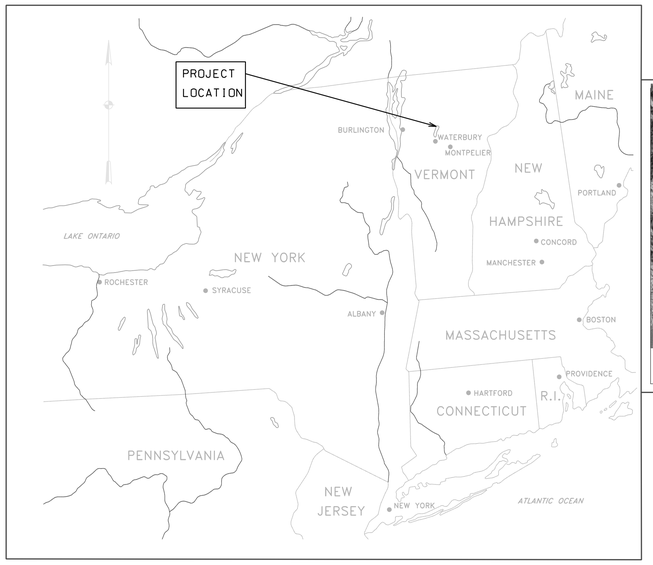
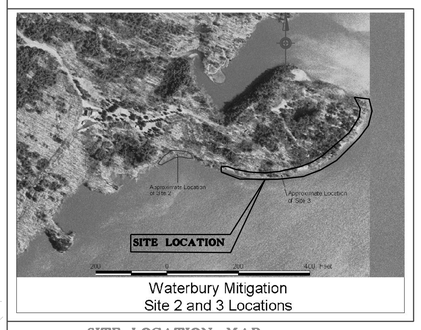
WATERBURY DAM SEEPAGE CONTROL REHABILITATION PROJECT MITIGATION SITE 3
WATERBURY RESERVOIR, WATERBURY, VT

CONSTRUCTION CONTRACT NO.
W912DS-05-B-0013

U.S. ARMY CORPS OF ENGINEERS
NEW YORK DISTRICT
NEW YORK, NEW YORK



VICINITY MAP
N.T.S.



Waterbury Mitigation
Site 2 and 3 Locations

SITE LOCATION MAP
N.T.S.

DRAWING INDEX

SHEET NO.	SHEET REFERENCE NUMBER:	TITLE
1	CC-WAT-00	COVER SHEET AND DRAWING INDEX
2	CC-WAT-01	EXISTING CONDITIONS PLAN
3	CC-WAT-02	EXISTING CONDITIONS CROSS-SECTIONS
4	CC-WAT-03	CONSTRUCTION PLAN
5	CC-WAT-04	GRAGING PLAN
6	CC-WAT-05	FINAL GRADE CROSS-SECTIONS
7	CC-WAT-06	BIOSTABLIZATION AREA CROSS-SECTIONS
8	CC-WAT-07	TYPICAL CROSS-SECTION
9	CC-WAT-08	PLANTING PLAN
10	CC-WAT-09	EROSION PREVENTION AND SEDIMENT CONTROL PLAN
11	CC-WAT-10	EROSION PREVENTION AND SEDIMENT CONTROL PLAN DETAIL
12	CC-WAT-11	DETAIL

US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT – MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

COVER SHEET AND DRAWING INDEX

Sheet reference number
CC-WAT-00
Sheet 1 of 12

TEMPORARY BENCH MARK TABLE		
TBM#	ELEV (FT.)	DESC.
1	574.29	CHISLED "X" IN LEDGE
2	640.42	SPIKE IN ROOT 16" HEMLOCK
3	644.73	S.I.R. 36" WHITE PINE
4	644.75	S.I.R. 12" WHITE BIRCH
5	644.20	SPIKE IN TREE 14" WHITE PINE
6	618.98	S.I.T. 14" WHITE BIRCH

NOTE:
DATUM BASED ON BRASS PLUG CEMENTED INTO CONCRETE STEP OF GATEHOUSE ELEVATION 634.10

FLAG LOCATION TABLE

FLAG NO.	NORTHING	EASTING	ELEV
6	209953.5172	4794420.6619	647.42
7	209958.6872	479437.2719	655.49
9	210037.8872	479773.9319	635.18
10	210079.3872	479811.9919	644.81
11	210075.2172	479830.3219	640.22
12	210175.8472	479976.2119	642.94
13	210197.8772	479998.5719	642.02
14	210226.5601	480042.0431	625.23
16	210278.2631	480089.8507	615.67
17	210291.4377	480092.9157	617.63
18	210315.2205	480142.6325	602.37
19	210297.5816	480137.7110	589.04
21	210121.8570	479981.5082	607.56
22	210071.4572	479914.1819	594.77
23	209995.3772	479773.5619	595.88
24A	209903.5972	479489.2019	592.19

NOTES:
1. STATION COORDINATES WERE OBTAINED USING A TRIMBLE MODEL 4800 GPS SURVEYING SYSTEM CORRECTED VCAP VT CORS.
2. HORIZONTAL SURVEY IS BASED IN NAD83 VT STATE PLANES U.S. FOOT.
3. VERTICAL SURVEY IS BASED ON N.G.V.D 1929 DATUM.

40 20 0 40 80FT
SCALE: 1"= 40'

US Army Corps of Engineers
New York District

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT - MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

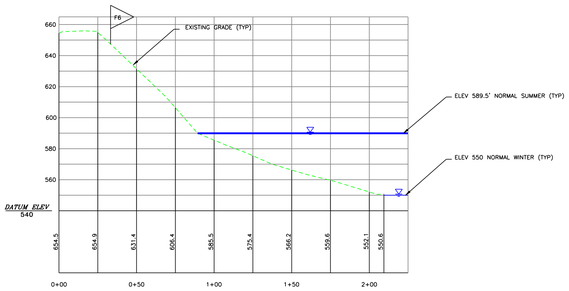
EXISTING CONDITIONS PLAN

Sheet reference number
CC-WAT-01
Sheet 2 of 12

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: S.SEBASKIE, CONTRACT
Drawn by: BB
Reviewed by: MURT. ODY
Submitted by:
Date: 01 APR 2005
Contract No.: DACW51-03
Drawing code: CC-WAT-01
Plot Date: Surveyor: Bethany Bemrose
Scale: AS SHOWN

CC-WAT-01 - Existing Plan.dgn 03/31/2005 02:14:35 PM



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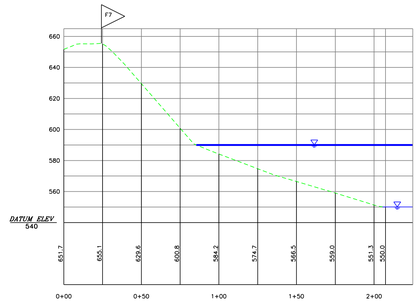

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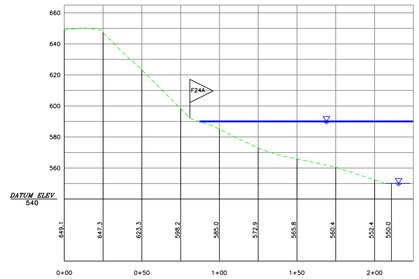

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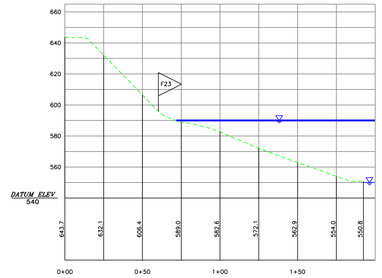

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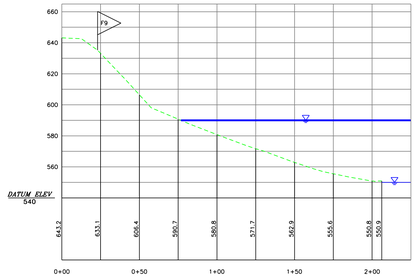

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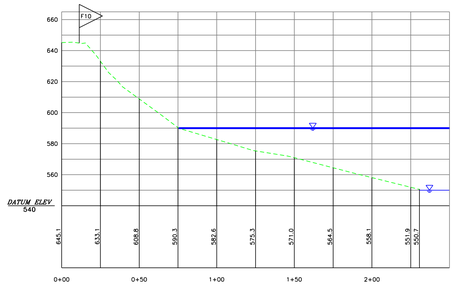

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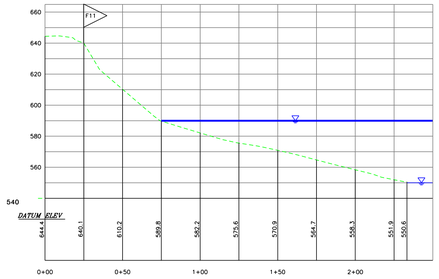

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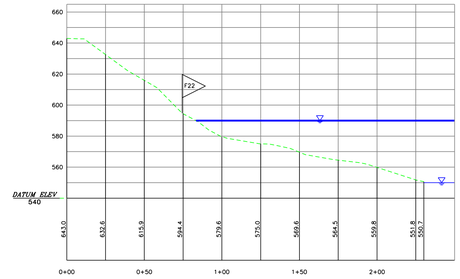

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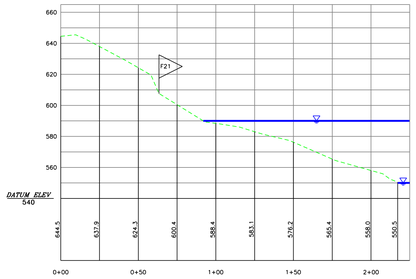

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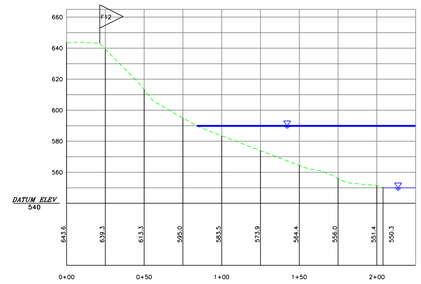

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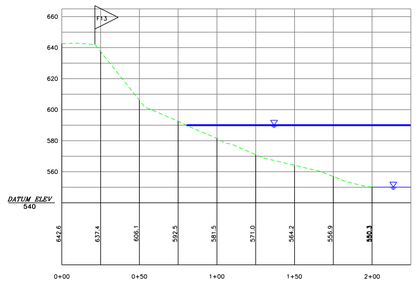

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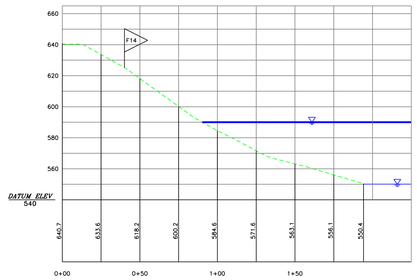

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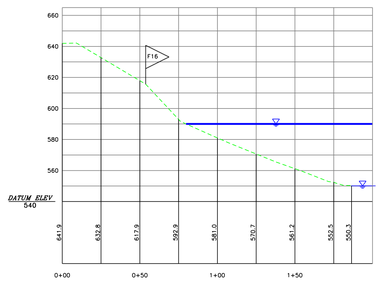

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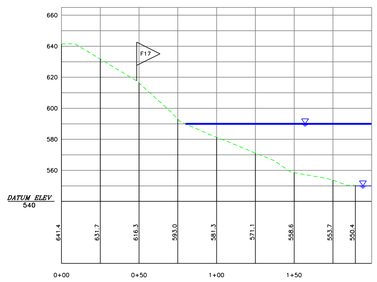

