

# CITY OF WOBURN, MA

## HORN POND BROOK STREAM RESTORATION

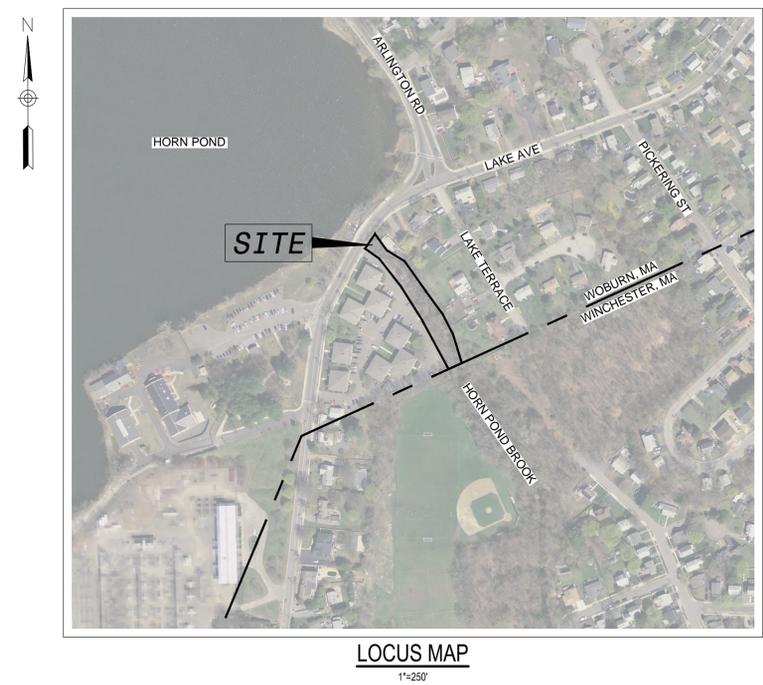
### MVP GRANT

### 38 LAKE AVENUE

### WOBURN, MA 01801

**Weston & Sampson**  
 Weston & Sampson Engineers, Inc.  
 55 Walkers Brook Drive, Suite 100  
 Reading, MA 01867  
 978.532.1900 800.SAMPSON  
 www.westonandsampson.com

Applicant:



#### ZONING INFORMATION

**MAP/LOT:** MAP 68 / BLOCK 12 / LOTS 01 & 03  
 MAP 75 / BLOCK 02 / LOTS 01, 02 & 03

**OWNERS:**

WILLIAM J. & HARRIET A. MEARLS  
 3 LAKE TERRACE  
 WOBURN, MA  
 (MAP 68 / BLOCK 12 / LOT 01)

JAMES S. CORONIS  
 38 LAKE AVENUE  
 WOBURN, MA  
 (MAP 68 / BLOCK 12 / LOT 03)

HUGO A. & VIRGINA M. VOLPE  
 9 LAKE TERRACE  
 WOBURN, MA  
 (MAP 75 / BLOCK 02 / LOT 01)

VIRGINA M. VOLPE TRSTE  
 COSMO DITUCCI LIFE ESTATE  
 5 LAKE TERRACE  
 WOBURN, MA  
 (MAP 75 / BLOCK 02 / LOT 02)

LAKESIDE UNIVERSITY APARTMENTS, LLC  
 48 LAKE AVENUE  
 WOBURN, MA  
 (MAP 75 / BLOCK 02 / LOT 03)

#### DRAWING INDEX

SHEET	TITLE
C002	ABBREVIATIONS, NOTES AND LEGEND
CD100	SITE PREPARATION PLAN
C100	SITE PLAN
C101	STREAM PROFILE
C102	PLANTING PLAN
C500	CONSTRUCTION DETAILS
C501	CONSTRUCTION DETAILS
C502	CONSTRUCTION DETAILS

Issued Date:

## JUNE 30, 2020



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 Call before you dig.

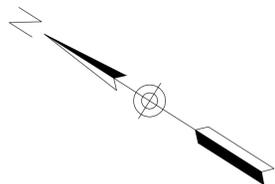
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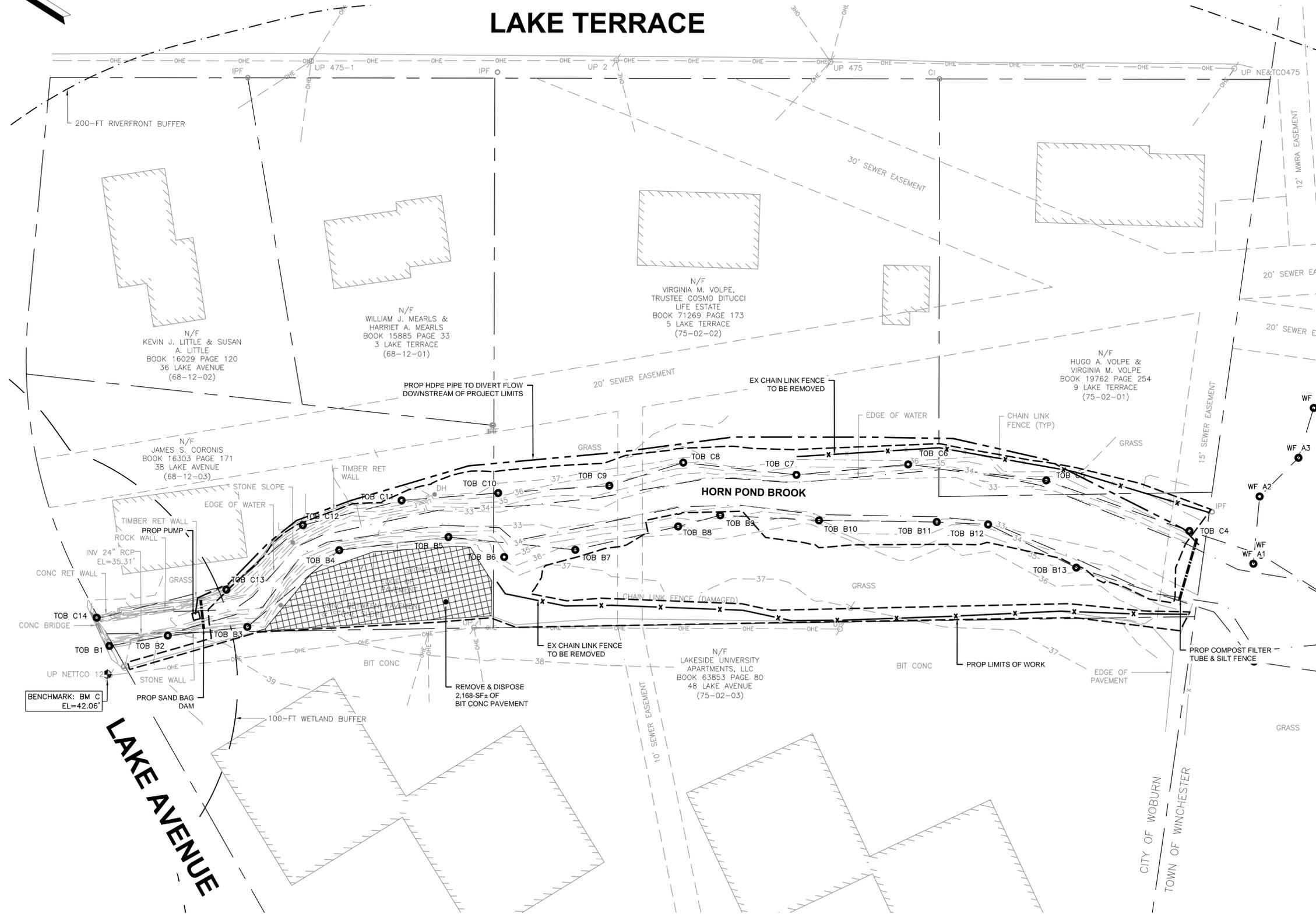
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# LAKE TERRACE



