	2.5	4 each	N/A	N/A	DNS	No	Rip rap substrate
KTN-8	Kulshan	5/9/2008	Culvert	Steel	Round	3.5	70	N/A	N/A	N/A	N/A	DNS	Yes	Passes under railroad tracks. Fish passage is blocked by wood slates at downstream end and gate at upstream end.
KTNE-1	Kulshan	5/9/2008	Culvert	HDPE	Round	0.7	DNS	N/A	N/A	N/A	N/A	DNS	Yes	Passes under church parking lot to KTN mainstem.
KTS-1	Kulshan	5/8/2008	Culvert	CMP	Round	2	46	N/A	N/A	N/A	N/A	DNS	Possible	Culvert is partially filled with debris and sediment at invert
KTS-2	Kulshan	5/8/2008	Culvert	CMP	Round	4	35	DNS	N/A	N/A	N/A	DNS	Not likely	Pipe is reinforced with gabion and partially filled with rip rap.
M1-12	Maddox	6/18/2008	Falls	Debris	N/A	N/A	N/A	DNS	DNS	2.6	0.3	N/A	Likely	None
M1-12.2	Maddox	6/18/2008	Culvert	CMP	Arch	N/A	52	2.6	4.5	N/A	N/A	DNS	Not likely	Natural bed
M1-18	Maddox	6/18/2008	Culvert	CMP	Round	3	DNS	N/A	N/A	2	Shallow	N/A	Yes	Definite barrier to fish passage
M1-19	Maddox	6/18/2008	Culvert	CMP	Round	2	DNS	N/A	N/A	N/A	N/A	DNS	Possible	None
M1-27	Maddox	6/19/2008	Culvert	RCP	Round	3	100	N/A	N/A	N/A	N/A	2	Possible	Culvert under Blackburn Rd
M1-29	Maddox	6/19/2008	Dam	Debris	N/A	N/A	DNS	N/A	32	3	0.8	N/A	Likely	None
M1-30	Maddox	6/19/2008	Culvert	DNS	Round	6	120	N/A	N/A	N/A	N/A	3	Possible	None
M4-1	Maddox	6/20/2008	Dam	Debris	N/A	N/A	15	N/A	7	2	DNS	N/A	Yes	None

Data Sheet ID	UTM Easting	UTM Northing	UTM Error (+/-)	Investigators
DNS	549719	5364643	26'	KK, SS, MM
DNS	549980	5364640	22'	KK, SS, MM
K-12	550299	5364720	DNS	KK, SS, MM, AM
K-13	550369	5364715	39'	KK, SS, MM, AM
K-14	550436	5364703	DNS	KK, SS, MM, AM
K-18	550700	5364551	24'	SS, AM, SO
K-8	550167	5364671	DNS	KK, SS, MM
KTN-1	549980	5364744	16'	KK, SS, MM
KTN-3	550055	5364942	16'	KK, SS, MM
KTN-4	550044	5364995	30'	SS, KK, MM, AM
KTN-5	549891	5365184	DNS	KK, SS, MM, AM
KTN-8	549731	5365278	DNS	KK, SS, MM, AM
KTNE-1	550074	5365102	DNS	KK, SS, MM, AM
KTS-1	549977	5364621	36'	KK, SS, MM
KTS-2	549917	5364559	DNS	KK, SS, MM
M1-12	552021	5362525	20'	SS, AM
M1-12.2	552022	5362521	26'	SS, AM
M1-18	551438	5362215	18'	SS, AM
M1-19	551343	5362224	17'	SS, AM
M1-27	550755	5361707	22'	SS, AM, MM
M1-29	550454	5361213	21'	SS, AM, MM
M1-30	550412	5361119	27'	SS, AM, MM
M4-1	550739	5361850	24'	SS, AM

Trumpeter Creek Fish Barriers

Data Sheet ID	Sub-basin	Sampling Date	Type	Material	Shape	Diameter (ft)	Length (ft)	Height (ft)	Width (ft)	Drop (ft)	Pool Depth (ft)	Gradient (%)	Fish Barrier	Notes
T1-1	Trumpeter	5/13/2008	Culvert	CMP	Double Arch	N/A	50	3	3 each	N/A	N/A	DNS	Not likely	Natural bed, crosses under College Way.
T1-16	Trumpeter	5/19/2008	Culvert	RCP	Round	1.4	DNS	N/A	N/A	N/A	N/A	DNS	Possible	None
T1-21	Trumpeter	5/19/2008	Culvert	CMP	Round	1.3	30	N/A	N/A	N/A	N/A	DNS	Possible	East of Sioux and Shoshone
T1-21.2	Trumpeter	5/19/2008	Fence	Wire/Debris	N/A	N/A	N/A	N/A	DNS	2.4	0.5	N/A	Yes	Wire fence is crossing stream perpendicular to flow. Fence has backed up sediment and twigs.
T1-22	Trumpeter	5/19/2008	Culvert	CMP	Round	1.1	DNS	N/A	N/A	N/A	N/A	DNS	Yes	Stream is tightlined under lawn and then empties into roadside ditch
T1-23	Trumpeter	5/19/2008	Culvert	CMP	Round	2	70	N/A	N/A	1.2	0.2	53	Yes	Culvert is above a 53% rip rap slope
T1-24	Trumpeter	5/19/2008	Dam	Debris	N/A	N/A	N/A	N/A	DNS	2	DNS	23	Possible	None
T1-24-2	Trumpeter	5/19/2008	Dam	Debris	N/A	N/A	N/A	N/A	DNS	3	0.1	N/A	Yes	None
T1-24-3	Trumpeter	5/19/2008	Culvert	RCP	Round	3	DNS	N/A	N/A	0.6	DNS	DNS	Possible	None
T1-25	Trumpeter	5/19/2008	Falls	Rock	N/A	N/A	9	DNS	DNS	N/A	N/A	48	Likely	None
T1-26	Trumpeter	5/19/2008	Dam	Debris	N/A	N/A	DNS	DNS	DNS	N/A	N/A	46	Possible	None
T1-3	Trumpeter	5/13/2008	Culvert	CMP	Round	5.5	20	N/A	N/A	N/A	N/A	DNS	No	None
T1-5	Trumpeter	5/13/2008	Culvert	CMP	Round	5	40	N/A	N/A	N/A	N/A	DNS	No	None
T1-7	Trumpeter	5/14/2008	Dam	Concrete	N/A	N/A	N/A	N/A	DNS	1.4	1.6	N/A	No	None
T1BPT-2	Trumpeter	5/15/2008	Culvert	HDPE	Round	3	100	N/A	N/A	N/A	N/A	DNS	Possible	Passes under 30th street west of BV park
T1SB-20	Trumpeter	5/19/2008	Culvert	RCP	Round	1.4	DNS	N/A	N/A	N/A	N/A	DNS	Possible	Under East Division St
T1ST-1	Trumpeter	5/13/2008	Dam	Debris Jam	N/A	N/A	DNS	N/A	DNS	1.3	1.2	DNS	Not likely	None
T1ST-4	Trumpeter	5/13/2008	Dam	Debris Jam	N/A	N/A	3	N/A	DNS	1	1.2	DNS	Not likely	None
T1ST-4.2	Trumpeter	5/13/2008	Bridge	DNS	N/A	N/A	13	5	17	N/A	N/A	N/A	No	None
T1ST-5	Trumpeter	5/13/2008	Dam	Log	N/A	N/A	DNS	N/A	DNS	1.3	1.5	N/A	Not likely	None
T1ST-5.2	Trumpeter	5/13/2008	Culvert	CMP	Arch	N/A	DNS	3.5	8	N/A	N/A	N/A	No	Natural bed
T1ST-7	Trumpeter	5/13/2008	Dam	Debris Jam	N/A	N/A	DNS	N/A	DNS	1.8	0.6	N/A	Likely	None
T1ST-8	Trumpeter	5/14/2008	Dam	Debris Jam	N/A	N/A	DNS	N/A	DNS	2.4	0.7	N/A	Likely	None
T2-1	Trumpeter	5/19/2008	Culvert	RCP	Round	5	45	N/A	N/A	N/A	N/A	DNS	No	None
T2-14	Trumpeter	5/20/2008	Culvert	CMP	Arch	N/A	DNS	4	7	N/A	N/A	DNS	Not likely	mud bottom
T2-2	Trumpeter	5/19/2008	Dam	Wood	N/A	N/A	N/A	N/A	DNS	1.6	1	N/A	Not likely	Tree trunk across channel
T2-21	Trumpeter	5/20/2008	Culvert	CMP	Round	5	Uncertain	N/A	N/A	N/A	N/A	DNS	Possible	None
T2-23	Trumpeter	5/20/2008	Culvert	CMP	Arch	DNS	40	DNS	9	N/A	N/A	DNS	No	None
T2-26	Trumpeter	5/20/2008	Dam	Debris	N/A	N/A	DNS	N/A	DNS	1.5	1	N/A	Not likely	None
T2-28	Trumpeter	5/20/2008	Dam	Debris	N/A	N/A	24	DNS	DNS	DNS	DNS	38	Likely	None
T2-29	Trumpeter	5/20/2008	Dam	Debris	N/A	N/A	N/A	N/A	DNS	3.5	0.5	N/A	Yes	Old willow tree/debris jam
T2-31	Trumpeter	5/20/2008	Culvert	RCP	Round	3.3	DNS	N/A	N/A	0.7	3	DNS	Likely	None
T2-5	Trumpeter	5/20/2008	Culvert	CMP	Triple Arch	N/A	80	DNS	20	N/A	N/A	DNS	Not likely	Each arch is 3.5' wide
T2-9	Trumpeter	5/20/2008	Culvert	CMP	Triple Arch/Round	2 round @ 3'	60	DNS	1 arch @ 7'	N/A	N/A	DNS	Not likely	None
T4-2	Trumpeter	5/22/2008	Culvert	CMP	Round	2.5	112	N/A	N/A	N/A	N/A	32	Yes	This barrier consists of a steep gradient culvert above a steep gradeinet debris jam. A definite barrier.
T4-5	Trumpeter	5/22/2008	Dam	Debris	N/A	N/A	16	DNS	DNS	DNS	N/A	35	Possible	None
T4-5.2	Trumpeter	5/22/2008	Dam	Debris	N/A	N/A	35	DNS	35	DNS	N/A	29	Possible	Downstream end of debris flow from slope failure upslope. Large blockage of wood, sand, cobbles.
T4-7	Trumpeter	5/22/2008	Dam	Debris	N/A	N/A	7	DNS	DNS	DNS	0.6	40	Possible	None
T5-3	Trumpeter	5/22/2008	Culvert	CMP	Arch	N/A	90	2.4	4	N/A	N/A	DNS	Possible	None
T5-4	Trumpeter	5/22/2008	Culvert	CMP	Arch	N/A	DNS	2.5	4	N/A	N/A	DNS	Possible	None
T6-1	Trumpeter	6/17/2008	Culvert	RCP	Round	2	DNS	N/A	N/A	N/A	N/A	DNS	Yes	Culvert is located at the upstream end of the daylighted creek
T7-1	Trumpeter	6/17/2008	Culvert	CMP	Round	2.5	DNS	N/A	N/A	0.6	0.5	DNS	Likely	None
T7-2	Trumpeter	6/17/2008	Subsurface flow	Rip Rap	N/A	N/A	48	N/A	DNS	N/A	N/A	N/A	Yes	None

Data Sheet ID	UTM Easting	UTM Northing	UTM Error (+/-)	Investigators
T1-1	DNS	DNS	DNS	SS, AM, SO
T1-16	552227	5363344	DNS	SS, DD, JW, SM
T1-21	552207	5363590	28'	SS, DD, JW, SM
T1-21.2	552180	5363630	22'	SS, DD, JW, SM
T1-22	552143	5363643	28'	SS, DD, JW, SM
T1-23	552062	5363886	28'	SS, DD, JW, SM
T1-24	552044	5363947	DNS	SS, DD, JW, SM
T1-24-2	552035	5363956	30'	SS, DD, JW, SM
T1-24-3	552022	5363983	35'	SS, DD, JW, SM
T1-25	552024	5364010	33'	SS, DD, JW, SM
T1-26	552044	5364074	DNS	SS, DD, JW, SM
T1-3	552574	5364893	16'	SS, AM, SO
T1-5	552442	5364783	16'	SS, AM, SO
T1-7	552375	5364725	19'	SS, AM
T1BPT-2	551599	5364548	14'	SS, EA
T1SB-20	553158	5363351	16'	SS, DD, JW, SM
T1ST-1	552659	5364917	DNS	SS, AM, SO
T1ST-4	552703	5364722	DNS	SS, AM, SO
T1ST-4.2	552711	5364724	24'	SS, AM, SO
T1ST-5	552720	5364707	28'	SS, AM, SO
T1ST-5.2	552731	5364677	20'	SS, AM, SO
T1ST-7	552791	5364374	27'	SS, AM, SO
T1ST-8	552851	5364179	DNS	SS, AM
T2-1	552396	5365024	17'	SS, DD, JW, SM
T2-14	551197	5364146	18'	SS, DD, JW, SM
T2-2	552433	5365035	15'	SS, DD, JW, SM
T2-21	551166	5363989	20'	SS, DD, JW, SM
T2-23	551114	5363872	DNS	SS, DD, JW, SM
T2-26	551068	5363696	DNS	SS, DD, JW, SM
T2-28	550992	5363594	21'	SS, DD, JW, SM
T2-29	550970	5363594	DNS	SS, DD, JW, SM
T2-31	550947	5363340	15'	SS, DD, JW, SM
T2-5	552221	5364969	DNS	SS, DD, JW, SM
T2-9	551602	5364730	DNS	SS, DD, JW, SM
T4-2	553187	5363969	DNS	SS, DD, JW, SM
T4-5	553024	5364058	23'	SS, DD, JW, SM
T4-5.2	552998	5364068	25'	SS, DD, JW, SM
T4-7	552941	5364064	29'	SS, DD, JW, SM
T5-3	552108	5365080	13'	SS, DD, JW, SM
T5-4	552032	5365131	15'	SS, DD, JW, SM
T6-1	552803	5364949	17'	SS, MM
T7-1	553086	5364936	17'	SS, MM
T7-2	553104	5364906	17'	SS, MM

Kulshan Creek And Maddox Creek Outfalls

Data Sheet ID	Sub-basin	Land Use in Drainage Area	Type	Material	Shape	Diameter (ft)	Depth (ft)	Top Width (ft)	Bottom Width (ft)	Submerged In Water	Submerged With Sediment	In-Stream (Y/N)	Flow Present? (Y/N)	Flow Description (If present)
K-1	Kulshan	Industrial/Commercial	Open drainage	Earthen	Trapezoid	N/A	2	7	N/A	N/A	N/A	N/A	N	N/A
K-12	Kulshan	Industrial	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
K-12.2	Kulshan	Suburban Residential/Commercial	Closed Pipe	PVC	Circular	0.5	N/A	N/A	N/A	No	No	N/A	Y	Trickle
K-13	Kulshan	Unknown	Closed Pipe	CMP	Circular	N/A	N/A	N/A	N/A	No	No	N/A	Y	Trickle
K-15	Kulshan	Suburban Residential	Closed Pipe	HDPE	Circular	0.4	N/A	N/A	N/A	Partially	No	N/A	Y	Trickle
K-16	Kulshan	Suburban Residential	Closed Pipe	RCP	Circular	1	N/A	N/A	N/A	No	No	N/A	Y	Trickle
K-18	Kulshan	Open Space	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	Partially	Y	N	N/A
K-4	Kulshan	Open Space	Closed Pipe	Steel	Circular	1	N/A	N/A	N/A	DNS	Partially	N/A	N	N/A
K-5	Kulshan	Industrial	Closed Pipe	PVC	Circular	0.8	N/A	N/A	N/A	Partially	No	N/A	Y	Trickle
K-5.2	Kulshan	Industrial	Closed Pipe	RCP	Circular	N/A	N/A	N/A	N/A	No	No	N/A	N	N/A
K-5.3	Kulshan	Industrial	Closed Pipe	PVC	Circular	0.6	N/A	N/A	N/A	No	Partially	N/A	N	N/A
K-6	Kulshan	Commercial	Closed Pipe	CMP	Gated Arch	2.5	N/A	N/A	N/A	Partially	No	N/A	Y	Moderate
K-8	Kulshan	Ultra-Urban Residential	Open drainage	Earthen	Trapezoid	N/A	2.5	7	N/A	N/A	N/A	N/A	Y	Moderate
K-8.2	Kulshan	Commercial/Urban	Closed Pipe	DNS	Circular	1.2	N/A	N/A	N/A	Fully	Partially	N/A	N	N/A
KTN-1	Kulshan	Commercial	Closed Pipe	CMP	Circular	2	N/A	N/A	N/A	Partially	Partially	N/A	N	N/A
KTN-3	Kulshan	Commercial	Closed Pipe	PVC	Circular	0.7	N/A	N/A	N/A	No	No	N/A	N	N/A
KTN-5	Kulshan	Institutional	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
KTN-6	Kulshan	Institutional	Closed Pipe	PVC	Circular	1.3	N/A	N/A	N/A	No	No	N/A	N	N/A
KTN-6.2	Kulshan	Institutional	Closed Pipe	HDPE	Circular	1.1	N/A	N/A	N/A	No	No	N/A	N	N/A
KTNE-1	Kulshan	Institutional	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
M1-11	Maddox	Ultra-Urban Residential	Closed Pipe	HDPE	Circular	1.4	N/A	N/A	N/A	Partially	Partially	Y	Y	Trickle
M1-11.2	Maddox	Ultra-Urban Residential	Closed Pipe	HDPE	Circular	0.4	N/A	N/A	N/A	No	No	N/A	Y	Trickle
M1-15	Maddox	Suburban Residential	Closed Pipe	HDPE	Circular	1.2	N/A	N/A	N/A	Partially	No	N/A	Y	Moderate
M1-15.2	Maddox	Suburban Residential	Open drainage	Earthen	Parabolic	N/A	1	3	N/A	N/A	N/A	N/A	N	N/A
M1-15.3	Maddox	Suburban Residential	Closed Pipe	HDPE	Circular	0.4	N/A	N/A	N/A	No	No	N/A	N	N/A
M1-20	Maddox	Open Space	Closed Pipe	HDPE	Circular	N/A	N/A	N/A	N/A	No	No	N/A	Y	Trickle
M1-26	Maddox	Suburban Residential	Open drainage	Earthen	Parabolic	N/A	3.5	12	N/A	N/A	N/A	N/A	Y	Moderate
M1-29	Maddox	Open Space	Closed Pipe	HDPE	Circular	1.6	N/A	N/A	N/A	No	No	N/A	N	N/A
M2-3	Maddox	Suburban Residential	Closed Pipe	HDPE	Circular	0.4	N/A	N/A	N/A	No	No	N/A	N	N/A
M3-1	Maddox	Open Space	Closed Pipe	HDPE	Circular	0.6	N/A	N/A	N/A	No	No	N/A	Y	Moderate
M4-1	Maddox	DNS	Closed Pipe	RCP	Circular	1	N/A	N/A	N/A	No	No	N/A	Y	Trickle
M5-5	Maddox	Suburban Residential	Closed Pipe	PVC	Circular	0.7	N/A	N/A	N/A	No	No	N	N	N/A

Kulshan Creek And Maddox Creek Outfalls

Data Sheet ID	Notes	Sampling Date	UTM Easting	UTM Northing	UTM Error (+/-)	Investigators
K-1	Water present but not flowing, outfall is a stormwaer swale inflow from west.	5/8/2008	549279	5364492	DNS	KK, SS, MM
K-12	Outfall is a roof drain. There is a second 50' downstream and a 3rd 75' downstream.	5/9/2008	550273	5364705	DNS	KK, AM
K-12.2	Source is potentially from the parking lot of a commercial building upstream from Gentlemen Gene's	5/9/2008	550237	5364695	19'	KK, AM
K-13	Culvert under road	5/9/2008	550367	5364718	26'	KK, AM
K-15	Source is yard runoff	5/9/2008	550531	5364695	DNS	KK, AM
K-16	Drains along 19th St	5/9/2008	550487	5364699	27'	KK, MM, SS, AM
K-18	none	5/12/2008	550662	5364569	28'	SS, AM, SO
K-4	none	5/8/2008	549354	5364553	DNS	KK, MM, SS
K-5	Appears to originate from adjacent open space	5/8/2008	549561	5364644	DNS	SS, KK, MM
K-5.2	none	5/8/2008	549561	5364644	DNS	SS, KK, MM
K-5.3	Stormwater outfall fed by road runoff	5/8/2008	549650	5364636	DNS	KK, MM, SS
K-6	Standing water. Connects to Kulshan Creek by an open drainage	5/8/2008	549721	5364636	26'	KK, SS, MM
K-8	Outfall is a stormwater swale, which originates under road at apartment complex	5/8/2008	550012	5364652	21'	KK, SS, MM
K-8.2	Outfall located by "Gentlemen Gene's". Stormwater drain on road 55' up.	5/8/2008	550167	5364671	DNS	KK, SS, MM
KTN-1	Partially submerged. Source of water is road runoff/stormwater	5/8/2008	549980	5364744	16'	KK, SS, MM
KTN-3	Source is stormwater from commercial building parking lot	5/8/2008	550032	5364892	23'	KK, SS, MM
KTN-5	Stormwater runoff from parking lot.	5/9/2008	550022	5365019	12'	KK, AM
KTN-6	Stormwater runoff from parking lot.	5/9/2008	549945	5365181	15'	AM, KK
KTN-6.2	Stormwater swale for parking lot runoff	5/9/2008	549959	5365115	DNS	AM, KK
KTNE-1	Stormwater from church parking lot is source.	5/9/2008	550033	5365007	12'	KK
M1-11	Outfall origin is stormwater from Digby St.	6/18/2008	552026	5362615	22'	SS, AM
M1-11.2	Drains nearby yard	6/18/2008	552013	5362610	18'	SS, AM
M1-15	Stormwater from Section St.	6/18/2008	551852	5362518	24'	SS, AM
M1-15.2	Origin is probably roadway stormwater	6/18/2008	551779	5362476	19'	SS, AM
M1-15.3	Origin is stormwater from Maddox Cr. Road	6/18/2008	551732	5362456	17'	SS, AM
M1-20	Uncertain origin - possibly nearby development	6/19/2008	551201	5362003	24'	SS, AM, MM
M1-26	Ditches on both sides of Blackburn Rd enter Creek	6/19/2008	550760	5361692	13'	SS, AM, MM
M1-29	Originates in Bonnie Rae Park	6/19/2008	550499	5361307	19'	SS, AM, MM
M2-3	none	6/20/2008	550039	5361534	33'	SS, AM
M3-1	Outfall drains adjacent field	6/20/2008	551609	5362267	26'	SS, AM
M4-1	Origin is unknown	6/20/2008	550794	5361801	22'	SS, AM
M5-5	None	8/14/2008	551969	5361929	24'	SS, KK

Trumpeter Creek Outfalls

Data Sheet ID	Sub-basin	Land Use in Drainage Area	Type	Material	Shape	Diameter (ft)	Depth (ft)	Top Width (ft)	Bottom Width (ft)	Submerged In Water	Submerged With Sediment	In-Stream (Y/N)	Flow Present? (Y/N)	Flow Description (If present)
T1-1	Trumpeter	Commercial	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N	Y	Trickle
T1-1.2	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.7	N/A	N/A	N/A	Fully	No	Y	Y	Unknown
T1-11	Trumpeter	Open Space	Open drainage	Earthen	Parabolic	N/A	0.7	7	0	N/A	N/A	N	Y	Moderate
T1-15	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N	N	N/A
T1-15.2	Trumpeter	Suburban Residential	Closed Pipe/Open drainage	CMP	Various	Various	N/A	N/A	N/A	Partially	Partially	Y	Y	Moderate
T1-20	Trumpeter	DNS	Closed Pipe	HDPE	Circular	0.7	N/A	N/A	N/A	Partially	Partially	N	Y	Moderate
T1-22	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.4	N/A	N/A	N/A	No	No	N	N	N/A
T1-24	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N	N	N/A
T1-26	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N	N	N/A
T1-4	Trumpeter	Suburban Residential	Open drainage	Earthen	Incised tributary	N/A	2	1	0.7	N/A	N/A	N	Y	Moderate
T1-4.2	Trumpeter	Suburban Residential	Closed Pipe	PVC/CMP	Circular - Double	0.7	N/A	N/A	N/A	No	No	N	Y	Trickle
T1-5.2	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N	Y	Trickle
T1-9	Trumpeter	Suburban Residential	Open drainage	Earthen	Ditch	N/A	1	9	5	N/A	N/A	Y	Y	Moderate
T1BPT-2	Trumpeter	Open Space	Closed Pipe	HDPE	Circular	2.5	N/A	N/A	N/A	Partially	Partially	N/A	Y	Moderate
T1ST-10	Trumpeter	Open Space	Open drainage	Earthen	Parabolic	N/A	0.6	0.5	0.4	N/A	N/A	N/A	Y	Moderate
T1ST-20	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular - Double	0.5	N/A	N/A	N/A	No	No	N/A	N	N/A
T1ST-6	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N/A	N	N/A
T1ST-6.2	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N/A	N	N/A
T1ST-6.3	Trumpeter	DNS	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N/A	N	N/A
T2-12	Trumpeter	Open Space	Open drainage	Earthen	Trapezoid	N/A	1	1.5	1	N/A	N/A	N/A	Y	Moderate
T2-15	Trumpeter	Suburban Residential	Closed Pipe	RCP	Circular	1.3	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T2-17	Trumpeter	Ultra-Urban Residential	Closed Pipe	HDPE	Circular	0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
T2-18	Trumpeter	Ultra-Urban Residential	Closed Pipe/Open Drainage	CMP/Earthen	Circular/Trapezoid	2.5	2	8	6	Partially	Partially	N/A	Y	Substantial
T2-20	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.5	N/A	N/A	N/A	No	No	N/A	N	N/A
T2-21	Trumpeter	Suburban Residential	Closed Pipe	RCP	Circular	1.7	N/A	N/A	N/A	Partially	No	Y	Y	Moderate
T2-21.2	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N/A	Y	N/A
T2-21.3	Trumpeter	Suburban Residential	Closed Pipe	RCP	Circular	1.7	N/A	N/A	N/A	Partially	No	Y	Y	Moderate
T2-21.4	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular - double	0.5/0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
T2-22.2	Trumpeter	Suburban Residential	Open drainage	Rip rap	Trapezoid	N/A	2	0.5	2.5	N/A	N/A	N/A	Y	Moderate
T2-22.3	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	1	N/A	N/A	N/A	Partially	No	N/A	Y	Moderate
T2-24	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.3	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T2-26	Trumpeter	Open Space	Closed Pipe	Steel	Circular	2	N/A	N/A	N/A	No	No	N/A	Y	Moderate
T2-27	Trumpeter	DNS	Open drainage	Earthen	Parabolic	N/A	1	1.4	N/A	N/A	N/A	N/A	Y	Trickle
T2-28	Trumpeter	Open Space	Closed Pipe	CMP	Circular	1	N/A	N/A	N/A	No	No	N/A	Y	Moderate
T2-3	Trumpeter	Commercial	Closed Pipe	HDPE	Circular	2	N/A	N/A	N/A	No	No	N	Y	Substantial
T2-30	Trumpeter	DNS	Closed Pipe	CMP	Circular	1.3	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T2-31	Trumpeter	Suburban Residential	Closed Pipe	CMP	Circular	1	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T2-6	Trumpeter	Suburban Residential	Open drainage	Rip rap	Trapezoid	N/A	1	2.7	2	N/A	N/A	N	Y	Moderate
T2-7	Trumpeter	Suburban Residential	Open drainage	Rip rap	Trapezoid	N/A	0.8	5.3	1.5	N/A	N/A	N/A	Y	Moderate
T2-7.2	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	1	N/A	N/A	N/A	Partially	No	Y	Y	Moderate
T2-9	Trumpeter	Suburban Residential	Open drainage	Earthen	Trapezoid	N/A	0.7	3.3	0.5	N/A	N/A	N/A	Y	Moderate
T2-9.2	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	1	N/A	N/A	N/A	No	No	N/A	Y	Moderate
T4-1	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.3	N/A	N/A	N/A	No	No	N/A	N	N/A
T4-3	Trumpeter	Suburban Residential	Open drainage	Earthen	Trapezoid	N/A	5	3	2	N/A	N/A	N/A	Y	Trickle
T4-8	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.8	N/A	N/A	N/A	No	No	N/A	N	N/A
T5-1	Trumpeter	Suburban Residential	Closed Pipe	CMP	Circular	2	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T5-3	Trumpeter	DNS	Closed Pipe	PVC	Circular	0.4	N/A	N/A	N/A	No	No	N/A	N	N/A
T5-3.2	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.3	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T5-4	Trumpeter	Suburban Residential	Closed Pipe	HDPE	Circular	0.3	N/A	N/A	N/A	No	No	N/A	Y	Trickle
T6-1	Trumpeter	Suburban Residential	Open drainage	Rip rap	Parabolic	N/A	1.2	9.5	N/A	N/A	N/A	N/A	Y	Trickle
T7-1	Trumpeter	Suburban Residential	Closed Pipe	PVC	Circular	0.6	N/A	N/A	N/A	Partially	Partially	Y	Y	Trickle
T9-1	Trumpeter	Suburban Residential	Closed Pipe	RCP	Circular	2	N/A	N/A	N/A	Partially	Partially	Y	Y	Moderate

