

L-0700-019
January 9, 2020

Mr. Dexter Legg, Chair
City of Portsmouth Planning Board
1 Junkins Avenue
Portsmouth, New Hampshire 03801

**Re: Lonza Biologics G2E– Proposed Parking Expansion
Site Plan Review Application**

Dear Chairman Legg:

On behalf of Lonza Biologics, we are pleased to submit the following information to support a request to the Planning Board for a recommendation for approval to the Pease Development Authority (PDA) for Site Plan Review for proposed exterior improvements along Goose Bay Drive in the rear of its existing facility that is located at 101 International Drive:

- One (1) copy of the PDA Application for Site Review dated December 23, 2019;
- One (1) copy of the Owner Authorization dated December 23, 2019;
- One (1) full size & one (1) half size copies of the Site Plan Set revised January 9, 2020;
- One (1) copy of the Drainage Analysis Memorandum revised January 9, 2020;
- One (1) CD containing digital copies of the above listed materials

The proposed project is located at 101 International Drive which is identified as Map 305 Lot 6 on the City of Portsmouth Tax Maps. The proposed project includes parking expansions at three (3) different locations on site. The work at each location, referenced as the Northern, Eastern, and Western Expansions, can be summarized as follows:

- Northern Expansion: twenty-two (22) proposed parking spaces with drainage improvements and driveway access, including a rain garden to collect and treat runoff.
- Eastern Expansion: eighteen (18) proposed parking spaces along the existing access road and drainage improvements including deep sump catch basins with oil separator hoods which discharge to a Contech Jellyfish stormwater filtration unit that will provide treatment before tying into the existing stormwater management system.
- Western Expansion: twenty (20) proposed parking spaces built out from the existing lot, relocation of two (2) light poles, and drainage improvements including a deep sump catch basin with oil separator hood tied to an underground infiltration system.

On January 7, 2020 the project received a recommendation of approval from the Technical Advisory Committee (TAC) with the following stipulations:

1. Plans shall be updated to include two more additional ADA spaces, closest to the building entrance, as required by standards.

The number of required ADA parking spaces have been calculated by considering the garage and surface parking lots as two separate parking facilities. This makes the total required number of ADA spaces 15. There are 11 existing ADA spaces on site and an additional 4 ADA spaces have been added to the plans.



2. Plans shall be updated to show replacement trees along the road where new parking is proposed, consistent with those that are planned for the opposite side of the road.

Trees have been added to the plans along Goose Bay Drive to replace the trees being removed as part of this project. Tree species have been chosen to match the trees planned for the opposite side of the road.

3. The applicant shall verify if there is a stand pipe in the garage and coordinate with the Fire Department on requirements for access.

The parking garage two stand pipes one adjacent to each stair well, one in the north corner and one in the south corner. The fire department connections for the stand pipes are located at the entrance to the garage along Goose Bay Drive and the exit of the garage on the International Drive side. The proposed northern parking expansion area does not limit or change the fire departments access to these connection points. An e-mail was sent to Deputy Chief Howe on January 9, 2020 to confirm the Fire Department is satisfied with their access.

On December 19, 2019, the PDA Board granted conceptual approval for these improvements. On January 7, 2020, the Technical Advisory Committee (TAC) voted to recommend Site Plan Review approval. We respectfully request to be placed on the Planning Board meeting agenda for January 16, 2020. If you have any questions or need any additional information, please contact Patrick Crimmins by phone at (603) 433-8818 or by email at pmcrimmins@tighebond.com.

Sincerely,
TIGHE & BOND, INC.



Patrick M. Crimmins, PE
Senior Project Manager



Neil A. Hansen, PE
Project Engineer

Cc: Lonza Biologics (via email)
Pease Development Authority

Pease Development Authority
55 International Drive, Portsmouth, NH 03801, (603) 433-6088



Application for Site Review

For PDA Use Only			
Date Submitted: _____	Municipal Review: _____	Fee: _____	
Application Complete: _____	Date Forwarded: _____	Paid: _____	Check #: _____

Applicant Information

Applicant: Lonza Biologics, Inc.	Agent: Tighe & Bond, Inc.
Address: 101 International Drive Portsmouth, NH 03801	Address: 177 Corporate Drive Portsmouth, NH 03801
Business Phone: 603-334-6100	Business Phone: 603-433-8818
Mobile Phone: _____	Mobile Phone: _____
Fax: _____	Fax: _____

