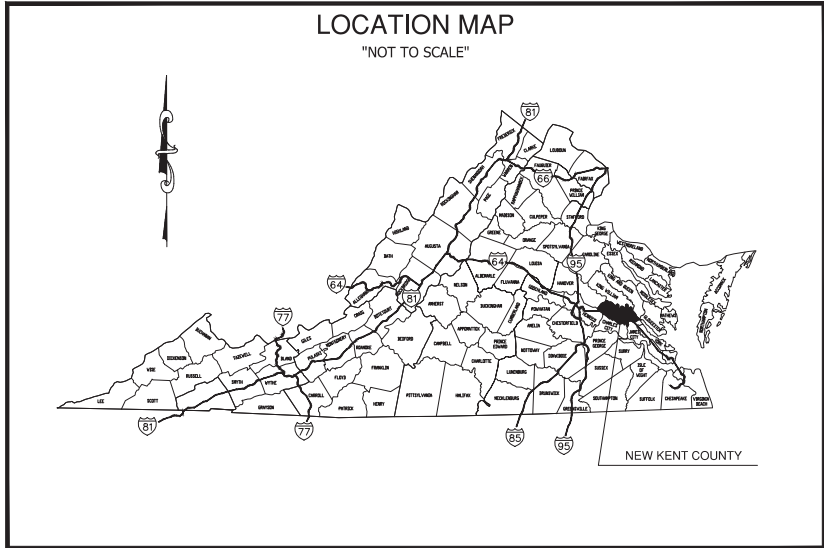
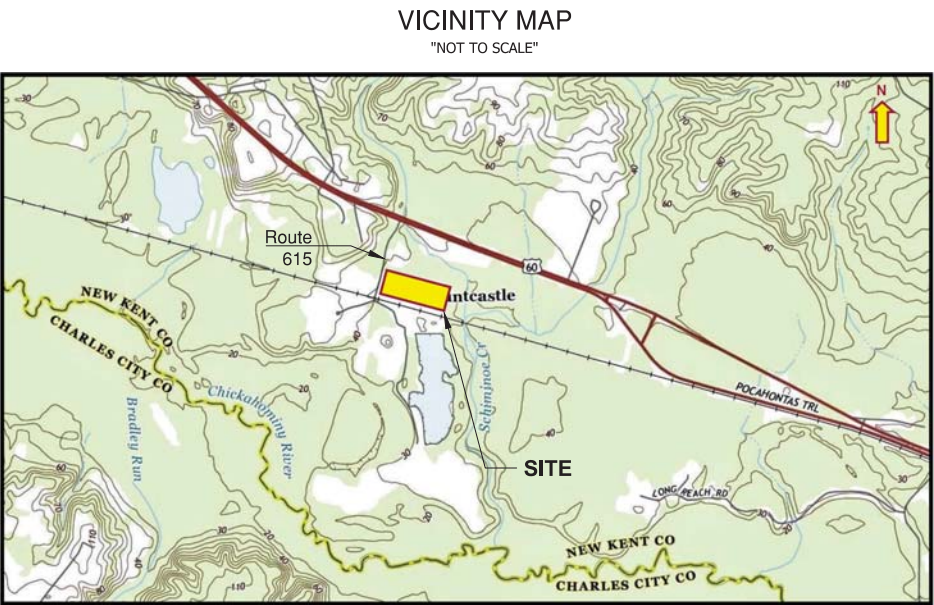


L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
RESPONSE ACTION PLAN

CONSTRUCTION ISSUE 5/15/2017



* * *
NEW KENT COUNTY, VIRGINIA



SITE SUMMARY

OWNER: L-WOOD, INC., SOUTHERN PINE SPECIALISTS

ADDRESS: 4101 SOUTH MOUNTCASTLE ROAD
PROVIDENCE FORGE, VIRGINIA 23140

CONTACT: MR. THOMAS LIESFELD

LOCATION: NEW KENT COUNTY

LIMITS OF DISTURBANCE: 4.9 ACRES

TAX MAP: 40-9B, 40-9C

GPIN: F12-1889-3611

HUC: JL 23

IMPERVIOUS SURFACE AREAS			
	EXISTING	PROPOSED ADDITIONAL	TOTAL PROPOSED
TOTAL SITE, ACRES	14.664 AC.	0	14.664 AC.
IMPERVIOUS AREA, ACRES	2.760 AC.	0	2.760 AC.
PERCENT IMPERVIOUS	18.82%	0	18.82%

SHEET LIST

NO.	TITLE
C001	COVER SHEET
C002	NOTES AND LEGEND
C003	ESC NARRATIVE
C101	EXISTING CONDITIONS
C201	PHASE 1 ESC - OVERALL
C202	OVERALL EXCAVATION PLAN
C203	FINAL GRADING AND ESC PLAN
C301	EXCAVATION AREA 1
C302	EXCAVATION AREA 2
C303	EXCAVATION AREA 3
C304	EXCAVATION AREA 4
C401	PRE-DEVELOPMENT AND POST-DEVELOPMENT RUNOFF
C402	DRAINAGE AREAS
C403	STORMWATER CALCULATIONS
C501	DETAILS
C502	DETAILS
C503	DETAILS

DRAPER ADEN ASSOCIATES REVIEW

THESE PLANS HAVE BEEN SUBJECTED TO TECHNICAL AND QUALITY REVIEWS BY:

MONA Q. DAI, E.I.T. 5/4/16
NAME: PRINTED SIGNATURE DATE
PROJECT DESIGNER

WILLIAM G. HASE, P.E. 5/4/16
NAME: PRINTED SIGNATURE DATE
PROJECT MANAGER

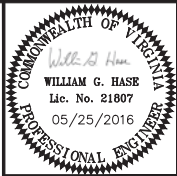
DON MARICKOVICH, P.E. 5/4/16
NAME: PRINTED SIGNATURE DATE
QUALITY REVIEWER

NOTE: CONTRACTOR TO CONTACT
MISS UTILITY (1-800-552-7001)
AT LEAST 3 WORKING DAYS IN
ADVANCE OF PLANNED WORK.



REVISED MAY 25, 2016
* * * * *
DAA PROJECT # R15434-05F

These documents, including drawings and specifications, were prepared by Draper Aden Associates, Consulting Engineers, pursuant to a contract by and between Draper Aden Associates and L-Wood, Inc. with respect to the project described in said contract. Any reuse or modification of said documents (whether hard copy or electronic) without written verification or adaptation by Draper Aden Associates for the specific purpose intended will be at the sole risk of the individual or entity utilizing said documents, drawings and specifications and such use is without the authorization of Draper Aden Associates. Draper Aden Associates, Consulting Engineers, shall have no legal liability resulting from any and all claims, damages, losses, and expenses, including attorney's fees arising out of the unauthorized use of these documents, drawings, specifications, reports, and studies prepared as a result of the aforesaid contract.



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COVER SHEET
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

REVISION HISTORY
MAY 4, 2016
PER COUNTY COMMENTS
MAY 25, 2016
PER COUNTY COMMENTS

CONSTRUCTION ISSUE
5/15/2017

DATE: 05/04/2016

PROJECT NUMBER:
R15434R-05F

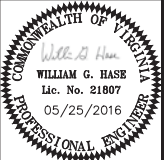
C001

GENERAL SITE NOTES:

1. GENERAL SITE INFORMATION:
- A. FIELD TOPOGRAPHIC MAPPING WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF DRAPER ADEN ASSOCIATES FROM AN ACTUAL FIELD SURVEY MADE UNDER P. CRAIG BROWN'S SUPERVISION; THAT THE IMAGERY AND/OR ORIGINAL DATA WAS OBTAINED ON 12/5/15; AND THAT THIS MAP DATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED. TOPOGRAPHY OUTSIDE OF FIELD SURVEY FROM NEW KENT COUNTY GIS.
- B. BOUNDARY INFORMATION TAKEN FROM NEW KENT COUNTY GIS. A FIELD BOUNDARY SURVEY WAS NOT PREPARED BY DRAPER ADEN ASSOCIATES.
- C. WETLANDS DELINEATED BY WESTON SOLUTIONS, WEST CHESTER, PENN, FOR THE U.S. EPA REGION 3.
- D. TOTAL DISTURBED AREA: 4.9 ACRES
2. GENERAL CONSTRUCTION INFORMATION:
- A. WETLAND AREAS WILL NOT BE DISTURBED.
- B. SITE IS OPERATIONAL. AT NO TIME SHALL CONTRACTOR IMPEDE OPERATIONS WITHOUT PROVIDING OWNER WITH A MINIMUM OF 24 HOURS NOTICE.
- C. CONTRACTOR IS REQUIRED TO INCLUDE SUFFICIENT TIME IN SCHEDULE TO ACCOMMODATE ALL TESTING FOR ALL MATERIALS AND INSTALLATION.
- D. IN PREPARING BID, CONTRACTOR SHALL COORDINATE WITH THE OWNER THE LOCATION FOR STOCKPILES AND LAYDOWN AREAS, WHICH SHALL NOT IMPACT OPERATIONS.
3. SITE CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING GENERAL REQUIREMENTS:
- A. FIELD LAYOUT SHALL BE BASED ON THE DIMENSIONS SHOWN ON THE DRAWINGS.
- B. THE CONTRACTOR SHALL SECURE NECESSARY PERMITS AND BONDS FOR THIS PROJECT FROM NEW KENT COUNTY WITH THE EXCEPTION OF THE EROSION CONTROL PLAN APPROVAL, WHICH WILL BE OBTAINED BY THE OWNER. THE CONTRACTOR WILL BE DESIGNATED AS THE RESPONSIBLE LAND DISTURBER AND MUST BE CERTIFIED TO CARRY OUT CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY ALL CONDITIONS AND REQUIREMENTS OF THE PERMITS. IF NOT OTHERWISE STIPULATED, CONTRACTOR SHALL NOTIFY NEW KENT COUNTY PRIOR TO STARTING WORK AS OUTLINED IN ES-2.
- C. ALL WORK IS TO BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REQUIREMENTS, COMMONWEALTH OF VIRGINIA CONSTRUCTION & PROFESSIONAL SERVICES MANUAL, LATEST VERSION, THE VIRGINIA DEPARTMENT OF TRANSPORTATION ROAD AND BRIDGE SPECIFICATIONS, LATEST EDITION AND ALL OTHER STANDARDS AND LEGAL REQUIREMENTS NOTED OR IMPLIED IN THE DRAWINGS AND SPECIFICATIONS.
- D. NOTHING ON THESE CONTRACT DRAWINGS SHALL BE CONSTRUED AS A GUARANTEE THAT UTILITIES INDICATED AS EXISTING ARE IN THE LOCATION INDICATED OR THAT THEY ACTUALLY EXIST, OR THAT OTHER EXISTING UTILITIES ARE NOT WITHIN THE AREA OF OPERATIONS. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL MAKE ALL NECESSARY INVESTIGATIONS TO DETERMINE THE EXISTENCE, LOCATIONS, AND ELEVATIONS OF EXISTING UTILITIES IN THE WORK AREA. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR THE PROTECTION OF EXISTING UTILITIES AND STRUCTURES WITHIN THE CONSTRUCTION ZONE. DAMAGE TO STRUCTURES, UTILITIES, AND EQUIPMENT TO REMAIN SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE, IN ACCORDANCE WITH THE STATE AND LOCAL REQUIREMENTS, THE OWNER'S REPRESENTATIVE, AND THE AUTHORITIES HAVING JURISDICTION. CONTRACTOR SHALL CONTACT NEW KENT COUNTY, AT LEAST THREE WORKING DAYS PRIOR TO ANY EARTH MOVING OR DIGGING ACTIVITIES AND CONDUCT UTILITY LOCATIONS IN AREAS NOT SERVICED BY NEW KENT COUNTY.
- E. CONTRACTOR SHALL BARRICADE OPEN EXCAVATIONS OCCURRING AS PART OF THIS WORK AND POST WITH WARNING TAPE OR OTHER APPROPRIATE BARRICADE.
- F. CONTRACTOR IS REQUIRED TO MAINTAIN DITCHES, PIPES, AND OTHER DRAINAGE STRUCTURES FREE FROM OBSTRUCTION UNTIL WORK IS ACCEPTED BY THE OWNER. THE CONTRACTOR IS RESPONSIBLE FOR DAMAGES CAUSED BY FAILURE TO MAINTAIN DRAINAGE STRUCTURES IN OPERABLE CONDITION.
- G. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPLY WITH SECTION 59.1-406, ET SEQ. OF THE CODE OF VIRGINIA (OVERHEAD HIGH VOLTAGE LINES SAFETY ACT).
- H. ALL IMPROVEMENTS AND WORK SHALL BE SUBJECT TO INSPECTION BY THE OWNER AND THE NEW KENT COUNTY OFFICES.
- I. CONTRACTOR SHALL MAINTAIN EMERGENCY, SERVICE, AND DELIVERY VEHICLE ACCESS TO THE SURROUNDING AREA, INCLUDING BUT NOT LIMITED TO TRAFFIC CONTROL, SIGNAGE, AND PERSONNEL.
- J. CONTRACTOR SHALL HAVE AN APPROVED SET OF PLANS AND PERMITS ON SITE AT ALL TIMES DURING CONSTRUCTION. A DESIGNATED RESPONSIBLE EMPLOYEE SHALL BE AVAILABLE FOR CONTACT BY THE OWNER.
- K. DAMAGE TO UTILITIES OR PROPERTY OF OTHERS BY CONTRACTOR DURING CONSTRUCTION SHALL BE REPAIRED TO PRE-CONSTRUCTION CONDITIONS BY CONTRACTOR AT NO COST TO OWNER.
- L. EXISTING PAVEMENT AND OTHER SURFACES DISTURBED BY CONTRACTOR (WHICH ARE NOT TO BE REMOVED) SHALL BE REPAIRED TO LIKE-NEW CONDITION.
- M. THE NEW KENT COUNTY ENVIRONMENTAL MANAGER HAS THE AUTHORITY TO ADD OR DELETE EROSION AND SEDIMENT CONTROLS ON AN AS NEEDED BASIS.
- N. NO EROSION AND SEDIMENT CONTROLS CAN BE REMOVED WITHOUT APPROVAL FROM THE NEW KENT COUNTY ENVIRONMENTAL MANAGER.

GENERAL LEGEND

EXISTING		PROPOSED
---1000---	CONTOURS	---1000---
x 1561.3	SPOT ELEVATION	1528.3 TC 1528.3
	SHRUB	N/A
	TREE	N/A
- . . . -	TREELINE	N/A
- X - X -	FENCE	N/A
---	PROPERTY LINE/ROW	---
	BUILDING	
	EDGE OF PAVEMENT	
	CONCRETE	
	GRAVEL	N/A
	SIGN	N/A
	BOLLARD	N/A
	STORM SEWER	
	STORM CLEANOUT	N/A
	STORM MANHOLE	
	STORM DRAINAGE INLET	
	SANITARY MANHOLE	
ss	SANITARY SEWER	---
uge	UNDERGROUND ELECTRIC	---UGE---
ohp	OVERHEAD POWER	---OHP---
	GUY WIRE	N/A
	LIGHT POLE	N/A
	ELECTRIC POLE	
	ELECTRIC MANHOLE	N/A
w	WATER	---W---
	WATER VALVE	
	FIRE HYDRANT	N/A
	WATER MANHOLE	
ugt	UNDERGROUND TELEPHONE	---UGT---
	TELEPHONE BOX	N/A
	TELEPHONE MANHOLE	N/A
	TELEPHONE PEDESTAL	N/A
	TELEPHONE POLE	N/A
	MONITORING WELL	N/A
	GAS EXTRACTION WELL	N/A
	GAS VENT	N/A
	GAS PROBE	N/A
	LEACHATE CLEANOUT	
	CONCENTRATED FLOW PATH	
	ROD FOUND	N/A
	MONUMENT FOUND	N/A
	BENCHMARK	N/A
	CONCRETE SIDEWALK	
	ASPHALT PAVEMENT	
---	LIMITS OF DISTURBANCE	---
---	MATCH EXISTING	M.E.
---	PRELIMINARY LIMITS OF DISTURBANCE	---P.L.O.D.---
---	LIMITS OF DISTURBANCE	---L.O.D.---



Draper Aden Associates
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Greenville, SC
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Suite 200
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NOTES AND LEGEND
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

REVISIONS

- MAY 4, 2016
PER COUNTY COMMENTS
- MAY 25, 2016
PER COUNTY COMMENTS

CONSTRUCTION ISSUE
5/15/2017

DESIGNED BY:

WGH

DRAWN BY:

MQD

CHECKED BY:

LPK

SCALE:

NO SCALE

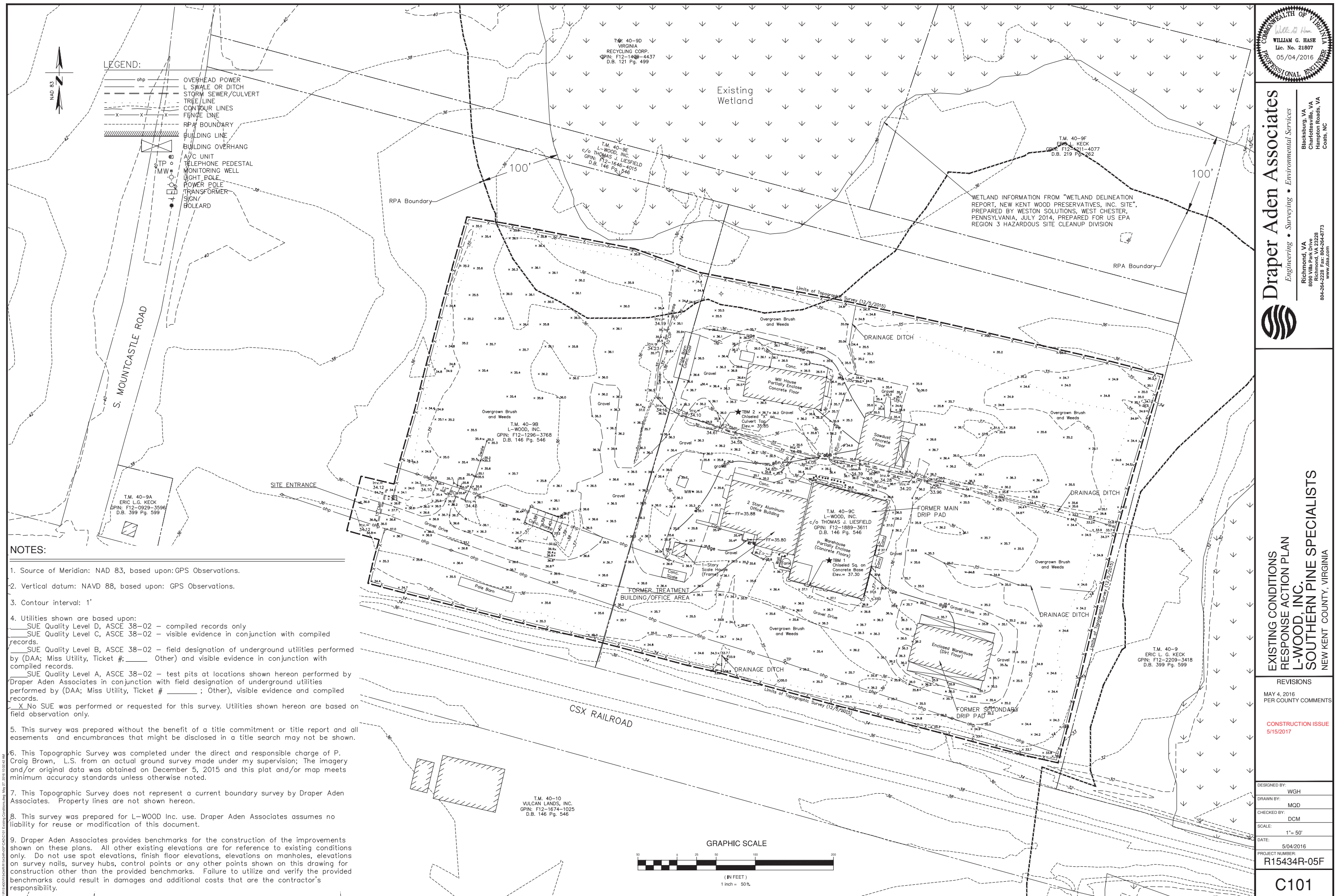
DATE:

5/04/2016

PROJECT NUMBER:

