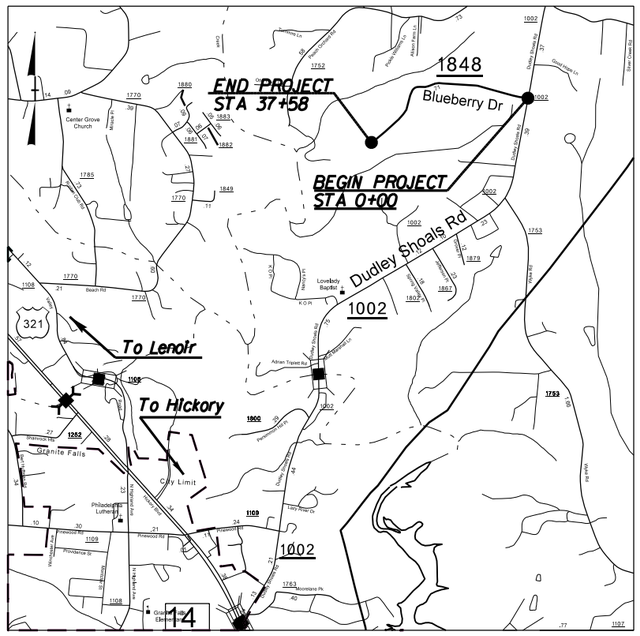
PROJECT: 11C.014097

VICINITY MAP



Porous Baffle Spacing
*Baffles in Silt Basins at drainage turnouts and all other temporary rock sediment dams–Type B:
–If basin length=10′ or less;1 baffle
–If basin length=11′ to 20′;2 baffles
–If basin length=20′ or more;3 baffles
equally spaced in basin

NOTE:
PERIMETER EROSION CONTROL MEASURES SHALL BE INSTALLED DURING CLEARING AND GRUBBING PHASE.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

CALDWELL COUNTY

LOCATION: SR 1848 BLUEBERRY DRIVE FROM SR 1002 DUDLEY SHOALS RD TO E.O.P. STA 0+00 TO EOP STA 37+58

TYPE OF WORK: GRADING, DRAINAGE, BASE AND PAVING – 0.71 MILES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	11C.014097	EC-1	13

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION

EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
	Temporary Rock Silt Check Type-A with Matting and Polyacrylamide (PAM)	
1633.02	Temporary Rock Silt Check Type-B	
	Wattle / Coir Fiber Wattle	
	Wattle / Coir Fiber Wattle with Polyacrylamide (PAM)	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1630.04	Stilling Basin	
1630.06	Special Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A
1632.02	Type B	B
1632.03	Type C	C
	Skimmer Basin	
	Tiered Skimmer Basin	
	Infiltration Basin	

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

Level III Cert # 3498

GRAPHIC SCALE

25 0 50
PLANS

5 0 10
PROFILE (HORIZONTAL)

5 0 10
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

THESE EROSION AND SEDIMENT CONTROL PLANS COMPLY WITH THE REGULATIONS SET FORTH BY THE NCG-010000 GENERAL CONSTRUCTION PERMIT EFFECTIVE AUGUST 3, 2011 ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES DIVISION OF WATER QUALITY.

Prepared In the Office of:

DIVISION OF HIGHWAYS
DIVISION 11, DISTRICT 2 BOONE
P.O. BOX 1460, BOONE, N.C. 28607

2012 STANDARD SPECIFICATIONS

Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 2012 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1604.01	Railroad Erosion Control Detail	1632.01	Rock Inlet Sediment Trap Type A
1605.01	Temporary Silt Fence	1632.02	Rock Inlet Sediment Trap Type B
1606.01	Special Sediment Control Fence	1632.03	Rock Inlet Sediment Trap Type C
1607.01	Gravel Construction Entrance	1633.01	Temporary Rock Silt Check Type A
1622.01	Temporary Berms and Slope Drains	1633.02	Temporary Rock Silt Check Type B
1630.01	Riser Basin	1634.01	Temporary Rock Sediment Dam Type A
1630.02	Silt Basin Type B	1634.02	Temporary Rock Sediment Dam Type B
1630.03	Temporary Silt Ditch	1635.01	Rock Pipe Inlet Sediment Trap Type A
1630.04	Stilling Basin	1635.02	Rock Pipe Inlet Sediment Trap Type B
1630.05	Temporary Diversion	1640.01	Coir Fiber Baffle
1630.06	Special Stilling Basin	1645.01	Temporary Stream Crossing
1631.01	Matting Installation		

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04/16/11

PROJECT REFERENCE NO.	SHEET NO.
11C.014097	1A

EROSION CONTROL & PIPE INSTALLATION SCHEDULE
TROUT BUFFER ZONE SEQUENCE
GENERAL E&SC NOTES
GROUND STABILIZATION CHART

Erosion Control Schedule and Notes

1. Generally, the order of installation of the erosion control measures will be as follows:

   A. Temporary silt basins shall be installed before clearing and grubbing begins.

   B. Silt fences and temporary silt ditches shall be installed after clearing and before grading.

   C. Temporary stone ditch checks with PAM or wattles with PAM shall be installed in all disturbed areas as soon as the disturbance begins.

   D. Final stone ditch checks or wattles shall be installed as soon as ditch line is established.

   E. Pipe outlet and inlet protection will be done as soon as the pipe is installed.

   F. Other permanent erosion control measures are to be implemented as soon as practical.

2. Temporary rock silt checks, type B will be spaced by percent grade as shown in the erosion control plan.

3. No. 5 stone, or equivalent, will be used in conjunction with the temporary rock silt checks in locations where water is leaving the project or entering a pipe.

4. All devices are to be cleaned out when half full.

5. Establish permanent vegetation per ground stabilization chart.

Notes:

For silt basin size see the attached erosion control plans.

PAM is to be placed on all Type A checks and wattles in the erosion control chain except for the final device in HWQ and Trout projects.

Wet Pipe Installation Schedule and Notes

1. Prior to installing any E&SC measures identify permit conditions and impact area limits.

2. Install erosion control devices.

3. Manage the water course. The pipe must be placed in the dry. Install dewatering measures.

4. Remove material and existing pipe while limiting, material and sediment from entering stream and escaping the project.

5. Excavation of stream channel shall not exceed 10' on either side of new pipe or culvert unless indicated on permit.

6. Per permit conditions for Corps of Engineers and the Wildlife Resources Commission, all pipes in streams 48"or greater must be buried 12" below streambed elevation. Pipes less than 48"must be buried with 20% of the diameter below streambed elevation.

7. Place the new pipe and compact backfill.

8. Install slope protection on the outlet and inlet ends of the pipe. Also complete installation of erosion control measures and perform maintenance as needed on existing measures.

9. Establish permanent vegetation per ground stabilization chart.

10. More information on wet pipe installation can be found in the BMP manual section 4.2 "Pipe & Culvert installation"

General Erosion Control Sequence & Notes for NC DOT Projects in Trout Buffer Zones

1. Prior to installing any E&SC measures identify permit conditions and impact area limits. Review trout buffer variance approval conditions for any special provisions.

2. All materials should be on the hand before work is commenced.

3. Install EC devices

4. Work within the buffer zone should be sequenced to minimize the length of time that disturbed areas are exposed. Stream bank stabilization, which includes the area from the edge of water to the top of bank, should be phased so that each day's work is a completed work, including provision of adequate ground cover.

5. Graded slopes and fills within the trout buffer zone will within 7 calendar days of completion of any phase of grading be planted or otherwise provided with temporary or permanent ground cover, devices, or structures sufficient to restrain erosion.

6. Graded slopes and fills within the trout buffer zone (excluding road shoulders) shall be protected with rolled erosion control product, bonded fiber matrix, or flexible growth medium after seeding.

Notes:

Silt fence backed by woven wire, with a post spacing of 6 feet, shall be used instead of standard silt fence in trout buffer zone. Special sediment control fence shall be used in areas where bedrock is encountered which prohibits the proper anchoring of fabric, and in low points of the silt fence in 3-foot sections to allow for concentrated flows.

The disturbed areas within the stream buffer shall be restored to native vegetation characteristic of an undisturbed buffer to the extent practical upon completion of construction.

Flyrock protection such as blast mats should be provided for blasting in close proximity to streams.

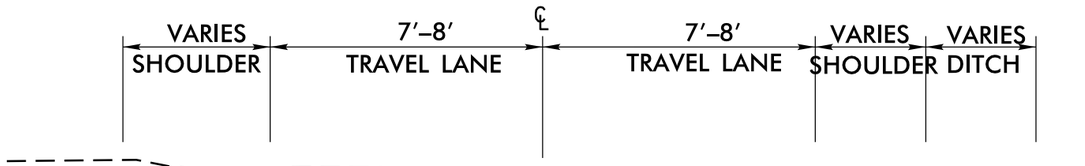
PAM is to be placed on all Type A checks and wattles in the erosion control chain except for the final device in HWQ and Trout projects.

GROUND STABILIZATION CHART

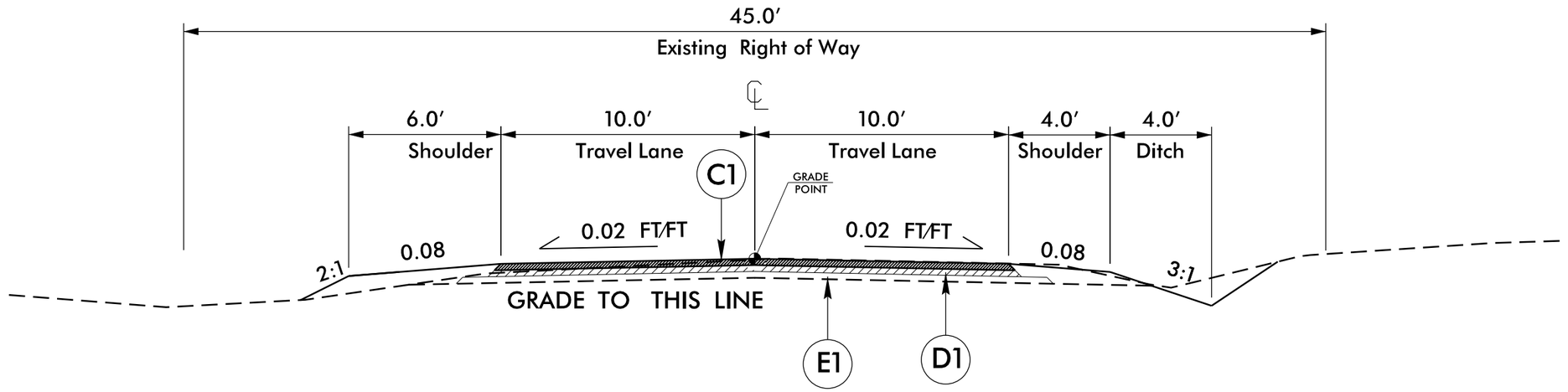
Site Area Description	Stabilization Time Frame	Stabilization Time Frame Exceptions
Perimeter dikes, swales, ditches and slopes	7 days	None
High Quality Water Zones	7 days	None
Slopes steeper than 3:1	7 days	If slopes are 10 ft. or less in length and are not steeper than 2:1, 14 days are allowed
Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50' in lenght
All other areas flatter than 4:1	14 days	None (except for perimeters and HQW zones)

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
IIC.014097	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



14′–16′ EXISTING TYPICAL SECTION



TYPICAL SECTION NO. 1

*Sta. 0+00 to 21+75

*Sta. 22+75 to 36+61

C1	PROP. ASPHALT SURFACE TREATMENT (TRIPLE SEAL).
D1	PROP. APPROX. 3″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 6″ AGGREGATE BASE COURSE.

