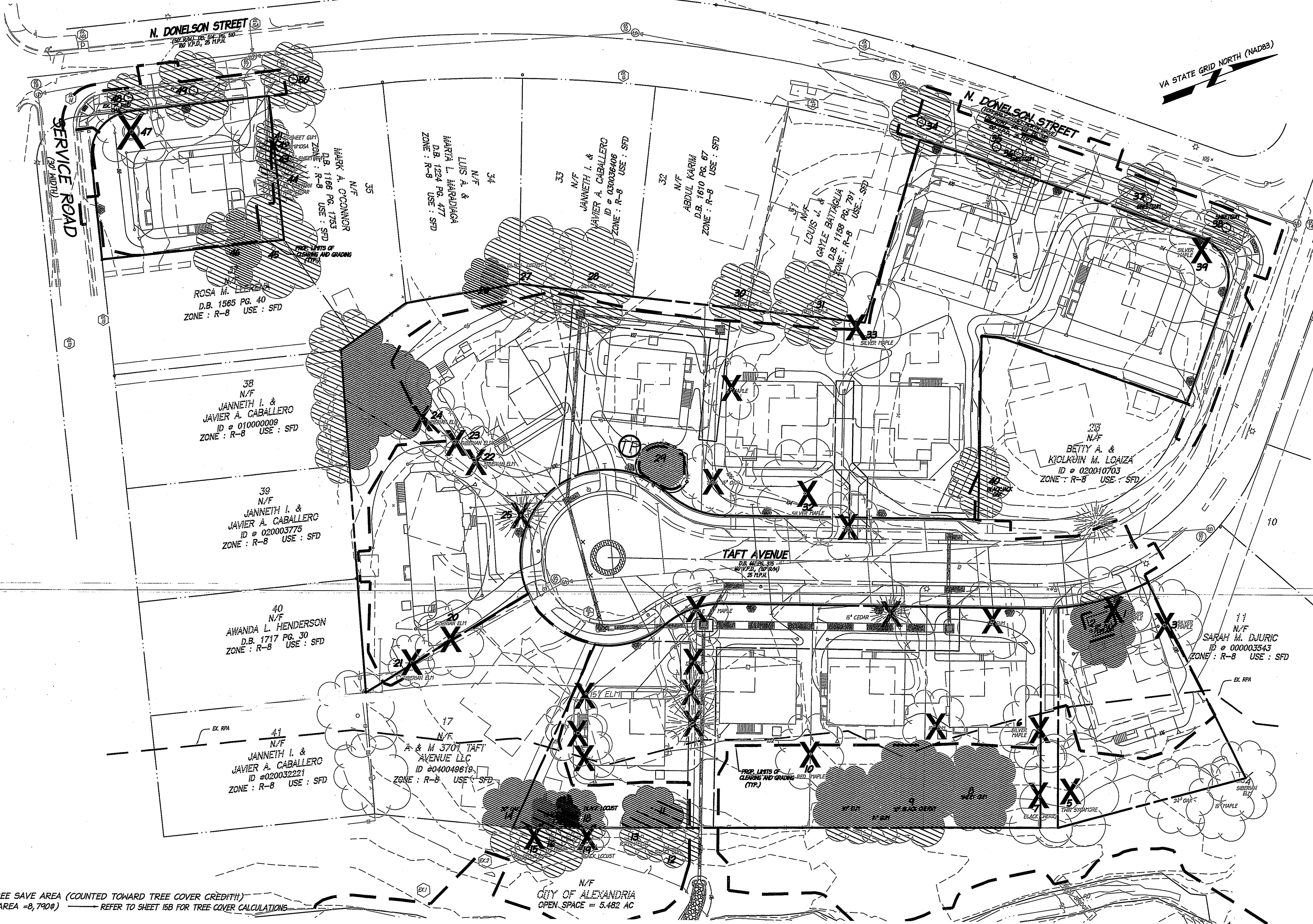


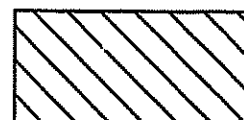
THIS SHEET IS FOR TREE PRESERVATION PURPOSES ONLY!!



**LEGEND**



TREE SAVE AREA (COUNTED TOWARD TREE COVER CREDIT!!)  
(AREA = 8,790') REFER TO SHEET 15B FOR TREE COVER CALCULATIONS



TREE SAVE AREA (NOT COUNTED TOWARD TREE COVER CREDIT!!)



EX. TREE TO BE REMOVED

**NOTES:**

- ALL TREE PROTECTION SHALL BE APPROVED IN-FIELD BY THE CITY ARBORIST PRIOR TO COMMENCEMENT OF ANY SITE DISTURBING ACTIVITIES.
- SUPER SILT FENCE IS USED IN LIEU OF TREE PROTECTION ALONG THE PERIMETER OF THE CONSTRUCTION ACTIVITY. PLEASE SEE SHEET 8-9 FOR THE LOCATION OF THE SUPER SILT FENCE.
- SEE SHEET 16 FOR TREE PRESERVATION DETAILS.
- THE EXISTING SHEDS ON THE RPA SIDE WILL BE REMOVED WITHOUT HEAVY EQUIPMENT ENTERING INTO THE DRIP LINE OF THE EXISTING TREE.
- "TRENCHLESS" CONSTRUCTION, OR SIMILAR APPROACH TO THE SATISFACTION OF THE DIRECTOR OF PAZ SHALL BE USED FOR ROOF DRAINS WHENEVER LOCATED WITHIN THE TREE CANOPY.

6. ALL ARCHAEOLOGICAL WORK WILL BE CARRIED OUT IN ACCORDANCE WITH THE CITY OF ALEXANDRIA ARCHAEOLOGICAL STANDARDS AND IS SUBJECT TO THE APPROVAL OF THE CITY ARCHAEOLOGIST.

ALL ARCHEOLOGICAL PRESERVATION MEASURES MUST BE COMPLETED PRIOR TO GROUND-DISTURBING ACTIVITIES (SUCH AS CORING, GRADING, FILLING, VEGETATION REMOVAL, UNDERGROUND UTILITIES, PILE DRIVING, LANDSCAPING AND OTHER EXCAVATIONS AS DEFINED IN SECTION 2-151 OF THE ZONING ORDINANCE). TO CONFIRM, CALL ALEXANDRIA ARCHAEOLOGY AT (703) 838-4399.

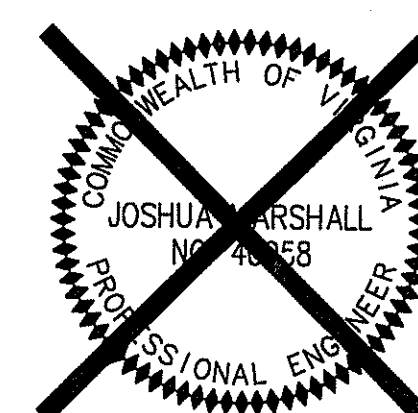
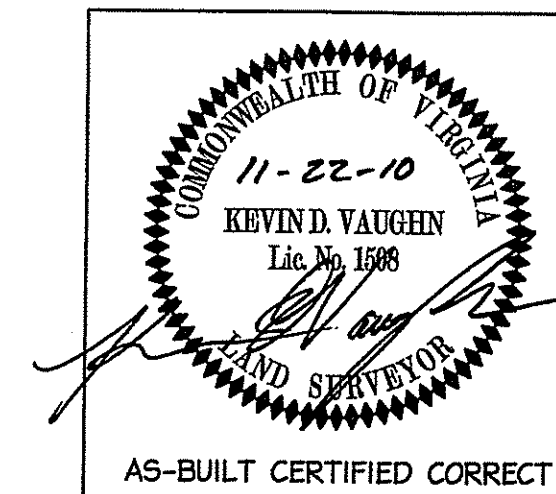
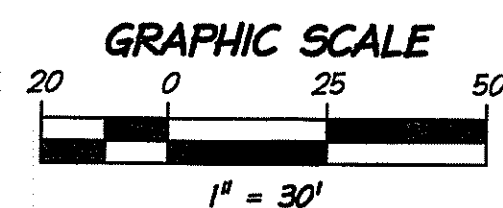
7. CALL ALEXANDRIA ARCHAEOLOGY (703-838-4399) IMMEDIATELY IF ANY BURIED STRUCTURAL REMAINS (WALL FOUNDATIONS, WELLS, PRIVIES, CISTERNS, ETC.) OR CONCENTRATIONS OF ARTIFACTS ARE DISCOVERED DURING DEVELOPMENT. WORK MUST CEASE IN THE AREA OF THE DISCOVERY UNTIL A CITY ARCHAEOLOGIST COMES TO THE SITE AND RECORDS THE FINDINGS. THE APPLICANT HAS COMPLETED A PHASE I ARCHAEOLOGICAL SURVEY AND NO SIGNIFICANT ARTIFACTS WERE FOUND.

8. REMOVE ALL SIBERIAN ELMS.

**\*\* REFER TO STREAM RESTORATIONS PLANS FOR PLANTING IN RPA.\*\***

**APPROVED ASBUILT**

DEVELOPMENT SITE PLAN NO. 2004-0038  
DEPARTMENT OF TRANSPORTATION & ENVIRONMENTAL SERVICES  
DIRECTOR: [Signature] DATE: 2.22.16  
SPECIAL USE PERMIT



**ESI PEER REVIEW**

**APPROVED**  
DEVELOPMENT SITE PLAN NO. \_\_\_\_\_  
DEPARTMENT OF PLANNING & ZONING  
DIRECTOR \_\_\_\_\_ DATE \_\_\_\_\_  
DEPARTMENT OF TRANSPORTATION & ENVIRONMENTAL SERVICES  
SITE PLAN NO. 2004-0038  
DIRECTOR \_\_\_\_\_ DATE \_\_\_\_\_  
CHAIRMAN, PLANNING COMMISSION \_\_\_\_\_ DATE \_\_\_\_\_  
DATE RECORDED \_\_\_\_\_  
INSTRUMENT NO. \_\_\_\_\_ DEED BOOK NO. \_\_\_\_\_ PAGE NO. \_\_\_\_\_

I HEREBY CERTIFY THAT OTHER THAN THE REVISIONS SHOWN HEREON, NO OTHER CHANGES HAVE BEEN MADE.