Site Information


Portsmouth Tax Map: 305	Lot #: 0006	Zone: Airport, Business, Commercial
Site Address / Location : 101 International Drive, Portsmouth, NH 03801		
Site Address / Location :		Area of On-site Wetlands:

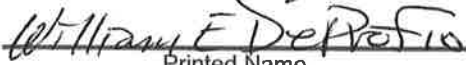
Activity Information

Change of Use: Yes [] No [X]	Existing Use: <u>Office/Research/Manufacturing</u>
	Proposed Use: <u>Office/Research/Manufacturing</u>
Description of Project:	<u>The proposed project consists of the construction of 60 additional parking spaces to support the existing facilities operations. The spaces are in three separate areas throughout the property. The northern expansion area will be treated with a proposed raingarden, and the western and eastern expansion areas will connect to the existing drainage system.</u>
<i>All above information shall be shown on a site plan submitted with this application. Provide 3 full size hard copies and one PDF copy of all application materials as well as one half-size set of drawings to PDA. Applicant shall supply additional copies as may be required by applicable municipality. Refer to Chapter 400 of PDA land Use Controls for additional information.</i>	

Certification

I hereby certify under the penalties of perjury that the foregoing information and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I hereby apply for Site Review and acknowledge I will comply with all regulations and any conditions established by the Review Committee(s) and PDA Board in the development and construction of this project.


23 Dec 19
 Signature of Applicant Date


 Printed Name

N:\Engineer\ ApplicationforSiteReview.xlsx

Owner's/Agent Letter of Authorization

This letter is to authorize Tighe & Bond, Inc. (Civil Engineer), to represent and submit on behalf of Lonza Biologics, Inc. (Applicant), applications and materials in all site design and permitting matters for the proposed project at 101 International Drive in Portsmouth, New Hampshire. This project includes the construction of parking expansion areas at three (3) different locations on site. and associated site and stormwater improvements. This authorization shall relate to those activities that are required for local, state and federal permitting for the above project and include any required signatures for those applications.