5′ 0′ 5′
GRAPHIC SCALE

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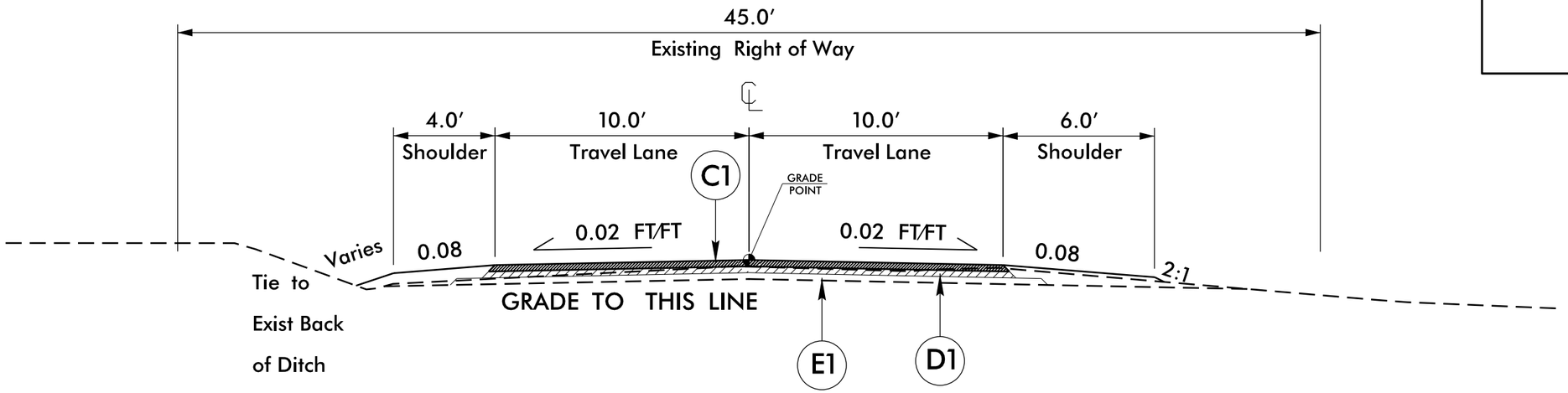
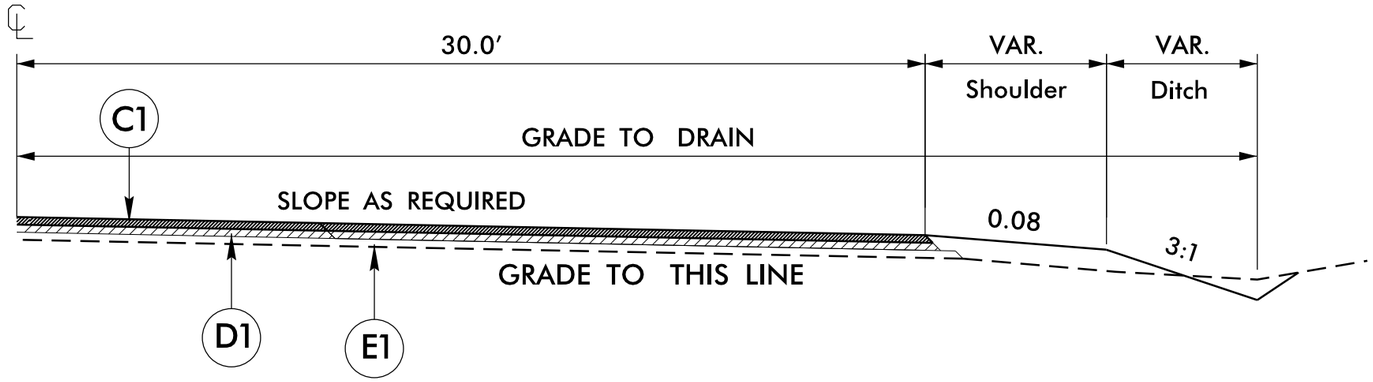
6/2/99

PROJECT REFERENCE NO.	SHEET NO.
IIC.014097	2A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



TYPICAL SECTION NO. 2

*Sta. 21+75 to 22+75



TYPICAL SECTION NO. 3

CUL-DE-SAC TYPICAL

*Sta. 36+61 to 37+58

C1	PROP. ASPHALT SURFACE TREATMENT (TRIPLE SEAL).
D1	PROP. APPROX. 3″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E1	PROP. APPROX. 6″ AGGREGATE BASE COURSE.

5′ 0′ 5′

GRAPHIC SCALE

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PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-3
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION SUMMARY SHEET

MATTING FOR EROSION CONTROL

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
6	-L-	15+50	14+25	RT	105
6	-L-	16+40	14+75	LT	140
7	-L-	16+60	20+25	LT	300
7	-L-	21+25	24+23	LT	245
8	-L-	24+23	27+50	LT	270
9	-L-	34+25	35+35	LT	95
9	-L-	24+25	35+20	RT	655
9	-L-	36+75	37+35	LT	60
			SUBTOTAL		1870
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					
			TOTAL		1870
			SAY		1870

PERMANENT SOIL REINFORCEMENT MAT

CONST SHEET NO.	LINE	FROM STATION	TO STATION	SIDE	ESTIMATE (SY)
4	-L-	0+25	2+00	RT	145
4	-L-	7+50	3+75	LT	310
4	-L-	7+50	3+75	RT	310
6	-L-	13+00	7+50	LT	455
6	-L-	14+25	7+50	RT	555
			SUBTOTAL		1775
MISCELLANEOUS MATTING TO BE INSTALLED AS DIRECTED BY THE ENGINEER					
			TOTAL		1775
			SAY		1775

PROJECT REFERENCE NO.	SHEET NO.
IIC.014097	EC-3B
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

SOIL STABILIZATION TIMEFRAMES

SITE DESCRIPTION	*STABILIZATION TIME*	*TIMEFRAME EXCEPTIONS*
PERIMETER DIKES, SWALES, DITCHES AND SLOPES	7 DAYS	NONE
HIGH QUALITY WATER (HQW) ZONES	7 DAYS	NONE
SLOPES STEEPER THAN 3:1	7 DAYS	IF SLOPES ARE 10' OR LESS IN LENGTH AND ARE NOT STEEPER THAN 2:1, 14 DAYS ARE ALLOWED.
SLOPES 3:1 OR FLATTER	14 DAYS	7 DAYS FOR SLOPES GREATER THAN 50' IN LENGTH.
ALL OTHER AREAS WITH SLOPES FLATTER THAN 4:1	14 DAYS	NONE, EXCEPT FOR PERIMETERS AND HQW ZONES.

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PROJECT NO.	SHEET NO.
11C.014097	3-C

revised: 07/07/17

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48" & UNDER)

		NEW PIPES									EXISTING PIPES												
		DRAINAGE PIPE (RCP, CSP, CAAP, HDPE, OR PVC)																					
SIZE	LOCATION (LT, RT, OR CL)	12"	15"	18"	24"	30"	36"	42"	48"		12"	15"	18"	24"	30"	36"	42"	48"	PIPE REMOVAL	DROP INLET STD. 840.14 OR STD. 840.15	D.I.FRAME AND GRATE STD. 840.16	J.B. STD. 840.31 OR 840.32	ENDWALL STD. 838.05 (CUBIC YARDS)	REMARKS
TYPE																							
STATION																							
02+68	CL				60'									42'					42'				
11+41	RT		35'									31'							31'				
11+67	LT		30'									26'							26'				
14+22	CL				42'									33'					33'				
14+47	RT		25'								37'								37'				
14+95	RT		25'									26'							26'				
17+85	LT		30'									30'							30'				
20+25	CL			41'																			
22+59	LT		20'									20'							20'				
24+23	CL		50'										32'						32'				
28+15	RT		20'									20'							20'				
29+70	RT		20'									20'							20'				
30+36	RT		20'									20'							20'				
32+64	RT		20'									20'							20'				
34+15	RT		20'									20'							20'				
35+29	CL			42'									30'						30'				
37+37	LT		20'																				ADD
SHEET TOTALS		0'	335'	83'	102'	0'	0'	0'	0'	520'	37'	233'	62'	75'	0'	0'	0'	0'	407'				

PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

JOSEPH & VICKIE BOWMAN
DB 1885 PG 024

0+00 1+00 2+00 3+00 4+00 5+00

+25 +50

Farm Fields

9 x 3 x 3
2 ft. weir
ID 4.1

9 x 3 x 3
2 ft. weir
ID 4.2

9 x 3 x 3
2 ft. weir
ID 4.3

INSTALL PSRM IN THE PROPOSED DITCH LINE.

00+00
B.O.P.

50' x 150' SD

PP1

Sign

F1.6 17.9 | F1.3 17.7 | F5.8 26.7 | F8.1 31.3 | F5.8 26.6 | F2.3 19.8 | C1.0 18.8 | C0.7 19.4 | C0.9 19.1

8-18"Wattles@42'

AST Gr

2'

4.5'

-5.5%

SR 1848 Blueberry Drive

EXISTING R/W

Drainage

60"-24' CSP

+6.5%

MATCHLINE**5+30

AST

GW

PP1

C0.0 20.5 | C1.1 22.2 | 3-18"Wattles@44' | C0.5 19.7 | F1.7 18.5 | F0.9 17.0 | F1.3 17.7 | C0.9 19.0 | C0.3 20.8 | PP | C1.3 22.4

9 x 3 x 3
2 ft. weir
ID 4.4

INSTALL PSRM IN THE PROPOSED DITCH LINE.

9 x 3 x 3
2 ft. weir
ID 4.5

8-18"Wattles@42'

INSTALL PSRM IN THE PROPOSED DITCH LINE.