Trumpeter Creek Outfalls

Data Sheet ID	Notes	Sampling Date	UTM Easting	UTM Northing	UTM Error (+/-)	Investigators
T1-1	Outfall is draining plant nursery	5/21/2008	552784	5365037	13'	SS, SO, AM
T1-1.2	none	5/21/2008	552670	5364946	25'	SS, SO, AM
T1-11	Origin is pond fed by small drainage ditch.	5/15/2008	552124	5364489	20'	SS, EA
T1-15	Source is mowed lawn yard	5/15/2008	551989	5364157	20'	SS, EA
T1-15.2	2 RCP and 1 arch SMP feed Trumpeter Creek near large culvert at Fir St at south end of Bakerview Park. Outfalls appear to transport water from drainage ditch on the south side of Fir St.	5/15/2008	551990	5364146	22'	SS, EA
T1-20	Origin is from yard upstream	5/19/2008	552193	5363495	21'	SS, JW, DD, SM
T1-22	Origin is from lawn yard	5/19/2008	552074	5363840	27'	SS, JW, DD, SM
T1-24	There are three pipes together with one other nearby, all the same type, origin is from lawn yard.	5/19/2008	552045	5363963	36'	SS, JW, DD, SM
T1-26	Origin is yard drainage.	5/19/2008	552044	5364074	DNS	SS, JW, DD, SM
T1-4	Origin of outfall is yard/ditch	5/13/2008	552439	5364761	25'	SS, SO, AM
T1-4.2	There are two perched outfalls on either side of the creek, origin is stormwater	5/13/2008	552396	5364749	16'	SS, SO, AM
T1-5.2	Origin of outfall is presumed to be from yard drainage. There is are outfalls on both sides of stream.	5/13/2008	552444	5364774	19'	SS, SO, AM
T1-9	Origin is pond and stormwater from Waugh Rd	5/15/2008	552280	5364546	17'	SS, EA
T1BPT-2	Appears to drain from direction of parking lot	5/15/2008	551855	5364551	18'	SS, EA
T1ST-10	Outfall is a slope wetland/ephemeral tributary	5/14/2008	552890	5364110	24'	SS, AM
T1ST-20	Origin is either detention pond or	5/19/2008	553157	5363355	19'	SS, DD, JW, SM
T1ST-6	Originates from residential yard drainage	5/13/2008	552770	5364464	20'	SS, SO, AM
T1ST-6.2	Pipe drains nearby yard	5/13/2008	552769	5364436	24'	SS, SO, AM
T1ST-6.3	Pipe drains yard to the west	5/13/2008	552766	5364423	27'	SS, SO, AM
T2-12	Draining field behind JJ Place off of College Way	5/20/2008	551419	5364687	16'	SS, JW, DD, SM
T2-15	none	5/20/2008	551188	5364291	17'	SS, JW, DD, SM
T2-17	Drainage from roof of nearby house	5/21/2008	551198	5364400	13'	SS, JW, DD, SM
T2-18	Outfall is a branch of the creek that splits off upstream and flows through the trailer park	5/21/2008	551334	5364539	15'	SS, JW, DD, SM
T2-20	Drainage pipe from yard.	5/21/2008	551184	5364042	19'	SS, JW, DD, SM
T2-21	Origin is probably from roadway storm drain	5/21/2008	551180	5363993	21'	SS, JW, DD, SM
T2-21.2	Origin is roof gutter. There are two more similar outfalls upstream 3 feet.	5/21/2008	551154	5363965	15'	SS, JW, DD, SM
T2-21.3	Origin is possibly from storm drain	5/21/2008	551180	5363993	21'	SS, JW, DD, SM
T2-21.4	Outfall is yard drainage pipe	5/21/2008	551180	5364021	20'	SS, JW, DD, SM
T2-22.2	Origin is stormwater pond	5/21/2008	551145	5363927	12'	SS, JW, DD, SM
T2-22.3	Origin is stormwater detention pond	5/21/2008	551128	5363931	16'	SS, JW, DD, SM
T2-24	Origin is from nearby yard	5/21/2008	551095	5363821	14'	SS, JW, DD, SM
T2-26	Origin are two retention ponds	5/21/2008	551081	5363709	22'	SS, JW, DD, SM
T2-27	Originates from ditch behind houses	5/21/2008	550994	5363648	21'	SS, JW, DD, SM
T2-28	none	5/21/2008	550980	5363630	24'	SS, JW, DD, SM
T2-3	Stormwater from Martin Rd.	5/20/2008	552368	5365026	13'	SS, JW, DD, SM
T2-30	There are two 4" PVC pipes approximately 40' downstream	5/21/2008	550959	5363433	14'	SS, JW, DD, SM
T2-31	Originates from storwater detention pond	5/21/2008	550947	5363340	DNS	SS, JW, DD, SM
T2-6	none	5/20/2008	552165	5364937	17'	SS, JW, DD, SM
T2-7	Origin is stormwater from College Way	5/20/2008	552125	5364932	15'	SS, JW, DD, SM
T2-7.2	Origin is stormwater from College Way	5/20/2008	552097	5364933	21'	SS, JW, DD, SM
T2-9	It is a ditch from trailerpark	5/20/2008	551979	5364866	20'	SS, JW, DD, SM
T2-9.2	Origin is stormwater pond	5/20/2008	551683	5364847	17'	SS, JW, DD, SM
T4-1	Origin is drainage from road	5/22/2008	553361	5363901	21'	SS, DD, JW, SM
T4-3	Outfall is a drainage ditch upslope and slope failure.	5/22/2008	553074	5364035	23'	SS, DD, JW, SM
T4-8	Outfall is roadside ditch, which includes two other 4" pipes.	5/22/2008	553388	5363892	17'	SS, DD, JW, SM
T5-1	none	5/22/2008	552184	5365027	19'	SS, DD, JW, SM
T5-3	Outfall originates from yard. There are two other identical outfalls upstream 30'.	5/22/2008	552149	5365048	18'	SS, DD, JW, SM
T5-3.2	Drains nearby yard	5/22/2008	552117	5365072	15'	SS, DD, JW, SM
T5-4	Drains nearby yard	5/22/2008	552058	5365116	12'	SS, DD, JW, SM
T6-1	Outfall is ephemeral drainage ditch	6/17/2008	552948	5364948	13'	SS, MM
T7-1	Pipe drains yard	6/17/2008	553012	5364939	16'	SS, MM
T9-1	None	6/17/2008	551590	5365719	16'	SS, KK

Appendix A

WSP Description of Methods for Stream Surveys

December 4, 2008

Jana Hanson
Development Services Department
City of Mount Vernon
P.O. Box 809
910 Cleveland Avenue
Mount Vernon, WA 98273-0809

Re: 2008 Stream Surveys

Dear Ms Hanson:

We have completed the stream surveys of Kulshan, Trumpeter, and Maddox Creeks within the Mount Vernon city limits. The information we collected has been compiled into a database to be used by the city to create GIS maps, which characterize stream reaches.

I have enclosed a brief report titled, *Description of Methods for Stream Surveys Conducted in Mount Vernon, Washington*, which describes field and office methods used to conduct the stream surveys and assemble the data. At the back of the report you will find four CDs. These CDs contain the following information:

1) Stream Survey Data and Field Maps,
2) Trumpeter Creek Stream Survey Photos,
3) Kulshan Creek Stream Survey Photos, and
4) Maddox Creek Stream Survey Photos.

If you have any questions regarding these materials or would like any further clarification please contact me at any time.

Sincerely yours,

Sam Stoner
Staff Scientist

SLP:slp
K:\Mount Vernon\02 Reports\streamwalk\Correspondence\Stream Survey Transmittal.doc
Enclosures

WSP Environment & Energy
2324 Eastlake Avenue East, Suite 505
Seattle, WA 98102
Tel: (206) 284-7402
Fax: (206) 282-0457
www.wspenvironmental.com

Description of Methods for Stream Surveys Conducted in Mount Vernon, Washington

December 4, 2008

Prepared for:

City of Mount Vernon
910 Cleveland Ave.
PO Box 809
Mount Vernon, WA 98273

Prepared By:

Ecosystem Science & Natural Resources Management
2324 Eastlake Ave. East Suite 505
Seattle, WA 98102
206.284.7402

I. Introduction

WSP Environment & Energy (WSP) was retained by the City of Mount Vernon to conduct stream condition and habitat surveys within the city's drainage basins. Of the city's eight drainage basins (Kulshan, Trumpeter, Maddox, Nookachamps, Carpenter, Lindegren, Britt Slough, and Combined Sewer), WSP identified three priority stream systems to survey during 2008. Trumpeter, Kulshan and Maddox Creeks were selected due to their high level of past impacts and likelihood for future development impacts. Data collected during these 2008 surveys will build upon and update previous investigations performed by Shannon & Wilson (2001).

The scope of the 2008 surveys was threefold: to 1) characterize current stream conditions, 2) identify potential fish barriers, and 3) collect stormwater outfall information to assist with the city's Phase II National Pollution Discharge Elimination System (NPDES) process. Data collected during these stream surveys was collated in a database that will be used by the City of Mount Vernon to create GIS map layers, which will allow city staff to quickly view stream characteristics. This mapping capability will provide a rapid first look at streams to assist in the planning process and implementation of the Critical Areas Ordinance (CAO).

II. Methodology

A. Stream Survey Protocols

WSP scientists developed protocols for rapid assessment of stream conditions based on standardized field protocols for stream characterization and current best available science. These protocols were developed to assess stream geomorphology (e.g. stream gradient, channel cross section, bank stability), plant community (e.g. vegetation quality, buffer width, non-native species presence), and fish habitat (e.g. fish presence, residual pools, fish barriers). These protocols were compiled into a "Stream Survey Data Form" (Appendix A) for data collection in the field. In addition Blaine Chesterfield, Engineering Manager, Department of Public Works, City of Mount Vernon provided the "Outfall Reconnaissance Inventory/ Sample Collection Field Sheet" (Appendix A) for collecting data regarding the type, location, and characteristics of stormwater outfalls.

The WSP stream survey rapid assessment protocols were designed around a reach-based system. For this survey, a reach was defined as a relatively homogeneous stream section having similar physical characteristics and habitat types. An upstream and downstream limit was established for each reach based on uniformity of stream characteristics (e.g. vegetation community, stream gradient, side channel slope, buffer width) or obvious physical features (e.g. road crossings, culverts). A datasheet was prepared for each defined reach.

Stream surveys were conducted by teams of two to five people consisting of WSP staff and Skagit Valley College (SVC) Environmental Conservation students. All surveys were conducted between May 6 and August 14, 2008.

Stream surveys were conducted over consecutive reaches along an entire stream for each of the three basins proceeding either upstream or downstream between the confluence or city limits to the headwaters, including all tributaries. There were several occasions when access to private property was prohibited. In other cases, portions of streams could not be surveyed due to extreme terrain (e.g. unstable slopes, blackberry thickets, and deep water).

B. Field Methods and Database Explanation

Following is an explanation of the field methods and notation used when conducting stream surveys using the "Stream Survey Data Form." Explanation regarding how information has been inputted into the electronic database is provided in italics. Stream survey protocols assembled by WSP are included in Appendix B.

Datasheet ID: Name of stream reach.
A unique identification name was given to each reach entered as "stream branch – reach number" where "T" stands for Trumpeter Creek, "K" stands for Kulshan Creek, and "M" stands for Maddox Creek (e.g. the first and second reaches on the main stem of Trumpeter Creek were called T1-1 and T1-2).

1. Sub-basin: Three sub-basins were assessed, Kulshan, Maddox or Trumpeter.
Entered as Kulshan, Maddox, or Trumpeter.

2. Sampling Date: The date that stream survey occurred.
Entered as Day/Month/Year.

3. Stream Location: A quick description of the stream location as related to nearby streets, landmarks, or other reaches of the stream.
Entered as a short description.

4. Location: The upstream and downstream limits of a reach recorded by standing in the thalweg (e.g. deepest portion of the channel) using a hand held GPS instrument.
Entered as UTM coordinates in units of meters, with error recorded in units of feet, using Datum NAD83. For each reach there is an upstream and a downstream set of coordinates dictating the reach boundaries.

5. Investigators: Investigators were listed by name on the first datasheet they participated on, then by initials every time after.
Entered in stream survey database as initials. WSP staff include Sam Stoner and Kate Knox. SVC students include Michael Moynihan, Alecia Major, Erin Allander, Sara Ortiz, Donovan DeMacy, Jordan Woods, and Steve Manthe.

6. Method of Reach Selection: Reaches were selected based on a relatively homogenous section of the stream. The maximum reach length was typically no greater than 500 feet, but was often shorter than 500 feet depending on homogeneity of the stream. Reaches ended at culverts, major nick points (a point of rapid erosion and incision at which as

streambed is eroded to a new base level by a stream) e.g., road crossings, significant vegetation changes, significant changes in channel morphology (e.g., longitudinal profile, cross-section), etc.

Entered as Natural Feature, Culvert, Ditch, or Other.

8. Montgomery-Buffington Classification: The survey utilized the bed form technique for stream classification first proposed by Montgomery and Buffington (1993) (See Table 1).

Entered as one of the seven channel types outlined by Montgomery and Buffington (1993) including Dune Ripple, Pool Riffle, Plane Bed, Braided, Step Pool, Cascade, and Bedrock. The Montgomery-Buffington classification system was not applicable for some highly-modified, urban stream reaches, which were described as such (e.g. Ditch, Glide, Wetland).

TABLE 1. DIAGNOSTIC FEATURES OF EACH CHANNEL TYPE

	Dune ripple	Pool riffle	Plane bed	Step pool	Cascade	Bedrock	Colluvial
Typical bed material	Sand	Gravel	Gravel-cobble	Cobble-boulder	Boulder	Rock	Variable
Bedform pattern	Multilayered	Laterally oscillatory	Featureless	Vertically oscillatory	Random	Irregular	Variable
Dominant roughness elements	Sinuosity, bedforms (dunes, ripples, bars) grains, banks	Bedforms (bars, pools), grains, sinuosity, banks	Grains, banks	Bedforms (steps, pools), grains, banks	Grains, banks	Boundaries (bed and banks)	Grains
Dominant sediment sources	Fluvial, bank failure	Fluvial, bank failure	Fluvial, bank failure, debris flows	Fluvial, hillslope, debris flows	Fluvial, hillslope, debris flows	Fluvial, hillslope, debris flows	Hillslope, debris flows
Sediment storage elements	Overbank, bedforms	Overbank, bedforms	Overbank	Bedforms	Lee and stoss sides of flow obstructions	Pockets	Bed
Typical confinement	Unconfined	Unconfined	Variable	Confined	Confined	Confined	Confined
Typical pool spacing (channel widths)	5 to 7	5 to 7	None	1 to 4	<1	Variable	Unknown

From: Montgomery, D.R. and J.M. Buffington. 1997. Channel reach morphology in mountain drainage basins. GSA bulletin. 109 (5) 596-611.

9. Stream gradient: Stream gradient was measured using a hand held clinometer, along the longest possible representative portion of the stream within a reach. Gradient was measured between similar stream positions (e.g. pool and pool, or riffle and riffle).

Entered as a percent ranging from 0 to approximately 35.

10. Stream channel cross-section: One stream channel cross-section was established for each reach, located at a representative section along the channel. If possible, cross-sections were positioned in a riffle, run or glide, rather than a pool. Cross-sections were established along a relatively straight portion of the reach and not at a meander.

Cross-section profiles were surveyed by stretching a tape at ordinary high water and measuring the distance and depth at five points: ordinary high water left bank, edge of water left bank, thalweg, edge of water right bank, and ordinary high water right bank.

Only the OHW channel width and depth were recorded in the stream survey worksheet. Full measurements and drawings of the channel cross section are included for each reach in a separate worksheet titled "Stream Cross Section."

Floodprone width was measured perpendicular to the direction of flow. To determine the height at which floodprone width occurs, we followed the heuristic of two times the ordinary high water thalweg depth. Using this height we projected horizontally over the floodplain until the projection intersected the floodplain surface. Typically, there was an obvious, natural break in the floodplain, which we would adjust to, before measuring floodprone width.

An exact floodprone width is entered in units of feet, or a notation is made that the floodprone width is greater than a certain width (e.g. >100).

We measured the side channel slope for each bank using a clinometer. To measure side channel slope, the investigator with the clinometer would stand in the thalweg and measure their eye level either by spotting another person or a measuring rod positioned at the top of the bank.

Side channel slope is measured in percent for both the Right Bank (RB) and the Left Bank (LB). RB is defined as the bank on the right side of the stream when facing downstream. LB is defined as the bank on the left side of the stream when facing downstream.

Note: Ordinary high water is a regulatory term which determines limits of jurisdiction of the Clean Water Act (Waters of the U.S.). "In absence of adjacent wetlands, the jurisdiction extends to the ordinary high water mark." (See Corps of Engineers/EPA CWA regulations 33CFR Part 328 (e): "The term "ordinary high water mark" means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." The following photos are provided by the US Army Corps of Engineers (2007).

11. Channel Quality: Channel quality was visually assessed for each bank to determined whether the channel was primarily concrete lined, rip rap lined, leveed, or not artificially hardened.

Entered as either concrete lined, rip rap lined, leveed, ditched, not artificially hardened, or other. Channel quality was noted for both RB and LB.

12. Bank Stability Rating: Using the rapid assessment protocol described by Henshaw 1999 and included in Scholz and Booth (2001), we classified the reach into one of 4 classes as described in the following table (Table IV).

Bank stability rating is entered as 1, 2, 3, or 4.

Table IV. Streambank stability classification criteria (from Henshaw, 1999)

Class	Description
4	STABLE • Perennial vegetation to waterline • No raw or undercut banks (some erosion on outside of meaner bends OK) • No recently exposed roots • No recent tree falls
3	SLIGHTLY UNSTABLE • Perennial vegetation to waterline in most places • Some scalloping of banks • Minor erosion and/or bank undercutting • Recently exposed tree roots rare but present
2	MODERATELY UNSTABLE • Perennial vegetation to waterline sparse (mainly scoured or stripped by lateral erosion) • Bank held by hard points (trees, boulders) and eroded back elsewhere • Recently exposed tree roots and fine root hairs common
1	COMPLETELY UNSTABLE • No perennial vegetation at waterline • Banks held only by hard points • Severe erosion of both banks • Recently exposed tree roots common • Tree falls and/or severely undercut trees common

From: Scholz, J.G., D.B. Booth. 2001. Environmental Monitoring and Assessment. 71(2): 143-164.

13. Dominant Substrate: We determined the dominant substrate of the channel bed by making visual observations throughout the reach and measuring representative particles. Particle size and corresponding substrate types are provided below.

Substrate type	Particle size range (mm)
Boulder	>256
Cobble	61 - 256
Pebble	16 - 63
Gravel	2 - 15
Sand	0.06 - <2
Silt/Clay	<0.059

Entered as substrate type; boulder, cobble, pebble, gravel, sand, or silt/clay.

14. Erosion/Channel incision notes (OHW width/OHW depth ratio):
Divide the OHW channel width by the mean channel depth to calculate the W:D ratio. This ratio is the stream width-to-depth at OHW discharge. This ratio is the stream width-to-depth at OHW discharge.

Entered as a numerical value.

15. Large wood (LW): Large wood is defined as having a mid-point diameter of at least 4 inches and a length of at least 10 feet (modified from Fox et al. 2003), and existing below OHW.

Large wood presence is noted in the stream survey database as present (Y) or not present (N). If present, the number of pieces was tallied.

We also recorded the number of key pieces (e.g., important for formation of log jams). Key pieces are defined as in-channel large wood that is: (1) independently stable (not functionally held by another factor such as pinned by another log, buried, trapped by a rock, or bed form, and (2) retains (or has potential to retain) other pieces of large wood (Washington Forest Practices Board 1997; Fox et al. 2003). Key pieces typically have very large diameters (e.g., 20 inches). (See the Large woody debris fact sheet 2004 for additional information.)

16. Dominant community type: The dominant plant community was determined for each reach by visual estimation. We used five different plant community types including emergent (vegetation with non-woody stems such as grasses, herbs, and ferns), scrub-shrub (vegetation with woody stems less than 20 ft tall such as willows and red-osier dogwood), deciduous forest (deciduous trees such as red alder and big-leaf maple), conifer/deciduous (a mix of deciduous and coniferous trees), and conifer forest (coniferous trees such as western red cedar and Douglas-fir).

For RB and LB, the dominant vegetation community type was entered as emergent, scrub-shrub, deciduous forest, conifer/deciduous, or conifer forest.

17. Vegetation quality: We noted whether the vegetation was composed of primarily native, non-native or mixed vegetation species for each bank in a reach.

Entered as native, non-native, or mixed.

18. Non-native species present: We recorded the presence and abundance of six different non-native, invasive species.

In the stream survey database, non-native species were annotated by abbreviations using the first two letters of the genus and species name: Rubus discolor (RUDI), Rubus laciniatus (RULA), Polygonum japonica (POJA), Phalaris arundinaceae (PHAR), Hedera helix (HEHE), and Ilex aquifolium (ILAQ).

19. Width of contiguous forest canopy in buffer: For each reach, we recorded the average width of contiguous forest canopy in the buffer.

Buffer width was recorded in the database in four categories: 0 ft, between 0 and 30 ft, between 30 and 150 ft, and greater than 150 ft.

20. Canopy Cover over Stream Channel: Canopy cover over stream channel was estimated using a densiometer at a representative point along the reach, standing in the thalweg (the deepest point in the channel). The average of four measurements (facing upstream, downstream, river right, and river left) was recorded.

Entered as a numerical percentage of canopy cover (e.g. 30% means there is 30% aerial coverage by canopy and 70% open sky over the stream channel)

21. Fish Habitat Assessment: Observations of fish presence were recorded. If possible, fish species were identified and noted. If a potential fish barrier was observed, a Fish Barrier Datasheet was completed.

The presence of fish was noted with a "Y" for yes if fish were observed and an "N" for no if fish were not observed. Fish habitat remarks were noted using a short sentence. If there were no comments, that was noted with "none."

22. Stormwater outfalls: We tallied the number of stormwater outfalls observed along the reach. For each outfall, or cluster of outfalls, a Stormwater Outfall Datasheet was completed, which recorded information regarding the type, characteristics, and location of the outfall.

The number of stormwater outfalls observed within a reach was recorded. Details regarding each outfall were recorded in a separate worksheet titled "Outfall."

Notes: Additional notes were made detailing a particular feature or aspect of a reach that could not be documented by the other sections of the datasheet.

B. Fish Barrier

Whenever a potential barrier to fish passage was observed, we documented the type of barrier observed, including Universal Transverse Mercator (UTM) coordinates, photos, and measurements. We measured primary dimensions of the barrier including height, width, drop, pool depth, gradient, diameter, length, etc., when applicable.

C. Stormwater Outfall

Using the datasheet provided by the Department of Public Works, we recorded the type and location of any stormwater inputs to the streams, such as rip rap lined open drainages, yard drainage systems, and stormwater pipes from nearby roads.

D. Photos

Photographs were taken to characterize each reach. Information was recorded about the photos including aspect, location, and/or a description. Generally, four photos were taken per reach, including an upstream and downstream photo, a photo of the cross section, and a photo of the datasheet. Photos were taken of each potential fish barrier surveyed and each stormwater outfall.
Photos were organized in a folder titled "stream survey photos." Photos were given names denoting to which stream and reach they belong.

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APPENDIX A – Data Forms

Data Sheet ID:

STREAM SURVEY DATA FORM - City of Mount Vernon

1. Sub-basin (number reach): Kulshan Maddox Trumpter **2. Sampling Date:**_____

3. Stream/Location:_____

4. Location: Upstream UTM _____E _____N Datum _____

Downstream UTM _____E _____N

5. Investigator(s):_____

6. Method of Reach Selection (Circle):

upstream	Natural Feature	Culvert	500 ft	Other
downstream	Natural Feature	Culvert	500 ft	Other

describe:

7. Reach length:

Channel Geomorphology

8. Montgomery-Buffington Classification (Circle): Pool riffle Braided Cascade Dune ripple Plane bed Step pool Bedrock

9. Stream Gradient: _____% Vertical Drop (ft):_____ Distance (ft):_____

10. Cross Section

Location: UTM _____E _____N

OHW Channel Width _____

	OHW (L)	Edge of Water (L)	Thalweg	Edge of Water (R)	OHW (R)
Height (ft)					
Distance (ft)					

Flood Prone width (at 2x Thalweg Depth, or by geomorphic surface): _____

Side channel Slope (LB): _____% **Side Channel Slope (RB):** _____ %

Left Bank Right Bank

Draw channel shape

11. Channel Quality (Circle)

RB	Concrete lined	Rip rap lined	Leveed	Not artificially hardened
LB	Concrete lined	Rip rap lined	Leveed	Not artificially hardened

12. Bank stability rating (Circle): 4 (Stable) 3 (Slightly unstable) 2 (Moderately unstable) 1 (Completely unstable)

13. Dominant Substrate:

<2mm	2 -15 mm	16-63 mm	64-256 mm	>256 mm
Sand/silt/clay	Gravel	Pebble	Cobble	Boulder

14. Erosion/channel incision notes = OHW Width/ OHW Depth Ratio:

15. Large Wood Present (Y/N):_____ **Number of LW Pieces:**

LW = >4' diameter, > 10 feet long

Number of Key Pieces (>20 inch diameter):

Vegetation Assessment

16. Dominant Community Type (Circle dominant community for each bank):

R. Bank	Emergent	Scrub-shrub	Deciduous Forest	Conifer/Deciduous	Conifer Forest
L. Bank	Emergent	Scrub-shrub	Deciduous Forest	Conifer/Deciduous	Conifer Forest

17. Vegetation Quality (Circle):

R. Bank	Native	Non-native	Mixed
L. Bank	Native	Non-native	Mixed

18.Non-native species present — **Est. Cover % of reach**

Rubus discolor _____

Rubus laciniatus _____

Polygonum japonica _____

Phalaris arundinaceae _____

Hedera helix _____

Ilex aquifolium _____

19. Width of Contiguous forest canopy in buffer (Circle)

R. Bank _____	0-30'	30-150'	>150'	
L. Bank	0-30'	30-150'	>150'	

20. Canopy Cover over Stream Channel:_____ dots x 1.04 = _____%

Data Sheet ID: **STREAM SURVEY DATA FORM - City of Mount Vernon**

21. Fish Habitat Assessment

Fish observed (Y/N):_____ **Residual pools (tally)**_____ (pools >10 sq ft, > 6 inches deep)

Fish habitat remarks:_____

Fish barriers observed (Y/N): ***If yes, complete Barrier Datasheet***

22. Stormwater Outfalls **Number of outfalls (tally):**

See Outfalls Datasheet

Remarks: Reach description/ Other Notes

Photo Points

Location	Aspect	Direction looking (up/downstream)	Brief description

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.): Last 24 hours:	Last 48 hours:	
Latitutde:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	

Land Use in Drainage Area (Check all that apply):

☐ Industrial
☐ Ultra-Urban Residential
☐ Suburban Residential
☐ Commercial
☐ Open Space
☐ Institutional
Other: _____
Known Industries: _____

Notes (e.g.., origin of outfall, if known):

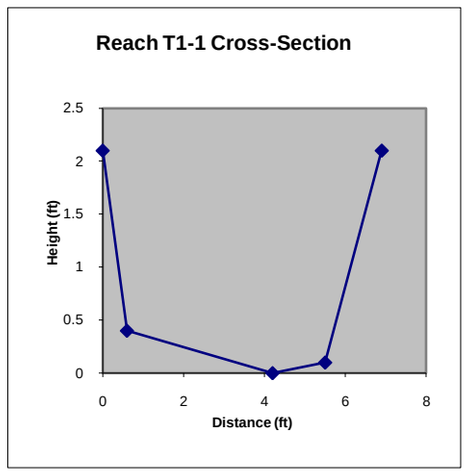
Section 2: Outfall Description

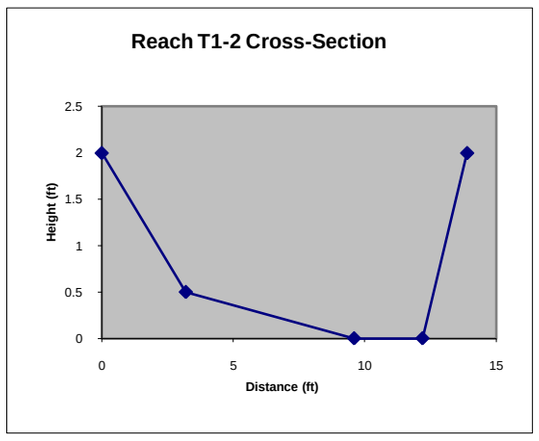
LOCATION	MATERIAL	SHAPE		DIMENSIONS (IN.)	SUBMERGED
☐ **Closed Pipe**	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Eliptical ☐ Box ☐ Other: _____	☐ Single ☐ Double ☐ Triple ☐ Other: _____	Diameter/Dimensions: _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ **Open drainage**	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____		Depth: _____ Top Width: _____ Bottom Width: _____	
☐ **In-Stream**	**(applicable when collecting samples)**				
Flow Present?	☐ Yes ☐ No *If No, Skip to Section 5*				
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial				