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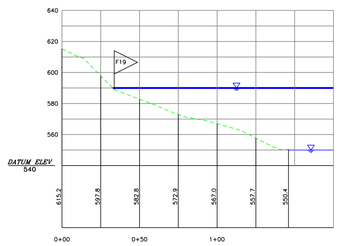

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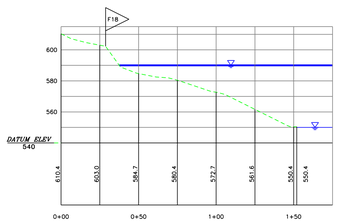


FLAG 18

40 20 0 40 80FT

SCALE: 1"= 40'

US Army Corps of Engineers
New York District

Issue	Date

Date: 07 APR 2005
Drawing no.
Revision no.
Drawing scale

Designed by: B. SABAUSKIE, CONTRACT
Drawn by: BB
Checked by: JRD
Reviewed by: MARY GAFF
Submitted by:
Approved by: Anthony Swanson
Date: 07 APR 2005

U.S. ARMY ENGINEER DISTRICT
CONSTRUCTION DIVISION
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REPAIR, EVALUATION, AND MODIFICATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

EXISTING CONDITIONS CROSS-SECTIONS

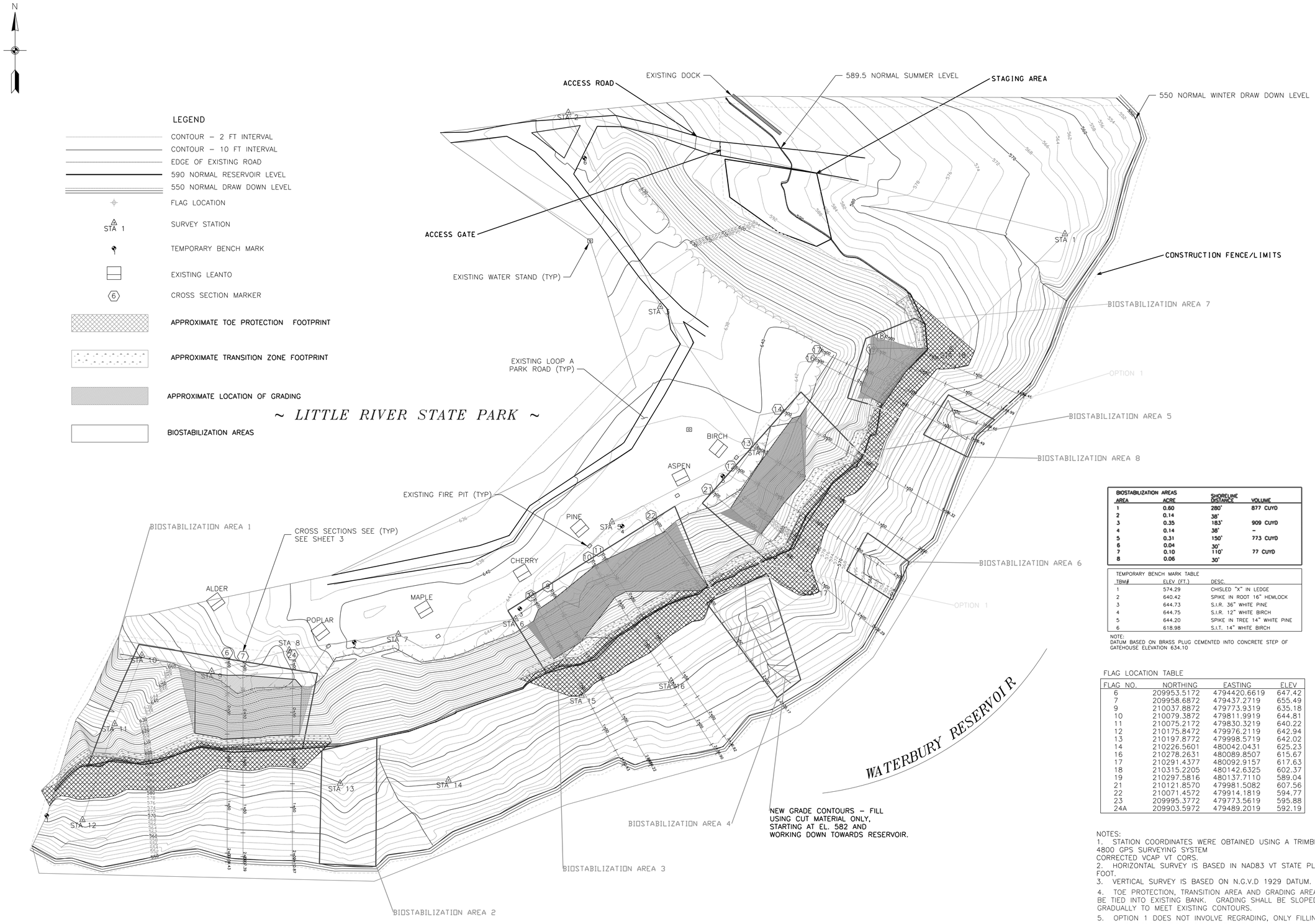
Sheet reference number

CC-WAT-02

Sheet 3 of 12

Plot Date: 30-MAR-1917 Hour:
FILE NAME
Submittal Dir: USERNAME

CC-WAT-02 - Existing CS.dgn 03/31/2005 02:17:37 PM



BIOSTABILIZATION AREAS			
AREA	ACRE	SHORELINE DISTANCE	VOLUME
1	0.60	280'	877 CUYD
2	0.14	38'	
3	0.35	183'	909 CUYD
4	0.14	38'	–
5	0.31	150'	773 CUYD
6	0.04	30'	
7	0.10	110'	77 CUYD
8	0.06	30'	

TEMPORARY BENCH MARK TABLE

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NOTES:
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2. HORIZONTAL SURVEY IS BASED IN NAD83 VT STATE PLANES U.S. FOOT.
3. VERTICAL SURVEY IS BASED ON N.G.V.D 1929 DATUM.
4. TOE PROTECTION, TRANSITION AREA AND GRADING AREA SHALL BE TIED INTO EXISTING BANK. GRADING SHALL BE SLOPED GRADUALLY TO MEET EXISTING CONTOURS.
5. OPTION 1 DOES NOT INVOLVE REGRADING, ONLY FILLING.
6. IN BIOSTABILIZATION AREA 2, FILL THE AREA USING CUT MATERIAL ONLY, STARTING AT EL. 590 AND WORKING DOWN TOWARDS THE RESERVOIR. FINAL CONTOURS SHALL BE PARALLEL TO THE RESERVOIR SHORELINE.
7. IN BIOSTABILIZATION AREA 6 AND 8, FILL THE AREA USING CUT MATERIAL ONLY, STARTING AT EL. 566 AND WORKING DOWN TOWARDS THE RESERVOIR. FINAL CONTOURS SHALL BE PARALLEL TO THE RESERVOIR SHORELINE.

40 20 0 40 80FT
SCALE: 1"= 40'

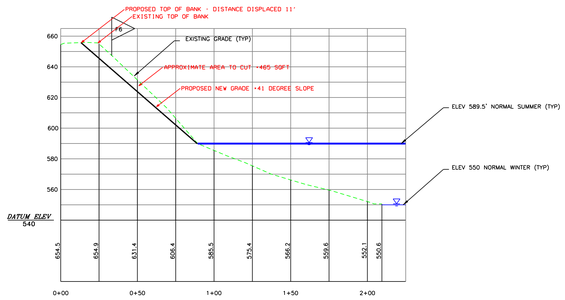
US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT - MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

GRADING PLAN

Sheet reference number
CC-WAT-04
Sheet 5 of 12



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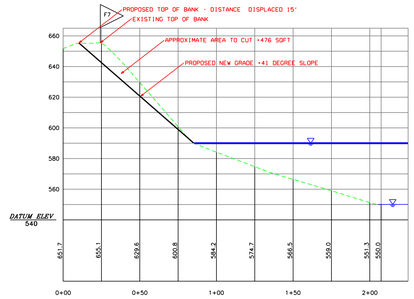

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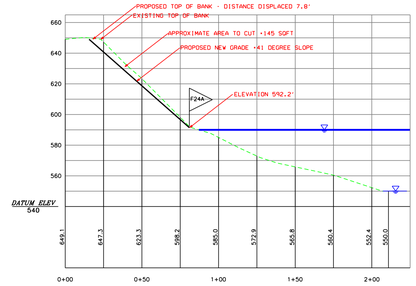

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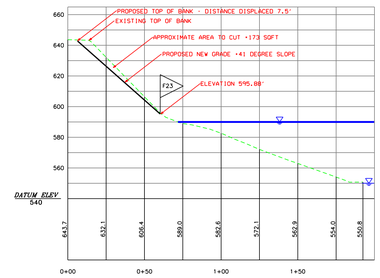

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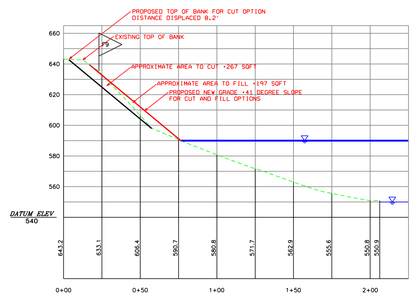

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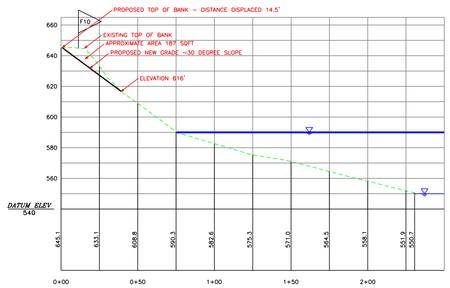

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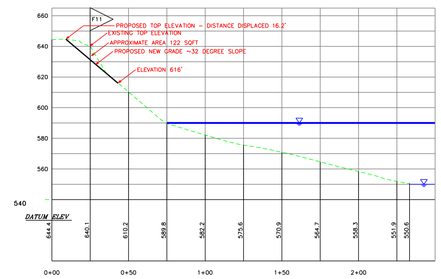

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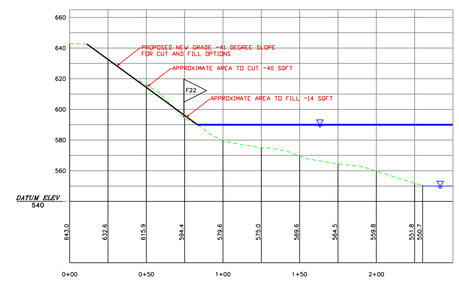

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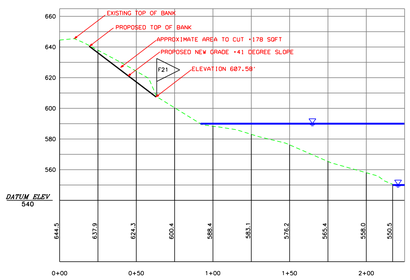

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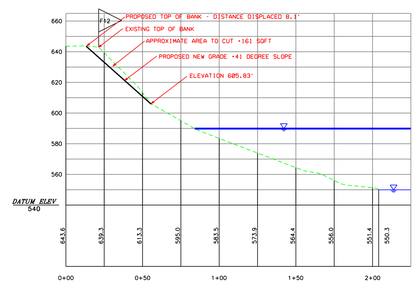

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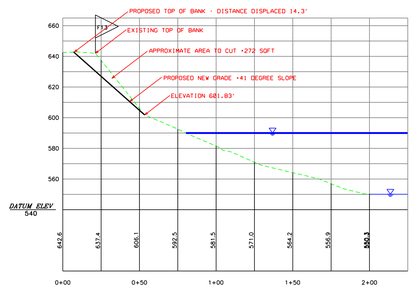