50' x 150' SD

SR 1002 Dudley Shoals Road

Farm Fields

JOSEPH & VICKIE BOWMAN
DB 1885 PG 024

REVISIONS

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

8/17/99

REVISIONS

JOSEPH & VICKIE BOWMAN
DB 1885 PG 024

PEGGY MIDDLETON
DB 1339 PG 1247

JOHN PAUL KIRBY
DB 1782 PG 739

MATCHLINE**5+30

MATCHLINE**12+10

0+00 7+00 8+00 9+00 10+00 11+00 12+00

Farm Fields

Woods

INSTALL PSRM IN THE PROPOSED DITCH LINE.

8-18"Wattles@42'

INSTALL PSRM IN THE PROPOSED DITCH LINE.

9-18"Wattles@55'

INSTALL PSRM IN THE PROPOSED DITCH LINE.

11-18"Wattles@56'

INSTALL PSRM IN THE PROPOSED DITCH LINE.

Farm Road

Grade to Drain

+64 Soil

+85 Soil

+41 Conc

+6.5%

-5%

20'

45'

EXISTING R/W

SR 1848 Blueberry Drive

15" CSP

C1.0 18.9
C0.2 20.8
C3.5 25.8
C2.7 24.4
C1.7 23.0
C1.4 22.4
C0.6 19.5
C0.7 19.3
C0.8 19.3
C1.3 22.4
C0.9 21.9
C1.0 22.0
C0.3 20.0
C1.7 22.9
C1.4 22.5
C5.3 28.4
C4.7 27.5

TP
PP
GW
EIP
WM

ROBERT LOUDERMELT
DB 1274 PG 1473

JOSEPH & VICKIE BOWMAN
DB 1885 PG 024

PEGGY MIDDLETON
DB 1339 PG 1247

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PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

8/17/99

REVISIONS

JOHN PAUL KIRBY
DB 1782 PG 739

JOHNNY C KIRBY
DB 1782 PG 737

ANGIE R YOUNT
DB 1669 PG 417

13+00 14+00 15+00 16+00 17+00 18+00

+25 +50

Woods

INSTALL PSRM IN THE PROPOSED DITCH LINE.

9-18"Wattles@55'

9 x 3 x 3 2 ft. weir ID 6.1

9 x 3 x 3 2 ft. weir ID 6.3

9 x 3 x 3 2 ft. weir ID 6.4

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

4-18"Wattles@73'

MATCHLINE**12+10

MATCHLINE**18+90

EXISTING R/W

-5% +2.2% +1.6% -4%

SR 1848 Blueberry Drive

15" CSP

ECM

4'ChLnk

Planter

Hedge

Oak

6SBW

Conc

Gravel

45 Elec

WM

GW

PP

EIP

ID 6.2

B

11-18"Wattles@56'

INSTALL PSRM IN THE PROPOSED DITCH LINE.

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

ROBERT LOUDERMELT
DB 1274 PG 1473

BOB & SANDRA CAUSBY
DB 1000 PG 227

BOB & SANDRA CAUSBY
DB 1000 PG 227

BILLY R WOODIE
DB 1234 PG 874

ERIC & STEPHANIE MAYNARD
DB 1864 PG 1285

DWAYNE WRIGHT
DB 1881 PG 748

WILLIAM S INGLE
DB 1758 PG 1739

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PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

8/17/99

REVISIONS

WILLIAM S INGLE
DB 1758 PG 1739

Pasture

19+00

20+00

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

4-18"Wattles@73'

9 x 3 x 3
2 ft. weir
ID 7.1

9 x 3 x 3
2 ft. weir
ID 7.3

9 x 3 x 3
2 ft. weir
ID 7.2

9 x 3 x 3
2 ft. weir
ID 7.5

9 x 3 x 3
2 ft. weir
ID 7.6

9 x 3 x 3
2 ft. weir
ID 7.4

MATCHLINE**18+90

MATCHLINE**25+70

21+00

22+00

23+00

24+00

25+00

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

2-18"Wattles@99'

Pasture

2-18"Wattles@109'

C1.4 22.5

C1.0 18.8

C1.1 18.8

C0.4 21.1

C1.3 22.4

C1.4 22.5

C0.2 20.7

C0.3 20.9

C0.2 20.8

F0.4 17.0

F4.0 23.4

F1.0 17.3

F0.7 17.6

F1.0 17.9

F0.9 17.2

F1.1 17.4

F7.3 29.8

4S Elec

-4%

+1%

-2.4%

-2.2%

EXISTING R/W

Grade to Drain

GW

WM

Sidewalk / Steps

ISFD

Wood Ret Wall

Gate

Garage

15" CSP

50' 18" CSP

SR 1848 Blueberry Drive

PP

TP

WILLIAM S INGLE
DB 1758 PG 1739

Pasture

Pasture

WILLIAM S INGLE
DB 1758 PG 1739

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PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

REVISIONS 8/17/99

WILLIAM S INGLE
DB 1758 PG 1757

Pasture

Pasture

27+00 28+00 29+00 30+00 31+00 32+00

9 x 3 x 3
2 ft. weir
ID 8.1

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

2-18"Wattles@109'

C0.3 20.0 | C0.8 19.1 | F1.5 18.2 | F2.4 19.9 | F2.8 20.8 | F2.8 20.8 | F2.8 20.8 | F2.8 20.7 | F1.7 18.5

C0.3 20.8 | GW | PP | F1.3 17.7 | C1.1 18.8 | C0.0 20.4 | C0.5 21.2 | C1.0 21.9 | C0.7 21.5 | C0.2 20.8 | WM | Ped | EIP

4S Elec | EXISTING R/W | -2.2% | -2.1% | 15" CSP | +15 Soil | +05 | +56 | +70 Gravel | Dead Tree | +26 | +36 Gravel | SR 1848 Blueberry Drive | 20' | 45' | +28 | +16 | +88 | +93 Gravel

MATCHLINE**25+70

MATCHLINE**32+50

RODNEY & KARLA INGLE DB 1541 PG 1828

RODNEY & KARLA INGLE DB 1912 PG 1352

RODNEY & KARLA INGLE
DB 1361 PG 596

JORDAN & VICTORIA CLARK
DB 1899 PG 1611

DAVID & DEBRA WILLIAMS
DB 806 PG 239

5-18"Wattles@133'

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

PROJECT REFERENCE NO.	SHEET NO.
11C.014097	EC-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

8/17/99

REVISIONS

WILLIAM S INGLE
DB 1758 PG 1757

33+00 34+00 35+00 +38 36+00 37+00 +50

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

9 x 3 x 3 2 ft. weir ID 9.1

9 x 3 x 3 2 ft. weir ID 9.3

9 x 3 x 3 2 ft. weir ID 9.2

9 x 3 x 3 2 ft. weir ID 9.4

Pasture

25' R

MATCHLINE**32+50

SR 1848 Blueberry Drive -2.2%

-2.1%

+1%

+2%

EXISTING R/W

15" CSP

18" CSP

F1.1 17.4
F1.6 18.3
C1.3 18.4
C1.4 18.3
C1.0 19.0
C0.0 20.4
C0.4 19.8
C0.9 19.0
F1.9 19.0
C1.4 18.4
F3.0 21.1
F2.4 19.9
F2.0 19.0
C1.3 18.5

45 Elec
Gate
WM
Hedge
+64 Gravel
+15 Gravel
+43
+41
+37 Gravel
+52 Gravel
+57 Gravel
+63 Gravel
ChLnk +63 Tree Hedge
45' R
30' R
35' R
R/W

37+58
E.O.P.

5-18"Wattles@133'

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

INSTALL MATTING FOR EROSION CONTROL IN THE PROPOSED DITCH LINE.

RODNEY HUDSON
DB 1888 PG 1623

RODNEY HUDSON
DB 1888 PG 1623

Pasture

WILLIAM S INGLE
DB 1758 PG 1745

RODNEY & ANNA HUDSON
DB 1745 PG 296

18-JUL-2017 16:50
R:\Road Projects\Secondary\Caldwell\SR1848_Blueberry Drive\EC Work\EC_Plan_Sheets\EC-9.dgn
$$$$LICENAME$$$$

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 1 of 28

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	0 + 25
to Sta.:	2 + 50
Right/Left:	Lt.
% Ditch Grade:	5.500 %
Contributing R/W Width:	12.5 feet
Length of Run	X 225 feet
Disturbed Area	= 0.06 acres
Drainage Area:	0.06 acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

EROSION DESIGN

Version 2.10.2012

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **4** ***spaced at*** **45** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.05500	ft/ft
V=	294.64	$ft^3/ac/yr$
Required Storage Volume=	19.02	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	27.27	ft
Storage Behind Device (assumes 65% effeciency):	29.91	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	29.91	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.1 9X3X3 Type B sed dam

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.06** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.06**

Required Sediment Storage (ft^3)= **116.22** ft^3

Final Required Storage: **116.22** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 5.34 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 9.98 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 2 of 28

Construction time ≤ 6 months (Y/N)?	**Y**
HQW (Y/N)?	**N**
Trout (Y/N)?	**N**
From Sta.:	**2 + 50**
to Sta.:	**3 + 75**
Right/Left:	**Lt.**
% Ditch Grade:	**6.500** %
Contributing R/W Width:	**12** feet
Length of Run	X **125** feet
Disturbed Area	= **0.03** acres
Drainage Area:	**0.03** acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	**Y**
Is this a Typical Section (Y/N)?	**Y**
Will RUSLE2 be used to model the Non-Typical sections?	**N**

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	**549**	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	**70**	*Figure 2-1*
Erodibility Factor, *K*	**0.17**	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	**Fairview, moderately eroded**	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **2** ***spaced at*** **42** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	**549**	
Rainfall Factor, **R**	**70**	
Erodibility Factor, **K**	**0.17**	
Soil Type	**Fairview, moderately eroded**	
Ditchline Slope, **s**	**0.06500** ft/ft	
V=	**348.21** $ft^3/ac/yr$	
Required Storage Volume=	**11.99** ft^3	

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	**0.00**	tons/acre/yr
Converting to $ft^3/ac/yr$:	**N/A**	$ft^3/ac/yr$
Required Storage Volume=	**N/A**	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	**3**	**:1**
Enter Ditch Back Slope Gradient (H:V):	**1.5**	**:1**
Enter Device Height:	**1.5**	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	23.08	ft
Storage Behind Device (assumes 65% effeciency):	**25.31**	ft^3
Wrapped TRSC-A/Wattles required:	X **1.0**	
Total	**25.31**	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.2 9X3X3 Type B sed dam

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **61.98** ft^3

Final Required Storage: **61.98** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 3.36 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 6.29 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	3 + 75
to Sta.:	7 + 50
Right/Left:	Lt.
% Ditch Grade:	6.500 %
Contributing R/W Width:	10 feet
Length of Run	X 375 feet
Disturbed Area	= 0.09 acres
Drainage Area:	0.09 acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **8** ***spaced at*** **42** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.06500	ft/ft
V=	417.98	$ft^3/ac/yr$
Required Storage Volume=	35.98	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required
**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	23.08	ft
Storage Behind Device (assumes 65% effeciency):	25.31	ft^3
Wrapped TRSC-A/Wattles required:	X 2.0	
Total	50.63	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.3 9x3x3 type b sed dam