Signature

William E DeProffio
Print Name

23 Dec 19
Date


Witness

MARK S. CASWELL
Print Name

23 DEC 19
Date

PROPOSED PARKING EXPANSION

LONZA BIOLOGICS

101 INTERNATIONAL DRIVE

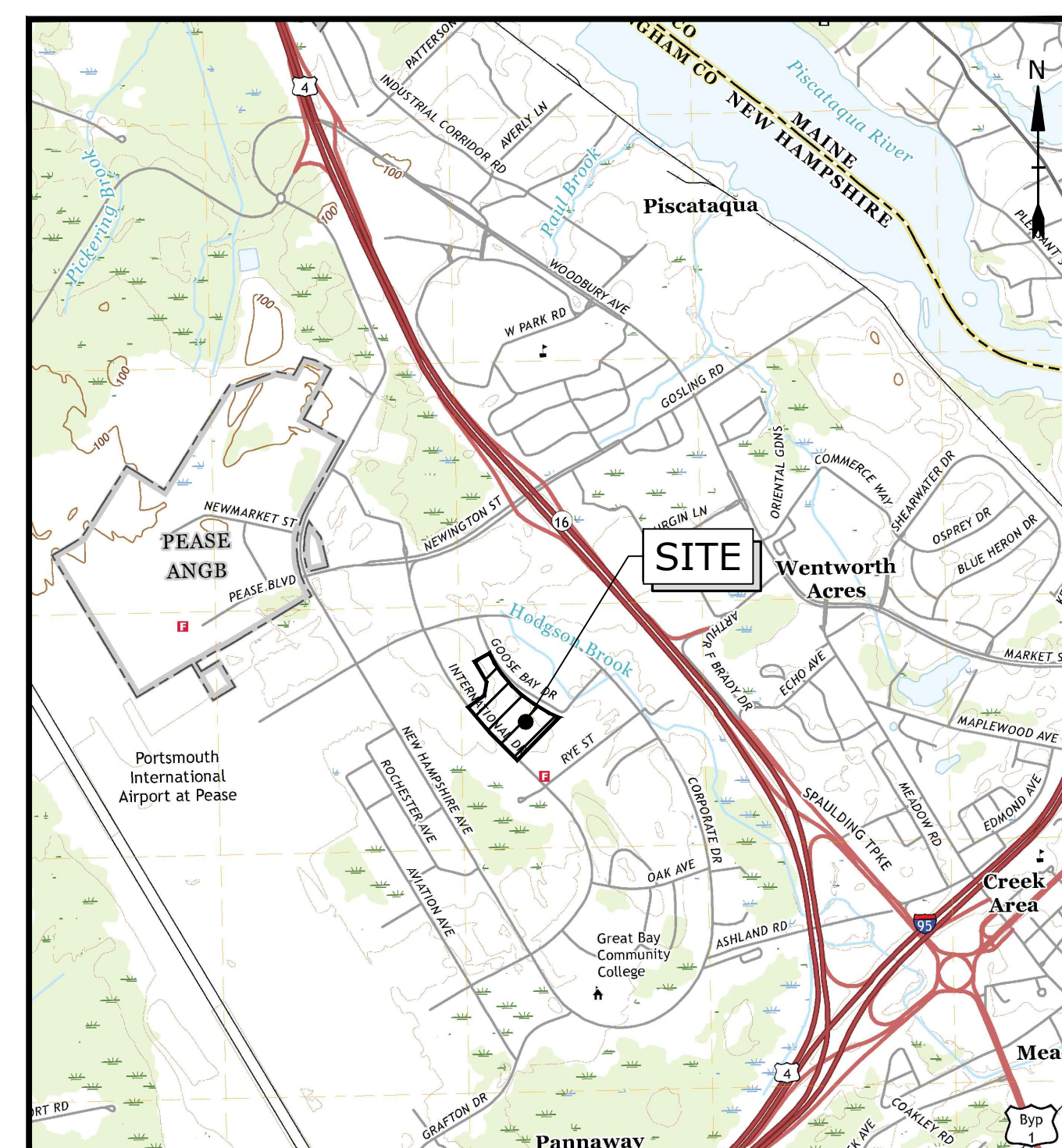
PORTSMOUTH, NEW HAMPSHIRE

DECEMBER 23, 2019

LAST REVISED: JANUARY 9, 2020

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	01/09/2020
C-101	OVERALL EXISTING CONDITIONS AND DEMOLITION NOTES	01/09/2020
C-101.1	EXISTING CONDITIONS AND DEMOLITION PLAN	01/09/2020
C-102	OVERALL SITE PLAN AND GENERAL NOTES	01/09/2020
C-102.1	SITE PLAN	01/09/2020
C-103	GRADING, DRAINAGE, EROSION CONTROL, AND UTILITIES PLAN	01/09/2020
C-501	EROSION CONTROL NOTES AND DETAILS SHEET	01/09/2020
C-502	DETAILS SHEET	01/09/2020
C-503	DETAILS SHEET	01/09/2020
C-504	DETAILS SHEET	01/09/2020
C-505	DETAILS SHEET	01/09/2020

LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT		



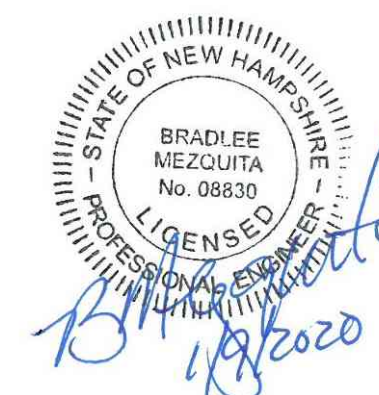
LOCATION MAP
SCALE: 1" = 2,000'

LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

OWNER: LONZA BIOLOGICS
101 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801

CIVIL ENGINEER: **Tighe&Bond**
Engineers | Environmental Specialists
177 CORPORATE DRIVE
PORTSMOUTH, NEW HAMPSHIRE 03801

SURVEYOR: DOUCET SURVEY, INC.
102 KENT PLACE
NEWMARKET, NEW HAMPSHIRE 03857



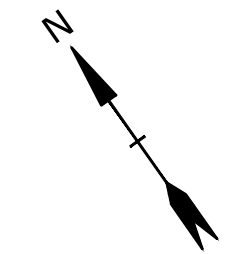
DEMOLITION NOTES:

1. THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK.
2. THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES. CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.
3. ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES.
4. COORDINATE REMOVAL, RELOCATION, DISPOSAL OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.
5. ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO MATCH ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
6. SAW CUT AND REMOVE PAVEMENT ONE (1) FOOT OFF PROPOSED EDGE OF PAVEMENT OR EXISTING CURB LINE IN ALL AREAS WHERE PAVEMENT TO BE REMOVED ABUTS EXISTING PAVEMENT OR CONCRETE TO REMAIN.
7. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL OF THE PERMIT APPROVALS.
8. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL DEMOLITION AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK, EXCEPT FOR WORK NOTED TO BE COMPLETED BY OTHERS.
10. UTILITIES SHALL BE TERMINATED AT THE MAIN LINE PER UTILITY COMPANY STANDARDS. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES LOCATED WITHIN THE LIMITS OF WORK.
11. CONTRACTOR SHALL VERIFY ORIGIN OF ALL DRAINS AND UTILITIES PRIOR TO REMOVAL/TERMINATION TO DETERMINE IF DRAINS OR UTILITY IS ACTIVE, AND SERVICES ANY ON OR OFF-SITE STRUCTURE TO REMAIN. THE CONTRACTOR SHALL NOTIFY ENGINEER IMMEDIATELY OF ANY SUCH UTILITY FOUND AND SHALL MAINTAIN THESE UTILITIES UNTIL PERMANENT SOLUTION IS IN PLACE.
12. PAVEMENT REMOVAL LIMITS ARE SHOWN FOR CONTRACTOR'S CONVENIENCE. ADDITIONAL PAVEMENT REMOVAL MAY BE REQUIRED DEPENDING ON THE CONTRACTOR'S OPERATION. CONTRACTOR TO VERIFY FULL LIMITS OF PAVEMENT REMOVAL PRIOR TO BID.

13. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE PADS, UTILITIES AND PAVEMENT WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ITEMS TO BE REMOVED INCLUDE BUT ARE NOT LIMITED TO: CONCRETE, PAVEMENT, CURBS, UNDER GROUND PIPING, AND POLES.
14. COORDINATE ALL WORK WITHIN THE PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
15. CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED BY THE CONTRACTOR, THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED SURVEYOR TO REPLACE DISTURBED MONUMENTS.
16. PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS/CURB INLETS WITHIN CONSTRUCTION LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. INLET PROTECTION BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE "HIGH FLOW SILT SACK" BY ACF ENVIRONMENTAL OR EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN EVENT OF 0.25 INCHES OR GREATER. CONTRACTOR SHALL COMPLETE A MAINTENANCE INSPECTION REPORT AFTER EACH INSPECTION. SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED OR SEDIMENT HAS ACCUMULATED TO 1/3 THE DESIGN DEPTH OF THE BARRIER.
17. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.
18. THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFETY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.
19. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCH FOR ALL UTILITIES TO BE REMOVED AND PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
20. THE CONTRACTOR SHALL ACQUIRE A PDA DIG PERMIT BEFORE ANY DISTURBANCE CAN TAKE PLACE. ALLOW 7 CALENDAR DAYS FOR PROCESSING.
21. BEFORE ANY DEWATERING IS PERFORMED, COORDINATION BETWEEN THE APPLICANT, PDA, NHDES AND THE AIR FORCE IS REQUIRED TO DETERMINE PROPER PROCEDURES AND PERMITTING REQUIRED.
22. ALL EXCESS SOIL RESULTING FROM THE CONSTRUCTION SHALL REMAIN ON SITE.