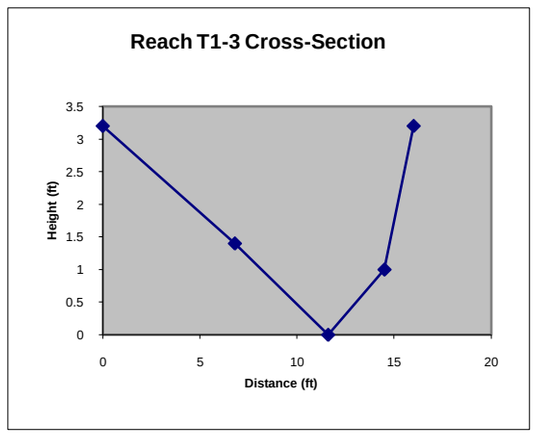
Section 3: Quantitative Characterization

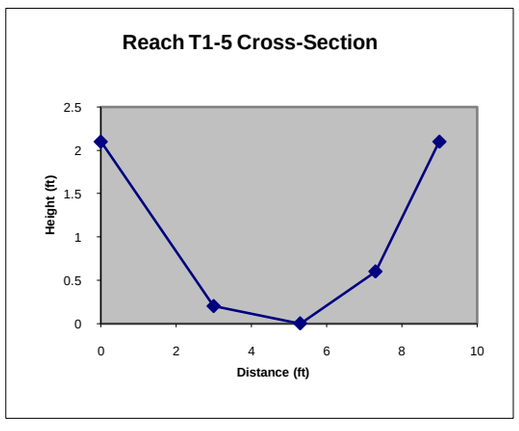
FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER		**RESULT**	**UNIT**	**EQUIPMENT**
☐Flow #1	Volume		Liter	Bottle
	Time to fill		Sec	
☐Flow #2	Flow depth		In	Tape measure
	Flow width	____' ____"	Ft, In	Tape measure
	Measured length	____' ____"	Ft, In	Tape measure
	Time of travel		S	Stop watch
Temperature			°F	Thermometer
pH			pH Units	Test strip/Probe
Ammonia			mg/L	Test strip

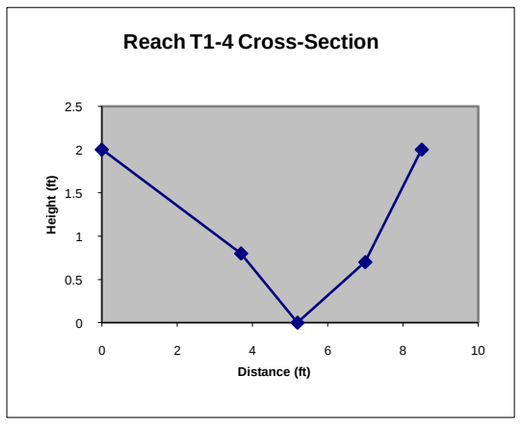
Reach		Dimensions				
		OHW (L)	Edge of Water (L)	Thalweg	Edge of Water (R)	OHW (R)
T1-1	**Height (ft)**	2.1	0.4	0	0.1	2.1
	Distance (ft)	0	0.6	4.2	5.5	6.9
T1-2	**Height (ft)**	2	0.5	0	0	2
	Distance (ft)	0	3.2	9.6	12.2	13.9
T1-3	**Height (ft)**	3.2	1.4	0	1	3.2
	Distance (ft)	0	6.8	11.6	14.5	16
T1-5	**Height (ft)**	2.1	0.2	0	0.6	2.1
	Distance (ft)	0	3	5.3	7.3	9
T1-4	**Height (ft)**	2	0.8	0	0.7	2
	Distance (ft)	0	3.7	5.2	7	8.5



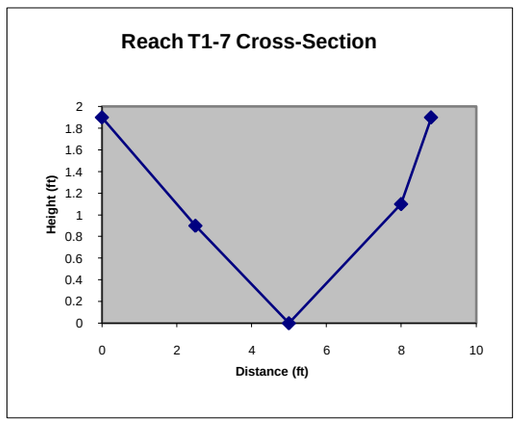




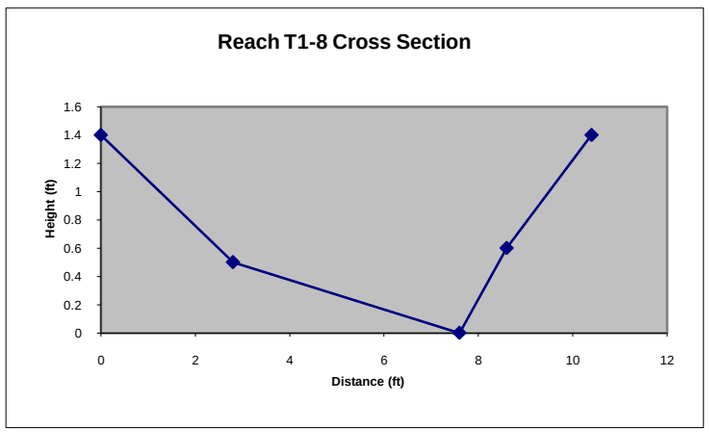




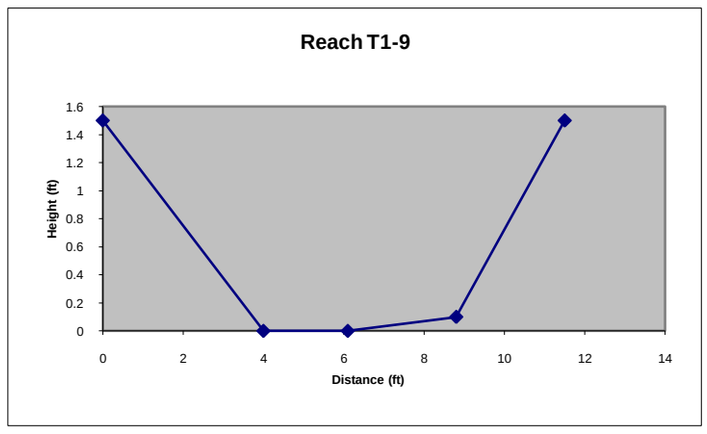
T1-7	**Height (ft)**	1.9	0.9	0	1.1	1.9
	Distance (ft)	0	2.5	5	8	8.8



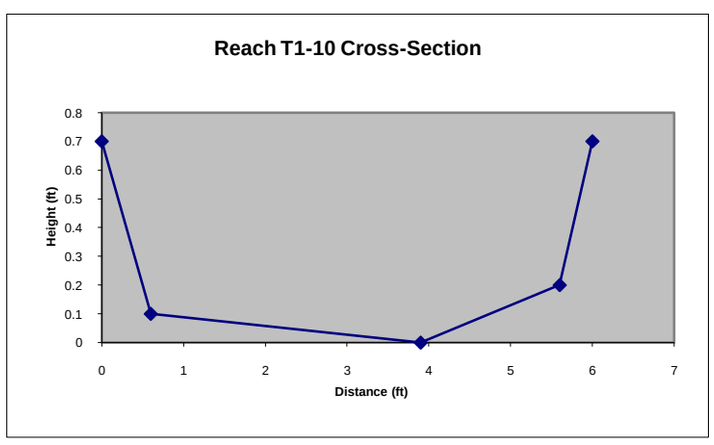
T1-8	**Height (ft)**	1.4	0.5	0	0.6	1.4
	Distance (ft)	0	2.8	7.6	8.6	10.4



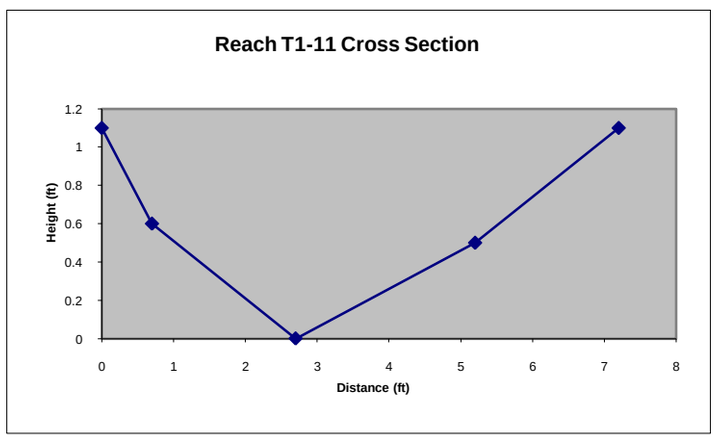
T1-9	**Height (ft)**	1.5	0	0	0.1	1.5
	Distance (ft)	0	4	6.1	8.8	11.5



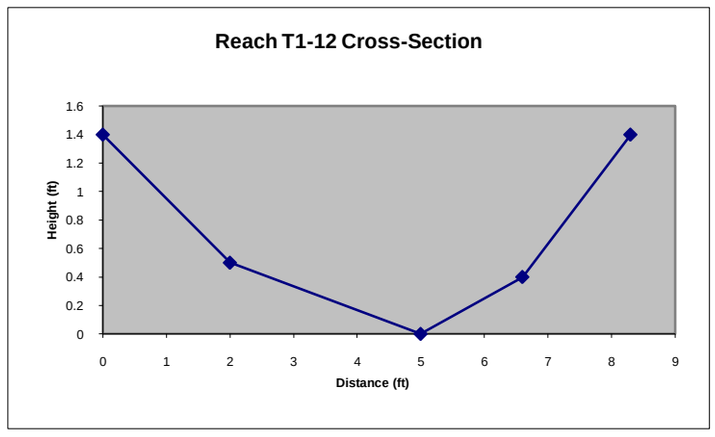
T1-10	**Height (ft)**	0.7	0.1	0	0.2	0.7
	Distance (ft)	0	0.6	3.9	5.6	6



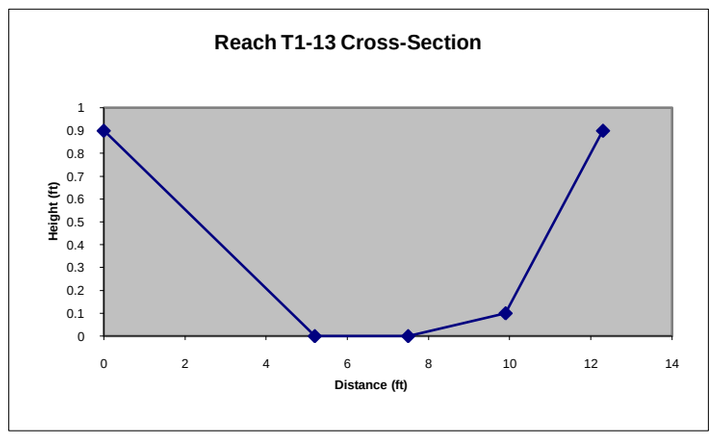
T1-11	**Height (ft)**	1.1	0.6	0	0.5	1.1
	Distance (ft)	0	0.7	2.7	5.2	7.2



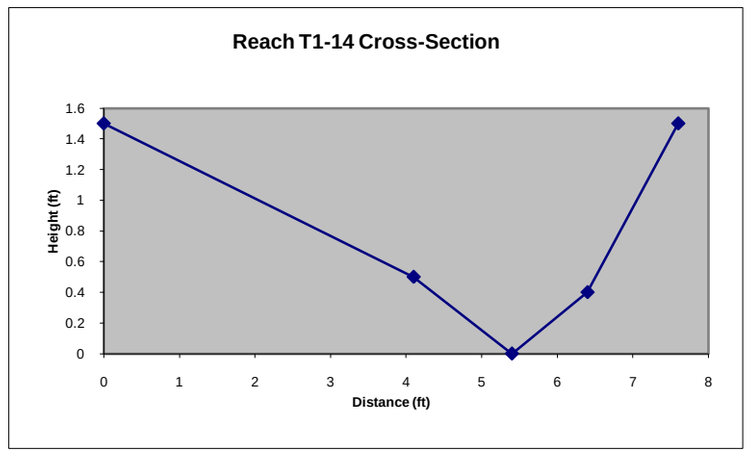
T1-12	**Height (ft)**	1.4	0.5	0	0.4	1.4
	Distance (ft)	0	2	5	6.6	8.3



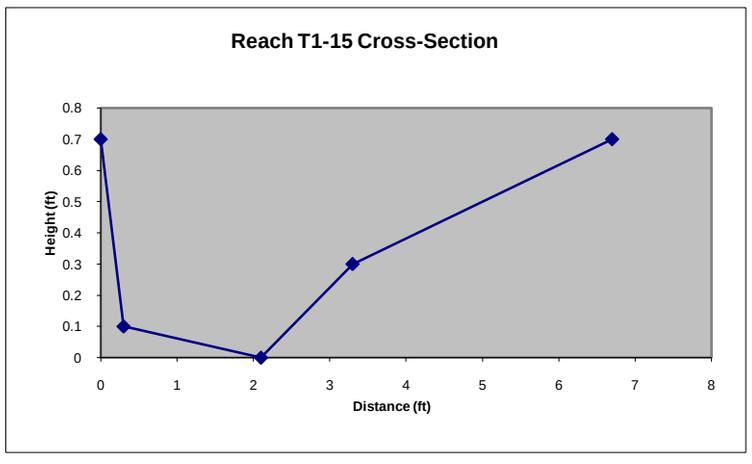
T1-13	**Height (ft)**	0.9	0	0	0.1	0.9
	Distance (ft)	0	5.2	7.5	9.9	12.3



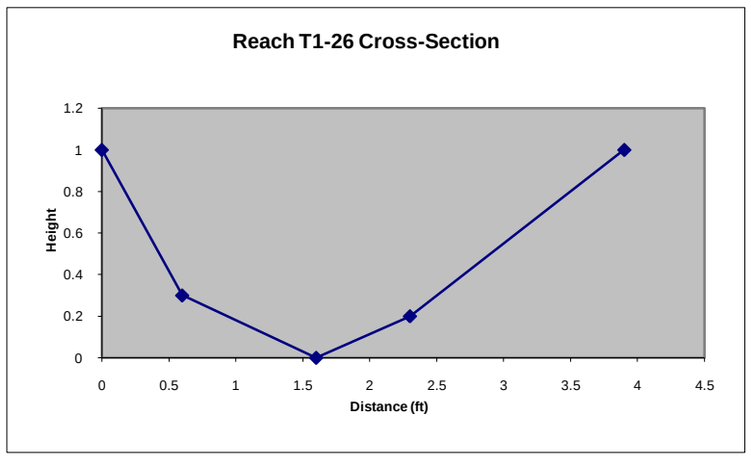
T1-14	**Height (ft)**	1.5	0.5	0	0.4	1.5
	Distance (ft)	0	4.1	5.4	6.4	7.6



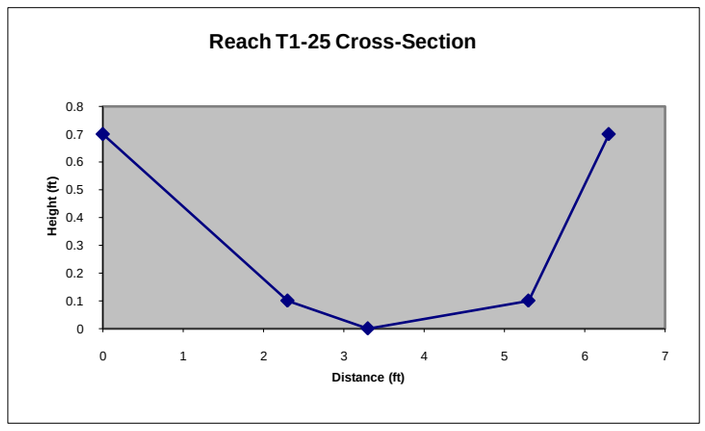
T1-15	**Height (ft)**	0.7	0.1	0	0.3	0.7
	Distance (ft)	0	0.3	2.1	3.3	6.7



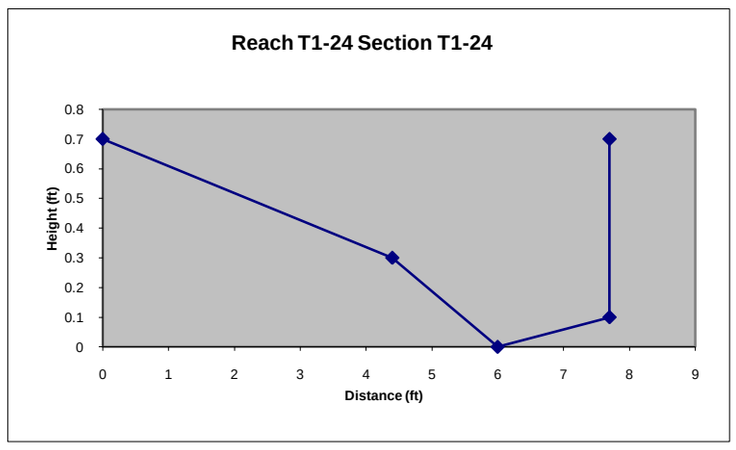
T1-26	**Height (ft)**	1	0.3	0	0.2	1
	Distance (ft)	0	0.6	1.6	2.3	3.9



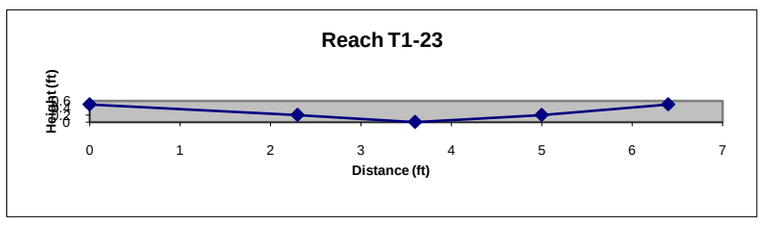
T1-25	**Height (ft)**	0.7	0.1	0	0.1	0.7
	Distance (ft)	0	2.3	3.3	5.3	6.3



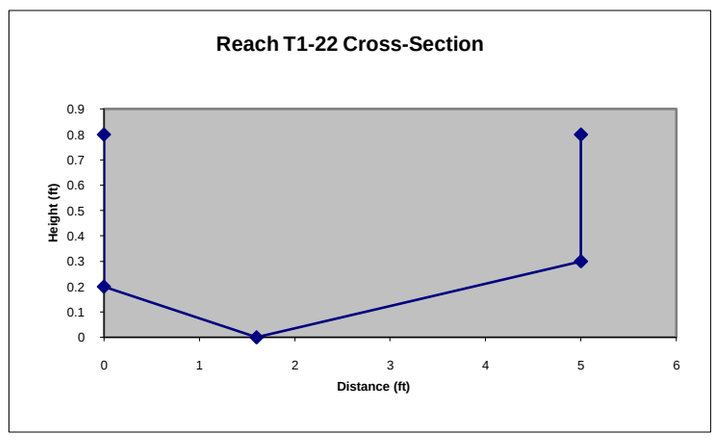
T1-24	**Height (ft)**	0.7	0.3	0	0.1	0.7
	Distance (ft)	0	4.4	6	7.7	7.7



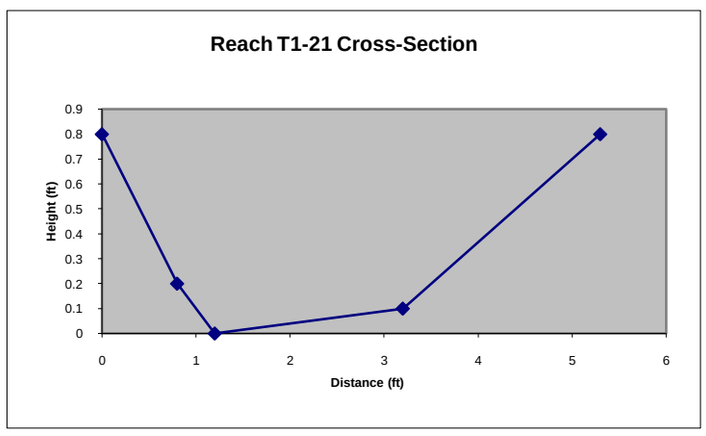
T1-23	**Height (ft)**	0.5	0.2	0	0.2	0.5
	Distance (ft)	0	2.3	3.6	5	6.4



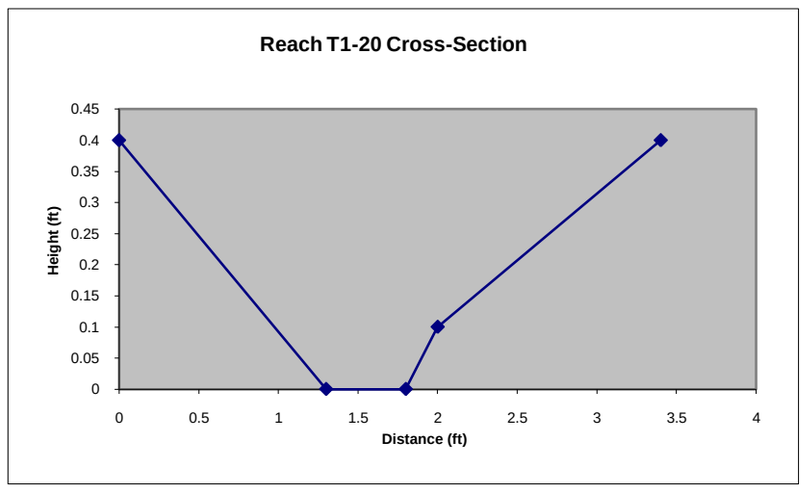
T1-22	**Height (ft)**	0.8	0.2	0	0.3	0.8
	Distance (ft)	0	0	1.6	5	5



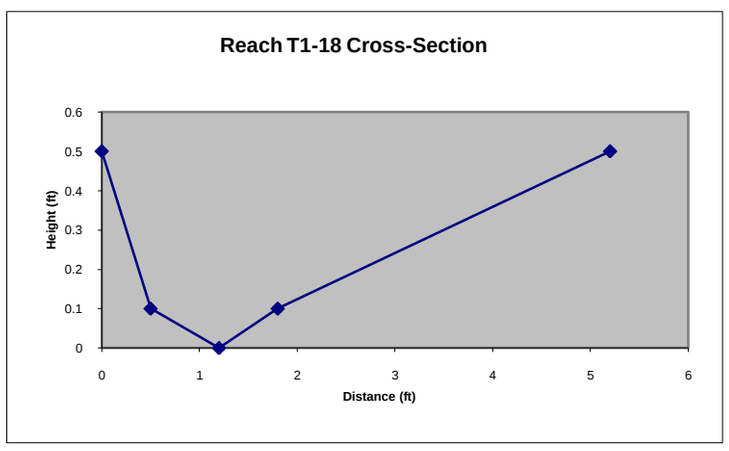
T1-21	**Height (ft)**	0.8	0.2	0	0.1	0.8
	Distance (ft)	0	0.8	1.2	3.2	5.3



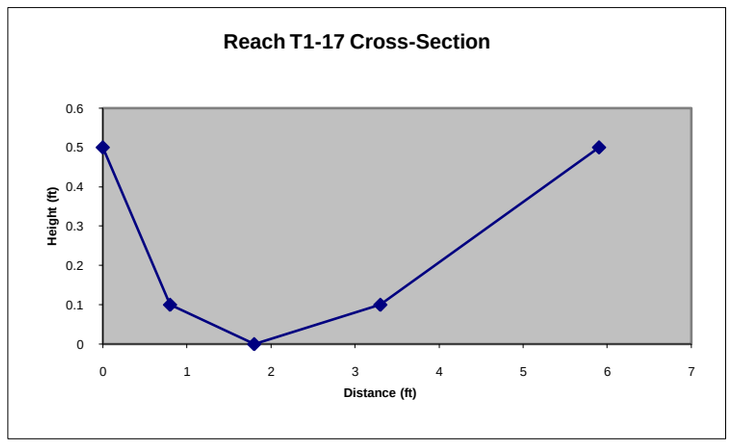
T1-20	**Height (ft)**	0.4	0	0	0.1	0.4
	Distance (ft)	0	1.3	1.8	2	3.4



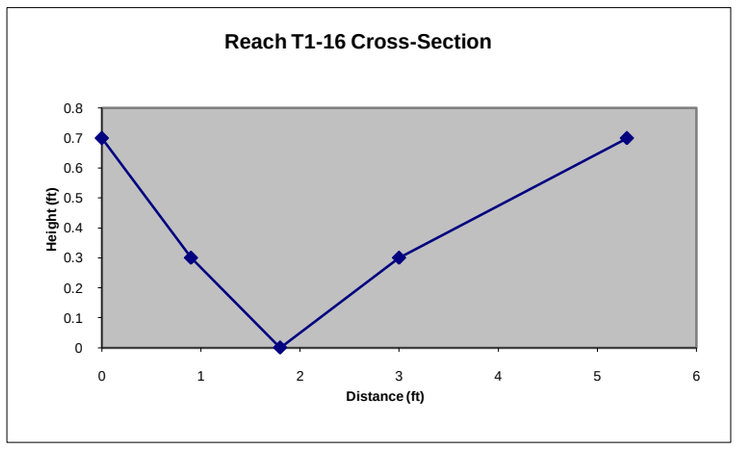
T1-18	**Height (ft)**	0.5	0.1	0	0.1	0.5
	Distance (ft)	0	0.5	1.2	1.8	5.2



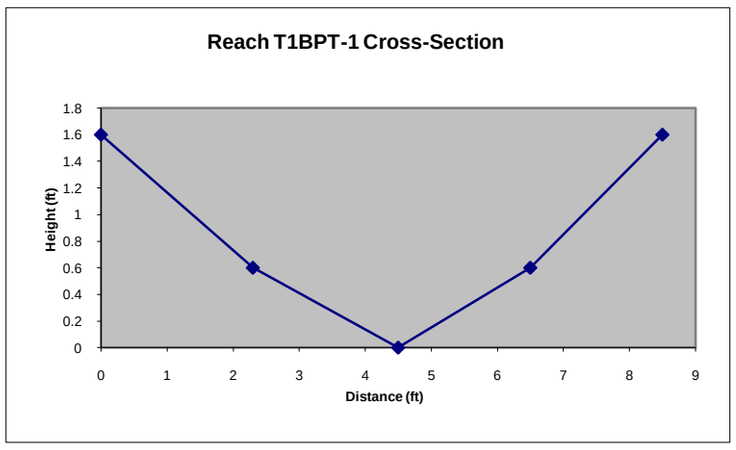
T1-17	**Height (ft)**	0.5	0.1	0	0.1	0.5
	Distance (ft)	0	0.8	1.8	3.3	5.9



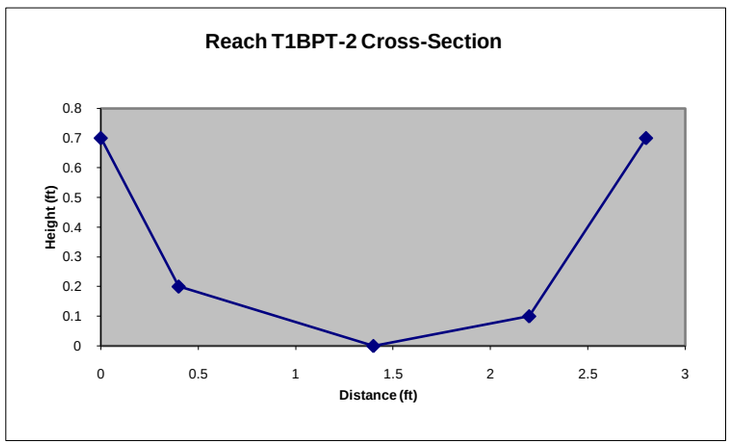
T1-16	**Height (ft)**	0.7	0.3	0	0.3	0.7
	Distance (ft)	0	0.9	1.8	3	5.3



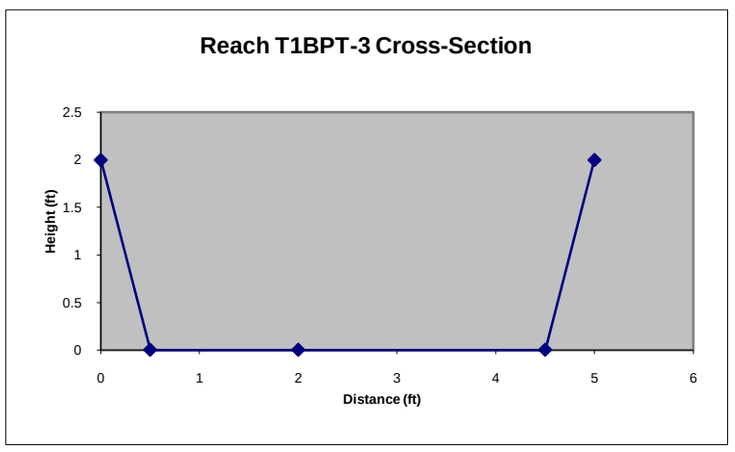
T1BPT-1	**Height (ft)**	1.6	0.6	0	0.6	1.6
	Distance (ft)	0	2.3	4.5	6.5	8.5