SCALE: 1" = 30'

SHEET 11 OF 14

DATE: MARCH, 2007  
DRAFT: RP CHECK: MM  
FILE NUMBER: 04126-1-0-35B 2004-0038

LAND DESIGN CONSULTANTS  
PLAN FOR SUCCESS  
WWW.LDC-VA.COM  
8569-E SUDLEY ROAD, MANASSAS, VIRGINIA, 20110  
PH: 703.631.8387, FX: 703.631.9414

TREE REMOVAL & PRESERVATION PLAN  
AS-BUILT

TAFT AVENUE PROPERTY  
CITY OF ALEXANDRIA, VIRGINIA



THIS SHEET IS FOR LANDSCAPING PURPOSES ONLY!!

VIRGINIA UNIFORM CODING SYSTEM  
for Erosion and Sediment Control Practices

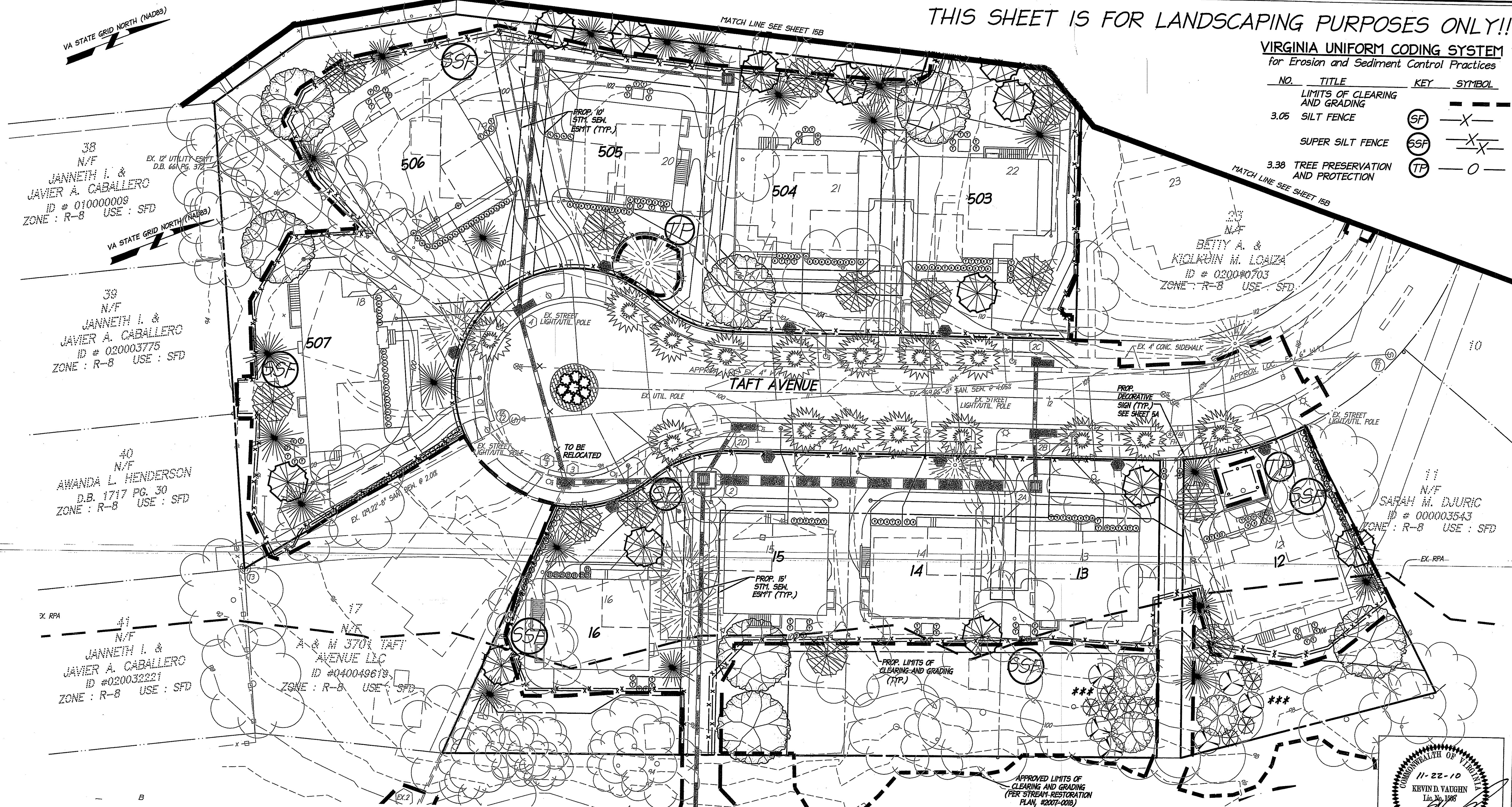
NO.	TITLE	KEY	SYMBOL
3.05	SILT FENCE	(SF)	-X-
	SUPER SILT FENCE	(SSF)	-XX-
3.38	TREE PRESERVATION AND PROTECTION	(TP)	-O-

LAND DESIGN CONSULTANTS  
PLAN FOR SUCCESS  
WWW.LDC-VA.COM  
8866 SUDLEY ROAD MANASSAS, VIRGINIA 20110  
PH: 703.651.6387 FX: 703.651.9414

LANDSCAPE PLAN  
AS-BUILT

TAFT AVENUE PROPERTY

CITY OF ALEXANDRIA, VIRGINIA



\*\* SEE SHEET 15B FOR LANDSCAPING NOTES \*\*

\*\* PLEASE REFER TO ATTACHED WEG PLANS FOR STREAM RESTORATION PLANTINGS \*\*

LOT PLANTING SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	TREE COVER CREDIT (S.F.)	SIZE (HEIGHT)	CALIPER	COVER AREA
(A)	ACER RUBRUM CV.	RED MAPLE CULTIVARS	13	750	12'-14' HT.	2.5"-3"	9,750 SF
(B)	HALESIA CAROLINA	CAROLINA SILVERBELL	25	250	6'-8' HT.	2.5"-3"	6,250 SF
(C)	OSTRYA VIRGINIANA	IRONHOOD	17	250	6'-8' HT.	2.5"-3"	4,250 SF
(D)	STYRAX JAPONICA	JAPANESE SNOWBELL	17	250	6'-8' HT.	2.5"-3"	4,250 SF
(E)	NANDINA DOMESTICA 'FIREPOWER'	FIREPOWER HEAVENLY BAMBOO	23	2	24" HT.	N/A	N/A
(F)	PRUNUS LAUROCERASUS 'OTTO LUYKEN'	OTTO LUYKEN LAUREL	159	2	24" HT.	N/A	N/A
(G)	ILEX CORNUTA X BURFORDI	DWARF BURFORD HOLLY	154	2	24" HT.	N/A	N/A
TOTAL				24,500 SF			

APPROVED ASBUILT

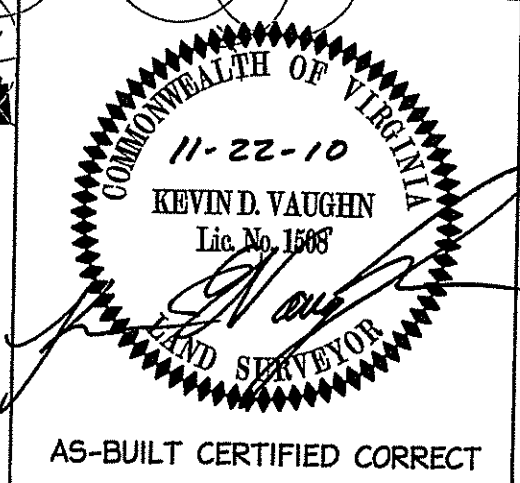
DEVELOPMENT SITE PLAN NO. 2004-0038  
DEPARTMENT OF TRANSPORTATION & ENVIRONMENTAL SERVICES  
DIRECTOR: [Signature] DATE: 2.22.10  
SPECIAL USE PERMIT

STREET AND TRAFFIC ISLAND PLANTING SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	QUANTITY	TREE COVER CREDIT (S.F.)	SIZE (HEIGHT)	CALIPER	COVER AREA
(H)	PRUNUS X YEDOENSIS	YOSHINO CHERRY	28	250	6'-8' HT.	2.5"-3"	7,000 SF
(I)	JUNIPERUS HORIZONTALIS	CREeping JUNIPER	8	2	24" HT.	N/A	N/A
TOTAL				7,000 SF			

\*\*\*RPA REVEGETATION AREA PLANT SCHEDULE:

LEGEND	BOTANICAL NAME	COMMON NAME	SPECIFICATION	INDICATOR	REMARKS
(J)	<b>CANOPY TREES</b>				
(J1)	CARYA OVATA	SHAGBARK HICKORY	1 1/2"-2" CAL	FACU-	CANOPY TREES TO BE PLANTED AT ONE (1) PER 400 SQUARE FEET. CANOPY TREES TO BE LOCATED OPPOSITE EXISTING TREES IN PLANTING AREA.
(J2)	LIQUIDAMBAR STRACILFLUA	SWEETGUM	1 1/2"-2" CAL	FAC	
(J3)	LIRIODENDRON TULIPIFERA	TULIP TREE	1 1/2"-2" CAL	FACU	
(J4)	QUERCUS PALUSTRIS	PIN OAK	1 1/2"-2" CAL	FACH	
(K)	<b>UNDERSTORY TREES/LARGE SHRUBS</b>				
(K1)	AMELANCHIER CANADENSIS	SERVICEBERRY	5'-6' MULTI-STEM	FAC	UNDERSTORY TREES AND LARGE SHRUBS TO BE PLANTED AT TWO (2) PER 400 SQUARE FEET. UNDERSTORY TREES AND LARGE SHRUBS TO BE SPACED AT 8' OC MINIMUM.
(K2)	CELTIS LAEVIGATA	SUGAR HACKBERRY	3/4"-1 1/2" CAL	FACH	
(K3)	HAMAMELLIS VIRGINIANA	WITCH HAZEL	3'-4'	FAC-	
(K4)	ILEX OPACA	AMERICAN HOLLY	3'-4'	FACU-	
(K5)	VIBURNUM LENTAGO	NANNYBERRY	3'-4'	FAC	
(L)	<b>SMALL SHRUBS</b>				
(L1)	ARONIA MELANOCARPA	BLACK CHOKEBERRY	15"-18"	FAC	SMALL SHRUBS TO BE PLANTED AT THREE (3) PER 400 SQUARE FEET. SMALL SHRUBS TO BE SPACED AT 5' OC MINIMUM.
(L2)	CLETHRA ALNIFOLIA	SWEET PEPPERBUSH	15"-18"	FAC+	
(L3)	FOTHERGILLA GARDENII	DWARF FOTHERGILLA	15"-18"	FACH	
(L4)	ILEX VERTICILLATA	WINTERBERRY	15"-18"	FAC+	
(L5)	KALMIA LATIFOLIA	MOUNTAIN LAUREL	15"-18"	FACU	
(L6)	VACCINIUM ANGUSTIFOLIUM	LOWBUSH BLUEBERRY	15"-18"	FACU-	



\*\*\* ADDITIONAL DISTURBED AREA WITH REVISION = 1170 SF. REVEGETATION REQUIREMENT IS 3 CANOPY TREES, 6 UNDERSTORY TREES & 9 SMALL SHRUBS.