R15434R-05F

C002



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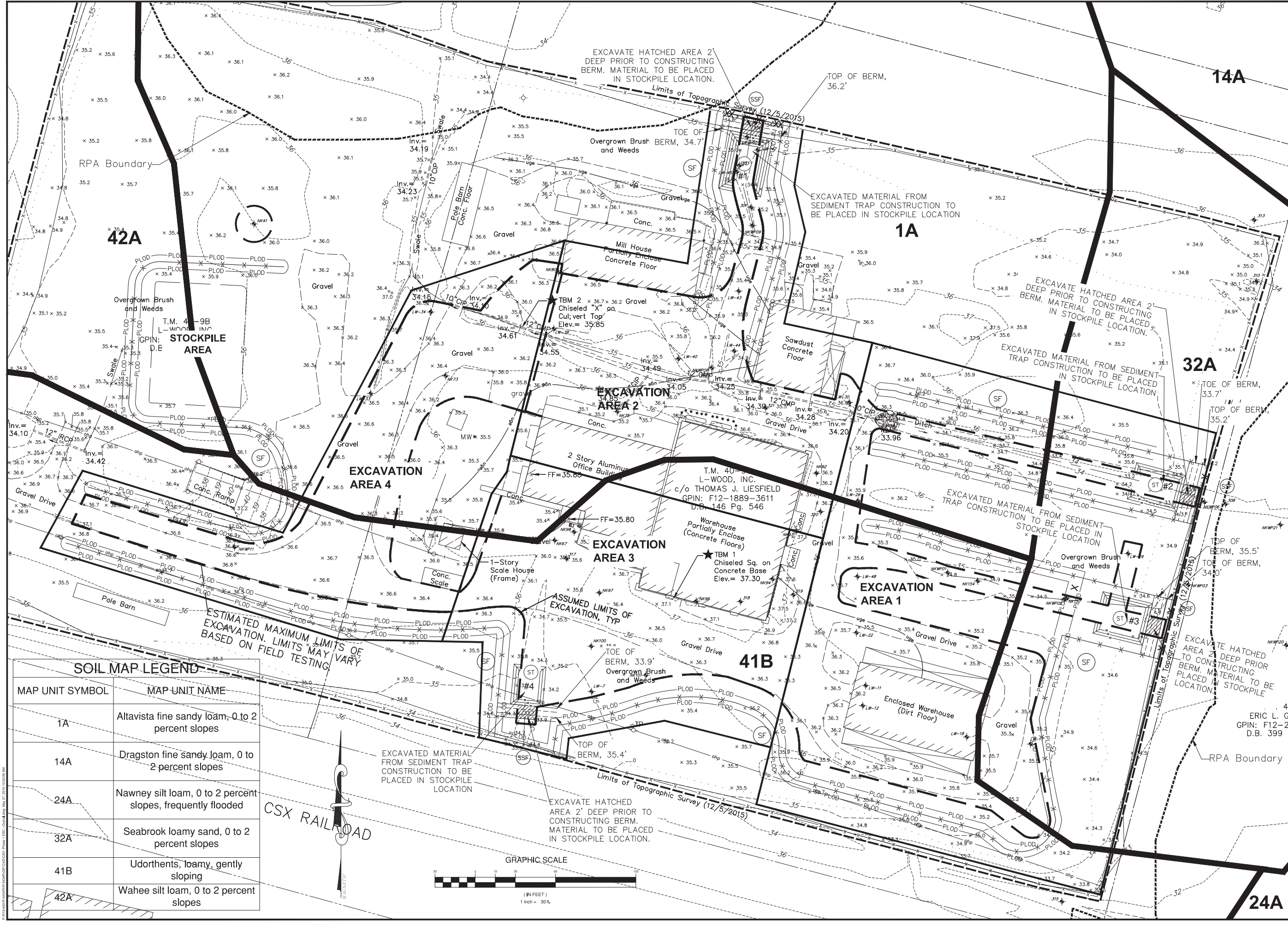
EXISTING CONDITIONS
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

REVISIONS

CONSTRUCTION ISSUE
5/15/2017

DESIGNED BY:	WGH
DRAWN BY:	MQD
CHECKED BY:	DCM
SCALE:	1" = 50'
DATE:	5/04/2016
PROJECT NUMBER:	R15434R-05F

C101



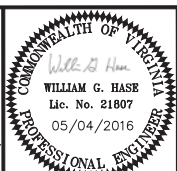
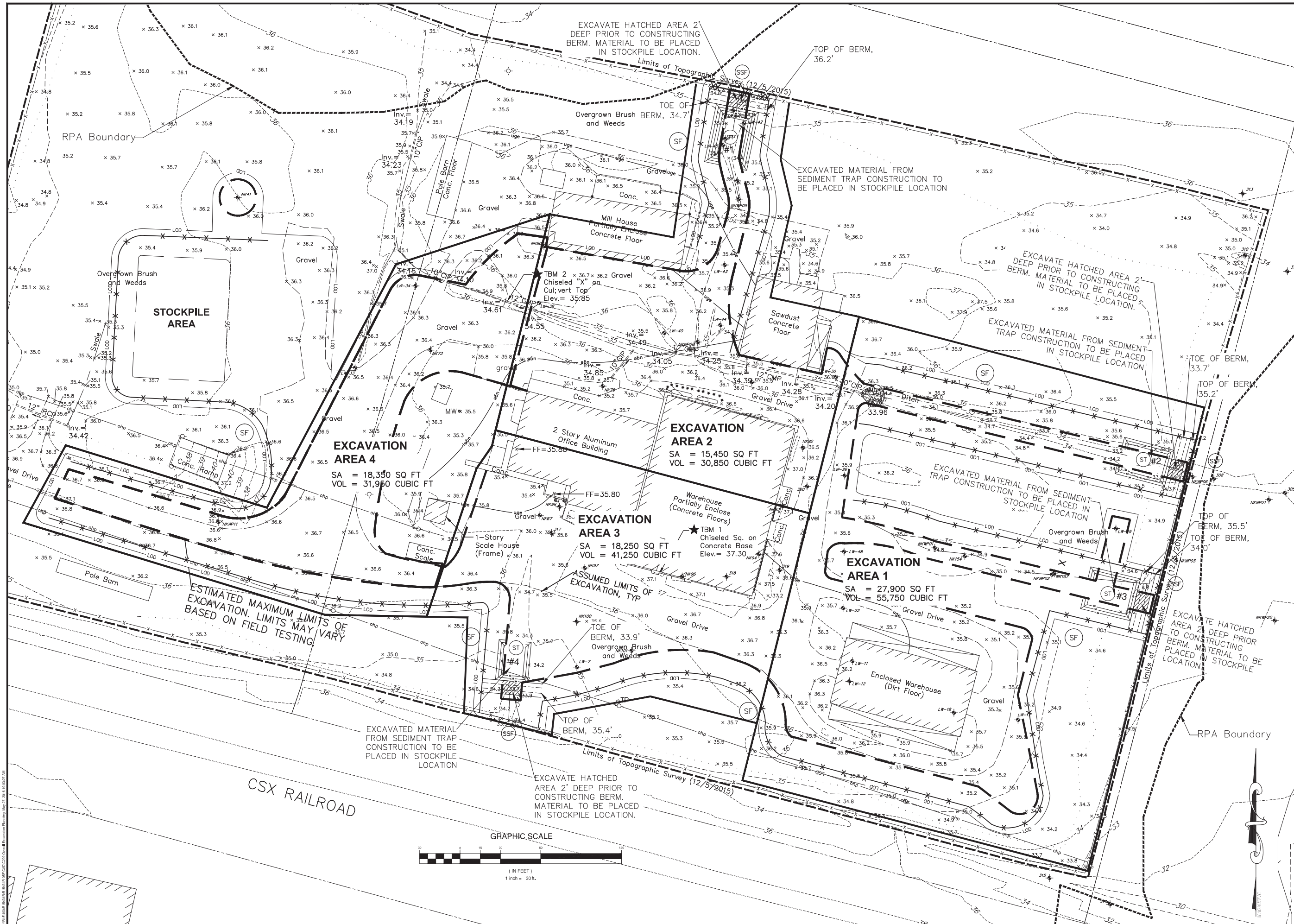
COMMONWEALTH OF VIRGINIA
WILLIAM G. HASE
Lic. No. 21807
05/04/2016
PROFESSIONAL REVIEWER

Draper Aden Associates
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Blacksburg, VA
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**PHASE 1 ESC - OVERALL
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS**
NEW KENT COUNTY, VIRGINIA

REVISIONS	
MAY 4, 2016	PER COUNTY COMMENTS
CONSTRUCTION ISSUE 5/15/2017	
DESIGNED BY:	WGH
DRAWN BY:	MQD
CHECKED BY:	LPK
SCALE:	1" = 30'
DATE:	5/04/2016
PROJECT NUMBER:	R15434R-05F
C201	

SOIL MAP LEGEND	
MAP UNIT SYMBOL	MAP UNIT NAME
1A	Altavista fine sandy loam, 0 to 2 percent slopes
14A	Dragston fine sandy loam, 0 to 2 percent slopes
24A	Nawney silt loam, 0 to 2 percent slopes, frequently flooded
32A	Seabrook loamy sand, 0 to 2 percent slopes
41B	Udorthents, loamy, gently sloping
42A	Wahee silt loam, 0 to 2 percent slopes



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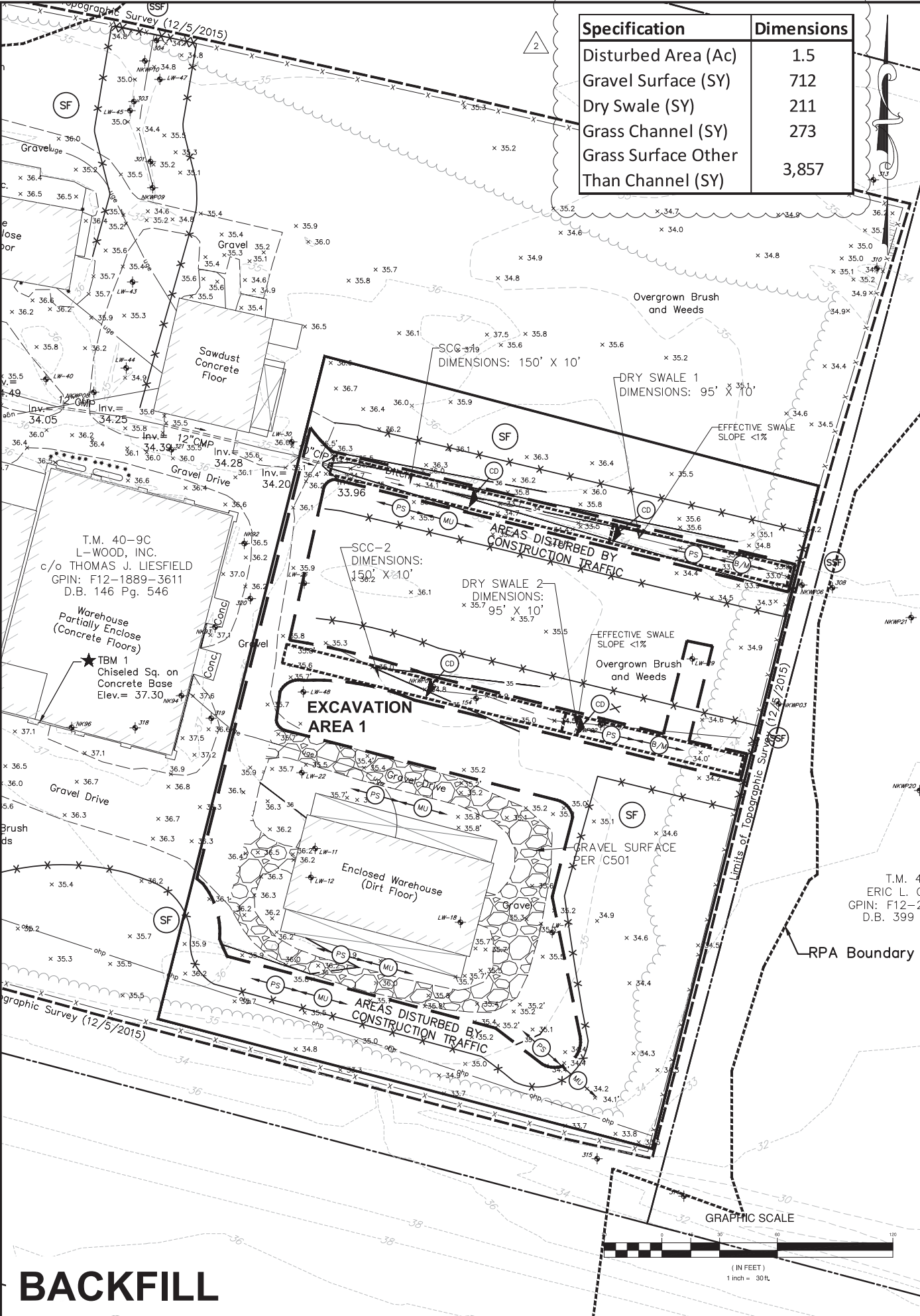
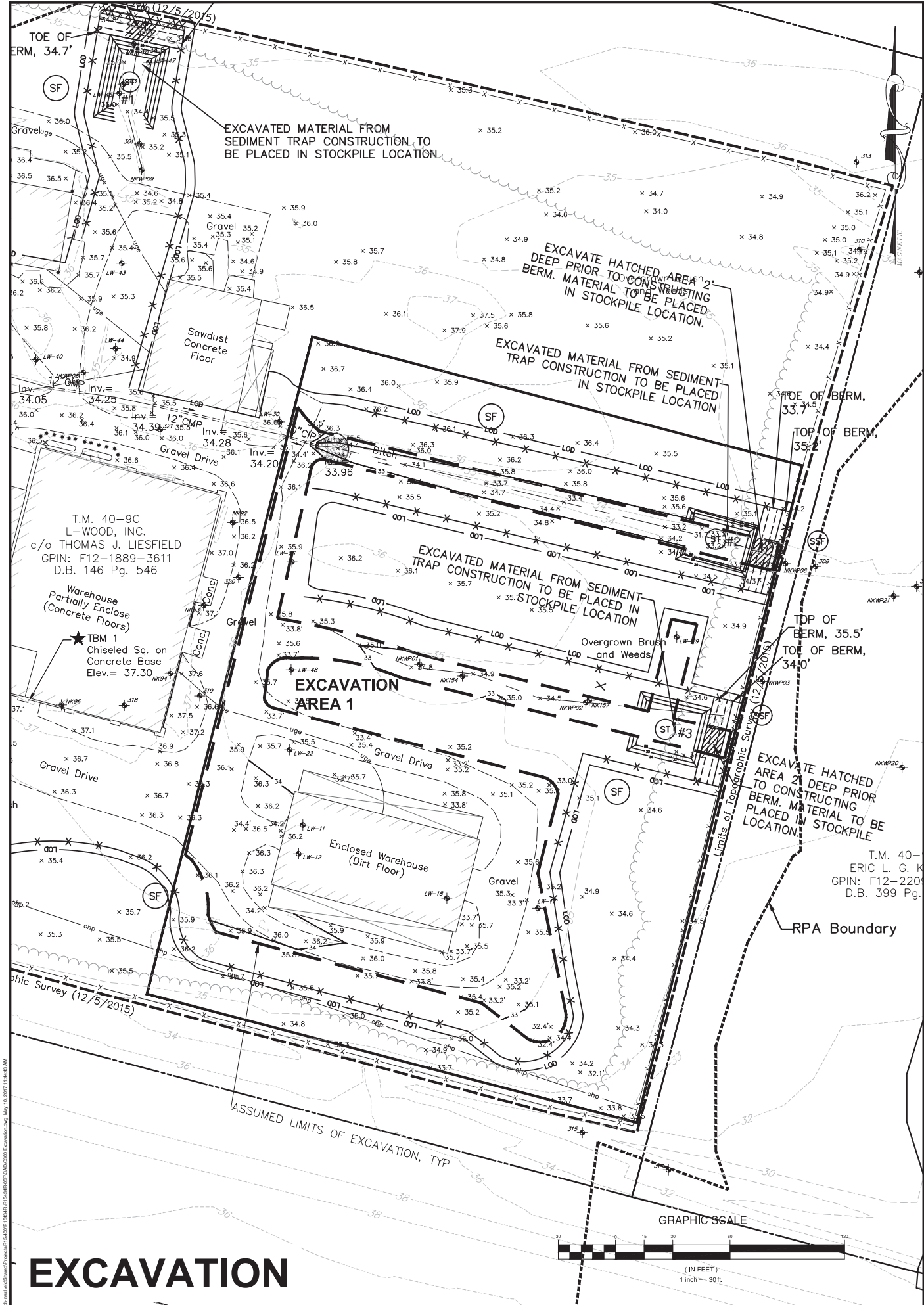
**OVERALL EXCAVATION PLAN
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA**

REVISIONS
MAY 4, 2016
PER COUNTY COMMENTS

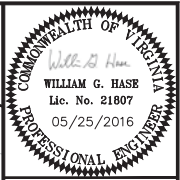
CONSTRUCTION ISSUE
5/15/2017

DESIGNED BY: WGH
DRAWN BY: MQD
CHECKED BY: DCM
SCALE: 1" = 30'
DATE: 5/04/2016
PROJECT NUMBER: R15434R-05F

C202



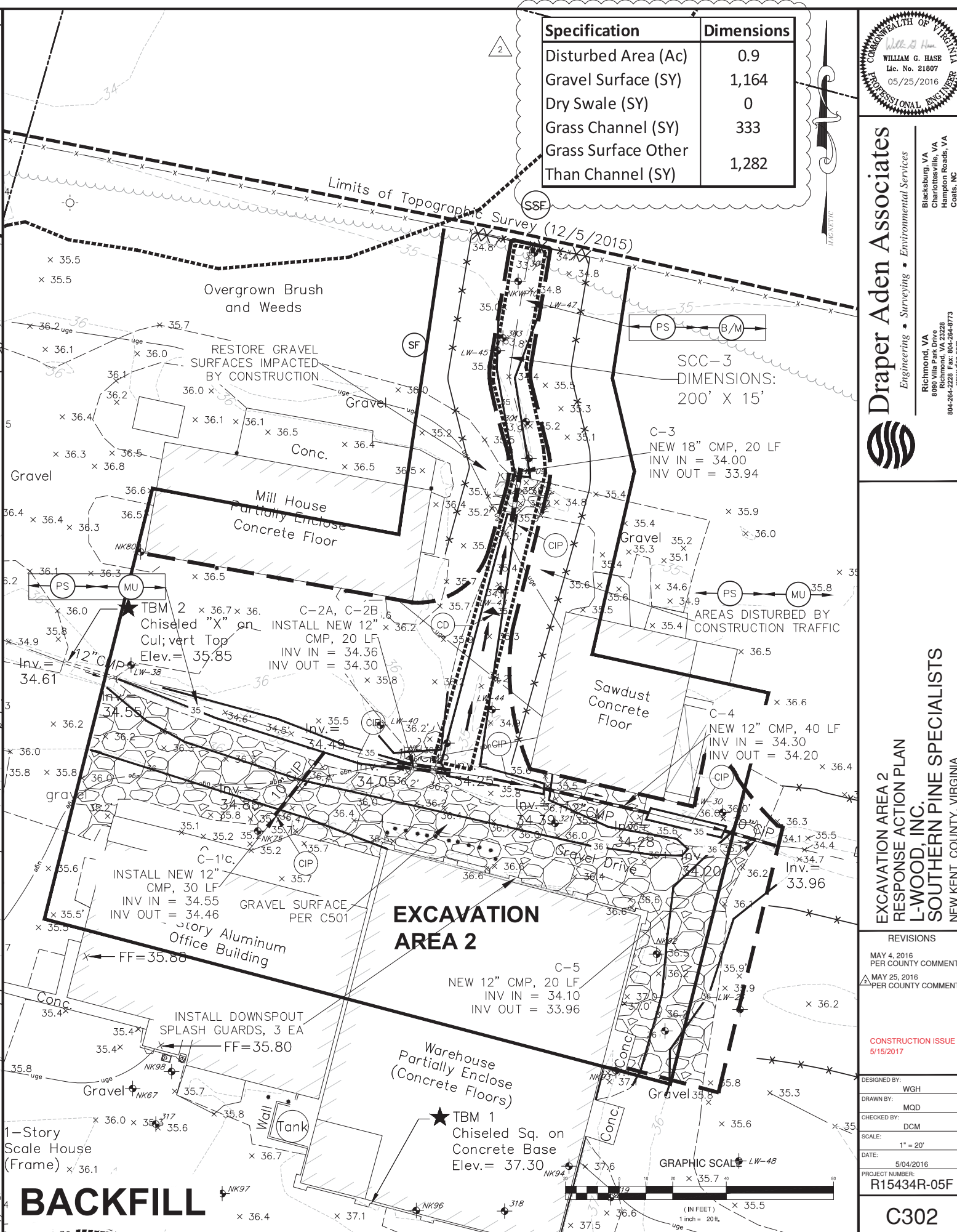
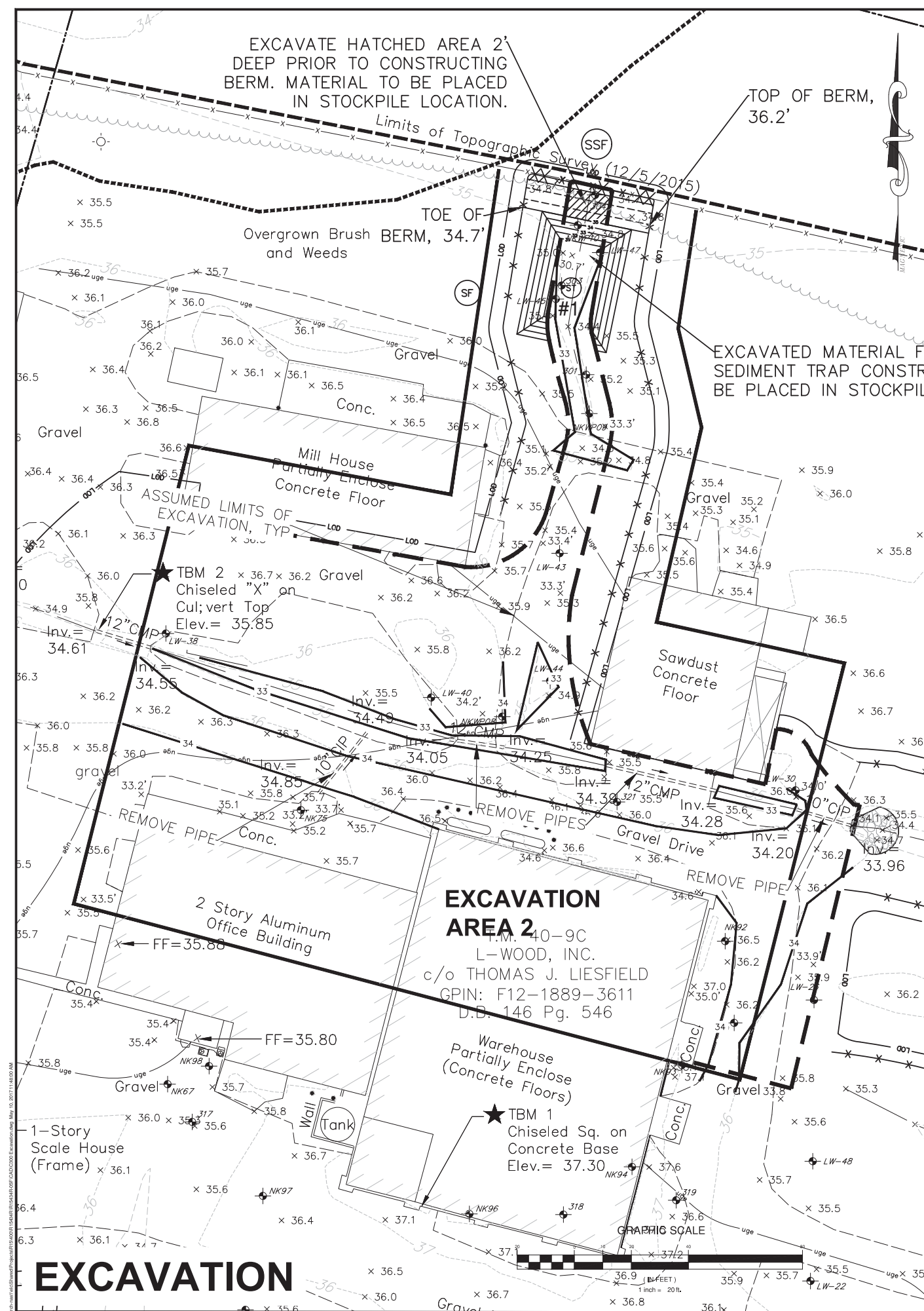
Specification	Dimensions
Disturbed Area (Ac)	1.5
Gravel Surface (SY)	712
Dry Swale (SY)	211
Grass Channel (SY)	273
Grass Surface Other Than Channel (SY)	3,857