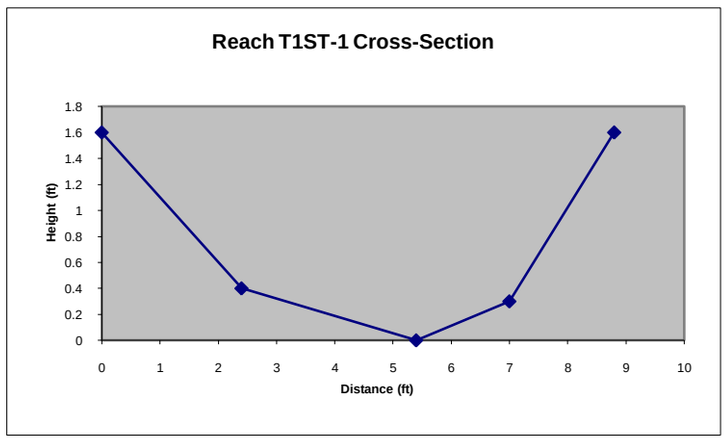
T1BPT-2	**Height (ft)**	0.7	0.2	0	0.1	0.7
	Distance (ft)	0	0.4	1.4	2.2	2.8



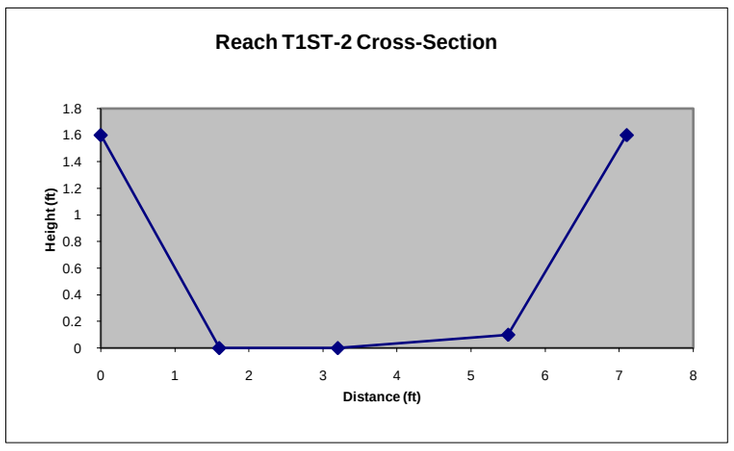
T1BPT-3	**Height (ft)**	2	0	0	0	2
	Distance (ft)	0	0.5	2	4.5	5



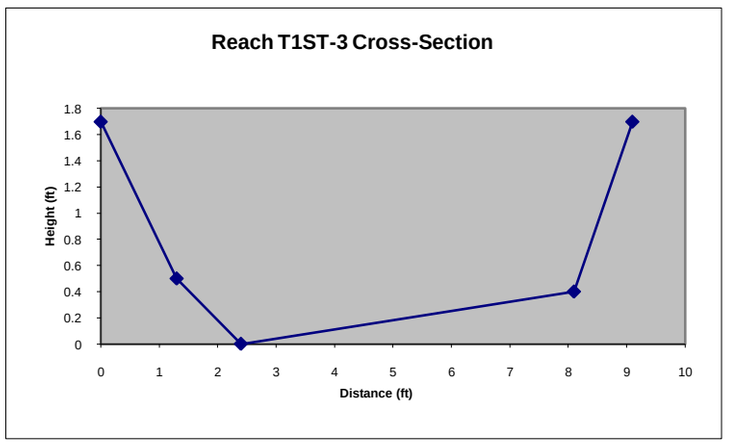
T1ST-1	**Height (ft)**	1.6	0.4	0	0.3	1.6
	Distance (ft)	0	2.4	5.4	7	8.8



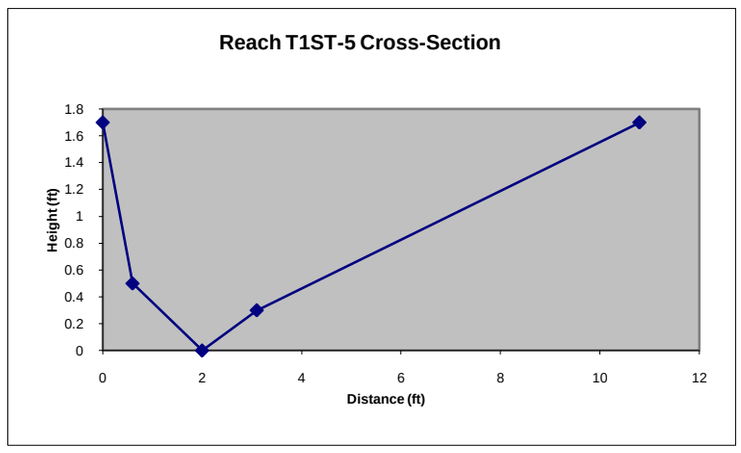
T1ST-2	**Height (ft)**	1.6	0	0	0.1	1.6
	Distance (ft)	0	1.6	3.2	5.5	7.1



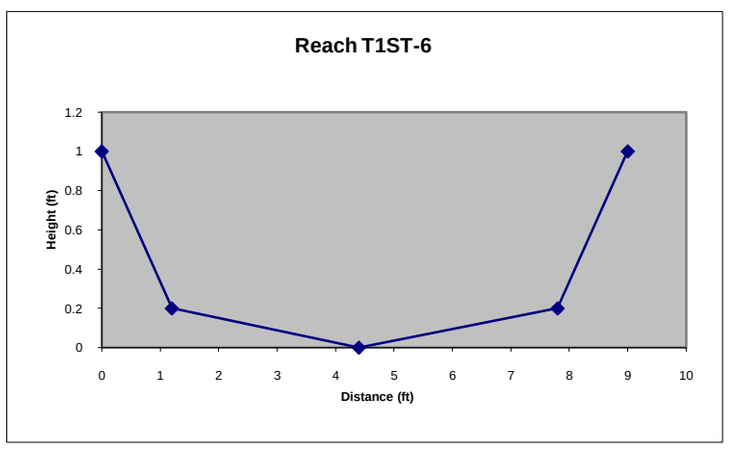
T1ST-3	**Height (ft)**	1.7	0.5	0	0.4	1.7
	Distance (ft)	0	1.3	2.4	8.1	9.1



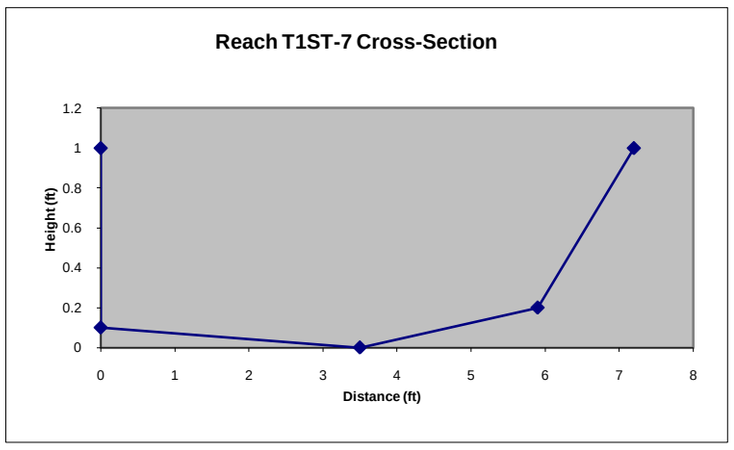
T1ST-5	**Height (ft)**	1.7	0.5	0	0.3	1.7
	Distance (ft)	0	0.6	2	3.1	10.8



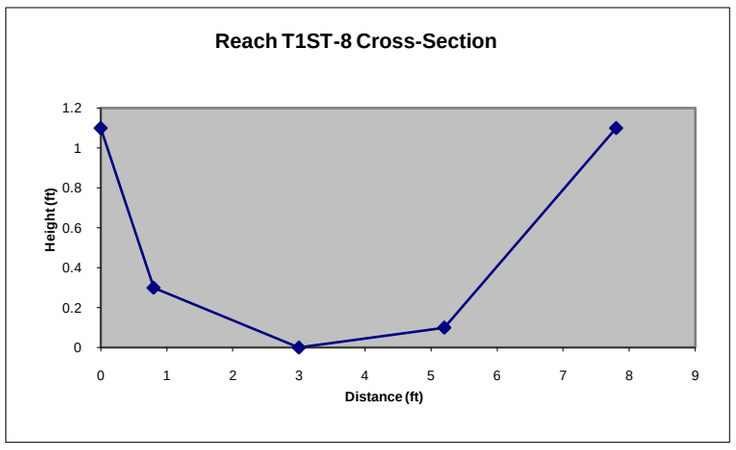
T1ST-6	**Height (ft)**	1	0.2	0	0.2	1
	Distance (ft)	0	1.2	4.4	7.8	9



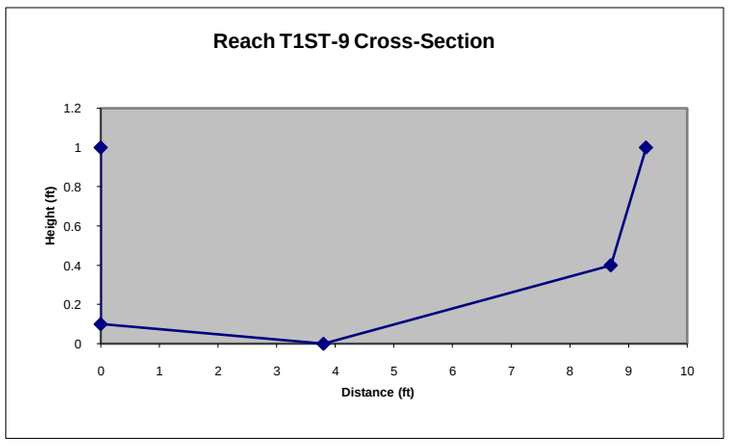
T1ST-7	**Height (ft)**	1	0.1	0	0.2	1
	Distance (ft)	0	0	3.5	5.9	7.2



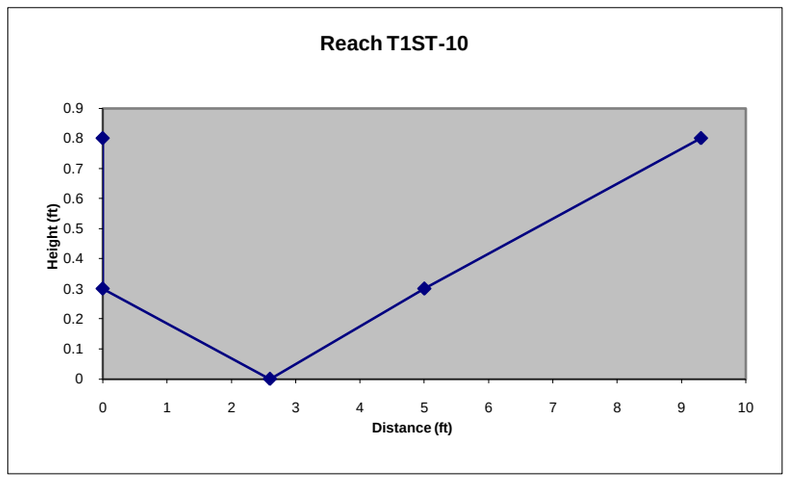
T1ST-8	**Height (ft)**	1.1	0.3	0	0.1	1.1
	Distance (ft)	0	0.8	3	5.2	7.8



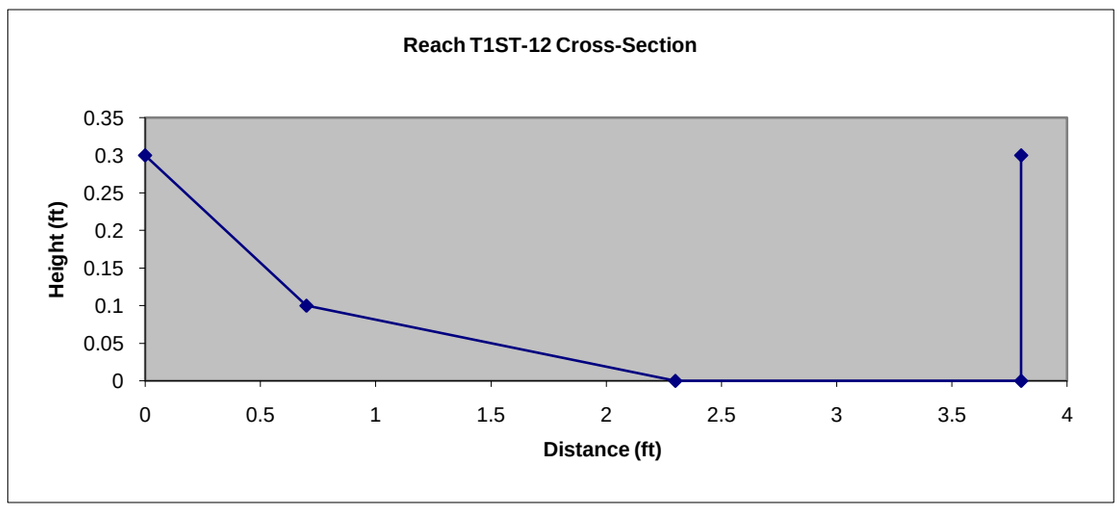
T1ST-9	**Height (ft)**	1	0.1	0	0.4	1
	Distance (ft)	0	0	3.8	8.7	9.3



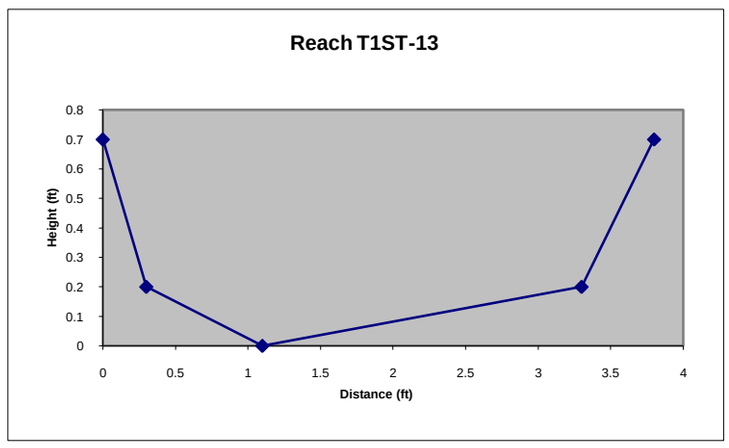
T1ST-10	**Height (ft)**	0.8	0.3	0	0.3	0.8
	Distance (ft)	0	0	2.6	5	9.3



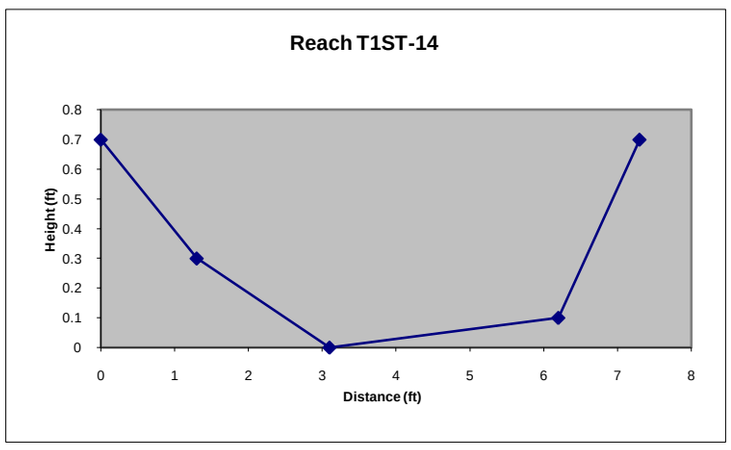
T1ST-12	**Height (ft)**	0.3	0.1	0	0	0.3
	Distance (ft)	0	0.7	2.3	3.8	3.8



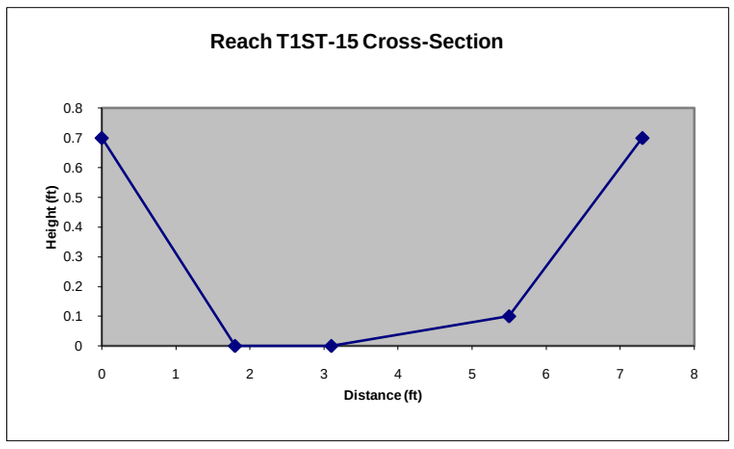
T1ST-13	**Height (ft)**	0.7	0.2	0	0.2	0.7
	Distance (ft)	0	0.3	1.1	3.3	3.8



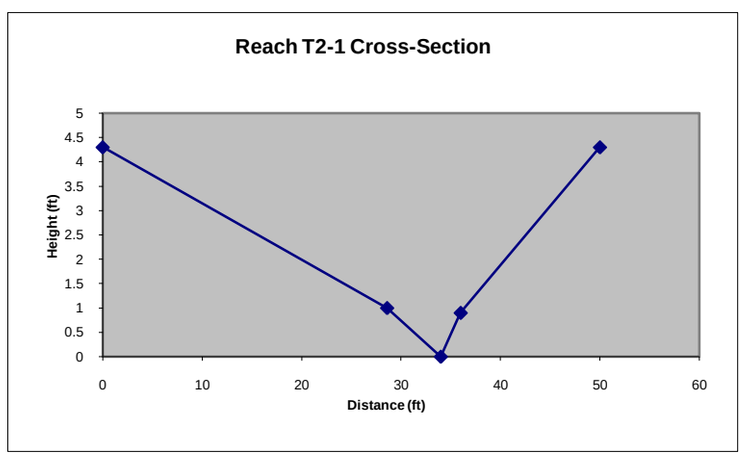
T1ST-14	**Height (ft)**	0.7	0.3	0	0.1	0.7
	Distance (ft)	0	1.3	3.1	6.2	7.3



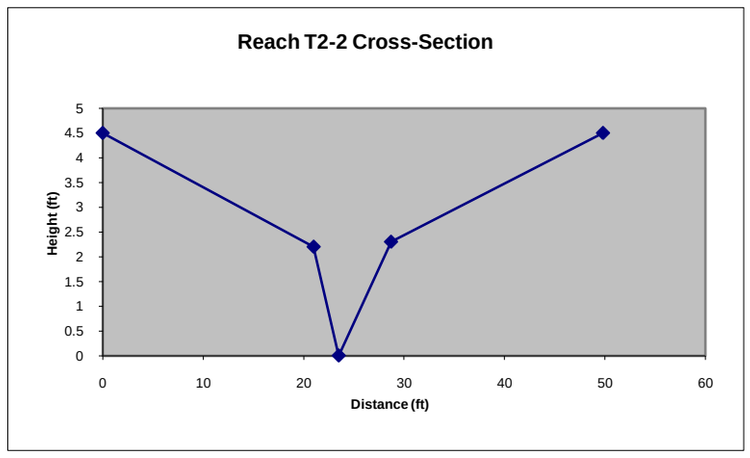
T1ST-15	**Height (ft)**	0.7	0	0	0.1	0.7
	Distance (ft)	0	1.8	3.1	5.5	7.3



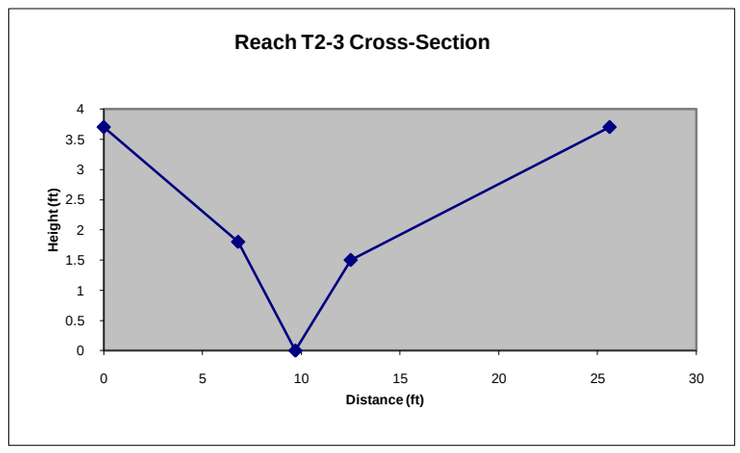
T2-1	**Height (ft)**	4.3	1	0	0.9	4.3
	Distance (ft)	0	28.6	34	36	50



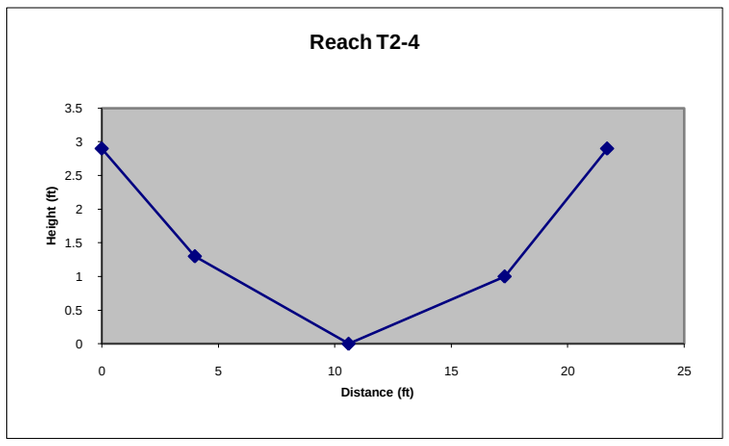
T2-2	**Height (ft)**	4.5	2.2	0	2.3	4.5
	Distance (ft)	0	21	23.5	28.7	49.8



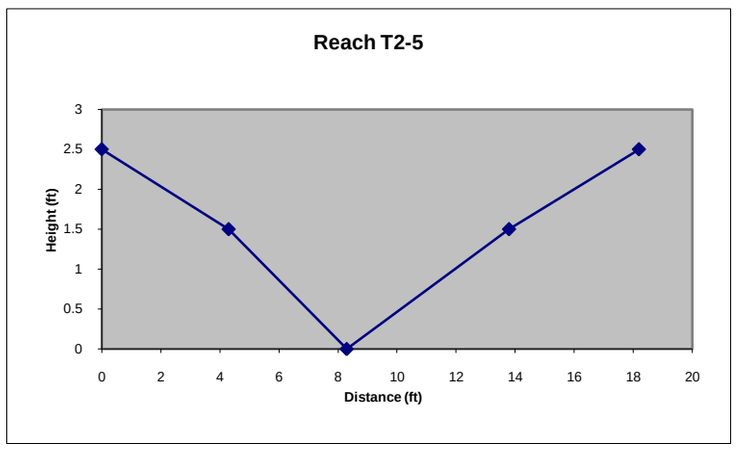
T2-3	**Height (ft)**	3.7	1.8	0	1.5	3.7
	Distance (ft)	0	6.8	9.7	12.5	25.6



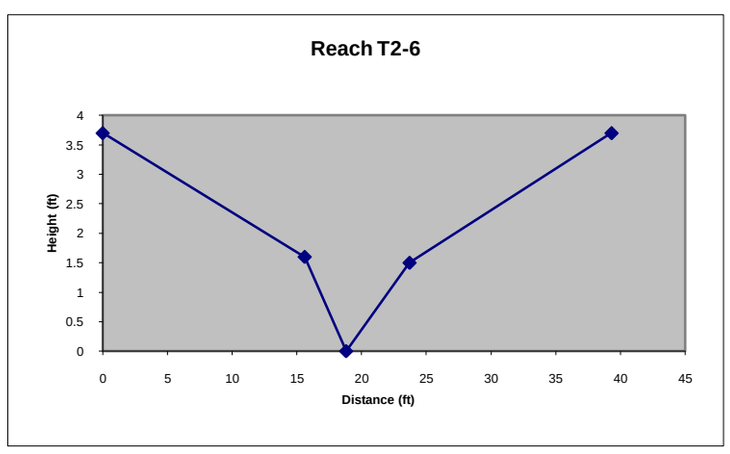
T2-4	**Height (ft)**	2.9	1.3	0	1	2.9
	Distance (ft)	0	4	10.6	17.3	21.7



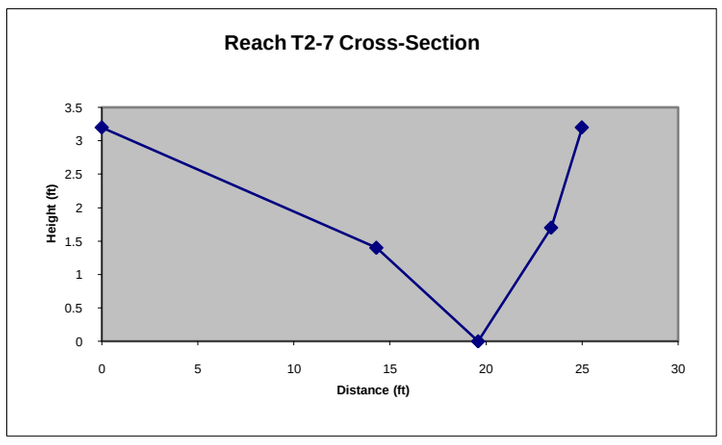
T2-5	**Height (ft)**	2.5	1.5	0	1.5	2.5
	Distance (ft)	0	4.3	8.3	13.8	18.2



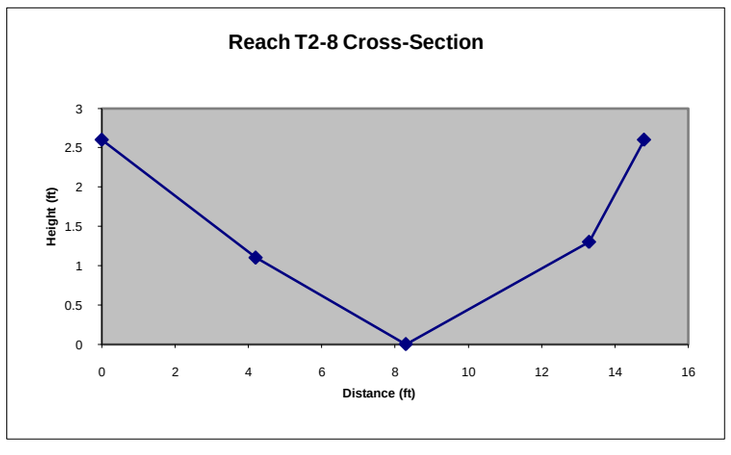
T2-6	**Height (ft)**	3.7	1.6	0	1.5	3.7
	Distance (ft)	0	15.6	18.8	23.7	39.3



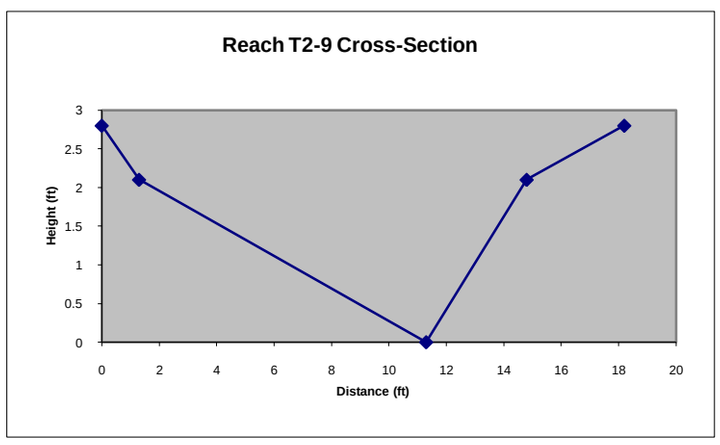
T2-7	**Height (ft)**	3.2	1.4	0	1.7	3.2
	Distance (ft)	0	14.3	19.6	23.4	25