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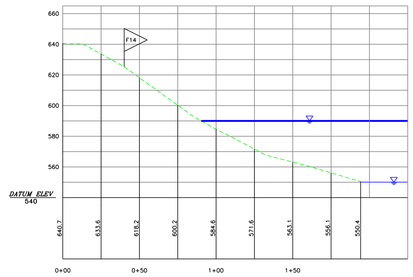

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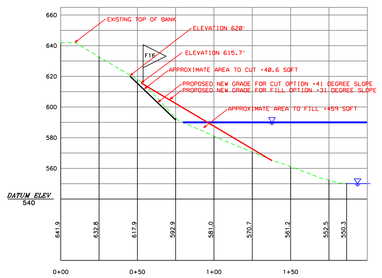

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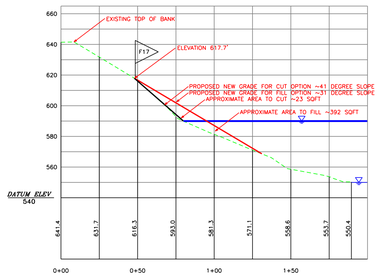

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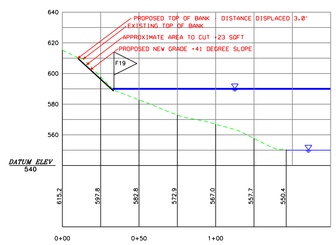

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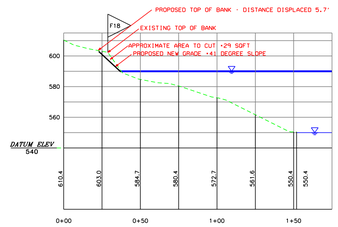


FLAG 18

40 20 0 40 80FT
SCALE: 1"= 40'

US Army Corps of Engineers
New York District

Date	Description

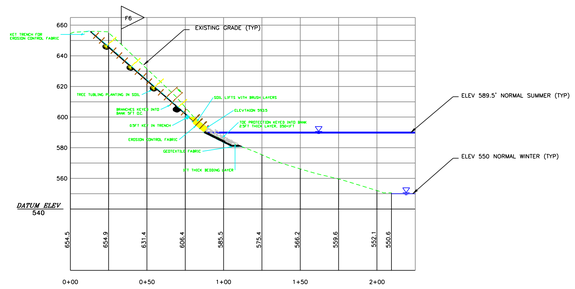
Date: 01 APR 2005
Drawing file no: CC-WAT-05
Drawing code:
Designed by: S.SEASHOLES, CONCEPTS
Checked by: HEC
Drawn by: BR
Reviewed by: M.TRY, MATT GOFF
Submitted by:
Project Manager: Salvatore Bermudez
Date: 03/30/2005

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT MITIGATION
WINOOSKI RIVER/WATERBURY RESERVOIR, WATERBURY, VERMONT

FINAL GRADE CROSS-SECTIONS

Sheet reference number
CC-WAT-05
Sheet 6 of 12



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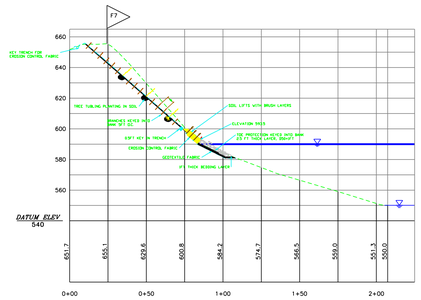

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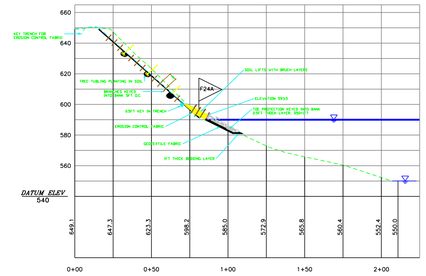

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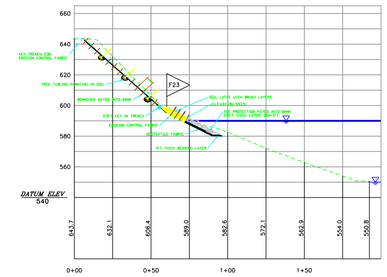

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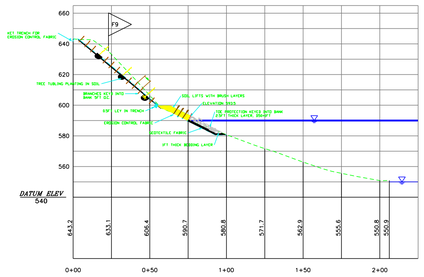

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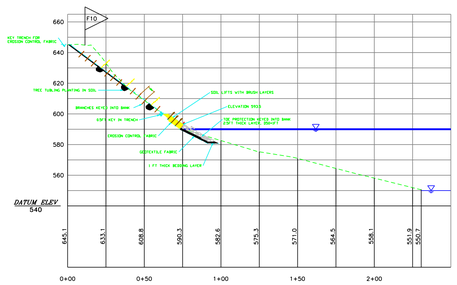

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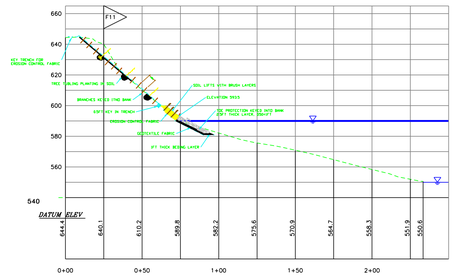

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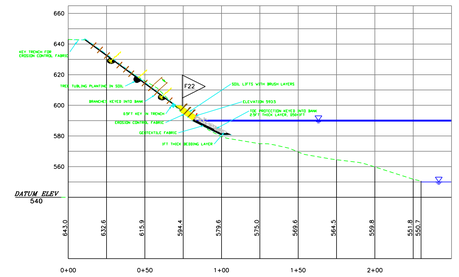

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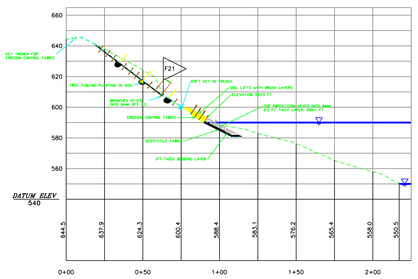

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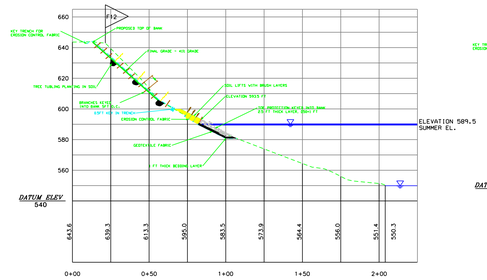

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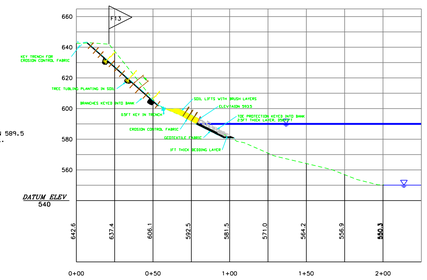

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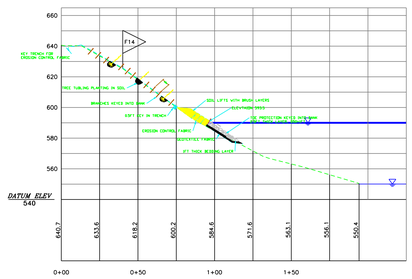

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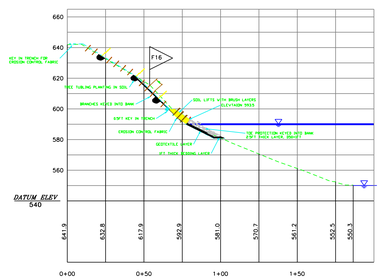

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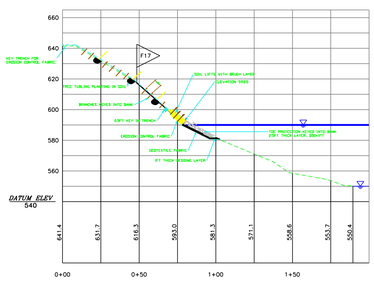

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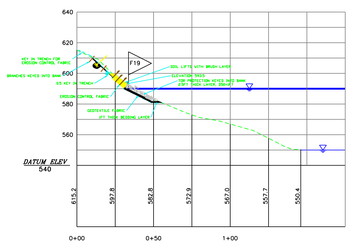

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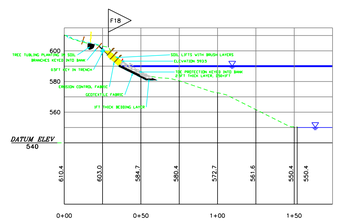


FLAG 18

40 20 0 40 80FT

SCALE: 1"= 40'

US Army Corps of Engineers
New York District

Date	Rev.

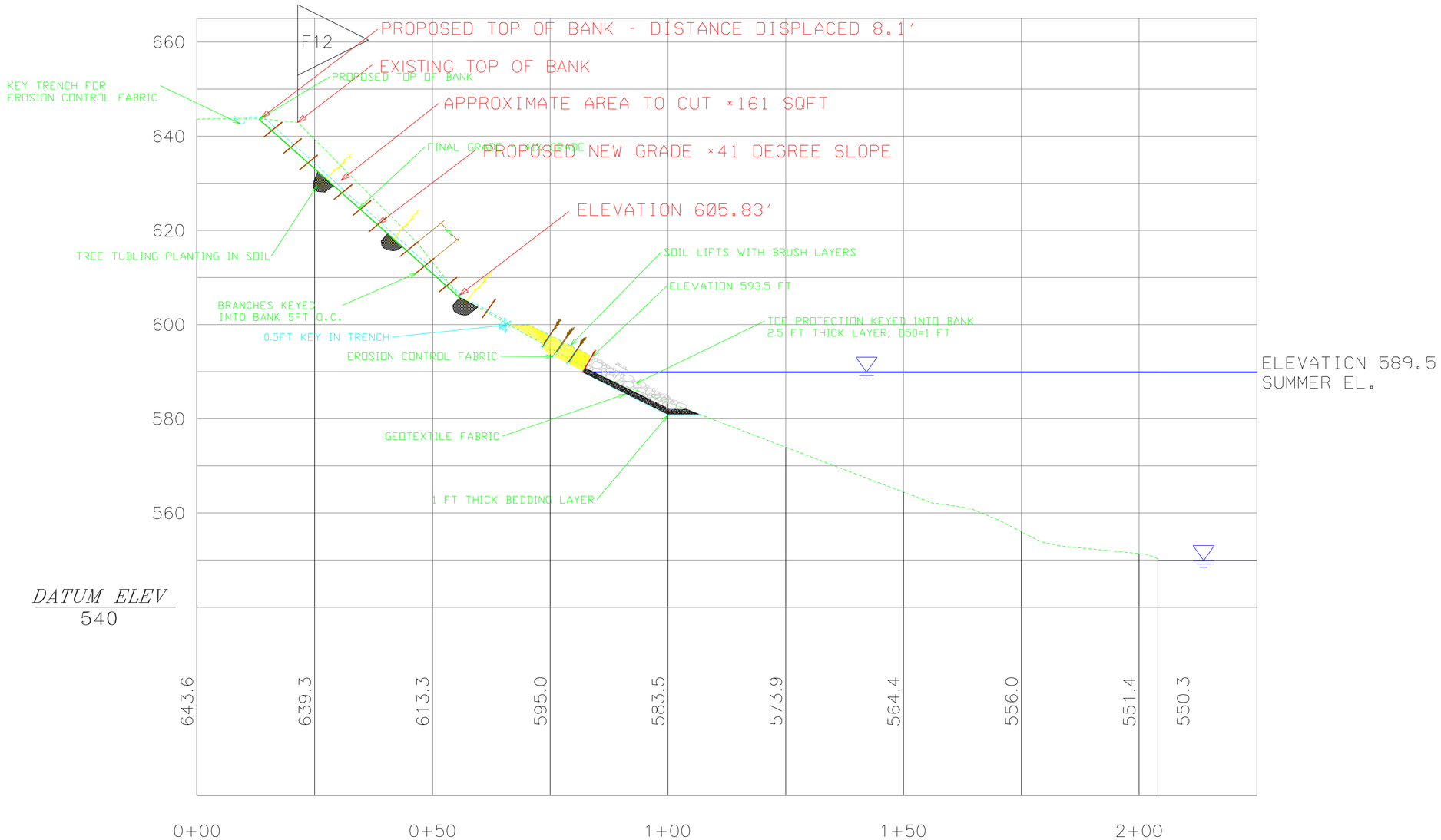
Designed by: B. SCANDREK, CONSULTANT
Drawn by: BB
CAD by: BB
Checked by: MATTY KOPP
Submitted by:
Date: 01 APR 2005
Drawing to no. existing scale
Approved: Bernard Bennecke
Date: 03.03.2005

