

DRAINAGE DETAIL INDEX

DESCRIPTION

DETAIL NUMBER

STANDARD CATCH BASIN	DR-1
CATCH BASIN FRAME AND GRATE	DR-1A
CATCH BASIN WITH GUTTER INLET	DR-2
BIO-RETENTION AREA	DR-3
STANDARD PRECAST DRAINAGE MANHOLE	DR-4
BLOCK DRAINAGE STRUCTURE	DR-5
ROADWAY UNDER-DRAIN	DR-6
UTILITY SUPPORT	DR-7
OUTLET EROSION PROTECTION	DR-8
OUTLET EROSION PROTECTION CROSS SECTION	DR-8A
FIELD STONE HEADWALL	DR-9
INFILTRATION BASIN	DR-10
INFILTRATION BASIN CROSS SECTION	DR-10A
BASIN BERM CROSS SECTION	DR-11
FOREBAY BERM	DR-12
EMERGENCY SPILLWAY	DR-13
OUTLET CONTROL STRUCTURE	DR-14
OUTLET CONTROL STRUCTURE GRATE	DR-14A
OUTLET CONTROL STRUCTURE ALT. 1	DR-15
OUTLET CONTROL STRUCTURE ALT. 2	DR-15A
STORMWATER POND	DR-16
STORMWATER POND NOTES	DR-16A
SPILLWAY	DR-17

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

DRAINAGE DETAIL INDEX

SECTION:

DRAINAGE

DWG #:

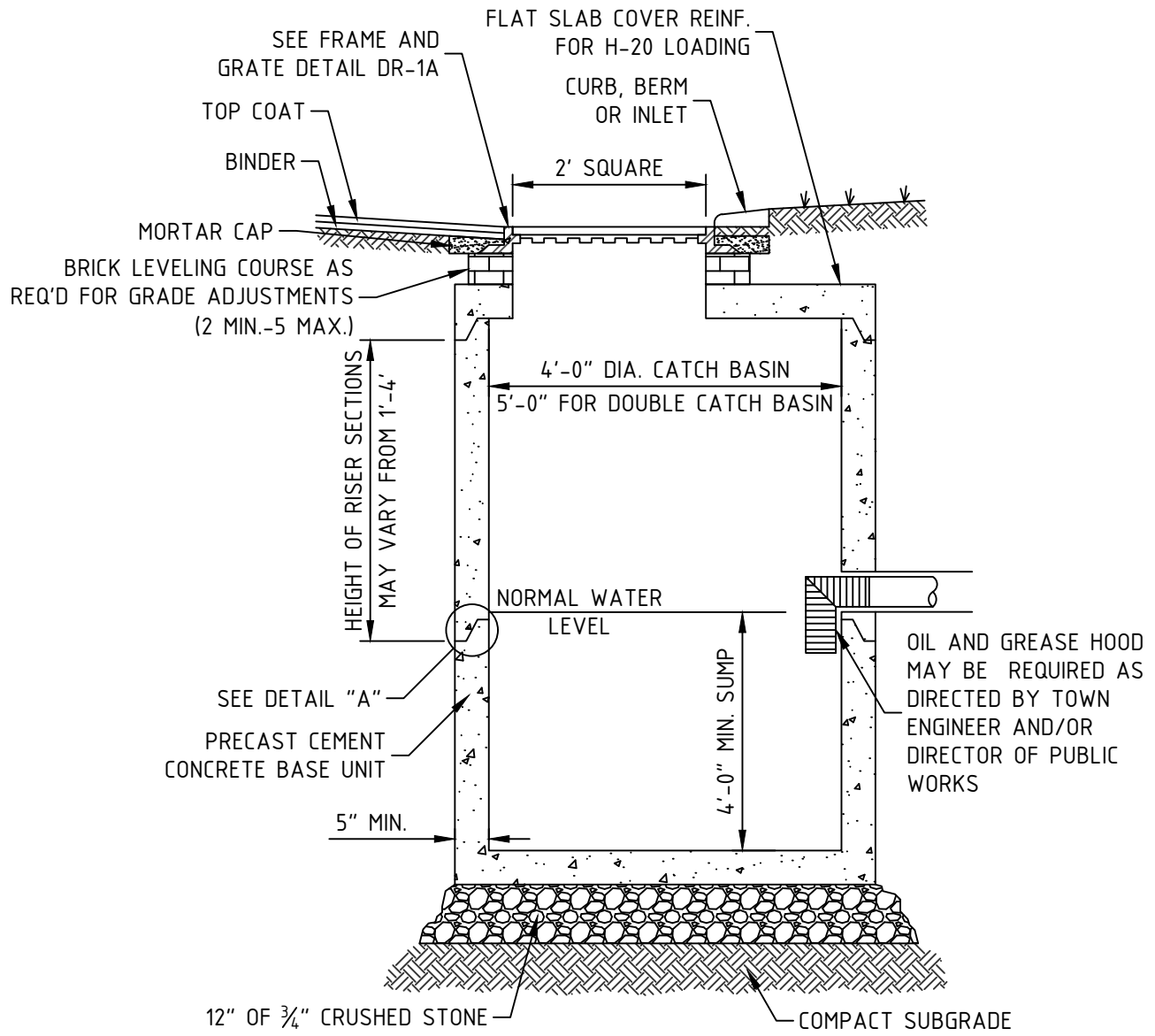
DR-INDEX

DATE:

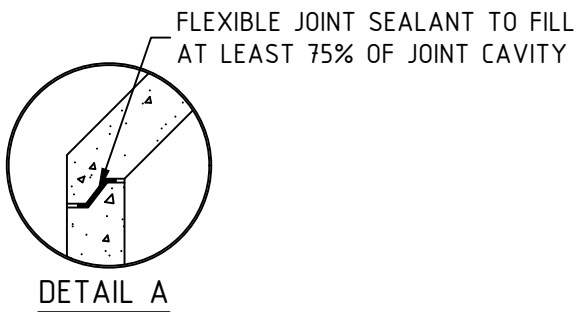
JAN 2022

PAGE:

43



NOTE:
 PRECAST REINFORCED CONCRETE CATCH BASIN TO BE CAPABLE OF SUPPORTING H-20 LOADING.



CHECKED BY:
 AT

APPROVED BY:
 RR



Town of Durham Engineering Division

STANDARD CATCH BASIN
 DETAIL

SECTION: DRAINAGE

DWG #: DR-1

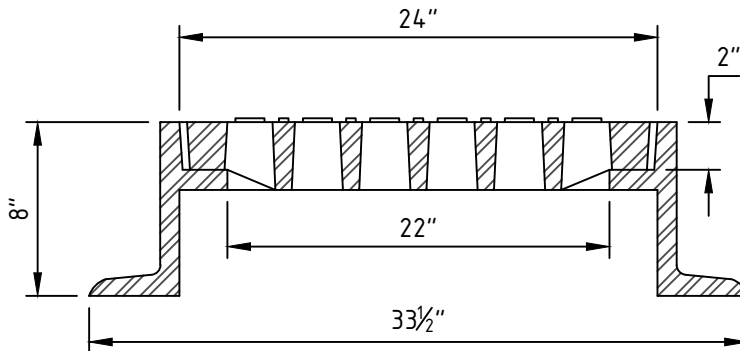
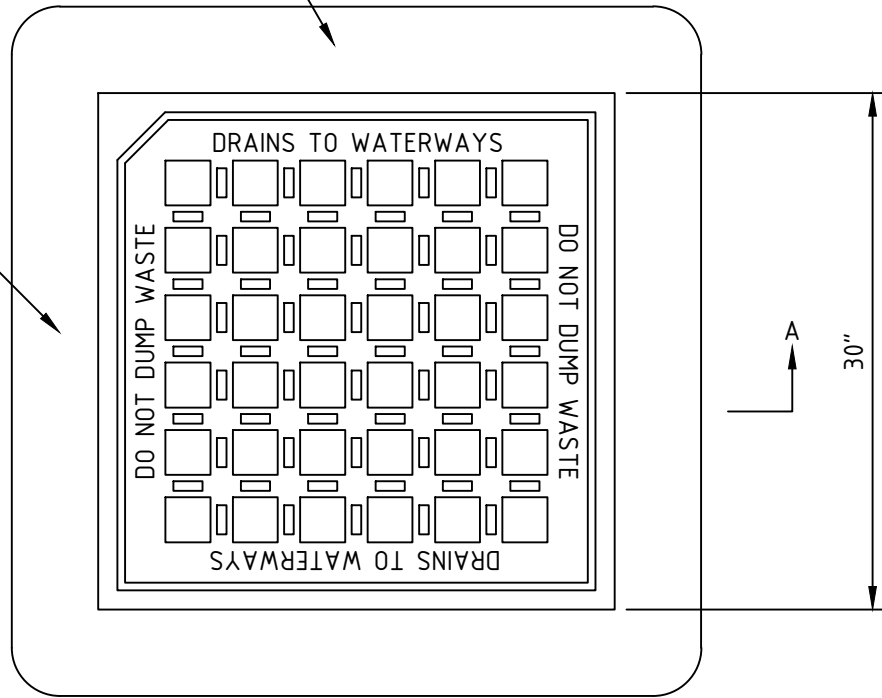
DATE: JAN 2022

PAGE: 44

4 FLANGE AVAILABLE
(SEE NOTE BELOW)

3 FLANGE FRAME

A



SECTION A-A

NOTE:

GRATES SHALL BE NHDOT TYPE WITH "DUMP NO WASTE" OR "DUMP NO WASTE" & "DRAINS TO WATERWAY"

3 FLANGE FRAMES TO BE USED WHERE INLET IS ADJACENT TO CURB STONES,
4 FLANGE FRAME TO BE USED ELSEWHERE.

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

**CATCH BASIN FRAME AND
GRATE**

SECTION:

DRAINAGE

DWG #:

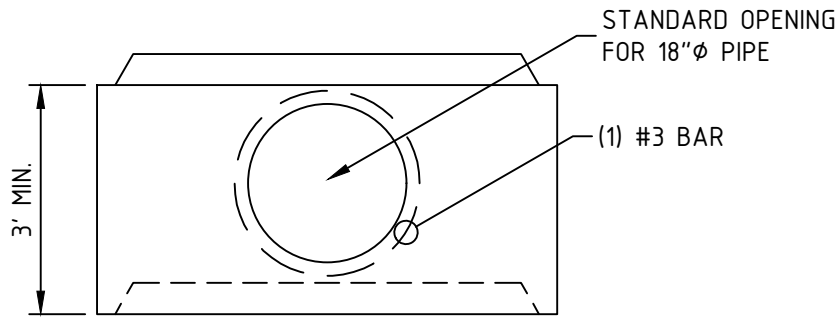
DR-1A

DATE:

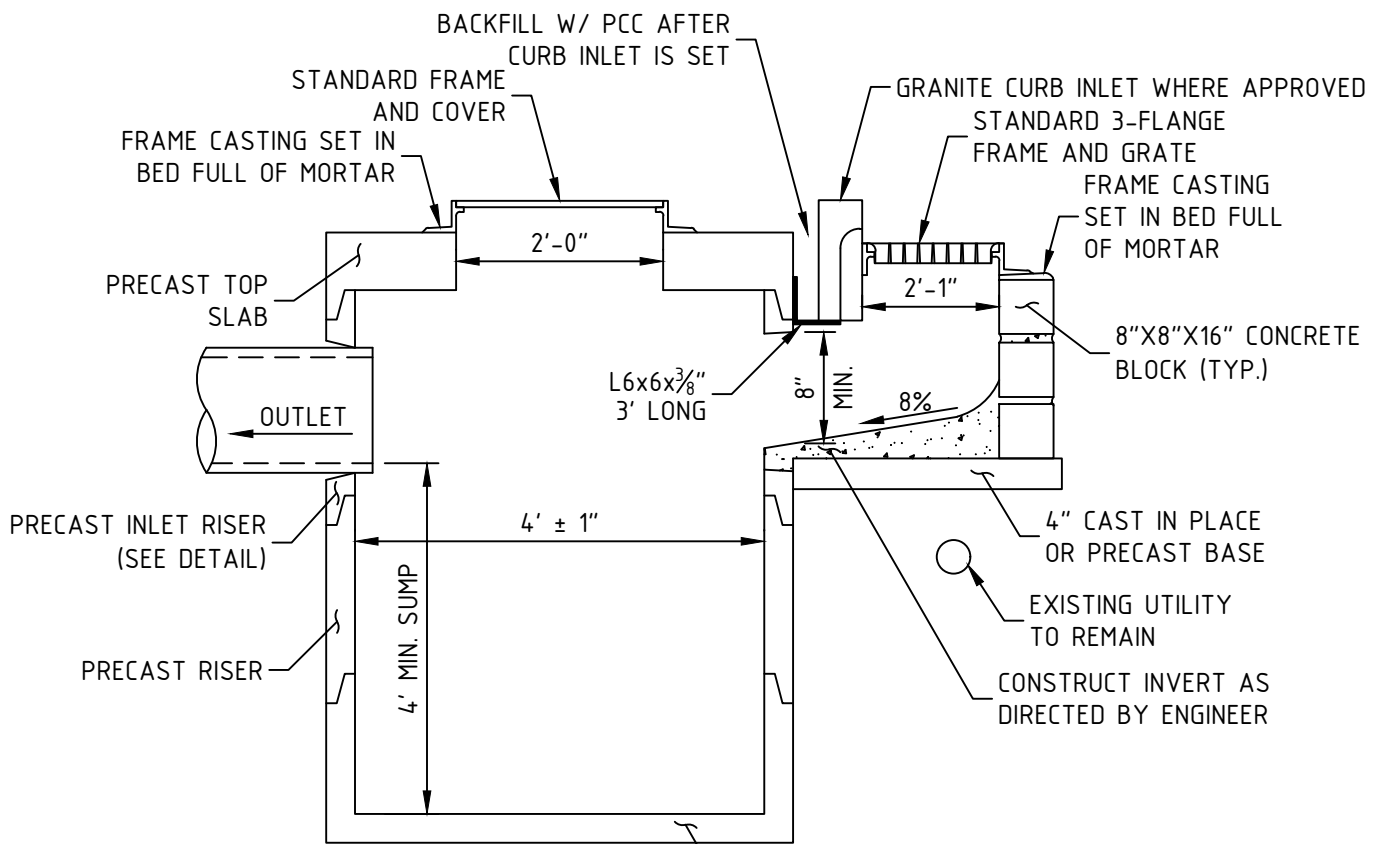
JAN 2022

PAGE:

45



INLET RISER



CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

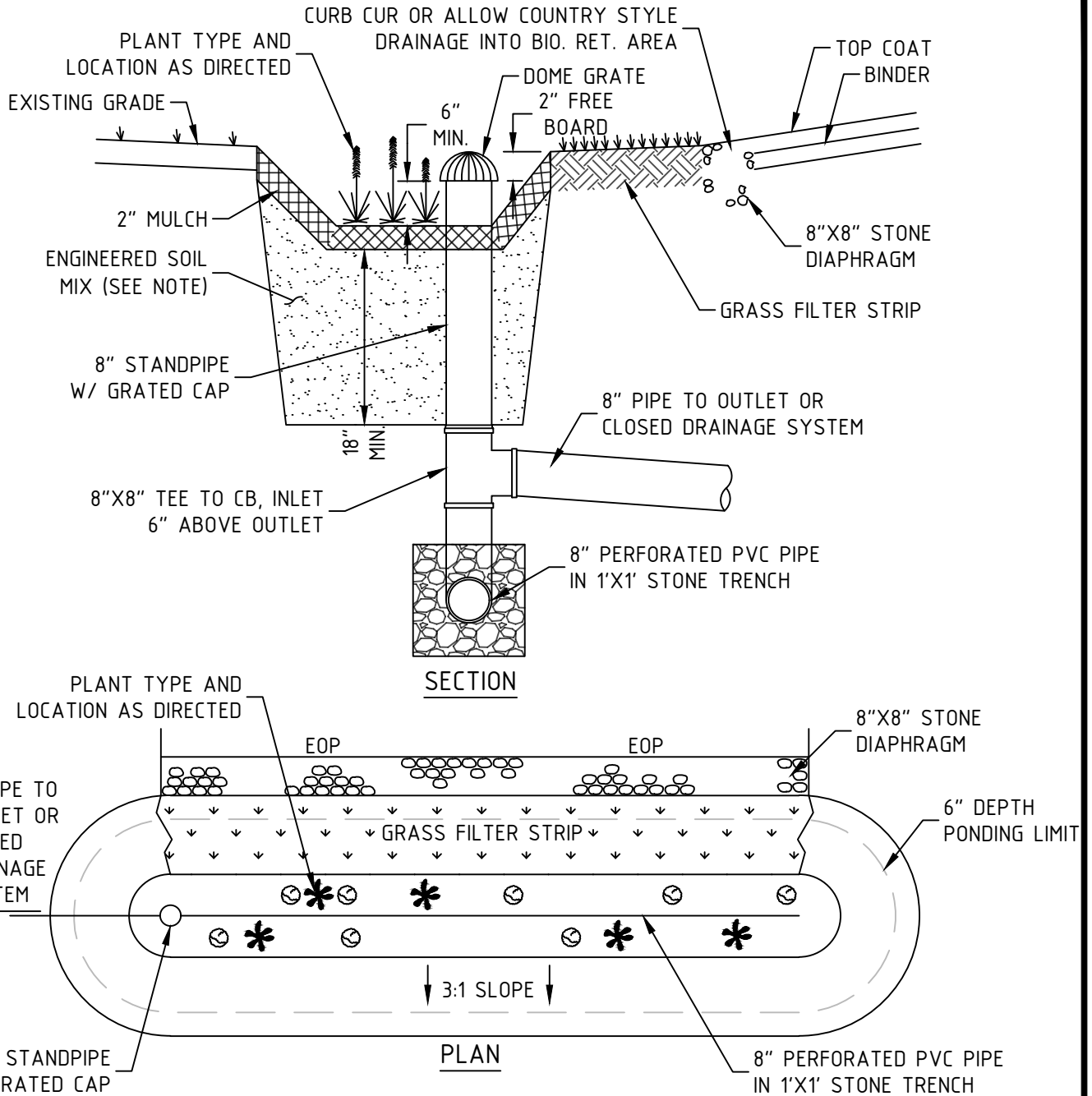
CATCH BASIN WITH GUTTER INLET DETAIL

SECTION: DRAINAGE

DWG #: DR-2

DATE: JAN 2022

PAGE: 46



NOTES:

1. SNOW SHOULD NEVER BE STORED IN BIO-RETENTION AREAS.
2. THE SOIL MIX FOR BIO-RETENTION AREAS SHOULD BE A MIX OF SAND, COMPOST AND SOIL.
 - 40% SAND
 - 20% TO 30% SAND,
 - 30% TO 40% COMPOST
 AND SHOULD CONFORM TO THE SPECIFICATIONS IN THE NH STORMWATER HANDBOOK ('08) VOL. 2 CH. 2 PAGE 26.
3. BOTTOM OF BIO-RETENTION AREA SHALL BE 2 FEET MINIMUM ABOVE GROUNDWATER.

CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

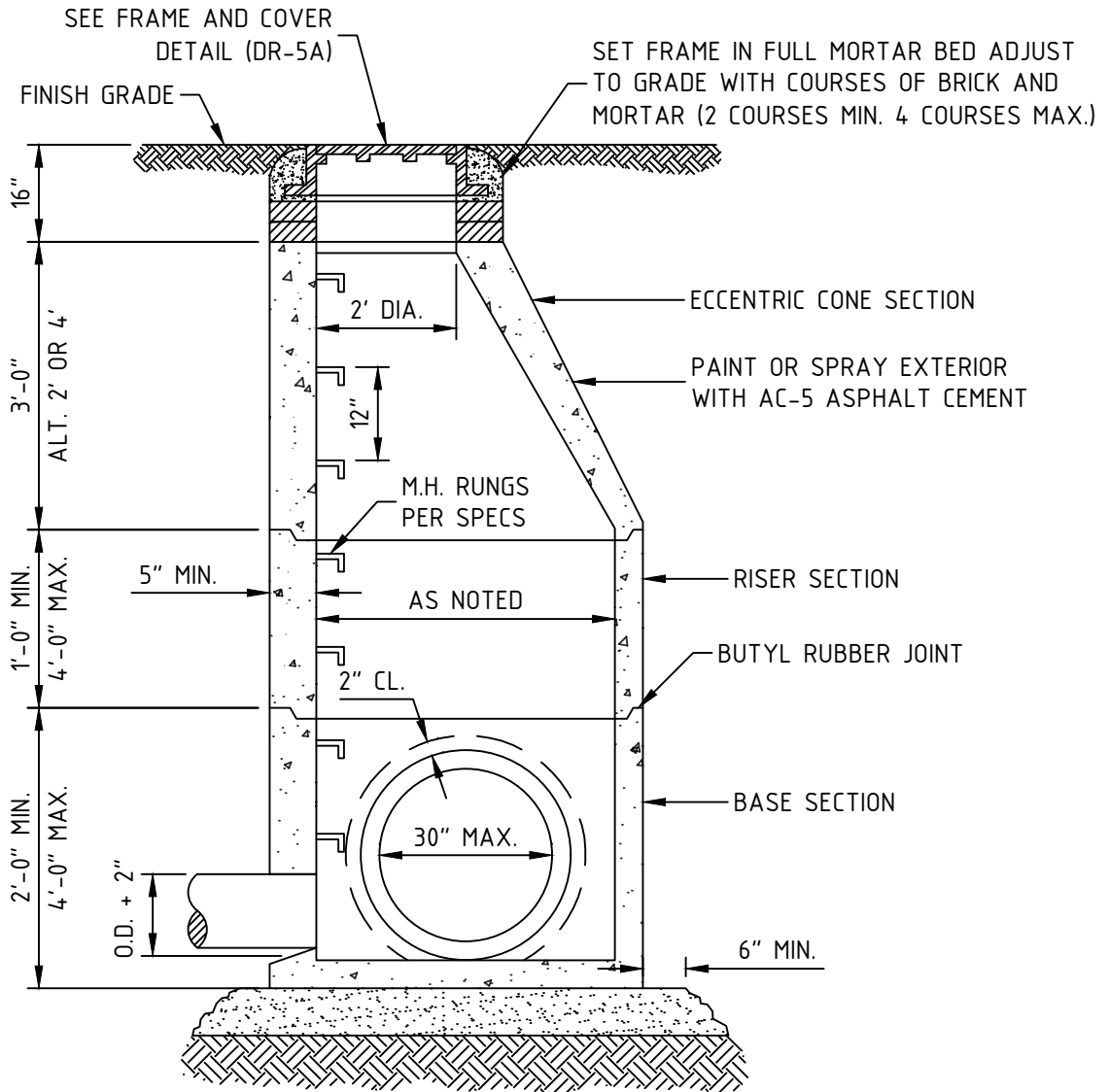
BIORETENTION DETAIL

SECTION: DRAINAGE

DWG #: DR-3

DATE: JAN 2022

PAGE: 47



NOTE:
PRECAST REINFORCED CONCRETE MANHOLE TO
BE CAPABLE OF SUPPORTING H-20 LOADING

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

STANDARD PRECAST
DRAINAGE MANHOLE DETAIL

SECTION:

DRAINAGE

DWG #:

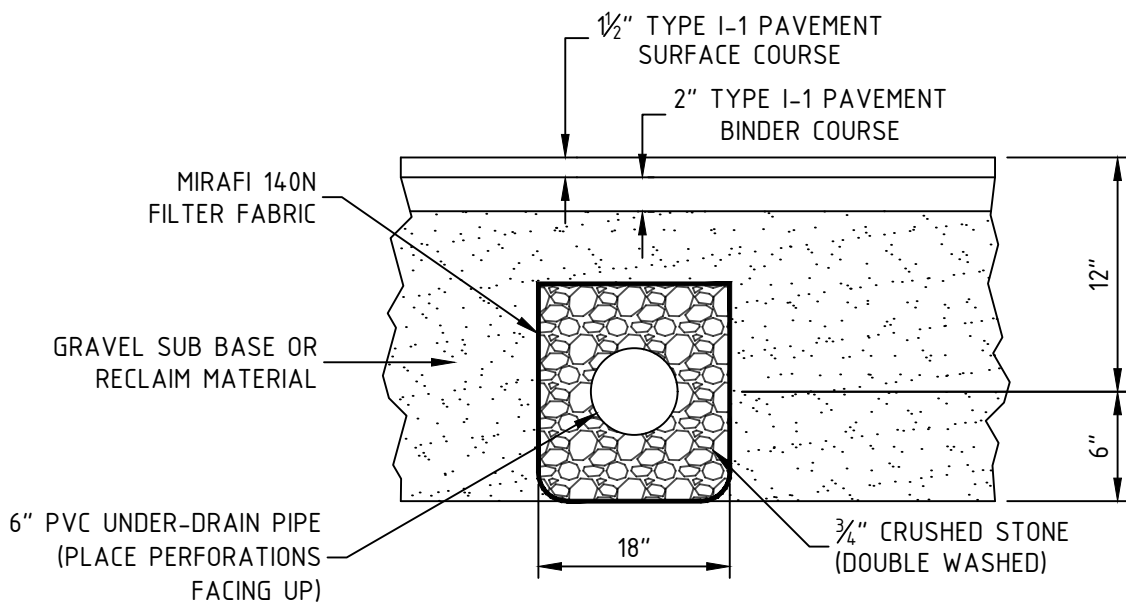
DR-4

DATE:

JAN 2022

PAGE:

48



CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

ROADWAY UNDERDRAIN
DETAIL

SECTION:

DRAINAGE

DWG #:

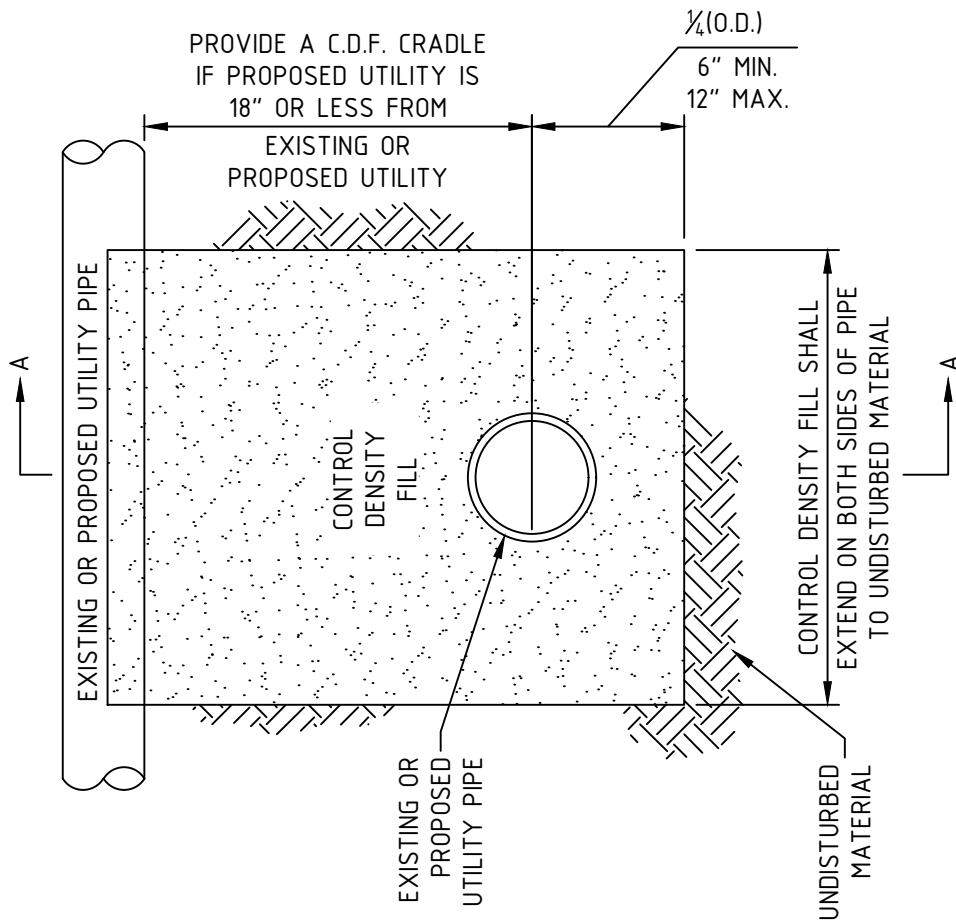
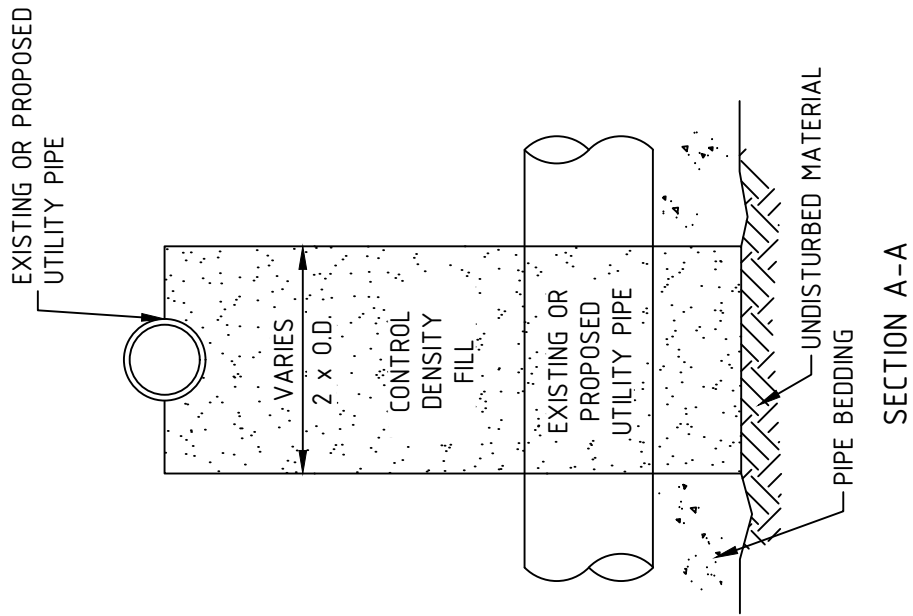
DR-6

DATE:

JAN 2022

PAGE:

50



CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

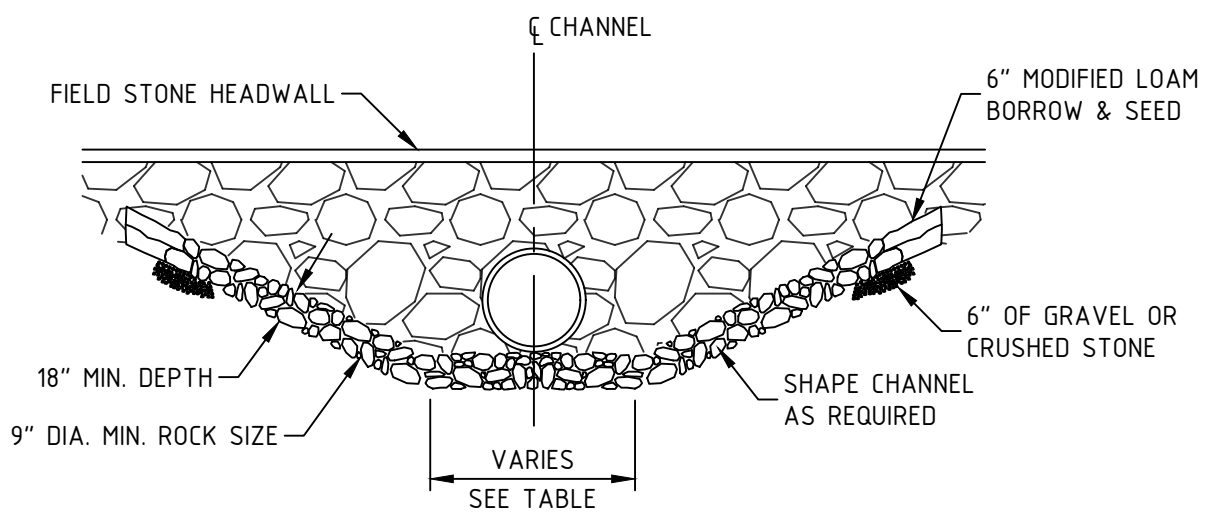
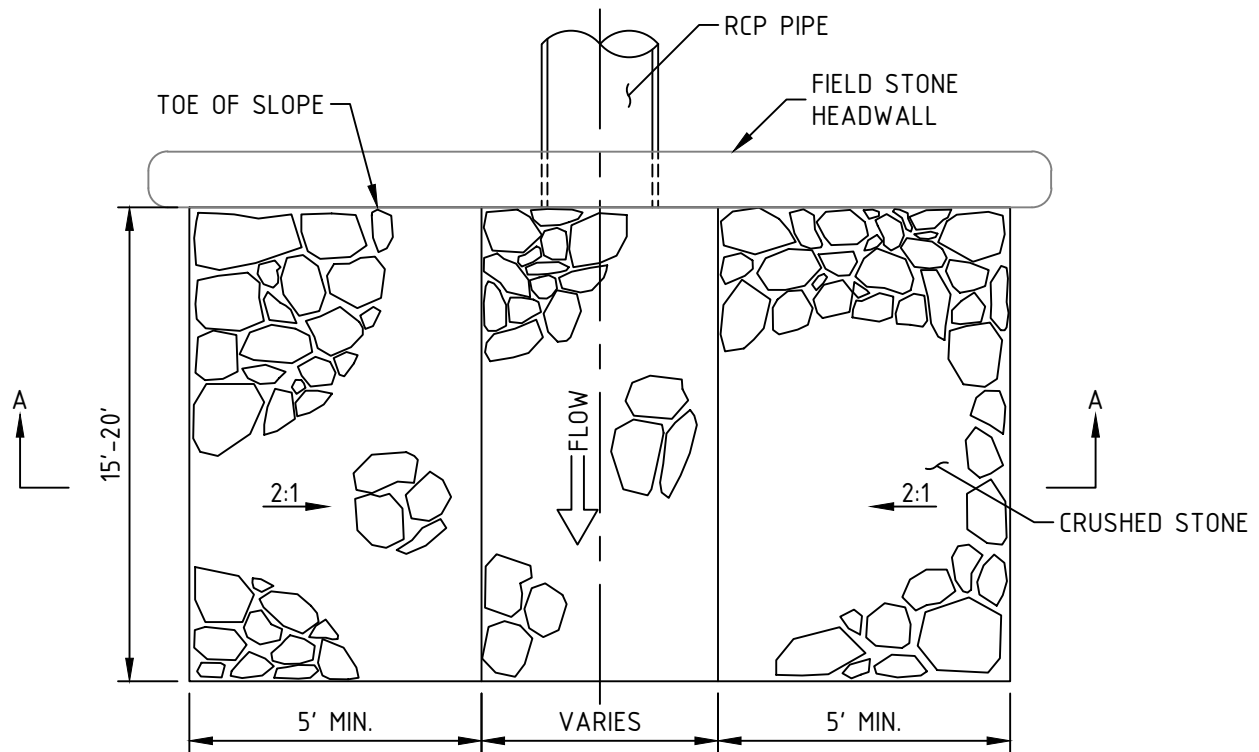
UTILITY SUPPORT DETAIL