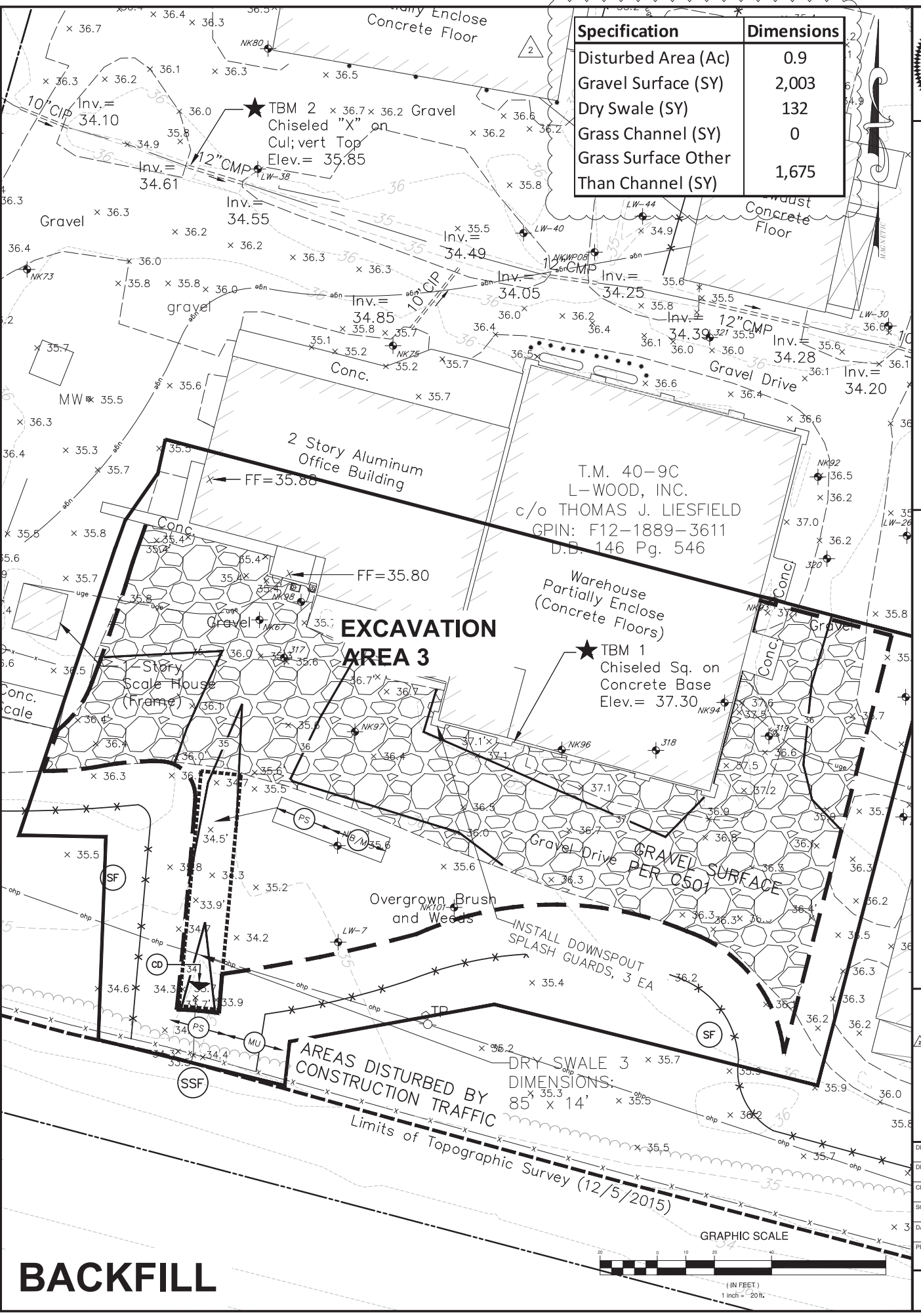
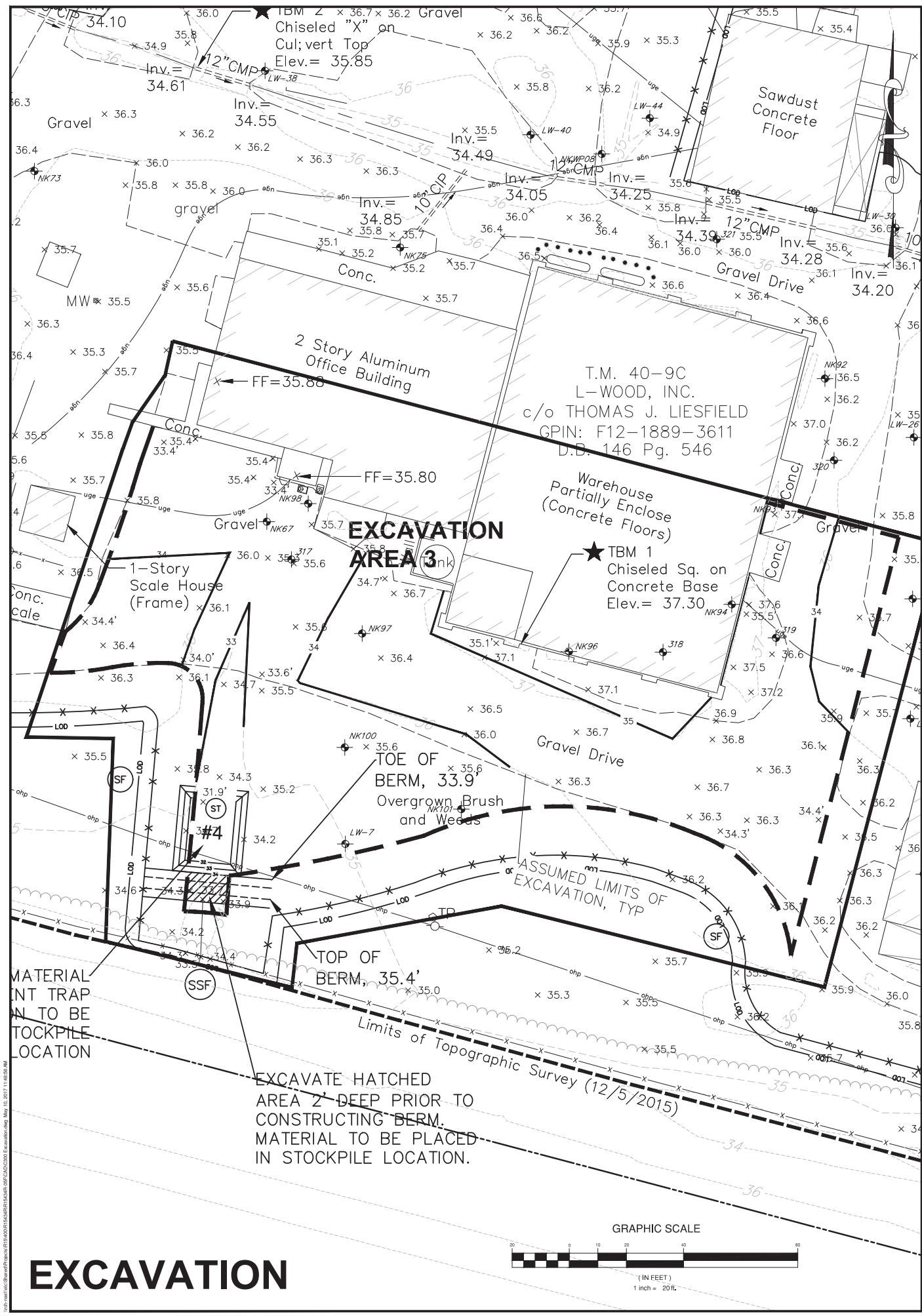


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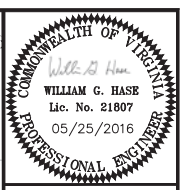
**EXCAVATION AREA 1
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS**
NEW KENT COUNTY, VIRGINIA

REVISIONS
MAY 4, 2016 PER COUNTY COMMENTS
MAY 25, 2016 PER COUNTY COMMENTS
CONSTRUCTION ISSUE 5/15/2017
DESIGNED BY: WGH
DRAWN BY: MOD
CHECKED BY: DCM
SCALE: 1" = 30'
DATE: 5/04/2016
PROJECT NUMBER: R15434R-05F
C301





Specification	Dimensions
Disturbed Area (Ac)	0.9
Gravel Surface (SY)	2,003
Dry Swale (SY)	132
Grass Channel (SY)	0
Grass Surface Other Than Channel (SY)	1,675



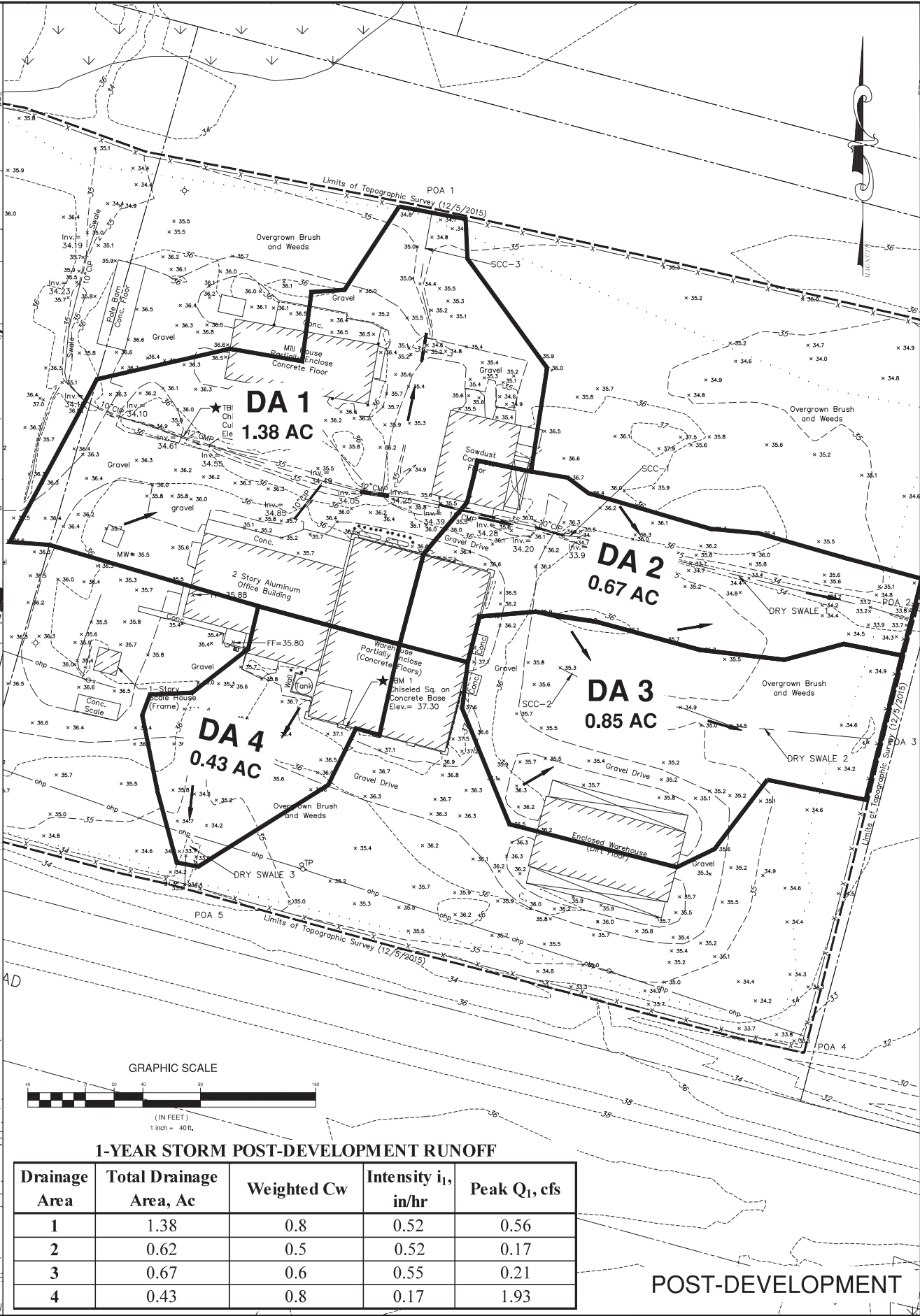
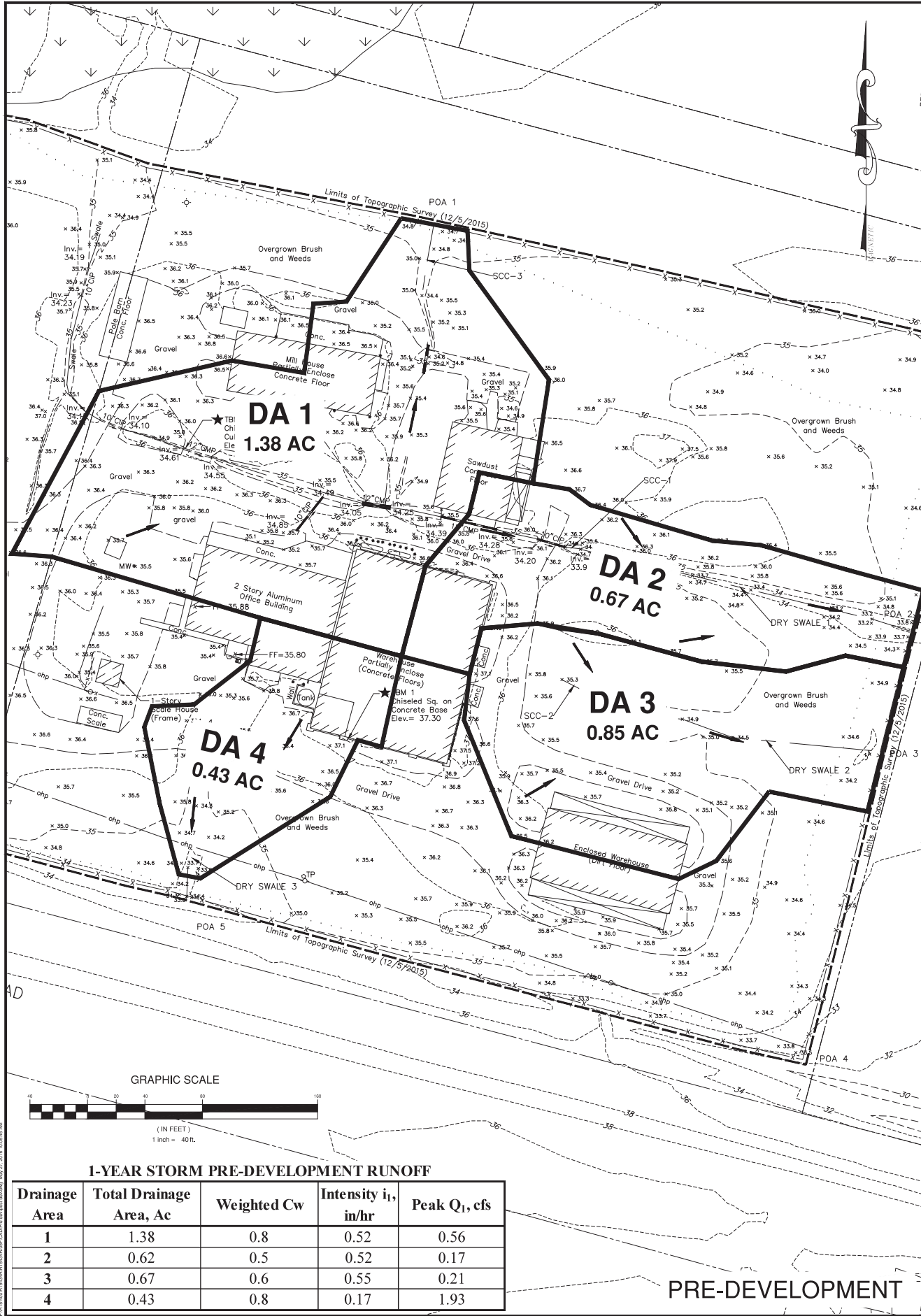
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**EXCAVATION AREA 3
RESPONSE ACTION PLAN**
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

DESIGNED BY:	WGH
DRAWN BY:	MQD
CHECKED BY:	DCM
SCALE:	1" = 20'
DATE:	5/04/2016
PROJECT NUMBER:	R15434R-05F
REVISIONS	
MAY 4, 2016	PER COUNTY COMMENTS
MAY 25, 2016	PER COUNTY COMMENTS
CONSTRUCTION ISSUE	5/15/2017

EXCAVATION

BACKFILL



COMMONWEALTH OF VIRGINIA
WILLIAM G. HASE
Lic. No. 21807
05/04/2016
PROFESSIONAL ENGINEER

Draper Aden Associates
Engineering • Surveying • Environmental Services
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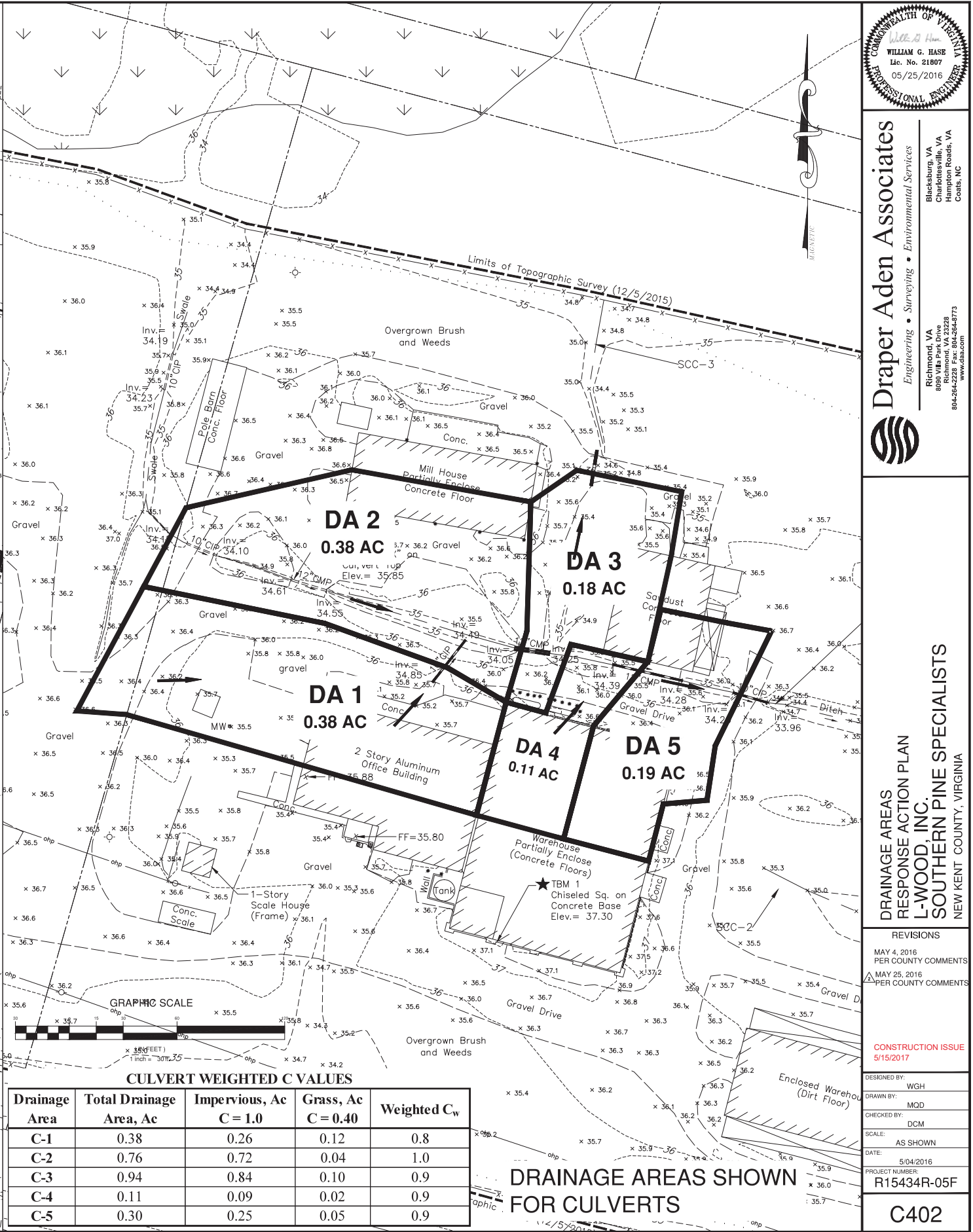
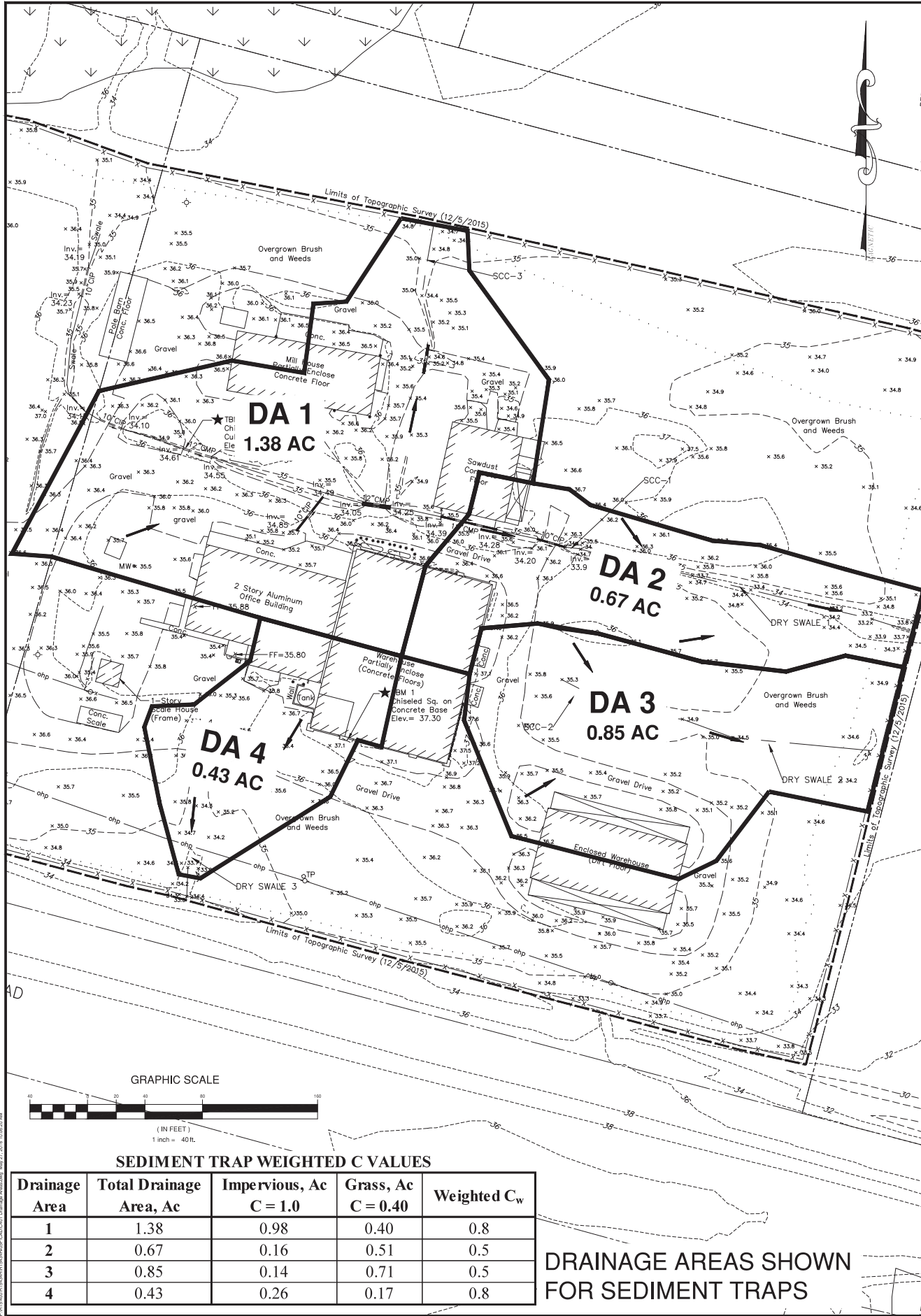
PRE-DEVELOPMENT/POST-DEVELOPMENT RUNOFF
RESPONSE ACTION PLAN
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