2

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 *Shortcut Method,* t_c (A≤4.6S)

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 *Kirpich Method*

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.09** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.09**

Required Sediment Storage (ft^3)= **154.96** ft^3

Final Required Storage: **154.96** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 10.09 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 18.87 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 4 of 28

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	0 + 25
to Sta.:	2 + 0
Right/Left:	Rt.
% Ditch Grade:	5.500 %
Contributing R/W Width:	8 feet
Length of Run	X 175 feet
Disturbed Area	= 0.03 acres
Drainage Area:	0.03 acres

Elevation Tool (ft)
0
0
No Elev Data

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 3 ***spaced at*** 44 **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.05500	ft/ft
V=	353.68	$ft^3/ac/yr$
Required Storage Volume=	11.37	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required
**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	27.27	ft
Storage Behind Device (assumes 65% effeciency):	29.91	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	29.91	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.4 9x3x3 type b Sed dam

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **57.85** ft^3

Final Required Storage: **57.85** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 3.19 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 5.96 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 6 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N	**Elevation Tool (ft)**	
Trout (Y/N)?	N		
From Sta.:	3 + 75	0	
to Sta.:	7 + 50	0	
Right/Left:	Rt	**No Elev Data**	%
% Ditch Grade:	6.500	%	
Contributing R/W Width:	10	feet	
Length of Run	X 375	feet	
Disturbed Area	= 0.09	acres	
Drainage Area:	0.09	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **8** ***spaced at*** **42** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.06500 ft/ft	
V=	417.98 $ft^3/ac/yr$	
Required Storage Volume=	35.98 ft^3	

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	23.08	ft
Storage Behind Device (assumes 65% effeciency):	25.31	ft^3
Wrapped TRSC-A/Wattles required:	X 2.0	
Total	50.63	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.6 9x3x3 type b sed dam

2

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 *Shortcut Method,* t_c (A≤4.6S)

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 *Kirpich Method*

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.09** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.09**

Required Sediment Storage (ft^3)= **154.96** ft^3

Final Required Storage: **154.96** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 10.09 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 18.87 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	2 + 0
to Sta.:	3 + 75
Right/Left:	Rt.
% Ditch Grade:	6.000 %
Contributing R/W Width:	7 feet
Length of Run	X 175 feet
Disturbed Area	= 0.03 acres
Drainage Area:	0.03 acres

Elevation Tool (ft)
0
0
No Elev Data

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 3 ***spaced at*** 44 **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.06000	ft/ft
V=	321.43	$ft^3/ac/yr$
Required Storage Volume=	9.04	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	25.00	ft
Storage Behind Device (assumes 65% effeciency):	27.42	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	27.42	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

4.5 Temporary Silt Fence and Sediment Control Outlet

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **50.62** ft^3

Final Required Storage: **50.62** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 2.54 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 4.74 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 7 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	Elevation Tool (ft)
Trout (Y/N)?			N	
From Sta.:	7 +	50		0
to Sta.:	13 +	0		0
Right/Left:			Lt.	No Elev Data
% Ditch Grade:			5.000	%
Contributing R/W Width:			12	feet
Length of Run	X		550	feet
Disturbed Area	=		0.15	acres
Drainage Area:			0.15	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **9** ***spaced at*** **55** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.05000	ft/ft
V=	321.53	$ft^3/ac/yr$
Required Storage Volume=	48.72	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	30.00	ft
Storage Behind Device (assumes 65% effeciency):	32.91	ft^3
Wrapped TRSC-A/Wattles required:	X 2.0	
Total	65.81	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.1 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.15** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.15**

Required Sediment Storage (ft^3)= **272.73** ft^3

Final Required Storage: **272.73** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 13.66 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 25.55 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**3**
Suggested Top Length (ft)	**6**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	7 + 50
to Sta.:	14 + 25
Right/Left:	Rt.
% Ditch Grade:	5.000 %
Contributing R/W Width:	13 feet
Length of Run	X 675 feet
Disturbed Area	= 0.20 acres
Drainage Area:	0.2 acres

Elevation Tool (ft)
0
0
No Elev Data

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **11** ***spaced at*** **56** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.05000	ft/ft
V=	321.53	$ft^3/ac/yr$
Required Storage Volume=	64.77	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	30.00	ft
Storage Behind Device (assumes 65% effeciency):	32.91	ft^3
Wrapped TRSC-A/Wattles required:	X 2.0	
Total	65.81	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.2 RPIST TypeB , 11wattles @ 56'

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.2** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.20**

Required Sediment Storage (ft^3)= **362.60** ft^3

Final Required Storage: **362.60** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 18.17 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 33.96 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**3**
Suggested Top Length (ft)	**6**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	15 + 50
to Sta.:	14 + 25
Right/Left:	Rt.
% Ditch Grade:	2.200 %
Contributing R/W Width:	8 feet
Length of Run	X 125 feet
Disturbed Area	= 0.02 acres
Drainage Area:	0.2 acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **0** ***spaced at*** **N/A** **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02200	ft/ft
V=	141.47	$ft^3/ac/yr$
Required Storage Volume=	3.25	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	68.18	ft
Storage Behind Device (assumes 65% effeciency):	74.79	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	74.79	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.2 RPIST TypeB , no wattles

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.2** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.02**

Required Sediment Storage (ft^3)= **41.32** ft^3

Final Required Storage: **41.32** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 0.91 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 1.70 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 10 of 28

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	13 + 0
to Sta.:	14 + 61
Right/Left:	Lt.
% Ditch Grade:	2.200 %
Contributing R/W Width:	9 feet
Length of Run	X 161 feet
Disturbed Area	= 0.03 acres
Drainage Area:	0.03 acres

Elevation Tool (ft)
0
0
No Elev Data

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **1** ***spaced at*** **81** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02200	ft/ft
V=	117.86	$ft^3/ac/yr$
Required Storage Volume=	3.92	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	68.18	ft
Storage Behind Device (assumes 65% effeciency):	74.79	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	74.79	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.3 9x3x3 sed dam type b

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **59.88** ft^3

Final Required Storage: **59.88** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.10 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.06 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 11 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N		
Trout (Y/N)?	N		
		Elevation Tool (ft)	
From Sta.:	16 + 40	0	
to Sta.:	14 + 75	0	
Right/Left:	Lt.	No Elev Data	%
% Ditch Grade:	1.600	%	
Contributing R/W Width:	12.5	feet	
Length of Run	X 165	feet	
Disturbed Area	= 0.05	acres	
Drainage Area:	0.05	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 0 ***spaced at*** N/A **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659		
Rainfall Factor, **R**	70		
Erodibility Factor, **K**	0.17		
Soil Type	Fairview, moderately eroded		*From Step 1 above*
Ditchline Slope, **s**	0.01600	ft/ft	
V=	102.89	$ft^3/ac/yr$	
Required Storage Volume=	4.87	ft^3	

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr	
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$	
Required Storage Volume=	N/A	ft^3	

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	93.75	ft
Storage Behind Device (assumes 65% effeciency):	102.83	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	102.83	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.4 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.05** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.05**

Required Sediment Storage (ft^3)= **85.23** ft^3

Final Required Storage: **85.23** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.37 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.55 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 12 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y			
HQW (Y/N)?	N		**Elevation Tool (ft)**	
Trout (Y/N)?	N			
From Sta.:	16 + 0		0	
to Sta.:	17 + 23		0	
Right/Left:	Rt.		**No Elev Data**	%
% Ditch Grade:	1.600	%		
Contributing R/W Width:	13	feet		
Length of Run	X 123	feet		
Disturbed Area	= 0.04	acres		
Drainage Area:	0.04	acres		

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **0** ***spaced at*** **N/A** **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549		*From Step 1 above*
Rainfall Factor, **R**	70		
Erodibility Factor, **K**	0.17		
Soil Type	Fairview, moderately eroded		
Ditchline Slope, **s**	0.01600	ft/ft	
V=	85.71	$ft^3/ac/yr$	
Required Storage Volume=	3.15	ft^3	

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	93.75	ft
Storage Behind Device (assumes 65% effeciency):	102.83	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	102.83	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.5 Tempory Silt Fence and Sediment Control Outlet
thru yards

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.04** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.04**

Required Sediment Storage (ft^3)= **66.07** ft^3

Final Required Storage: **66.07** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 0.88 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 1.65 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 13 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N	**Elevation Tool (ft)**	
Trout (Y/N)?	N		
From Sta.:	17 + 23	0	
to Sta.:	18 + 0	0	
Right/Left:	Rt.	**No Elev Data**	%
% Ditch Grade:	4.000	%	
Contributing R/W Width:	10	feet	
Length of Run	X 77	feet	
Disturbed Area	= 0.02	acres	
Drainage Area:	0.02	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **1** ***spaced at*** **39** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.04000	ft/ft
V=	214.29	$ft^3/ac/yr$
Required Storage Volume=	3.79	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	37.50	ft
Storage Behind Device (assumes 65% effeciency):	41.13	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	41.13	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

6.6 Tempory Silt Fence and Sediment Control Outlet
thru yards

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.02** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.02**

Required Sediment Storage (ft^3)= **31.82** ft^3

Final Required Storage: **31.82** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.06 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 1.99 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 14 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	
Trout (Y/N)?			N	
From Sta.:	16	+ 60		
to Sta.:	20	+ 25		
Right/Left:			Lt.	
% Ditch Grade:			4.000	%
Contributing R/W Width:			12.5	feet
Length of Run	X		365	feet
Disturbed Area	=		0.10	acres
Drainage Area:			0.1	acres

Elevation Tool (ft)
0
0
No Elev Data

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **4** ***spaced at*** **73** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.04000	ft/ft
V=	257.22	$ft^3/ac/yr$
Required Storage Volume=	26.94	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	37.50	ft
Storage Behind Device (assumes 65% effeciency):	41.13	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	41.13	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.1sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.1** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.10**

Required Sediment Storage (ft^3)= **188.53** ft^3

Final Required Storage: **188.53** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 7.56 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 14.13 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 15 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	
Trout (Y/N)?			N	
From Sta.:	18 +	0		
to Sta.:	20 +	25		
Right/Left:			Rt.	
% Ditch Grade:			4.000	%
Contributing R/W Width:			12.5	feet
Length of Run	X		225	feet
Disturbed Area	=		0.06	acres
Drainage Area:			0.06	acres