APPROVED DEVELOPMENT SITE PLAN NO. 2004-0038  
DEPARTMENT OF PLANNING & ZONING  
DIRECTOR: \_\_\_\_\_ DATE: \_\_\_\_\_  
DEPARTMENT OF TRANSPORTATION & ENVIRONMENTAL SERVICES  
SITE PLAN NO. 2004-0038  
DIRECTOR: \_\_\_\_\_ DATE: \_\_\_\_\_  
CHAIRMAN, PLANNING COMMISSION: \_\_\_\_\_ DATE: \_\_\_\_\_  
DATE RECORDED: \_\_\_\_\_  
INSTRUMENT NO. \_\_\_\_\_ DEED BOOK NO. \_\_\_\_\_ PAGE NO. \_\_\_\_\_

ESR REVIEW  
I HEREBY CERTIFY THAT OTHER THAN THE REVISIONS SHOWN HEREON, NO OTHER CHANGES HAVE BEEN MADE.  
JOSHUA W. HARRIS  
PROFESSIONAL ENGINEER  
SCALE: 1"=20'  
SHEET 12 OF 14  
DATE: MARCH, 2007  
DRAFT: CHECK: RP MM  
FILE NUMBER: 0426-1-0-35B 2004-0038









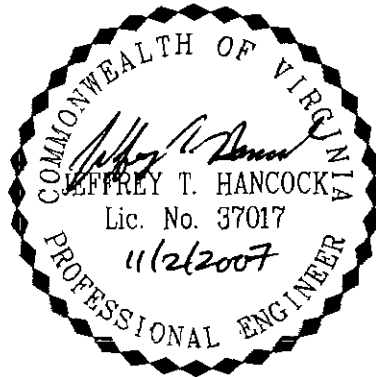


# APPENDIX D – TAFT AVENUE STREAM RESTORATION STUDY REPORT



**TAFT AVENUE  
STREAM RESTORATION STUDY**  
DSP 2007-0018  
City of Alexandria, Virginia

Prepared for:  
Calvert Development  
12656-C Lake Ridge Drive  
Lake Ridge, Virginia 22192



Prepared by:  
Williamsburg Environmental Group, Inc.  
5705 Salem Run Blvd., Suite 105  
Fredericksburg, VA 22407  
Telephone: (540) 785-5544  
Fax: (540) 785-1742

December 2005 (Revised June 2006 and November 2007)

13921 Park Center Road, Suite 160  
Herndon, Virginia 20171  
Telephone: (703) 437-3096  
Fax (703) 437-6920

5209 Center Street  
Williamsburg, VA 23188  
Telephone (757) 220-6869  
Fax: (757) 229-4507

7501 Boulders View Drive, Suite 205  
Richmond, Virginia 23225  
Telephone: (804) 267-3474  
Fax: (804) 267-3470

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3.0 HYDRAULIC ANALYSIS .....	6
4.0 RESULTS AND CONCLUSIONS.....	7

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Table 4-1 Summary of 100-year Water Surface Elevations (WSE).....	7

## APPENDICES

APPENDIX A – FEMA FIRM PANEL  
APPENDIX B – HYDROLOGIC SUMMARY & PONDPACK OUTPUT  
APPENDIX C – HEC-RAS OUTPUT

## MAPS

Map Pocket A Existing 100-Year Floodplain  
Map Pocket B Proposed 100-Year Floodplain

## 1.0 INTRODUCTION

Strawberry Run, a tributary to Cameron Run, is located between Taft Avenue and Fort Williams Parkway, flowing perpendicular to Duke Street in the City of Alexandria. The area of Strawberry Run at the project location is part of the City of Alexandria's Fort Williams Park. Strawberry Run drains approximately 138 acres of a primarily residential watershed before entering an 88" culvert under Duke Street. See Figures 1-1 and 1-2 for project vicinity and location maps.

The upstream portion of the channel within the project area is severely incised, exhibiting vertical banks and minimal connectivity to the floodplain. Although the downstream portion of the stream is less incised, bank erosion and scour continue to demonstrate the overall instability of the channel. Bank erosion has undermined the integrity of an existing stormwater inflow pipe, in addition to a wooden foot bridge. Concrete debris within the channel disrupts natural flow dynamics. The existing riparian corridor is primarily comprised of maintained grass and scattered mature hardwoods, with non-native species. Minimal herbaceous vegetation on the stream banks contributes to further degradation within the channel.

The proposed stream restoration combines in-stream structures with bank stabilization techniques. In-stream structures will also be utilized to divert erosive flows from outer bends into the center of the channel and create in-stream habitat. Rock toe protection shall provide additional protection in high stress areas along the stream channel. The existing concrete debris shall be removed to restore natural flow dynamics. Vegetated bankfull benches will increase connectivity to the floodplain and provide channel capacity.

The proposed stream restoration project is located in a zone AE floodplain district, as shown in the "Floodplain Map, City of Alexandria, Alexandria, Virginia" dated May 15, 1991. The Floodplain Map is based on the Flood Insurance Rate Map (FIRM) published by the Federal Emergency Management Agency (FEMA) for the City of Alexandria, Virginia, Community-

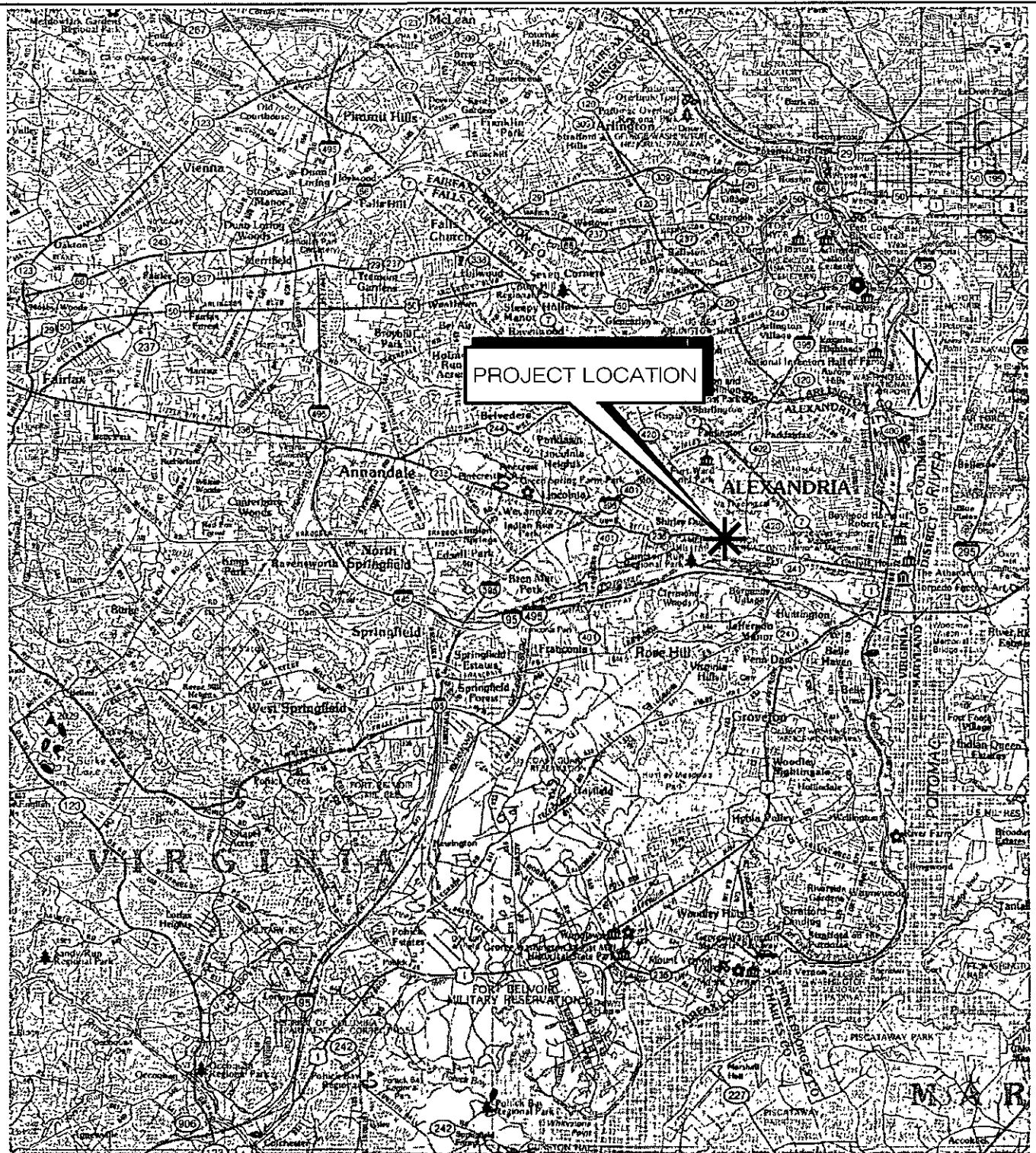


Panel Number 515519 0005 D, revised May 15, 1991 (see Appendix A.) A floodway has not been delineated for the zone AE floodplain district on Strawberry Run.

Section 6-300 of the City of Alexandria Zoning Ordinance establishes the floodplain district and provides the standards for regulation of development within the established district. Section 6-308 prohibits any filling of any kind within the boundaries of any zone AE floodplain district, except where such filling will not increase the water surface elevation of the 100-year-flood more than one-half foot. The purpose of this floodplain alteration study is to determine how the proposed stream restoration project will impact the 100-year water surface elevations in Strawberry Run. The 100-year water surface elevations for the existing and proposed conditions were modeled for the study, as detailed in this report.