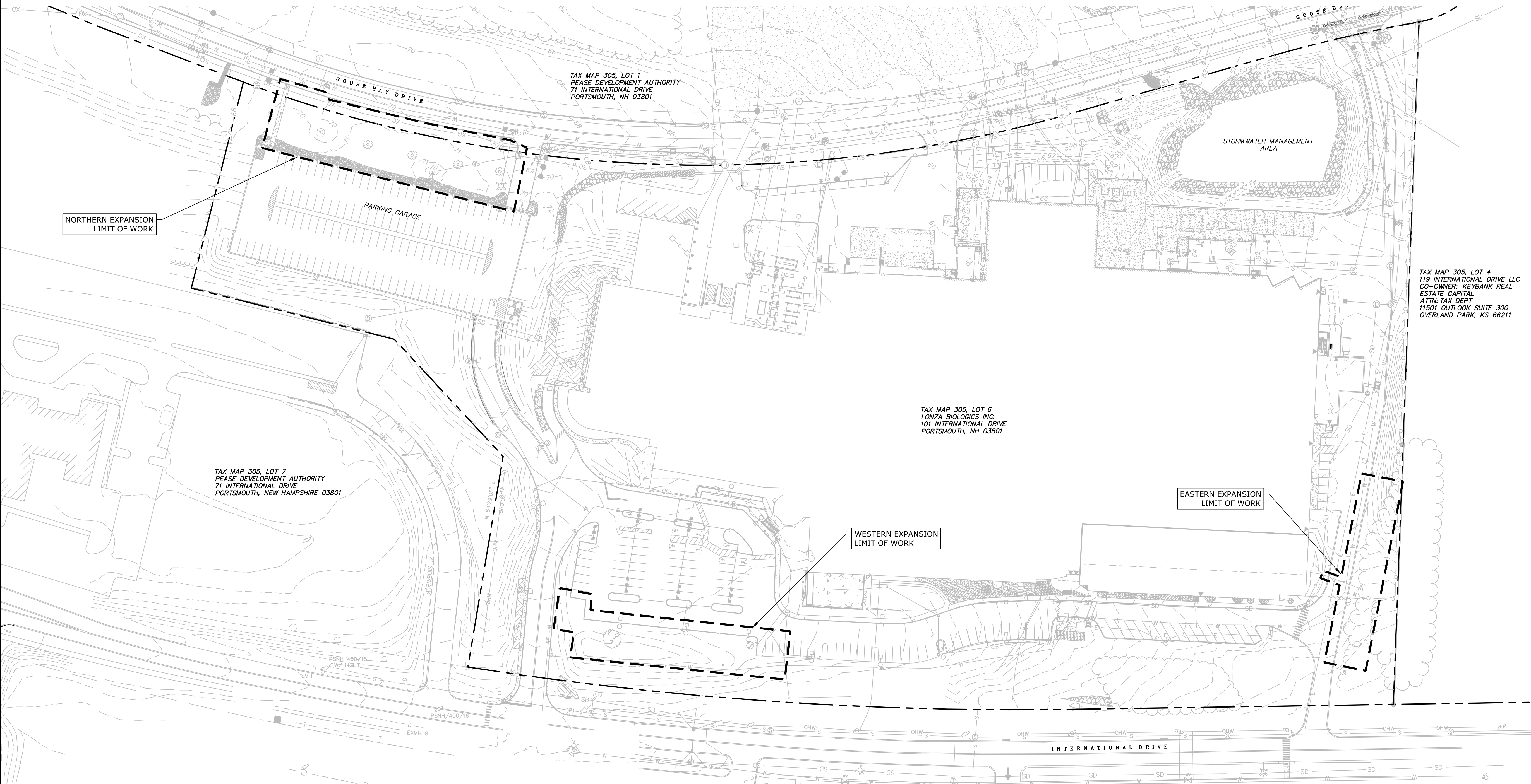
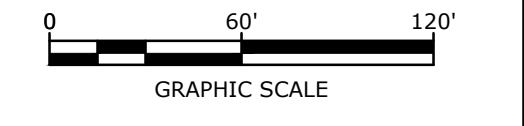
LEGEND

	PROPERTY LINE		CATCHBASIN
	CHAIN-LINK FENCE		DRAIN MANHOLE
	GUARDRAIL		SEWER MANHOLE
	STORM DRAIN		HYDRANT
	SANITARY SEWER		WATER VALVE
	WATER		IRRIGATION CONTROL VALVE
	APPROXIMATE IRRIGATION		ELECTRIC MANHOLE
	TELEPHONE LINE		UTILITY POLE
	GAS		LIGHT POLE
	UNDERGROUND ELECTRIC		MONUMENT
	OVERHEAD UTILITY		TREES/SHRUBS
	MAJOR CONTOUR		
	MINOR CONTOUR		
	CONCRETE		
	RIP RAP		
	GRAVEL		
	LANDSCAPING		