REVISIONS
MAY 4, 2016
PER COUNTY COMMENTS

CONSTRUCTION ISSUE
5/15/2017

DESIGNED BY: WGH
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SCALE: AS SHOWN
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PROJECT NUMBER: R15434R-05F

C401



Draper Aden Associates
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**DRAINAGE AREAS
RESPONSE ACTION PLAN**
L-WOOD, INC.
SOUTHERN PINE SPECIALISTS
NEW KENT COUNTY, VIRGINIA

REVISIONS

DATE	REVISION
MAY 4, 2016	PER COUNTY COMMENTS
MAY 25, 2016	PER COUNTY COMMENTS

CONSTRUCTION ISSUE
5/15/2017

DESIGNED BY: WGH
DRAWN BY: MOD
CHECKED BY: DCM
SCALE: AS SHOWN
DATE: 5/04/2016
PROJECT NUMBER: R15434R-05F

C402

Peak Flow Summary Table																
		Overland Flow			Shallow Concentrated Flow			Concentrated Flow			Total T _c , min	Intensity i ₂ , in/hr	Intensity i ₁₀ , in/hr	Peak Q ₂ (cfs)	Peak Q ₁₀ (cfs)	
Description	Drainage Area, Ac	C-Value	% Slope	Drainage Length, ft	T _c , min	% Slope	Drainage Length, ft	T _c , min	ΔH	Drainage Length, ft.						T _c , min
SCC-1	0.67	0.5	2.23	88	7.0	N/A	N/A	0.0	2.5	124	1.4	8.4	5.0	6.5	1.8	2.4
SCC-2	0.85	0.5	3.75	66	5.8	N/A	N/A	0.0	2.6	121	1.4	7.2	5.2	6.7	2.2	2.8
SCC-3	1.38	0.8	0.55	200	15.8	0.38	66.9	9.5	1.9	200	2.2	27.5	2.6	3.6	3.0	4.1
Dry Swale 1	0.67	0.5	2.23	88	7.0	N/A	N/A	0.0	3.8	244	2.9	9.9	4.5	6.0	1.6	2.2
Dry Swale 2	0.85	0.5	3.75	66	5.8	N/A	N/A	0.0	3.6	241	2.8	8.6	5.0	6.5	2.1	2.8
Dry Swale 3	0.43	0.8	2.25	108	7.7	N/A	N/A	0.0	3.6	83	0.9	8.6	5.0	6.5	1.6	2.1
C-1	0.38	0.8	0.84	71.6	5.5	N/A	N/A	0.0	2.1	135	1.4	6.9	5.2	6.7	1.6	2.1
C-2	0.76	1.0	2.66	77.1	3.7	N/A	N/A	0.0	2.2	107	1.2	4.9	5.7	7.2	4.2	5.3
C-3	0.94	0.9	3.21	49.8	4.2	N/A	N/A	0.0	2.6	102	1.1	5.3	5.5	7.0	4.9	6.2
C-4	0.11	0.9	6.64	35.4	3.3	N/A	N/A	0.0	2.3	41	0.2	3.5	7.1	8.6	0.7	0.9
C-5	0.30	0.9	3.61	69.2	4.3	N/A	N/A	0.0	2.9	41	0.3	4.6	5.9	7.4	1.6	2.0

Notes:
1. City of Richmond IDF curves were used to determine rainfall intensity
2. C-Value is weighted C per sheet C401.

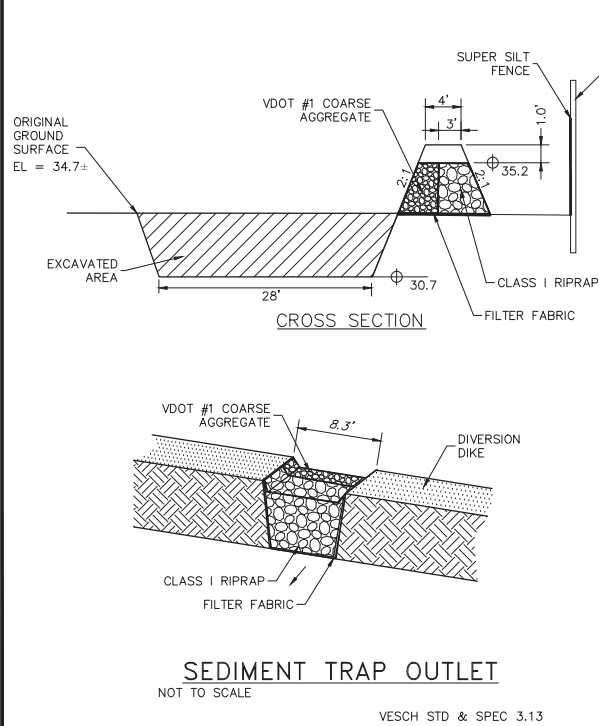
Peak Flow Summary at Impacted SCCs & Dry Swales

Swale ID	Analyzed Phase	Total T _c , min	Peak Q ₂ , cfs	Peak Q ₁₀ , cfs	Slope, %	Ditch Type	Manning's n	Side Slopes	Ditch Depth, ft	Overtopping	Erosion	Lining
										Flow Depth D ₁₀ , ft	Velocity V ₂ , ft/s	
SCC-1	Final Conditions	8.4	1.82	2.37	0.14	Vee	0.03	6:1	1.5	0.67	0.83	Grass, EC-2
SCC-2	Final Conditions	7.2	2.20	2.84	1.52	Vee	0.03	30:1	1.0	0.25	1.43	Grass, EC-2
SCC-3	Final Conditions	27.5	2.96	4.10	0.87	Vee	0.03	3:1	1.0	0.76	2.16	Grass, EC-2
Dry Swale 1	Final Conditions	9.9	1.64	2.18	0.14	Swale	0.03	3:1	1.0	0.27	0.67	Grass, EC-2
Dry Swale 2	Final Conditions	8.6	2.12	2.76	1.52	Swale	0.03	3:1	1.0	0.31	0.73	Grass, EC-2
Dry Swale 3	Final Conditions	8.6	1.64	2.13	1.21	Swale	0.03	3:1	1.0	0.22	0.59	Grass, EC-2

Dry Swale	Treatment Volume (ft ³)	Volume Reduced by Upstream BMP (ft ³)	Dry Swale Surface Area (ft ²)	Dry Swale Surface Area (Ac)	Width (ft)	Length (ft)
1	774.00	0.00	946.0	0.08	10.0	94.6
2	783.00	0.00	957.0	0.08	10.0	95.7
3	992.00	0.00	1212.4	0.03	14.0	86.6

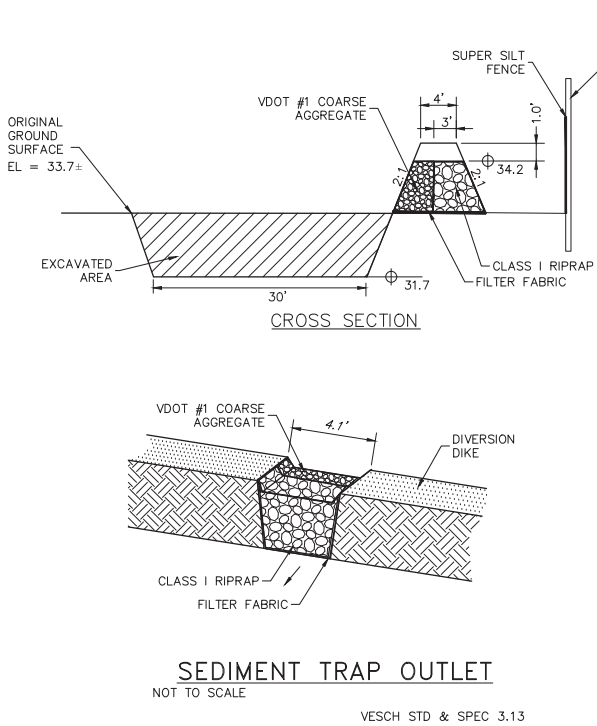
Peak Flow Adequacy Summary at Culverts

								Inlet Control		Outlet Control												
Culvert ID	Description	Site Condition Analyzed	Pipe Diameter, ft	Design Peak Flow Q_{10} , cfs	Length, ft	Inv. In	Inv. Out	HW/D	HW _{in}	D _c , ft	(D _c + D)/2	h _o	k _c	H	LS _o	HW _{out}	HW Elev IC	HW Elev OC	Control HW Elev	Road Elevation	Pipe Capacity, cfs	Outlet Velocity V ₁₀ , ft/s
C-1	12" CMP	Final Conditions	1.0	2.07	30	34.55	34.48	0.88	0.9	0.6	0.8	0.8	0.20	0.9	0.1	1.8	35.43	36.3	36.3	36.4	1.00	1.19
C-2A	12" CMP	Final Conditions	1.0	2.65	20	34.36	34.30	1.05	1.1	0.4	0.7	0.7	0.20	0.4	0.1	1.2	35.41	35.5	35.5	36.2	1.14	1.35
C-2B	12" CMP	Final Conditions	1.0	2.65	20	34.36	34.30	1.05	1.1	0.4	0.7	0.7	0.20	0.4	0.1	1.2	35.41	35.5	35.5	36.2	1.14	1.35
C-3	18" CMP	Final Conditions	1.5	6.18	40	34.30	34.20	0.95	1.4	1.0	1.3	1.3	0.20	0.3	0.1	1.6	35.73	35.9	35.9	35.9	3.06	1.61
C-4	12" CMP	Final Conditions	1.0	0.86	20	34.10	33.96	0.40	0.4	0.3	0.7	0.7	0.20	0.3	0.1	1.1	34.50	35.1	35.1	36.1	1.74	2.06
C-5	12" CMP	Final Conditions	1.0	2.01	20	34.00	33.94	0.87	0.9	0.6	0.8	0.8	0.20	0.5	0.1	1.4	34.87	35.3	35.3	36.0	1.14	1.35



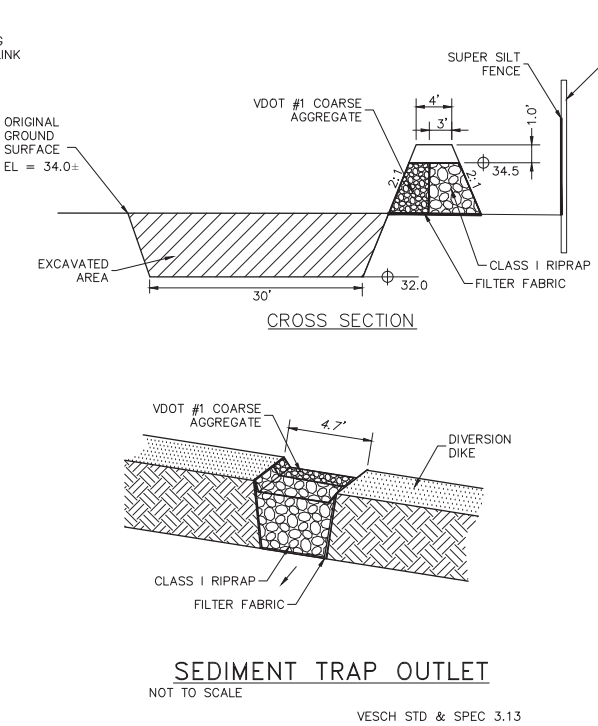
SEDIMENT TRAP 1 DESIGN

DRAINAGE AREA = 1.38 ACRES
TOTAL VOLUME REQUIRED = 185 CY
TOTAL VOLUME PROVIDED = 209 CY
BOTTOM OF EXCAVATED AREA = 16' X 28'
AT ELEV 30.7
WET VOLUME REQUIRED = 92.5 CY
WET VOLUME PROVIDED = 95 CY
DRY VOLUME REQUIRED = 92.5 CY
DRY VOLUME PROVIDED = 114 CY



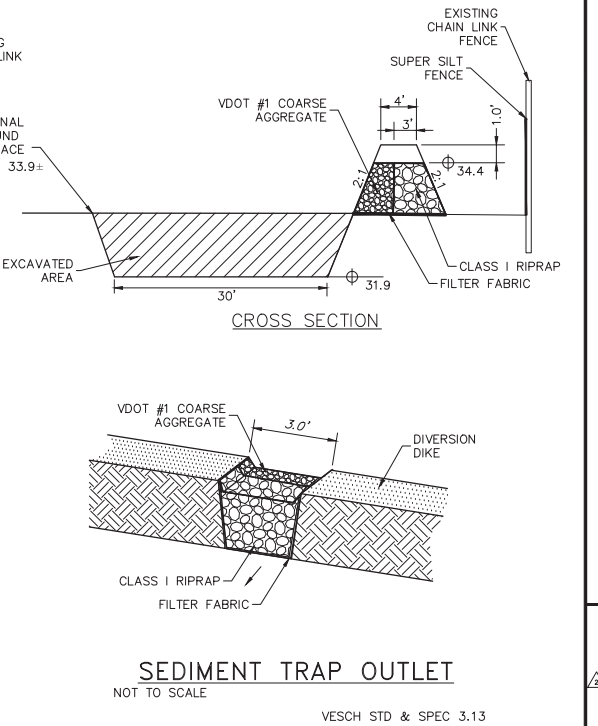
SEDIMENT TRAP 2 DESIGN

DRAINAGE AREA = 0.68 ACRES
TOTAL VOLUME REQUIRED = 91.2 CY
TOTAL VOLUME PROVIDED = 98.8 CY
BOTTOM OF EXCAVATED AREA = 20' X 30'
AT ELEV 31.7
WET VOLUME REQUIRED = 45.6 CY
WET VOLUME PROVIDED = 52 CY
DRY VOLUME REQUIRED = 45.6 CY
DRY VOLUME PROVIDED = 46.8 CY



SEDIMENT TRAP 3 DESIGN

DRAINAGE AREA = 0.78 ACRES
TOTAL VOLUME REQUIRED = 104.6 CY
TOTAL VOLUME PROVIDED = 117.2 CY
BOTTOM OF EXCAVATED AREA = 24' X 30'
AT ELEV 32.0
WET VOLUME REQUIRED = 52.3 CY
WET VOLUME PROVIDED = 61.6 CY
DRY VOLUME REQUIRED = 52.3 CY
DRY VOLUME PROVIDED = 55.6 CY



SEDIMENT TRAP 4 DESIGN

DRAINAGE AREA = 0.43 ACRES
TOTAL VOLUME REQUIRED = 57.7 CY
TOTAL VOLUME PROVIDED = 61.2 CY
BOTTOM OF EXCAVATED AREA = 16' X 22'
AT ELEV 31.9
WET VOLUME REQUIRED = 28.9 CY
WET VOLUME PROVIDED = 32.0 CY
DRY VOLUME REQUIRED = 28.9 CY
DRY VOLUME PROVIDED = 29.2 CY



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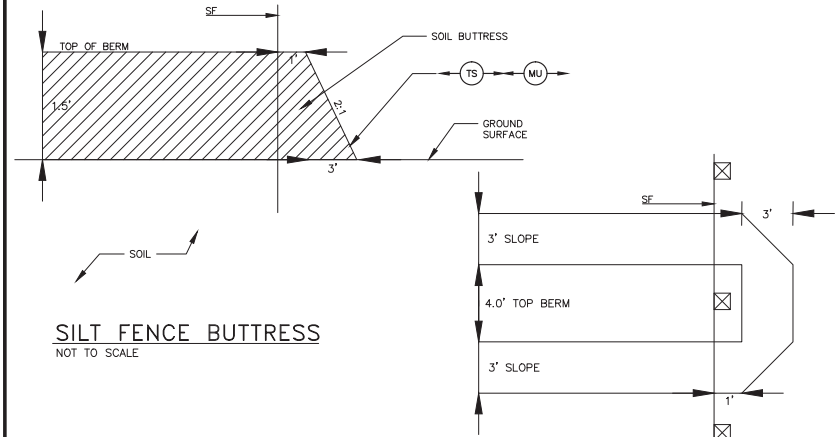
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DESIGNED BY: WGH
DRAWN BY: MQD
CHECKED BY: DCM
SCALE: NO SCALE
DATE: 5/04/2016
PROJECT NUMBER: R15434R-05F

C403



SILT FENCE BUTTRESS
NOT TO SCALE

1992 3.32

(PS) **TABLE 3.32-D**
SITE SPECIFIC SEEDING MIXTURES FOR COASTAL PLAIN AREA

	Total Lbs. Per Acre.
Minimum Care Lawn	
- Commercial or Residential	
- Kentucky 31 or Turf-Type Tall Fescue	175-200 lbs.
or	
- Common Bermudagrass **	75 lbs.
High-Maintenance Lawn	
- Kentucky 31 or Turf-Type Tall Fescue	200-250 lbs.
or	
- Hybrid Bermudagrass (seed) **	40 lbs. (unhulled)
or	
- Hybrid Bermudagrass (by other vegetative establishment method, see Std. & Spec. 3.34)	30 lbs. (hulled)
General Slope (3:1 or less)	
- Kentucky 31 Fescue	228 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- White Clover	2 lbs.
Low Maintenance Slope (Steeper than 3:1)	
- Kentucky 31 Tall Fescue	252 lbs.
- White Clover	2 lbs.
- Red Top Grass	2 lbs.
- Seasonal Nurse Crop *	20 lbs.
- Sericea Lespedeza **	252 lbs.

* Use seasonal nurse crop in accordance with seeding dates as stated below:
February, March through April Annual Rye
May 1st through August Foxtail Millet
September, October through November 15th Annual Rye
November 16th through January Winter Rye

** May through October, use hulled seed. All other seeding periods, use unhulled seed. Weeping Lovegrass may be added to any slope or low-maintenance mix during warmer seeding periods; add 10-10 lbs./acre in mixes.

VESCH STD & SPEC 3.32

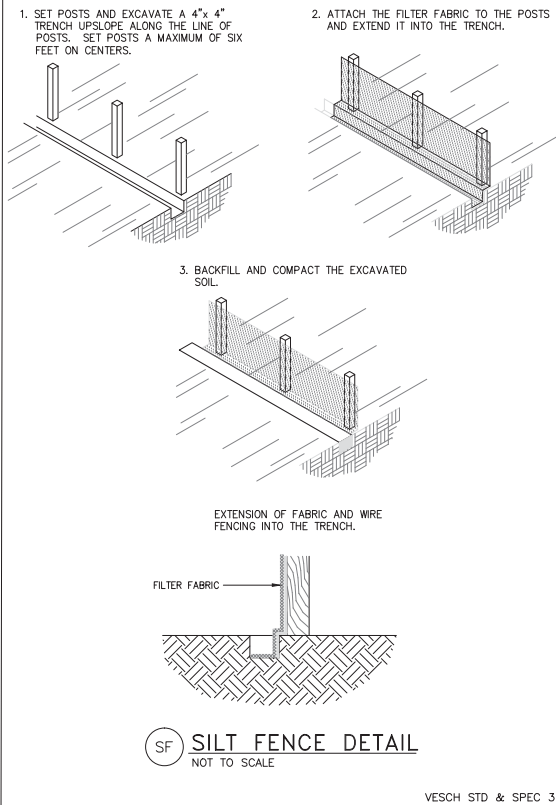
(PS) **LIME AND FERTILIZER APPLICATION RATES**
IF POSSIBLE, DETERMINE BY SOILS TEST. WHERE NOT POSSIBLE TO OBTAIN A SOILS TEST, THE FOLLOWING SOIL AMENDMENTS WILL APPLY:

LIME
COASTAL PLAIN: 2 TONS/ACRE PULVERIZED AGRICULTURAL GRADE LIMESTONE (90 LBS./1000 FT²)
PIEDMONT AND APPALACHIAN REGION: 2 TONS/ACRE PULVERIZED AGRICULTURAL GRADE LIMESTONE (90 LBS./1000 FT²)
NOTE: AN AGRICULTURAL GRADE OF LIMESTONE SHOULD ALWAYS BE USED.