Elevation Tool (ft)
0
0
No Elev Data

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **2** ***spaced at*** **75** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.04000	ft/ft
V=	214.29	$ft^3/ac/yr$
Required Storage Volume=	13.84	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	37.50	ft
Storage Behind Device (assumes 65% effeciency):	41.13	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	41.13	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.2 9x3x3 Sed dam type b

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.06** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.06**

Required Sediment Storage (ft^3)= **116.22** ft^3

Final Required Storage: **116.22** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 3.88 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 7.26 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 16 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	
Trout (Y/N)?			N	
From Sta.:	20 +	25		Elevation Tool (ft)
to Sta.:	21 +	25		0
Right/Left:			Lt.	No Elev Data %
% Ditch Grade:			1.000	%
Contributing R/W Width:			12.5	feet
Length of Run	X		100	feet
Disturbed Area	=		0.03	acres
Drainage Area:			0.03	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **0** ***spaced at*** **N/A** **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.01000	ft/ft
V=	64.31	$ft^3/ac/yr$
Required Storage Volume=	1.85	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	150.00	ft
Storage Behind Device (assumes 65% effeciency):	109.69	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	109.69	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.3a use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **51.65** ft^3

Final Required Storage: **51.65** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 0.52 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 0.97 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 17 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	Elevation Tool (ft)
Trout (Y/N)?			N	
From Sta.:	20 +	25		0
to Sta.:	22 +	8		0
Right/Left:			Rt.	No Elev Data
% Ditch Grade:			2.400	%
Contributing R/W Width:			12.5	feet
Length of Run	X		183	feet
Disturbed Area	=		0.05	acres
Drainage Area:			0.05	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 1 ***spaced at*** 92 **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02400	ft/ft
V=	128.57	$ft^3/ac/yr$
Required Storage Volume=	6.75	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	62.50	ft
Storage Behind Device (assumes 65% effeciency):	68.55	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	68.55	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.4 Tempory Silt Fence and Sediment Control Outlet

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.05** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.05**

Required Sediment Storage (ft^3)= **94.52** ft^3

Final Required Storage: **94.52** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.89 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 3.54 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 19 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Version 2.10.2012

Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N	**Elevation Tool (ft)**	
Trout (Y/N)?	N		
From Sta.:	22 + 38	0	
to Sta.:	24 + 23	0	
Right/Left:	Rt.	**No Elev Data**	%
% Ditch Grade:	2.400	%	
Contributing R/W Width:	10	feet	
Length of Run	X 185	feet	
Disturbed Area	= 0.04	acres	
Drainage Area:	0.04	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **1** ***spaced at*** **93** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549		*From Step 1 above*
Rainfall Factor, **R**	70		
Erodibility Factor, **K**	0.17		
Soil Type	Fairview, moderately eroded		
Ditchline Slope, **s**	0.02400	ft/ft	
V=	128.57	$ft^3/ac/yr$	
Required Storage Volume=	5.46	ft^3	

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	62.50	ft
Storage Behind Device (assumes 65% effeciency):	68.55	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	68.55	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.6 9x3x3 type b sed dam

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.04** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.04**

Required Sediment Storage (ft^3)= **76.45** ft^3

Final Required Storage: **76.45** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	0
Soil Permeability (in/hr)	0.00
Dewatering Time (Days)	N/A

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	0
Suggested Top Length (ft):	0
Final Design Top Width (ft):	3
Final Design Top Length (ft):	9
Final Design Depth (ft):	3
Weir Width (ft):	4
Skimmer Size (in)	1.5
Orifice Diameter (in)	0.25
Dewatering Time (Days)	1
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.53 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.86 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 18 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	Elevation Tool (ft)
Trout (Y/N)?			N	
From Sta.:	21 +	25		0
to Sta.:	24 +	23		0
Right/Left:			Lt.	No Elev Data
% Ditch Grade:			2.400	%
Contributing R/W Width:			12.5	feet
Length of Run	X		298	feet
Disturbed Area	=		0.09	acres
Drainage Area:			0.09	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **2** ***spaced at*** **99** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02400	ft/ft
V=	154.33	$ft^3/ac/yr$
Required Storage Volume=	13.20	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	62.50	ft
Storage Behind Device (assumes 65% effeciency):	68.55	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	68.55	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.5a use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.09** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.09**

Required Sediment Storage (ft^3)= **153.93** ft^3

Final Required Storage: **153.93** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 3.70 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 6.92 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 20 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	Elevation Tool (ft)
Trout (Y/N)?			N	
From Sta.:	25 +	75		0
to Sta.:	24 +	23		0
Right/Left:			Rt.	No Elev Data
% Ditch Grade:			2.200	%
Contributing R/W Width:			11	feet
Length of Run	X		152	feet
Disturbed Area	=		0.04	acres
Drainage Area:			0.04	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **1** ***spaced at*** **76** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02200	ft/ft
V=	117.86	$ft^3/ac/yr$
Required Storage Volume=	4.52	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	68.18	ft
Storage Behind Device (assumes 65% effeciency):	74.79	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	74.79	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

7.7 9x3x3 type b sed dam

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.04** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.04**

Required Sediment Storage (ft^3)= **69.09** ft^3

Final Required Storage: **69.09** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.27 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.37 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 21 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N	**Elevation Tool (ft)**	
Trout (Y/N)?	N		
From Sta.:	24 + 23	0	
to Sta.:	27 + 50	0	
Right/Left:	Lt.	**No Elev Data**	%
% Ditch Grade:	2.200	%	
Contributing R/W Width:	12.5	feet	
Length of Run	X 327	feet	
Disturbed Area	= 0.09	acres	
Drainage Area:	0.09	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **2** ***spaced at*** **109** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02200	ft/ft
V=	141.47	$ft^3/ac/yr$
Required Storage Volume=	13.28	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	68.18	ft
Storage Behind Device (assumes 65% effeciency):	74.79	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	74.79	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

8.1 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.09** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.09**

Required Sediment Storage (ft^3)= **168.90** ft^3

Final Required Storage: **168.90** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 3.72 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 6.96 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

Construction time ≤ 6 months (Y/N)?	Y
HQW (Y/N)?	N
Trout (Y/N)?	N
From Sta.:	26 + 10
to Sta.:	27 + 10
Right/Left:	Rt.
% Ditch Grade:	2.200 %
Contributing R/W Width:	8 feet
Length of Run	X 100 feet
Disturbed Area	= 0.02 acres
Drainage Area:	0.02 acres

Elevation Tool (ft)
0
0
No Elev Data

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y
Is this a Typical Section (Y/N)?	Y
Will RUSLE2 be used to model the Non-Typical sections?	N

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 0 ***spaced at*** N/A **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02200	ft/ft
V=	117.86	$ft^3/ac/yr$
Required Storage Volume=	2.16	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required
**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	68.18	ft
Storage Behind Device (assumes 65% effeciency):	74.79	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	74.79	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

8.2 Tempory Silt Fence and Sediment Control Outlet

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.02** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.02**

Required Sediment Storage (ft^3)= **33.06** ft^3

Final Required Storage: **33.06** ft^3

Proposed Basin Side Slopes: **1.5** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**1**
Verify Storage (ft^3)	*27.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 0.61 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 1.14 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 23 of 28

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County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	
Trout (Y/N)?			N	
From Sta.:	27 +	50	0	Elevation Tool (ft)
to Sta.:	34 +	25	0	
Right/Left:			Lt.	No Elev Data
% Ditch Grade:			2.100	%
Contributing R/W Width:			12.5	feet
Length of Run	X		675	feet
Disturbed Area	=		0.19	acres
Drainage Area:			0.19	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **4** ***spaced at*** **135** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02100	ft/ft
V=	112.50	$ft^3/ac/yr$
Required Storage Volume=	21.79	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	71.43	ft
Storage Behind Device (assumes 65% effeciency):	78.35	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	78.35	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

8.3 Tempory Silt Fence and Sediment Control Outlet

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.19** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.19**

Required Sediment Storage (ft^3)= **348.66** ft^3

Final Required Storage: **348.66** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	0
Soil Permeability (in/hr)	0.00
Dewatering Time (Days)	N/A

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	0
Suggested Top Length (ft):	0
Final Design Top Width (ft):	3
Final Design Top Length (ft):	9
Final Design Depth (ft):	3
Weir Width (ft):	4
Skimmer Size (in)	1.5
Orifice Diameter (in)	0.25
Dewatering Time (Days)	2
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 6.11 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 11.43 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 24 of 28

Construction time ≤ 6 months (Y/N)?	**Y**
HQW (Y/N)?	**N**
Trout (Y/N)?	**N**
From Sta.:	**34 + 25**
to Sta.:	**35 + 35**
Right/Left:	**Lt.**
% Ditch Grade:	**2.100** %
Contributing R/W Width:	**12.5** feet
Length of Run	X **110** feet
Disturbed Area	= **0.03** acres
Drainage Area:	**0.03** acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	**Y**
Is this a Typical Section (Y/N)?	**Y**
Will RUSLE2 be used to model the Non-Typical sections?	**N**

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	**659**	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	**70**	*Figure 2-1*
Erodibility Factor, *K*	**0.17**	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	**Fairview, moderately eroded**	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **0** ***spaced at*** **N/A** **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	**659**	
Rainfall Factor, **R**	**70**	
Erodibility Factor, **K**	**0.17**	
Soil Type	**Fairview, moderately eroded**	
Ditchline Slope, **s**	**0.02100**	ft/ft
V=	**135.04**	$ft^3/ac/yr$
Required Storage Volume=	**4.26**	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	**0.00**	tons/acre/yr
Converting to $ft^3/ac/yr$:	**N/A**	$ft^3/ac/yr$
Required Storage Volume=	**N/A**	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required
**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	**3**	**:1**
Enter Ditch Back Slope Gradient (H:V):	**1.5**	**:1**
Enter Device Height:	**1.5**	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	71.43	ft
Storage Behind Device (assumes 65% effeciency):	**78.35**	ft^3
Wrapped TRSC-A/Wattles required:	X **1.0**	
Total	**78.35**	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

9.1 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.03** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.03**

Required Sediment Storage (ft^3)= **56.82** ft^3

Final Required Storage: **56.82** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.20 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.24 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 25 of 28

Construction time ≤ 6 months (Y/N)?	**Y**
HQW (Y/N)?	**N**
Trout (Y/N)?	**N**
From Sta.:	**27 + 25**
to Sta.:	**35 + 20**
Right/Left:	**Lt.**
% Ditch Grade:	**2.100** %
Contributing R/W Width:	**12.5** feet
Length of Run	X **795** feet
Disturbed Area	= **0.23** acres
Drainage Area:	**0.23** acres

Elevation Tool (ft)
0
0
No Elev Data %

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	**Y**
Is this a Typical Section (Y/N)?	**Y**
Will RUSLE2 be used to model the Non-Typical sections?	**N**