STATE OF NEW HAMPSHIRE
BRADLEE MEZQUITA
No. 08830
LICENSED PROFESSIONAL ENGINEER
1/18/2020

STATE OF NEW HAMPSHIRE
PATRICK M. CRIMMINS
No. 12375
LICENSED PROFESSIONAL ENGINEER
1/18/2020



Parking Expansion

Lonza Biologics

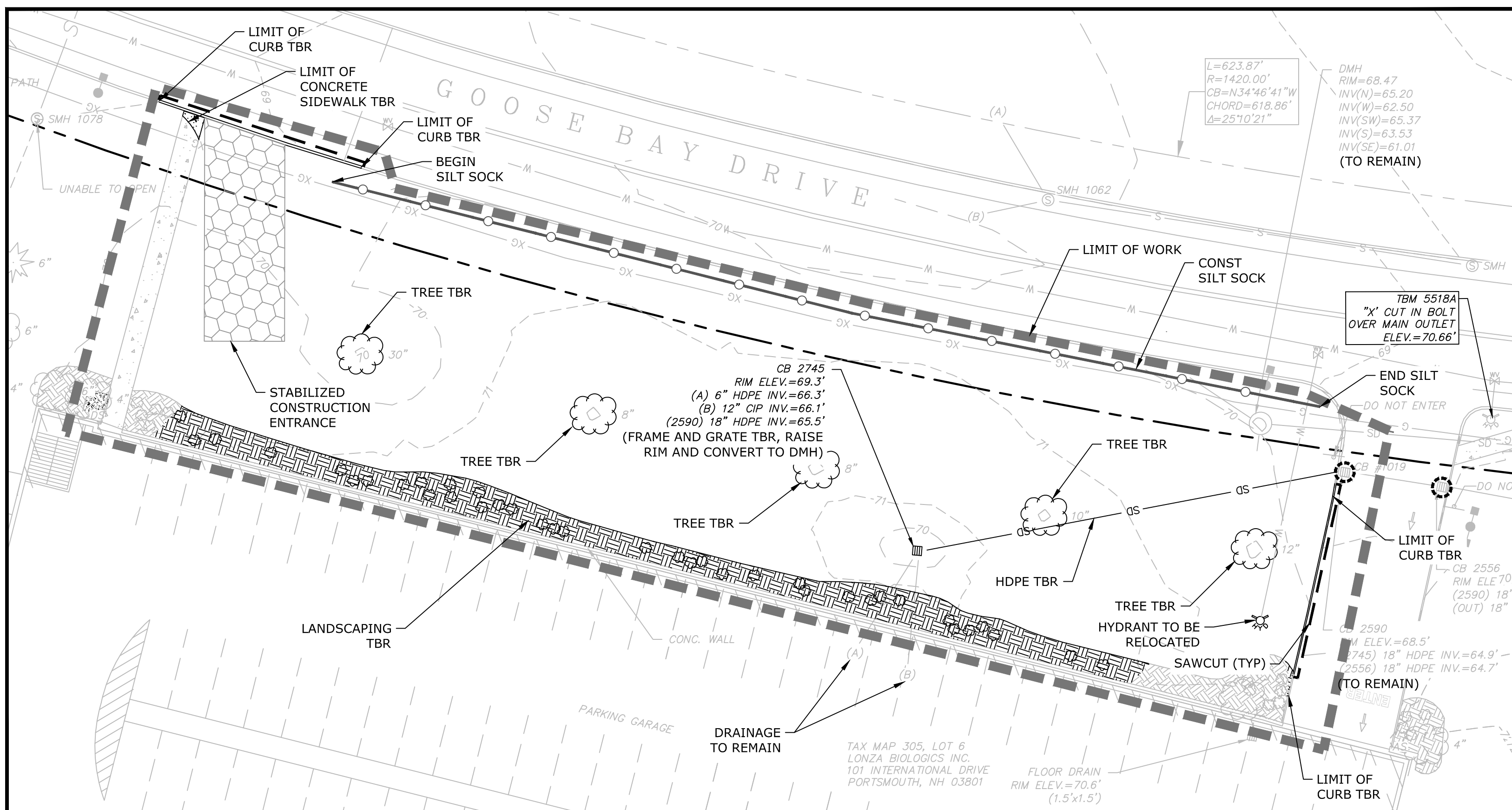
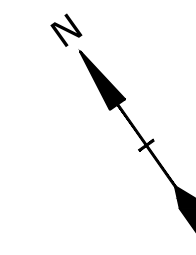
Portsmouth, NH

B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission
MARK	DATE	DESCRIPTION
PROJECT NO:	L-0700-019	
DATE:	November 13, 2019	
FILE:	L-0700-019-C-DSGN.DWG	
DRAWN BY:	BKC	
CHECKED:	NAH/PMC	
APPROVED:	BLM	