FERTILIZER
MIXED GRASSES AND LEGUMES: 1000 LBS./ACRE 10-20-10 OR EQUIVALENT NUTRIENTS (23 LBS./1000 FT²).
LEGUME STANDS ONLY: 1000 LBS./ACRE 5-20-10 (23 LBS./1000 FT²) IS PREFERRED; HOWEVER, 1000 LBS./ACRE OF 10-20-10 OR EQUIVALENT MAY BE USED.
GRASS STANDS ONLY: 1000 LBS./ACRE 10-20-10 OR EQUIVALENT NUTRIENTS, (23 LBS./1000 FT²).
OTHER FERTILIZER FORMATIONS, INCLUDING SLOW-RELEASE SOURCES OF NITROGEN (PREFERRED FROM A WATER QUALITY STANDPOINT), MAY BE USED PROVIDED THEY CAN SUPPLY THE SAME AMOUNTS AND PROPORTIONS OF PLANT NUTRIENTS.
INCORPORATION - LIME AND FERTILIZER SHALL BE INCORPORATED INTO THE TOP 4-6 INCHES OF SOIL FROM A WATER QUALITY STANDPOINT, MAY BE USED PROVIDED THEY CAN SUPPLY THE SAME AMOUNTS AND PROPORTIONS OF PLANT NUTRIENTS.

(MU) **ORGANIC MULCH MATERIALS AND APPLICATION RATES**

MULCHES:	RATES:		NOTES:
	PER ACRE	PER 1000 SQ. FT.	
STRAW OR HAY	1 1/2 - 2 TONS (MINIMUM 2 TONS OF WINTER COVER)	70 - 90 LBS.	FREE FROM WEEDS AND COARSE MATTER. MUST BE ANCHORED, SPREAD



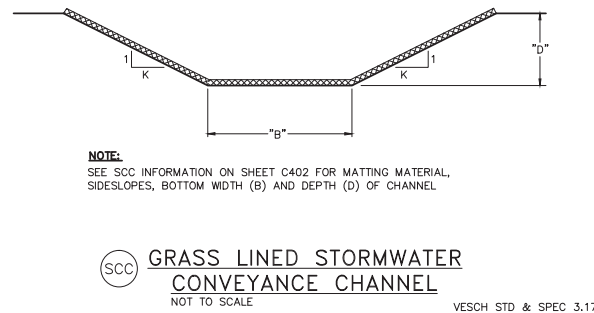
(SF) **SILT FENCE DETAIL**
NOT TO SCALE

VESCH STD & SPEC 3.05

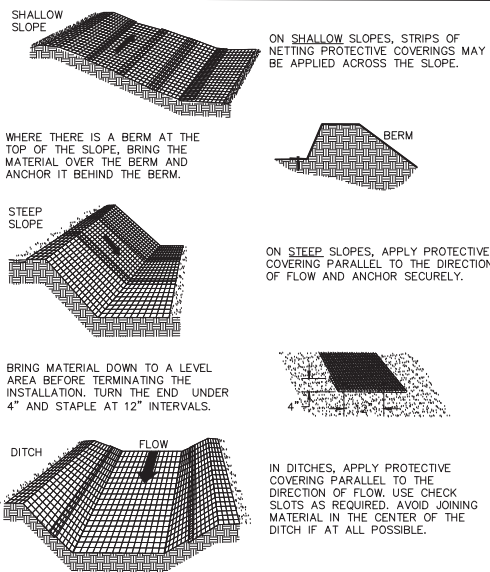
(SCC) **TABLE 3.31-B**
ACCEPTABLE TEMPORARY SEEDING PLANT MATERIALS
"QUICK REFERENCE FOR ALL REGIONS"

PLANTING DATES	SPECIES	RATE (LBS./ACRE)
SEPT. 1 - FEB. 15	50/50 MIX OF ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM) & CEREAL (WINTER) RYE (SECALE CEREALE)	50-100
FEB. 16 - APR. 30	ANNUAL RYEGRASS (LOLIUM MULTI-FLORUM)	60-100
MAY 1 - AUG 31	GERMAN MILLET (SETARIA ITALICA)	50

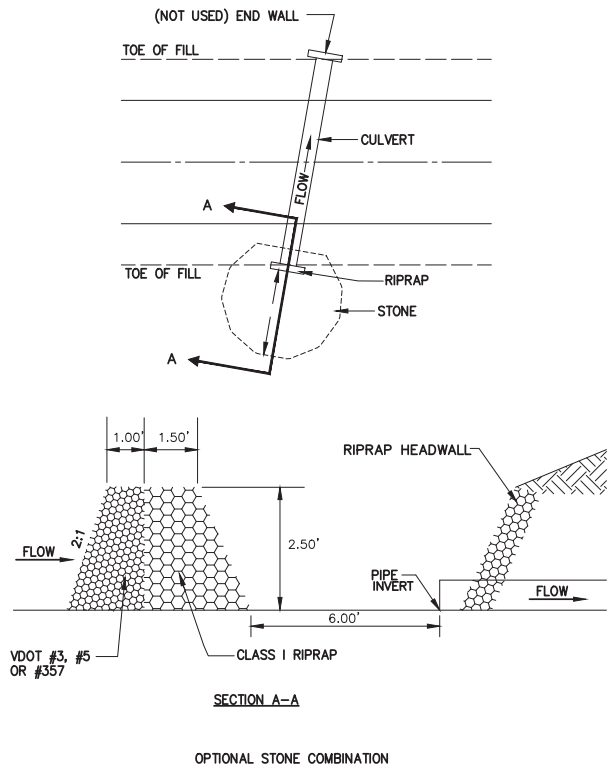
VESCH STD & SPEC 3.31



(SCC) **GRASS LINED STORMWATER CONVEYANCE CHANNEL**
NOT TO SCALE
VESCH STD & SPEC 3.17

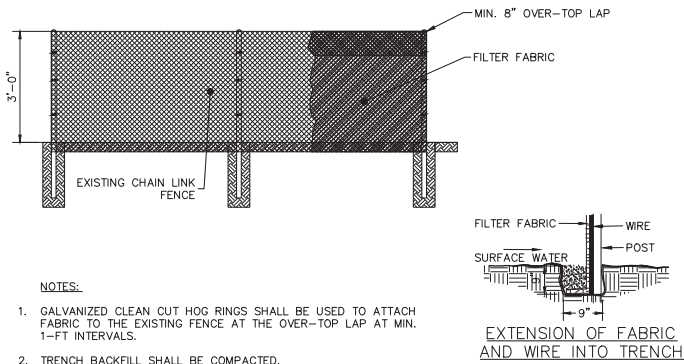


(B/M) **TYPICAL ORIENTATION OF TREATMENT - 1 (EC-2) SOIL STABILIZATION BLANKET**
NOT TO SCALE



(CIP) **CULVERT INLET PROTECTION DETAIL**
NOT TO SCALE

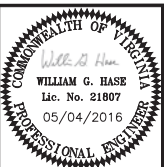
VESCH STD & SPEC 3.08



- NOTES:
1. GALVANIZED CLEAN CUT HOG RINGS SHALL BE USED TO ATTACH FABRIC TO THE EXISTING FENCE AT THE OVER-TOP LAP AT MIN. 1-FT INTERVALS.
 2. TRENCH BACKFILL SHALL BE COMPACTED.

(SSF) **SUPER SILT FENCE**
NOT TO SCALE

VESCH STD & SPEC 3.05



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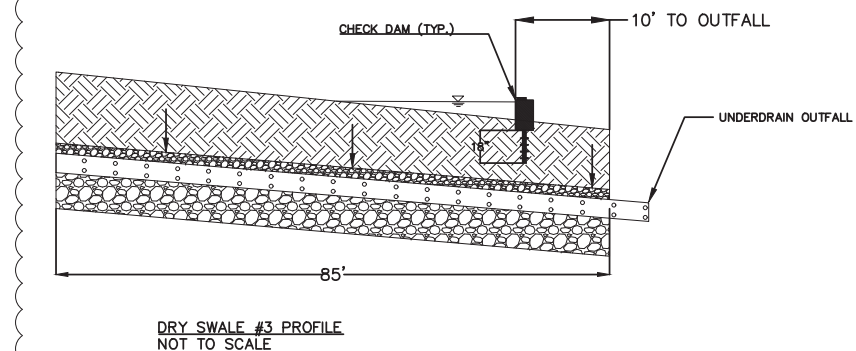
DESIGNED BY: WGH
DRAWN BY: MOD
CHECKED BY: DCM
SCALE: NO SCALE
DATE: 5/04/2016
PROJECT NUMBER: R15434R-05F

C501



DRY SWALE

NOT TO SCALE

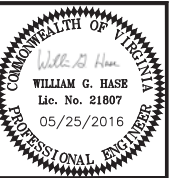
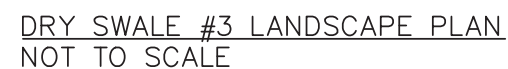
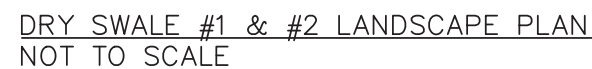


¹ The storage depth is the sum of the Void Ratio (Vr) of the soil media and gravel layers multiplied by their respective depths, plus the surface ponding depth.

² Refer to Stormwater Design Specification No. 9: Bioreentention for soil specifications.

Dry Swale Material Specifications		
Material	Specification	Notes
Filter Media Composition	Filter Media to contain: <ul style="list-style-type: none"> • 85-88% sand • 8-12% soil fines • 3-5% organic matter in form of leaf compost 	The volume of filter media is based on 110% of the product of the surface area and the media depth, to account for settling.
Filter Media Testing	P-index range = 10-30; Cation Exchange Capacity (CEC) greater than 10. Mix on-site or	
Surface Cover	Turf or river stone.	
Top Soil	4 inch surface depth of loamy sand or sandy loam texture, with less than 5% clay	
Filter Fabric	A non-woven polypropylene geotextile with a flow rate of > 110 gal./min./sq. ft. (e.g. A 2 to 4 inch layer of sand over a 2 inch layer of choker stone (typically #8 or #89	
Choking Layer	A 9 to 18 inch layer (depending on the desired depth of the storage layer) of a #57	
Stone and/or Storage Layer	6-inch rigid schedule 40 PVC pipe, with 3/8-inch perforations. Use corrugated HDPE for rain gardens.	Install perforated pipe for the full length of the Dry Swale cell. Use non-perforated pipe, as needed, to connect with the storm drain system.
Underdrains, Cleanouts, and Observation Wells		
Vegetation	Plant species as specified on the landscaping plan.	
Check Dams	Use non-erosive material such as wood, gabions, riprap, or concrete. All check dams	
Erosion Control Fabric	Where flow velocities dictate, use woven biodegradable erosion control fabric or	

SPECIES	HEIGHT	TOTAL
AUTUMN OLIVE	2-3 FEET	24
EASTERN RED CEDAR	4-5 FEET	6
RIVER BIRCH	4-5 FEET	6



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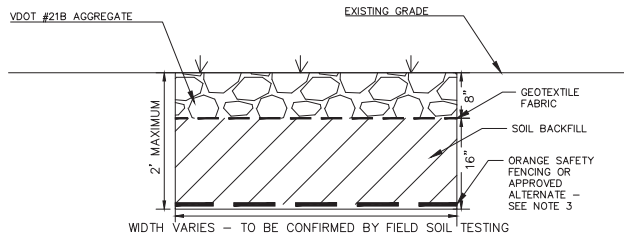
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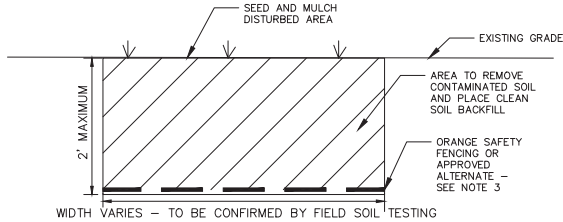
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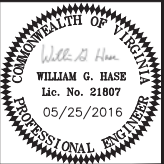
GRAVEL SURFACE AREA BACKFILL
NOT TO SCALE



GRASSED AREA BACKFILL
NOT TO SCALE

1. EXCAVATED SOILS TO BE STOCKPILED IN DESIGNATED AREA. SOIL TO BE PLACED ON PLASTIC SHEETING.
2. EXCAVATION WIDTHS TO BE FIELD CONFIRMED BY TESTING PERSONNEL.
3. IN THE EVENT THAT CONTAMINANTS EXCEED RESPONSE GOALS AT A DEPTH OF 24 INCHES, INSTALL ORANGE SAFETY FENCING ON BOTTOM OF EXCAVATION.
4. SOIL BACKFILL TO BE PROVIDED BY CONTRACTOR. SOIL TO BE MATERIAL THAT CLASSIFIES IN THE ASTM D2487 SOIL CLASSIFICATION GROUPS SM, SC, ML, MH, AND CL OR A COMBINATION OF THESE GROUPS. SOILS SHALL CONTAIN NO PARTICLES LARGER THAN 2" IN SIZE. SOIL SHALL BE GENERALLY FREE OF ROOTS OR DEBRIS.
5. SOIL TO BE PLACED IN TWO COMPACTED 8 INCH LIFTS. COMPACT TO MINIMUM 95 PERCENT MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698.
6. GEOTEXTILE FABRIC TO BE WOVEN POLYPROPYLENE, ACF ENVIRONMENTAL S300 OR APPROVED EQUAL.
7. AGGREGATE TO BE COMPACTED VDOT 21B.

1. EXCAVATED SOILS TO BE STOCKPILED IN DESIGNATED AREA. SOIL TO BE PLACED ON PLASTIC SHEETING.
2. EXCAVATION WIDTHS TO BE FIELD CONFIRMED BY TESTING PERSONNEL.
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5. SOIL TO BE AMENDED AS NEEDED TO PROVIDE MINIMUM 4 PERCENT BY VOLUME CLEAN ORGANIC MATTER (SUCH AS COMPOSTED YARD MATERIAL).
6. SOIL SHALL BE PLACED IN THREE COMPACTED 8 INCH LIFTS. COMPACT TO MINIMUM 90 PERCENT MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D698.
7. LIME, FERTILIZER, AND SEED IN ACCORDANCE WITH DETAILS ON DRAWINGS.



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R15434R-05F

C503

TECHNICAL SPECIFICATIONS

SECTION 01000

GENERAL CONSTRUCTION STANDARDS

PART 1 GENERAL

1.01 Summary of Work

- A. Work covered consists of earthwork and site work associated with removal of contaminated soils and aggregate and replacement with clean materials.
- B. The Contractor under this project will be required to provide all labor, equipment, materials, tools and services necessary to complete the work indicated or called for on the Contract Drawings and/or specified in this Project Manual. The Contractor's work is generally described as follows:
- C. The work will generally consist of the following (the following list of work items does not imply a construction sequence):
 - 1. Supply and install erosion and sediment control devices – includes, but may not be limited to, construction entrances, siltation fencing, sediment traps. Contractor is responsible for maintenance of all ESC features for this project and for measures required for protection or restoration of impacted downstream drainageways and basins and establishment of slope stabilization that are not shown on the plans.
 - 2. Work is to be completed in pre-defined phases, indicated as Excavation Areas 1, 2, 3, and 4, in order to minimize disruption of the businesses that are currently operating on the property. The success of the phased approach will rely largely on close communication among project personnel, Contractor, and the tenants.
 - 3. Removal of material (soil and stone) that is contaminated with arsenic and cadmium from areas generally indicated on the project drawings. Removal extents will be determined by field sampling and analysis for arsenic and cadmium levels. The remedial goals are 30 mg/kg (ppm) for arsenic and 63 mg/kg for cadmium. Preconstruction detection level data is available from the Engineer.
 - 4. Backfill excavated areas with clean soil and stone provided by the Contractor and pre-approved by the Engineer.

5. Install culverts and other drainage features including dry swales as indicated.
 6. Seed and mulch disturbed areas.
- D. Borrow Areas – soil for this project shall be from an off-site borrow areas provided by the Contractor. Contractor is responsible for implementing necessary erosion and sediment control measures for the borrow areas per the requirements of the locality in which it is located.
- E. Contractor shall comply with the Stormwater Pollution Prevention Plan (SWPPP) contained in Attachment 2. Contractor shall conduct SWPPP inspections as indicated in the plan.
- F. Provision of minimum 1-year warranty on workmanship and materials provided by Contractor. (Note: Should faulty workmanship create damage to site, Contractor shall be responsible for costs associated with repair.)

1.02 Site Access

- A. The Owner agrees to make the project site accessible to the Contractor during Monday through Saturday 6:00 a.m. to 6:00 p.m. Additional hours must be approved by the Owner in writing.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.03 Coordination with Occupants

- A. Full Owner Occupancy: Owner will occupy site and adjacent building during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
1. Ingress and egress to the project area will be limited to the *west* entrance to the facility and the asphalt-paved roadway / parking lot that leads to the south end of the facility.
 2. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and approval of authorities having jurisdiction.

3. Notify Owner not less than 72 hours in advance of activities that will affect Tenants operations.

1.04 Work Restrictions

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner.

1.05 Payment

- A. Applications for Payment
 - (1) The form of each application for payment shall be as provided in Section 00673 or as approved by the Owner. Payment for stored material delivered but not incorporated in the work will be the invoiced amount only. Stored materials drawdown shall be approved by the Owner. Submit to the Engineer bill of sale or other evidence of material stored on site but not incorporated into the work. Material shall be stored in a manner acceptable to the Engineer. Submit applicable invoices with Application for Payment. Monthly partial payment request shall be submitted in to Draper Aden Associates for approval by the 25th of the month so that the Owner can receive the approved payment request by the first working day of the next month. Partial payments shall be made on a monthly basis on or before the end of the next month for which the work was performed, in accordance with the Contract Documents.
 - (2) The Owner shall pay to the Contractor 95 percent of the total amount due and the Owner shall retain five (05) percent of the amount due until work has been performed strictly in accordance with the Contract Documents and until such work has been accepted by the Owner.
 - (3) At least ten (10) consecutive calendar days prior to submitting the first application for a partial payment, Contractor shall submit a progress schedule, a final schedule of Shop Drawings submission and a schedule of values of the work. These schedules shall be satisfactory in form and substance to the Engineer. The schedule of values shall include quantities and unit prices aggregating the contract price, and shall subdivide the work into component parts in sufficient detail to serve as the basis for

progress payments during construction. Upon approval of the schedules of values by the Engineer, it shall be incorporated into the form of application for payment furnished by the Engineer.

B. Change Order Procedures

- (1) No amount, in part or in whole, of a Change Order shall be included in a requisition for payment by the Contractor until the Change Order has been executed and copies of the Change Order have been distributed to the Owner and Contractor.
- (2) Proceed Orders: A Proceed Order is a device which enables the Owner to promptly order changes in the work which may involve changes in cost or contract time, or both pending preparation and execution of a formal Change Order.
- (3) Request for Change Order Proposal: The Owner may request the Contractor to submit a Change Order Proposal for changes in Contract work. The Contractor shall submit the proposal in accordance with contract requirements within a reasonable time. The Owner may issue to the Contractor a Proceed Order authorizing the required changes for an additional amount not to exceed, or a deduction of not less than the amount shown in the Proceed Order. If the Contractor is not in agreement with the amount stipulated in the Proceed Order, he shall, within a reasonable time after the issue date of the order, submit an equitable proposal and develop with the Owner a mutually acceptable price for the required change in work.
- (4) Change Order Proposal: Without further request and within a reasonable time from the issue date of a Proceed Order, the Contractor shall submit a written Change Order Proposal covering the work authorized in the Proceed Order so that a Change Order may be prepared for execution.

PART 2 PRODUCTS

All products incorporated into the work area are to be new, unused, and first quality unless otherwise specifically noted.

PART 3 EXECUTION

3.01 Existing Work

- A. Removal and alteration of existing work shall include work necessary to provide final conditions as shown on Contract Drawings. Complete such work carefully to minimize disturbance to adjacent areas.
- B. Restore areas disturbed during construction to their original condition, including patching, painting, etc. to the satisfaction of the Owner and the Engineer.
- C. If work is not as anticipated or involves structural considerations, notify Engineer prior to proceeding.

3.02 Superintendence by Contractor

- A. The Contractor shall give his personal superintendence to the work or have a competent superintendent, satisfactory to the Engineer, on the work at all times during progress, with authority to act for him.
- B. The Contractor shall have posted in a conspicuous spot with his equipment and on the work site a sign or sticker identifying his equipment as to its owner and an emergency twenty-four hour phone number.
- C. The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents.
- D. Contractor's personnel must work under a Health and Safety Plan (HASP) prepared by the Contractor.
- E. Contractor must use Hazwopper trained/certified personnel (40 hour with 8 hour annual refresher, and supervisor training as applicable). Copies of the certificates are to be provided to the Engineer.

3.03 Specifications and Contract Drawings

- A. The Contractor shall keep at the work site a copy of the Contract Drawings and specifications including authorized change orders and shall at all times give the Engineer access thereto. Anything mentioned in the specifications and not shown on the Contract Drawings, or shown on the Contract Drawings and not mentioned in the specifications, shall be of like effect as if shown or mentioned in both. In case of difference between the Contract Documents, the Contract Drawings shall take precedence over the specifications. In case of discrepancy either in the figures, or in the Contract Drawings or specifications, the matter shall be

promptly submitted to the Engineer who shall promptly make a determination. Any adjustment by the Contractor without such a determination shall be at his own risk and expense. The Engineer shall furnish from time to time such detail drawings and other information, as he may consider necessary, unless otherwise provided.