The hydrologic analysis was completed using the NRCS TR-55 methodology. The watershed model for Strawberry Run was created in Haested Methods' PondPack software using general land cover conditions as obtained from the City of Alexandria GIS.

The hydraulic analysis for the existing stream was performed using US Army Corps of Engineers HEC-RAS software. HEC-RAS is a one-dimensional flow model that allows the user to input section stationing and elevations, flows and channel defining characteristics to model the hydraulics of natural streams and constructed channels. The hydraulic analysis of the existing culvert running under Duke Street, utilized for downstream boundary conditions, was performed using Haested Methods' CulvertMaster software.



2.4 MILES 1.2 0 MILES 2.4 MILES

SCALE: 1 INCH = 2.4 MILES



SOURCE: VIRGINIA ATLAS AND GAZETTEER,  
DeLORME MAPPING CO., 1995.



**WILLIAMSBURG  
ENVIRONMENTAL  
GROUP, INC.**

FIGURE 1-1  
**PROJECT VICINITY MAP  
TAFT PROPERTIES**

ALEXANDRIA, VA

MAY 2006



#### 4.0 RESULTS AND CONCLUSIONS

The proposed stream restoration of Strawberry Run combines in-stream structures with bank stabilization techniques. In-stream structures will be utilized to divert erosive flows from outer bends into the center of the channel and create in-stream habitat. Rock toe protection shall provide additional protection in high stress areas along the stream channel. The existing concrete debris will be removed to restore natural flow dynamics. Vegetated bankfull benches will increase connectivity to the floodplain and provide channel capacity.

Table 4-1 summarizes the modeled 100-year water surface elevations for the existing and proposed conditions, and the difference in water surface elevation between the existing and proposed conditions.

**Table 4-1 Summary of 100-year Water Surface Elevations (WSE)**

Cross Section	Existing 100-year WSE (ft)	Proposed 100-year WSE (ft)	$\Delta$ WSE (ft)
657*	97.66	97.40	-0.26
547	94.96	94.93	-0.03
521*	95.06	94.55	-0.51
514*	94.82	94.60	-0.22
500	94.51	94.46	-0.05
458	93.74	93.61	-0.13
426*	92.74	92.90	0.16
320	90.06	89.85	-0.21
224*	89.02	88.78	-0.24
213	88.47	88.49	0.02
170	87.50	87.54	0.04
105	87.00	86.99	-0.01
44	86.93	86.93	0.00
0*	86.95	86.95	0.00

\*non-surveyed cross section

The proposed restoration has a minimal effect on the water surface elevations in the project study area for the 100-year storm event, with the largest modeled rise in water surface elevation of 0.16-ft (1.9 inches) occurring at cross section 426. The maps in Pockets A and B show the existing and proposed 100-year floodplain limits in plan view. The analysis shows

that no existing or proposed structures are affected by flooding associated with the 100-year storm event.

Due to the fact that the proposed stream restoration project will not increase the water surface elevation of the 100-year-flood more than one-half foot, a floodplain alteration variance or waiver is not required by City Code. However, the City's Floodplain District Ordinance requires that a floodplain development permit be obtained from the Director of Transportation and Environmental Services prior to the start of the stream restoration project. In addition, as the changes in the 100-year water surface elevation and floodplain boundaries for the proposed condition are negligible, a revision to the FIRM is not deemed necessary.



APPENDIX A  
FEMA FIRM PANEL





APPENDIX B  
HYDROLOGIC SUMMARY  
&  
PONDPACK OUTPUT

I:\2200s\2256-Taft Avenue\Floodplain Analysis\Existing Floodplain\1st Revision (6-23-06)\APPENDIX A\_REV 1.dwg



STORM EVENT (YR)	RAINFALL (IN)
1	2.7
2	3.2
10	5.3
100	7.5

0'	250'	500'	
----	------	------	--

WATERSHED	AREA (AC)	P (FT)	V (FT/S)	TT (HR)	TOTAL TC (HR)
TAFT AVE.	137.51	25	7.89	0.0806	0.6501



1,000 Eastview Circle  
Williamsburg, Virginia 23185  
757-220-8884  
(703) 437-3006

7801 Esplanade View Drive  
Suite 205  
Richmond, Virginia 23225  
804-757-3474  
(804) 858-8584

Environmental Consultants  
**WILLIAMSBURG ENVIRONMENTAL GROUP, INC.**

# HYDROLOGIC SUMMARY

## TAFT AVENUE

### CITY OF ALEXANDRIA, VIRGINIA

DATE: 6/28/06  
JOB NUMBER: 2256  
SCALE: 1 INCH = 500 FEET  
SOURCE: XXX



Type.... Master Network Summary  
 Name.... Watershed  
 File.... L:\2200's\2256 - Taft Ave\PondPack\TAFT AVE.PPW

MASTER DESIGN STORM SUMMARY

Network Storm Collection: Alexandria

Return Event	Total Depth in	Rainfall Type	RNF ID	
1	2.7000	Synthetic Curve	TypeII	24hr
2	3.2000	Synthetic Curve	TypeII	24hr
10	5.3000	Synthetic Curve	TypeII	24hr
100	7.5000	Synthetic Curve	TypeII	24hr

MASTER NETWORK SUMMARY  
 SCS Unit Hydrograph Method

(\*Node=Outfall; +Node=Diversion;)  
 (Trun= HYG Truncation: Blank=None; L=Left; R=Rt; LR=Left&Rt)

Max Pond Storage Node ID ac-ft	Return Type Event	HYG vol ac-ft	Trun	Qpeak hrs	Qpeak cfs	Max WSEL ft
*OUTFALL	JCT 1	13.146		12.3000	109.76	
*OUTFALL	JCT 2	17.625		12.3000	149.15	
*OUTFALL	JCT 10	38.374		12.3000	327.23	
*OUTFALL	JCT 100	61.724		12.2500	522.04	
TAFT AVENUE	AREA 1	13.146		12.3000	109.76	
TAFT AVENUE	AREA 2	17.625		12.3000	149.15	
TAFT AVENUE	AREA 10	38.374		12.3000	327.23	
TAFT AVENUE	AREA 100	61.724		12.2500	522.04	

Type.... Runoff CN-Area  
 Name.... TAFT AVENUE

File.... L:\2200's\2256 - Taft Ave\PondPack\TAFT AVE.PPW

RUNOFF CURVE NUMBER DATA

.....

-----

Soil/Surface Description	CN	Area acres	Impervious Adjustment		Adjusted CN
			%C	%UC	
IMPERVIOUS	98	45.480			98.00
WOODS-GOOD-C	70	15.000			70.00
OPEN SPACE-C	74	77.030			74.00
COMPOSITE AREA & WEIGHTED CN --->		137.510			81.50 (82)

.....



Type.... Tc Calcs  
Name.... TAFT AVENUE

File.... L:\2200's\2256 - Taft Ave\PondPack\TAFT AVE.PPW

.....  
TIME OF CONCENTRATION CALCULATOR  
.....

-----  
Segment #1: Tc: TR-55 Sheet

Mannings n .1500  
Hydraulic Length 100.00 ft  
2yr, 24hr P 3.2000 in  
Slope .010000 ft/ft  
  
Avg.Velocity .13 ft/sec

Segment #1 Time: .2155 hrs

-----  
Segment #2: Tc: TR-55 Shallow

Hydraulic Length 2430.00 ft  
Slope .013990 ft/ft  
Unpaved  
  
Avg.Velocity 1.91 ft/sec

Segment #2 Time: .3537 hrs

-----  
Segment #3: Tc: TR-55 Channel

Flow Area 30.0000 sq.ft  
Wetted Perimeter 25.00 ft  
Hydraulic Radius 1.20 ft  
Slope .026956 ft/ft  
Mannings n .0350  
Hydraulic Length 2300.00 ft  
  