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Regression Constant, *C*	**659**	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	**70**	*Figure 2-1*
Erodibility Factor, *K*	**0.17**	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	**Fairview, moderately eroded**	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **5** ***spaced at*** **133** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	**659**	
Rainfall Factor, **R**	**70**	
Erodibility Factor, **K**	**0.17**	
Soil Type	**Fairview, moderately eroded**	
Ditchline Slope, **s**	**0.02100**	ft/ft
V=	**135.04**	$ft^3/ac/yr$
Required Storage Volume=	**30.81**	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	**0.00**	tons/acre/yr
Converting to $ft^3/ac/yr$:	**N/A**	$ft^3/ac/yr$
Required Storage Volume=	**N/A**	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required
**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	**3**	**:1**
Enter Ditch Back Slope Gradient (H:V):	**1.5**	**:1**
Enter Device Height:	**1.5**	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	71.43	ft
Storage Behind Device (assumes 65% effeciency):	**78.35**	ft^3
Wrapped TRSC-A/Wattles required:	X **1.0**	
Total	**78.35**	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

9.2 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.23** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.23**

Required Sediment Storage (ft^3)= **410.64** ft^3

Final Required Storage: **410.64** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 8.64 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 16.16 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**2**
Suggested Top Length (ft)	**4**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 26 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N		
Trout (Y/N)?	N		
		Elevation Tool (ft)	
From Sta.:	37 + 63	0	
to Sta.:	35 + 35	0	
Right/Left:	Lt.	No Elev Data	%
% Ditch Grade:	1.000	%	
Contributing R/W Width:	12.5	feet	
Length of Run	X 228	feet	
Disturbed Area	= 0.07	acres	
Drainage Area:	0.07	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **0** ***spaced at*** **N/A** **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659		*From Step 1 above*
Rainfall Factor, **R**	70		
Erodibility Factor, **K**	0.17		
Soil Type	Fairview, moderately eroded		
Ditchline Slope, **s**	0.01000	ft/ft	
V=	64.31	$ft^3/ac/yr$	
Required Storage Volume=	4.21	ft^3	

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	150.00	ft
Storage Behind Device (assumes 65% effeciency):	164.53	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	164.53	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

9.3 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.07** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.07**

Required Sediment Storage (ft^3)= **117.77** ft^3

Final Required Storage: **117.77** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter**

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	0
Soil Permeability (in/hr)	0.00
Dewatering Time (Days)	N/A

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	0
Suggested Top Length (ft):	0
Final Design Top Width (ft):	3
Final Design Top Length (ft):	9
Final Design Depth (ft):	3
Weir Width (ft):	4
Skimmer Size (in)	1.5
Orifice Diameter (in)	0.25
Dewatering Time (Days)	2
Verify Storage (ft^3)	*81.00* **Too Low**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.18 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.21 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 27 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Construction time ≤ 6 months (Y/N)?	Y		
HQW (Y/N)?	N	**Elevation Tool (ft)**	
Trout (Y/N)?	N		
From Sta.:	36 + 75	0	
to Sta.:	35 + 20	0	
Right/Left:	Lt.	No Elev Data	%
% Ditch Grade:	2.000	%	
Contributing R/W Width:	12.5	feet	
Length of Run	X 155	feet	
Disturbed Area	= 0.04	acres	
Drainage Area:	0.04	acres	

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	549	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES **1** ***spaced at*** **78** **feet**

Choose between Type B Rock Silt Checks or Wattles

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	549	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02000	ft/ft
V=	107.14	$ft^3/ac/yr$
Required Storage Volume=	4.77	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Option of using Wrapped Type A Rock Silt Checks or Wattles

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	75.00	ft
Storage Behind Device (assumes 65% effeciency):	82.27	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	82.27	ft^3

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

8.3 Tempory Silt Fence and Sediment Control Outlet

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.04** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.04**

Required Sediment Storage (ft^3)= **80.06** ft^3

Final Required Storage: **80.06** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 1.34 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 2.50 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

Note on the EC Plan whether the 30 or 60 day option is used.

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

STEP 1: Input Project Information ****items in red are REQUIRED***

SECTION 28 of 28

County:	Caldwell
Location:	SR 1848 Blueberry Dr.
Prepared By:	Greg Kirby
Date Prepared:	7/5/2017
Level III A #:	3498
Level III A Expiration:	12/31/2019
Reviewed By:	
Date Reviewed:	
Level III A #:	
Level III A Expiration:	

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Version 2.10.2012

Construction time ≤ 6 months (Y/N)?			Y	
HQW (Y/N)?			N	
Trout (Y/N)?			N	
From Sta.:	37 +	35	0	Elevation Tool (ft)
to Sta.:	36 +	75	0	
Right/Left:			Lt.	No Elev Data
% Ditch Grade:			2.000	%
Contributing R/W Width:			12.5	feet
Length of Run	X		60	feet
Disturbed Area	=		0.02	acres
Drainage Area:			0.02	acres

****Drainage Area must equal or exceed the Disturbed Area found above***

Surface Dewatering Device	Y	
Is this a Typical Section (Y/N)?	Y	
Will RUSLE2 be used to model the Non-Typical sections?	N	

Regression Constant, *C*	659	*Table 2-7 (Level III Ref Manual)*
Rainfall Factor, *R*	70	*Figure 2-1*
Erodibility Factor, *K*	0.17	*Table 2-2 or Web Soil Survey (http://soildatamart.nrcs.usda.gov/)*
Soil Type	Fairview, moderately eroded	** informational purposes only.*

STEP 2: Ditch Liner requirements: *Utilize the* ***Required Liner*** *tab and note recommendations on plans.*

STEP 3: Velocity Control Requirements

TYPE B ROCK SILT CHECKS OR WATTLES 0 ***spaced at*** N/A **feet**

Velocity control is not required. The outlet device from Option 4,5, or 6 will be sufficient.

****See the HELP Tab for additional clarification and an example on how to place on plans.***

Start with Option 4A

OPTION 4: Using RUSLE2 Analysis to determine required storage

OPTION 4A: For DRAINAGE AREA < 3 Acre: Use V=CRKs to determine storage

Regression Constant, **C**	659	
Rainfall Factor, **R**	70	
Erodibility Factor, **K**	0.17	
Soil Type	Fairview, moderately eroded	
Ditchline Slope, **s**	0.02000	ft/ft
V=	128.61	$ft^3/ac/yr$
Required Storage Volume=	2.21	ft^3

From Step 1 above

Using 82% of Rainfall Factor-see note in cell C4 - Move on to Option 4C

OPTION 4B: For DRAINAGE AREA > 3 Acre: Use RUSLE2 Modeling to determine storage

Sediment Delivery from RUSLE2:	0.00	tons/acre/yr
Converting to $ft^3/ac/yr$:	N/A	$ft^3/ac/yr$
Required Storage Volume=	N/A	ft^3

See Option 4A

OPTION 4C: Using the Required Storage Volume from Option 4A or 4B to determine # of Wrapped TRSC-A/Wattles Required

**** These devices can be used to satisfy the velocity requirements in Step 3.***

Storage from Wrapped Type A Rock Silt Checks or Wattles

Enter Ditch Front Slope Gradient (H:V):	3	:1
Enter Ditch Back Slope Gradient (H:V):	1.5	:1
Enter Device Height:	1.5	ft
Area Behind Device:	5.06	ft^2
Length of Ditch Behind Device:	75.00	ft
Storage Behind Device (assumes 65% effeciency):	65.81	ft^3
Wrapped TRSC-A/Wattles required:	X 1.0	
Total	65.81	ft^3

Option of using Wrapped Type A Rock Silt Checks or Wattles

GOOD. Place measure(s) on EC Plan. Start with the first device as close to the outlet point as possible and then space them evenly up the grade. PAM should not be placed on the last BMP at outlet.

****Designer still has the option of using Option 5 or 6***

COMMENTS:

9.5 use sediment dam type B 9x3x3

OPTION 5: IF DRAINAGE AREA > 1 Acre: Use Surface Area Calculations to determine storage, A=325Q $_p$

a. Determine the Peak Runoff Rate, **Q_p** ($Q_p = Q_{10}$ (Q_{25} for HQW or Trout)) **USE Q10**

Q_p=CiA

Runoff Coefficient, **C** 0 *Table 1-4,1-5,1-6*

Time of Concentration, **t_c** (minutes)

1 ***Shortcut Method,*** **t_c (A≤4.6S)**

Watershed Slope, **S** 0 %

t_c= **N/A** minutes **See Kirpich**

2 ***Kirpich Method***

Flow Path, **L** 0 feet **see Module 1 Eq. 3*

Watershed Slope, **S** 0 ft/ft **see Module 1 Eq. 3*

Kirpich, **t_c=** **#DIV/0!** minutes

*Using a Return Period (**T**) of 10 yrs (25 for HQW) and a **t_c** of* **#DIV/0!** *minutes, the rainfall intensity, **i** (in/hr), can be read from Appendix A or the NOAA website, http://hdsc.nws.noaa.gov/hdsc/pfds/orb/nc_pfds.html*

Rainfall Intensity, **i** (in/hr) 0 in/hr *Appendix A*

Drainage Area given as **0.02** acres

Peak Rate of Runoff, **Q_p =CiA** **0.00** cfs

b. Determine the Required Surface Area= **0.00** ft^2

c. Use Surface Area (**A**) to determine required **VOLUME** of Temporary Type-B Sediment Dam

Design Depth: 3

Required VOLUME using the design depth: **0.00** ft^3

d. Sediment Storage Required using 1800 ft^3/ac

Disturbed Area (acres)= **0.02**

Required Sediment Storage (ft^3)= **30.99** ft^3

Final Required Storage: **30.99** ft^3

Proposed Basin Side Slopes: **0.0** **:1 side slopes** ***must be at least 1.5:1 or flatter***

Infiltration Analysis Web Soil Survey (http://soildatamart.nrcs.usda.gov/)

Sat. Hydraulic Con. (Ksat, micro m/sec)	**0**
Soil Permeability (in/hr)	**0.00**
Dewatering Time (Days)	**N/A**

Skimmer Basin Required

Basin Design	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**0**
Suggested Top Length (ft):	**0**
Final Design Top Width (ft):	**3**
Final Design Top Length (ft):	**9**
Final Design Depth (ft):	**3**
Weir Width (ft):	**4**
Skimmer Size (in)	**1.5**
Orifice Diameter (in)	**0.25**
Dewatering Time (Days)	**2**
Verify Storage (ft^3)	*81.00* **OK**
Verify Surface Area (ft^2)	*27.00* **OK**

Place Basin at outlet point. Ensure devices are used to satisfy requirements of Step 3. Install Baffles*.

See Option 6 if installing this measure is not practical.