U.S. ARMY ENGINEER DISTRICT
CONSTRUCTION DIVISION
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT - MITIGATION
WINTERBURN RESERVOIR, WATERBURY, VERMONT

BIOSTABILIZATION AREAS
CROSS-SECTIONS

Sheet reference number
CC-WAT-06
Sheet 7 of 12



FLAG 12

10 5 0 10 20FT
VERTICAL SCALE: 1"= 10'

US Army Corps of Engineers
New York District

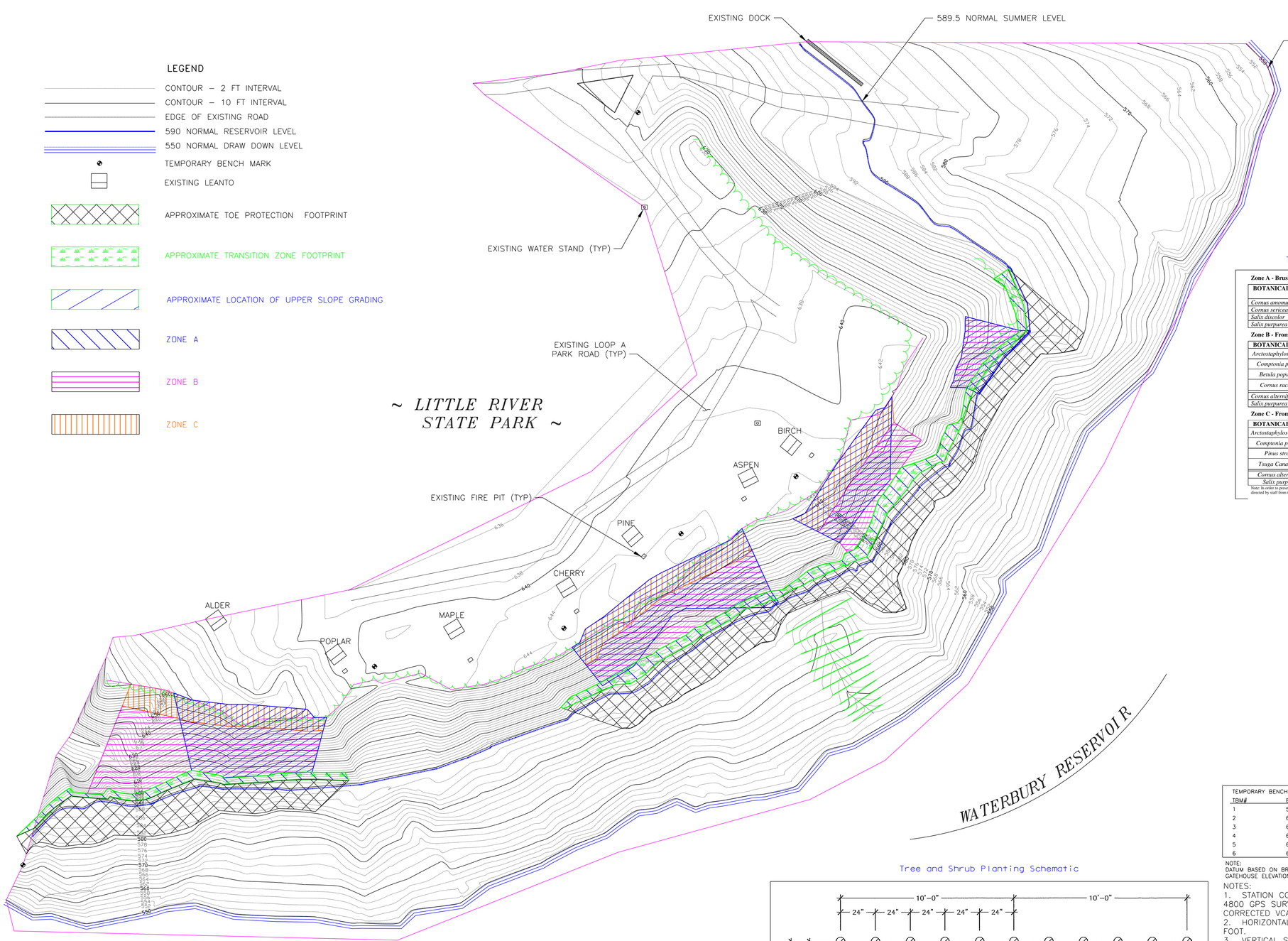
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT - MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

TYPICAL CROSS-SECTION

Sheet reference number
CC-WAT-07
Sheet 8 of 12

CC-WAT-07 - Typ CS.dgn 03/31/2005 03:11:53 PM



LEGEND

- CONTOUR – 2 FT INTERVAL
- CONTOUR – 10 FT INTERVAL
- EDGE OF EXISTING ROAD
- 590 NORMAL RESERVOIR LEVEL
- 550 NORMAL DRAW DOWN LEVEL
- TEMPORARY BENCH MARK
- EXISTING LEANTO
- APPROXIMATE TOE PROTECTION FOOTPRINT
- APPROXIMATE TRANSITION ZONE FOOTPRINT
- APPROXIMATE LOCATION OF UPPER SLOPE GRADING
- ZONE A
- ZONE B
- ZONE C

Tree and Shrub Species and Planting Zones

Zone A - Brush Layer Material

BOTANICAL NAME	COMMON NAME	STOCK-TYPE	CALIPER	SIZE	QUANTITY
Cornus amomum	Silky dogwood	Cuttings	¼ - 2"	3-7 ft length	1,810
Cornus sericea	Red osier dogwood				1,810
Salix discolor	Pussy willow				1,810
Salix purpurea	Purple osier willow				1,810

Zone B - From Top of Transition Area to Bottom of Zone C

BOTANICAL NAME	COMMON NAME	STOCK-TYPE	QUANTITY
Arctostaphylos uva-ursi	Bearberry	Container stock: 2 quart to 1 gallon	110
Comptonia peregria	Sweetfern		140
Betula populifolia	Gray birch	Tubelings: 6-24" in length Bareroot: 12-24" Container stock: 18-26" in 1-3 gallon containers	65
Cornus racemosa	Gray dogwood		250
Cornus alternifolia	Alternate leaf dogwood	Live Stake	845
Salix purpurea	Purple osier willow		845

Zone C - From Top of Slope Extending 20 Feet Downslope

BOTANICAL NAME	COMMON NAME	STOCK-TYPE	QUANTITY
Arctostaphylos uva- ursi	Bearberry	Container stock: 2 quart to 1 gallon	80
Comptonia peregria	Sweetfern		75
Pinus strobes	White pine	Tubelings: 6-24" in length Bareroot: 12-24" Container stock: 18-26" in 1-3 gallon containers	70
Tsuga Canadensis	Eastern hemlock		30
Cornus alternifolia	Alternate leaf dogwood	Live Stakes	380
Salix purpurea	Purple osier willow		380

Note: In order to preserve the viewscape of the Cherry, Pine, Aspen and Birch campsites, tree species shall be planted outside the campsites line of view of the reservoir or as directed by staff from the Vermont Agency of Natural Resources, Department of Forest, Parks and Recreation.

Seed Mixes

Botanical Name (Common Name)	Seeding Rate
TEMPORARY SEED	
Lolium multiflorum (Annual Ryegrass)	40 lbs/acre
PERMANENT SEED MIX	
Lolium multiflorum (Annual Ryegrass)	20 lbs/acre
Festuca arundinacea (Tall Fescue)	15 lbs/acre
Festuca rubra (Creeping Red Fescue)	10 lbs/acre
Lotus corniculatus (Birdsfoot Trefoil)	8 lbs/acre
Lathyrus sylvestris (Flatpea)	10 lbs/acre
Andropogon gerardi (Big Bluestem)	5 lb/acre
Lespedeza capitata (Round Headed Bush Clover)	1 lb/acre
Solidago juncea (Early Goldenrod)	1 lb/acre

TEMPORARY BENCH MARK TABLE

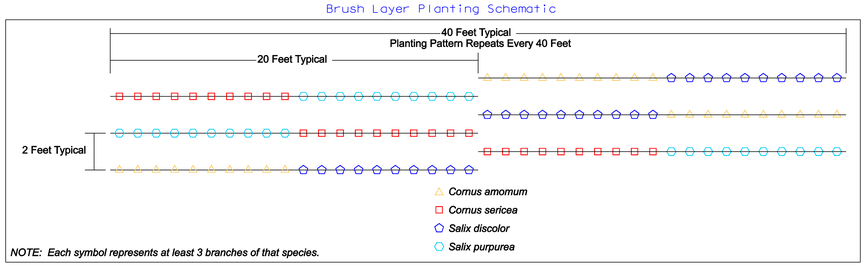
TBM#	ELEV (FT.)	DESC.
1	574.29	CHISLED "X" IN LEDGE
2	640.42	SPIKE IN ROOT 16" HEMLOCK
3	644.73	S.I.R. 36" WHITE PINE
4	644.75	S.I.R. 12" WHITE BIRCH
5	644.20	SPIKE IN TREE 14" WHITE PINE
6	618.98	S.I.T. 14" WHITE BIRCH

NOTE:
DATUM BASED ON BRASS PLUG CEMENTED INTO CONCRETE STEP OF GATEHOUSE ELEVATION 634.10

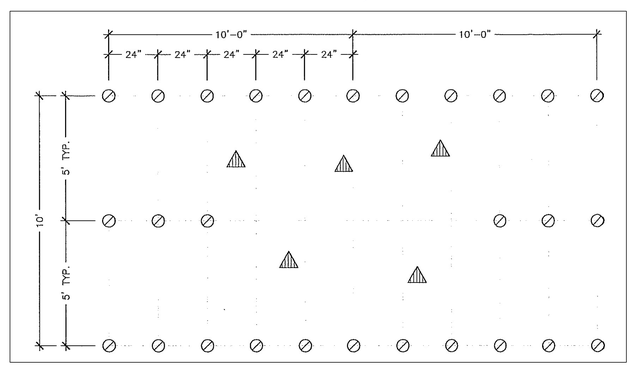
NOTES:

1. STATION COORDINATES WERE OBTAINED USING A TRIMBLE MODEL 4800 GPS SURVEYING SYSTEM CORRECTED VCAP VT CORS.
2. HORIZONTAL SURVEY IS BASED IN NAD83 VT STATE PLANES U.S. FOOT.
3. VERTICAL SURVEY IS BASED ON N.G.V.D 1929 DATUM.
4. TOE PROTECTION, TRANSITION AREA AND GRADING AREA SHALL BE TIED INTO EXISTING BANK. GRADING SHALL BE SLOPED GRADUALLY TO MEET EXISTING CONTOURS.