Project:

**HORN POND BROOK  
STREAM RESTORATION  
MVP GRANT**



**CITY OF WOBURN  
10 COMMON STREET  
WOBURN, MA 01801**

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Reviewed By: AZ

Approved By: JIP

W&S Project No: 2190869

W&S File No: -

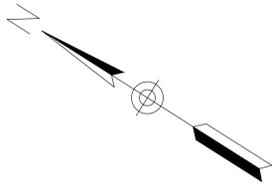
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**SITE  
PREPARATION  
PLAN**

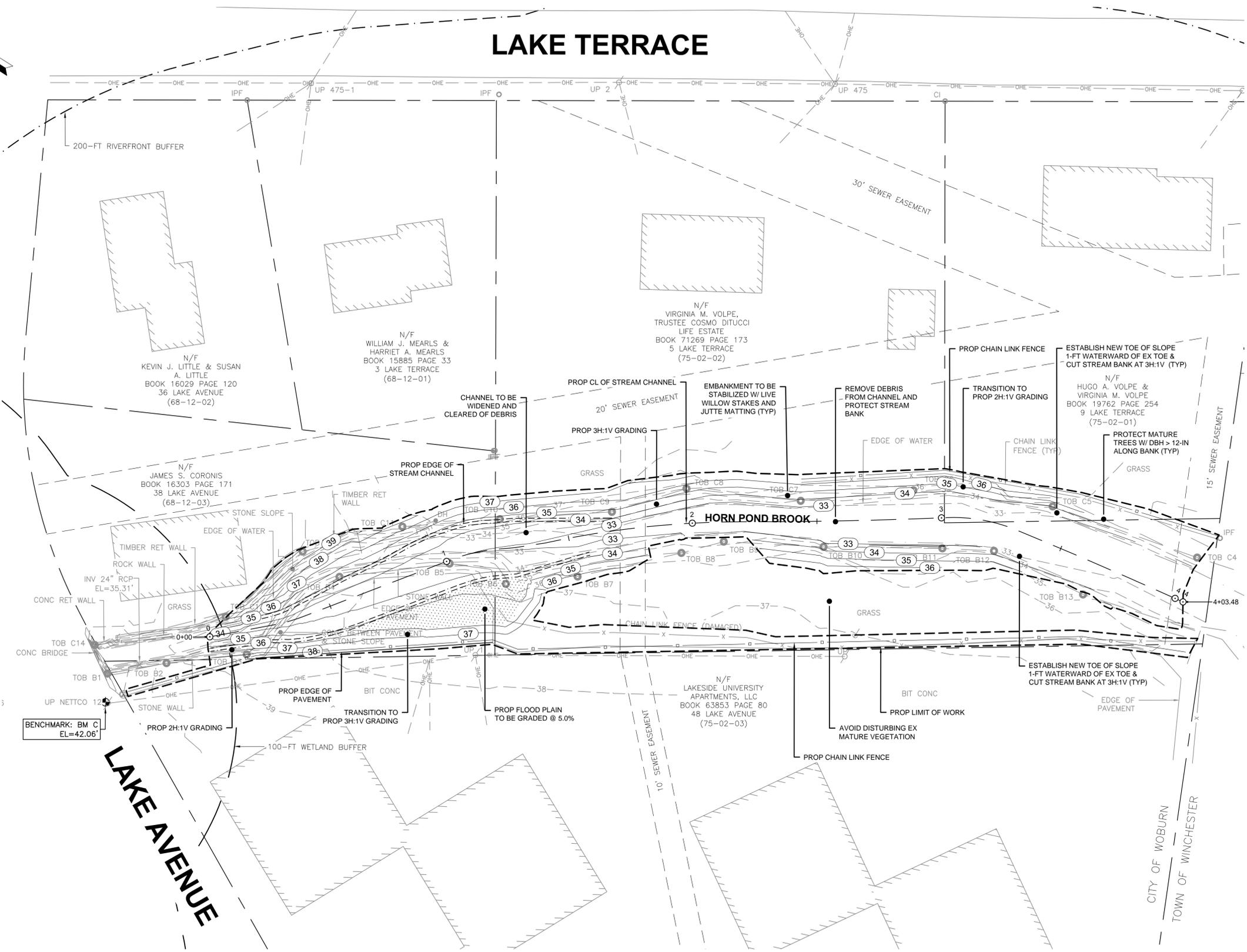
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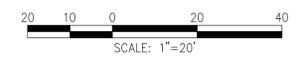


# LAKE TERRACE



BENCHMARK: BM C  
EL=42.06'