- B. Discrepancies and Errors: Should the Contractor discover a discrepancy between the Contract Drawings and specifications and the site conditions or an error or omission in the Contract Drawings or specifications, he shall at once report them to the Engineer, but he shall not be responsible for their existence or discovery. However, if the Contractor proceeds with work that may be affected by such discrepancies, errors or omissions, after their discovery but before their correction, such work shall be at the Contractor's own risk.

3.04 Materials and Equipment

- A. Quality: Material and Equipment Incorporated into the Work shall be new and unused and shall:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type, and quality selected, or as specifically approved in writing by the Owner.
 - 3. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
 - 4. When Contract Documents require that installation of work shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to parties involved in the installation. Maintain one set of complete instructions at the job site during installation and until completion. Handle, install, connect, clean, condition, and adjust products in accordance with such instructions and in conformity with specified requirements. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with the Owner for further instructions. Do not proceed with work without clear instructions. Perform work in accordance with manufacturer's instructions. Do not omit a preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.
- B. Transportation and Handling
 - 1. Verify prior to bidding that specified items will be available in time for installation during orderly and timely progress of the Work. In the event

specified items will not be available, notify the Engineer prior to submission of Bids. Costs of delays because of non-availability of specified items, when not identified by the Contractor prior to submission of Bids shall not be borne by the Owner.

2. Arrange deliveries of products in accordance with construction schedules. Coordinate to avoid conflict with work and conditions at the site. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible. Immediately on delivery, inspect shipments to confirm compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
3. Provide equipment and personnel to handle products by methods to reduce soiling or damage to products or packaging.

C. Storage and Protection

1. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store products subject to damage by the elements in weather tight enclosures. Maintain temperature and humidity within the ranges required by manufacturer's instructions.
2. Exterior Storage: Store fabricated products above the ground, on blocking or skids; prevent soiling or staining; cover products that are subject to deterioration with impervious sheet coverings; and provide adequate ventilation to avoid condensation.
3. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to confirm that products are maintained under specified conditions and free from damage or deterioration.

D. Project Substitutions

1. Trade names, brand names and/or manufacturer's information used in these specifications are for the purposes of establishing quality. Bids on products or other qualified manufacturers are acceptable provided request is made in writing after the date of the Agreement, and, if approved:
 - a. No major changes in the construction, design intent, or to any services or modifications to other equipment of the project would be required. Changes required to accommodate substituted items or the cost to repair damage resulting from effecting such changes

or modifications made necessary or caused by substitution shall be made by the Contractor at no additional cost or time delay.

- b. Features of quality, capacity, construction, performance, appearance, size, arrangement, and general utility including economy of operation of substitutes offered, either parallel or exceed those of specified products.
- c. The provisions of Article 6.30 of the General Conditions and any other guarantees, if required by the specification sections, shall apply in full force and effect to the performance of such substitute products, approved for incorporation into the work.

- 2. Technical data covering the proposed substitution shall be furnished with the request.

3.05 Testing

- A. Soil compaction tests called for within the project specifications will be provided by the contractor.
- B. Testing services other than those called for in these contract documents may be called for by the Owner to check compliance with specifications, the testing service charges will be borne by the Owner, but when non-compliance with specification is indicated, the testing service charges will be deduced from the Contract Sum.

3.06 Decontamination Area

Contractor is responsible for creating, maintaining, and closing an equipment decontamination area on site for characterizing/analyzing decontamination wastes.

3.07 Utilities and Monitoring Points

- A. Existing utilities shall be located, protected, and rerouted as necessary during construction. Utilities are not intended to be moved or replaced. Locations of underground utilities shown on the Contract Drawings are approximate.
- B. It is not the intent of these specifications to identify each existing utility, but the responsibility of the Contractor to maintain, repair, or restore utilities. Contractor shall be responsible for the cost of damages to utilities or monitoring points caused by the construction. Contractor shall be responsible for utility markings as required by law before beginning excavation.

3.08 Site Security

Caution shall be maintained by the Contractor to verify the site is secured at all times. Security measures shall be coordinated with the Owner.

END OF SECTION

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SECTION 01050

LICENSES AND PERMITS

PART 1 GENERAL

- 1.01 Prior to beginning construction, the Contractor shall obtain and display County and State licenses required by law in the operation of his business and obtain and pay for permits required to complete the work.
- 1.02 Subcontractors shall obtain and display County and State licenses required by law in the operation of their business.
- 1.03 The Contractor shall obtain the land disturbance permit from New Kent County and post the Erosion and Sediment Control and Stormwater Management Bond.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01060

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.01 Regulatory Compliance

It is consistent with the intent of these Specifications to describe those performance standards, often broad and general in nature, as per the requirements of the referenced standards. It shall be the responsibility of the Contractor to familiarize himself fully regarding the detailed needs and requirements of the regulatory agencies having jurisdiction over this work. These detailed needs and requirements shall be accommodated, as part of the work, in every manner just as if they were prescribed in these Specifications.

1.02 Requirement Included

Provide required personnel, equipment, and materials to construct the project according to applicable codes.

1.03 Application and Standards

As a minimum standard of quality and workmanship, construction is to comply with the latest edition of the following codes and standards, insofar as they are applicable:

- A. Virginia Erosion and Sediment Control Handbook, 1992.
- B. American Society for Testing Materials (ASTM).
- C. Virginia Department of Transportation, "Road and Bridge Specifications", 1994.
- D. Occupational Safety and Health Administration (OSHA).

The above codes and standards are hereinafter referred to as "Reference Specifications".

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01070

LINES AND GRADES

PART 1 GENERAL

- 1.01 Elevations indicated or specified refer to the National Vertical Datum indicated on the drawings. Control benchmarks are at the elevation and in the location as shown on the Contract Drawings.
- 1.02 Coordinates indicated refer to an assumed coordinate system.
- 1.03 Layout of Work
 - A. The Engineer will provide control point and benchmarks information. From these points, the Contractor shall run lines and levels, furnish, set, and drive grade stakes, and do other work necessary to lay out the work in accordance with the dimensions and elevations shown on the Contract Drawings.
 - B. The Contractor shall, at his expense, provide necessary survey services and shall provide and maintain accurate, detailed survey field notes and daily progress reports.
 - C. Contractor shall verify dimensions and elevations at the site prior to proceeding with the work. The Contractor shall also verify existing utility locations prior to purchasing materials affected by these locations.
 - D. The Contractor shall locate and inform the Engineer as to existing or conflicting utilities, prior to construction.
 - E. Earthwork shall be graded to $\pm 0.2'$ of required grades provided positive drainage is maintained.
 - F. Piping shall be graded to $\pm 0.1'$ provided required slopes are maintained.
- 1.04 The Contractor will be held responsible for the preservation of stakes and marks established by the Engineer, and if the stakes and marks are disturbed, the cost of replacing them shall be charged against the Contractor.
- 1.05 Approximate alignment and location of the lines are as indicated on the Contract Drawings. The Contractor shall furnish necessary personnel and equipment to establish the line, grade, and elevations for the specified work

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 GENERAL

- 1.01 Work completed under the contract will be measured using United States Units of Measurements.
- 1.02 Items not specifically listed in the Bid Form, for which there are no instructions as to where the price shall be included, shall be covered by distributing the price within the listed items. No additional payment will be allowed.

1.03 Measurement

- A. Linear measurements shall be measured as shown on the Contract Drawings (i.e. horizontal distances, not slope distances).
- B. Area computations will be based upon horizontal (plan) longitudinal measurements and transverse measurements based upon neat dimensions shown on the Contract Drawings.
- C. Volume computations will be based upon the specified thickness times the horizontal area measured in the field. Final quantities will be determined from field survey(s) after completion of work.
- D. "Lump Sum" when used as an item of payment, will mean complete functioning item for the work described in the contract. When a complete structure or structural unit is specified as the unit of measurement, the unit will be construed to include necessary fittings, accessories, and appurtenances.
- E. Unit price is applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.
- F. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

1.04 Definitions of Units

The definition of items and basis of payment are as indicated on the Bid Form. Materials, labor, tools, equipment, and incidentals necessary to complete the work shall be included.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- 3.01 Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

END OF SECTION

SECTION 01153

CHANGE ORDER PROCEDURES

PART 1 GENERAL

1.01 Requirement Included

Promptly implement change order procedures and provide full written data required to evaluate changes to Owner and Engineer.

1.02 Preliminary Procedures

- A. Owner or Engineer may initiate changes by submitting a Proposal Request to Contractor. Request will include:
 - 1. Detailed description of the Change, products, and location of the Change in the Project.
 - 2. Supplementary or revised Drawings and Specifications.
 - 3. The projected time span for making the change.
 - 4. A specific period of time during which the requested price will be considered valid.
 - 5. Such request is for information only, and is not an instruction to execute the changes, or to stop work in progress.
- B. Contractor may initiate changes by submitting a written notice to Engineer, containing:
 - 1. Description of the proposed changes.
 - 2. Statement of the reason for making the changes.
 - 3. Statement of the effect on the Contract Sum and the Contract Time.
 - 4. Statement of the effect on the Work of separate Contractors.
 - 5. Documentation supporting change in Contract Sum or Contract Time, as appropriate.

1.03 Construction Change Authorization

- A. In lieu of Proposal Request, Engineer may issue a Construction Change Authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.
- B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change,

and will designate the method of determining the change in the Contract Sum and the change in Contract Time.

- C. Owner and Engineer will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.
- D. Contractor may sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.04 Documentation of Proposals and Claims

- A. Support each quotation for a lump-sum price with sufficient substantiating data to allow Engineer to evaluate the quotation.
- B. On request provide additional data to support time and cost computation:
 - 1. Labor required.
 - 2. Equipment required.
 - 3. Products required; both the recommended source of purchase and unit cost and the quantities required.
 - 4. Taxes, insurance, and bonds.
 - 5. Credit for work deleted from Contract, similarly documented.
 - 6. Overhead and profit.
 - 7. Justification for change in Contract Time.

1.05 Preparation of Change Orders

- A. Engineer will review each Change Order.
- B. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- C. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.06 Lump-Sum/Fixed Price Change Order

- A. Content of Change Orders will be based on, either:
 - 1. Engineer's Proposal Request and Contractor's responsive proposal as mutually agreed between Owner and Contractor.
 - 2. Contractor's proposal for a change, as recommended by Engineer.
- B. Engineer will sign and date the Change Order as recommendation for the Owner to accept the changes.

- C. Contractor will sign and date the Change Order to indicate agreement with the terms therein.
- D. Owner will sign and date the Change Order as authorization for the Contractor to proceed with the changes. Owner will distribute executed Change Order to Contractor and to Engineer.

1.07 Correlation with Contractor's Submittals

- A. Periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of Work, and to record the adjusted Contract Sum.
- B. Periodically revise the Construction Schedule to reflect each change in Contract Time. Revise sub-schedules to show changes for other items of work affected by the changes.
- C. Upon completion of work under a Change Order, enter pertinent changes in Record Documents.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01201

PRECONSTRUCTION CONFERENCE

PART 1 GENERAL

- 1.01 The Engineer shall arrange a Preconstruction Conference after the effective date of the Agreement. The Preconstruction Conference will be held prior to the Contractor's mobilization to the site. At a minimum, attendees shall include the Contractor, Engineer, Engineer's Resident Project Representative, and tenants.
- 1.02 Items of discussion shall include, but not be limited to the following:
- A. Tentative construction schedule
 - B. Work sequencing
 - C. Coordination of Contractor and tenant activities
 - D. Designation of responsible personnel
 - E. Use of the premises
 - F. Office, work, and storage areas
 - G. Equipment/material deliveries and priorities
 - H. Security and working hours
 - I. Housekeeping

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01202

PROGRESS MEETINGS

PART 1 GENERAL

- 1.01 Progress meetings will be held at least every other week, unless the Engineer directs otherwise, to discuss project progress, problems that may be encountered, quality of workmanship, and other aspects of concern. Date, time, and location of progress meetings will be established at the preconstruction conference.
- 1.02 The Contractor's superintendent and Engineer's Resident Project Representative shall attend progress meetings.
- 1.03 The Resident Project Representative shall record meeting minutes and distribute copies to everyone in attendance.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 GENERAL

1.01 Requirement Included

- A. Prior to the Preconstruction Conference, the Contractor shall submit to the Engineer a proposed construction schedule.
- B. Construction schedule shall be in a form that will clearly show the proposed degree of completeness of each aspect of the construction throughout the life of the contract. Gantt graphs and/or PERT diagrams are acceptable forms.
- C. Items shown in the Construction schedule shall be identified in the Schedule of Values developed by the Contractor.
- D. The progress schedule shall be updated monthly. The updated progress schedule shall be submitted with each Application for Payment.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01340

SHOP DRAWINGS AND PRODUCT DATA

PART 1 GENERAL

- 1.01 The Contractor shall submit for the approval of the Engineer, prior to start of construction, details or shop drawings, and manufacturer's specifications of materials and equipment he intends to furnish under or as part of this project.
- 1.02 Equipment shall not be fabricated, ordered, or delivered until shop drawings have been approved.
- 1.03 Shop drawings shall be checked, stamped, signed, and dated by the Contractor before submission to the Engineer. Shop drawings shall be accompanied with a certificate, signed by Supplier and Contractor, stating that products comply with the requirements of these Specifications and clearly identifying the Specification Section or Sections.
- 1.04 Each shop drawing submittal shall be accompanied by a cover sheet (sample attached) that contains the following information:
 - A. Project Name.
 - B. Contractor's Name.
 - C. Supplier.
 - D. Material submitted.
 - E. Applicable Specifications Section(s).
 - F. Date of Submittal.
 - G. Submittal Number.
 - H. Identify whether submittal is a new submittal or resubmittal.
- 1.05 The Engineer's approval of the Contractor's shop drawings will be general and shall not relieve the Contractor from the responsibility for adherence to the Contract Document, nor shall it relieve him of the responsibility for errors that may exist. Where such errors or omissions are discovered later, they shall be made good by the Contractor irrespective of approval by the Engineer or Owner.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- 3.01 Contractor shall submit three (3) copies more than the number that he wishes to have returned from the Engineer. Shop drawings and product data shall be submitted for at least the following items. This list may not include all submittals required for the project.
- a. Siltation fencing
 - b. Stone gradation
 - c. Seed mixture (includes fertilizer, lime, mulch)
 - d. Geotextile Fabric
 - e. EC matting
 - f. Corrugated metal pipe
- 3.02 Shop drawings shall be approved by Contractor and those Subcontractors whose work is associated with the subject equipment as being in accordance with Contract Documents, prior to submission.
- 3.03 Where contents of submittal literature from manufacturers include data not pertinent to the submittal, clearly indicate which portion of the contents is not being submitted for review.
- 3.04 Consecutively number submittals. Accompany each submittal with a letter of transmittal showing the transmittal number, date, brief description of submittal, and the company name of the originator of the submittal. On at least the first page of each copy of each submittal, indicate the transmittal number and name of project.
- 3.05 When material is resubmitted for any reason, transmit under a new letter of transmittal with a new number; indicate by reference to previous submittal that this is a resubmittal. Make corrections and resubmit the required number of corrected copies of Shop Drawings or new samples.
- 3.06 Failure to comply with these requirements will result in the submittal being returned unprocessed.

END OF SECTION

SECTION 01370

SCHEDULE OF VALUES

PART 1 GENERAL

- 1.01 Contractor shall submit a proposed Schedule of Values to the Engineer for acceptance before start of construction.
- 1.02 Schedule of Values shall be broken down into as many items as necessary to properly determine value of work complete at any time.
- 1.03 Items that Contractor wishes to be shown on an application for payment must be shown on the Schedule of Values.
- 1.04 Contractor's overhead margin and profit shall be distributed through all items on Schedule of Values and shall not be shown as a separate item.
- 1.05 Final Schedule of Values for use in applications for payment shall be mutually acceptable to Engineer and Contractor.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 Protection and Safety

- A. Do not interfere with use of or access to adjacent properties. Maintain free and safe passage to and from the jobsite.
- B. Protect trees, areas to receive planting, and other features remaining as part of the final landscaping.
- C. Protect bench marks and existing structures, property corners, roads, sidewalks, paving, and curbs against damage from equipment and vehicular or foot traffic.
- D. Cease operations and notify Engineer immediately if safety of adjacent structures appears to be endangered. Do not resume operations until safety is restored.
- E. Reduce movement, settlement, or collapse of adjacent services, structures, trees, etc. Assume liability for such movement, settlement, or collapse. Promptly repair damage at no cost to the Owner.
- F. Notify Engineer of unexpected sub-surface conditions and discontinue work in area until Engineer provides notification to resume work.
- G. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods, as required to reduce cave-ins or loose dirt from falling into excavations.
- H. Verify required environmental protection devices and procedures are in place, properly maintained, and operational.
- I. Coordinate work with facility tenants.

1.02 Coordination

- A. Arrangements for access to the site, workmen's parking locations, sites for storing material, sanitary facilities, utilities during construction, etc., shall be coordinated by the Contractor with the Engineer. The Owner agrees to make the site accessible to the Contractor six days per week (Monday through Saturday). Contractor can work extended hours during those days upon approval of the Owner and Engineer. No keys will be furnished for use by the Contractor.

1.03 Telephone Services

Contractor shall provide telephone service for its personnel.

1.04 Field Office

The Contractor may provide and maintain a suitable temporary field office at the project for his own use. The Contractor shall be responsible for necessary permits to install the temporary office and utilities. The location of the field office shall not interfere with the site operations.

1.05 Sanitary Facilities

The Contractor shall provide and maintain such sanitary accommodations (temporary toilets, wash facilities, and drinking water) for the use of his employees and those of his subcontractors as may be necessary to comply with the requirements and regulations of the local and state departments of health, and as directed by the Engineer. These accommodations shall be at the Contractor's expense. The Contractor shall not use the Owner's current sanitary facilities.

1.06 Maintenance of Traffic

- A. It shall be the sole responsibility of the Contractor to furnish and maintain, until the work has been accepted by the Owner, signs, lights, barricades, flagmen, torches, etc. necessary for the safety of the general public, including both vehicular and pedestrian traffic.
- B. Traffic control on public roads shall be in accordance with the current Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD). Costs for maintenance of traffic shall be included in the contract.
- C. Contractor shall recognize activity of the operating facility and shall operate vehicles and equipment in a safe manner. Contractor and Subcontractors shall provide safe passage of facility operations at all times.
- D. The Contractor shall promptly remove excavated material or other debris that may be spilled or tracked onto the traveled pavement during the conduct of his work.
- E. Flagging should only be employed when required to control traffic or when other methods of traffic control are inadequate to warn and direct drivers. At least one lane of traffic shall be maintained at all times. While work is not in progress, traffic is to be returned to the normal fashion.

1.07 Support Facilities

A. Temporary Road and Paved Areas

Construct and maintain temporary roads and paved areas adequate for construction operations.

B. Dust Control

Provide dust control treatment that is non-polluting and non-tracking. Reapply treatment as required to minimize dust.

C. Temporary Use of Permanent Roads and Paved Areas

Protect existing pavement from damage. Remove tracked and spilled dirt from pavement on a daily basis.

D. Fire Hydrant Access

Maintain access for fire-fighting equipment and access to fire hydrants.

E. Parking

Use designated areas of Owner's existing parking areas for construction personnel. Coordinate number of spaces and locations with Owner.

F. Dewatering Facilities and Drains

Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
2. Remove snow and ice as required to minimize accumulations.

G. Project Signs

Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Temporary Signs: Provide other signs as required to inform public and individuals seeking entrance to Project.

1.08 Security and Protection Facilities Installation

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01560

EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 Requirements Included

- A. Provide personnel, equipment, materials, and supplies to reduce erosion and control sediment during the construction period.
- B. Comply with local and state erosion control regulations. Comply with erosion and sediment controls as set forth on the Contract Drawings.
- C. Contractor is solely responsible for control of erosion on site and is responsible for taking measures to reduce and control erosion. Measures may be necessary above and beyond those shown on the Contract Drawings and Contractor shall implement those additional measures. The Contractor shall install additional measures required by the Owner but not shown on the Contract Drawings. The Contractor shall be entitled to compensation for additional measures that must be installed in the area of the work shown on the Contract Drawings, unless they are required solely for the Contractor's convenience or because of improvements or activities by the Contractor not shown on the Contract Drawings.
- D. Measures installed in conjunction with the development and operations of borrow and stockpile areas shall be considered incidental to construction and additional compensation will not be paid.

1.02 Related Requirements

Virginia Erosion and Sediment Control Handbook, 1992.

PART 2 PRODUCTS

2.01 Filter Fabric Siltation Control Fences

Filter fabric used in siltation control fences shall be woven or non-woven geotextile fabric that is resistant to ultra-violet light and specifically manufactured to be used in siltation control fences. Fence height shall be 36 inches.

2.02 Riprap

Riprap used shall be in accordance with the Virginia Erosion and Sediment Control Handbook, latest edition and as shown on the Contract Drawings.

2.03 Erosion Control Blanket

Erosion Control Blanket, VDOT EC-2 or EC-3, shall be in accordance with the Virginia Department of Transportation Road and Bridge Standards, latest edition. EC-2 shall be North American Green SC-150 or approved equal. EC-3 shall be North American Green C350 or approved equal.

PART 3 EXECUTION

3.01 General

Prior to significant disturbance of the site, perimeter erosion control shall be established in order to reduce uncontrolled drainage from leaving the limits of construction or from reaching State waters. Sediment barriers shall be constructed as soon as possible.

3.02 Installation

Contractor shall be responsible for the following activities:

- A. A continuous siltation barrier shall be down slope from construction activities as indicated on the Contract Drawings or as necessary to reduce sediment runoff. Barriers shall be placed around stockpiled material subject to erosion.
- B. Filter fabric fences shall be installed as per the manufacturer's directions. The fence shall be supported by wooden or metal posts driven at least two feet into the ground and spaced no further than six feet apart. Eight inches of the fabric shall be put in a trench facing the erosion source. The trench shall be backfilled after placing the fabric.
- C. Contractor shall inspect erosion and sediment control features at least weekly and after each rain storm. Make necessary repairs or clean-up to maintain the effectiveness of the feature immediately.