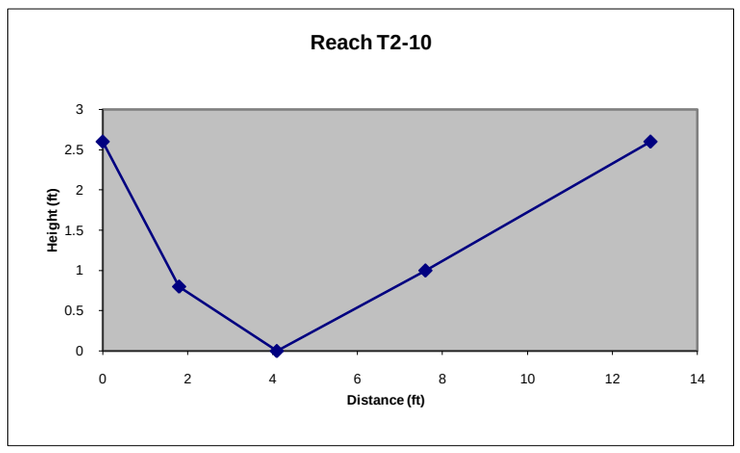
T2-8	**Height (ft)**	2.6	1.1	0	1.3	2.6
	Distance (ft)	0	4.2	8.3	13.3	14.8



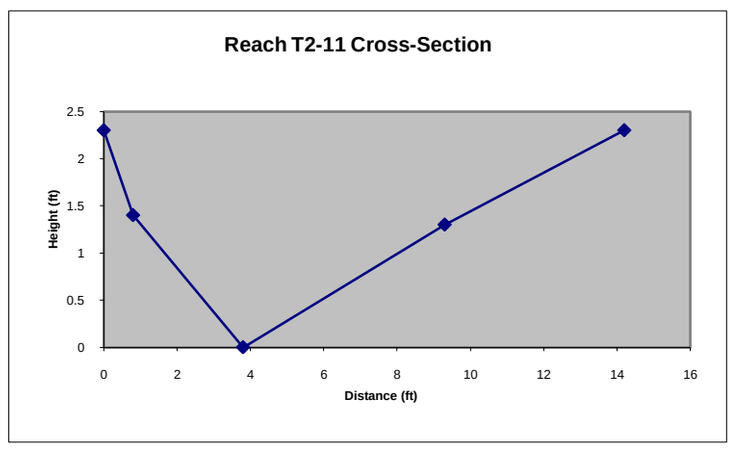
T2-9	**Height (ft)**	2.8	2.1	0	2.1	2.8
	Distance (ft)	0	1.3	11.3	14.8	18.2



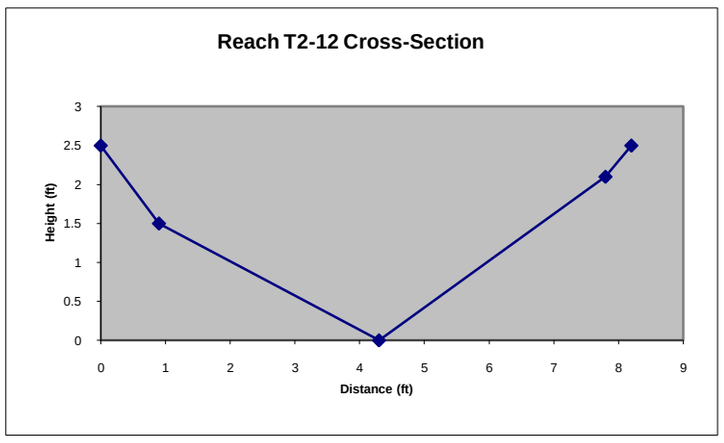
T2-10	**Height (ft)**	2.6	0.8	0	1	2.6
	Distance (ft)	0	1.8	4.1	7.6	12.9



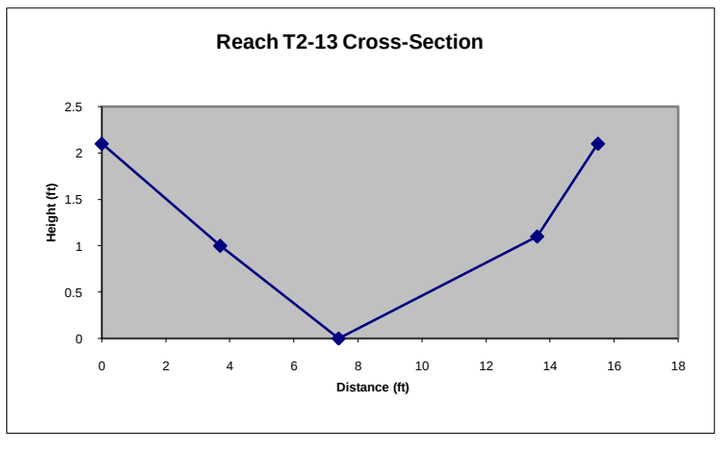
T2-11	**Height (ft)**	2.3	1.4	0	1.3	2.3
	Distance (ft)	0	0.8	3.8	9.3	14.2



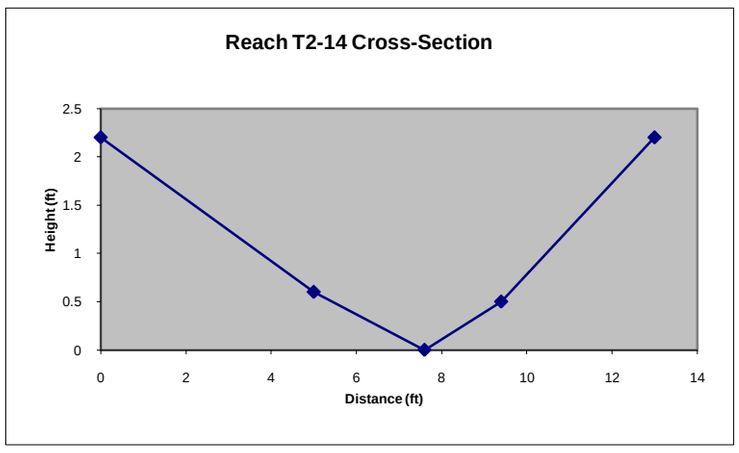
T2-12	**Height (ft)**	2.5	1.5	0	2.1	2.5
	Distance (ft)	0	0.9	4.3	7.8	8.2



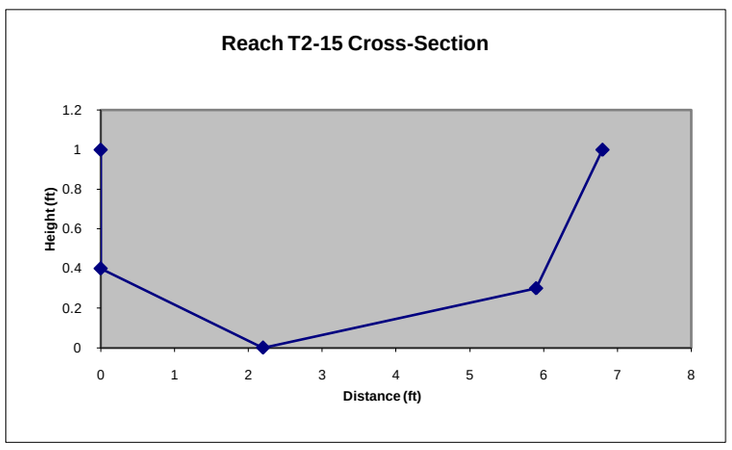
T2-13	**Height (ft)**	2.1	1	0	1.1	2.1
	Distance (ft)	0	3.7	7.4	13.6	15.5



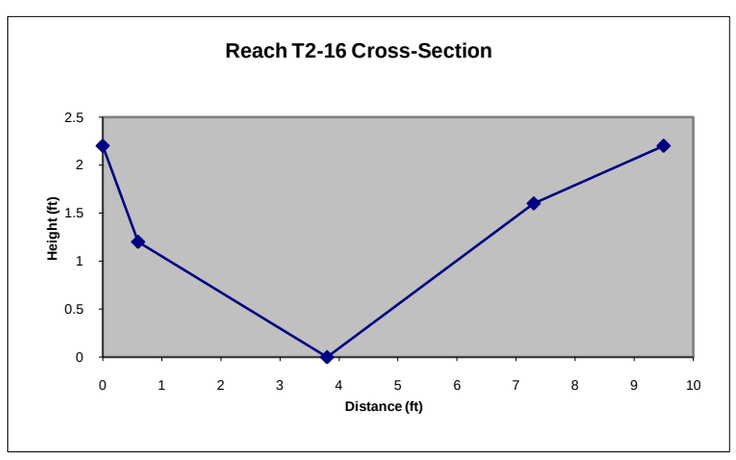
T2-14	**Height (ft)**	2.2	0.6	0	0.5	2.2
	Distance (ft)	0	5	7.6	9.4	13



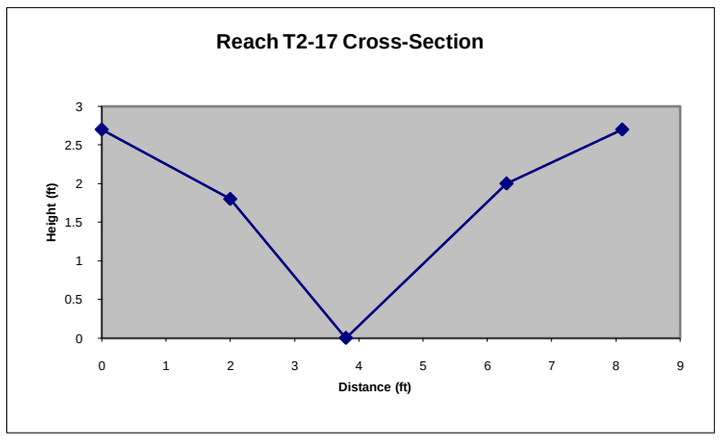
T2-15	**Height (ft)**	1	0.4	0	0.3	1
	Distance (ft)	0	0	2.2	5.9	6.8



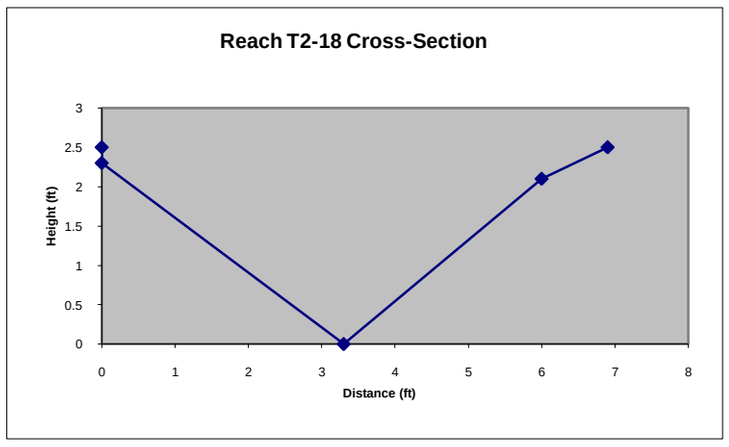
T2-16	**Height (ft)**	2.2	1.2	0	1.6	2.2
	Distance (ft)	0	0.6	3.8	7.3	9.5



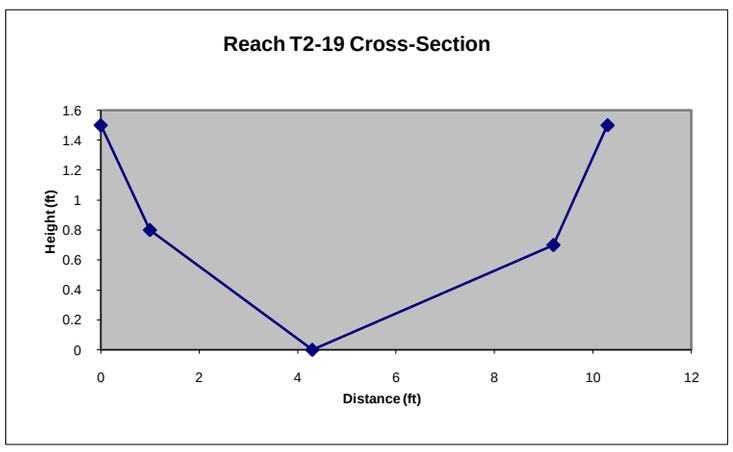
T2-17	**Height (ft)**	2.7	1.8	0	2	2.7
	Distance (ft)	0	2	3.8	6.3	8.1



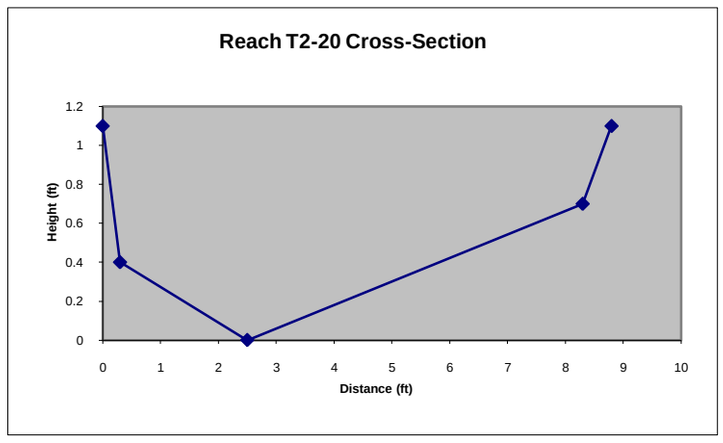
T2-18	**Height (ft)**	2.5	2.3	0	2.1	2.5
	Distance (ft)	0	0	3.3	6	6.9



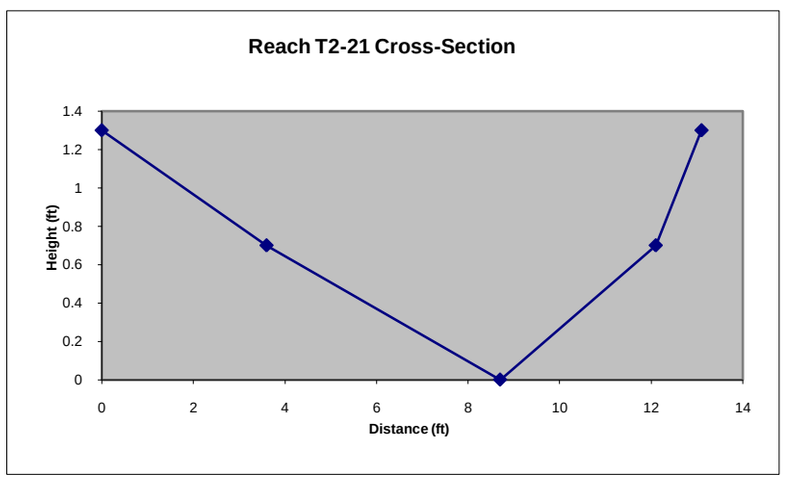
T2-19	**Height (ft)**	1.5	0.8	0	0.7	1.5
	Distance (ft)	0	1	4.3	9.2	10.3



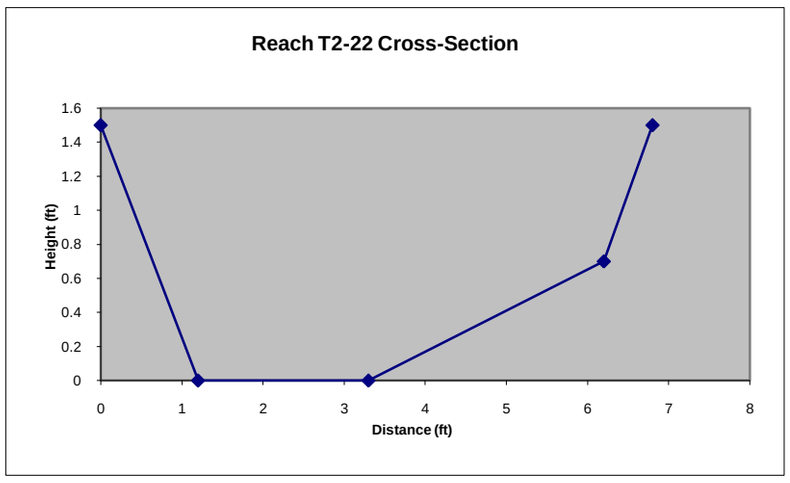
T2-20	**Height (ft)**	1.1	0.4	0	0.7	1.1
	Distance (ft)	0	0.3	2.5	8.3	8.8



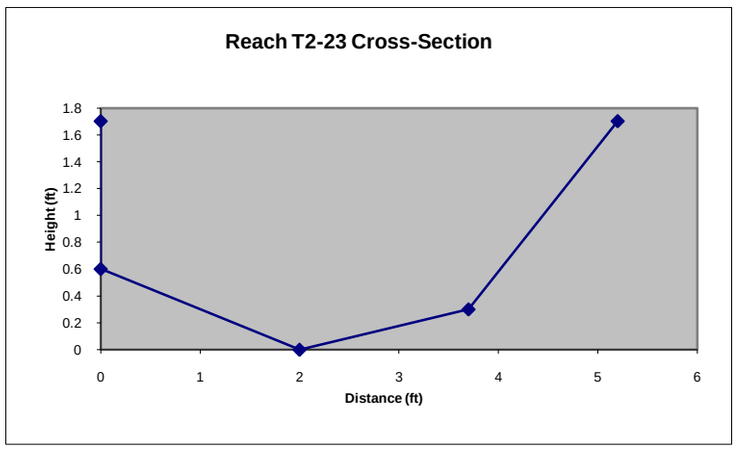
T2-21	**Height (ft)**	1.3	0.7	0	0.7	1.3
	Distance (ft)	0	3.6	8.7	12.1	13.1



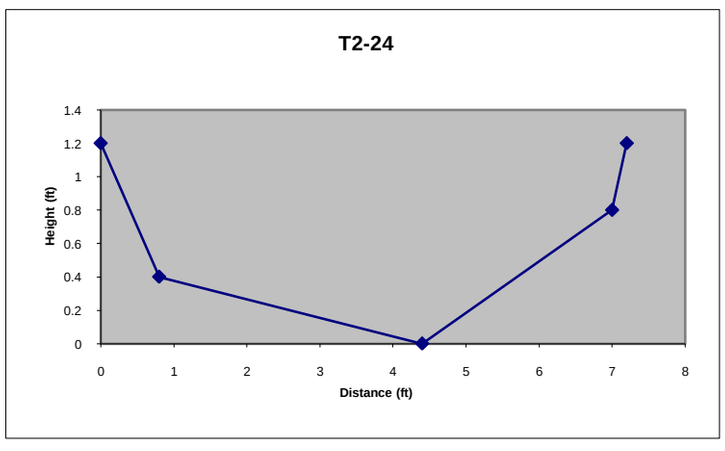
T2-22	**Height (ft)**	1.5	0	0	0.7	1.5
	Distance (ft)	0	1.2	3.3	6.2	6.8



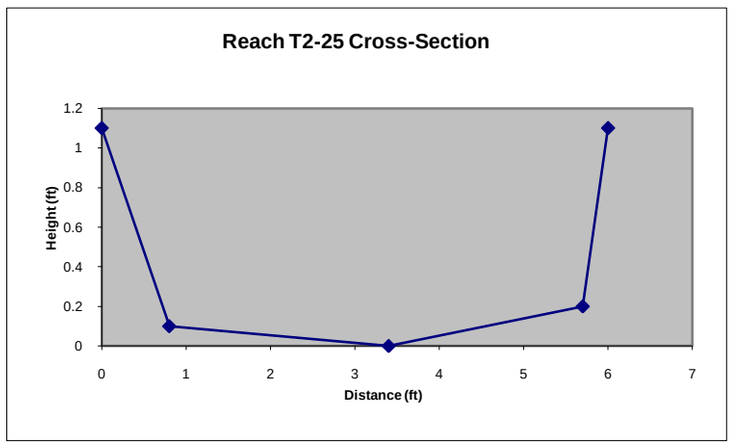
T2-23	**Height (ft)**	1.7	0.6	0	0.3	1.7
	Distance (ft)	0	0	2	3.7	5.2



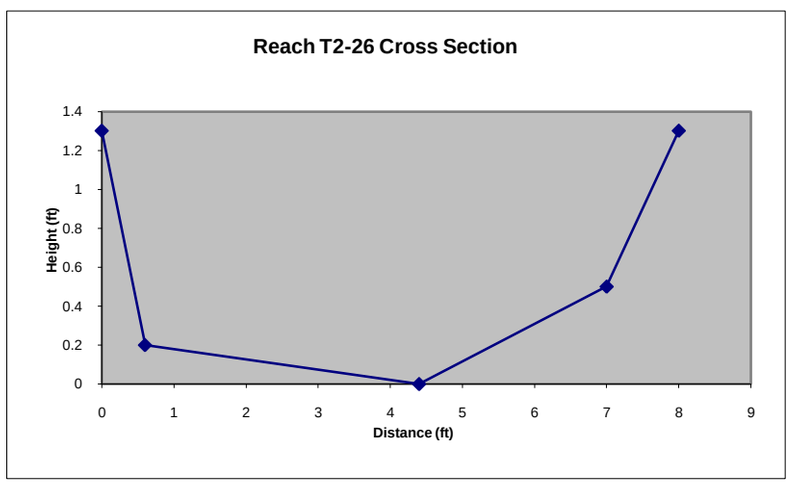
T2-24	**Height (ft)**	1.2	0.4	0	0.8	1.2
	Distance (ft)	0	0.8	4.4	7	7.2



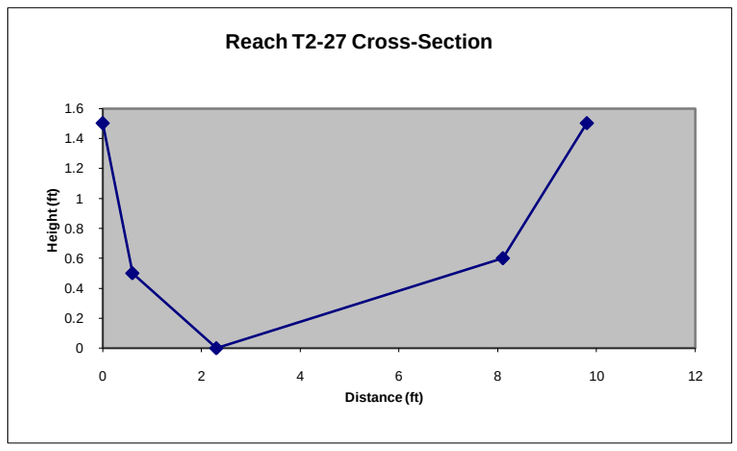
T2-25	**Height (ft)**	1.1	0.1	0	0.2	1.1
	Distance (ft)	0	0.8	3.4	5.7	6



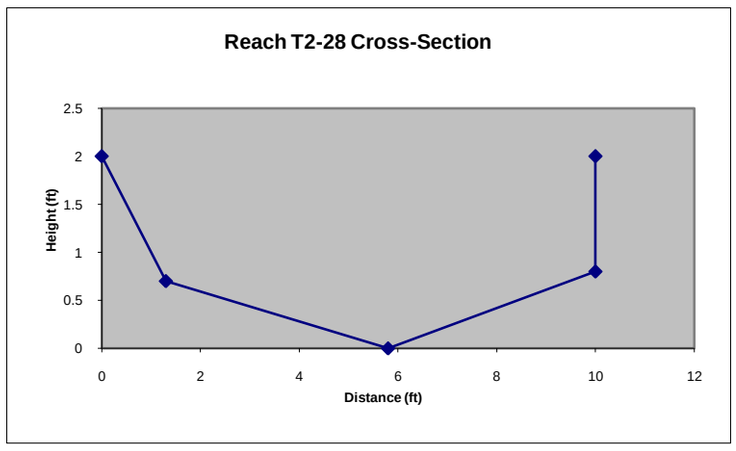
T2-26	**Height (ft)**	1.3	0.2	0	0.5	1.3
	Distance (ft)	0	0.6	4.4	7	8



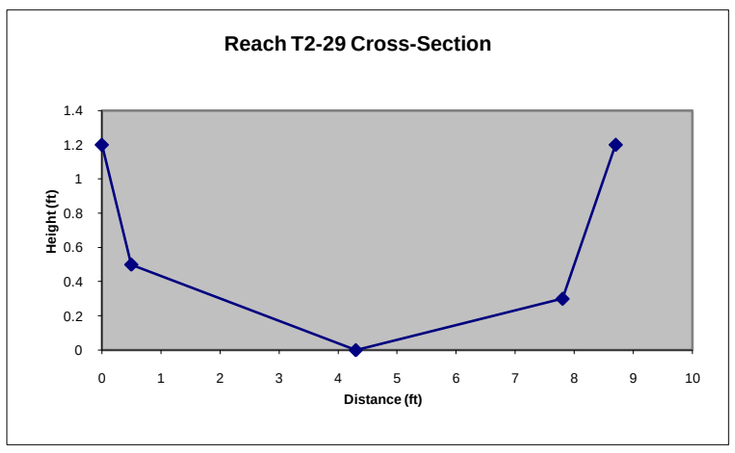
T2-27	**Height (ft)**	1.5	0.5	0	0.6	1.5
	Distance (ft)	0	0.6	2.3	8.1	9.8



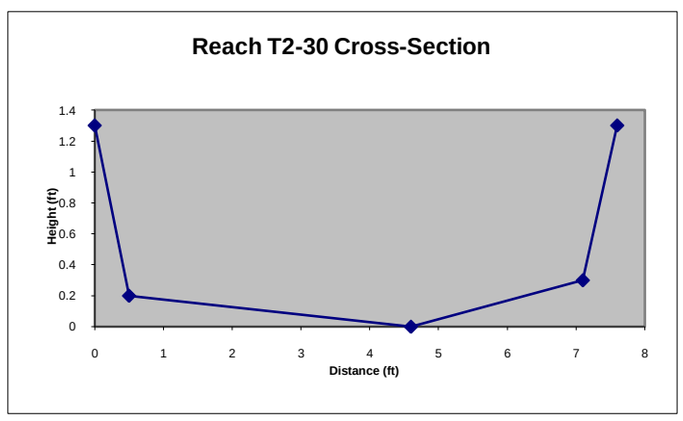
T2-28	**Height (ft)**	2	0.7	0	0.8	2
	Distance (ft)	0	1.3	5.8	10	10



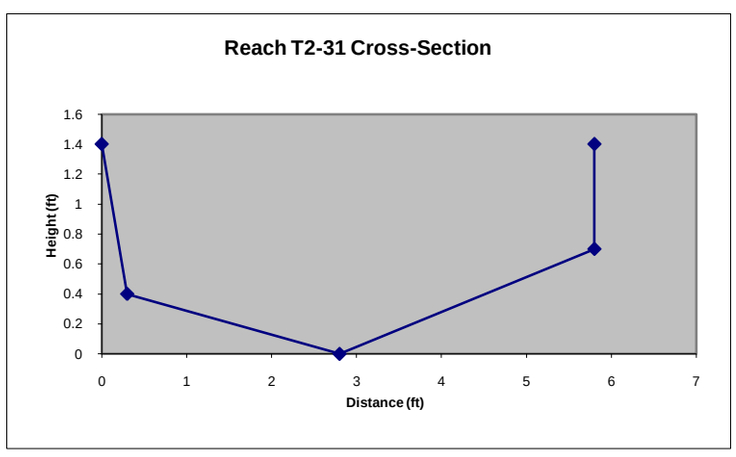
T2-29	**Height (ft)**	1.2	0.5	0	0.3	1.2
	Distance (ft)	0	0.5	4.3	7.8	8.7



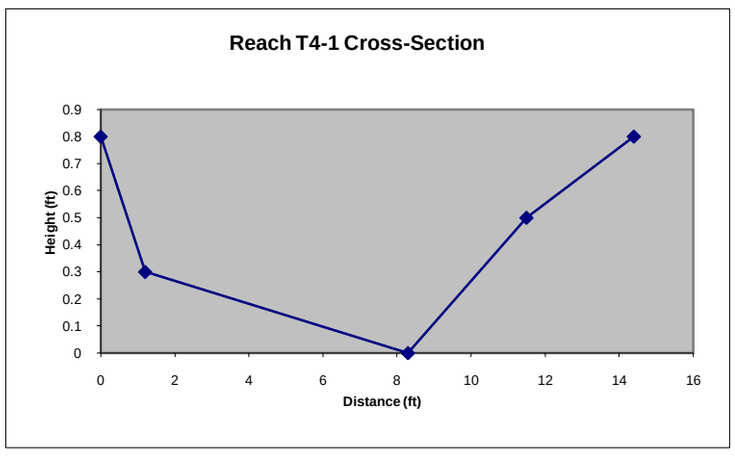
T2-30	**Height (ft)**	1.3	0.2	0	0.3	1.3
	Distance (ft)	0	0.5	4.6	7.1	7.6



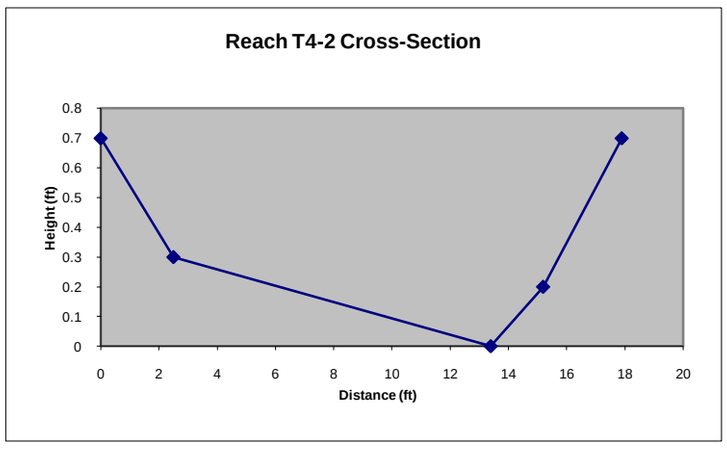
T2-31	**Height (ft)**	1.4	0.4	0	0.7	1.4
	Distance (ft)	0	0.3	2.8	5.8	5.8