## LAKE AVENUE



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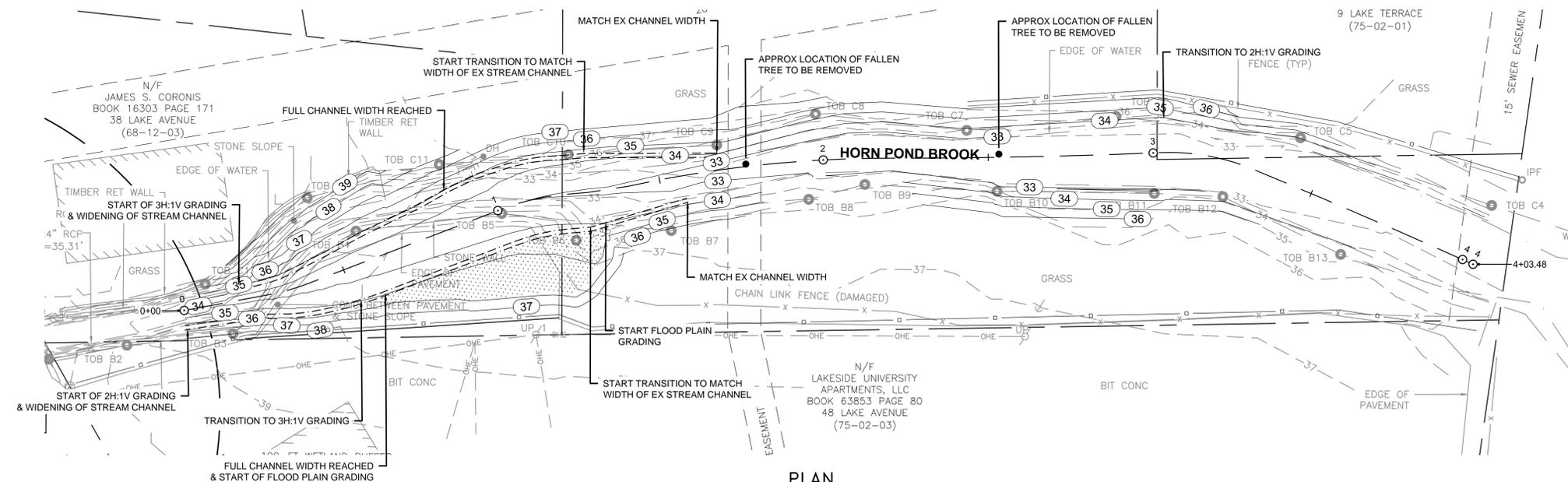
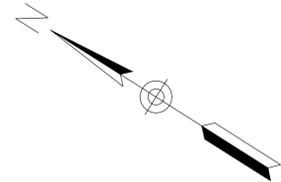
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**SITE PLAN**

Sheet Number:

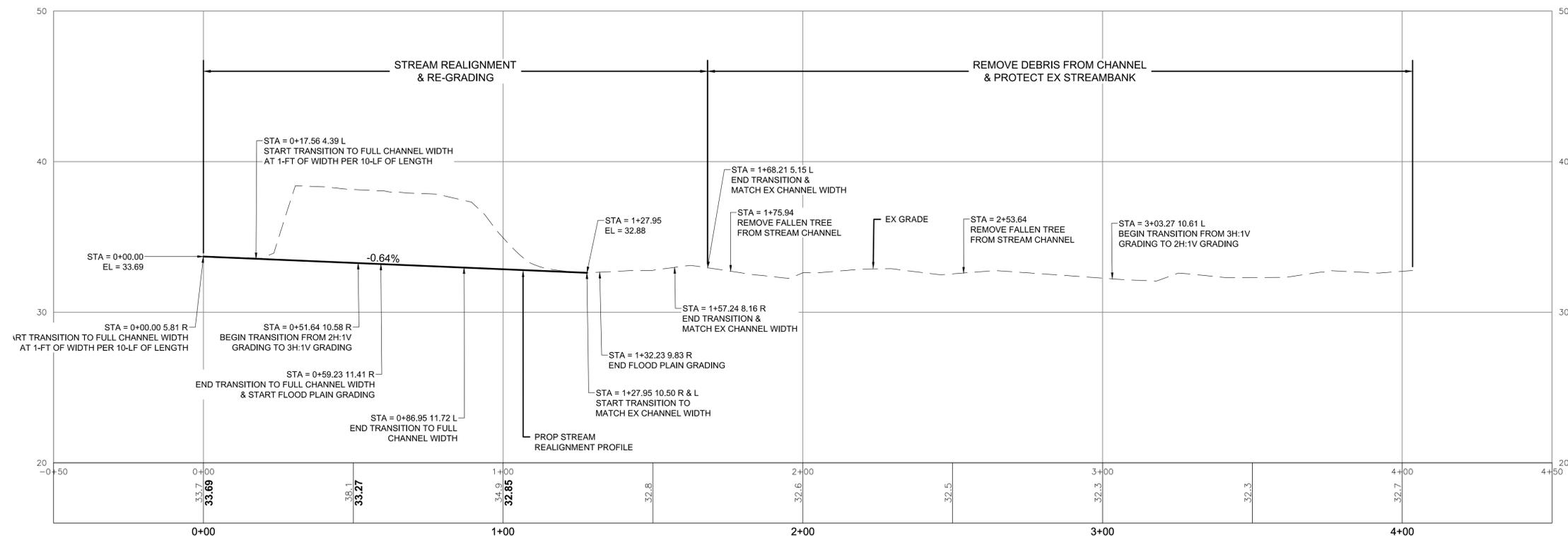
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PLAN  
SCALE: 1"=20'

HORN POND BROOK STREAM RESTORATION



PROFILE  
SCALE: 1"=20' HORIZ  
1"=4' VERT



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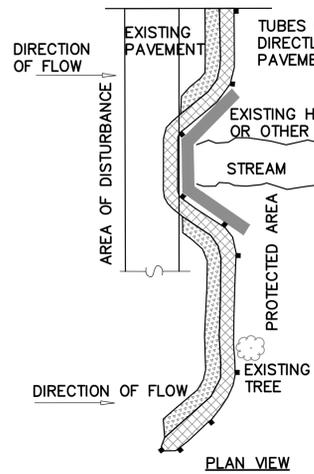
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**STREAM  
PROFILE**  
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**GENERAL NOTES:**

1. PROVIDE A MINIMUM TUBE DIAMETER OF 12 INCHES FOR SLOPES UP TO 50 FEET IN LENGTH WITH A SLOPE RATIO OF 3H:1V OR STEEPER. LONGER SLOPES OF 3H:1V MAY REQUIRE LARGER TUBE DIAMETER OR ADDITIONAL COURSING OF FILTER TUBES TO CREATE A FILTER BERM. REFER TO MANUFACTURER'S RECOMMENDATIONS FOR SITUATIONS WITH LONGER OR STEEPER SLOPES.
2. INSTALL TUBES ALONG CONTOURS AND PERPENDICULAR TO SHEET OR CONCENTRATED FLOW.
3. DO NOT INSTALL IN PERENNIAL, EPHEMERAL OR INTERMITTENT STREAMS.
4. CONFIGURE TUBES AROUND EXISTING SITE FEATURES TO MINIMIZE SITE DISTURBANCE AND MAXIMIZE CAPTURE AREA OF STORMWATER RUN-OFF.

PLACING TUBES AGAINST THE UPHILL SIDE OF WELL- ANCHORED, STATIONARY FEATURES SUCH AS EXISTING TREES CAN PROVIDE ADDITIONAL BRACING.