3.03 Dust Control

The Contractor shall be responsible for maintaining dust control on site during the project period. The site shall be watered as needed to limit excessive dust. The Contractor shall

also be responsible for dust control vehicles attributed to the construction activities. If necessary, the road shall be flushed daily. On days where freezing of water on the road surface is a possibility, the Contractor shall scrape and sweep to remove mud deposits from road surfaces.

PART 4 MAINTENANCE

- 4.01 In general, erosion and sediment control measures will be checked weekly by the Contractor and after each significant rainfall. Temporary and permanent seeding shall be completed in accordance with Section 02480. The following will be checked in particular:
- A. Silt fences for signs of clogging.
 - B. Sediment trap and basins to verify adequacy and to make sure the riser structures and outfalls are in place and effective, and that sediment build-up does not exceed an acceptable amount.
 - C. Check dams for signs of clogging.
 - D. Berms for signs of erosion damage and adequacy.
 - E. Inlet and outlet protection for signs of clogging and to verify that controls are fully in place and effective.
 - F. Construction entrance to verify that it is fully in place and effective.
- 4.02 Upon finding that a measure has failed or filled, the Contractor shall repair said measure at no additional cost to the Owner.
- 4.03 It shall be the sole responsibility of the Contractor to adequately control dust that is created as a result of its construction activity.

END OF SECTION

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SECTION 01580

PROJECT COORDINATION

PART 1 GENERAL

1.01 Owner Occupancy

Tenants are operating businesses on the facility and will continue to do so during the progress of the work covered by this Contract. The Contractor shall plan his work to minimize disruption of normal operating procedures and shall cooperate fully and coordinate his work with the operating staff in all aspects, including, but not limited:

- A. Coordinate with the operating staff construction effecting access roads and active areas of the facility. Some work in occupied areas and above occupied areas may need to be performed during non-working hours to accommodate the Owner's operations. The Contractor and tenants will confer on an acceptable schedule for the entire project, including a schedule required for work during such hours.
- B. Keep access roads open and free from obstructions at all times for the use of employees and staff of the tenants and provide ample protection of existing equipment and apparatus, as well as the employees and staff, against the elements and possible harm or injury from operations of the Contractor during the entire period of construction.
- C. Existing services must be maintained for the facility's operation. Aspects of the construction that involve the temporary interruption of essential services shall be scheduled in consultation with the tenants and Engineer and shall not be of longer duration than essential to accomplish the purpose of such interruption.
- D. Dust Control: Contractor shall verify that dust is held to an absolute minimum along portions of the work. Erect temporary partitions as required.
- E. Operations that require the use of machines that produce excessive noise such as rotary hammers, jack hammers, etc., as well as machines that will produce structural vibrations shall be coordinated with the tenants and Engineer prior to execution.

1.02 Coordination with Other Contractors

Contractor shall cooperate fully with the tenants about facility operating hours.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 Superintendent

Contractor shall identify personnel as superintendent of the site in writing to the Engineer. The Contractor's superintendent shall maintain a presence at the site during construction activities related to the project. The superintendent shall not be changed without the consent of the Engineer unless the superintendent ceases to be employed by the Contractor.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 Final Inspection

- A. Upon suspected completion of project, submit to Engineer written certification that the work has been completed in accordance with the Contract Documents and is ready for the Engineer's inspection.
- B. Final Inspection meeting will be held at the site to determine completeness.
- C. A final "punch list" of items to be completed will be prepared by the Engineer and Contractor at this meeting. Complete items on punch list and notify Engineer of completeness.
- D. Schedule a final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project. Clean up debris and dirt.

1.02 Application for Final Payment

Owner's payment of final application shall terminate the Contract except as provided for bonds and warranties for the guarantee period.

1.03 Submittals

- A. Provide one complete set of Contract Drawings and project manual recording changes to the work to indicate actual installation. Addenda items, bulletin drawings, change order items, field changes, and items changed during project meetings shall be included on the marked up drawings. Changes shall be noted in legible red letters at least 1/8 inch high. These records are a specific Contract requirement, and final payment will not be made until these drawings and project manual have been submitted in an acceptable form.
- B. At the conclusion of the project, the Contractor shall submit a complete list of Subcontractors, manufacturers, and suppliers who participated in the construction or who furnished materials or equipment. The address of each firm shall be included, together with types of materials or work performed.
- C. Statement of payment of taxes.

D. Affidavit of Payment of Debts and Claims.

E. Affidavit of Release of Liens.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

SECTION 01710

CLEANING

PART 1 GENERAL

1.01 Requirements Included

- A. Maintain the site in a neat and orderly condition at all times. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this work. Provide adequate storage for items waiting removal from the site. No open accumulation of refuse will be permitted. Debris must be removed from within the project area on a daily basis.
- B. Schedule a final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project. Thoroughly remove from premises debris remaining from construction activities and properly dispose. Leave premises in a clean, neat, orderly, and safe condition. Sweep paved areas.
- C. Restore areas damaged from construction activities.
- D. Remove construction facilities and equipment from the project site.

1.02 Disposal

Wastes shall be disposed of by the Contractor in a permitted facility.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION

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SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.01 Requirements Included

Provide personnel, equipment, materials and supplies to clear and grub necessary areas of the project site.

1.02 Related Requirements

Section 01560 Erosion and Sediment Control

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

- 3.01 Utilities: Notify utility locator service for area where Project is located before site clearing. Protect all existing utilities from damage.
- 3.02 Clearing and grubbing of vegetative cover shall be performed in the required areas only. Required areas include the sediment traps, ditches, and other areas as noted on the Contract Drawings. Vegetation in other areas shall be undisturbed.
- 3.03 Trees and brush shall be taken down and stumps pulled. The wood shall be burned under an approved permit acquired by the Contractor or hauled to a permitted disposal facility. Stumps and roots shall be removed with a root rake or similar equipment in such a manner that maximizes the separation of roots and topsoil or subsoil. Roots larger than three (3) inches in diameter shall be removed to a depth of eighteen (18) inches. Roots larger than one half (1/2) inch in diameter shall be removed to a depth of six (6) inches. Such depths shall be measured from the existing ground surface or the proposed finished grade, whichever is lower.

END OF SECTION

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SECTION 02110

SITEWORK PROCEDURES

PART 1 GENERAL

1.01 Scope

Sitework shall include site preparation of the project site, earthwork, and site improvements.

1.02 Related Requirements

Section 01560 Erosion and Sediment Control
Section 02100 Site Preparation
Section 02200 Earthwork

1.03 Quality Assurance

- A. Prior to beginning work, become thoroughly familiar with site conditions, construction documents, and all sections of the Division.
- B. Comply with pertinent codes and regulations.

1.04 Permits

Obtain required permits from appropriate authorities before sitework begins.

1.05 Maintaining Traffic

- A. Do not close or obstruct roadways.
- B. Conduct operations with minimum interference to facility access road.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 Site Inspection

Prior to work of this Division, carefully inspect the entire site and objects designated to be removed and to be preserved.

3.02 Clarification

The Contract Drawings do not propose to show all objects existing on the site. Before commencing work in this Division, verify with the Engineer all objects not clearly identified to be removed or to be preserved and discrepancies not fully resolved.

3.03 Prior Conditions Inspections

Prior to work of this section, carefully inspect the existing conditions. In the event of discrepancy, immediately notify the Engineer and do not proceed with installation in non-conforming areas until identified discrepancies have been fully resolved.

3.04 Protection and Safety

Verify required protection devices are in place and operational.

3.05 Preparation and Layout

- A. Establish extent of sitework by area and elevations; designate and identify datum elevation.
- B. Set required lines and levels.
- C. Maintain benchmarks, monuments and other reference points.

3.06 Excess Water Control

- A. Do not place, spread, or roll fill material during unfavorable weather conditions. Do not resume operations until moisture content and fill density are satisfactory.
- B. Provide berms or channels to reduce run-off into subgrade; promptly remove water collecting in depressions.
- C. Provide and maintain at all times during construction, ample means and devices with which to promptly remove and dispose of water from every source entering the excavations. De-water by means that will verify dry excavations and the preservation of the final lines and grades of bottoms of excavations.

3.07 Surplus Materials

- A. Remove surplus backfill materials from site, or as otherwise directed by Engineer.
- B. Stockpile surplus soils as directed by the Engineer.

3.08 Removal of Debris

- A. Remove surplus equipment and tools from the site.

END OF SECTION

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SECTION 02200

EARTHWORK

PART 1 GENERAL

1.1 Scope

The work covered by this section of the specifications consists of furnishing all labor, equipment, and materials to perform excavation and other earth moving operations, including facility excavation, construction and maintenance of necessary haul roads, structural fills and berms.

1.2 Related Requirements

Section 01560 Erosion and Sediment Control
Section 02100 Site Preparation
Section 02221 Trenching, Backfilling and Compacting
Section 02480 Seeding

1.3 Submittals

A. Submit copies of certificates to the CQA Engineer for conformance for review and approval of the following items before placement:

1. Backfill Soil
2. Engineered Soil Mix (Dry Swale Backfill)

The Contractor shall chemically analyze backfill soil material to be used on the project to determine the source soils for potential constituents of concern. Representative samples soil sample analysis report shall be submitted to the CQA Engineer prior to placement.

PART 2 PRODUCTS

2.1 Fill Material - General

The Contractor shall provide fill soil from off-site borrow areas.

2.2 Suitable Fill and Backfill

A. Suitable soil for fill and backfill shall be free of roots, limbs, trash, excessive organics and deleterious material. The maximum particle size for suitable soil shall be three inches. The Engineer shall approve soils.

- B. In the bid, the Contractor will identify the proposed source for the clean soils to be delivered to the site, and will provide permission, or otherwise secure permission, for the Owner to obtain samples of those soils, in order that Owner may chemically analyze the source soils for potential constituents of concern. The concentration of petroleum in replacement soils, or of any specific chemical compound in replacement soils, must be less than the respective laboratory limit-of-quantitation for those parameters.

2.3 Unsuitable Soil and Backfill

Unsuitable soil for fill and backfill shall be topsoil or soil containing roots, limbs, trash, excessive organics or deleterious material. In addition, unsuitable soil shall be soil not meeting the requirements of Section 2.02, above.

PART 3 EXECUTION

3.1 General

- A. The Contractor shall perform excavations described in whatever substance encountered to dimensions and elevations shown on the Contract Drawings. Excavation shall be unclassified soil excavation as described in Section 3.03.
- B. Existing utilities, structures, and fencing shall be protected during the construction period, and if damaged or removed by the Contractor in his operations, shall be repaired or replaced by the Contractor at no additional cost to the Owner.

3.2 Standby Time for Soil Testing

- A. Upon excavating a specified lift of soils, within a specified area, samples of soil will be obtained by the Engineer from the bottom of the excavation and from the sidewalls of the excavation, and chemically analyzed for arsenic and chromium. The Contractor cannot take further action within the affected area until the Engineer has received and evaluated the results of chemical analyses (which will determine if the area can be backfilled or if further excavation is necessary within that particular area).
- B. Such soil samples will be obtained from the targeted excavation area on the same day that the prescribed excavation within that targeted area has been completed and will be delivered to the laboratory as soon as practicable. Results of chemical analyses are anticipated to be available within 48 hours of 5 p.m. on the day the samples are delivered to the laboratory.

- C. In developing unit prices for excavation, transportation, and disposal of contaminated soils, and unit prices for transportation and placement of clean soils, the Contractor needs to consider the cost of potential standby time, while waiting for a decision to be made about the targeted area.
- D. If an area is excavated to a depth of two feet (the maximum depth allowed), it is *not* necessary to wait for the results of chemical analyses. Contractor may place warning barrier over bottom of excavation and backfill as soon as the Owner has obtained samples of soils from that particular area.

3.3 Moisture Content

Fill and backfill soil shall be compacted at a moisture content within a range of $\pm 3\%$ of the optimum moisture content, unless otherwise approved by the Engineer. As required, fill and backfill soil shall be dried by aerating with a scarifier, disc harrow, blade or other equipment or by such other means as may be necessary. As required, fill and backfill soil shall be wetted by the use of water trucks or sprinklers. Dried or wetted fill or backfill soil shall be thoroughly mixed to provide a material of uniform moisture content.

3.4 Depth and Mixing of Fill Layers

Fill and backfill soil shall be placed in layers that when compacted shall not exceed six inches (6"). Each layer shall be spread evenly and shall be thoroughly bladed and mixed during the spreading to verify uniformity of material in each layer.

3.5 Compaction of Fill

- A. Compaction of each layer, unless otherwise specified, as shown on the Contract Drawings and determined in the field shall be continuous over its entire area and the compaction equipment shall make sufficient trips to verify that the required density has been obtained. After each layer has been placed, mixed and spread evenly, it shall be thoroughly compacted in six inch (6") maximum compacted thickness lifts. The minimum dry density of the soil shall be at least ninety five percent (95) of the maximum dry density as determined by ASTM D698 (standard Proctor) under structures, paved areas, or embankments, unless otherwise shown on the Contract Drawings.
- B. Compaction equipment shall be of such design that it will be able to compact the fill to the specified density. Prior to placing the fill, at the preconstruction meeting or a minimum of 7 days prior to usage, the Contractor shall submit to the Engineer, for approval, a list of compaction equipment to be used. The CQA Engineer shall have 7 days to approve or disapprove the list. The list shall include the type of equipment, manufacturer and size.

- C. If, in the opinion of the Engineer, the compaction equipment is not acceptable, the Contractor may demonstrate the suitability of such equipment in a test area within the prepared fill site.
- D. Fill faces shall be compacted. Compacting operations shall be continued until the slope faces are stable but not too dense for planting and there is no appreciable amount of loose soil on the surface.

3.6 Management and Disposal of Excavated Materials

- A. Remove excavated materials and temporarily stockpile or remove them off Owner's property.
 - 1. If excavated materials are not immediately placed into trucks for removal from the property, ensure that excavated materials temporarily stockpiled on the site will be covered in a manner that prevents any contaminated soil from impacting areas outside the limits of excavation.
 - 2. Contractor shall be responsible for preparing any waste manifests that may be required by the facility that is to accept materials derived from this project.

Results of previous soil testing within the project area are available from the Engineer.
 - 3. Contractor shall be responsible for any sampling and chemical analyses of excavated materials, in addition to the information provided herein, at his own cost, if such additional sampling is required by the facility that is to accept materials derived from this project.
- B. Soils not immediately removed from the facility, for disposal, will be stockpiled separately within the work area as potentially hazardous versus potentially non-hazardous materials, based on laboratory analytical data.
- C. Potentially hazardous soils will be placed on plastic sheeting and, as warranted by anticipated weather conditions, will be covered with plastic sheeting. Stockpile size shall be controlled to they can be covered properly.
- D. Compost socks shall be placed along the perimeter of the soil stockpiles for control of any stormwater runoff from the pile.
- E. Contaminated soils must be delivered to waste management facility that is permitted to receive materials that are excavated and removed from the site. Contractor will provide documentation (manifests) to Owner for all materials that

are delivered to the selected, approved waste management facility. Waste profiles must be submitted to the disposal facility (ies) for approval before work starts.

3.7 Coordination with Verification Soil Sampling Program

- A. Coordinate with testing agency who will collect samples of exposed soils at subgrade elevations and deliver them to the testing laboratory. Sampling and testing costs will be paid by the Owner.
- B. After excavation to subgrade, do not backfill or install channel protection measures until the Owner's representative has sampled and chemically analyzed underlying soil materials, and received the results of those analyses, at which time the Owner or Owners designated project representative will provide authorization to either (1) proceed with completing the restoration work in the drainage or (2) excavate additional soils from the drainage.

3.8 Surface Water

Fill areas shall be kept free of standing water with positive drainage maintained at all times. Sloping of the fill surface and drainage ditches shall be provided to carry off water as it collects. Pumping of water shall be required to remove water from areas that cannot drain naturally.

3.9 Seasonal Limits

No fill material shall be placed, spread or rolled while the ground is frozen or thawing, or during unfavorable weather conditions. When the work is interrupted by inclement weather, fill operations shall not be resumed until the moisture content and density of the previously placed fill are as specified. Fill surfaces exposed to inclement weather or standing water shall be scarified to a depth of 6 inches, compacted and tested prior to placing addition fill lifts.

3.10 Integrity of the Work

It shall be the Contractor's responsibility to maintain the integrity of the work. Work that is damaged by weather or construction activities shall be restored and retested at the Contractor's expense.

END OF SECTION

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SECTION 02221

TRENCHING, BACKFILLING AND COMPACTING

PART 1 GENERAL

1.01 Requirements Included

Provide personnel, equipment, and materials to excavate and backfill trenches for the stormwater piping as shown on the plans.

1.02 Related Requirements

Section 02100 Site Preparation
Section 02200 Earthwork
Section 02480 Seeding

PART 2 PRODUCTS

Included in Part 3.

PART 3 EXECUTION

3.01 Clearing

The sites of work shall be cleared of trees, shrubs, and objectionable materials that interfere with execution of proposed work. Trees and shrubs that will not interfere with construction shall be protected from damage. Clearing of site will be considered as an incidental item of excavation. Clearing will be performed in accordance with Section 02100.

3.02 Classification of Excavated Materials

Excavated soil materials shall be unclassified. Rock is not anticipated.

3.03 Stockpiling of Excavated Materials

Excavated material shall be stockpiled in a manner that will not endanger the work and that will not obstruct ditches and natural water courses.

3.04 Sheeting and Shoring

Sheeting and shoring shall be furnished in accordance with the provisions of VOSH and as necessary to construct and protect the excavation, existing utilities, structures, and as necessary for the safety of the employees.

3.05 Dewatering

Where conditions are such that running or standing water occurs in the trench bottom or the soil in the trench bottom displays a "quick" tendency, the water should be removed by pumps and suitable means such as well points or pervious underdrain bedding until the pipe has been installed and the backfill has been placed to a sufficient height to limit pipe flotation.

3.06 Highway Rights-of-Way

Work within existing or proposed Virginia State Rights-of-Way shall meet requirements of the Virginia Department of Transportation.

3.07 Material

A. Suitable Material

Backfilling shall normally be done with the earth removed from the trench or excavation, provided that the excavated material is suitable for backfilling.

B. Unsuitable Material

Material such as clay mass, frozen materials, cinders, ashes, refuse, and vegetable or organic material shall be construed as unsuitable material for backfill.

C. Approved Granular Material

Granular material shall be well graded crushed stone meeting the requirements of Gradation 57 or 68 as specified in Section 2.03 of the VDOT Road and Bridge Specifications.

3.08 Excavation for Trenches

A. General

Excavation for trenches shall conform to the lines and grades shown on the approved drawings. Excavated material shall be removed and used for backfilling where suitable.

B. Pipe

The trench shall be excavated to a level below the established pipe grade in accordance with the requirements for bedding as specified below. As appropriate for the type of pipe used, bell holes shall be provided at each joint to permit proper joint assembly and pipe support. The trench bottom that is excavated below the required level shall be backfilled with approved granular material and compacted to a minimum 95 percent of theoretical maximum density as determined by ASTM D698.

3.09 Trench Width

Trench width at the ground surface may vary with and depend upon depth, type of soils, and position of surface structures. The minimum clear width of the trench, sheeted or unsheeted, measured at the springline of the pipe should be one foot greater than the outside diameter of the pipe. The maximum clear width of the trench at the top of the pipe should not exceed a width equal to the pipe outside diameter plus two feet. If the above defined trench widths must be exceeded or if the pipe is installed in a compacted embankment, pipe embedment should be compacted to a point of at least 2.5 pipe diameters from the pipe on both sides of the pipe or the trench walls, whichever is less. Excavation at manholes and similar structures shall be sufficient to provide 12 inches in the clear between the outside of the structure and the embankment or sheeting.

3.10 Unsuitable Subgrade

A. Unstable Foundation

When an unstable foundation is encountered that will not provide adequate pipe support, additional trench depth shall be excavated to a stable foundation and backfilled with approved granular material.

3.11 Bedding

- A.** The pipe shall be bedded in compacted approved granular material placed in a flat bottom trench. The granular bedding shall have a minimum thickness of four inches under the barrel and shall extend to four inches over the crown of the pipe.
- B.** Pipe bedding shall be installed in maximum six-inch lifts and shall be compacted to 95% of the maximum dry density as determined by ASTM D698.
- C.** Fine aggregate bedding shall meet requirements for fine aggregates, VDOT Road and Bridge Specifications, latest edition.

- D. Coarse aggregate bedding shall meet requirements for coarse aggregates, VDOT Road and Bridge Specifications, latest edition.
- E. Compact pipe bedding by tamping or rodding to limit settlement.

3.12 Backfilling Trenches

A. General

Trenches shall be backfilled immediately after the pipes and appurtenances are laid therein.

B. Pipe Detection Tape

Trenches for pressure lines shall include inert polyethylene locating tape having a metallic foil core. Tape shall be placed above centerline of pipes at a depth not exceeding two feet below ground surface.

C. Initial Backfill

Initial backfill shall begin at the top of the bedding and shall be placed in six-inch layers up to a level at least one foot above the crown of the pipe. Initial backfill shall be compacted to a minimum 95 percent of theoretical maximum density as determined by ASTM D698. No lumps greater than two inches in diameter shall be allowed in initial backfill material. Backfill under roadways, driveways, and sidewalks shall be approved granular material.

D. Final Backfill

Backfill for trenches not subjected to vehicular traffic shall be placed in layers no greater than one foot thick and compacted to at least 95 percent maximum density as determined by ASTM D 698. Topsoil (in grassed areas) shall be deposited in the final layer of backfill to guarantee the areas will be returned to original or better conditions.

E. Moisture Content

Backfill soil shall be compacted at a moisture content within a range of the optimum moisture content that allows for the required compaction. As required, backfill soil shall be dried by aerating with a scarifier, disc harrow, blade or other equipment or by such other means as may be necessary. As required, fill and backfill soil shall be wetted by the use of water trucks or sprinklers. Dried or wetted fill or backfill soil shall be thoroughly mixed to provide a material of uniform moisture content.

3.13 Restoration

A. General

Physical improvements disturbed by the work shall be restored to conditions equal to or better than those existing prior to the work. Repair of damages to structures and utilities shall be the responsibility of the Contractor.