Brush Layer Planting Schematic



Tree and Shrub Planting Schematic



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SCALE: 1" = 40'

US Army Corps of Engineers
New York District

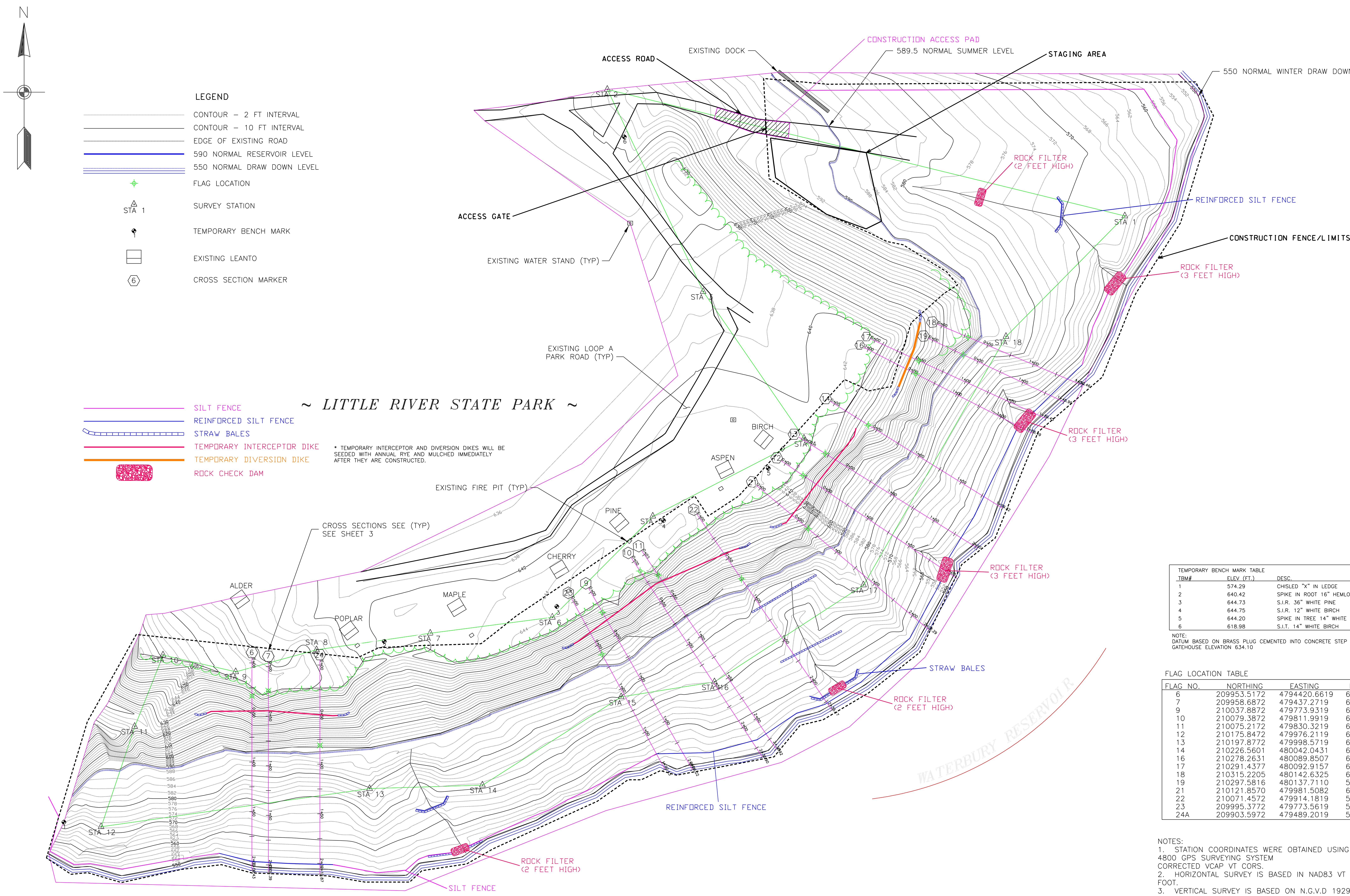
Date: 14 Feb 2005
Drawing file no.
Drawing code:
Drawn by: J.C.GIBLER, A.GOODWIN
Checked by: JC
Approved by: Bethany Seymore
Submitted by:
Project Engineer: Bethany Seymore
Project Manager:

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT – MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

PLANTING PLAN

Sheet reference number
CC-WAT-08
Sheet 9 of 12



TEMPORARY BENCH MARK TABLE

TBM#	ELEV (FT.)	DESC.
1	574.29	CHISLED "X" IN LEDGE
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6	618.98	S.I.T. 14" WHITE BIRCH

NOTE:
DATUM BASED ON BRASS PLUG CEMENTED INTO CONCRETE STEP OF GATEHOUSE ELEVATION 634.10

FLAG LOCATION TABLE

FLAG NO.	NORTHING	EASTING	ELEV
6	209953.5172	4794420.6619	647.42
7	209958.6872	479437.2719	655.49
9	210037.8872	479773.9319	635.18
10	210079.3872	479811.9919	644.81
11	210075.2172	479830.3219	640.22
12	210175.8472	479976.2119	642.94
13	210197.8772	479998.5719	642.02
14	210226.5601	480042.0431	625.23
16	210278.2631	480089.8507	615.67
17	210291.4377	480092.9157	617.63
18	210315.2205	480142.6325	602.37
19	210297.5816	480137.7110	589.04
21	210121.8570	479981.5082	607.56
22	210071.4572	479914.1819	594.77
23	209995.3772	479773.5619	595.88
24A	209903.5972	479489.2019	592.19

NOTES:
1. STATION COORDINATES WERE OBTAINED USING A TRIMBLE MODEL 4800 GPS SURVEYING SYSTEM CORRECTED VCAP VT CORS.
2. HORIZONTAL SURVEY IS BASED IN NAD83 VT STATE PLANES U.S. FOOT.
3. VERTICAL SURVEY IS BASED ON N.G.V.D 1929 DATUM.
4. CLEARING AND GRUBBING SHALL OCCUR IN DESIGNATED BIOSTABILIZATION AREAS 1, 3, 4, 5, AND 7 ONLY.

40 20 0 40 80FT
SCALE: 1"= 40'

US Army Corps of Engineers
New York District

Date: 01 APR 2005
Drawing file no.: CC-WAT-09
Designed by: C. CABLE/M. GOODWIN
Dwn by: CJC
Ckd by: JRT
Reviewed by: MARTY GOFF
Plot by: Bethany Bearmore
Scale: AS SHOWN

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT – MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

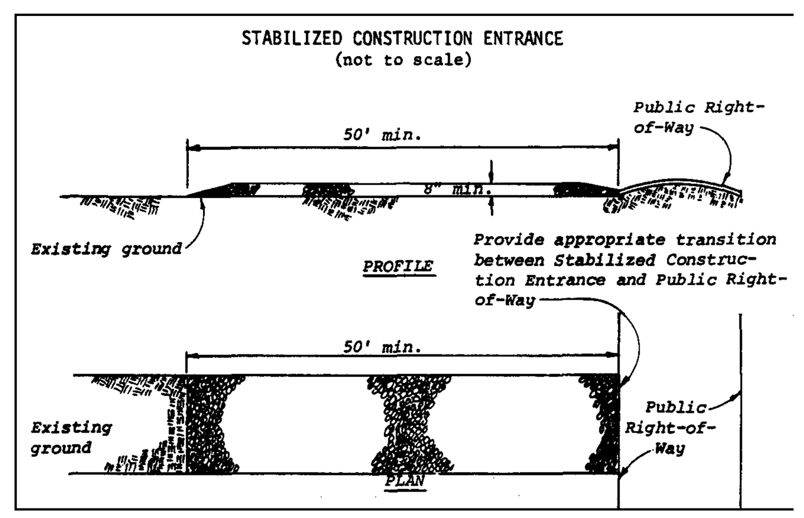
EROSION PREVENTION AND SEDIMENT CONTROL PLAN

Sheet reference number
CC-WAT-09

CC-WAT-09 - Erosion Control.dgn 04/04/2005 08:04:34 AM

STABILIZED CONSTRUCTION ENTRANCE (USACE BMP-1)

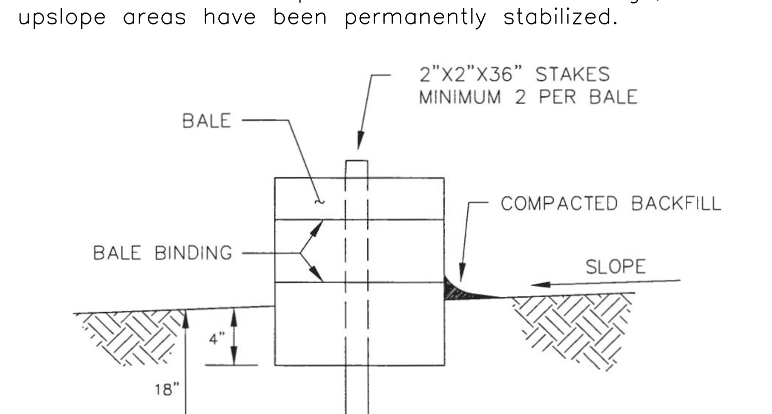
1. Coarse aggregate 2 to 3 inch stone shall be used.
2. Length shall be 50 to 75 feet.
3. Thickness shall be 8 to 12 inches.
4. Width shall be a minimum of 20 feet but not be less than full width of all points of ingress and egress and shall be such as to allow two vehicles to pass.
5. The area of the entrance must be excavated a minimum of 3 inches and must be cleared of all vegetation, roots, and other objectionable material. The filter fabric underliner will then be placed the full width and length of the entrance. The filter cloth utilized shall be a woven or non-woven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals and hydrocarbons, and be mildew and rot resistant.
6. Following the installation of the filter cloth, the stone shall be placed to the specified dimensions.
7. Washing. When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public right-of-way. When washing is required, it shall be done on an area stabilized with crushed stone, which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse through use of sand bags, gravel, boards, or other approved methods. Any drainage facilities required because of washing should be constructed according to specifications.
8. Maintenance. The entrance shall be maintained in a condition that will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed onto public rights-of-way must be removed immediately.



Source: Vermont Geological Survey 1987.

STRAW BALE BARRIER (USACE BMP 4)

1. Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another.
2. All bales shall be either wire-bound or string-tied. Straw bales shall be installed so that bindings are oriented around the sides rather than along the tops and bottoms of the bales in order to prevent deterioration of the bindings.
3. If the bales are to be placed on disturbed soil, they will be embedded into the ground a minimum of 4 inches. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked (gaps filled by wedging), the excavated soil shall be backfilled against the barrier. Backfill soil shall conform to the ground level on the downhill side and shall be built up to 4 inches against the uphill side of the barrier.
4. Bales shall be securely anchored in place by at least two stakes each having minimum dimensions of 1.5 inches x 1.5 inches x 36 inches or standard "T" or "U" steel posts (minimum weight of 1.33 pounds per linear foot) driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force bales together. Stakes or steel pickets shall be driven a minimum 18 inches deep into the ground to securely anchor the bales.
5. Bales shall be removed when they have served their usefulness, so as not to block or impede storm flow or drainage, but not before the upslope areas have been permanently stabilized.