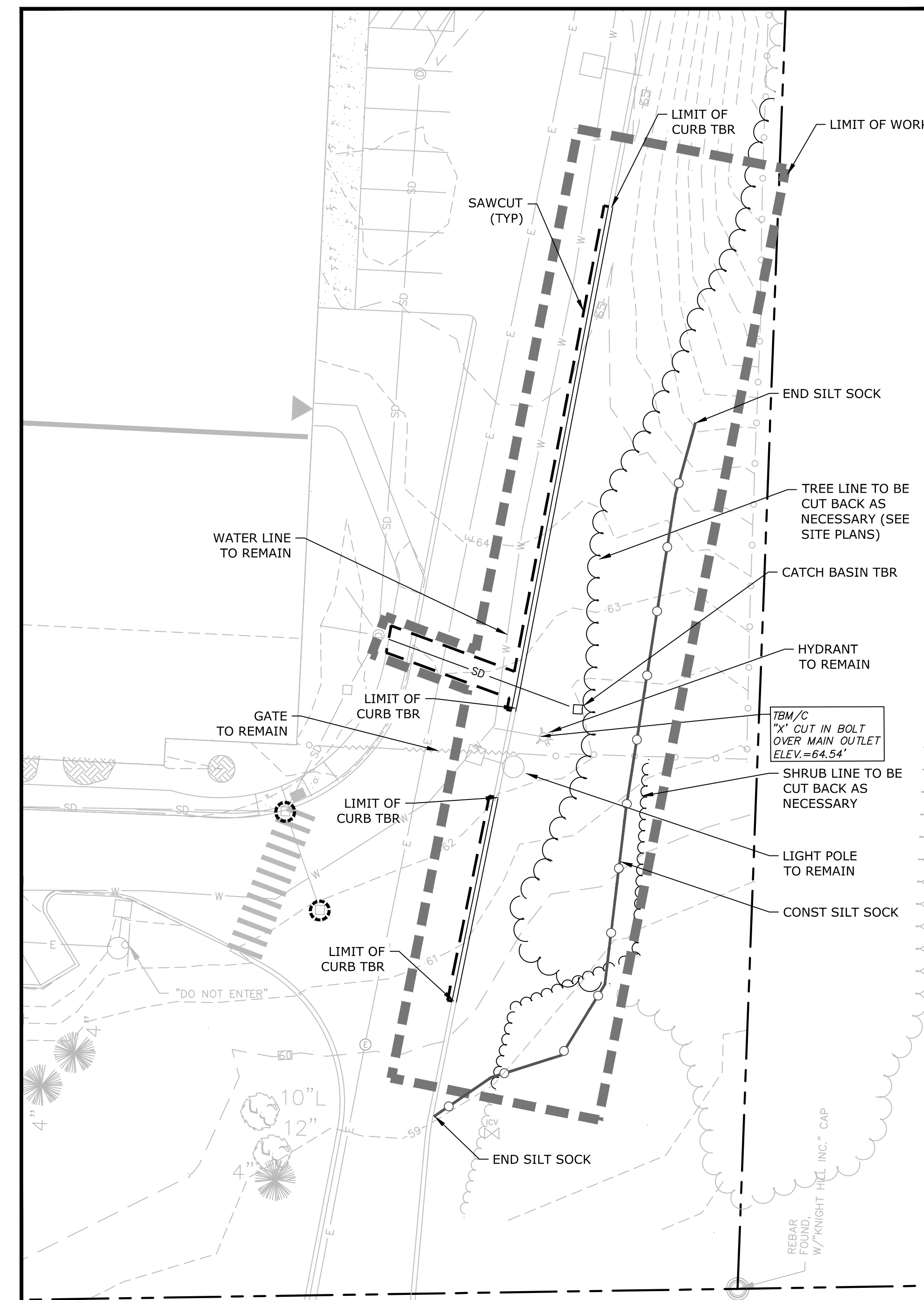
OVERALL EXISTING CONDITIONS AND DEMOLITION NOTES

SCALE: AS SHOWN

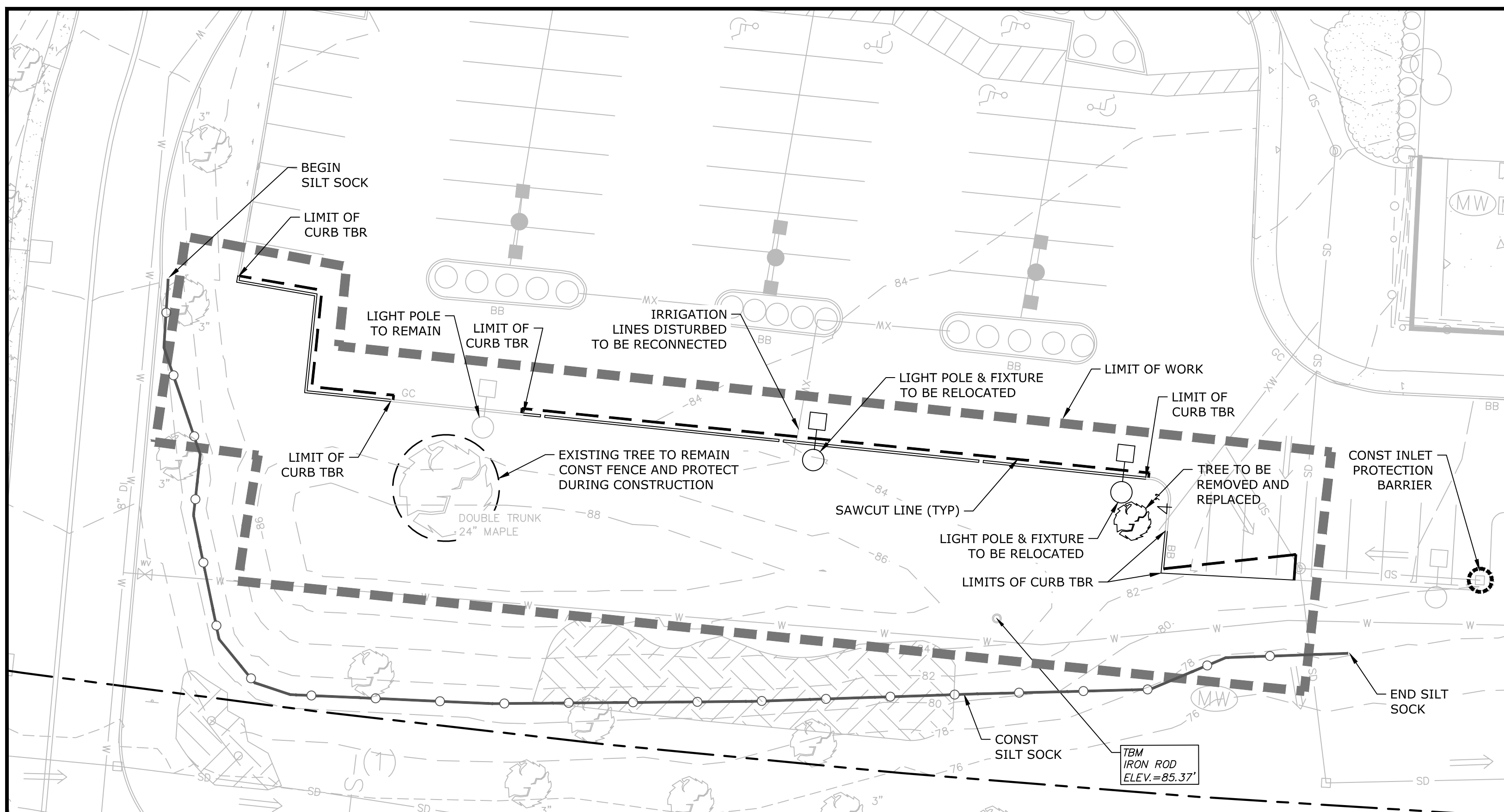
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Plotted On: Jan 09, 2020 10:16am
Tighe & Bond: P:\11\17000 Lonza Biologics Expansion was 157666.019 Parking Expansion\Drawings Figures\AutoCAD\Sheet\1-0700-019-C-DSGN.dwg