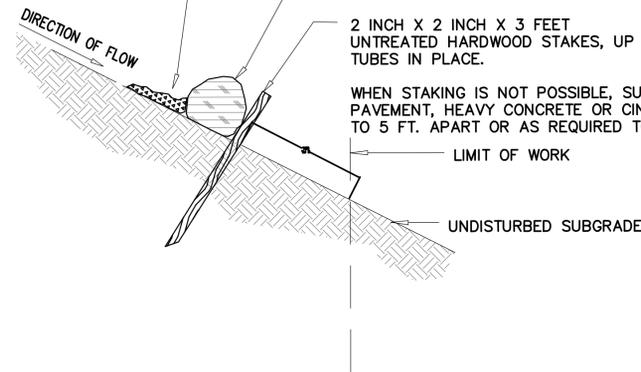
CURVE ENDS UPHILL TO PREVENT DIVERSION OF UNFILTERED RUN-OFF.

MULCH MATERIAL FOR THE FILTER TUBES SHALL BE WEED-FREE STRAW, WOOD EXCELSIOR, COMPOST, OR WOOD CHIPS, OR COIR. STRAW SHALL BE WEED FREE AND DERIVED FROM THRESHING OF GRAIN CROP.

2 IN. DEEP x 12 IN. WIDE LAYER OF LOOSE COMPOST MATERIAL PLACED ON UPHILL/FLOW SIDE OF TUBES TO FILL SPACE BETWEEN SOIL SURFACE AND TUBES.

COMPOST FILTER TUBE MINIMUM 12 INCHES IN DIAMETER WITH AN EFFECTIVE HEIGHT OF 9.5 INCHES. TUBES FOR COMPOST FILTERS SHALL BE JUTE MESH OR APPROVED BIODEGRADABLE MATERIAL. ADDITIONAL TUBES SHALL BE USED AT THE DIRECTION OF THE ENGINEER.

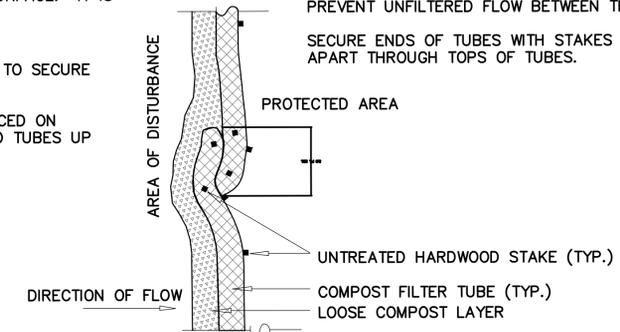
TAMP TUBES IN PLACE TO ENSURE GOOD CONTACT WITH SOIL SURFACE. IT IS NOT NECESSARY TO TRENCH TUBES INTO EXISTING GRADE.



WHEN STAKING IS NOT POSSIBLE, SUCH AS WHEN TUBES MUST BE PLACED ON PAVEMENT, HEAVY CONCRETE OR CINDER BLOCKS CAN BE USED BEHIND TUBES UP TO 5 FT. APART OR AS REQUIRED TO SECURE TUBES IN PLACE.

PROVIDE A 3 FT. MINIMUM OVERLAP AT ENDS OF TUBES TO JOIN IN A CONTINUOUS BARRIER AND MINIMIZE UNIMPEDED FLOW. STAKE JOINING TUBES SNUGLY AGAINST EACH OTHER TO PREVENT UNFILTERED FLOW BETWEEN THEM.

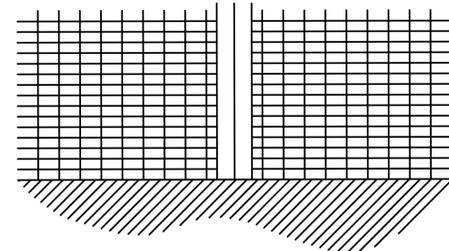
SECURE ENDS OF TUBES WITH STAKES SPACED 18 IN. APART THROUGH TOPS OF TUBES.



PLAN VIEW - JOINING DETAIL

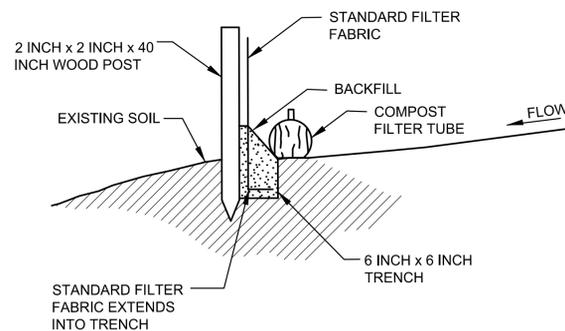
**1 SINGLE COMPOST FILTER TUBE DETAIL**  
SCALE: N.T.S.

- A. BURY THE TOP END OF EXCELSIOR MATTING STRIPS MINIMUM 6 INCHES.
- B. TAMP THE TRENCH FULL OF SOIL. SECURE WITH ROW OF STAPLES, 6 INCH SPACING 4 INCHES DOWN FROM THE TRENCH.
- C. OVERLAP. BURY UPPER END OF LOWER STRIP AS IN 'A' AND 'B'. OVERLAP END OF TOP STRIP 4 INCHES AND STAPLE.
- D. EROSION STOP-FOLD EDGE OF EXCELSIOR MATTING BURIED IN SILT TRENCH AND TAMPED; DOUBLE ROW OF STAPLES.