STRAW BALE BARRIERS SHOULD NOT BE USED FOR MORE THAN 3 MONTHS.

STRAW BALE BARRIERS MUST BE PLACED AT LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE ABOVE GROUND HEIGHT OF THE BARRIER.

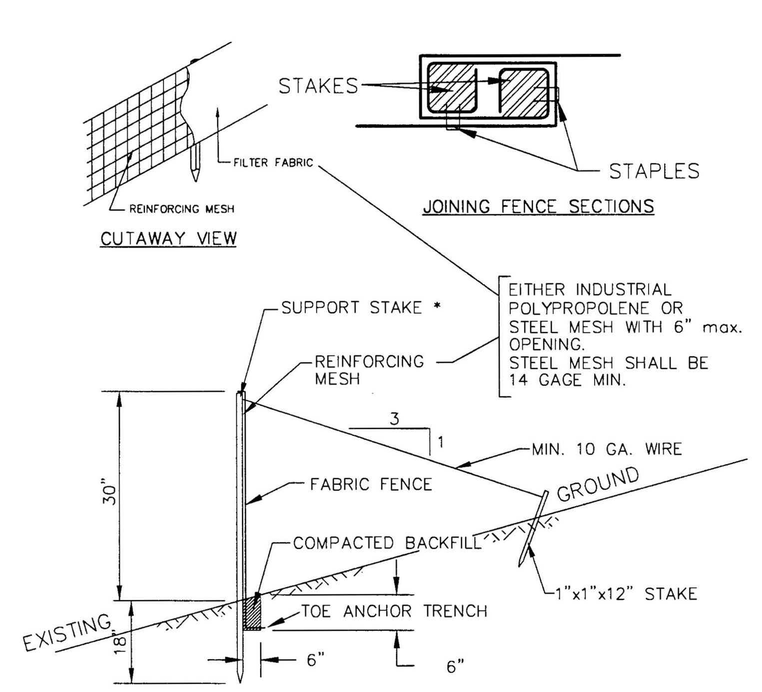
ANY SECTION OF STRAW BALE BARRIER WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET. SEE ROCK FILTER OUTLET DETAIL.

Source: Commonwealth of Pennsylvania Department of Environmental Protection Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000.

SILT FENCE (USACE BMP-5)

1. A trench should be excavated approximately 4 inches wide and 4 to 6 inches deep along the line the proposed silt fence.
2. Roll out fence and drive posts on the down slope side of the fabric. Posts should be spaced a maximum of 6 to 8 feet apart and driven securely into the ground a minimum of 18 inches. Wood stakes should be commercial quality lumber having minimum dimensions of 1.5 inches x 1.5 inches x 36 inches or standard "T" or "U" steel posts (minimum weight of 1.33 pounds per linear foot). Each stake should be free from decay, splits, or cracks longer than the thickness of the stake or other defects that would weaken the stakes and cause the stakes to be structurally unsuitable.
3. When joints are necessary, filter cloth should be spliced together only at a support post, with a minimum 6 inch overlap and twisted together.
4. When wire support is used, the wire mesh fence must be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1 inch long, tie wires, or hog rings. The wire shall extend into the trench a minimum of 2 inches and shall not extend more than 34 inches above the original ground surface. The fabric shall be stapled or wired to the wire fence, and 8 inches of the fabric shall be extended into the trench. The fabric shall not be stapled to existing trees.
5. Extend end sections of silt fence 8 feet upslope at a 45 degree angle.
6. The trench shall be backfilled and the soil compacted over the filter fabric.
7. Silt fences shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

REINFORCED FILTER FABRIC FENCE



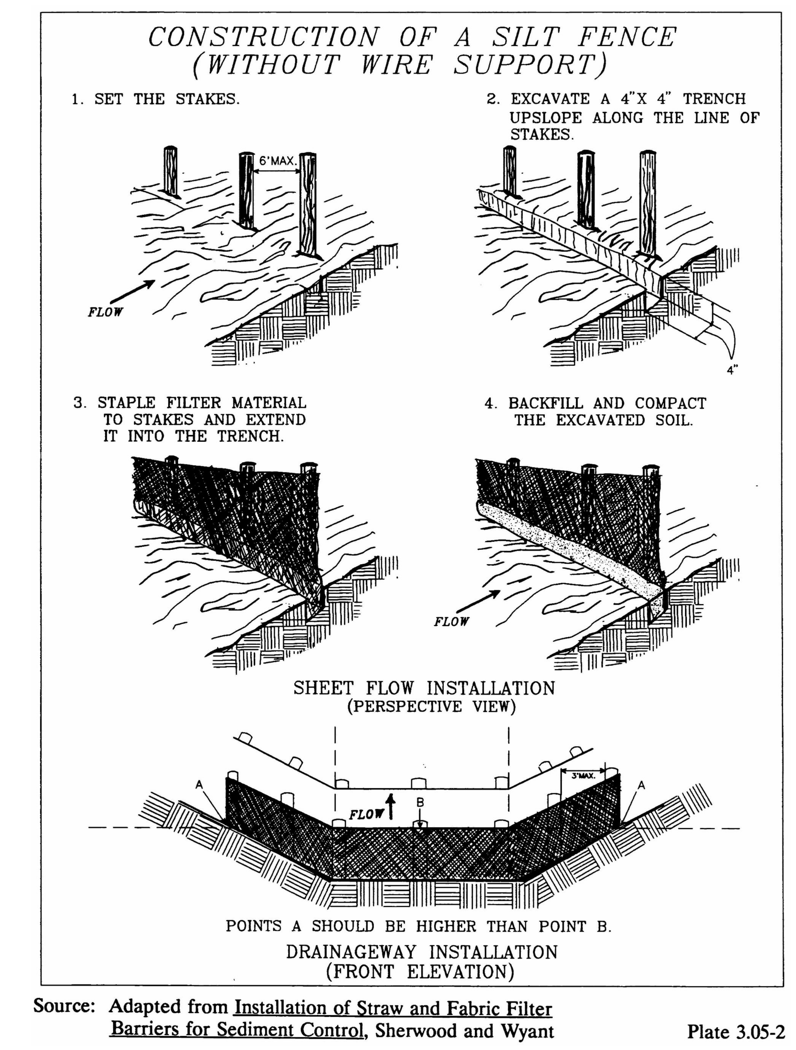
* STAKES SPACED @ 8' max.
USE 2"x 2" WOOD OR EQUIVALENT STEEL STAKES.

FILTER FABRIC FENCE MUST BE PLACED AT LEVEL GRADE. BOTH ENDS OF THE BARRIER MUST BE EXTENDED AT LEAST 8 FEET UP SLOPE AT 45 DEGREES TO THE MAIN BARRIER ALIGNMENT.

SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE ABOVE GROUND HEIGHT OF THE FENCE.

ANY SECTION OF FILTER FABRIC FENCE WHICH HAS BEEN UNDERMINED OR TOPPED MUST BE IMMEDIATELY REPLACED WITH A ROCK FILTER OUTLET. (SEE ROCK FILTER OUTLET DETAIL.)

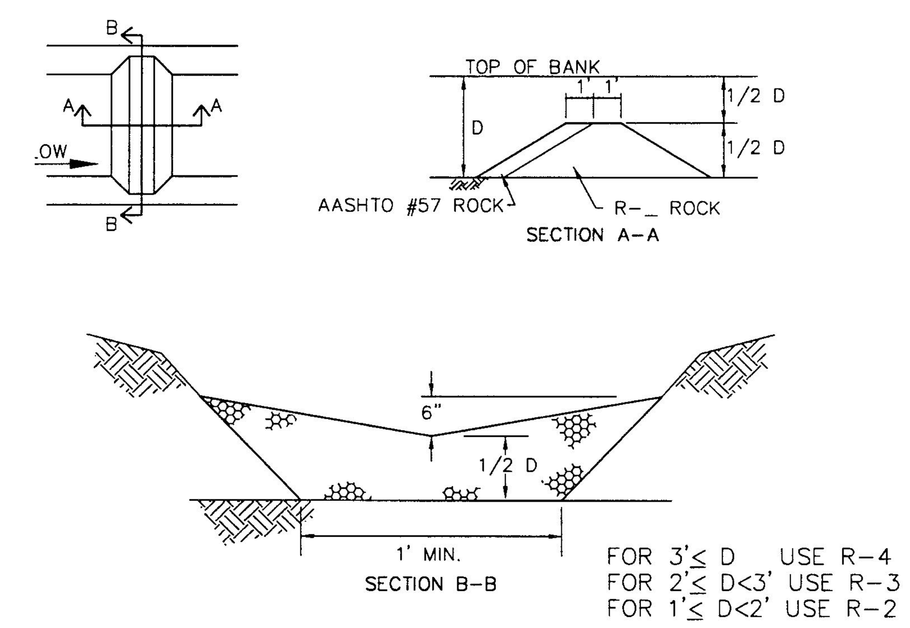
Source: Commonwealth of Pennsylvania Department of Environmental Protection Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000.



Source: Virginia Erosion and Sediment Control Handbook, 1992.

ROCK FILTERS (USACE BMP 20)

1. The side slope of the filter should be 2:1 (horizontal: vertical) or flatter.
2. The maximum height of the filter should be 3 feet.
3. The center of the filter should be 6 to 9 inches lower than the outer edges at natural ground elevation to prevent flow from going around the structure.
4. Rock should be placed on non-woven geotextile fabric to provide a stable foundation and to facilitate the removal of the stone.
5. Hand or mechanical placement may be necessary to achieve complete coverage of the ditch or swale and to insure that the center of the filter is lower than the edges.
6. Maintenance:
   a. Rock filters shall be inspected immediately after each rainfall. Any required repairs shall be made immediately.
   b. Regular inspections should be made to insure that the center of the filter is lower than the edges.
   c. Close attention shall be paid to the repair of end runs and undercutting.
   d. Sediment deposits should be removed when deposits reach approximately one-half the height of the barrier.
   e. Any sediment deposits remaining in place after the filter is no longer required shall be dressed to conform to the existing grade, prepared, and seeded.



ROCK FILTER NO.	LOCATION	CHANNEL DEPTH D (FT.)	RIPRAP SIZE

ROCK FILTERS SHOULD ONLY BE USED FOR 20 DAYS.

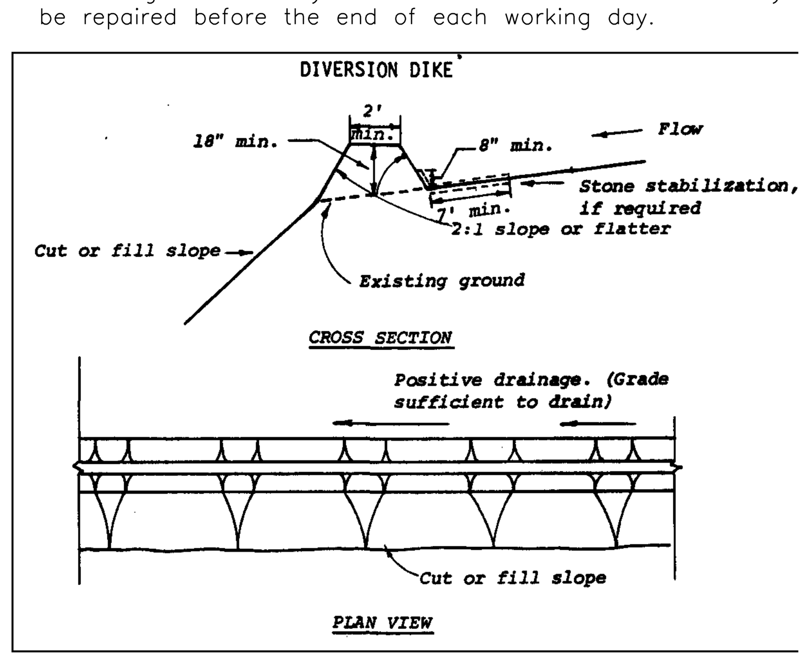
SEDIMENT MUST BE REMOVED WHEN ACCUMULATIONS REACH 1/2 THE HEIGHT OF THE FILTERS.