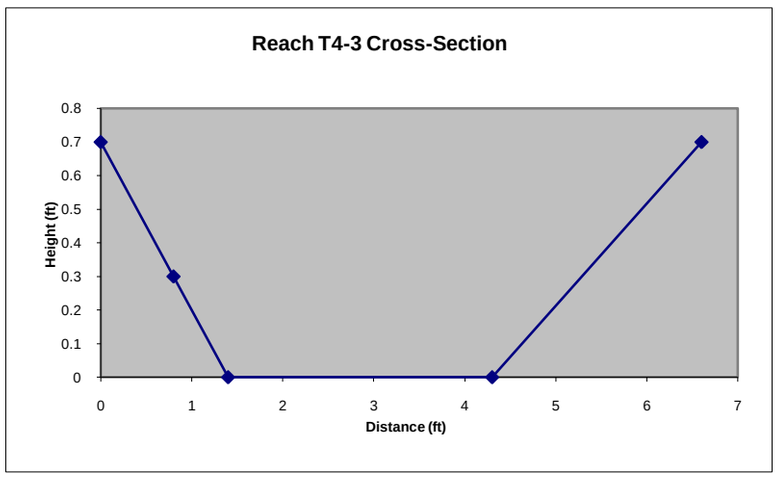
T4-1	**Height (ft)**	0.8	0.3	0	0.5	0.8
	Distance (ft)	0	1.2	8.3	11.5	14.4



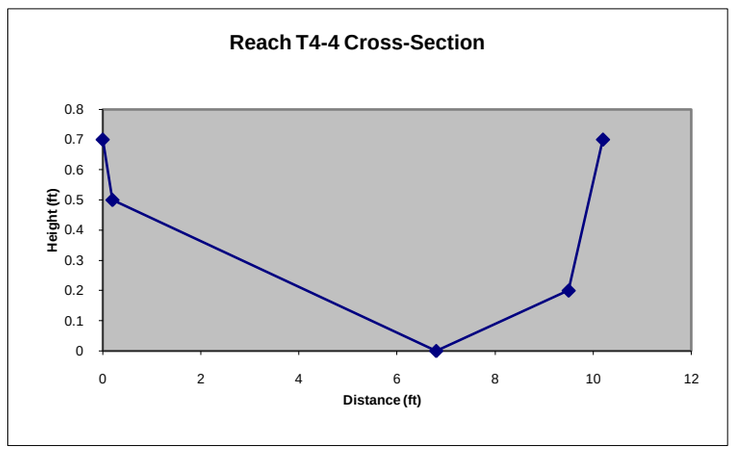
T4-2	**Height (ft)**	0.7	0.3	0	0.2	0.7
	Distance (ft)	0	2.5	13.4	15.2	17.9



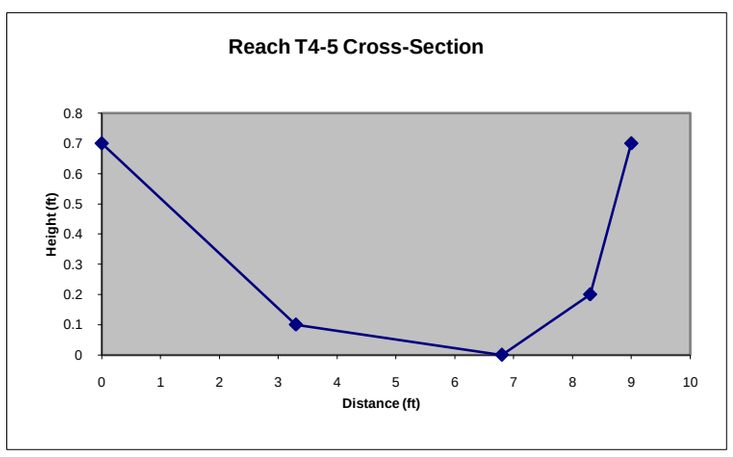
T4-3	**Height (ft)**	0.7	0.3	0	0	0.7
	Distance (ft)	0	0.8	1.4	4.3	6.6



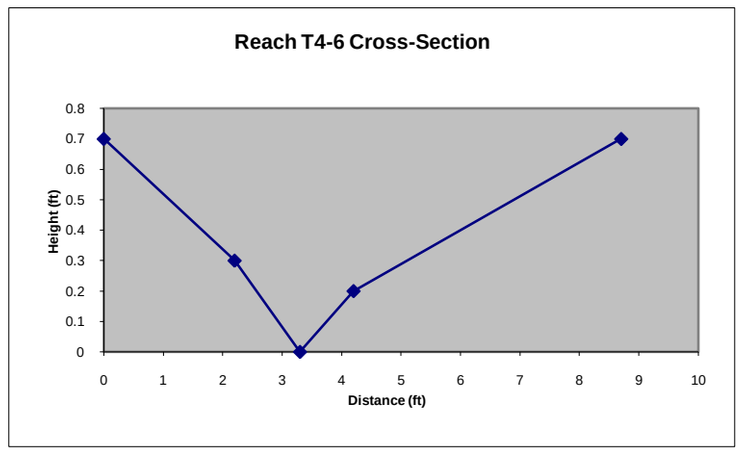
T4-4	**Height (ft)**	0.7	0.5	0	0.2	0.7
	Distance (ft)	0	0.2	6.8	9.5	10.2



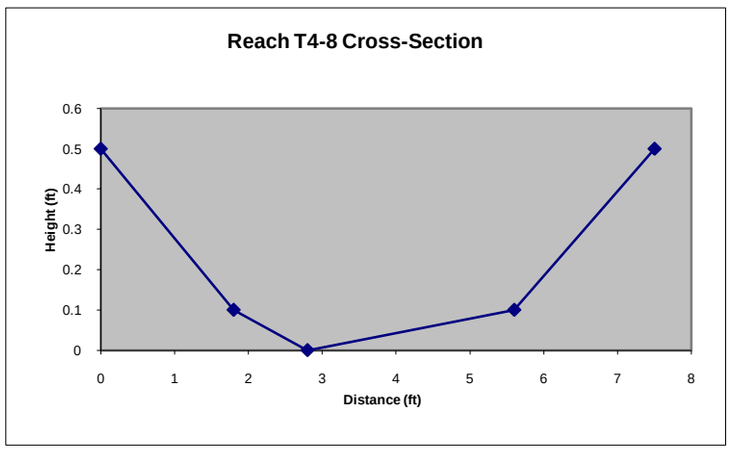
T4-5	**Height (ft)**	0.7	0.1	0	0.2	0.7
	Distance (ft)	0	3.3	6.8	8.3	9



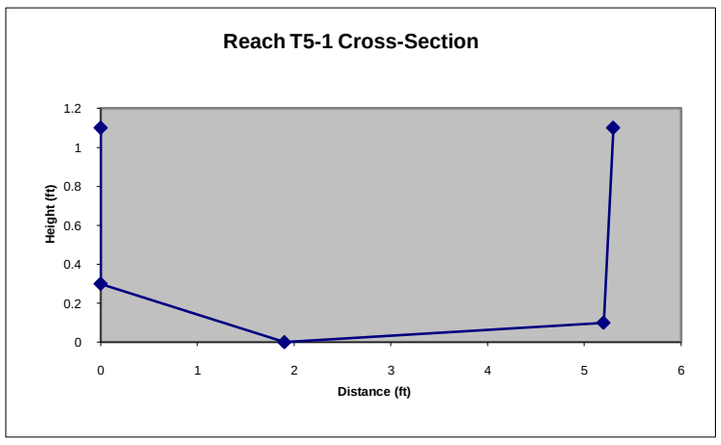
T4-6	**Height (ft)**	0.7	0.3	0	0.2	0.7
	Distance (ft)	0	2.2	3.3	4.2	8.7



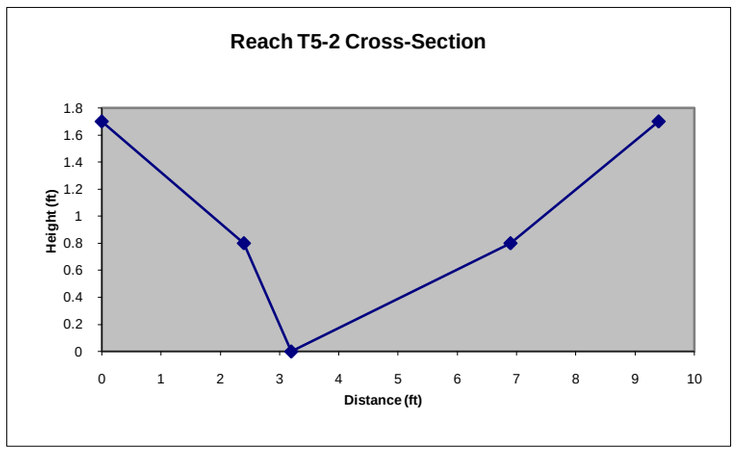
T4-8	**Height (ft)**	0.5	0.1	0	0.1	0.5
	Distance (ft)	0	1.8	2.8	5.6	7.5



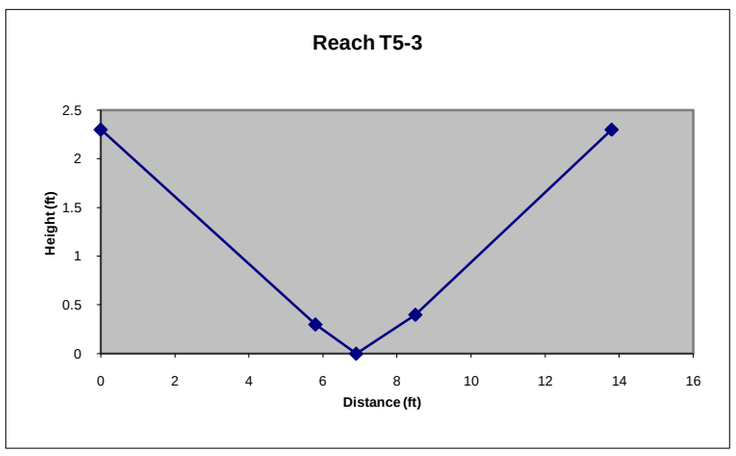
T5-1	**Height (ft)**	1.1	0.3	0	0.1	1.1
	Distance (ft)	0	0	1.9	5.2	5.3



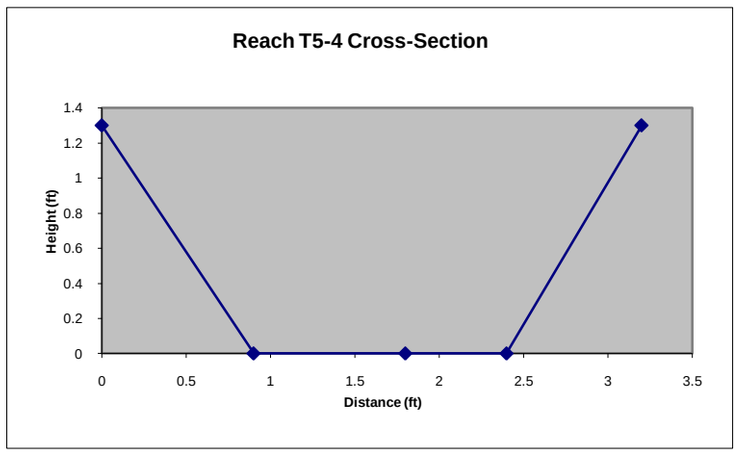
T5-2	**Height (ft)**	1.7	0.8	0	0.8	1.7
	Distance (ft)	0	2.4	3.2	6.9	9.4



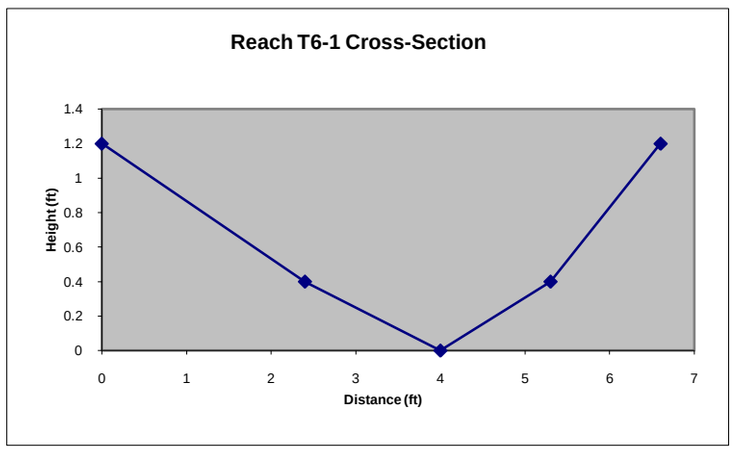
T5-3	**Height (ft)**	2.3	0.3	0	0.4	2.3
	Distance (ft)	0	5.8	6.9	8.5	13.8



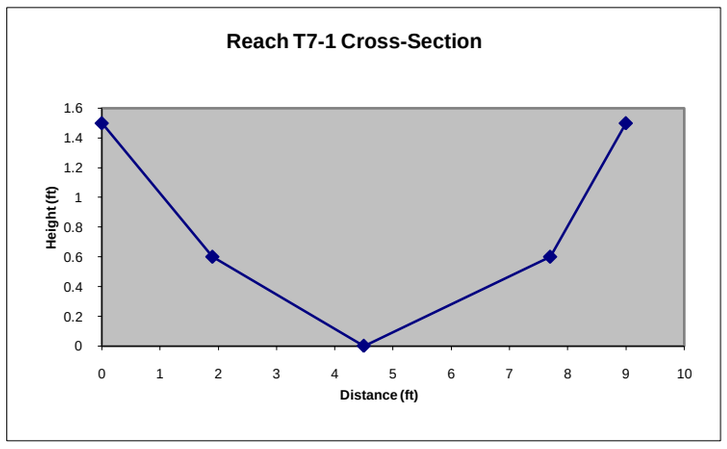
T5-4	**Height (ft)**	1.3	0	0	0	1.3
	Distance (ft)	0	0.9	1.8	2.4	3.2



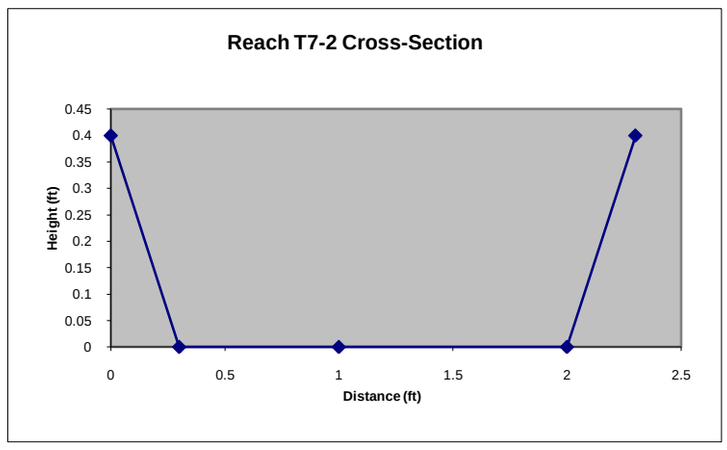
T6-1	**Height (ft)**	1.2	0.4	0	0.4	1.2
	Distance (ft)	0	2.4	4	5.3	6.6



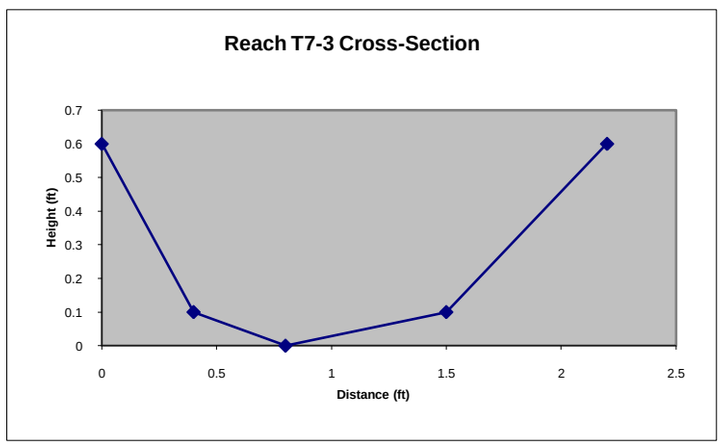
T7-1	**Height (ft)**	1.5	0.6	0	0.6	1.5
	Distance (ft)	0	1.9	4.5	7.7	9



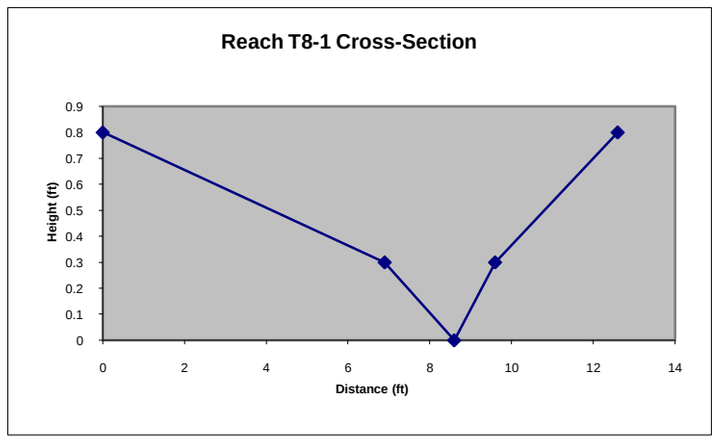
T7-2	**Height (ft)**	0.4	0	0	0	0.4
	Distance (ft)	0	0.3	1	2	2.3



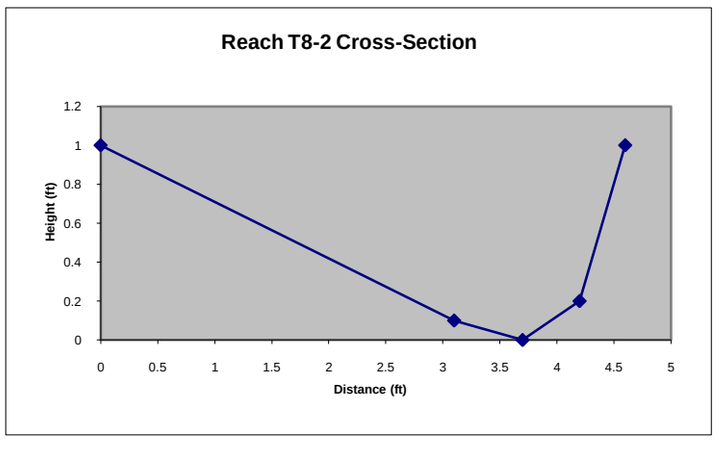
T7-3	**Height (ft)**	0.6	0.1	0	0.1	0.6
	Distance (ft)	0	0.4	0.8	1.5	2.2



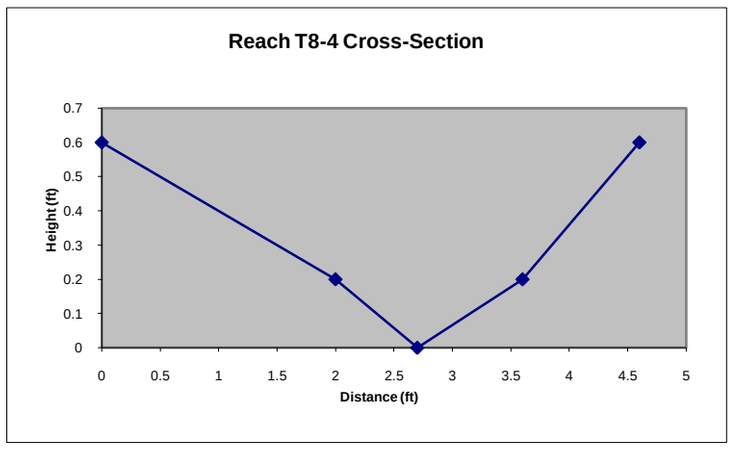
T8-1	**Height (ft)**	0.8	0.3	0	0.3	0.8
	Distance (ft)	0	6.9	8.6	9.6	12.6



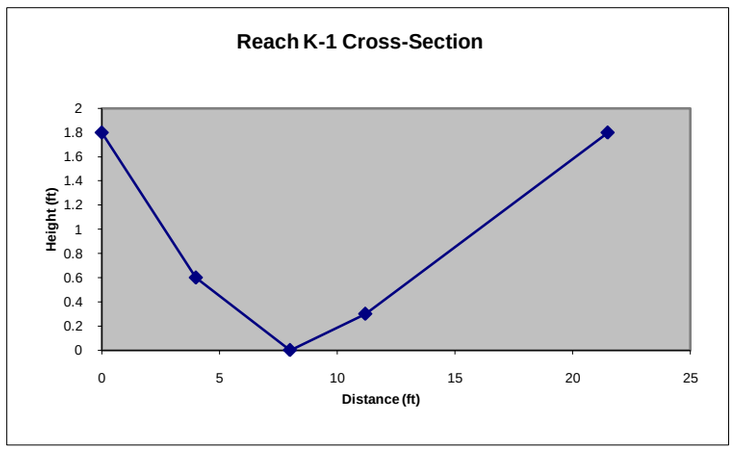
T8-2	**Height (ft)**	1	0.1	0	0.2	1
	Distance (ft)	0	3.1	3.7	4.2	4.6



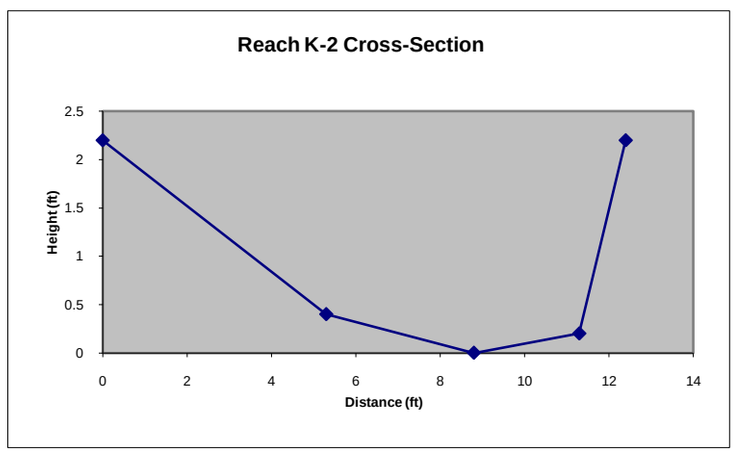
T8-4	**Height (ft)**	0.6	0.2	0	0.2	0.6
	Distance (ft)	0	2	2.7	3.6	4.6



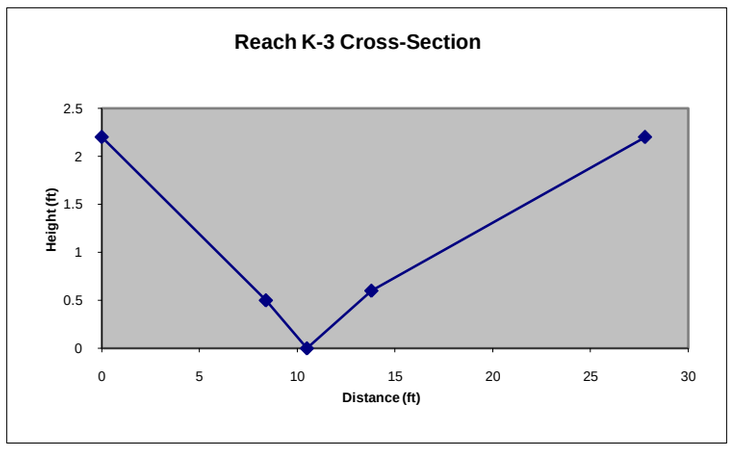
K-1	**Height (ft)**	1.8	0.6	0	0.3	1.8
	Distance (ft)	0	4	8	11.2	21.5



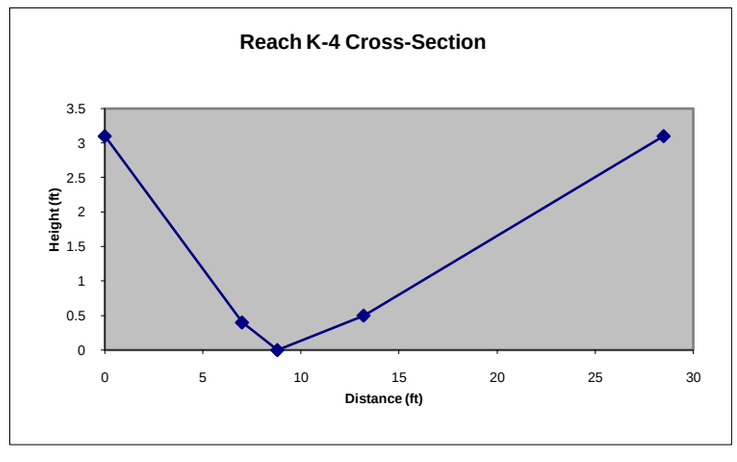
K-2	**Height (ft)**	2.2	0.4	0	0.2	2.2
	Distance (ft)	0	5.3	8.8	11.3	12.4



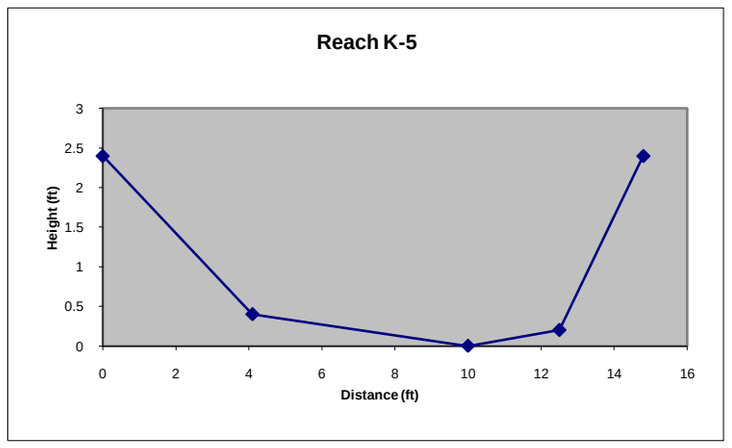
K-3	**Height (ft)**	2.2	0.5	0	0.6	2.2
	Distance (ft)	0	8.4	10.5	13.8	27.8



K-4	**Height (ft)**	3.1	0.4	0	0.5	3.1
	Distance (ft)	0	7	8.8	13.2	28.5

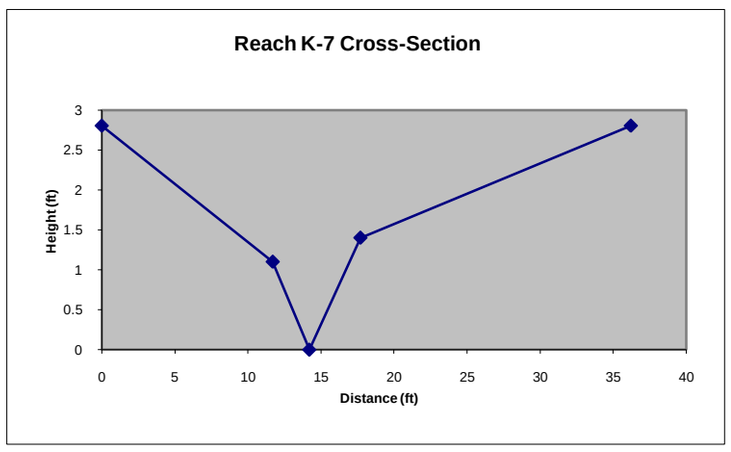


K-5	**Height (ft)**	2.4	0.4	0	0.2	2.4
	Distance (ft)	0	4.1	10	12.5	14.8

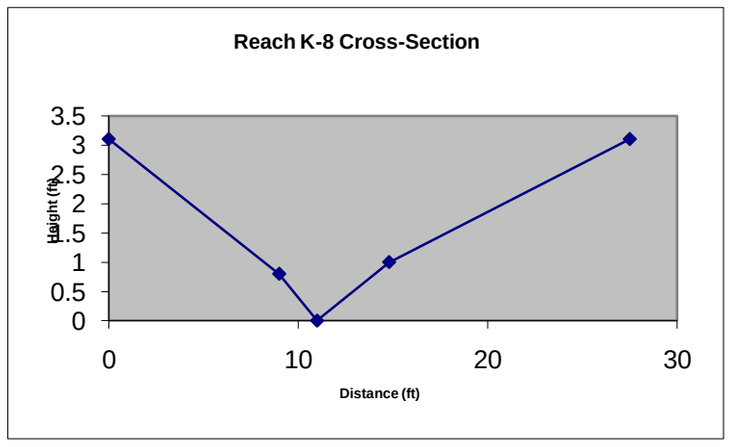


K-6	**Height (ft)**	3.3	1.6	0	1.6	3.3
	Distance (ft)	0	14.9	16.4	18.5	35.8

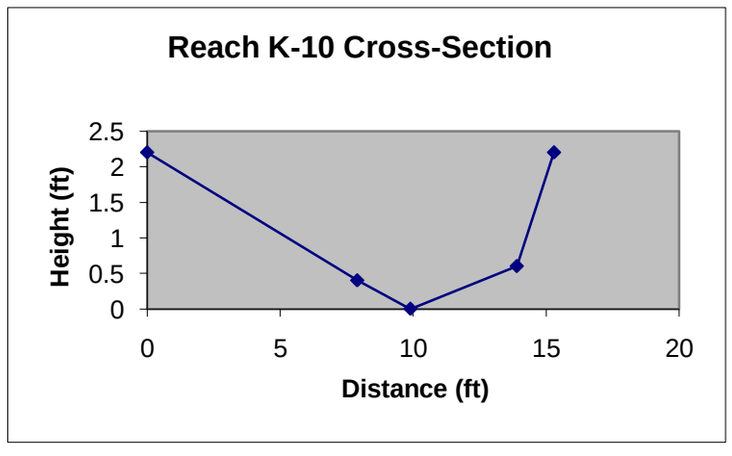
K-7	**Height (ft)**	2.8	1.1	0	1.4	2.8
	Distance (ft)	0	11.7	14.2	17.7	36.2