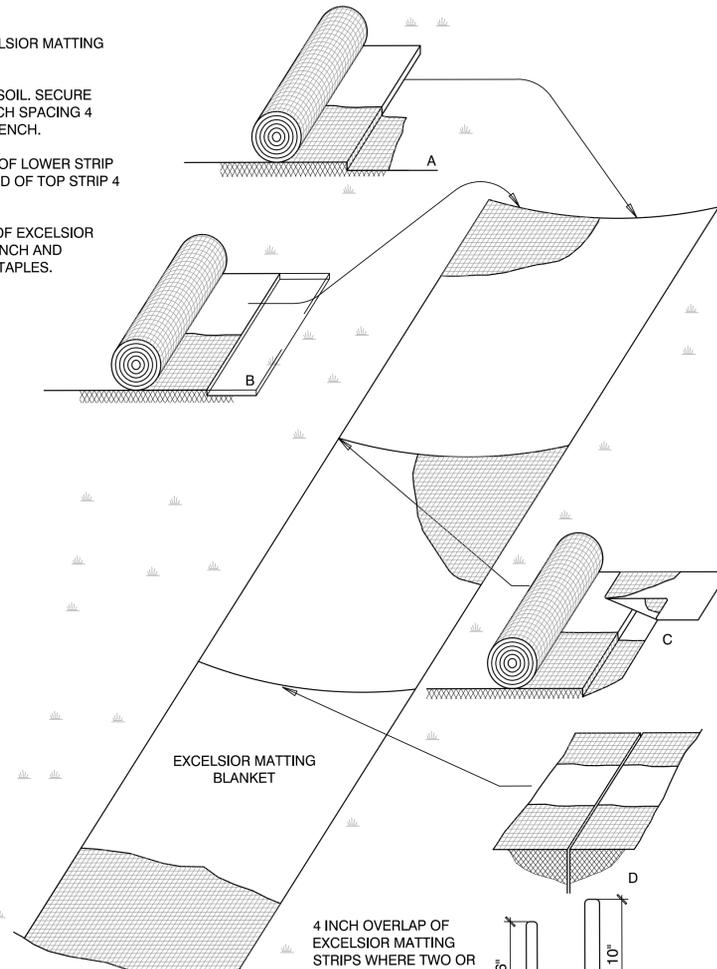


WHEN JOINING TWO OR MORE SILTATION FENCES TIE THE TWO END POSTS TOGETHER WITH NYLON CORD.

DITCH CHECK



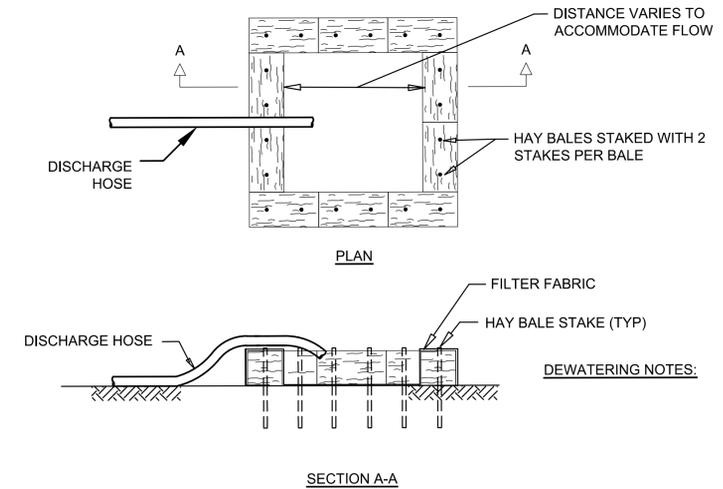
**2 SILT FENCE- EROSION CONTROL**  
SCALE: N.T.S.



NOTE:  
1. EROSION CONTROL BLANKET TO BE USED ON ALL SLOPES GREATER THAN 2.5H:1V AS INDICATED ON GRADING PLANS

STAPLE OUTSIDE EDGE ON 2'-0" CENTERS. TYPICAL STAPLES #8 GAUGE WIRE

**3 EROSION CONTROL BLANKET**  
SCALE: N.T.S.



1. IF NEEDED A DEWATERING PLAN SHALL BE SUBMITTED FOR APPROVAL PRIOR TO CONSTRUCTION ACTIVITIES INVOLVING DEWATERING. A DEWATERING POOL SHALL BE LOCATED ON THE PLANS OR AS REQUIRED BY THE ENGINEER.
2. ALL EROSION CONTROL DEVICES, INCLUDING DEWATERING POOL SHALL BE IN PLACE PRIOR TO COMMENCEMENT OF ANY DEWATERING ACTIVITIES.
3. THE CONTRACTOR SHALL CLEAN AND MAINTAIN THE DEWATERING POOL ON A REGULAR BASIS. SEDIMENTS REMOVED FROM POOL SHALL BE DISPOSED ACCORDING TO DEP GUIDELINES AND ORDER OF CONDITIONS.
4. ANY DEWATERING OPERATIONS DEEMED NECESSARY BY THE CONTRACTOR OR REQUIRED BY THE ENGINEER SHALL BE INCIDENTAL TO THE PROJECT.
5. THE CONTRACTOR SHALL SUBMIT DEWATERING PLANS, DETAILED PUMP SIZING AND ASSOCIATED POOL SIZING TO THE ENGINEER PRIOR TO THE START OF WORK.

**4 DEWATERING DISCHARGE DISPOSAL DETAIL**  
SCALE: N.T.S.

Project:  
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MVP GRANT**

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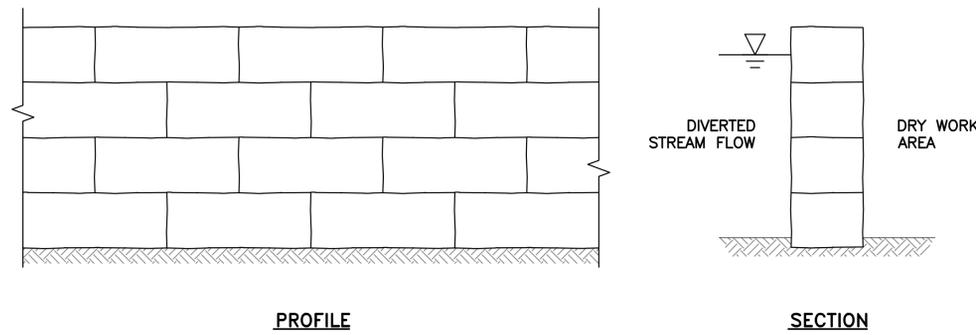
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Approved By: JJP  
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**CONSTRUCTION DETAILS**

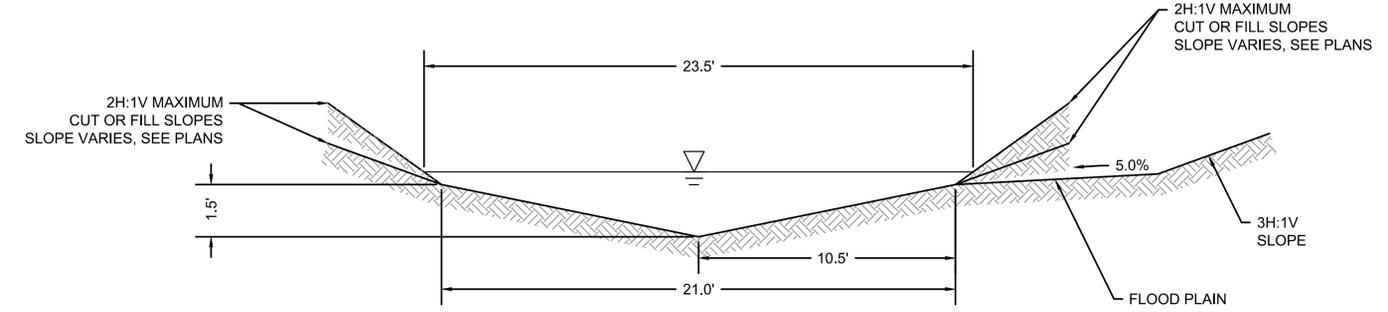
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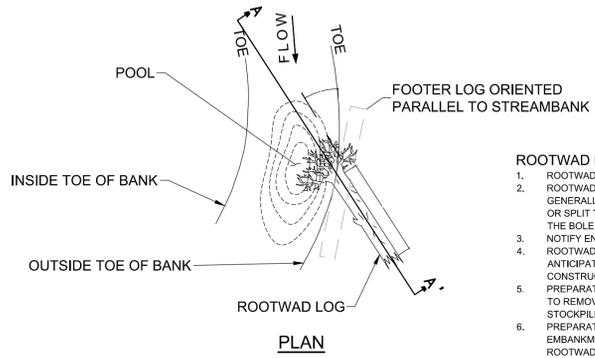
PROFILE