IMMEDIATELY UPON STABILIZATION OF EACH CHANNEL; REMOVE ACCUMULATED SEDIMENTS FROM THE ROCK FILTER, REMOVE THE ROCK FILTER, AND STABILIZE DISTURBED AREAS.

Source: Commonwealth of Pennsylvania Department of Environmental Protection Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000.

TEMPORARY DIVERSION DIKE (USACE BMP-9)

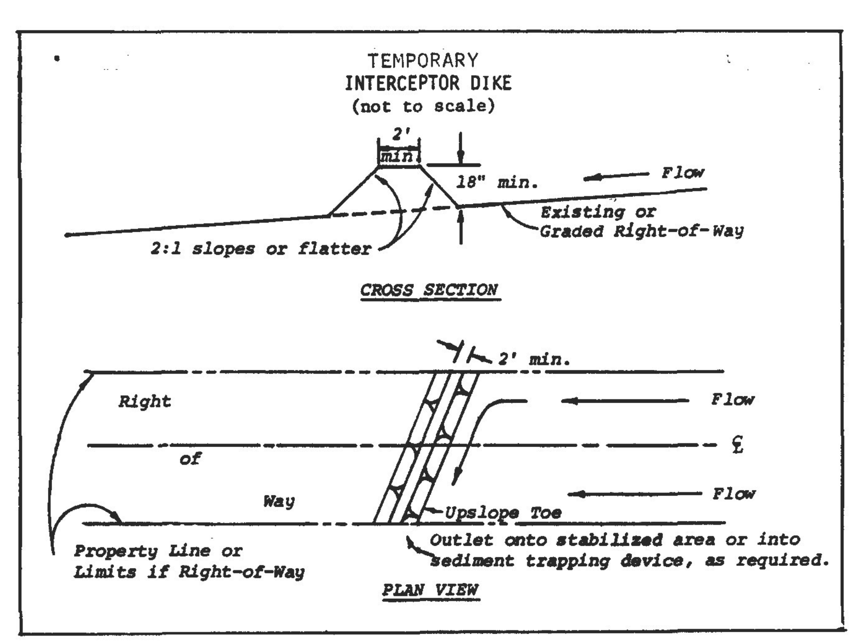
1. The minimum height measured from the upslope side of the dike is 18 inches.
2. The maximum height of the dam should be 3 feet.
3. The top of the dike should be a minimum of 2 feet wide.
4. All dikes must be machine compacted.
5. All diversion dikes must have positive grade to an outlet.
6. Diverted runoff must outlet directly onto an undisturbed stabilized area, a level spreader, or into a grade stabilization structure, such as a pipe slope drain, silt fence, straw bales, and/or rock check dam.
7. Diversion dikes must be seeded and mulched immediately after construction.
8. Dikes must be located far enough away from the disturbed area to permit machine regrading and clean-out.
9. Maintenance:
   a. The measure shall be inspected after every storm and repairs made to the dike, flow channel, outlet, or sediment trapping facility, as necessary.
   b. Damages caused by construction traffic or other activity must be repaired before the end of each working day.



Source: Vermont Geological Survey 1987.

INTERCEPTOR DIKE (USACE BMP-11)

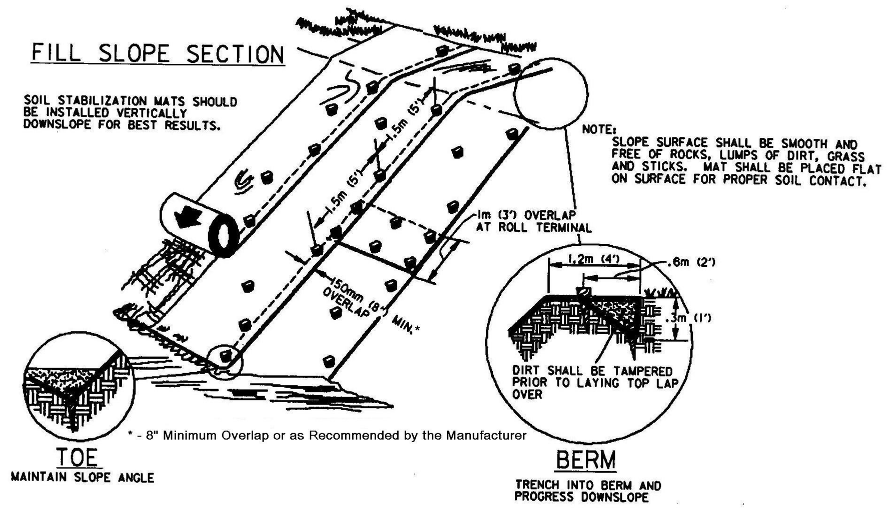
1. All trees, brush, stumps, obstructions, and other material shall be removed and disposed of so as not to interfere with the proper functioning of the Dike.
2. All earthen dikes must be machine compacted.
3. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the dike.
4. All interceptor dikes must have positive grade less then 5% to an outlet.
5. Top width may be wider and side slopes may be flatter if desired.
6. An interceptor dike shall have an outlet that functions with a minimum of erosion and a sediment trapping device such as silt fence, straw bales, rock check dam, and/or a sediment trap.
7. The on-site location may need to be adjusted to meet field conditions in order to utilize the most suitable outlet.
8. Maintenance:
   a. The interceptor dike shall be inspected after every storm and repairs made to the dike, flow channel, outlet, or sediment trapping facility, as necessary.
   b. Damages caused by construction traffic or other activity must be repaired before the end of each working day.



Source: Vermont Geological Survey 1987.

EROSION CONTROL FABRIC (USACE BMP-36)

1. Prepare soil before installing fabric, including any application of lime, fertilizer, and seed.
2. Begin at the top of the slope by anchoring the fabric in a 6 inch deep by 6 inch wide trench with approximately 12 inches of fabric extended beyond the upslope portion of the trench. Backfill and compact the trench after stapling. Apply seed to compacted soil and fold remaining 12 inch portion of the fabric back over the seed and compacted soil. Secure the fabric over the compacted soil with a row of staples/stakes spaced approximately 12 inches apart across the width of the fabric.
3. Roll the fabric down the slope with the appropriate side against the soil surface. Fabric must be securely fastened to the soil surface by placing staples/stakes in appropriate locations as shown on the staple pattern guide supplied by the manufacturer.
4. The edges of parallel sections of fabric shall be overlapped a minimum of 8 inches or as recommended by the manufacturer.
5. Consecutive sections of fabric spliced down the slope must be placed end over end (shingle style) with an approximate 3-foot overlap. Staple through the overlapped area approximately 12 inches apart across the entire width of the fabric.

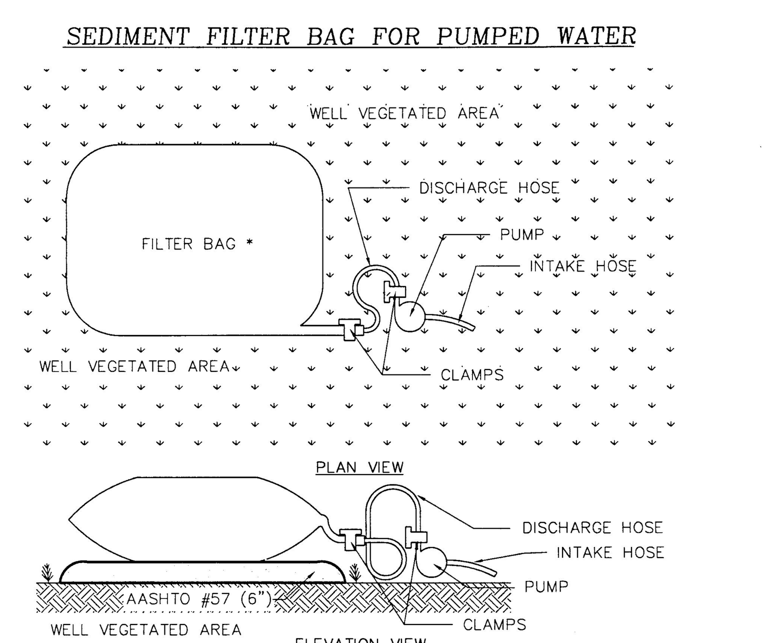


Source: USACE Handbook for the Preparation of Storm Water Pollution Prevention Plans for Construction Activities, 1997.

SEDIMENT FILTER BAG

1. Any water trapped behind an erosion or sediment control structure when performing maintenance operations or removal will be pumped out through a sediment filter bag.
2. Pumps greater then 4 inches in diameter will not be used.
3. Pipe clamps will be used to connect the discharge hose to the sediment filter bag.
4. Sediment filter bags will be placed in an undisturbed area and the discharge will be monitored to ensure that the dewatering does not cause an erosion problem.
5. Pump intake hose will be suspended within the trapped water to avoid pumping any settled sediments.

SEDIMENT FILTER BAG FOR PUMPED WATER



* NON-WOVEN GEOTEXTILE FILTER BAG WHICH RETAINS ALL SEDIMENT PARTICLES LARGER THAN 150 MICRONS.

PLACE FILTER BAGS ON STABLE OR WELL VEGETATED AREAS WHICH ARE FLATTER THAN 5% AND WHICH WILL NOT ERODE WHEN SUBJECTED TO BAG DISCHARGES.

CLAMP PUMP DISCHARGE HOSES SECURELY INTO FILTER BAGS.

LIMIT PUMPING RATE TO 1/2 THE MANUFACTURER'S MAXIMUM PUMPING RATE.

WHEN SEDIMENTS FILL 1/2 THE VOLUME OF A FILTER BAG, IMMEDIATELY REMOVE THAT BAG FROM SERVICE. PROPERLY DISPOSE OF SPENT BAGS WITH THEIR SEDIMENTS.

THE DISCHARGE FROM THE FILTER BAG SHOULD NOT PASS THROUGH A DISTURBED AREA OR CAUSE AN EROSION PROBLEM DOWN SLOPE.

Source: Commonwealth of Pennsylvania Department of Environmental Protection Office of Water Management, Erosion and Sediment Pollution Control Program Manual, April 15, 2000.

CONSTRUCTION ROAD STABILIZATION (USACE BMP-3)

1. Temporary roads shall follow the contour of the natural terrain to the extent possible. Slopes should not exceed 10 percent.
2. Roadbeds shall be at least 14 feet wide for one-way traffic and 20 feet wide for two-way traffic.
3. All cuts and fills shall be 2:1 or flatter to the extent possible.
4. Drainage ditches shall be provided as needed and shall be directed to appropriate sediment filtering devices.
5. The roadbed or parking surface shall be cleared of all vegetation, roots, and other material.
6. A 6-inch course of coarse aggregate, 2 to 3 inch stone, shall be applied immediately after grading. Filter fabric may be applied to the roadbed for additional stability. The filter cloth utilized shall be a woven or non-woven fabric consisting only of continuous chain polymeric filaments or yarns of polyester. The fabric shall be inert to commonly encountered chemicals and hydrocarbons, and be mildew and rot resistant.
7. In "heavy duty" traffic situations, stone should be placed at a minimum depth of 8 inches to avoid excessive dissipation or maintenance needs.
8. Disturbed areas outside of the road bed or parking area will be seeded with the temporary seed mix immediately after installation.
9. Maintenance:
   a. Roads and parking areas may require periodic top dressing with new gravel.
   b. Seeded areas adjacent to the roads and parking areas should be checked periodically to ensure that a vigorous stand of vegetation is maintained.
   c. Roadside ditches and other drainage structures should be checked regularly to ensure that they do not become clogged with silt or other debris.