SECTION: DRAINAGE

DWG #: DR-7

DATE: JAN 2022

PAGE: 51



DIMENSION TABLE:

PIPE DIA.	CHANNEL WIDTH
12"	2'-6"
15"	3'-0"
18"	3'-7"
24"	4'-8"

CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

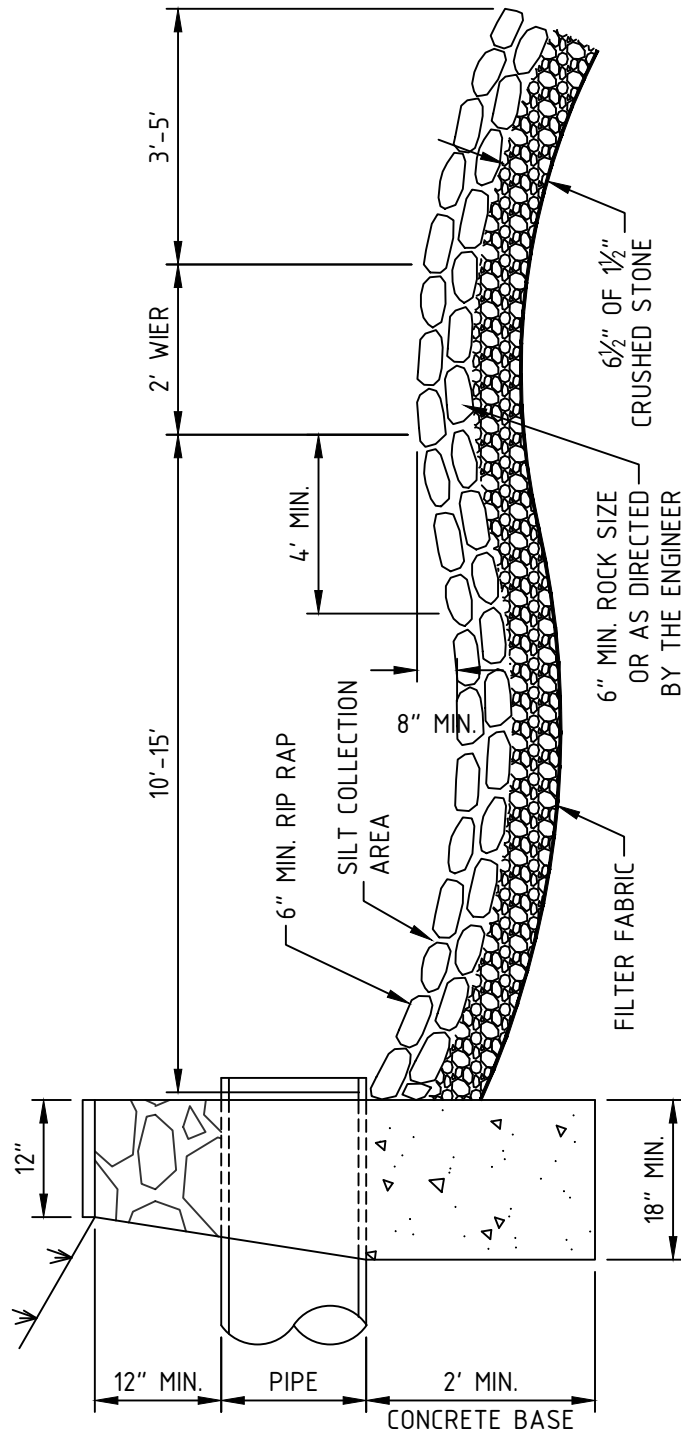
OUTLET EROSION PROTECTION DETAIL

SECTION: DRAINAGE

DWG #: DR-8

DATE: JAN 2022

PAGE: 52



CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

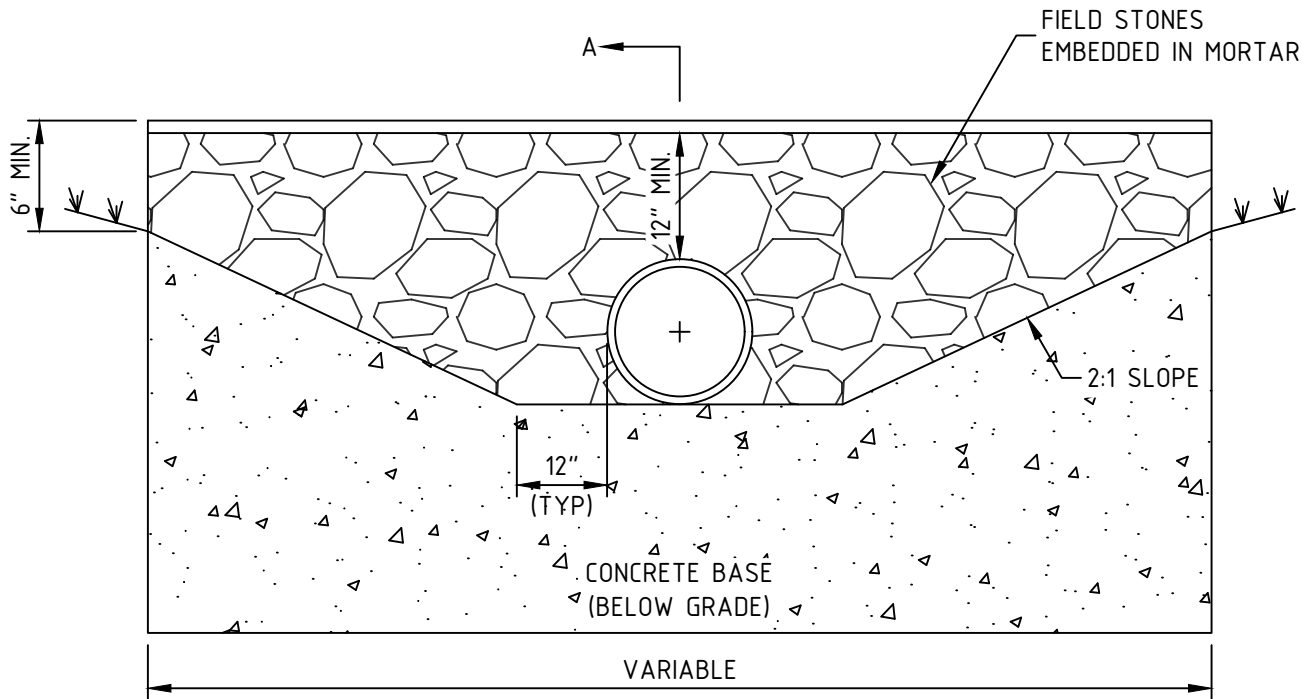
OUTLET EROSION PROTECTION CROSS SECTION DETAIL

SECTION: DRAINAGE

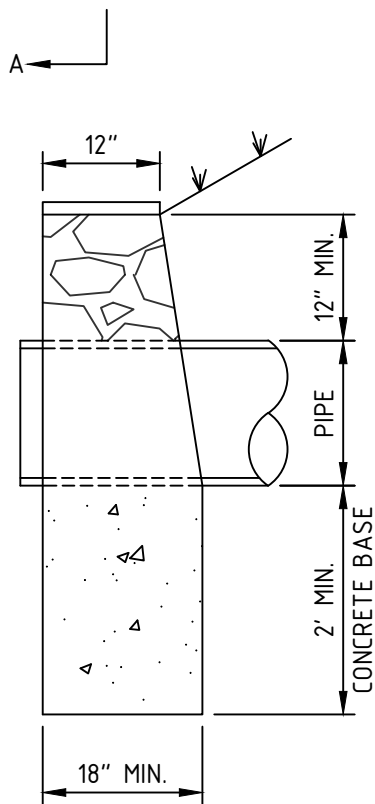
DWG #: DR-8A

DATE: JAN 2022

PAGE: 53



PRECAST HEADWALLS MAY BE ALLOWED WITH WRITTEN APPROVAL OF TOWN ENGINEER AND/OR DIRECTOR OF PUBLIC WORKS



SECTION A-A

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

FIELD STONE HEADWALL
DETAIL

SECTION:

DRAINAGE

DWG #:

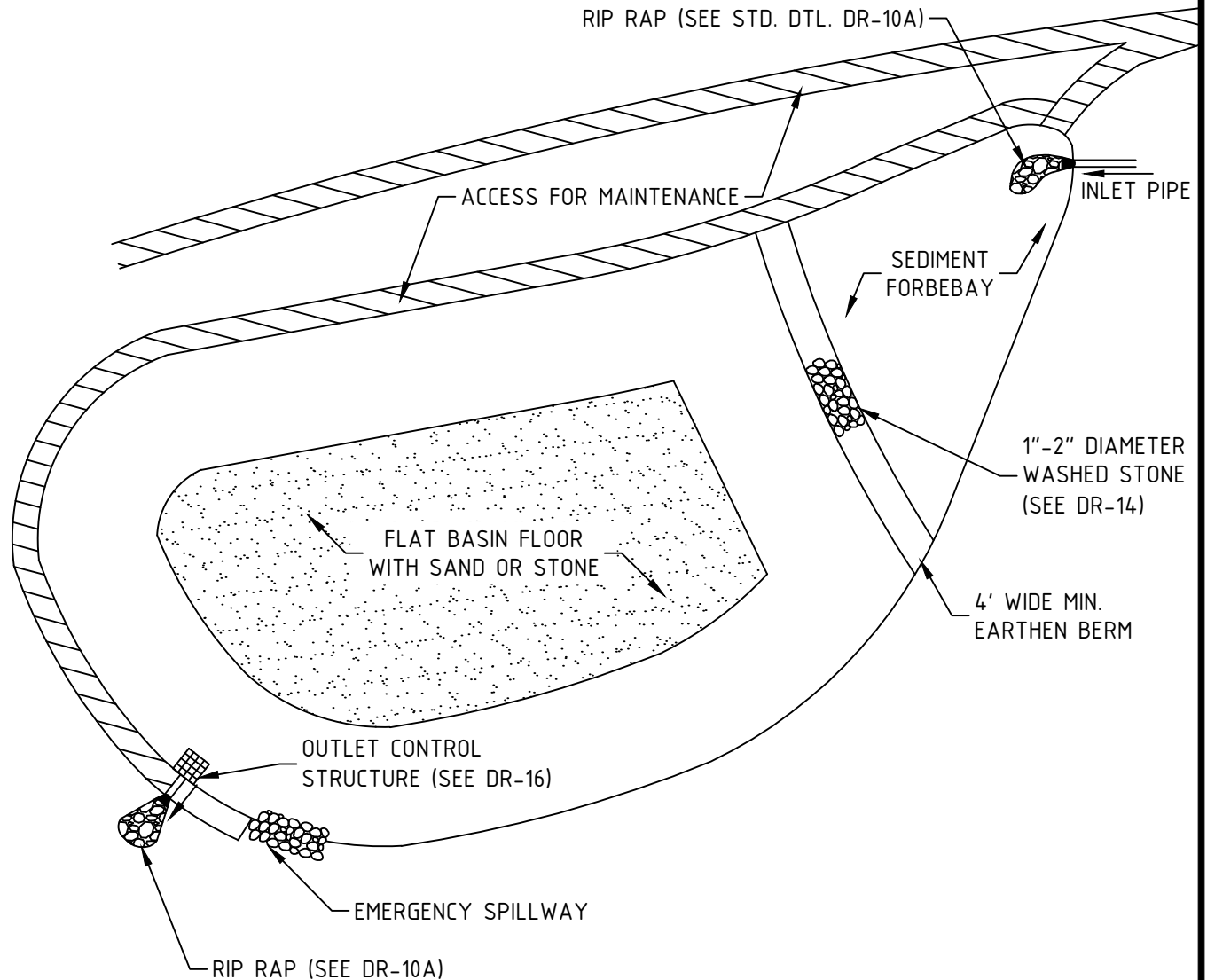
DR-9

DATE:

JAN 2022

PAGE:

54



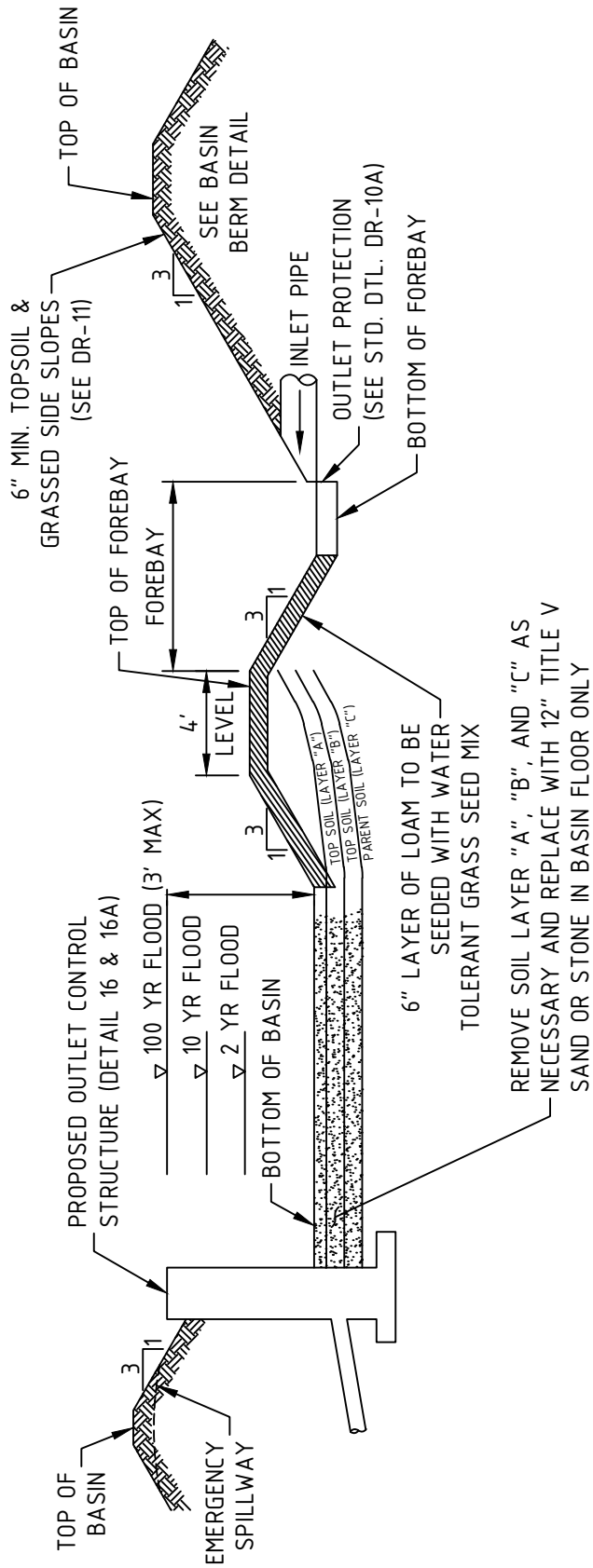
NOTE:
 THE INFILTRATION BASIN SHALL BE DESIGNED BY A
 PROFESSIONAL ENGINEER, AND SHALL COMPLY WITH ALL
 ASPECTS OF THE NH STORMWATER HANDBOOK.

CHECKED BY:
 AT
 APPROVED BY:
 RR



Town of Durham Engineering Division
INFILTRATION BASIN DETAIL

SECTION:	DRAINAGE
DWG #:	DR-10
DATE:	JAN 2022
PAGE:	55



NOTES:

1. THE INFILTRATION PORTION OF EACH BASIN SHALL BE SET A MINIMUM OF 2' ABOVE THE SEASONALLY HIGH GROUNDWATER TABLE. ALL OTHER PORTIONS OF THE BASIN SHALL BE SET A MINIMUM OF 2' ABOVE THE SEASONALLY HIGH GROUNDWATER TABLE.
2. THE LOWEST PORTION OF THE BASIN FLOOR SHALL CONSIST OF A MINIMUM OF 12" OF TITLE V SAND OR STONE PLACED DIRECTLY OVER NATIVE "C" LAYER SOILS.
3. THE INFILTRATION CAPACITY SHALL BE DETERMINED UTILIZING THE RAWL'S TABLES AS WELL AS ALL OTHER ASPECTS IN THE STORMWATER HANDBOOK.

CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

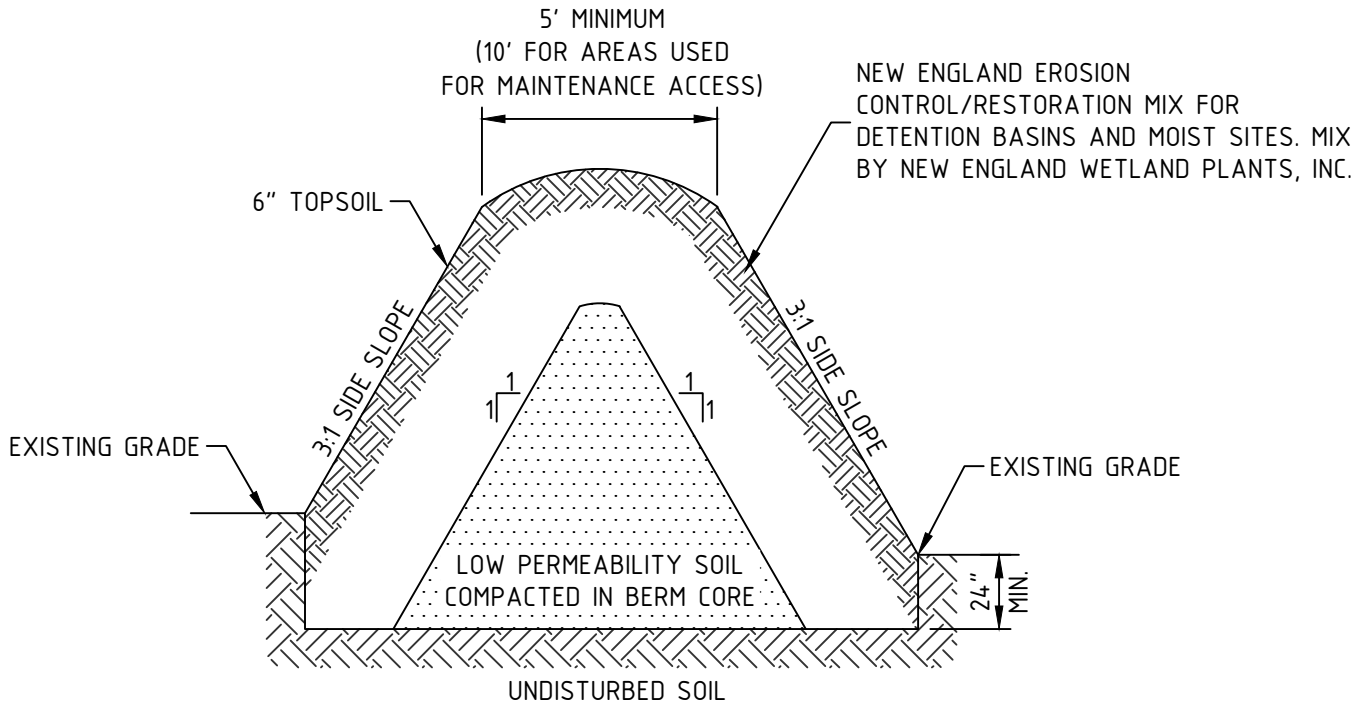
INFILTRATION BASIN CROSS SECTION DETAIL

SECTION: DRAINAGE

DWG #: DR-10A

DATE: JAN 2022

PAGE: 56



CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

BASIN BERM DETAIL

SECTION:

DRAINAGE

DWG #:

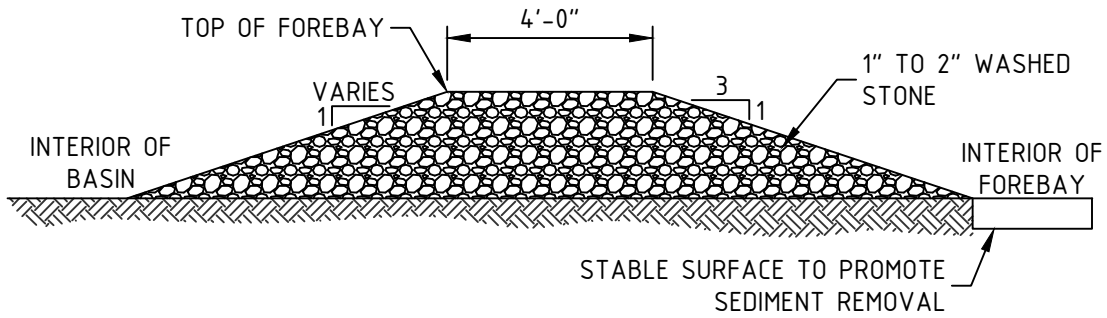
DR-11

DATE:

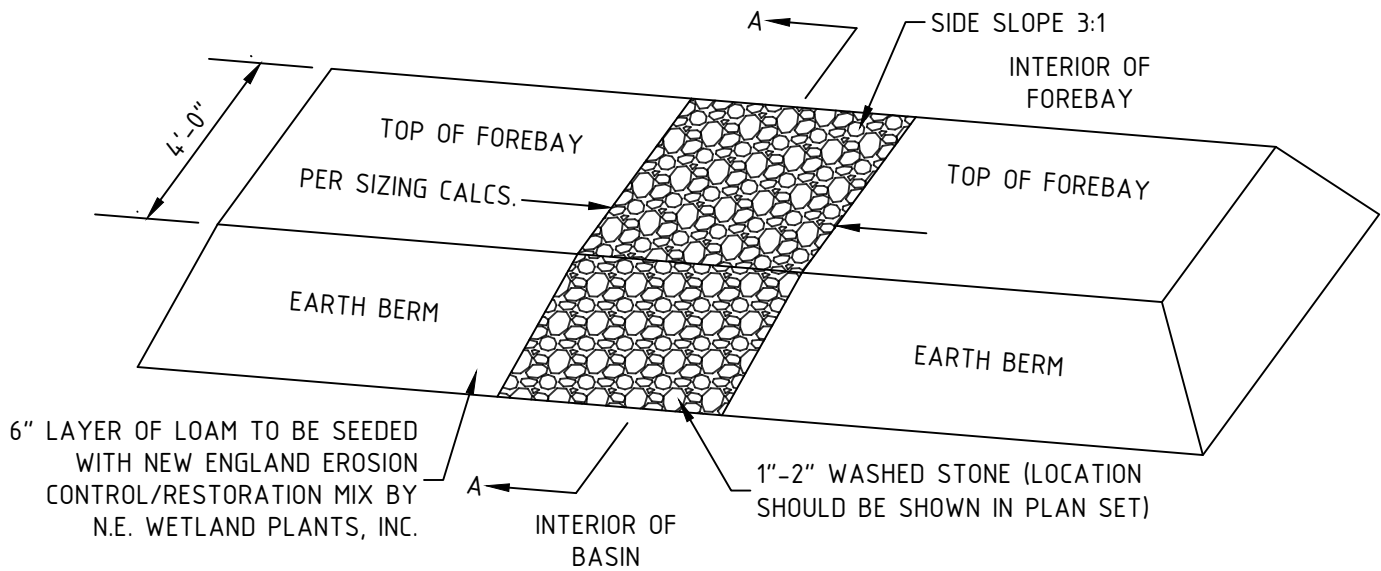
JAN 2022

PAGE:

57



SECTION A-A



CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

FOREBAY BERM DETAIL

SECTION:

DRAINAGE

DWG #:

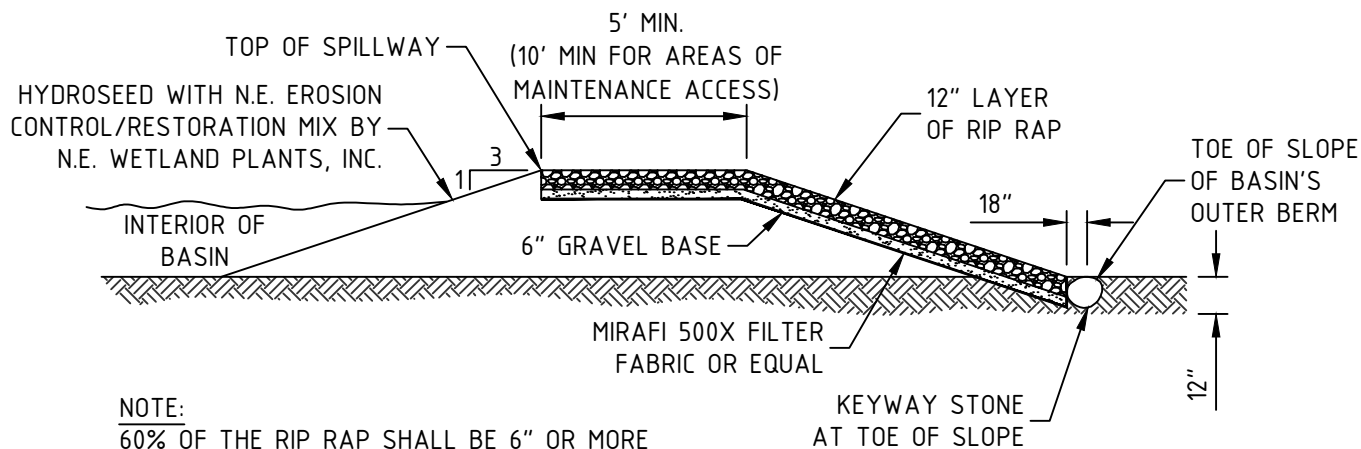
DR-12

DATE:

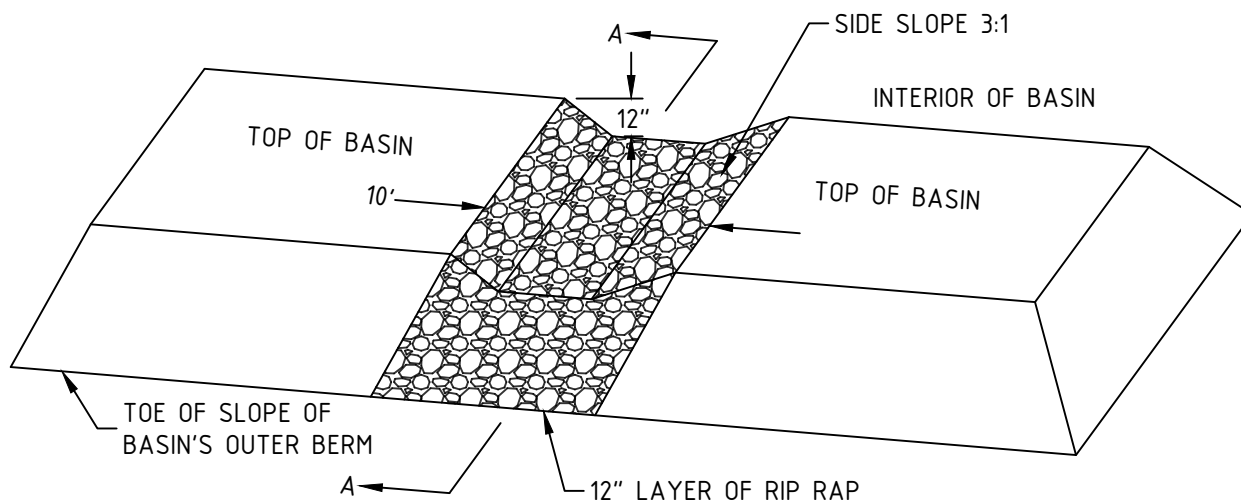
JAN 2022

PAGE:

58



SECTION A-A



CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

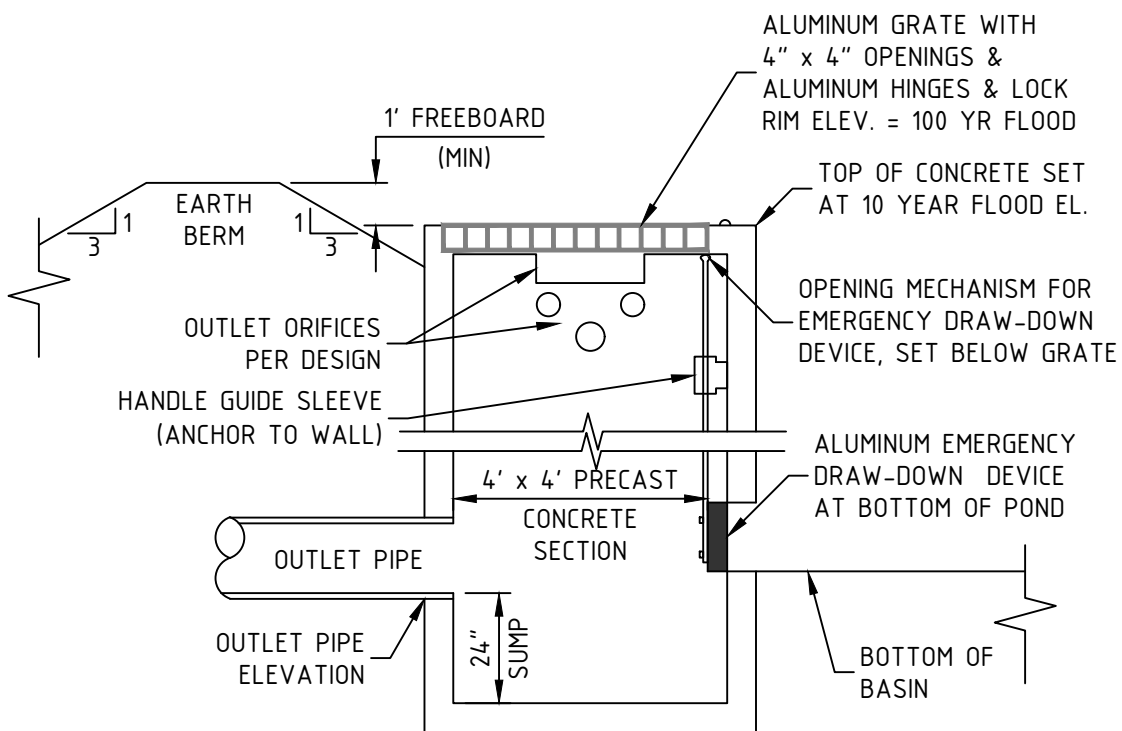
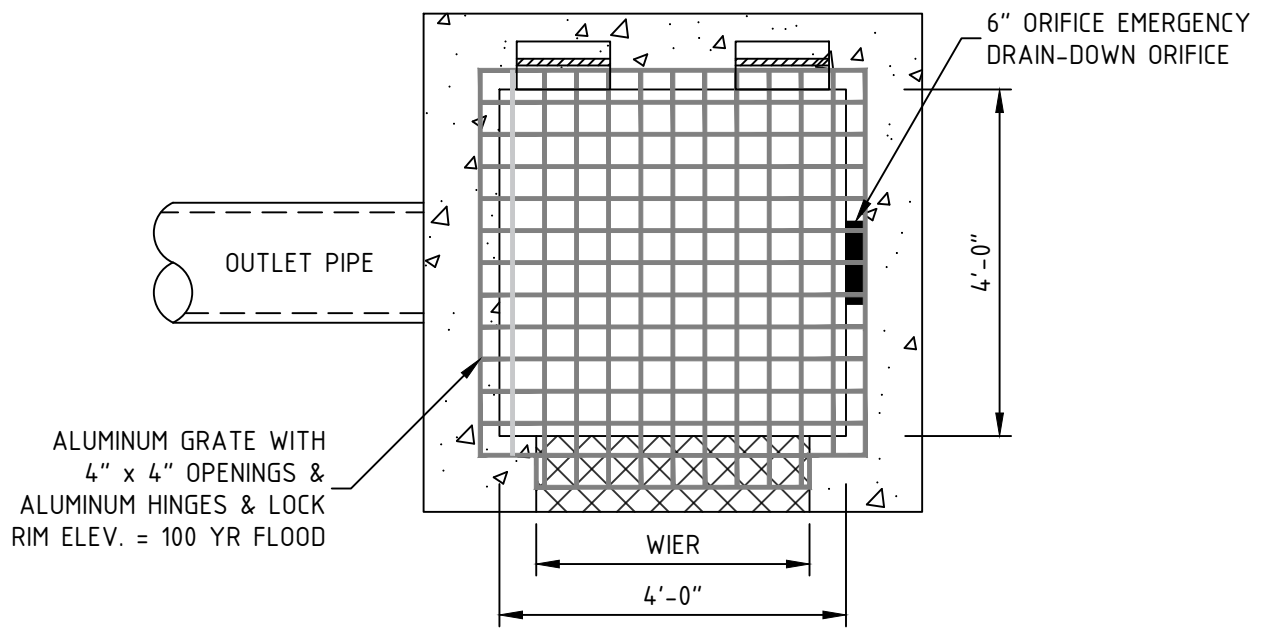
**EMERGENCY SPILLWAY
DETAIL**

SECTION: DRAINAGE

DWG #: DR-13

DATE: JAN 2022

PAGE: 59



NOTES:

1. ORIFICE ELEVATIONS SHALL BE SHOWN ON DESIGN PLANS.
2. CONTRACTOR SHALL CONFIRM INVERT GRADES IN FIELD PRIOR TO STRUCTURE INSTALLATION.
3. THE EMERGENCY DRAW-DOWN DEVICE IS PROVIDED TO ALLOW THE BASIN TO BE MANUALLY DRAINED IF NECESSARY. THE MECHANISM SHALL REMAIN CLOSED DURING NORMAL CONDITIONS.