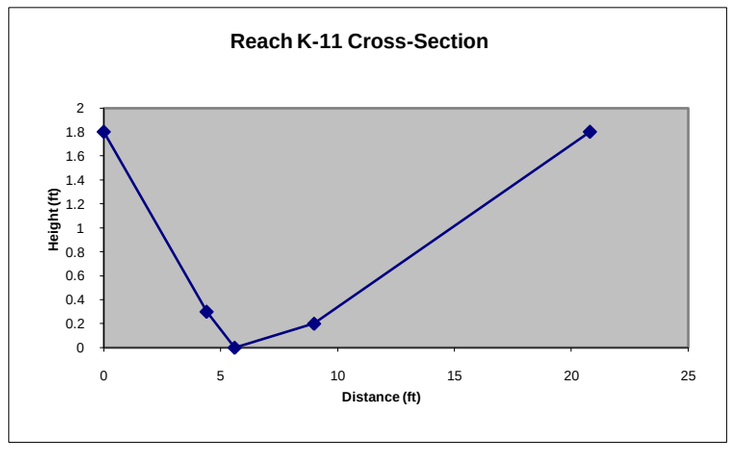
K-8	**Height (ft)**	3.1	0.8	0	1	3.1
	Distance (ft)	0	9	11	14.8	27.5



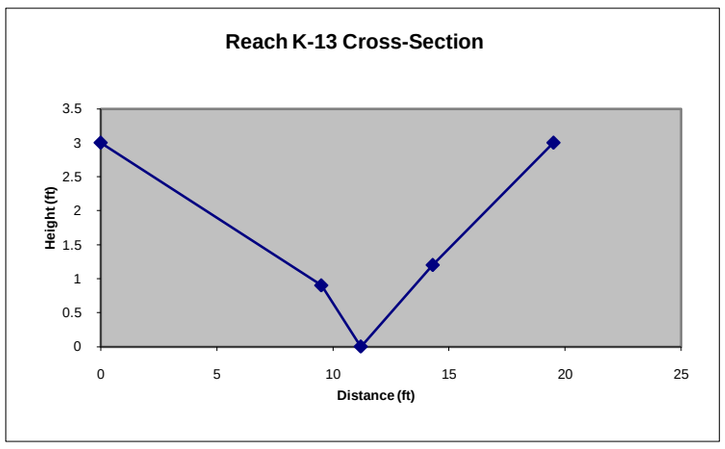
K-10	**Height (ft)**	2.2	0.4	0	0.6	2.2
	Distance (ft)	0	7.9	9.9	13.9	15.3



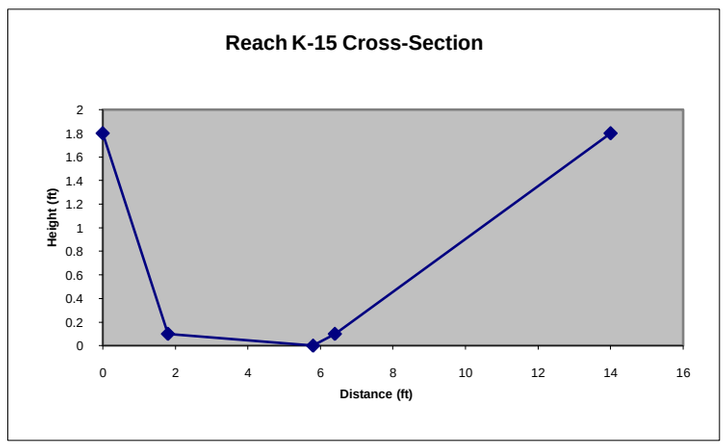
K-11	**Height (ft)**	1.8	0.3	0	0.2	1.8
	Distance (ft)	0	4.4	5.6	9	20.8



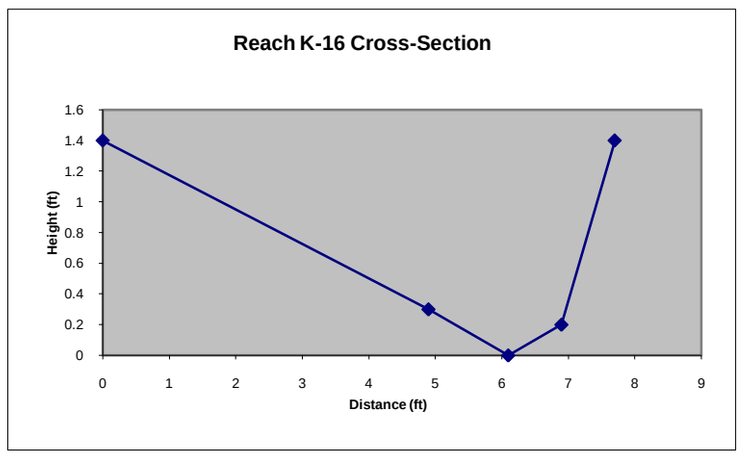
K-12	**Height (ft)**	same as K-11					
	Distance (ft)						
K-13	**Height (ft)**	3	0.9	0	1.2	3	
	Distance (ft)	0	9.5	11.2	14.3	19.5	



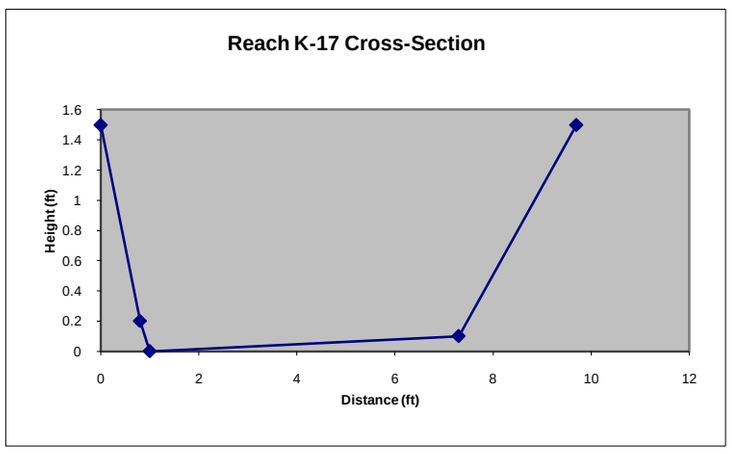
K-15	**Height (ft)**	1.8	0.1	0	0.1	1.8	
	Distance (ft)	0	1.8	5.8	6.4	14	



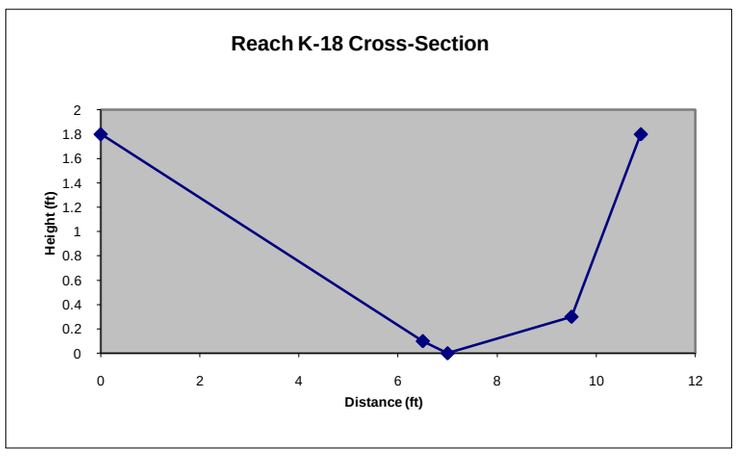
K-16	**Height (ft)**	1.4	0.3	0	0.2	1.4	
	Distance (ft)	0	4.9	6.1	6.9	7.7	



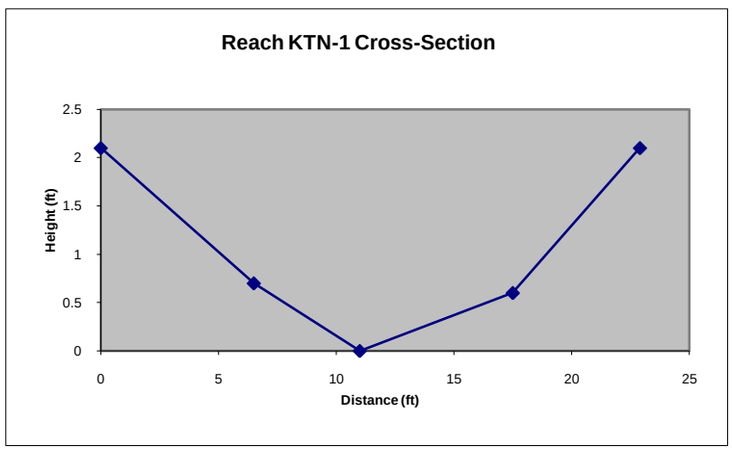
K-17	**Height (ft)**	1.5	0.2	0	0.1	1.5	
	Distance (ft)	0	0.8	1	7.3	9.7	



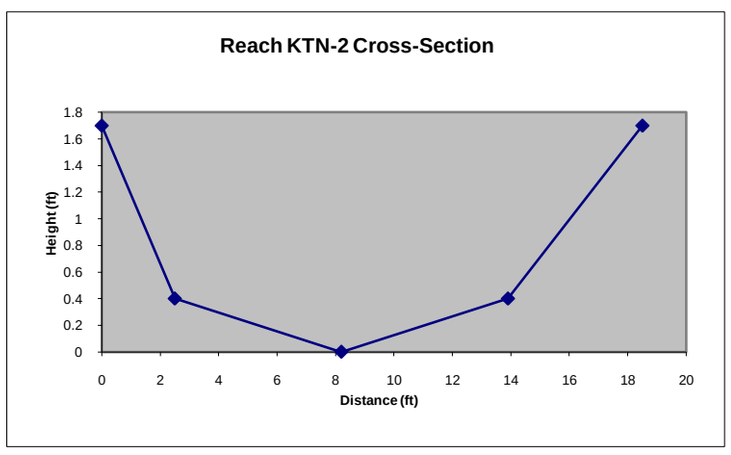
K-18	**Height (ft)**	1.8	0.1	0	0.3	1.8	
	Distance (ft)	0	6.5	7	9.5	10.9	



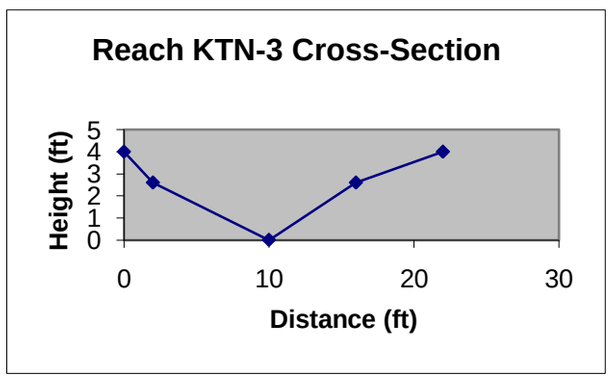
KTN-1	**Height (ft)**	2.1	0.7	0	0.6	2.1
	Distance (ft)	0	6.5	11	17.5	22.9



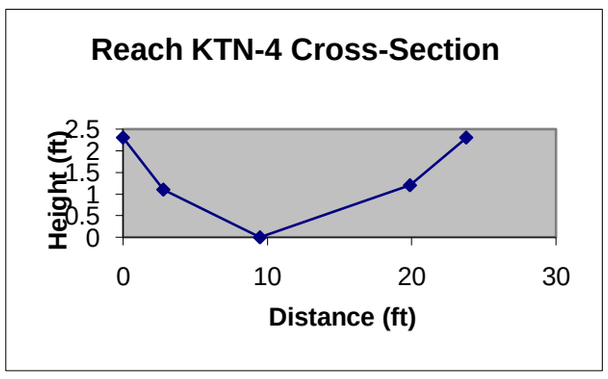
KTN-2	**Height (ft)**	1.7	0.4	0	0.4	1.7
	Distance (ft)	0	2.5	8.2	13.9	18.5



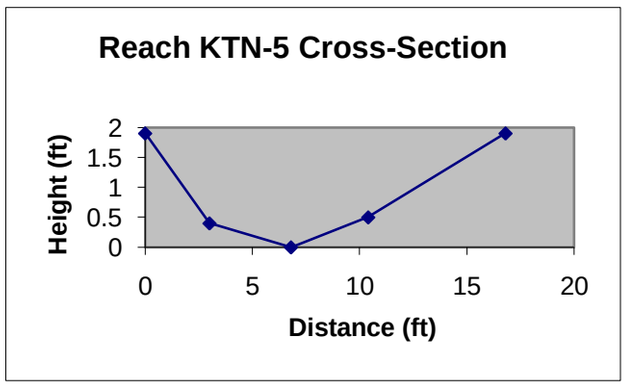
KTN-3	**Height (ft)**	4	2.6	0	2.6	4
	Distance (ft)	0	2	10	16	22



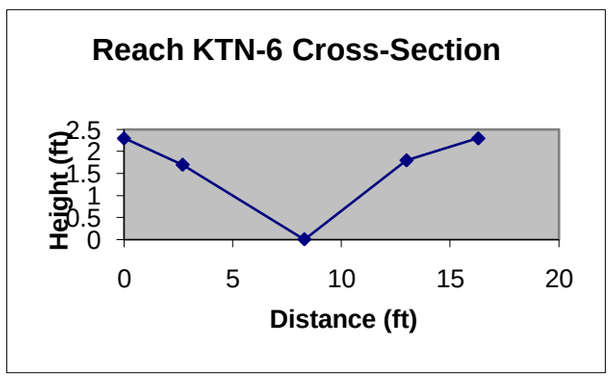
KTN-4	**Height (ft)**	2.3	1.1	0	1.2	2.3
	Distance (ft)	0	2.8	9.5	19.9	23.8



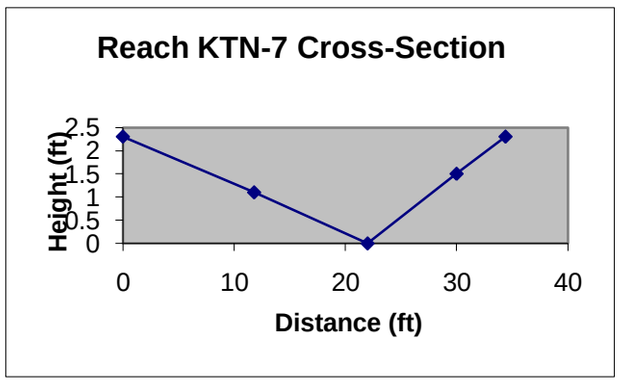
KTN-5	**Height (ft)**	1.9	0.4	0	0.5	1.9
	Distance (ft)	0	3	6.8	10.4	16.8



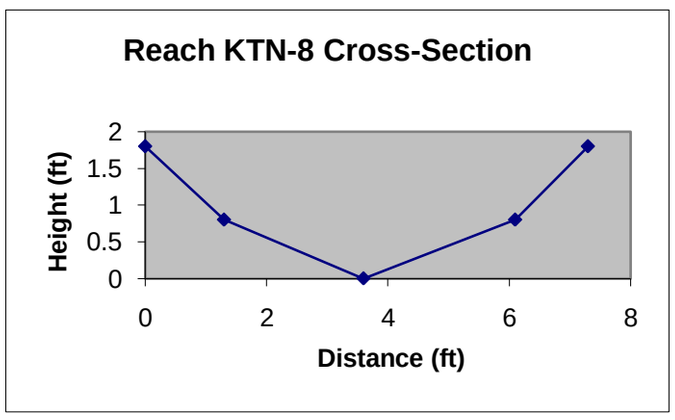
KTN-6	**Height (ft)**	2.3	1.7	0	1.8	2.3
	Distance (ft)	0	2.7	8.3	13	16.3



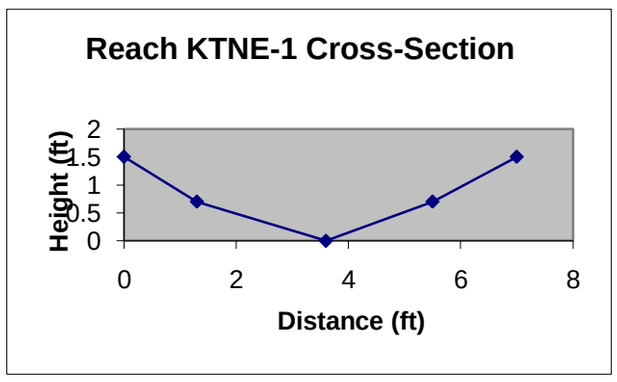
KTN-7	**Height (ft)**	2.3	1.1	0	1.5	2.3
	Distance (ft)	0	11.8	22	30	34.4



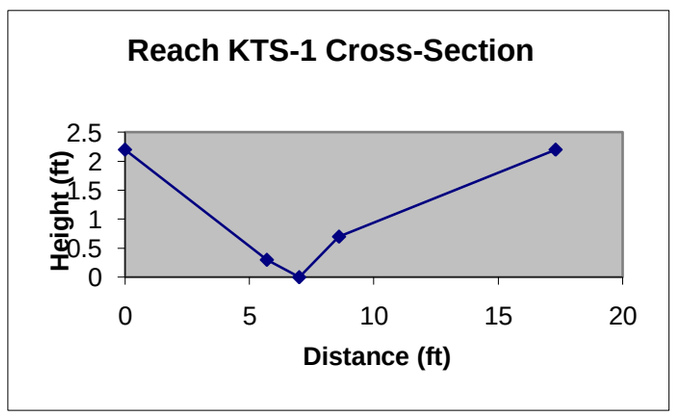
KTN-8	**Height (ft)**	1.8	0.8	0	0.8	1.8
	Distance (ft)	0	1.3	3.6	6.1	7.3



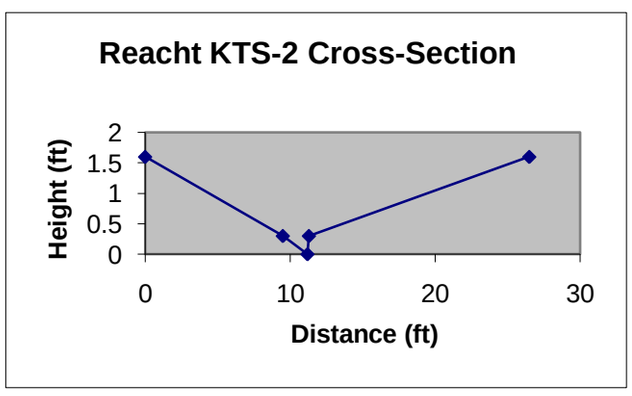
KTNE-1	**Height (ft)**	1.5	0.7	0	0.7	1.5
	Distance (ft)	0	1.3	3.6	5.5	7



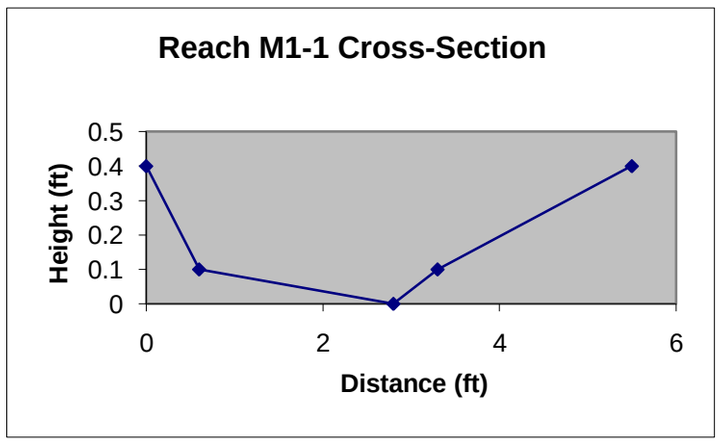
KTS-1	**Height (ft)**	2.2	0.3	0	0.7	2.2
	Distance (ft)	0	5.7	7	8.6	17.3



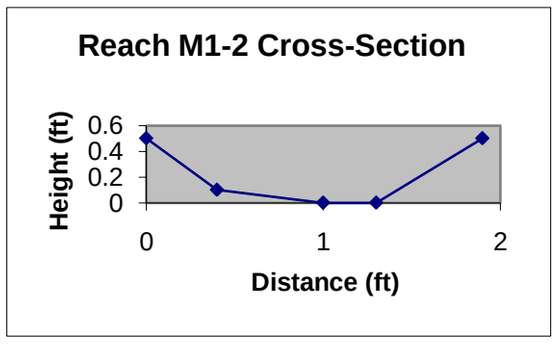
KTS-2	**Height (ft)**	1.6	0.3	0	0.3	1.6
	Distance (ft)	0	9.5	11.2	11.3	26.5



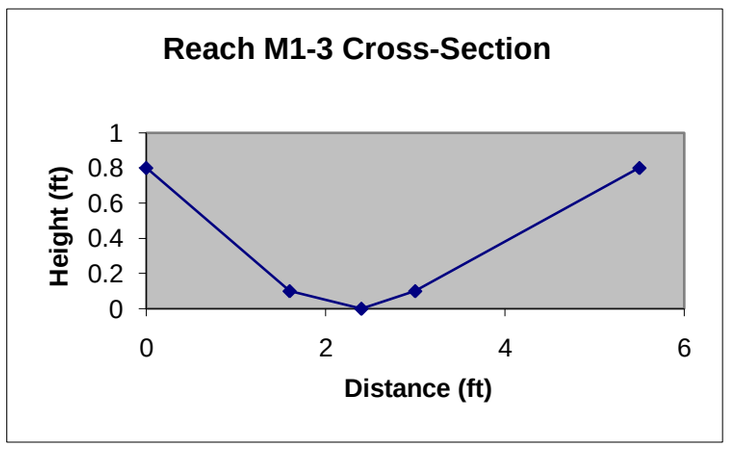
M1-1	**Height (ft)**	0.4	0.1	0	0.1	0.4
	Distance (ft)	0	0.6	2.8	3.3	5.5



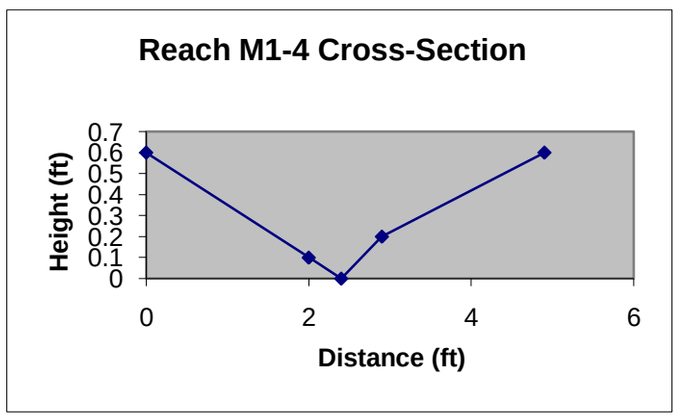
M1-2	**Height (ft)**	0.5	0.1	0	0	0.5
	Distance (ft)	0	0.4	1	1.3	1.9



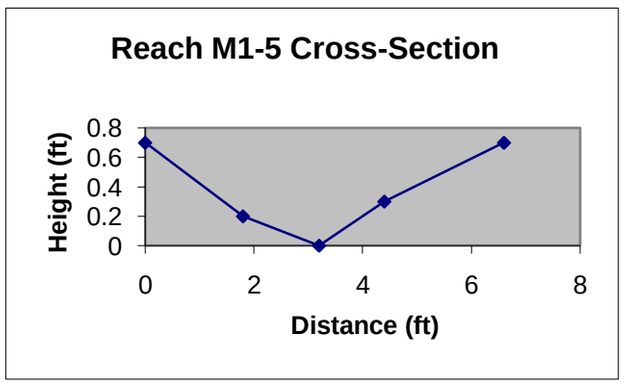
M1-3	**Height (ft)**	0.8	0.1	0	0.1	0.8
	Distance (ft)	0	1.6	2.4	3	5.5



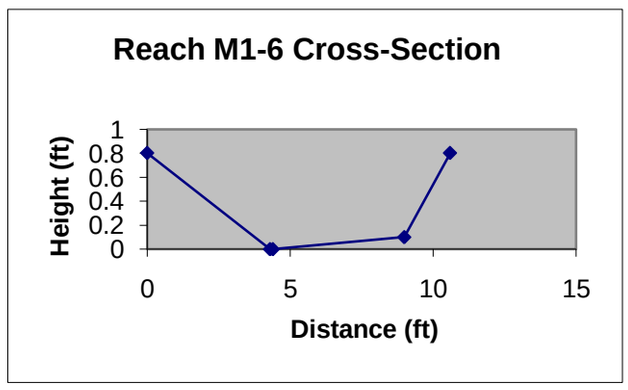
M1-4	**Height (ft)**	0.6	0.1	0	0.2	0.6
	Distance (ft)	0	2	2.4	2.9	4.9



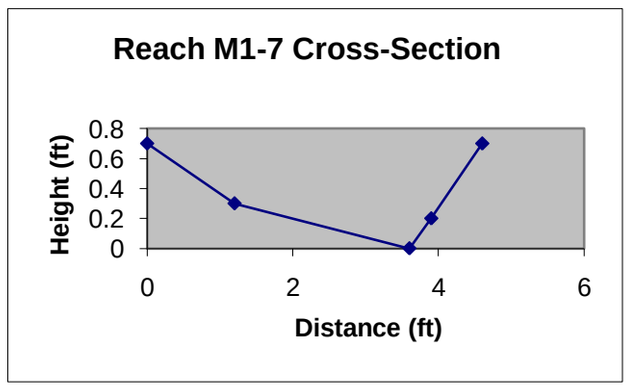
M1-5	**Height (ft)**	0.7	0.2	0	0.3	0.7
	Distance (ft)	0	1.8	3.2	4.4	6.6



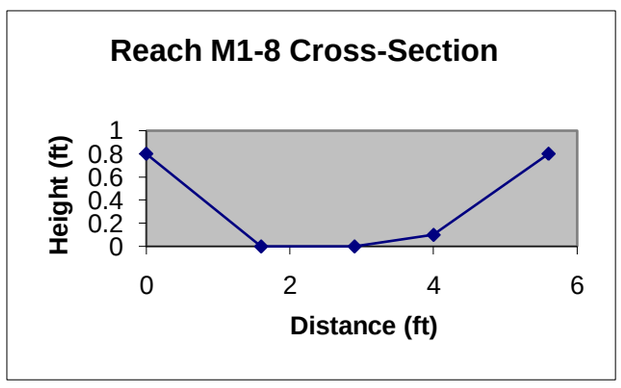
M1-6	**Height (ft)**	0.8	0	0	0.1	0.8
	Distance (ft)	0	4.3	4.4	9	10.6



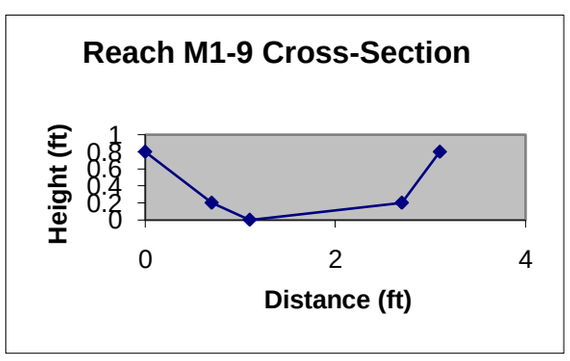
M1-7	**Height (ft)**	0.7	0.3	0	0.2	0.7
	Distance (ft)	0	1.2	3.6	3.9	4.6



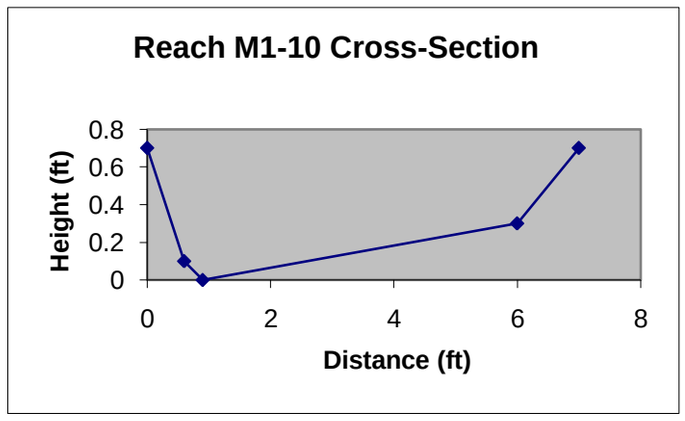
M1-8	**Height (ft)**	0.8	0	0	0.1	0.8
	Distance (ft)	0	1.6	2.9	4	5.6