Avg.Velocity 7.89 ft/sec

Segment #3 Time: .0809 hrs

=====  
Total Tc: .6501 hrs  
=====

APPENDIX C  
HEC-RAS OUTPUT



HEC-RAS

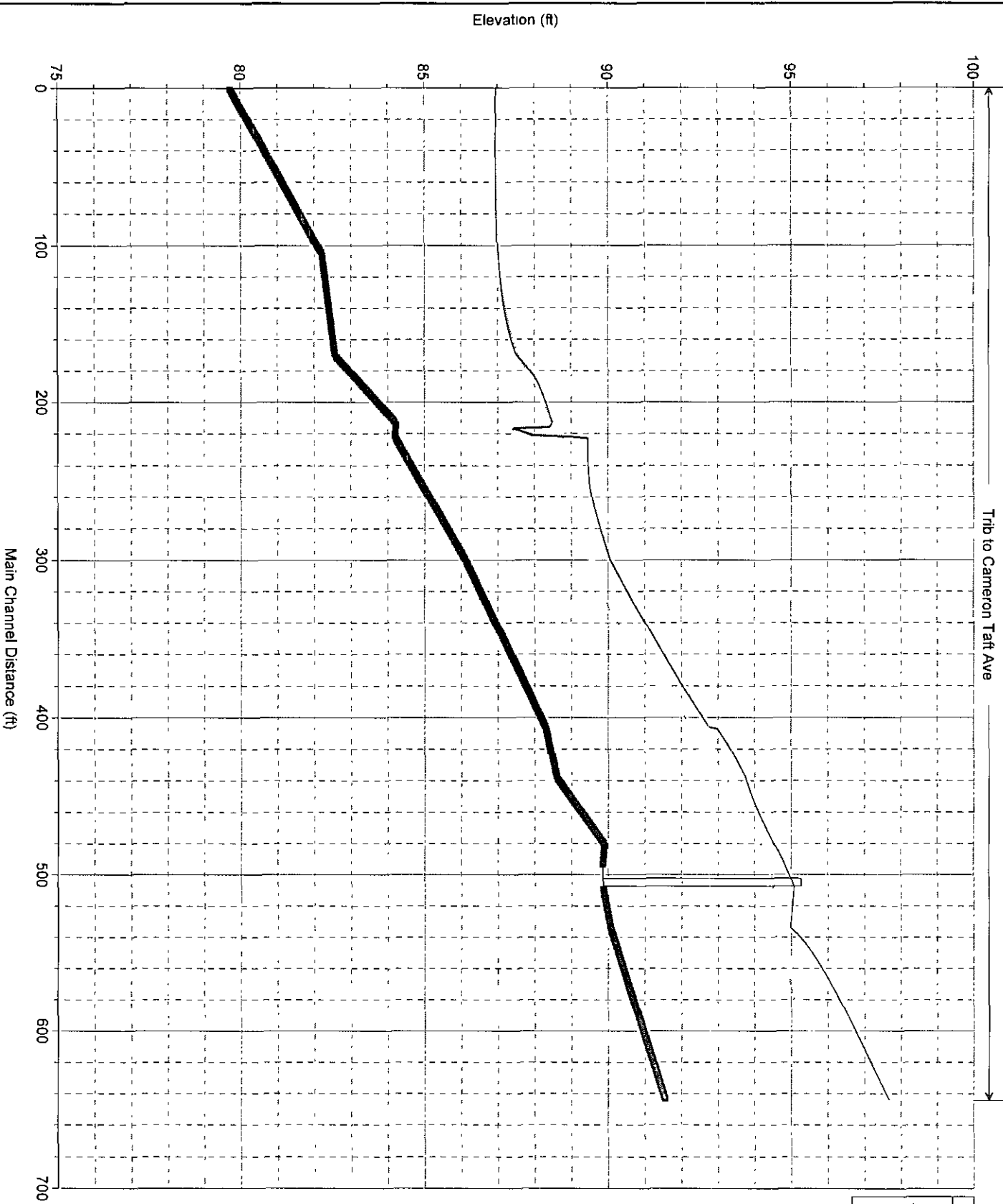
River: Trib to Cameron

Reach: Taft Ave Profile: 100-YR

Reach	River Sta	Profile	Plan	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude #	Chl ΔW.S. Elev (ft)
Taft Ave	657	100-YR	EX-3	522	91.56	97.66	97.08	98.75	0.020869	8.34	62.56	18.32		0.8
Taft Ave	657	100-YR	PROP-3	522	91.56	97.4	97.06	98.67	0.025761	9.02	57.87	17.69		0.88
Taft Ave	547	100-YR	EX-3	522	90.07	94.96	94.68	96.51	0.030132	10	52.2	13.77		0.91
Taft Ave	547	100-YR	PROP-3	522	90.07	94.93	94.93	95.68	0.009864	7.37	92.47	32.74		0.64
Taft Ave	521	100-YR	EX-3	522	89.85	95.06	93.64	95.72	0.009596	6.54	79.78	20.28		0.58
Taft Ave	521	100-YR	PROP-3	522	89.85	94.55	93.64	95.42	0.006063	7.48	69.75	19.3		0.69
Taft Ave	520													
Taft Ave	514	100-YR	EX-3	522	89.85	94.82	95.57	95.57	0.011339	6.96	75.05	19.82		0.63
Taft Ave	514	100-YR	PROP-3	522	89.85	94.6	93.12	95.2	0.005427	6.24	83.65	20.31		0.54
Taft Ave	500	100-YR	EX-3	522	89.9	94.51	95.43	95.43	0.014837	7.67	68.04	19.12		0.72
Taft Ave	500	100-YR	PROP-3	522	89.9	94.46	95.03	95.03	0.006664	6.4	107.86	37.41		0.55
Taft Ave	458	100-YR	EX-3	522	88.6	93.74	93	94.55	0.015582	7.24	72.14	31.27		0.73
Taft Ave	458	100-YR	PROP-3	522	88.6	93.61	92.93	94.48	0.011816	7.75	83.78	31.52		0.68
Taft Ave	426	100-YR	EX-3	522	88.3	92.74	92.65	94.02	0.023348	9.07	57.56	20.97		0.96
Taft Ave	426	100-YR	PROP-3	522	88.2	92.9	93.83	93.83	0.028307	8.15	76	29.87		0.74
Taft Ave	320	100-YR	EX-3	522	86.12	90.06	89.87	91.17	0.023261	8.49	61.95	25.73		0.91
Taft Ave	320	100-YR	PROP-3	522	86.12	89.85	89.67	90.93	0.017906	8.82	72.59	33.49		0.86
Taft Ave	224	100-YR	EX-3	522	84.2	89.02	89.02	89.66	0.025408	10.12	129.85	79.79		0.87
Taft Ave	224	100-YR	PROP-3	522	84	88.78	89.05	89.05	0.007624	4.98	168.06	76.49		0.42
Taft Ave	213	100-YR	EX-3	522	84.22	88.47	88.87	88.87	0.006277	5.25	126.14	73.06		0.5
Taft Ave	213	100-YR	PROP-3	522	84.22	88.49	88.95	88.95	0.014802	6.21	130.22	73.21		0.56
Taft Ave	170	100-YR	EX-3	522	82.57	87.5	88.33	88.33	0.015357	7.85	101.09	70.67		0.73
Taft Ave	170	100-YR	PROP-3	522	82.57	87.54	88.04	88.04	0.016652	6.2	119.88	71.98		0.57
Taft Ave	105	100-YR	EX-3	522	82.2	87	87.38	87.38	0.006347	5.93	163.39	77.27		0.5
Taft Ave	105	100-YR	PROP-3	522	82.1	86.99	87.32	87.32	0.004686	5.45	172.31	77.02		0.45
Taft Ave	44	100-YR	EX-3	522	80.74	86.93	87.08	87.08	0.001941	3.54	246.39	95.87		0.29
Taft Ave	44	100-YR	PROP-3	522	80.74	86.93	87.08	87.08	0.001941	3.54	246.38	95.87		0.29
Taft Ave	0	100-YR	EX-3	522	79.7	86.95	87.01	87.01	0.000417	1.99	307.47	83.25		0.15
Taft Ave	0	100-YR	PROP-3	522	79.7	86.95	87.01	87.01	0.000417	1.99	307.47	83.25		0.15

Taft Ave - Stream Restoration Plan: 1) PROP - 3 2) EX-3

Trib to Cameron Taft Ave



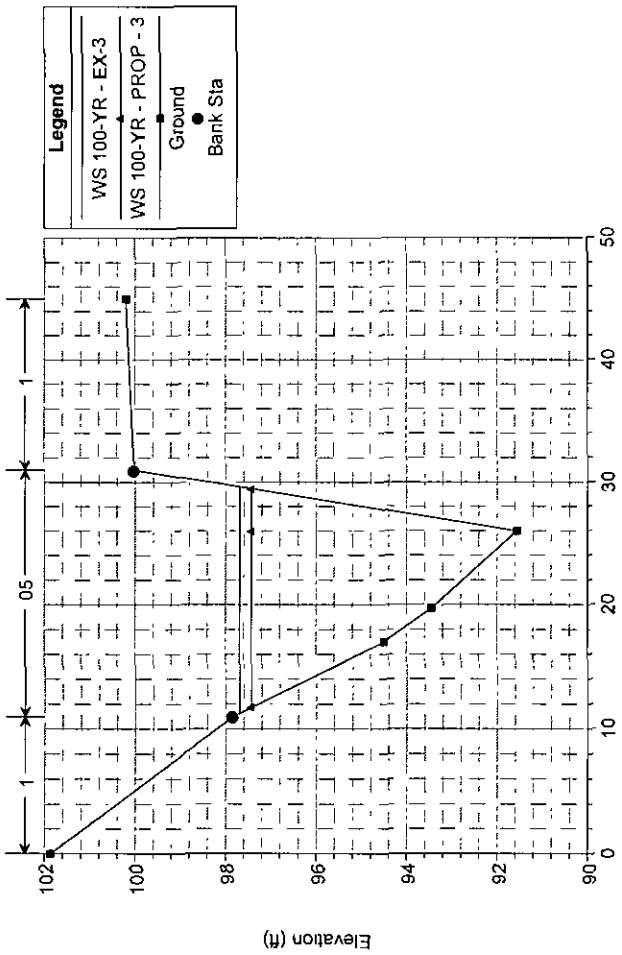
Legend	
WS 100-YR - PROP - 3	
WS 100-YR - EX-3	
Ground	

Main Channel Distance (ft)

Elevation (ft)

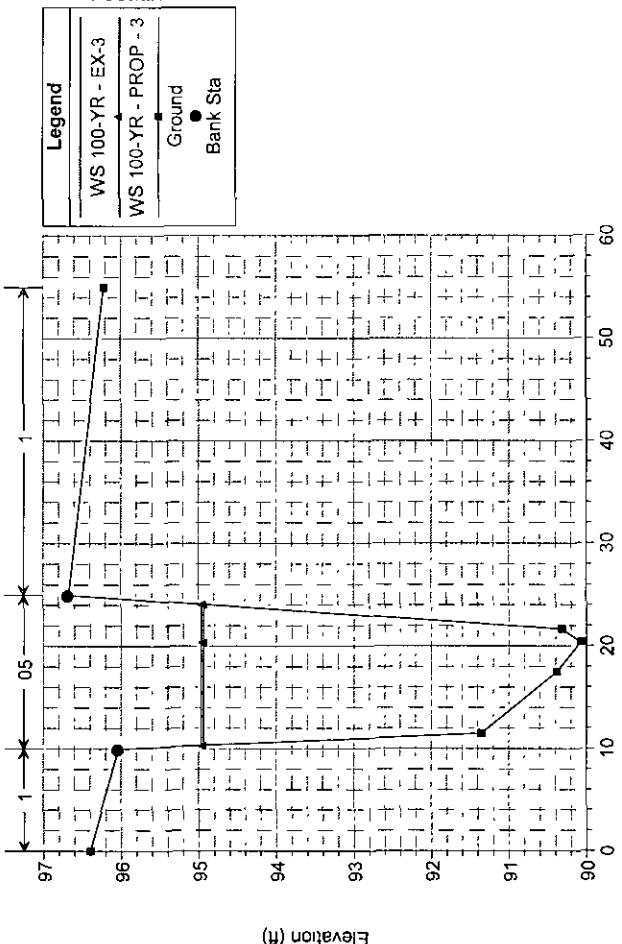
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 657