SECTION

1 SAND BAG DAM DETAIL  
SCALE: N.T.S.

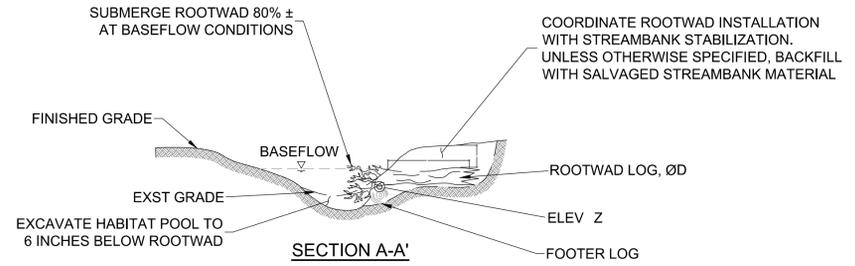


2 TYPICAL CHANNEL CROSS-SECTION  
SCALE: N.T.S.



PLAN

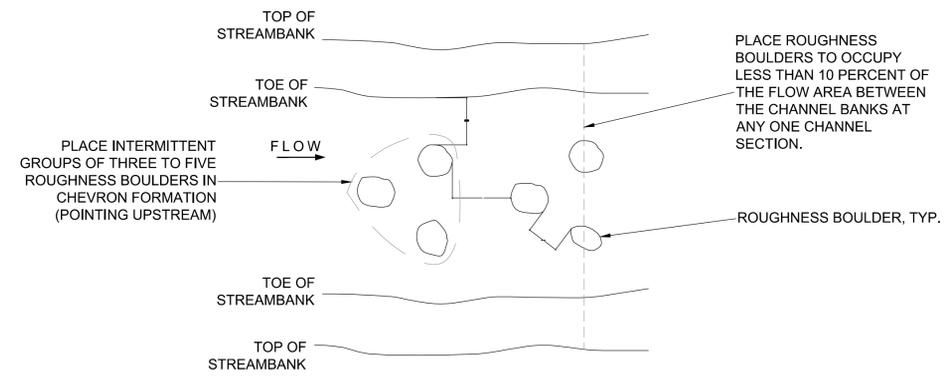
- ROOTWAD NOTES:**
1. ROOTWAD LOGS TO BE GENERATED ON-SITE FROM CLEARED TREES.
  2. ROOTWAD LOG SHALL BE SINGLE-TRUNK LOGS THAT HAVE BEEN LIMBED, ARE GENERALLY PLUMB AND SOUND, AND ARE FREE OF ROT, CHAR, TREATMENT, OR SPLIT TRUNKS. THE ROOTWAD SHALL BE STRONG ENOUGH TO SUPPORT THE BOLE WHEN THE ROOTWAD LOG IS LYING HORIZONTALLY.
  3. NOTIFY ENGINEER SEVEN DAYS IN ADVANCE OF INSTALLING ROOTWADS.
  4. ROOTWAD LOGS ARE NATURAL MATERIALS WITH NATURAL VARIABILITY. ANTICIPATE THAT ADJUSTMENTS TO THE DESIGN WILL BE NECESSARY DURING CONSTRUCTION DUE TO NATURAL VARIABILITY OF MATERIALS.
  5. PREPARATION FOR ROOTWADS IN EXCAVATED MATERIALS: EXCAVATE TRENCH TO REMOVE NATIVE MATERIAL NECESSARY TO PLACE ROOTWAD PER PLAN. STOCKPILE EXCAVATED SUBSTRATE AND TOPSOIL SEPARATELY.
  6. PREPARATION FOR ROOTWADS WITH EMBANKMENTS: CONSTRUCT EMBANKMENT TO AN ELEVATION 1 FOOT ABOVE THE TOP OF PROPOSED ROOTWAD, THEN EXCAVATE TRENCH WITHIN COMPACTED EMBANKMENT TO PLACE ROOTWAD PER PLAN.
  7. BACKFILL OF ROOTWADS: PLACE ROOTWAD AND BACKFILL WITH SPECIFIED MATERIALS IN LIFTS NOT TO EXCEED 12 INCHES. COMPACT LIFTS TO FIRM, UNYIELDING CONDITION TO ACHIEVE MINIMUM BURIAL DEPTH ON PLANS. REPLACE TOPSOIL AT PROPOSED GRADE.



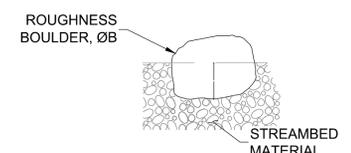
ROOTWAD METRICS

METRIC	DESIGN PARAMETER	DESIGN VALUE	UNIT
A	BOLE LENGTH TO ROOTWAD	MIN. 15.0	FT
B	BURIAL LENGTH	MIN. 12.0	FT
C	BURIAL DEPTH	MIN. 2.5	FT
D	BOLE DIAMETER-AT-BREAST-HEIGHT	9.0 TO 15.0	IN
Z	TOP OF FOOTER LOG ELEVATION	TBD	FT
θ	DEFLECTION ANGLE	20 TO 30	DEG

3 TYPICAL ROOTWAD DETAIL  
SCALE: N.T.S.



TYPICAL LAYOUT



SECTION

**ROUGHNESS BOULDER METRICS**

METRIC	DESIGN PARAMETER	DESIGN VALUE	UNIT
A	BOULDER CLUSTER SPACING	MIN. 10.0	FT
B	MAXIMUM AXIS DIAMETER	0.75 TO 1.5	FT
C	EMBEDMENT DEPTH	0.5 * B; MIN. 0.50	FT