* **Baffles** are required for infiltration and skimmer basins that are located at drainage turnouts.
If the device is greater than 20' in length, it will require 3 baffles. If it is 10'-20' in length, it will require 2 baffles.
If it is less than 10', it will require 1 baffle.

OPTION 6: Alternative Designs

IMPORTANT: Before using Option 6, be sure that the information in Step 1 is accurate!

There may be cases where the RUSLE2 Analysis (Option 4) yields an excessive number of devices to achieve storage requirements, and site constraints disallow infiltration and skimmer basin (option 5) installation. Therefore it will be necessary to utilize the option below that best fits your situation. **The 60 Day Option is not available for projects involving HQW or Trout Waters.**

30 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 23% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 30 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 30 day period in NC, the maximum amount of Rainfall Energy that can be expected is 23% of the annual total.

In this situation:

23% of RUSLE2 Required Volume: 0.62 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device. Wattles are required for Trout or HQW waters.**

60 DAY OPTION

Under these circumstances it will be necessary to provide a minimum of 43% of the storage calculated using the RUSLE2 analysis (Option 4) during the Clearing and Grubbing Phase. **This section must then be permanently stabilized within 60 days from the time clearing and grubbing begins.** This is derived from Table 2-1 of the Level III Reference Manual which indicates that for any given 60 day period in NC, the maximum amount of Rainfall Energy that can be expected is 43% of the annual total.

In this situation:

43% of RUSLE2 Required Volume: 1.16 ft^3

Design Depth (ft): 3

Proposed Basin Side Slopes: 1.5 **:1 side slopes**

Silt Basin Type B	***Minimum 2:1 (L:W) Ratio***
Suggested Top Width (ft):	**1**
Suggested Top Length (ft)	**2**
Final Design Top Width (ft):	**0**
Final Design Top Length (ft):	**0**
Final Design Depth (ft):	**3**
Weir Width (ft):	**0**
Verify Storage (ft^3)	*0.00* **Too Low**

***PAM must be introduced by a minimum of 1 Wrapped Type A Rock Silt Check or Wattle upgrade from this outlet device.**

***Note on the EC Plan whether the 30 or 60 day option is used.**

GENERAL NOTES:

*If the project involves HQW or Trout Waters, wattles in conjunction with PAM (polyacrylamide) must be installed according to Step 3 and Option 4 above. If Step 3 does not call for velocity control, an additional wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*If the project does **not** involve HQW or Trout Waters, install the Type B Rock Silt Checks (TRSC-B) or wattles according to Step 3 and the Wrapped Type A Rock Silt Checks (TRSC-A) or Wattles according to Option 4. If Option 4 only calls for 1 Wrapped TRSC-A or wattle, an additional Wrapped TRSC-A or wattle will be required up the grade to deliver the PAM during a runoff event. PAM should not be placed on the last BMP at the outlet.

*Baffles are required for Silt Basin Type B, infiltration and skimmer basins that are located at drainage turnouts.
-If the device is greater than 20" in length, it will require 3 baffles. If it is 10"-20" in length, it will require 2 baffles.
-If it is less than 10', it will require 1 baffle.

*If the Silt Basin Type B, infiltration or skimmer basin can not be installed properly due to the steepness of the ditchline grade, recommend utilizing the Tiered Basin method to ensure sediment storage is achieved.

*Install a Type A Rock Silt Check or Wattle in conjunction with the Silt Basin Type B, infiltration or skimmer basin.

*Always show required device and dimensions on EC Plan per spreadsheet. If Option 6 is used, note on the plans if this site must be stabilized within 30 or 60 days from the time clearing and grubbing begins.

COMMENTS:

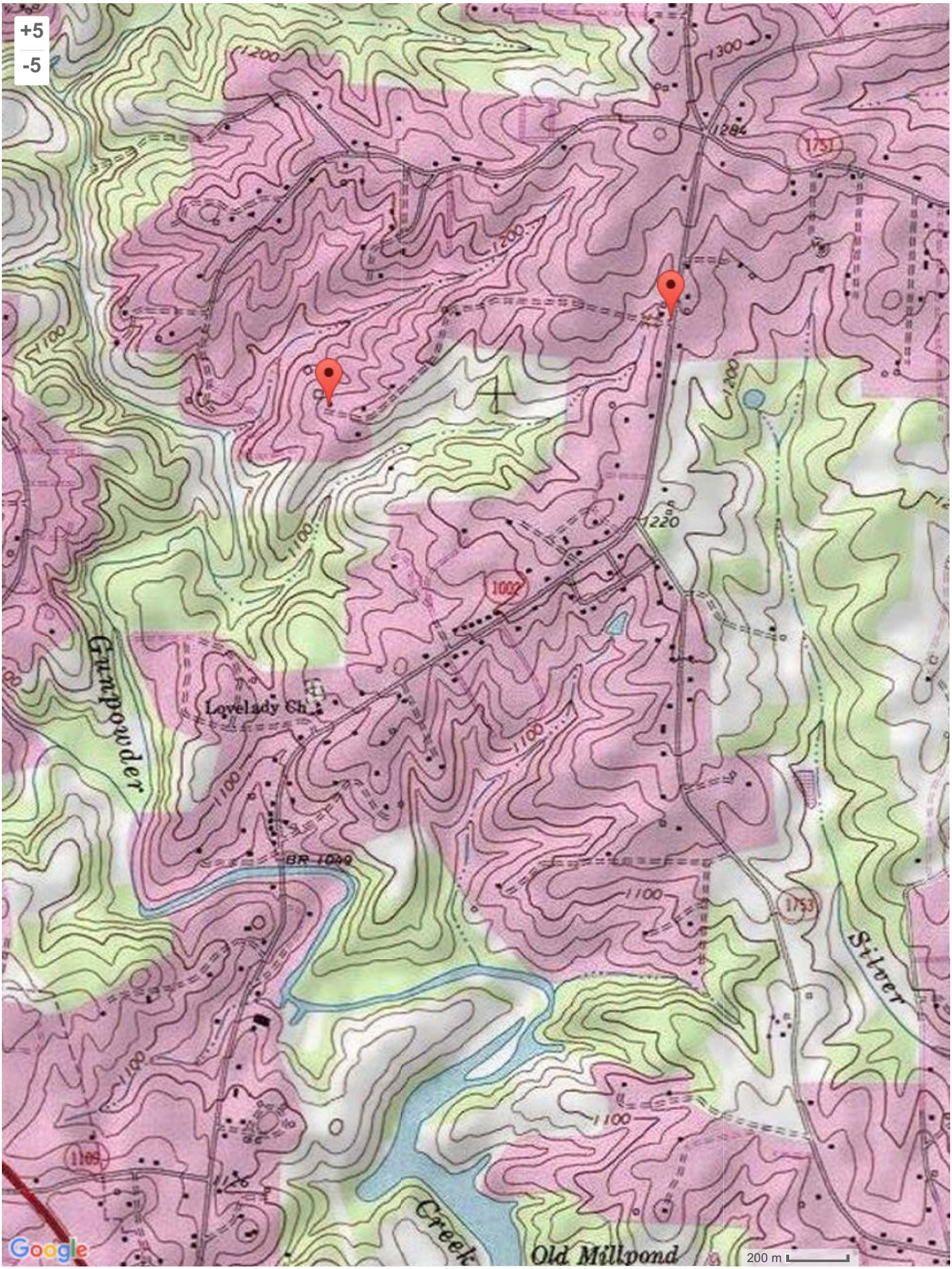
Temporary Liner (Matting) in Ditchline Calculations (English)

Construction Sheet #	4	6	7	8	9	
Construction Line (-L-,-Y-,etc.)	4.4	6.1	7.1	8.1	9.1	
Left or Right (LT.,RT.,Median)	R	L	L	L	L	
Upper Station No.	25	1300	2025	2423	3425	
Upper Station Elevation (ft.)						
Lower Station No.	200	750	1660	2750	3535	
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)	1.5	1.5	1.5	1.5	1.5	
Frontslope Grade (i.e. 2 for 2:1)	3	3	3	3	3	
Backslope Grade (i.e. 2 for 2:1)	1.5	1.5	1.5	1.5	1.5	
Base Width (ft., 0 for V-Ditches)	0	0	0	0	0	
Measured Ditchline Length (ft.)	175	550	365	327	110	
Ditch Grade (%)	5.50	5.00	4.00	2.20	2.20	0.00
Velocity (ft/s)	4.28	4.08	3.65	2.71	2.71	0.00
Shear Stress in Ditch (lb/ft^2)	1.13	1.03	0.82	0.45	0.45	0.00
Ditch Liner Requirement	**PSRM**	**PSRM**	**MATTING**	**MATTING**	**MATTING**	**None**
Matting Quantity (yd^2)	**0**	**0**	**300**	**270**	**95**	**0**
PSRM Matting Quantity (yd^2)	**145**	**455**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)	4.3	6.2	7.3		9.2	
Left or Right (LT.,RT.,Median)	L	R	L		R	
Upper Station No.	750	1425	2125		2725	
Upper Station Elevation (ft.)						
Lower Station No.	375	750	2025		3520	
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)	1.5	1.5	1.5		1.5	
Frontslope Grade (i.e. 2 for 2:1)	3	3	3		3	
Backslope Grade (i.e. 2 for 2:1)	1.5	1.5	1.5		1.5	
Base Width (ft., 0 for V-Ditches)	0	0	0		0	
Measured Ditchline Length (ft.)	375	675	100		795	
Ditch Grade (%)	6.50	5.00	1.00	0.00	2.10	0.00
Velocity (ft/s)	4.65	4.08	1.83	0.00	2.64	0.00
Shear Stress in Ditch (lb/ft^2)	1.34	1.03	0.21	0.00	0.43	0.00
Ditch Liner Requirement	**PSRM**	**PSRM**	**None**	**None**	**MATTING**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**655**	**0**
PSRM Matting Quantity (yd^2)	**310**	**555**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)	4.5	6.2a	7.5		9.3	
Left or Right (LT.,RT.,Median)	R	R	L		L	
Upper Station No.	750	1550	2125		3763	
Upper Station Elevation (ft.)						
Lower Station No.	375	1425	2423		3535	
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)	1.5	1.5	1.5		1.5	
Frontslope Grade (i.e. 2 for 2:1)	3	3	3		3	
Backslope Grade (i.e. 2 for 2:1)	1.5	1.5	1.5		1.5	
Base Width (ft., 0 for V-Ditches)	0	0	0		0	