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

**OUTLET CONTROL
STRUCTURE DETAIL**

SECTION:

DRAINAGE

DWG #:

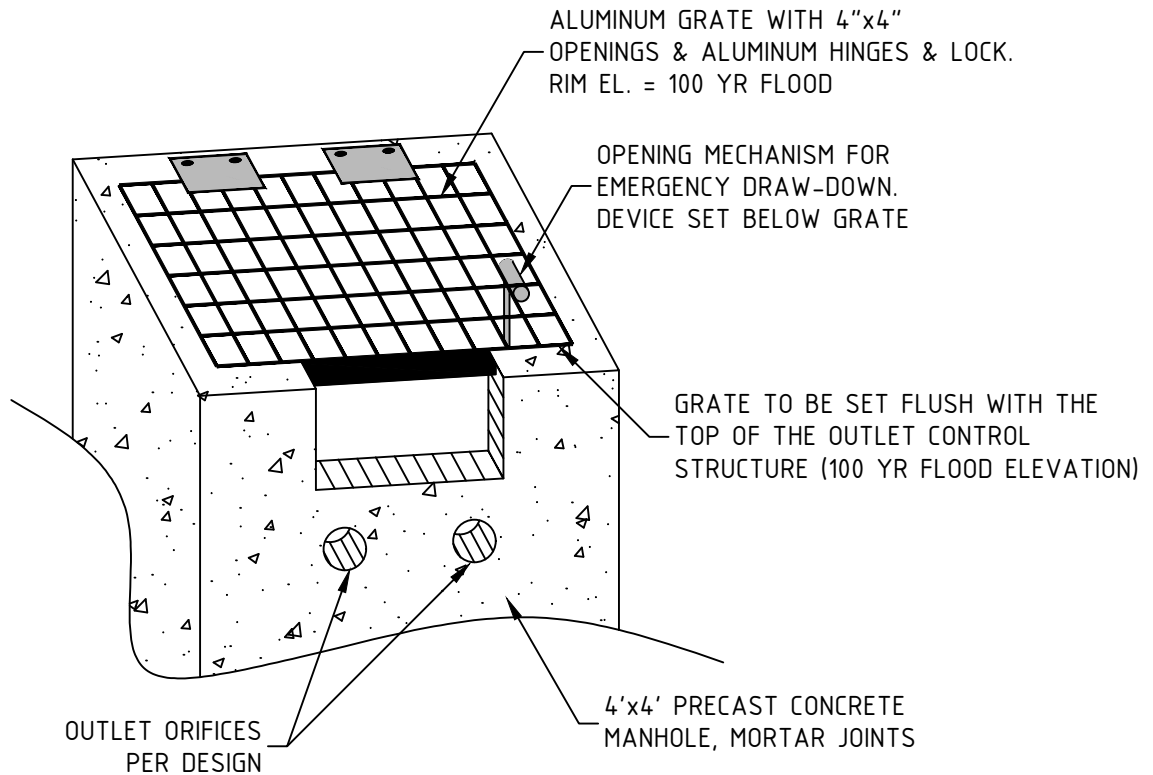
DR-14

DATE:

JAN 2022

PAGE:

60



NOTES:

1. ORIFICE ELEVATIONS SHALL BE SHOWN ON DESIGN PLANS.
2. CONTRACTOR SHALL CONFIRM INVERT GRADES IN FIELD PRIOR TO STRUCTURE INSTALLATION.
3. THE EMERGENCY DRAW-DOWN DEVICE IS PROVIDED TO ALLOW THE BASIN TO BE MANUALLY DRAINED IF NECESSARY. THE MECHANISM SHALL REMAIN CLOSED DURING NORMAL CONDITIONS.

CHECKED BY:
AT

APPROVED BY:
RR



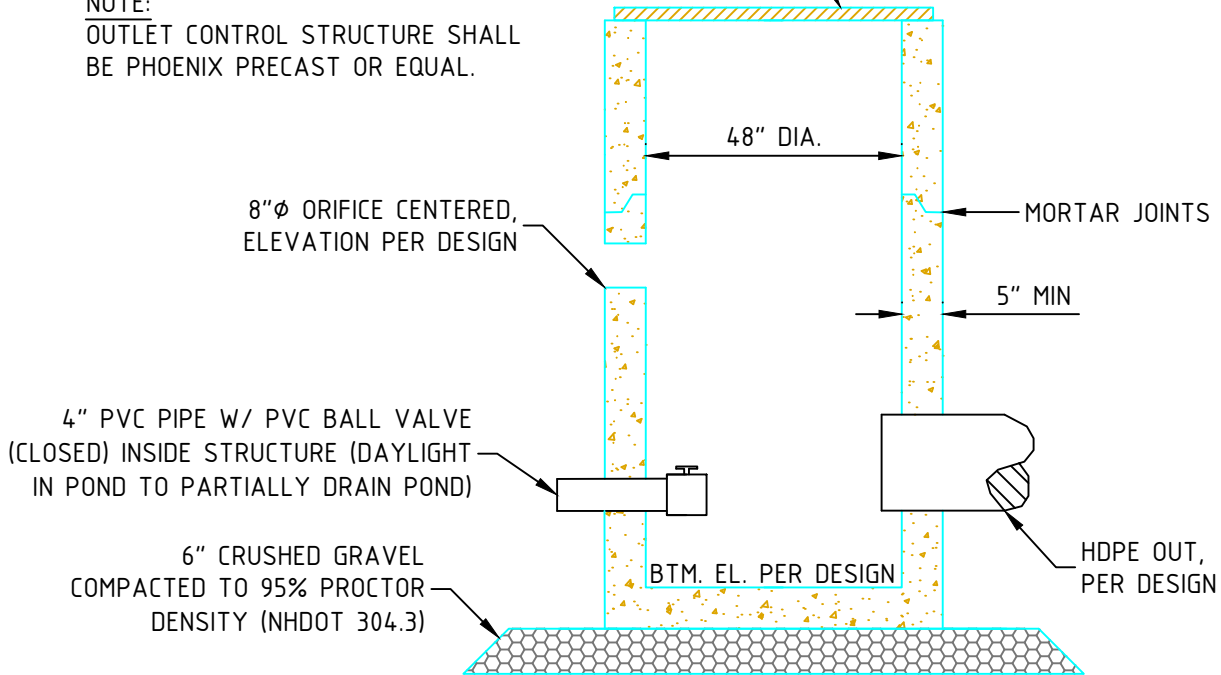
Town of Durham Engineering Division

**OUTLET CONTROL
STRUCTURE - GRATE DETAIL**

SECTION:	DRAINAGE
DWG #:	DR-14A
DATE:	JAN 2022
PAGE:	61

REMOVABLE 4' DIAMETER
FLAT BAR GRATING (PHOENIX
PRECAST OR EQUAL)

NOTE:
OUTLET CONTROL STRUCTURE SHALL
BE PHOENIX PRECAST OR EQUAL.



OUTLET CONTROL STRUCTURE NOTES:

1. DRAINAGE STRUCTURE MATERIALS SHALL COMPLY WITH NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION, DIVISION 600, SECTION 604.
2. CONCRETE TO BE 4,000 PSI CONCRETE.
3. PIPE OPENINGS SHALL BE FULLY MORTARED ON OUTSIDE PRIOR TO BACK FILLING. INSIDE OF PIPE OPENINGS SHALL BE MORTARED AND ALLOWED TO CURE PER MANUFACTURERS REQUIREMENTS PRIOR TO RECEIVING RUNOFF.
4. JOINTS BETWEEN ADJACENT RISERS SHALL BE FULLY SEALED WITH ELASTOMERIC SEALANT PER MANUFACTURERS REQUIREMENTS.
5. CONCRETE STRUCTURE AND TRASH RACKS AVAILABLE FROM:
PHOENIX PRECAST
77 REGIONAL DRIVE
CONCORD, NH 03301
(603)225-5169

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

OUTLET CONTROL
STRUCTURE DETAIL ALT. 1

SECTION:

DRAINAGE

DWG #:

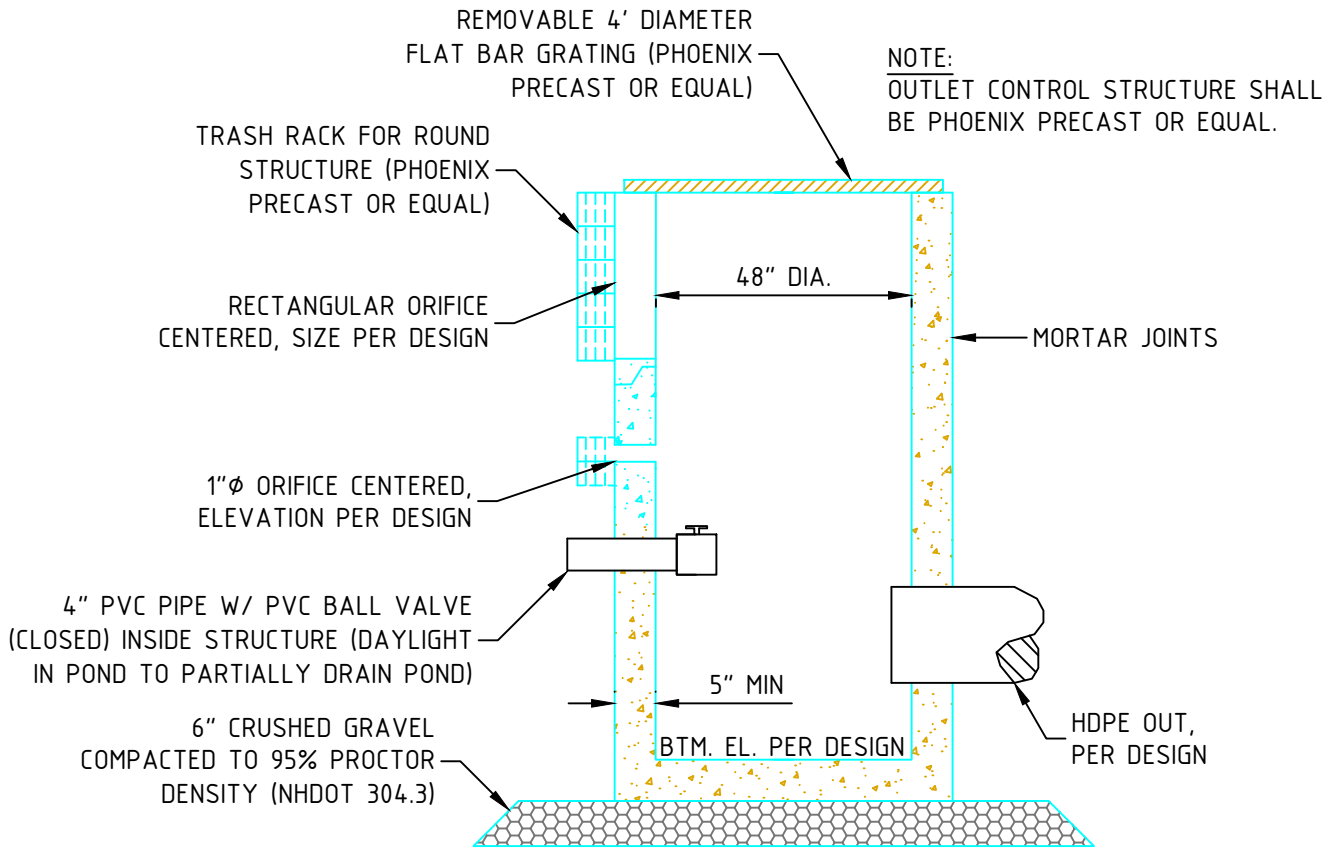
DR-15

DATE:

JAN 2022

PAGE:

62



OUTLET CONTROL STRUCTURE NOTES:

1. DRAINAGE STRUCTURE MATERIALS SHALL COMPLY WITH NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, LATEST EDITION, DIVISION 600, SECTION 604.
2. CONCRETE TO BE 4,000 PSI CONCRETE.
3. PIPE OPENINGS SHALL BE FULLY MORTARED ON OUTSIDE PRIOR TO BACK FILLING. INSIDE OF PIPE OPENINGS SHALL BE MORTARED AND ALLOWED TO CURE PER MANUFACTURERS REQUIREMENTS PRIOR TO RECEIVING RUNOFF.
4. JOINTS BETWEEN ADJACENT RISERS SHALL BE FULLY SEALED WITH ELASTOMERIC SEALANT PER MANUFACTURERS REQUIREMENTS.
5. CONCRETE STRUCTURE AND TRASH RACKS AVAILABLE FROM:
 PHOENIX PRECAST
 77 REGIONAL DRIVE
 CONCORD, NH 03301
 (603)225-5169

CHECKED BY:
AT

APPROVED BY:
RR



Town of Durham Engineering Division

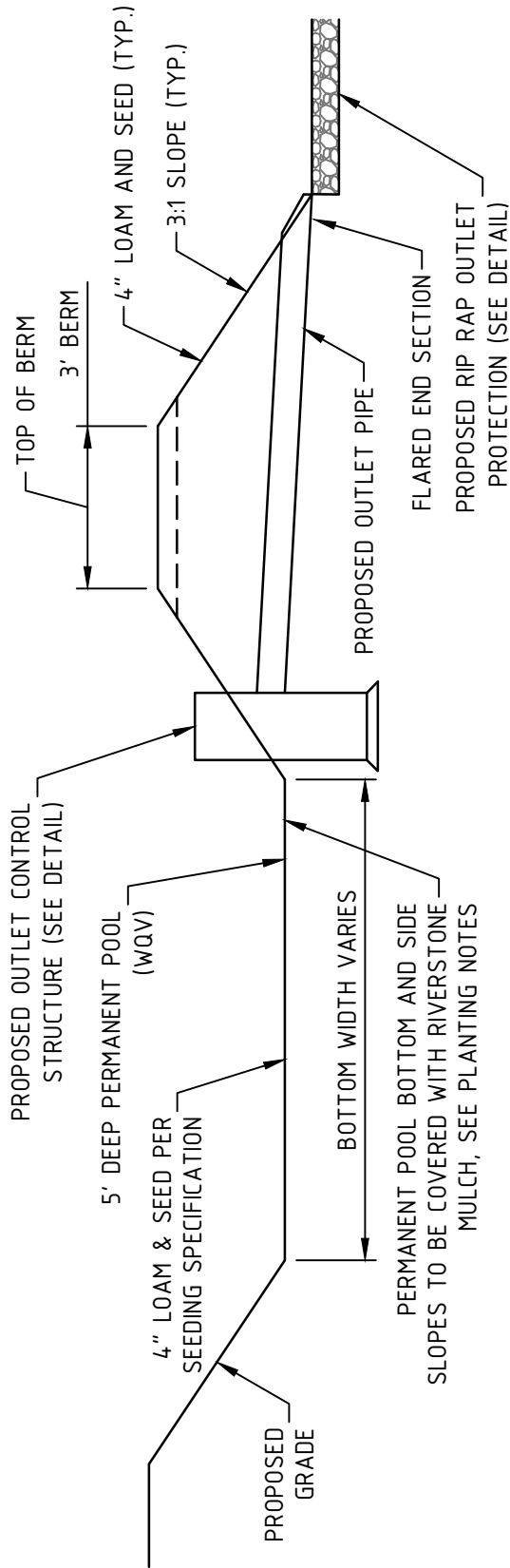
**OUTLET CONTROL
STRUCTURE DETAIL ALT. 2**

SECTION: DRAINAGE

DWG #: DR-15A

DATE: JAN 2022

PAGE: 63



CONSTRUCTION NOTES:

1. DO NOT PLACE STORMWATER POND INTO SERVICE UNTIL THE BMP HAS BEEN SEEDED AND STABILIZED. ALL CONTRIBUTING AREAS SHALL BE FULLY STABILIZED.
2. CLEAR AND GRUB THE AREA WHERE THE STORMWATER POND IS TO BE LOCATED. STOCKPILE LOAM FOR REUSE LATER.
3. THE FOUNDATION AREA SHALL BE SCARIFIED PRIOR TO PLACING FILL. ALL UNSUITABLE MATERIAL UNDER THE BERM SHALL BE REMOVED AND REPLACED WITH SUITABLE FOUNDATION MATERIAL.
4. THE BERM SHALL BE CONSTRUCTED BEGINNING FROM THE LOWEST POINT UNIFORMLY ALONG ITS ENTIRE LENGTH. PLACE MATERIALS IN MAXIMUM 12" LOOSE LIFTS COMPACTED TO 95% MAXIMUM DRY DENSITY. EMBANKMENT SOIL SHALL HAVE NO ORGANIC MATTER OR FROZEN MATERIAL AND NO STONES LARGER THAN 2/3 OF THE MAXIMUM LOOSE LIFT THICKNESS. STONES AROUND ANY STRUCTURES AND/OR CONDUITS SHALL NOT EXCEED 3 INCHES. EMBANKMENT FILL MATERIAL SHALL HAVE THE FOLLOWING GRADATION:

SIEVE SIZE:	% PASSING:
#4	80-90
#40	50-80
#100	30-45
#200	15-30

5. ALL PIPE TO PIPE CONNECTIONS SHALL BE WATER-TIGHT.
6. ALL DISTURBED AREAS SHALL RECEIVE FOUR INCHES OF LOAM AND SEEDED PER THE CONSTRUCTION SEQUENCING AND EROSION CONTROL NOTES.

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

STORMWATER POND DETAIL

SECTION:

DRAINAGE

DWG #:

DR-16

DATE:

JAN 2022

PAGE:

64

PLANTING NOTES:

1. PERMANENT POOL BOTTOM AND SIDE SLOPES TO BE COVERED WITH 2" DEEP RIVERSTONE (1-1/2" TO 2" STONES).
2. POND BOTTOM
POND BOTTOM EXCLUDING PERMANENT POOL TO BE SEEDED WITH NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS AND MOIST SITES (50 LBS./ACRE).

POND BERM AND SIDE SLOPES

BERM AND SIDE SLOPES EXCLUDING PERMANENT POOL SHALL BE SEEDED WITH NEW ENGLAND CONSERVATION/WILDLIFE MIX (30 LBS PER ACRE).

AVAILABLE FROM:

NEW ENGLAND WETLAND PLANTS, INC.
820 WEST STREET
AMHERST, MA 01002
(413)-548-8000

STORMWATER POND MAINTENANCE:

1. THE BOTTOM, SIDE SLOPES AND CREST SHALL BE MOWED AND THE VEGETATION MAINTAINED IN A HEALTHY CONDITION.
2. EMBANKMENTS SHOULD BE INSPECTED ANNUALLY BY A QUALIFIED PROFESSIONAL FOR SETTLEMENT, EROSION, SEEPAGE, ANIMAL BURROWS, AND WOODY VEGETATION. REPAIR AS NECESSARY.
3. A QUALIFIED PROFESSIONAL SHALL INSPECT THE OUTLET PIPE, SPILLWAY, AND OUTLET PROTECTION ANNUALLY. REPAIR AS NECESSARY.
4. TRASH AND DEBRIS SHALL BE REMOVED FROM THE BASIN AND PIPE INLETS AND OUTLETS WHENEVER PRESENT.
5. ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN THE DEPTH EXCEEDS 4 INCHES.

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

STORMWATER POND NOTES

SECTION:

DRAINAGE

DWG #:

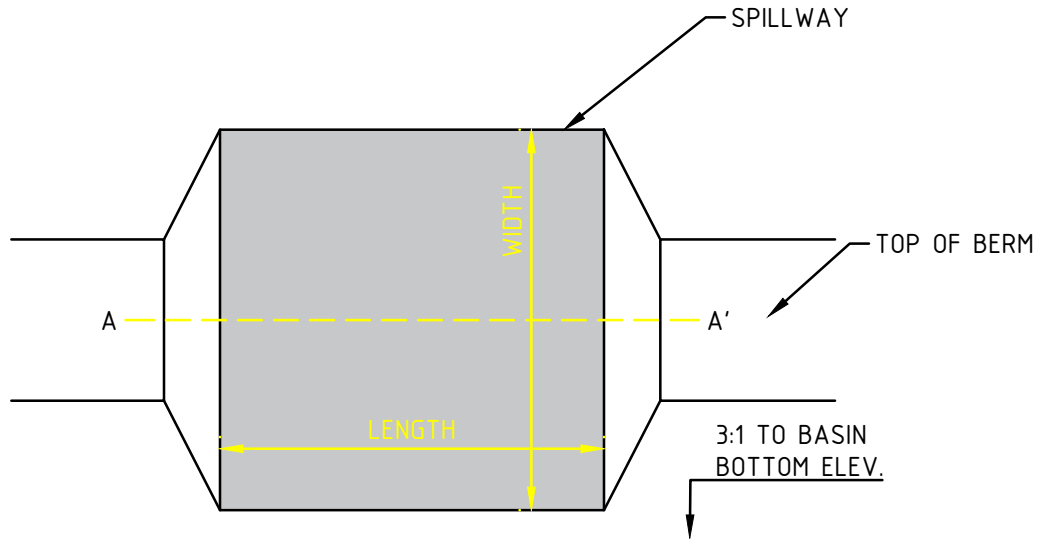
DR-16A

DATE:

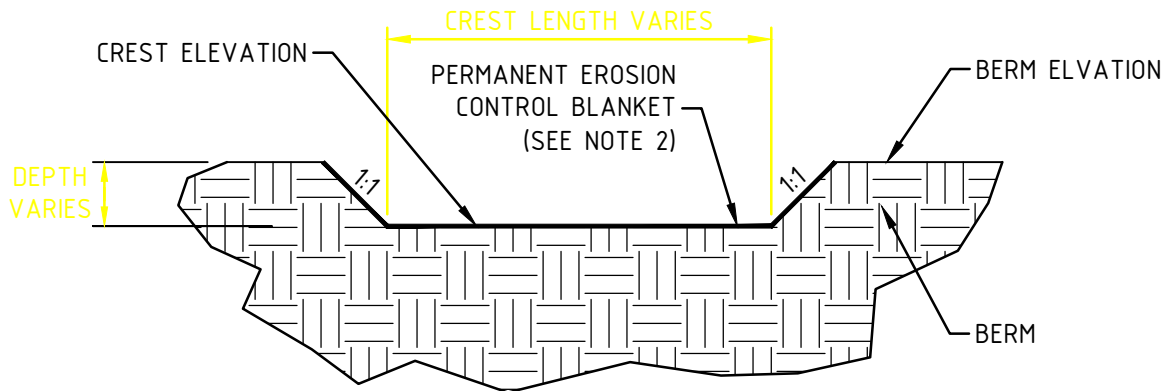
JAN 2022

PAGE:

65



PLAN VIEW



CROSS-SECTION A-A

NOTES:

1. SPILLWAYS ARE LOCATED AT SEDIMENT FOREBAY OUTLETS, STORMWATER POND AND INFILTRATION BASIN.
2. PERMANENT EROSION CONTROL BLANKET SHOULD BE TENSAR P300 OR APPROVED EQUAL
3. INSTALL TURF REINFORCEMENT PER MANUFACTURER'S SPECIFICATIONS.

SPILLWAY DIMENSION TABLE

LOCATION	CREST ELEV.	BERM ELEV.	LENGTH* [FEET]	WIDTH* [FEET]
SPILLWAY #1 - STORMWATER POND #1	87.60	88.50	6.0	6.0

*REFER TO DETAIL ABOVE FOR LOCATION OF WIDTH AND LENGTH

CHECKED BY:

AT

APPROVED BY:

RR



Town of Durham Engineering Division

SPILLWAY DETAIL

SECTION:

DRAINAGE

DWG #:

DR-17

DATE:

JAN 2022

PAGE:

66