B. Drainage Structures

Ditches, culverts, and other drainage structures that are damaged shall be restored promptly. Drainage structures shall be kept open and functional.

C. Finished Grading and Cleanup

Where possible, ground surface shall be left rounded and slightly higher than surrounding ground to allow for further settlement. Finished areas around structures shall be graded smooth and hand raked and shall meet the elevations and contours as shown on the Drawings. Lumber, earth clods or rocks larger than four inches and other undesirable materials shall be removed from the site at the completion of construction. Clean up shall be done as promptly as practicable and/or at least once a week. Ditches that are disturbed shall be restored as promptly as practical and/or at least once a week. Contractor shall maintain sediment and erosion control measures in accordance with Section 01560.

END OF SECTION

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SECTION 02420

SURFACE RUNOFF COLLECTION SYSTEMS

PART 1 GENERAL

1.01 Requirements Included

Provide personnel, equipment, and materials to construct a surface runoff collection and diversion system.

1.02 Related Requirements

Section 01560 Erosion and Sediment Control
Section 02480 Seeding

PART 2 PRODUCTS

2.01 Berms and Side Slopes

Surface runoff collection and perimeter surface berms and side slopes shall be promptly seeded following construction in accordance with Section 02480.

2.02 Riprap

Riprap shall be in accordance with Sections 204 and 414 of the VDOT Road and Bridge Specifications, 1994.

PART 3 EXECUTION

3.01 Dimensions

Surface runoff collection and perimeter surface berms shall be installed in the locations shown on the plans. Collection and diversion ditches shall be accurately constructed to the dimensions and grades shown on the drawings.

3.02 Grading

Perimeter surface diversions and channels shall have a minimum grade of 0.5%.

3.03 Erosion Control

Erosion control facilities shall be installed where indicated on the plans and in accordance with Section 01560.

3.04 Riprap

- A. Riprap shall be placed in the locations shown on the drawings and to the dimensions specified.
- B. Filter fabric shall be used under the riprap in drainage ditches. The riprap shall be placed in a manner to reduce damage to the filter fabric. The riprap shall be placed in accordance with Section 414 of the VDOT Road and Bridge Specifications, 1994.

END OF SECTION

SECTION 02480

SEEDING

PART 1 GENERAL

1.01 Requirements Included

Provide personnel, equipment, and materials to completely furnish, install, maintain and guarantee seeding and seeding items shown on the drawings and specified in the specifications. Place mulch as specified. Place fertilizer and lime as required by soil testing.

1.02 Related Requirements

Section 01560 Erosion and Sediment Control

1.03 Guarantee

- A. The Contractor shall be responsible for seeding as specified up to the final acceptance. Dependent upon the season, the Contractor may have to provide a temporary winter or summer cover crop that will eventually be incorporated into the soil prior to seeding in the appropriate spring and fall seasons.
- B. Areas that fail to develop a successful stand following seeding will be reseeded at the Contractor's expense. The Contractor shall establish a permanent vegetative cover with a 90% uniform stand of specified grasses in seeded areas. Bare areas shall be reseeded every 21 days. Eroded areas shall be repaired prior to reseeding. Once grass has been successfully established, the Contractor shall maintain the area for 60 days.

1.04 Submittals

- A. Submit copies of the following manufacturer's certificates of conformance for review and approval approximately 1 month before placement.
 - 1. Seed
 - 2. Fertilizer
- B. The Contractor shall test topsoil or amended soil to be used on the project to determine the proper application of lime and fertilizer. Representative samples shall be taken for existing topsoil or amended soil and separate samples for each separate source of new topsoil to be brought into the job site.

- C. A soil sample analysis report shall be submitted to the CQA Engineer prior to seeding operations. Lime, fertilizer requirements, phosphorus, potassium, calcium, magnesium and pH levels shall be tested for each sample and amendment recommendations provided in the soil analysis report.

PART 2 PRODUCTS

2.01 Temporary Seed Mixture

Temporary seed mixture shall be in accordance with the latest edition of the Virginia Erosion and Sediment Control Handbook. The actual seed used will vary with the seasons, but shall be certified to be high in percent germination and a variety adapted to Virginia shall be used.

2.02 Permanent Seed Mixture

- A. Permanent seed mixtures shall be in accordance with the latest edition of the Virginia Erosion and Sediment Control Handbook. Seeding shall comply with mixtures specified for the Virginia Coastal Plain region. Seeding for facility slopes shall consist of the following:

Kentucky 31 Tall fescue	93 - 108 lb /acre
Common bermudagrass	0 – 15 lb /acre
Red Top Grass	2 lb /acre
Seasonal Nurse Crop	20 lb/acre
Sericea Lespedeza	20 lb/acre

- B. Seasonal nurse crop shall be in accordance with the following:

May 12 th through April	Annual Rye
May 1 st through August	Foxtail Millet
September through November 15 th	Annual Rye
November 16 th through January	Winter Rye

- C. In May through October, use hulled seed for Sericea Lespedeza. Use unhulled seed for other seeding periods.
- D. Seeds shall be certified high in percent germination and a variety adapted to Virginia shall be used. Seed shall be of the latest season's crop with a minimum of 80% germination rate. Mix Seed on site or in the presence of the QAO. Weed seeds and inert matter shall not exceed 0.25% (one fourth of one percent) of total seed content. Seed should be free of noxious weeds.

2.03 Topsoil or Amended Soil

Topsoil shall be capable of promoting and sustaining vegetative growth. The topsoil shall be either off-site soil or on site soil mixed with other suitable organic amendment. The soil or soil mixture shall be free of debris, large roots, stumps, or frozen material. The topsoil shall have a pH between 5 and 7.6, contain between 1 and 2 percent organic matter, and have a maximum particle size of two (2) inches.

2.04 Mulch

- A. Mulch shall be free of noxious weeds, molds, or other deleterious material. Mulch/straw should be cured and mulched from the stalks of oats, wheat, barley, or rice. Furnish in air-dry condition. Do not use rye straw. Other materials may be used with prior written approval by the Engineer. Mulch shall be well seasoned before bailing, free from mature seed-bearing stalks or roots of prohibited or noxious weeds.
- B. Apply straw/hay mulch at a rate of 2 tons per acre (approximately 89 45-pound bales per acre). Mulch weight shall be dry weight. Fiber mulch applied during hydroseeding operations shall not be considered as part of the 2 tons per acre. Straw/hay mulch shall be applied so that 75% - 90% of surface is covered.
- C. Wood chips shall be applied at a rate of 10 - 20 tons per acre and a depth of 2" – 7". Wood chips shall be green or air-dried at time of application.
- D. Mulch, fertilizers, lime and inoculating bacteria shall comply with the Virginia Department of Transportation, Standard Specifications, Section 257.

2.05 Fertilizer

- A. Fertilizer shall be granular, commercial grade, dry, free flowing, uniform in composition, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
- B. Fertilizer shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Fertilizer that becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted. No cyanamide or hydrated lime shall be permitted in mixed fertilizer.
- C. The Contractor shall perform soil tests to determine the quantity and analysis of fertilizer required.

2.06 Limestone

- A. Ground limestone shall contain not less than 85% of total carbonates and shall be pelletized agricultural grade. Calcareous limestone shall contain at least 50% magnesium oxide and dolomitic limestone shall contain at least 40% magnesium oxide. Burned or slaked limestone is not permitted.
- B. The Contractor shall perform soil tests to determine the quantity of lime required.

2.07 Water

The Contractor shall be responsible for furnishing water free from substances harmful to seed growth. Contractor shall furnish related equipment such as hoses, sprinklers, tanks, or other methods of transportation.

PART 3 EXECUTION

3.01 Delivery, Storage, and Handling

- A. Fertilizer and Lime

Deliver materials to the site in the original, unopened containers showing the weight, chemical analysis, and manufacturer's name. In lieu of containers, bulk fertilizer and lime can be used only if appropriate certificates accompany each delivery.

- B. Seed

Deliver seed to the site in original sealed packages bearing the producer's guaranteed analysis for percentages of mixtures, purity, germination, weed content, and inert material. Wet, moldy, outdated, or otherwise damaged seed will be rejected.

- C. Storage and Handling

Store lime, fertilizer, and seed in dry locations away from contaminants. Protect seed from drying out. When handling materials, do not drop or dump from vehicles.

3.02 Temporary Seeded Areas

- A. Areas designated on the plans as requiring temporary seeding and areas of the site not to be constructed within 15 consecutive calendar days of final grading shall be seeded as soon as possible after the disturbance in the area is completed. The

temporary seeding shall be in accordance with the Virginia Erosion and Sediment Control Handbook.

- B. Prior to seeding, the surface of the area to be seeded shall be prepared by removing depressions and ruts. Care shall be taken to avoid compaction of the surface. The area shall be prepared by breaking up the surface of the soil.
- C. Areas that fail to establish vegetative cover adequate to limit rill erosion will be reseeded as soon as such areas are identified.

3.03 Permanent Seeded Areas

- A. Permanent seeding shall be accomplished on final grades, on cut and fill slopes, on access roads, surface water diversion ditches, rough-graded areas that will not be brought to final grade for a year or more and other areas as required. The required seed mixture shall be applied as soon as possible after the area is brought to final grade as per the plans. No seeding shall occur between November 16th and February 1st unless so approved by the Engineer.
- B. The area to be seeded shall be prepared by removing large ruts or surface depressions and by breaking up the surface of the soil. The soil shall be tested and lime, fertilizer, and, if necessary, inoculate bacteria shall be incorporated into the topsoil.
- C. Areas that fail to establish vegetative cover adequate to limit rill erosion will be reseeded as soon as such areas are identified.

3.04 Application of Materials

- A. In general, materials shall be applied by hand or with specialized equipment. If hydroseeding is used, mixing shall be done at the job site and care shall be exercised to avoid damaging the seeds during mixing or application.
- B. Notify QAO at least seven working days prior to start of seeding operations.
- C. Preparation
 - 1. After areas required to be seeded have been brought to the required grade, thoroughly till to a minimum depth of 2 inches by scarifying, disking, harrowing, or other approved method. Remove debris and stones larger than one inch remaining on the surface after tilling. Tilling will be necessary prior to seeding as well as when the summer or winter species is to be eradicated.
 - 2. Limit preparation to areas that will be immediately seeded.

D. Topsoil or Amended Soil

Areas shall have topsoil or amended soil uniformly distributed and evenly spread to a thickness of not less than six (6) inches.

E. Lime

Apply the rate and amount of lime necessary to maintain the areas at a pH level of 6 to 6.8. Soil analysis report of existing conditions and pH level will designate the amount of lime necessary to bring the soil to the acceptable levels.

F. Fine Grade

Fine grade seed areas to smooth, even surface with loose, uniformly fine texture. Roll, rake, and drag areas, remove ridges and fill depressions, as required to meet finish grades. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting seed. Do not create a muddy soil condition.

G. Fertilizer

Apply fertilizer at a uniform rate as determined by soil testing. Incorporate fertilizer and lime into the soil to a depth of at least 4 inches; this may be done as part of the subgrade tillage operation.

H. Installation

Seed immediately after preparation of bed. Seed areas disturbed as a result of construction activities. Mix seed on-site or in the presence of the QAO. Sow seed with approved sowing equipment. Cover seed by means of harrow, cultipacker, or other approved device. Perform seeding operations when the soil is dry and when winds do not exceed 5 miles per hour velocity.

I. Rolling

Immediately after seeding, firm entire area with a roller.

J. Mulch

Immediately mulch newly seeded areas. Chopped straw shall be evenly applied so as to provide a loose depth of not more than one half (1/2) inch with 75% coverage.

K. Tack Coat

1. Immediately following mulching, straw shall be secured in place by an EPA registered tackafier at a uniform applied rate as specified on the label.
2. In lieu of tackafier, crimp straw into soil by mechanical means.

L. Precautions

Protect existing utilities, structures, pavements, plantings or trees from damage caused by seeding operations. Contractor will be held responsible for damages. Extreme caution shall be given when tilling, liming, and fertilizing in the dripline of existing trees. Restrict traffic from seeded areas until grass is established.

M. Cleaning

Perform cleaning during installation of the work and upon completion of the work. Remove from site excess materials, debris, and equipment.

PART 4 MAINTENANCE

- 4.01 Begin maintenance immediately after seeding.
- 4.02 Maintenance shall include, but not be limited to proper watering, refilling of rainwashed gullies and rutted areas, refertilizing, mowing, liming, protective spraying, and other procedures consistent with good horticultural practice.
- 4.03 Ample soil moisture shall be maintained during this period.
- 4.04 The Contractor shall maintain seeded areas until final acceptance of the project and shall restore or replace seeding work that is found defective or becomes damaged prior to final acceptance. If winter or summer crops are planted, they shall be maintained until spring or fall seeding schedules can be met. The Contractor will be responsible for planting, maintaining the temporary cover, eradicating the temporary cover crop by tilling and grading prior to spring or fall seeding seasons, and replanting the project based on the spring or fall planting selections, whichever comes first. The Contractor shall perform supplemental seeding when less than a 90% uniform stand of permanent grass is obtained. Restoration or replacement work shall include the re-establishment of the grade or profile of the area, replacement of topsoil, refertilization, reseeding or remulching as directed by the Engineer. Maintenance shall be performed by the Contractor until the final acceptance of the spring or fall season grass is accomplished. There is no time limit in force.

END OF SECTION

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SECTION 13300

GEOTEXTILE FABRICS

PART 1 GENERAL

1.01 Scope

Provide personnel, equipment, and materials to install the geotextile fabrics as shown on the Contract Drawings.

1.02 Submittals

Submit shop drawings and product data for components. A change in the manufacturer shall require resubmittal.

PART 2 PRODUCTS

2.01 Manufacturer's Certification

Geotextile shall be of the type specified or an approved equal. Manufacturer shall submit a certificate to the Engineer stating the name of the manufacturer, the chemical composition of the filaments or yarns, and other pertinent information so as to fully describe the geotextiles. At a minimum the other pertinent data shall include Grab Strength, Elongation, Puncture Strength, and Apparent Opening Size. The manufacturer shall include in the certificate a guarantee stating that the geotextile that is furnished meets the requirements of the Specification for Geotextiles, AASHTO Designation M288-90 or applicable GRI standards.

2.02 Material Properties

- A. The geotextile shall not be exposed to precipitation prior to being installed. Geotextiles shall be capable of withstanding direct exposure to sunlight for 30 days with no measurable deterioration.
- B. If one particular side of the geotextile is to be placed against the soil to be filtered, that side shall be marked so. This requirement shall in no way diminish responsibility for any of the property values presented below.
- C. The geotextile shall meet or exceed the following:

Fabric	Nonwoven needlepunched polypropylene
Grab Tensile, lbs., ASTM D4632	200
Grab Elongation, %, ASTM D4632	50
Puncture, lbs, ASTM D4833-88.....	110
AOS, ASTM D4751	#70

2.03 Shipping and Identification

- A. The geotextile shall be uniformly rolled onto a core, and shall be wrapped in plastic to protect the material from moisture and damage during shipment. Protective wrapping shall be left on the geotextile until installation.
- B. Rolls shall be externally tagged for easy field identification. External tagging shall include the following:
 - 1. Name of Manufacturer
 - 2. Product Type
 - 3. Product Grade
 - 4. Lot Number
 - 5. Physical Dimensions (length, width & weight)

PART 3 EXECUTION

3.01 Exposure

The geotextile shall not be exposed to precipitation prior to being installed. Geotextiles shall be capable of withstanding direct exposure to sunlight for 30 days with no measurable deterioration.

3.02 Storage

- A. Storage of the geotextile rolls shall be the responsibility of the installer. A dedicated storage area shall be selected at the job site that is away from high traffic areas and is level, dry, and well drained. The Engineer shall approve the storage area.
- B. Rolls shall be stored in a manner that prevents sliding or rolling from the stacks and may be accomplished by the use of chock blocks or by use of the dunnage shipped between rolls. Rolls shall be stacked at a height no higher than that at which the lifting apparatus can be safely handled (typically no higher than four).
- C. Stored materials shall be off of the ground and be covered with a plastic sheet or tarpaulin until their installation.

- D. The integrity and legibility of the labels shall be preserved during storage.

3.03 Placement

Geotextile shall be placed smoothly and in direct contact with the underlying medium. Excessive wrinkles shall not be acceptable. Care shall be taken when placing geotextile. Excessive shifting of the material when trying to place could result in rejection of the material. Tears shall not be acceptable even when patched. Equipment shall never be run directly on the geotextile.

3.04 Seams and Overlaps

- A. Individual panels of the geotextile shall be sewn together or overlapped as site conditions and design dictate. Geotextile panels that are sewn together shall be overlapped a minimum of six (6) inches. Installer shall verify the strength of the seams in the field whenever geotextile is seamed transverse to a slope. On slopes 4H:1V or greater, continuously sew seams. On slopes less than 4H:1V, geotextiles shall overlap at least three (3) feet, either continuously sewn or thermally bonded, and seamed where rolled ends meet.
- B. Geotextile panels that are thermally bonded shall be overlapped a minimum of 6 inches. The six-inch overlap shall be thermally bonded continuously. Thermal bonding shall be performed with a Leister model, or equal. Installer shall verify the strength of the seams in the field whenever the seam is transverse to a slope.
- C. Any sewing shall be done using polymeric thread with chemical resistance properties equal to or exceeding those of the geotextile.

3.05 Repair

- A. Any holes or tears in the geotextile shall be repaired as follows:
1. On slopes, a patch made from the same geotextile shall be double seamed into place (with each seam $\frac{1}{4}$ inch to $\frac{3}{4}$ inch apart and no closer than one inch from any edge.) Should a tear exceed ten (10) percent of the width of the roll, that roll shall be removed from the slope and be replaced.
 2. On the bottom, a patch made from the same geotextile may be spot-seamed in place with a minimum of 24 inches overlap in all directions.
- B. Care shall be taken to remove soil or other material which may have penetrated the torn geotextile.

3.06 Protection from Damage

Geotextiles shall be secured from the wind until final cover is placed. Geotextiles shall be covered within two weeks of installation. The Contractor is responsible for damage that occurs to the geotextile during installation and will replace the damaged geotextile at no additional cost.

3.07 Protection from UV

The geotextile shall not be exposed to precipitation prior to being installed. The geotextile shall not be exposed to sunlight for more than 15 consecutive calendar days unless otherwise specified and guaranteed in writing by the geotextile manufacturer. The Contractor shall replace geotextile that is left exposed for more than 15 consecutive calendar days.

3.08 Conformance Testing

The Installer shall collect samples of geotextile from the materials delivered to the site for conformance testing.

END OF SECTION

ATTACHMENT 1

CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN

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ADDENDUM No. 1

To: Potential Bidders

From: Draper Aden Associates

Date: May 31, 2016

Project: New Kent Wood Preservatives Response Action Plan

DAA Project: R15434R-09

The following changes, corrections, deletions, clarifications, and/or additions constitute Addendum No. 1 to the project and are made to the Project Manual and Contract Drawings.

1. Project drawings have been revised and are attached. Additional details and information is provided on the Dry Swales and other features.
2. The Erosion and Sediment Control bond amount has been increased to \$155,000.

ADDENDUM No. 2

To: Potential Bidders

From: Draper Aden Associates

Date: June 7, 2016

Project: New Kent Wood Preservatives Response Action Plan

DAA Project: R15434R-09

The following changes, corrections, deletions, clarifications, and/or additions constitute Addendum No. 2 to the project and are made to the Project Manual and Contract Drawings.

Bidder's Questions and Responses:

1. The maximum excavation depth for the site is shown as 2', but the detail for the dry swales is shown to be 3' to allow for the stone and biomedial. Please confirm 3' excavation depth at the dry swales.

Response: The dry swale excavation depth is to be 3 feet.

2. The detail on sheet C501 for the grass lined stormwater conveyance channel shows the channel as trapezoidal, but the info table on sheet C403 calls them VEE type. Please confirm the detail for the SCCs.

Response: The grass lined channels will be Vee-shaped. The "B" dimension on the detail on Sheet C501 will be zero.

3. Are we to include the landscape plantings shown on sheet C502?

Response: Include the landscaping plantings from Sheet C502. Trees are to be 4 to 5 feet tall. Autumn Olives are to be 2 to 3 feet tall.

4. Please advise which bid item should include the stormwater conveyance channels.

Response: Include the stormwater conveyance channels in Item 12 on the bid form.

Miscellaneous:

5. The Erosion and Sediment Control bond amount has been revised by New Kent County to \$142,078.46.
6. Delete Item 9 from the Bid Form. Mark it as NA for Not Applicable.

ADDENDUM No. 3

To: Potential Bidders

From: Draper Aden Associates

Date: June 9, 2016

Project: New Kent Wood Preservatives Response Action Plan

DAA Project: R15434R-09

The following changes, corrections, deletions, clarifications, and/or additions constitute Addendum No. 3 to the project and are made to the Project Manual and Contract Drawings.

1. The bid due date is revised to Tuesday, June 14, 2016 at 2:00 pm.
2. Question: Could you please clarify the requirements for bid item 11?

Response: Before the contractor's equipment can leave the site, it must be completely decontaminated (including tracks, wheels, buckets, etc.) using a steam cleaner. This is done in a containment structure that allows the decontamination (decon) water to collect. This can consist of an above ground pond-like structure that has a liner to prevent the decon water from getting into the ground. It can consist of earthen berms several feet high that are covered with the liner. The bottom is often sloped so the decon water can be then pumped into a tank where it is then held. The decon water will have to be sampled and analyzed for the constituents required by the disposal facility that will receive the decontamination water.

Decontamination-generated wastes in addition to the decon water typically include but are not necessarily limited to disposable gloves, tyvek coveralls and booties, dust masks, paper towels, rags, disposable sampling supplies, decon. area liner, etc. These wastes are typically drummed, but a dumpster may be a viable alternative. We will need EPA approval to use a dumpster vs. clean drums.

3. Question: Line #4 on the bid form states that base bid items are item 1 – item 11. Is this correct? Does Item 12 not figure into the base bid?

Response: The line should read that Base Bid items are Item 1 – Item 12, with the exception that Item 9 will not figure into the base bid.