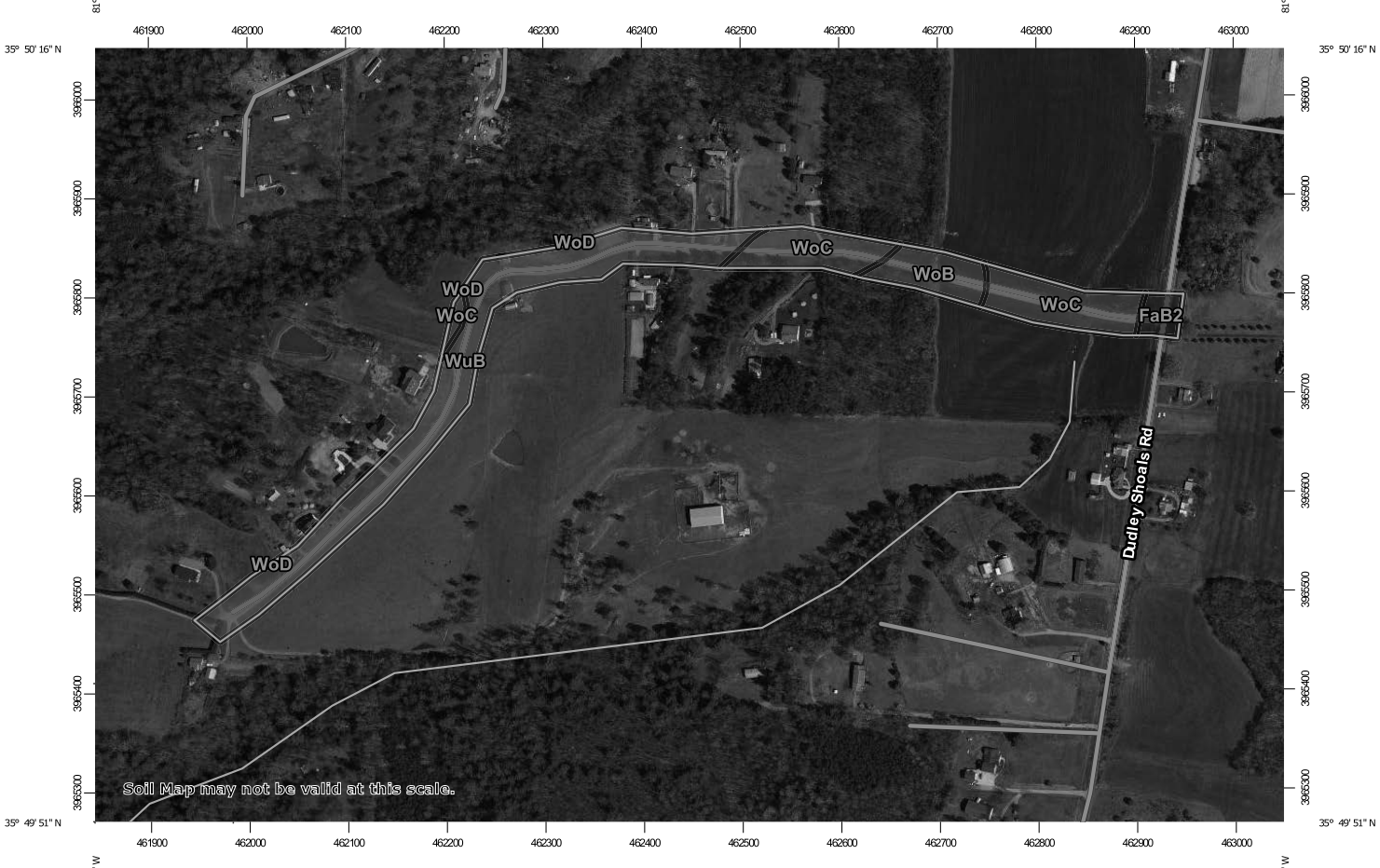
Measured Ditchline Length (ft.)	375	125	298		228	
Ditch Grade (%)	6.50	2.20	2.40	0.00	1.00	0.00
Velocity (ft/s)	4.65	2.71	2.83	0.00	1.83	0.00
Shear Stress in Ditch (lb/ft^2)	1.34	0.45	0.49	0.00	0.21	0.00
Ditch Liner Requirement	**PSRM**	**MATTING**	**MATTING**	**None**	**None**	**None**
Matting Quantity (yd^2)	**0**	**105**	**245**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**310**	**0**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)		6.4			9.4	
Left or Right (LT.,RT.,Median)		L			R	
Upper Station No.		1640			3735	
Upper Station Elevation (ft.)						
Lower Station No.		1475			3675	
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)		1.5			1.5	
Frontslope Grade (i.e. 2 for 2:1)		3			3	
Backslope Grade (i.e. 2 for 2:1)		1.5			1.5	
Base Width (ft., 0 for V-Ditches)		0			0	
Measured Ditchline Length (ft.)		165			60	
Ditch Grade (%)	0.00	1.60	0.00	0.00	2.00	0.00
Velocity (ft/s)	0.00	2.31	0.00	0.00	2.58	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.33	0.00	0.00	0.41	0.00
Ditch Liner Requirement	**None**	**MATTING**	**None**	**None**	**MATTING**	**None**
Matting Quantity (yd^2)	**0**	**140**	**0**	**0**	**50**	**0**
PSRM Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	**None**	**None**	**None**	**None**	**None**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						

Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	**None**	**None**	**None**	**None**	**None**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	**None**	**None**	**None**	**None**	**None**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	**None**	**None**	**None**	**None**	**None**	**None**
Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**
PSRM Matting Quantity (yd^2)	**0**	**0**	**0**	**0**	**0**	**0**

Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	None	None	None	None	None	None
Matting Quantity (yd^2)	0	0	0	0	0	0
PSRM Matting Quantity (yd^2)	0	0	0	0	0	0
Construction Line (-L-,-Y-,etc.)						
Left or Right (LT.,RT.,Median)						
Upper Station No.						
Upper Station Elevation (ft.)						
Lower Station No.						
Lower Station Elevation (ft.)						
Design Ditch Flow Depth (ft.)	0.33	0.33	0.33	0.33	0.33	0.33
Actual Ditch Depth (ft.)						
Frontslope Grade (i.e. 2 for 2:1)						
Backslope Grade (i.e. 2 for 2:1)						
Base Width (ft., 0 for V-Ditches)						
Measured Ditchline Length (ft.)						
Ditch Grade (%)	0.00	0.00	0.00	0.00	0.00	0.00
Velocity (ft/s)	0.00	0.00	0.00	0.00	0.00	0.00
Shear Stress in Ditch (lb/ft^2)	0.00	0.00	0.00	0.00	0.00	0.00
Ditch Liner Requirement	None	None	None	None	None	None
Matting Quantity (yd^2)	0	0	0	0	0	0
PSRM Matting Quantity (yd^2)	0	0	0	0	0	0
Total Matting Quantity (yd^2) =	0	245	545	270	800	0
Total Ditchline Matting Quantity =	1860.00	yd^2				
Total PSRM Quantity (yd^2) =	765	1010	0	0	0	0
Total Ditchline PSRM Quantity =	1775.00	yd^2				


+5
-5
1200
1300
1286
1751
1200
1100
1200
1220
1002
Gunpowder
Lovelady Ch
1100
1100
SR 1049
1100
1753
Silver
1100
1109
1126
Creek
Old Millpond
Google
200 m

Saturated Hydraulic Conductivity (Ksat)—Caldwell County, North Carolina
(Ksat)



Map Scale: 1:5,520 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- <= 8.6066
- > 8.6066 and <= 9.0000
- Not rated or not available

Soil Rating Lines
- <= 8.6066
- > 8.6066 and <= 9.0000
- Not rated or not available

Soil Rating Points
- <= 8.6066
- > 8.6066 and <= 9.0000
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Caldwell County, North Carolina
Survey Area Data: Version 16, Sep 19, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 22, 2010—Apr 30, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Saturated Hydraulic Conductivity (Ksat)

Saturated Hydraulic Conductivity (Ksat)— Summary by Map Unit — Caldwell County, North Carolina (NC027)				
Map unit symbol	**Map unit name**	**Rating (micrometers per second)**	**Acres in AOI**	**Percent of AOI**
FaB2	Fairview sandy clay loam, 2 to 8 percent slopes, moderately eroded	9.0000	0.4	4.0%
WoB	Woolwine-Fairview complex, 2 to 8 percent slopes	8.6066	1.1	10.4%
WoC	Woolwine-Fairview complex, 8 to 15 percent slopes	8.6066	3.3	29.9%
WoD	Woolwine-Fairview complex, 15 to 25 percent slopes	8.6066	0.0	0.0%
WuB	Woolwine-Fairview-Urban land complex, 2 to 8 percent slopes	8.6066	6.1	55.6%
Totals for Area of Interest			**11.0**	**100.0%**

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

Top Depth: 12

Bottom Depth: 36

Units of Measure: Inches

RUSLE2 Related Attributes

This report summarizes those soil attributes used by the Revised Universal Soil Loss Equation Version 2 (RUSLE2) for the map units in the selected area. The report includes the map unit symbol, the component name, and the percent of the component in the map unit. Soil property data for each map unit component include the hydrologic soil group, erosion factors Kf for the surface horizon, erosion factor T, and the representative percentage of sand, silt, and clay in the mineral surface horizon. Missing surface data may indicate the presence of an organic surface layer. .

Report—RUSLE2 Related Attributes

Soil properties and interpretations for erosion runoff calculations. The surface mineral horizon properties are displayed. Organic surface horizons are not displayed.

RUSLE2 Related Attributes–Caldwell County, North Carolina								
Map symbol and soil name	Pct. of map unit	Slope length (ft)	Hydrologic group	Kf	T factor	Representative value		
						% Sand	% Silt	% Clay
FaB2—Fairview sandy clay loam, 2 to 8 percent slopes, moderately eroded								
Fairview, moderately eroded	88	161	B	.17	5	58.0	16.0	26.0
WoB—Woolwine-Fairview complex, 2 to 8 percent slopes								
Woolwine	45	—	C	.28	3	44.8	41.2	14.0
Fairview, moderately eroded	40	—	B	.15	5	55.1	17.4	27.5
WoC—Woolwine-Fairview complex, 8 to 15 percent slopes								
Woolwine	45	—	C	.28	3	44.8	41.2	14.0
Fairview, moderately eroded	40	—	B	.15	5	55.1	17.4	27.5
WoD—Woolwine-Fairview complex, 15 to 25 percent slopes								
Woolwine	55	—	C	.28	3	44.8	41.2	14.0
Fairview, moderately eroded	25	—	B	.15	5	55.1	17.4	27.5
WuB—Woolwine-Fairview-Urban land complex, 2 to 8 percent slopes								
Woolwine	35	—	C	.28	3	44.8	41.2	14.0
Fairview, moderately eroded	30	—	B	.15	5	55.1	17.4	27.5

Data Source Information

Soil Survey Area: Caldwell County, North Carolina
Survey Area Data: Version 16, Sep 19, 2016