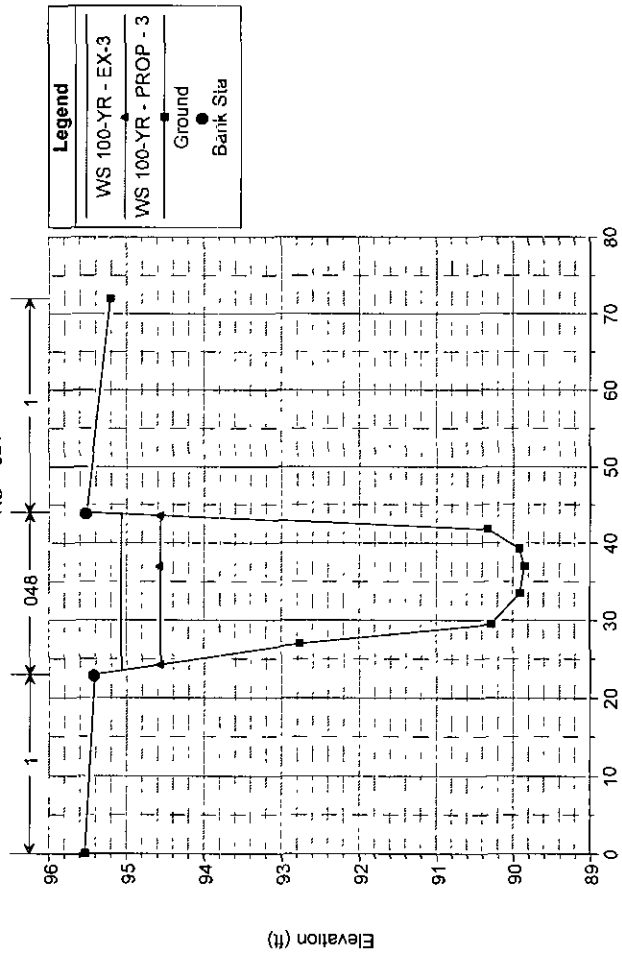
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 547



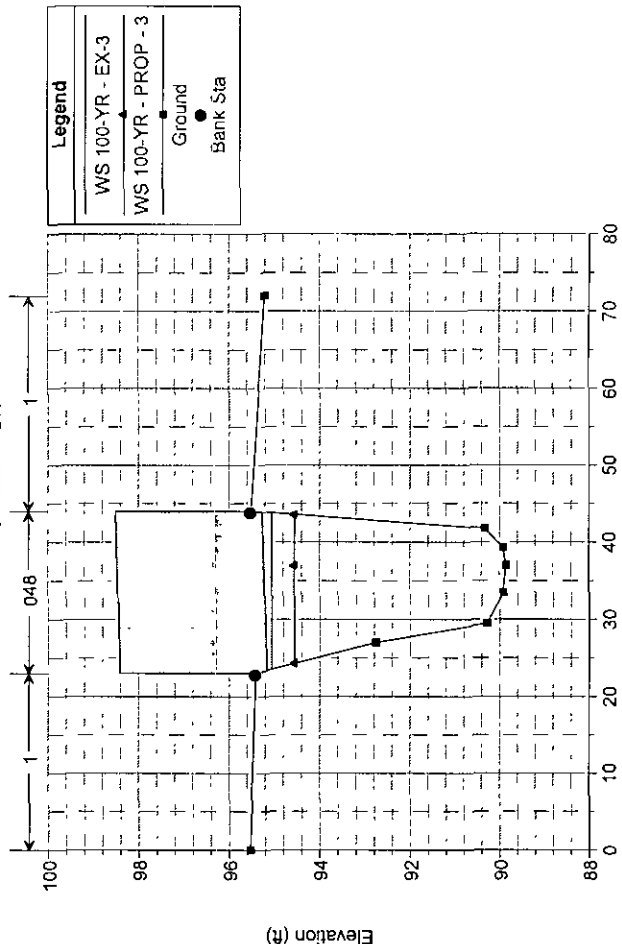
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 521



Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

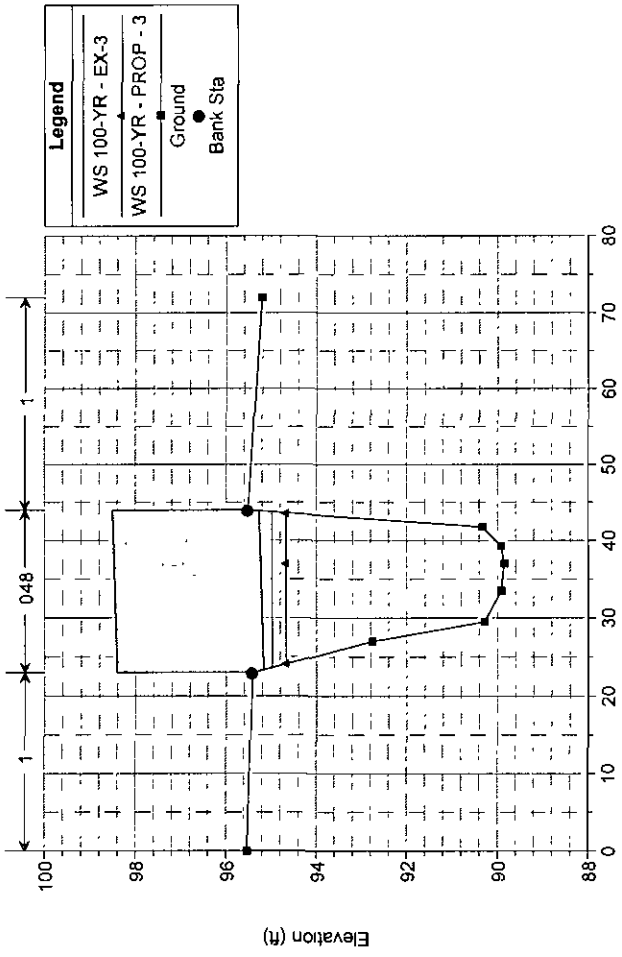
RS = 520 BR





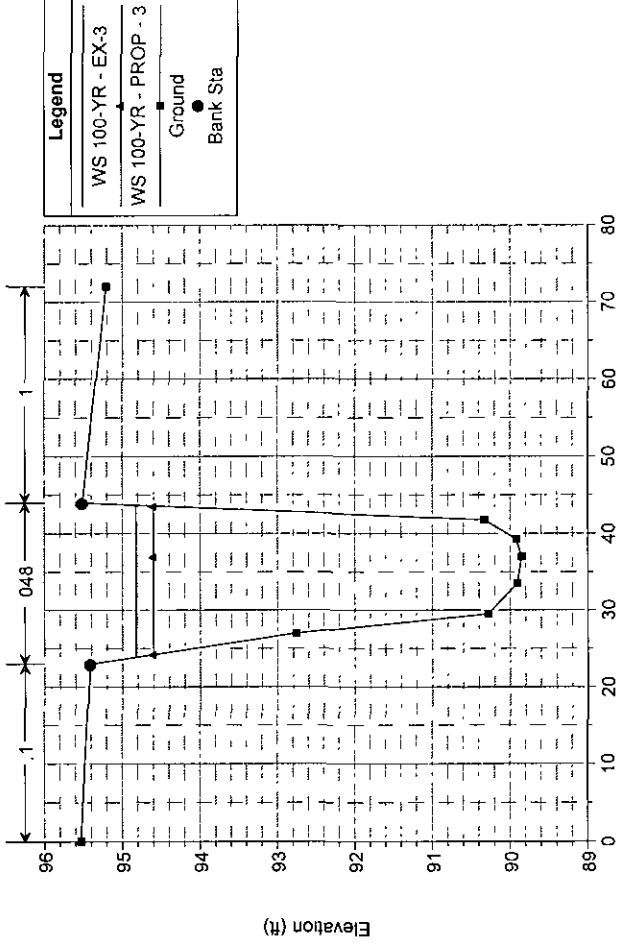
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 520 BR



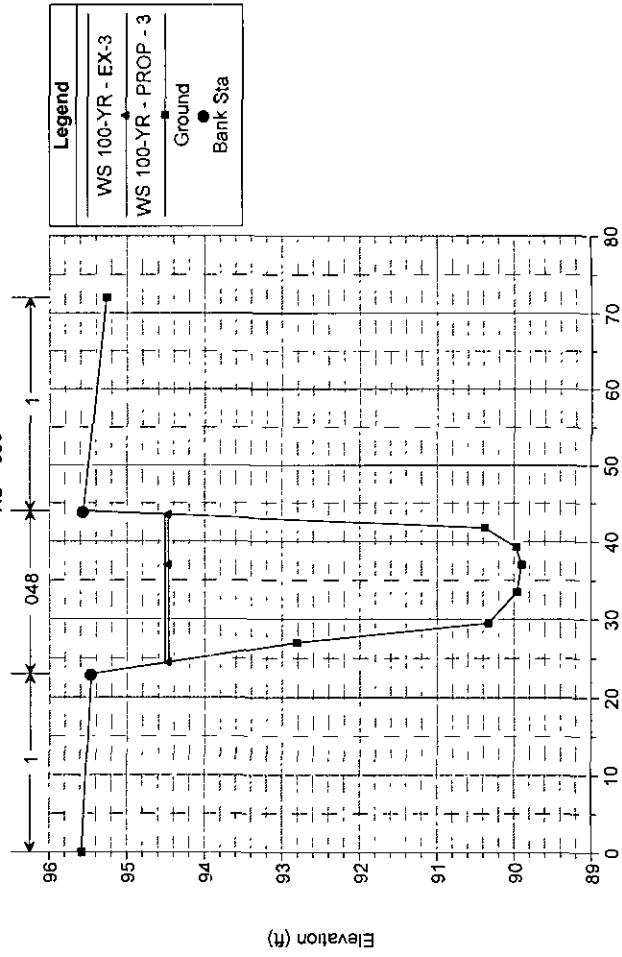
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 514



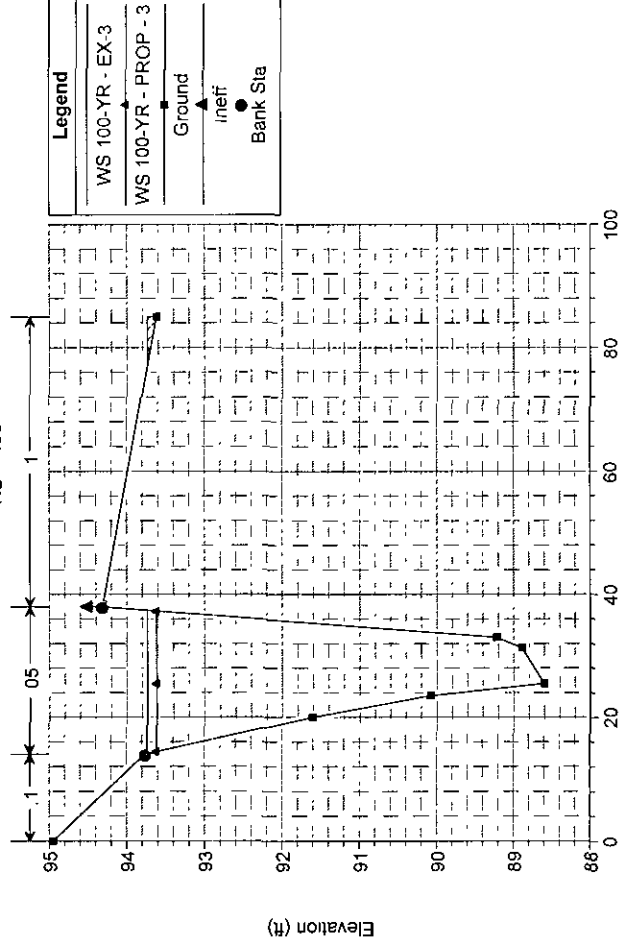
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 500