4 TYPICAL ROUGHNESS BOULDER DETAIL  
SCALE: N.T.S.

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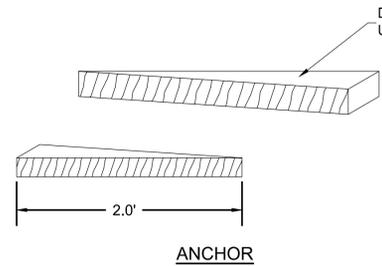
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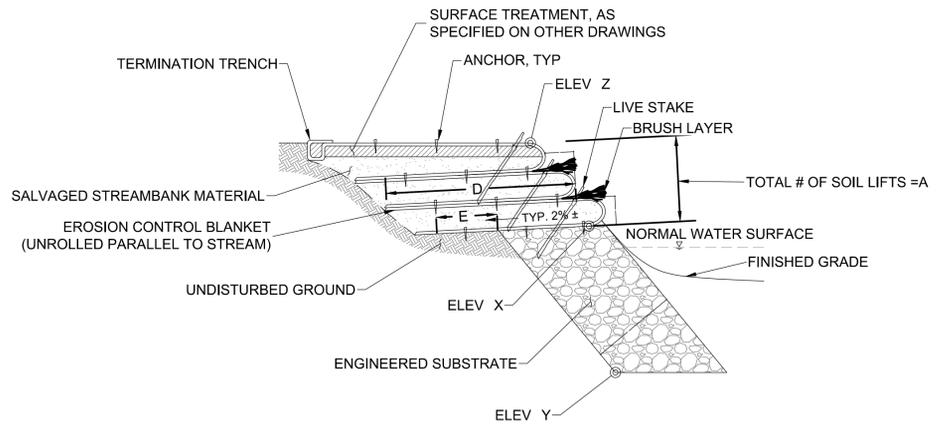
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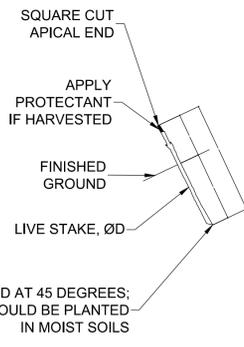
DIAGONALLY-CUT 2"x4" DIMENSIONAL UNTREATED (STUD) LUMBER

- SOIL LIFT NOTES:**
- THIS IS A TYPICAL DETAIL. FOR ILLUSTRATIVE PURPOSES, THE NUMBER OF SOIL LIFTS SHOWN MAY VARY FROM THOSE PROVIDED IN TABLE.
  - SHINGLE ADJACENT ROLLS OF EROSION CONTROL BLANKET MIN. 8 INCHES SUCH THAT THE UPSTREAM ROLL EXTENDS OVER AND PAST THE DOWNSTREAM ROLL.
  - EROSION CONTROL BLANKET: NORTH AMERICAN GREEN ROLL/MAX BIONET C700BN OR APPROVED EQUAL.
  - REVEGETATE SOIL LIFT PER PLANTING PLAN



STATIONING	SOIL LIFT METRICS									
	MATERIAL DIMENSIONS									
	A	B	C	D	E	F	X	Y	Z	
	NUMBER SOIL LIFTS	LIFT THICKNESS (FT)	LIFT OFFSET (FT)	LIFT DEPTH (FT)	ANCHOR SPACING (FT)	TOE THICKNESS (FT)	BOTTOM SOIL LIFT (FT)	BOTTOM TOE (FT)	TOP BANK (FT)	
### TO ### (UPPER REACH)	2	MAX 1.0	3.0	MIN. 6.0	MIN 2.0	TBD	BANKFULL	TBD	EXST TOP OF BANK	
### TO ### (LOWER REACH)	3	MAX 1.0	3.0	MIN. 6.0	MIN 2.0	TBD	BANKFULL	TBD	EXST TOP OF BANK	

**1 SOIL LIFT DETAIL**  
SCALE: N.T.S.

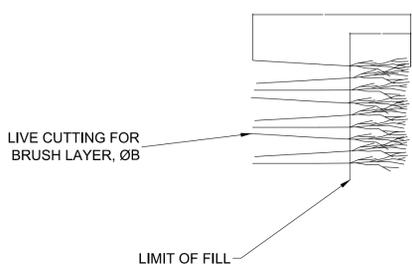


- LIVE STAKES NOTES:**
- PROTECTANT: TREEKOTE™ OR EQUAL APPROVED BY ENGINEER.
  - INSPECT AREA THAT LIVE STAKES WILL BE INSTALLED AND NOTIFY ENGINEER IN WRITING OF ANY UNSATISFACTORY CONDITIONS THAT MAY BE DETRIMENTAL TO THE PROPER AND TIMELY COMPLETION OF WORK, SUCH AS, BUT NOT LIMITED TO, ANTICIPATION THAT THE BASAL ENDS OF LIVE STAKES WILL NOT REACH SATURATED SOILS. DO NOT PROCEED WITH INSTALLATION UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
  - UNLESS WAIVED BY ENGINEER, INSTALL LIVE STAKES IN 150 TO 250 SQUARE FOOT TEST PLOT. OBTAIN ENGINEER APPROVAL OF INSTALLED LIVE STAKES IN TEST PLOT PRIOR TO FURTHER INSTALLATION OF LIVE STAKES.
  - UNLESS OTHERWISE SPECIFIED, MIX LIVE STAKE SPECIES EVENLY.
  - DRIVE BASAL END OF LIVE STAKES INTO FINISHED GROUND USING A DEAD-BLOW HAMMER, STINGER, OR OTHER MEANS THAT PREVENTS DAMAGE TO LIVE STAKE. IF NECESSARY, CREATE A PILOT HOLE USING IRON BAR, ROD, DIBBLE BAR, STINGER, OR EQUIVALENT MEANS, INSTALL LIVE STAKES AT AN ANGLE OF 60 DEGREES TO THE BANK, TITLED TOWARDS THE DOWNSTREAM DIRECTION.
  - FOLLOWING INSTALLATION, HAND TAMP MATERIAL ADJACENT TO LIVE STAKE SO THAT NO VOIDS REMAIN AROUND THE LIVE STAKE.