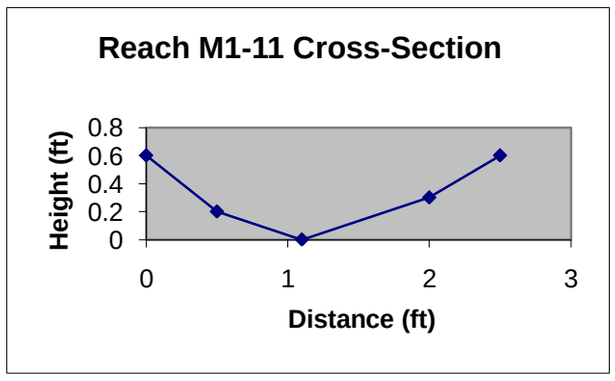
M1-9	**Height (ft)**	0.8	0.2	0	0.2	0.8
	Distance (ft)	0	0.7	1.1	2.7	3.1



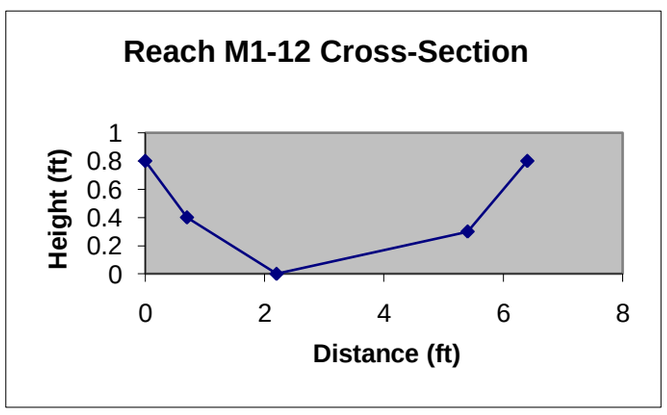
M1-10	**Height (ft)**	0.7	0.1	0	0.3	0.7
	Distance (ft)	0	0.6	0.9	6	7



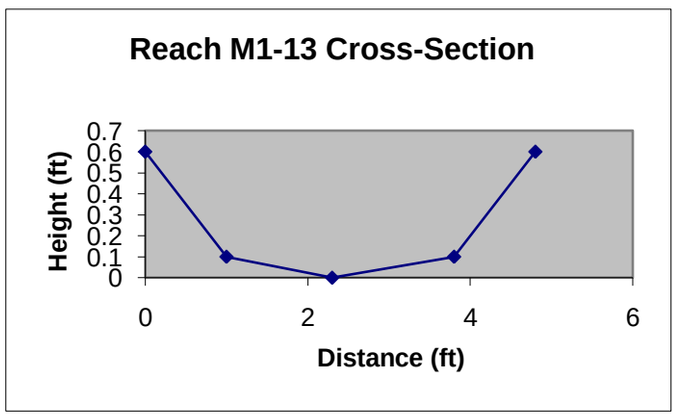
M1-11	**Height (ft)**	0.6	0.2	0	0.3	0.6
	Distance (ft)	0	0.5	1.1	2	2.5



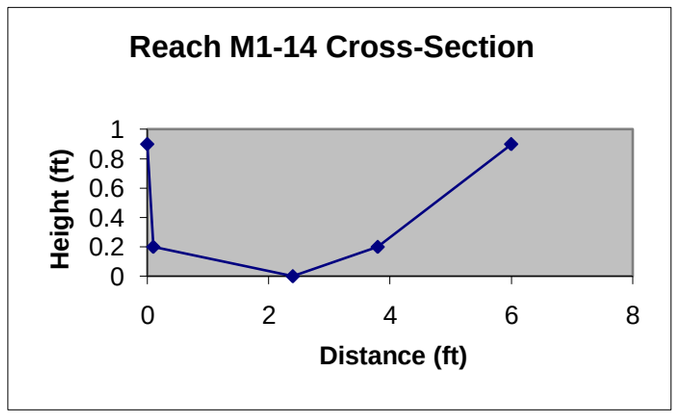
M1-12	**Height (ft)**	0.8	0.4	0	0.3	0.8
	Distance (ft)	0	0.7	2.2	5.4	6.4



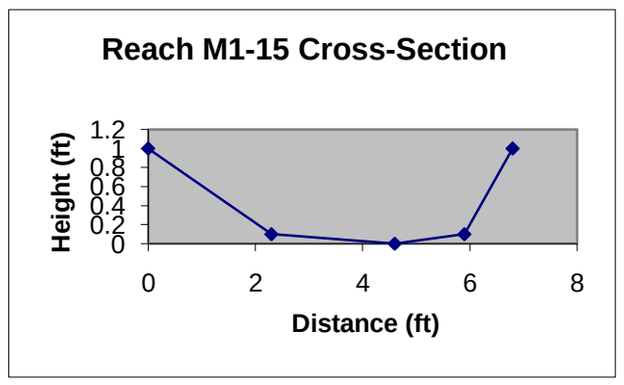
M1-13	**Height (ft)**	0.6	0.1	0	0.1	0.6
	Distance (ft)	0	1	2.3	3.8	4.8



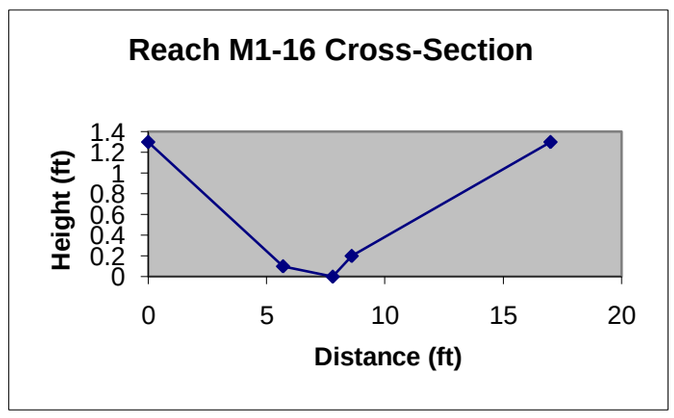
M1-14	**Height (ft)**	0.9	0.2	0	0.2	0.9
	Distance (ft)	0	0.1	2.4	3.8	6



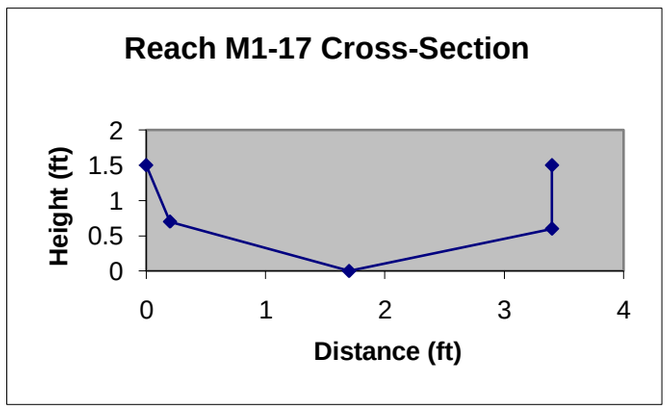
M1-15	**Height (ft)**	1	0.1	0	0.1	1
	Distance (ft)	0	2.3	4.6	5.9	6.8



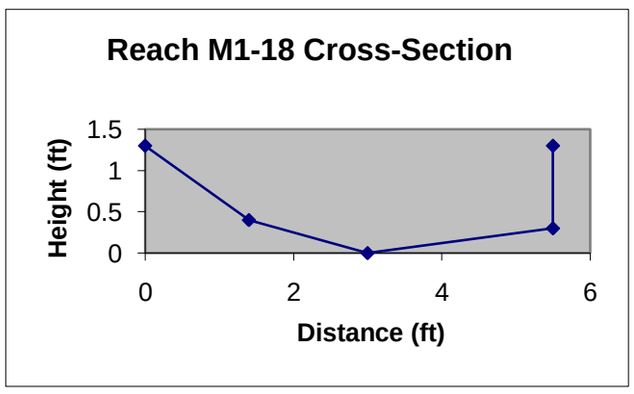
M1-16	**Height (ft)**	1.3	0.1	0	0.2	1.3
	Distance (ft)	0	5.7	7.8	8.6	17



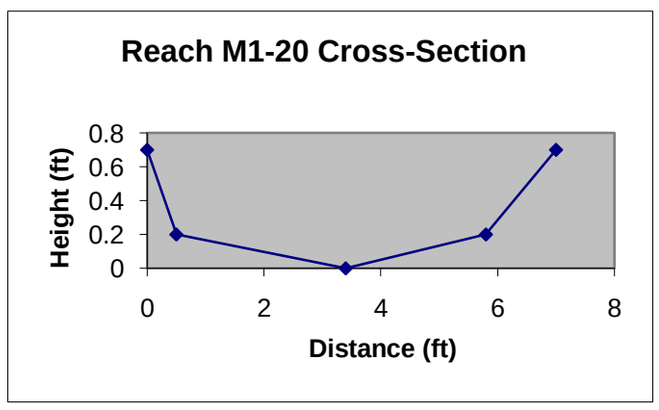
M1-17	**Height (ft)**	1.5	0.7	0	0.6	1.5
	Distance (ft)	0	0.2	1.7	3.4	3.4



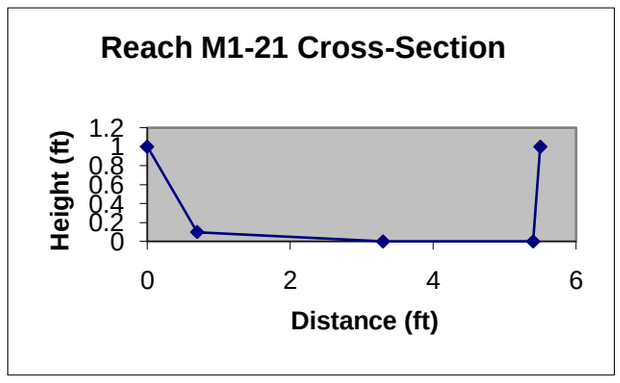
M1-18	**Height (ft)**	1.3	0.4	0	0.3	1.3
	Distance (ft)	0	1.4	3	5.5	5.5



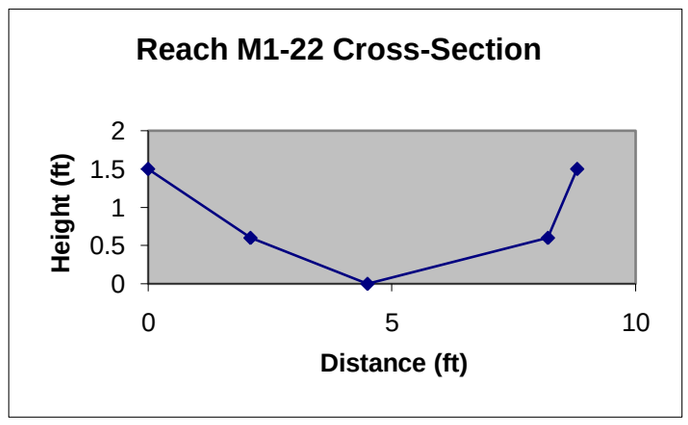
M1-20	**Height (ft)**	0.7	0.2	0	0.2	0.7
	Distance (ft)	0	0.5	3.4	5.8	7



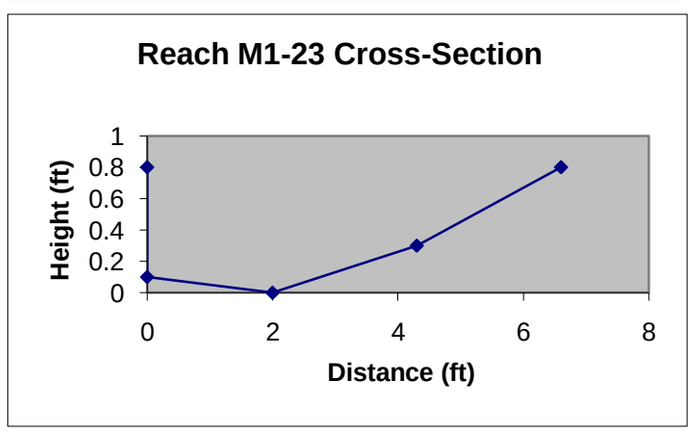
M1-21	**Height (ft)**	1	0.1	0	0	1
	Distance (ft)	0	0.7	3.3	5.4	5.5



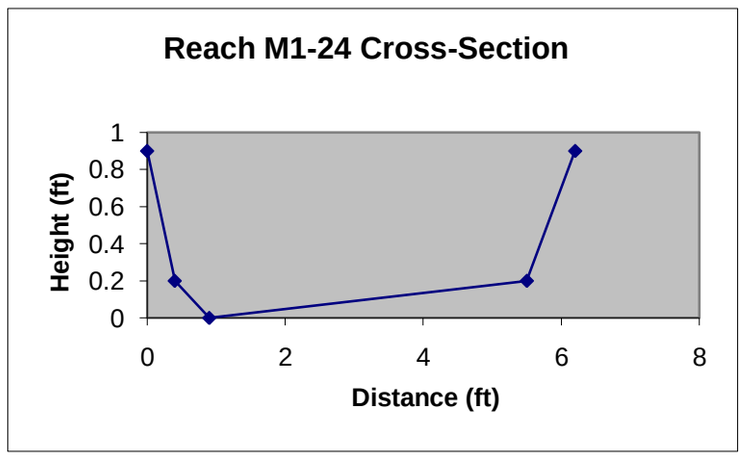
M1-22	**Height (ft)**	1.5	0.6	0	0.6	1.5
	Distance (ft)	0	2.1	4.5	8.2	8.8



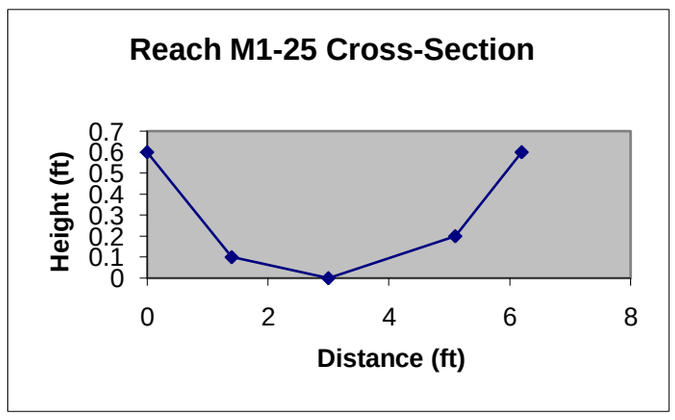
M1-23	**Height (ft)**	0.8	0.1	0	0.3	0.8
	Distance (ft)	0	0	2	4.3	6.6



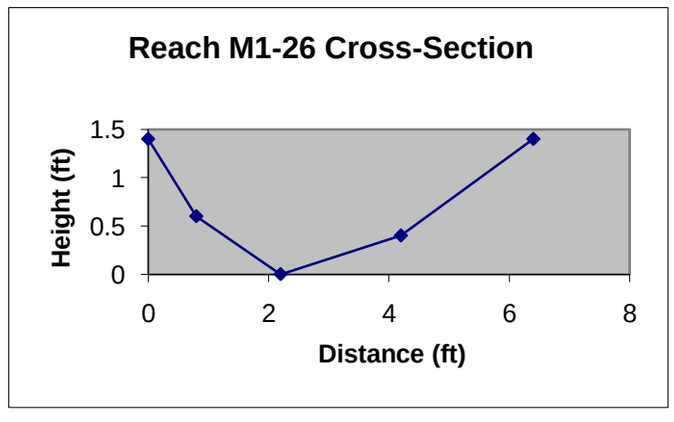
M1-24	**Height (ft)**	0.9	0.2	0	0.2	0.9
	Distance (ft)	0	0.4	0.9	5.5	6.2



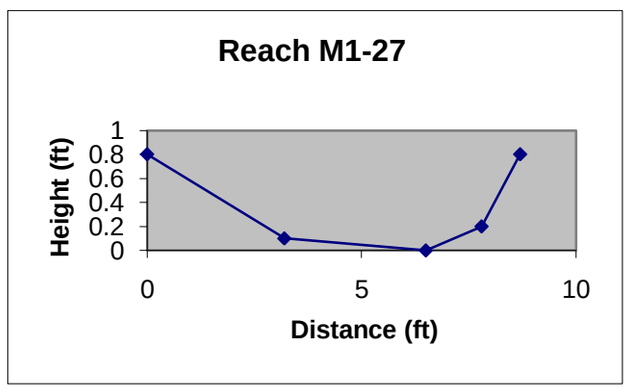
M1-25	**Height (ft)**	0.6	0.1	0	0.2	0.6
	Distance (ft)	0	1.4	3	5.1	6.2



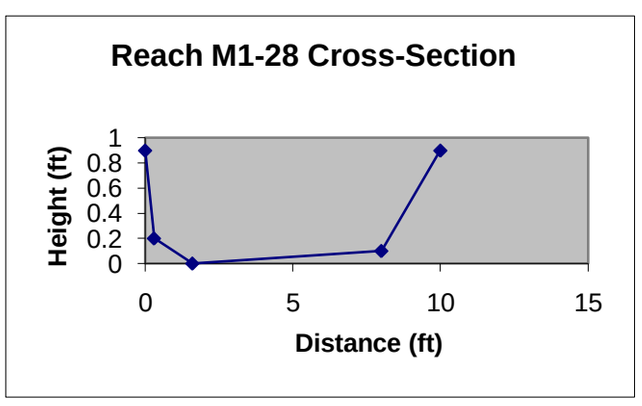
M1-26	**Height (ft)**	1.4	0.6	0	0.4	1.4
	Distance (ft)	0	0.8	2.2	4.2	6.4



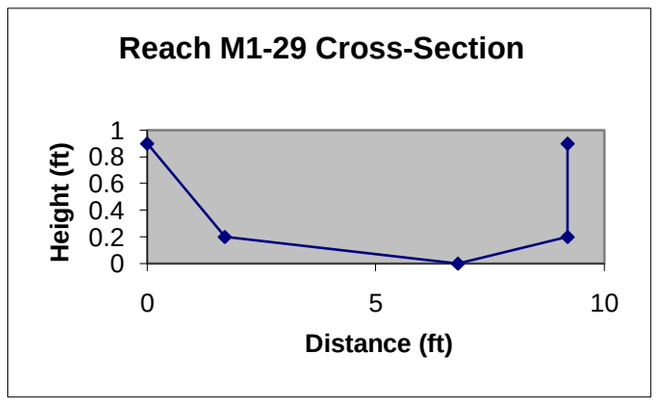
M1-27	**Height (ft)**	0.8	0.1	0	0.2	0.8
	Distance (ft)	0	3.2	6.5	7.8	8.7



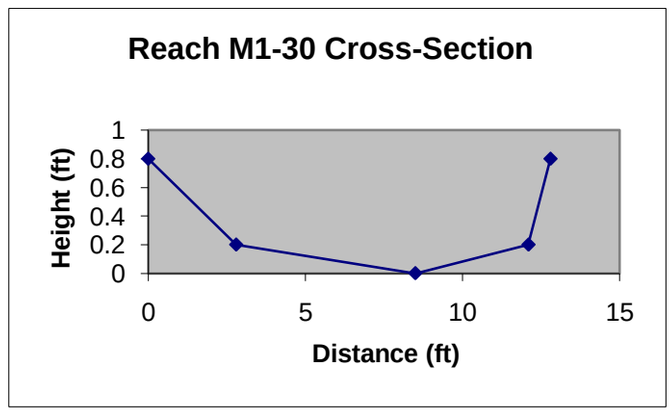
M1-28	**Height (ft)**	0.9	0.2	0	0.1	0.9
	Distance (ft)	0	0.3	1.6	8	10



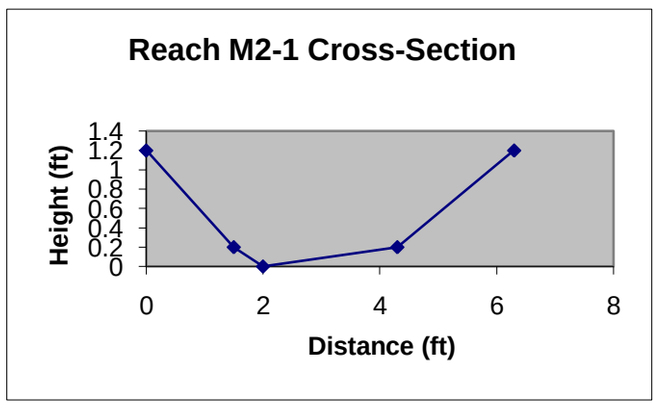
M1-29	**Height (ft)**	0.9	0.2	0	0.2	0.9
	Distance (ft)	0	1.7	6.8	9.2	9.2



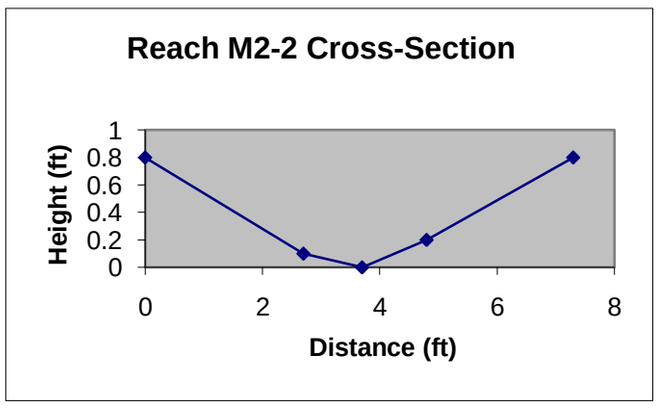
M1-30	**Height (ft)**	0.8	0.2	0	0.2	0.8
	Distance (ft)	0	2.8	8.5	12.1	12.8



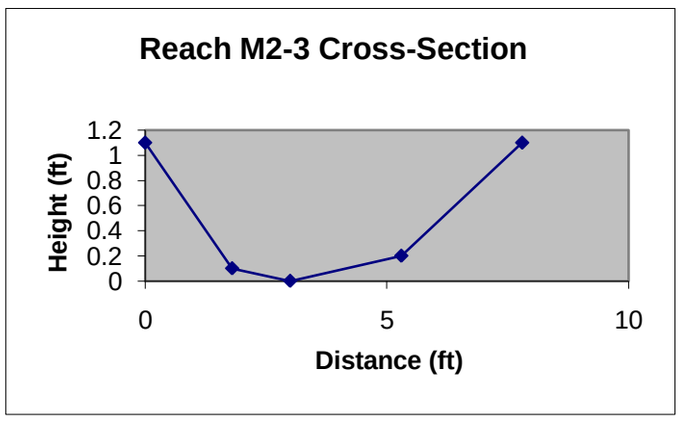
M2-1	**Height (ft)**	1.2	0.2	0	0.2	1.2
	Distance (ft)	0	1.5	2	4.3	6.3



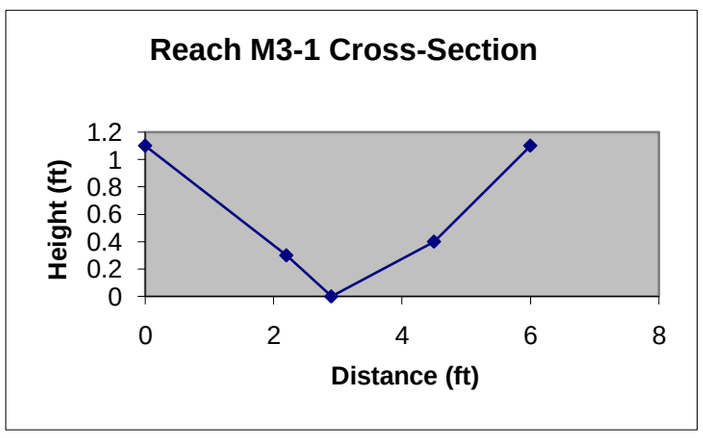
M2-2	**Height (ft)**	0.8	0.1	0	0.2	0.8
	Distance (ft)	0	2.7	3.7	4.8	7.3



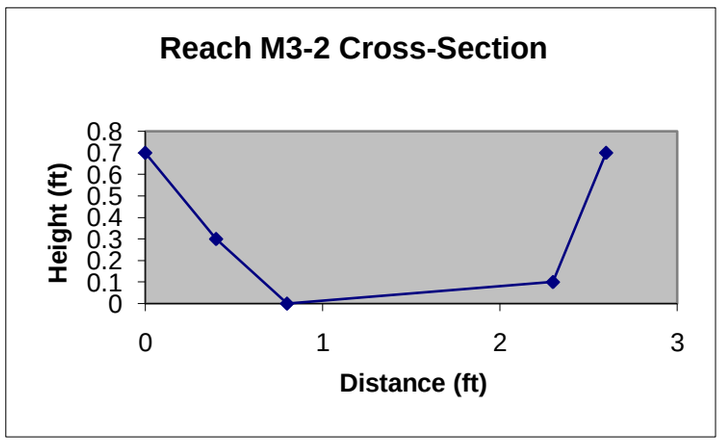
M2-3	**Height (ft)**	1.1	0.1	0	0.2	1.1
	Distance (ft)	0	1.8	3	5.3	7.8



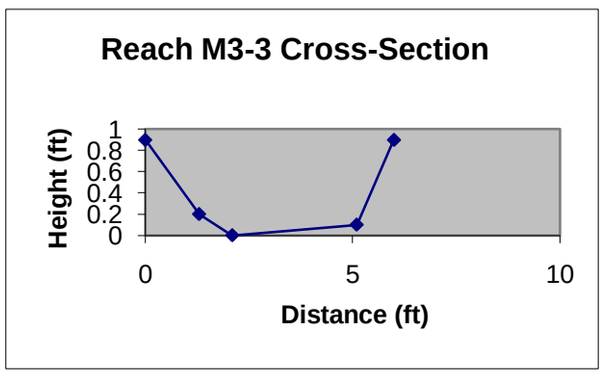
M3-1	**Height (ft)**	1.1	0.3	0	0.4	1.1
	Distance (ft)	0	2.2	2.9	4.5	6



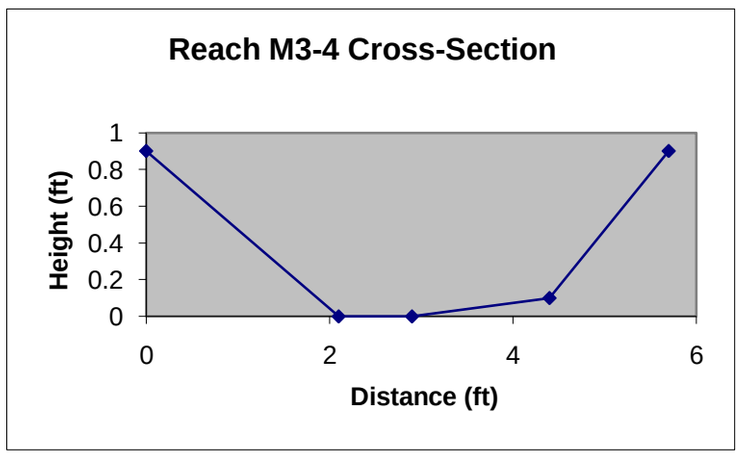
M3-2	**Height (ft)**	0.7	0.3	0	0.1	0.7
	Distance (ft)	0	0.4	0.8	2.3	2.6



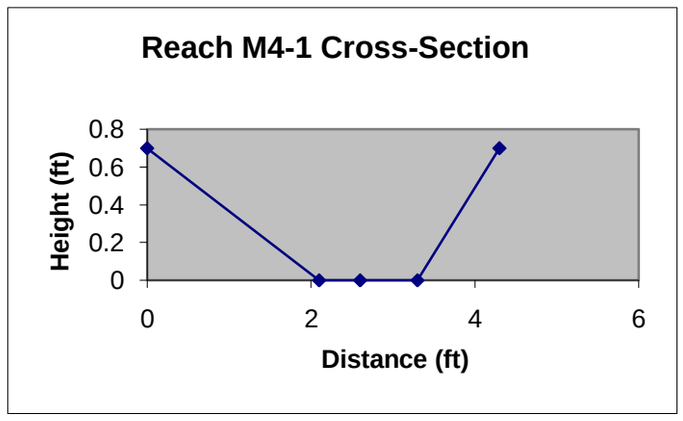
M3-3	**Height (ft)**	0.9	0.2	0	0.1	0.9
	Distance (ft)	0	1.3	2.1	5.1	6



M3-4	**Height (ft)**	0.9	0	0	0.1	0.9
	Distance (ft)	0	2.1	2.9	4.4	5.7



M4-1	**Height (ft)**	0.7	0	0	0	0.7
	Distance (ft)	0	2.1	2.6	3.3	4.3



M4-2	**Height (ft)**	0.8	0.2	0	0.1	0.8
	Distance (ft)	0	0.6	2.6	3.7	4.7