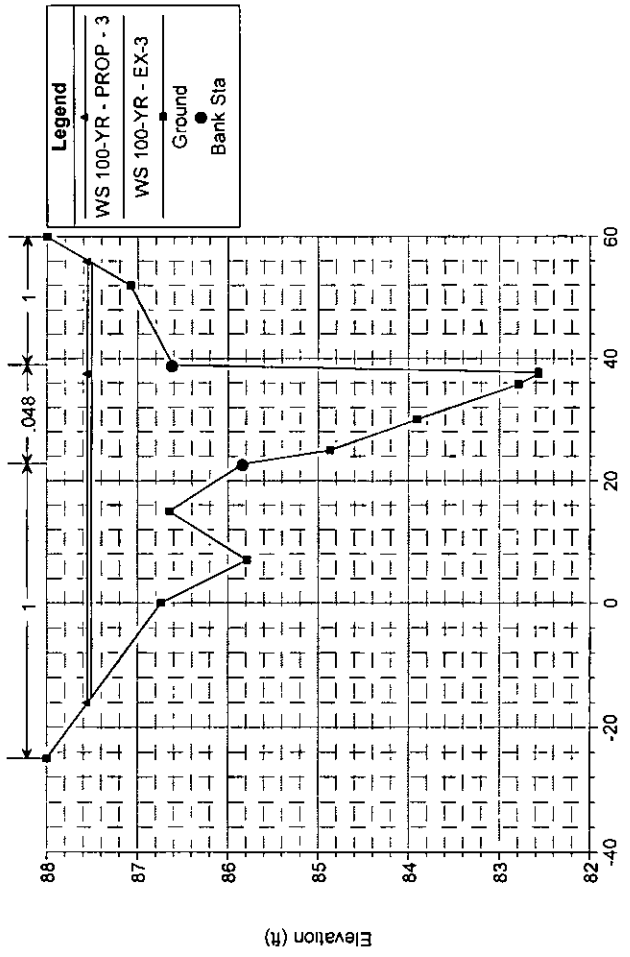
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3

RS = 458

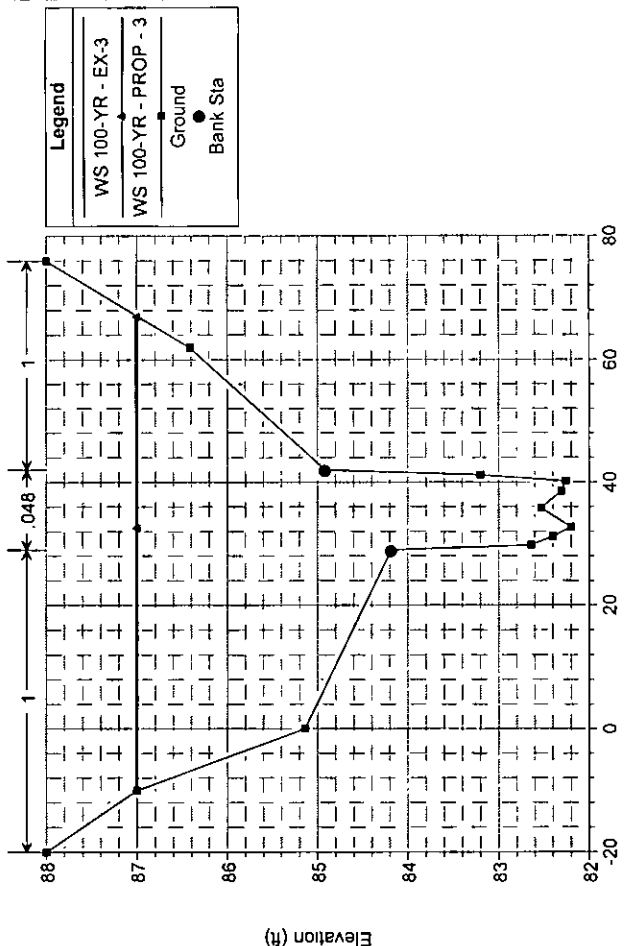




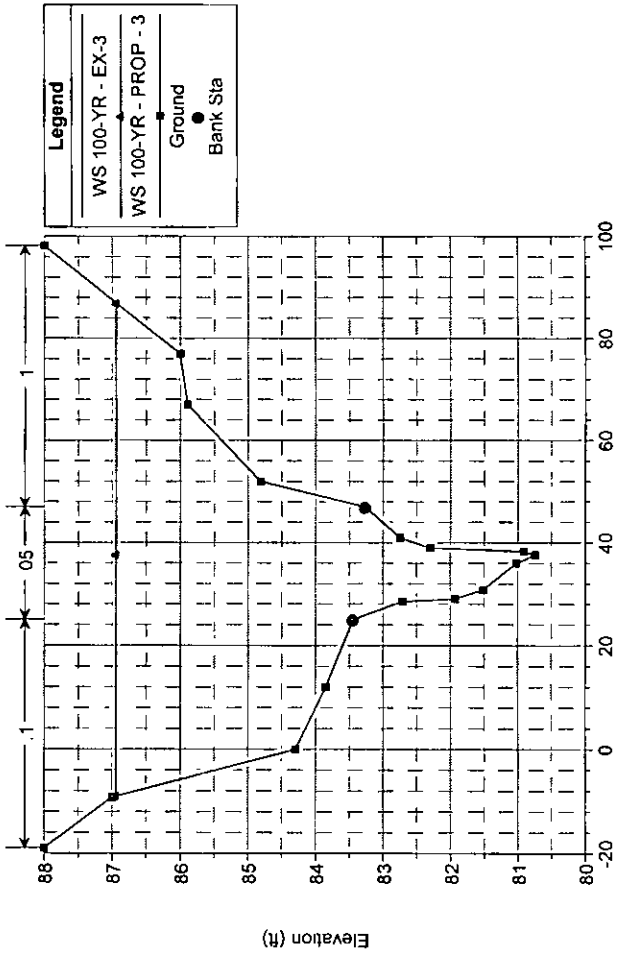
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3  
RS = 170



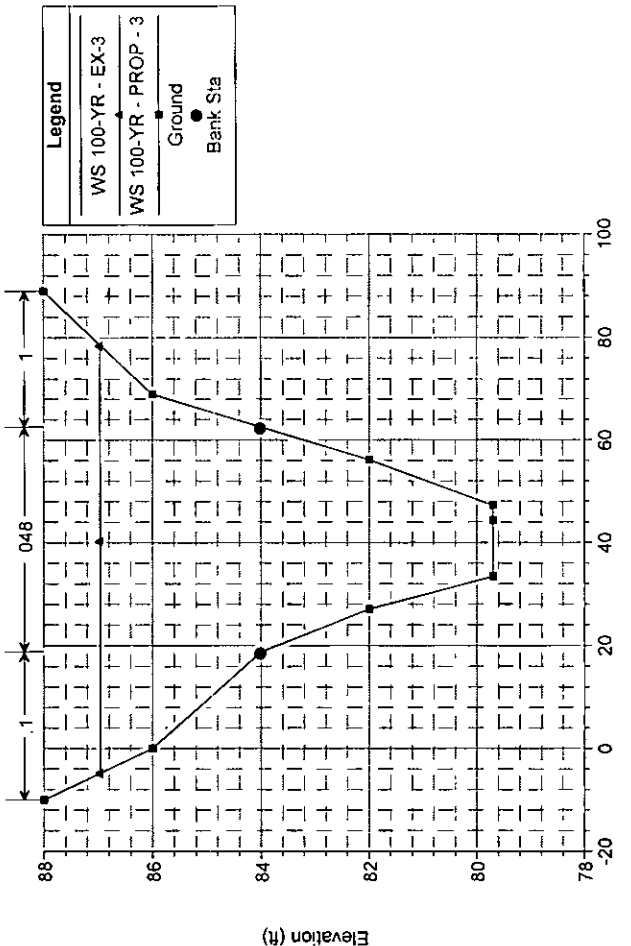
Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3  
RS = 105



Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3  
RS = 44



Taft Ave - Stream Restoration Plan: 1) EX-3 2) PROP - 3  
RS = 0





# APPENDIX E – FIELD SURVEY







## APPENDIX F – CROSS SECTION DATA



<i><b>SURVEY DATA</b></i>		→ <i><b>CROSS - SECTION</b></i>				<i><b>1</b></i>
<b>SITE: Strawberry Run - Forensic Analysis</b>					Date: 2021-11-05	
Location: <b>XS 0+50</b>						
Party / Notes: From Survey; S=0.015, n=0.045 HUC: <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span>						
Item	Distance, Point, or <b>STATION</b>	Back-Sight <b>B S</b>	Height of Instrument <b>HI</b>	Fore-Sight <b>F S</b>	Elevation <b>Elevation</b>	
	ft	ft	ft	ft	ft	<div style="border: 1px solid gray; padding: 2px; display: inline-block; margin-right: 5px;">NOTES</div> <div style="border: 1px solid gray; padding: 2px; display: inline-block; margin-right: 5px;">COMMENTS</div> <div style="border: 1px solid gray; padding: 2px; display: inline-block;">REMARKS</div>
1	0+22.5				82.27	
2	0+25.4				82.23	
3	0+28.8				82.00	
4	0+43.0				80.77	
5	0+43.6				80.58	
6	0+45.8				79.26	
7	0+46.4				79.22	
8	0+50.0				78.86	Thalweg
9	0+55.6				79.39	
10	0+56.3				79.41	
11	0+57.6				81.30	
12	0+58.0				81.66	
13	0+59.9				81.76	
14	0+76.3				83.47	
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						