- LIVE CUTTING MANAGEMENT NOTES:**
- LIVE CUTTINGS ARE FRESHLY CUT, LIVE, WOODY CUTTINGS THAT ARE USED AS MATERIAL FOR DERIVATIVES INCLUDING LIVE STAKES, BRUSH LAYERS, AND FASCINES. THE FOLLOWING NOTES FOR LIVE CUTTINGS APPLY EQUALLY TO ALL LIVE CUTTING DERIVATIVES.
  - SEE SECTION 32 93 01 FOR SPECIFICATIONS REGARDING PROCUREMENT AND HARVESTING OF LIVE CUTTINGS.
  - PROTECT LIVE CUTTINGS FROM DAMAGE, HEAT, SUN, WIND, FREEZING, AND DESICCATION. MAINTAIN LIVE CUTTINGS MOIST, COOL, AND SHADED AT ALL TIMES UNTIL INSTALLED. REPLACE DAMAGED LIVE CUTTINGS AT NO COST TO OWNER.
  - LIVE CUTTING BEST PRACTICES:
    - MANAGE LIVE CUTTINGS IN CONSISTENT GROUPINGS OF APPROXIMATELY 25 TO 50 LIVE CUTTINGS PER BUNDLE WITH APICAL (GROWING) ENDS ARRANGED IN THE SAME DIRECTION. LABEL EACH BUNDLE WITH COMMON NAME, SCIENTIFIC NAME, AND DATE HARVESTED OR DELIVERED TO SITE.
    - STRIP ALL STEMS AND LEAVES, TAKING CARE TO MINIMIZE SCARRING OR BRUISING. SALVAGE TRIMMINGS FOR USE AS SLASH OR DISCARD TRIMMINGS AT END OF EACH WORK DAY.
    - SUBMERGE BASAL END OF LIVE CUTTINGS IN WATER AT ALL TIMES AND FOR A MINIMUM OF 7 DAYS PRIOR TO INSTALLATION. DO NOT SUBMERGE LIVE CUTTINGS LONGER THAN 14 DAYS OR IF ROOTS BEGIN TO SPROUT. DO NOT STORE LIVE CUTTINGS HORIZONTALLY IN WATER. PLANT LIVE CUTTINGS DURING DORMANT SEASON, GENERALLY BETWEEN NOVEMBER 15 AND MARCH 31. DO NOT PLANT LIVE CUTTINGS WHEN THERE IS INSUFFICIENT SOIL MOISTURE OR GROUND IS FROZEN.
    - WATER REGULARLY TO MAINTAIN VIGOROUS GROWTH, PARTICULARLY DURING PERIODS OF DROUGHT, LOW STREAMFLOW, OR LOW PRECIPITATION.
  - LIVE STAKES SHALL EXHIBIT VIGOROUS GROWTH AND BE THOROUGHLY ROOTED ONE YEAR AFTER SUBSTANTIAL COMPLETION.
  - SEE SECTION 32 93 01 FOR MAINTENANCE AND WARRANTY SPECIFICATIONS.

LIVE STAKE SPECIES AND DIMENSIONS						
PLANT SPECIES		MATERIAL DIMENSIONS				EST. QUANTITY
COMMON NAME	SCIENTIFIC NAME	A	B	C	D	
		TOTAL LENGTH (FT)	EXPOSED LENGTH (FT)	BURIED LENGTH (FT)	BASAL DIAMETER (IN)	SPACING (FT)
Sandbar Willow	<i>Salix exigua ssp. interior</i>	MIN. 3.0	MAX. 1.0	MIN 2/3 TOTAL LENGTH	0.75 to 1.5	4.0 ON-CENTER
Silky Willow	<i>Salix sericea</i>	MIN. 3.0	MAX. 1.0	MIN 2/3 TOTAL LENGTH	0.75 to 1.5	4.0 ON-CENTER
Silky Dogwood	<i>Cornus amomum</i>	MIN. 3.0	MAX. 1.0	MIN 2/3 TOTAL LENGTH	0.75 to 1.5	4.0 ON-CENTER
Red Elderberry	<i>Sambucus racemosa</i>	MIN. 3.0	MAX. 1.0	MIN 2/3 TOTAL LENGTH	0.75 to 1.5	4.0 ON-CENTER
Arrowwood	<i>Viburnum dentatum</i>	MIN. 3.0	MAX. 1.0	MIN 2/3 TOTAL LENGTH	0.75 to 1.5	4.0 ON-CENTER

**2 LIVE STAKE DETAIL**  
SCALE: N.T.S.



- BRUSH LAYER NOTES:**
- PROTECT LIVE CUTTINGS FROM DAMAGE, HEAT, SUN, WIND, FREEZING, AND DESICCATION. MAINTAIN LIVE CUTTING MOIST, COOL, AND SHADED AT ALL TIMES UNTIL INSTALLED.
  - SUBMERGE BASAL END OF LIVE CUTTING IN WATER AT ALL TIMES, BUT NO LONGER THAN 14 DAYS OR IF ROOTS BEGIN TO SPROUT. DO NOT STORE LIVE CUTTING HORIZONTALLY IN WATER.
  - INSTALL LIVE CUTTINGS DURING DORMANT SEASON, GENERALLY BETWEEN NOVEMBER 15 AND MARCH 31.
  - UNLESS OTHERWISE SPECIFIED, MIX BRUSH LAYER SPECIES EVENLY.
  - PLACE LIVE CUTTINGS IN PREPARED TRENCH WITH BASAL END OF LIVE CUTTINGS ORIENTED INTO THE SLOPE.
  - BACKFILL TWO INCHES AND TAMP TO CREATE GOOD STEM-TO-SOIL CONTACT THROUGHOUT BRUSH LAYER BEFORE CONTINUING TO BACKFILL.

BRUSH LAYER LIVE CUTTING SPECIES AND DIMENSIONS					
PLANT SPECIES		MATERIAL DIMENSIONS			EST. QUANTITY
COMMON NAME	SCIENTIFIC NAME	A	B	C	
		TOTAL LENGTH (FT)	EXPOSED LENGTH (FT)	BASAL DIAMETER (IN)	
Sandbar Willow	<i>Salix exigua ssp. interior</i>	MIN. 3.0	MAX. 0.5	0.25 TO 1.0	
Silky Willow	<i>Salix sericea</i>	MIN. 3.0	MAX. 0.5	0.25 TO 1.0	
Silky Dogwood	<i>Cornus amomum</i>	MIN. 3.0	MAX. 0.5	0.25 TO 1.0	
Red Elderberry	<i>Sambucus racemosa</i>	MIN. 3.0	MAX. 0.5	0.25 TO 1.0	
Arrowwood	<i>Viburnum dentatum</i>	MIN. 3.0	MAX. 0.5	0.25 TO 1.0	

**1 BRUSH LAYER DETAIL**  
SCALE: N.T.S.

Project:

**HORN POND BROOK STREAM RESTORATION MVP GRANT**

**CITY OF WOBURN**  
10 COMMON STREET  
WOBURN, MA 01801

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Consultants:

Revisions:

No.	Date	Description

COA:  
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