TEMPORARY SEEDING (USACE BMP-31)

1. Areas requiring temporary seeding will be seeded with annual ryegrass (Lolium multi-florum) at a rate of at least 40 pounds per acre.
2. Seed shall be evenly applied with a broadcast seeder, drill, or cultipacker seeder.
3. Straw mulch should be applied at a rate of 2 tons per acre unless temporary seeding is made under favorable soil and site conditions during optimum spring and fall seeding dates and may not require mulch.
4. Areas which fail to establish vegetative cover adequate to prevent rill erosion will be reseeded as soon as such areas are identified.

US Army Corps of Engineers
New York District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

Designed by: C CABLE/M. GOODWIN | Date: 01 APR 2005 | Drawing file no.: CC-WAT-10
Dwn by: CJC | Ckd by: JRT
Reviewed by: MARTY GOFF
Plot by: Bethany Bearmore | Scale: AS SHOWN

WATERBURY DAM SEEPAGE CONTROL
REHABILITATION PROJECT - MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

EROSION PREVENTION AND SEDIMENT CONTROL PLAN DETAILS

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SEQUENCE OF CONSTRUCTION - HIGH BANK DESIGN

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADHERING TO ALL CONDITIONS OF THE CONSTRUCTION SPECIFICATIONS AND PERMITS.

2. CLEAR BANKS WITHIN GRADING LIMITS AND FILL LIMITS ONLY.

3. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED PRIOR TO START OF CONSTRUCTION, AS SPECIFIED IN THE SPECIFICATIONS.

4. CONSTRUCT ROCK TOE.

5. GRADE AS REQUIRED

6. INSTALL PLANT MATERIALS AS SPECIFIED

7. AFTER INSTALLATION, EXPOSED SOIL SURFACES SHALL BE HYDROSEEDED AND MULCHED. EROSION CONTROL FABRIC OR GEOTEXTILE FABRIC SHALL BE INSTALLED, ACCORDING TO THE SPECIFICATIONS. TEMPORARY EROSION CONTROL MEASURES SHALL BE REMOVED UPON COMPLETION.

8. A SERIES OF LIFTS SHALL BE CONSTRUCTED CONSISTING, AS INDICATED, OF TOPSOIL, COMPACTED FILL, EROSION CONTROL FABRIC AROUND THE FACE OF THE LIFTS AND BRUSH LAYERS.

9. AS INDICATED ON THE CROSS-SECTIONS, AN EROSION CONTROL FABRIC SHALL BE INSTALLED ON AN INCLINED PLANE AT ELEVATION 600 TO 593.5. THE EROSION CONTROL FABRIC SHALL BE COVERED WITH 6 FEET OF COMPACTED FILL. EROSION CONTROL FABRIC SHALL ALSO BE INSTALLED ABOVE AND BELOW EACH BRUSH LAYER. THE EROSION CONTROL FABRIC SHALL EXTEND INTO THE BANK 4FT.

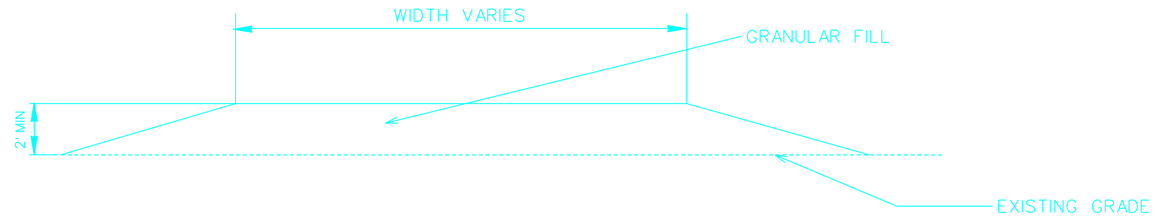
10. WHERE A BRUSH LAYER IS TO BE INSTALLED, 1FT OF TOPSOIL SHALL BE PLACED. A BRUSH LAYER SHALL BE PLACED UPON THIS LAYER AT A DENSITY OF 3 STEMS PER LONGITUDINAL FOOT PER BRUSH LAYER. THERE WILL BE 3 BRUSH LAYERS TOTAL. THE BRUSH SHALL BE PLACED ANGLED UP SLIGHTLY AT A 10 TO 15 DEGREE ANGLE WITH THE HORIZONTAL. FILL SHALL BE PLACED ON TOP OF THE BRUSH AND MIXED IN TO THE STEMS. BRANCHES SHALL BE 4 FEET IN LENGTH, WITH A BASAL END OF 0.125 TO 2 INCHES IN DIAMETER. SURFACE AND EXCAVATED MATERIAL WILL BE USED TO FILL IN THE REMAINING 1 FT FROM THE AREA BETWEEN THE BRUSH LAYERS.

11. ABOVE THIS LAYER, AN APPROXIMATELY 12 FOOT WIDE SELECTION OF EROSION CONTROL FABRIC SHALL BE PLACED ON THE FACE OF THE BANK.

12. THE FACE OF THE FILL SHALL BE SEEDED WITH THE SEED MIXTURE AND AT A DENSITY INDICATED IN THE SPECIFICATIONS. THE SEEDED FACE SHALL BE MULCHED WITH CLEAN, WEED-FREE, HAY-FREE STRAW, CONSISTING OF STEMS AT LEAST 4 INCHES LONG. THE EROSION CONTROL FABRIC SHALL BE WRAPPED AROUND THE SEEDED, MULCHED FACE, PULLED LANDWARD INTO THE BANK AT LEAST 4FT AND HAND TIGHTENED AND STAKED EVERY 2 TO 3 FEET LONGITUDINALLY. ADJACENT PIECES OF EROSION CONTROL FABRIC SHALL BE OVERLAPPED 4 TO 6 INCHES. THE SLOPE OF THE RESULTING FACE SHALL BE AS INDICATED ON THE CROSS SECTIONS. THE FACE SHALL BE DEEPLY WATERED AFTER INSTALLATION AND MAINTAINED SO AS TO ACHIEVE AN ADEQUATELY WATERED SYSTEM THROUGHOUT CONSTRUCTION.

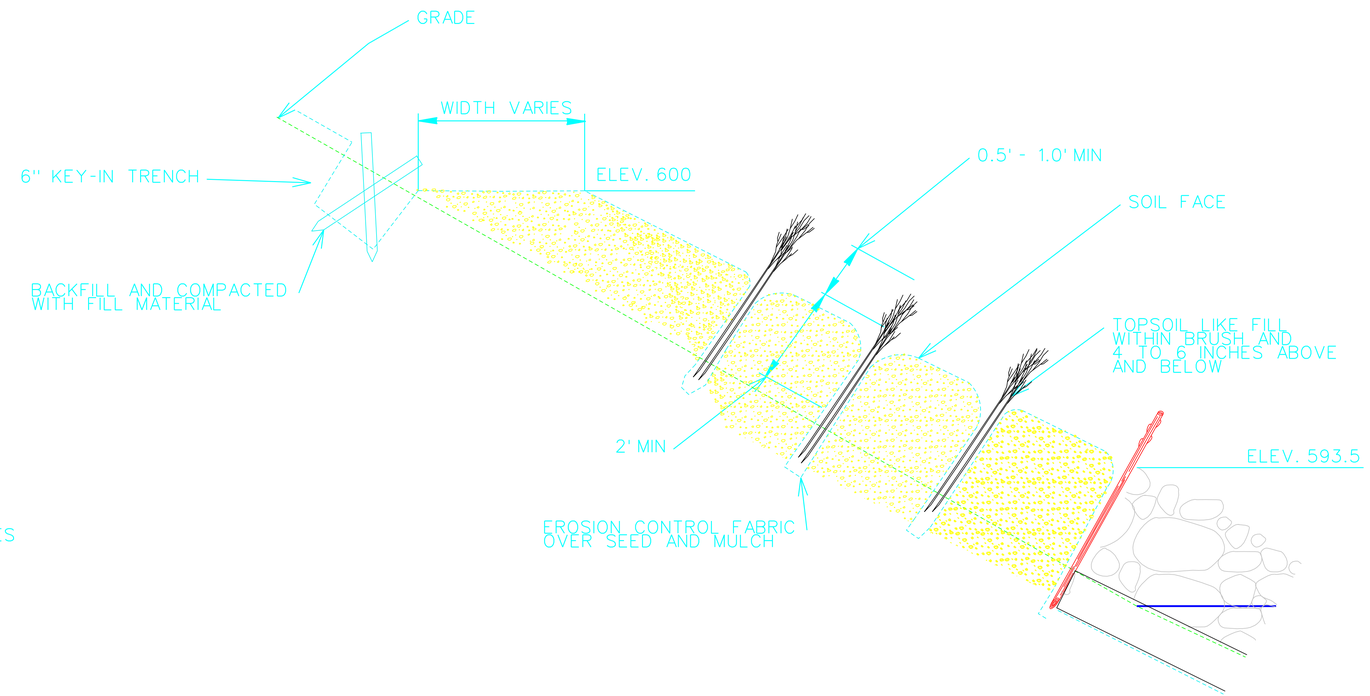
13. ANOTHER 2-FOOT LAYER OF FILL WITH EROSION CONTROL FABRIC WRAP AND A BRUSH LAYER SHALL BE CONSTRUCTED AS DESCRIBED ABOVE. SUCCESSIVE LIFTS SHALL BE CONSTRUCTED IN THE MANNER DESCRIBED ABOVE AT A SPACING OF 2 VERTICAL FEET BETWEEN BRUSH LAYERS, UP TO THE ELEVATION SPECIFIED IN THE CROSS-SECTIONS.

14. REFER TO SPECIFICATIONS FOR FULL DETAILS.



DETAIL - TYPICAL HAUL ROAD

NOT TO SCALE



DETAIL - BRUSH LAYERING

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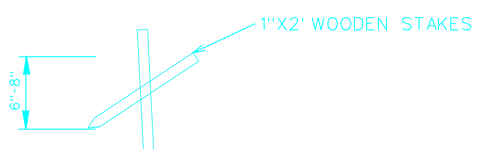

DETAIL - KEY IN TRENCH

NOT TO SCALE

US Army Corps of Engineers
New York District

Rev	Date	Description	By

Designed by: T.EDWARDS / D.HOGAN
Date: 01 Jan 2003
Drawn by: BB
Checked by: MARTY GORT
Approved by:
Submitted by:
Date: 31 Mar 2005
Drawing code: CC-WAT-11
Rev. no.:
Rev. date: 30-NOV-00
Battery Beermore

US ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
NEW YORK, NEW YORK

WATERBURY DAM SEDIMENT CONTROL
REHABILITATION PROJECT - MITIGATION
WATERBURY RESERVOIR, WATERBURY, VERMONT

DETAILS

Sheet reference number
CC-WAT-11
Sheet 12 of 12

Submitted by: USERNAME Plot Date: 00-MMM-YYYY HH:MM FILE NAME: ********

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