<b>SURVEY DATA</b>		→ <b>CROSS - SECTION 1</b>				
<b>SITE: Strawberry Run - Forensic Analysis</b>					Date: 2021-11-05	
Location: <b>XS 3+00</b>						
Party / Notes: From Survey; S=0.015, n=0.045 HUC: <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span>						
Item	Distance, Point, or	Back-Sight	Height of Instrument	Fore-Sight	Elevation	<div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> <span>COMMENTS</span> <span>REMARKS</span> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;">NOTES</div>
	STATION	BS	HI	FS	Elevation	
ft	ft	ft	ft	ft	ft	
1	0+02.1				87.98	
2	0+03.7				88.04	
3	0+06.4				87.99	
4	0+11.4				87.79	
5	0+18.2				88.01	
6	0+23.0				87.94	
7	0+41.7				86.82	
8	0+42.2				86.59	
9	0+44.4				82.97	
10	0+44.7				82.70	
11	0+45.3				82.69	Thalweg
12	0+50.0				82.73	
13	0+50.8				82.69	
14	0+56.6				83.10	
15	0+57.1				83.59	
16	0+60.0				84.87	
17	0+61.3				85.37	
18	0+65.7				86.93	
19	0+74.7				87.24	
20	0+87.4				88.00	
21	0+89.0				88.23	
22						
23						
24						
25						
26						
27						
28						

<i><b>SURVEY DATA</b></i>		→ <i><b>CROSS - SECTION</b></i>				<i><b>1</b></i>
<b>SITE: Strawberry Run - Forensic Analysis</b>					Date: 2021-11-05	
Location: <b>XS 4+00</b>						
Party / Notes: From Survey; S=0.015, n=0.045 HUC: <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span>						
Item	Distance, Point, or <b>STATION</b>	Back-Sight <b>B S</b>	Height of Instrument <b>HI</b>	Fore-Sight <b>F S</b>	Elevation <b>Elevation</b>	
	ft	ft	ft	ft	ft	NOTES
1	0+01.5				90.94	
2	0+08.8				91.37	
3	0+10.4				91.38	
4	0+20.1				90.93	
5	0+36.8				90.13	
6	0+39.1				89.19	
7	0+42.0				88.26	
8	0+42.8				87.29	
9	0+45.7				83.92	
10	0+46.3				83.76	
11	0+50.0				82.96	Thalweg
12	0+51.5				83.11	
13	0+56.6				83.86	
14	0+57.9				84.88	
15	0+61.0				86.97	
16	0+64.9				88.02	
17	0+69.7				89.73	
18	0+76.5				89.95	
19	0+87.0				90.15	
20	0+89.9				90.16	
21	0+92.5				90.21	
22						
23						
24						
25						
26						
27						
28						

<b>SURVEY DATA</b>		→ <b>CROSS - SECTION 1</b>				
<b>SITE: Strawberry Run - Forensic Analysis</b>					Date: 2021-11-05	
Location: XS 4+90						
Party / Notes: From Survey; S=0.015, n=0.045 HUC: <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">7</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">1</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">3</span> <span style="border: 1px solid black; padding: 2px;">0</span> <span style="border: 1px solid black; padding: 2px;">2</span>						
Item	Distance, Point, or	Back-Sight	Height of Instrument	Fore-Sight	Elevation	<div style="border: 1px solid black; padding: 5px; display: flex; justify-content: space-between;"> <span>COMMENTS</span> <span>REMARKS</span> </div> <div style="border: 1px solid black; padding: 2px; margin-top: 2px;">NOTES</div>
	STATION	BS	HI	FS		
ft	ft	ft	ft	ft	ft	
1	0+06.3				94.56	
2	0+34.2				92.55	
3	0+42.8				89.27	
4	0+45.7				88.15	
5	0+46.4				87.06	
6	0+47.8				84.86	
7	0+49.9				84.19	
8	0+50.0				84.16	Thalweg
9	0+50.1				84.18	
10	0+53.9				84.93	
11	0+55.6				87.03	
12	0+55.7				87.06	
13	0+58.1				87.78	
14	0+73.8				92.53	
15	0+74.2				92.53	
16	0+77.2				92.44	
17	0+87.3				92.13	
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						

# APPENDIX G – PEBBLE COUNT FIELD DATA





Site: <b>STRAWBERRY RUN</b>		HUC: _____			Dot Count for			COMPOSITE (3)					
Location: <b>S</b>		RIFFLE 1			POOL 2			COMPOSITE (3)					
Observers: <b>BIGGS / HEAP</b>		RIFFLE 2			POOL 2			COMPOSITE (3)					
Inches	PARTICLE	Millimeters	S/C	RIFFLE 1	POOL 2	COMPOSITE (3)	Reach:	Reach:	Reach:	Reach:			
				TOT #	ITEM %	% CUM	TOT #	ITEM %	% CUM	TOT #	ITEM %	% CUM	
	Silt / Clay	< .062	S/C										
	Very Fine	.062 - .125	S A N D										
	Fine	.125 - .25											
	Medium	.25 - .50											
	Coarse	.50 - 1.0											
.04 - .08	Very Coarse	1.0 - 2	G R A V E L										
.08 - .16	Very Fine	2 - 4											
.16 - .22	Fine	4 - 5.7											
.22 - .31	Fine	5.7 - 8											
.31 - .44	Medium	8 - 11.3											
.44 - .63	Medium	11.3 - 16											
.63 - .89	Coarse	16 - 22.6											
.89 - 1.3	Coarse	22.6 - 32											
1.3 - 1.8	Very Coarse	32 - 45											
1.8 - 2.5	Very Coarse	45 - 64											
2.5 - 3.5	Small	64 - 90	C O B B L E										
3.5 - 5.0	Small	90 - 128											
5.0 - 7.1	Large	128 - 180											
7.1 - 10.1	Large	180 - 256											
10.1 - 14.3	Small	256 - 362	B O U L D E R										
14.3 - 20	Small	362 - 512											
20 - 40	Medium	512 - 1024											
40 - 80	Large-Vry Large	1024 - 2048											
	Bedrock		BDRK										
<b>Stream Type:</b>				<b>Landscape Type:</b>				<b>TOTAL →</b>					

Site: <b>STRAWBERRY RUN</b>		HUC: _____		Dot Count for			COMPOSITE (3)	
Location: <b>52</b>		RIFFLE (1)		POOL (2)		Reach:		
Observers: <b>BIGGS / HERR</b>		Date: _____		Date: _____		Date: _____		
Inches		TOT #		TOT #		TOT #		
PARTICLE		ITEM %		ITEM %		ITEM %		
Millimeters		CUM		CUM		CUM		
S/C								
SAND								
GRAVEL								
COBBLE								
BOULDER								
BDRK								
Bedrock								
Stream Type:		Landscape Type:		TOTAL →				



Site: <i>Strawberry Run</i>		HUC: <input type="checkbox"/>		Dot Count for		POOL (2)		COMPOSITE (3)	
Location: <i>OH</i>		RIFFLE 1		RIFFLE 2		RIFFLE 3		Reach:	
Observers: <i>Bias/Heip</i>		Millimeters		Millimeters		Millimeters		Date:	
Inches	PARTICLE	Silt / Clay	S/C	RIFFLE 1	RIFFLE 2	RIFFLE 3	TOT #	ITEM %	% CUM
	Very Fine	< .062	SAND						
	Fine	.062 - .125	SAND						
	Medium	.125 - .25							
	Coarse	.25 - .50							
	Very Coarse	.50 - 1.0							
.04 - .08	Very Coarse	1.0 - 2	GRAVEL						
.08 - .16	Very Fine	2 - 4							
.16 - .22	Fine	4 - 5.7							
.22 - .31	Fine	5.7 - 8							
.31 - .44	Medium	8 - 11.3							
.44 - .63	Medium	11.3 - 16							
.63 - .89	Coarse	16 - 22.6							
.89 - 1.3	Coarse	22.6 - 32							
1.3 - 1.8	Very Coarse	32 - 45							
1.8 - 2.5	Very Coarse	45 - 64							
2.5 - 3.5	Small	64 - 90	COBBLE						
3.5 - 5.0	Small	90 - 128							
5.0 - 7.1	Large	128 - 180							
7.1 - 10.1	Large	180 - 256							
10.1 - 14.3	Small	256 - 362	BOJLDER						
14.3 - 20	Small	362 - 512							
20 - 40	Medium	512 - 1024							
40 - 80	Large-Vry Large	1024 - 2048							
	Bedrock		BDRK						
<b>Stream Type:</b>				<b>Landscape Type:</b>				<b>TOTAL →</b>	



Site: <b>STRAWBERRY RUN</b>		HUC: _____		Dot Count for		POOL		RIFFLE (1)		POOL (2)		COMPOSITE (3)						
Location: <b>SS</b>		Observer: <b>Beard / HEAD</b>		RIFFLE		POOL		RIFFLE (1)		POOL (2)		COMPOSITE (3)						
Inches	PARTICLE	Millimeters	S/C	1	2	3		Reach:	Date:	TOT #	ITEM %	% CUM	Reach:	Date:	TOT #	ITEM %	% CUM	
	Silt / Clay	< .062																
	Very Fine	.062 - .125	<b>SAND</b>															
	Fine	.125 - .25																
	Medium	.25 - .50																
	Coarse	.50 - 1.0																
.04 - .08	Very Coarse	1.0 - 2																
.08 - .16	Very Fine	2 - 4	<b>GRAVEL</b>															
.16 - .22	Fine	4 - 5.7																
.22 - .31	Fine	5.7 - 8																
.31 - .44	Medium	8 - 11.3																
.44 - .63	Medium	11.3 - 16																
.63 - .89	Coarse	16 - 22.6																
.89 - 1.3	Coarse	22.6 - 32																
1.3 - 1.8	Very Coarse	32 - 45																
1.8 - 2.5	Very Coarse	45 - 64																
2.5 - 3.5	Small	64 - 90		<b>COBBLE</b>														
3.5 - 5.0	Small	90 - 128																
5.0 - 7.1	Large	128 - 180																
7.1 - 10.1	Large	180 - 256																
10.1 - 14.3	Small	256 - 362	<b>BOULDER</b>															
14.3 - 20	Small	362 - 512																
20 - 40	Medium	512 - 1024																
40 - 80	Large-Vry Large	1024 - 2048																
	Bedrock		<b>BDRK</b>															
<b>Stream Type:</b>				<b>Landscape Type:</b>				<b>TOTAL →</b>										