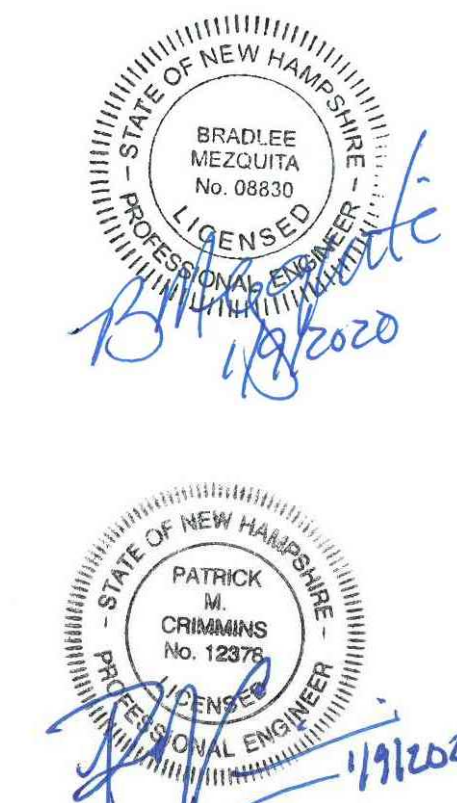
NORTHERN PARKING EXPANSION
SCALE: 1"=20'



EASTERN PARKING EXPANSION
SCALE: 1"=20'



WESTERN PARKING EXPANSION
SCALE: 1"=20'



Parking Expansion
Lonza Biologics
Portsmouth, NH

MARK	DATE	DESCRIPTION
B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission

PROJECT NO: L-0700-019
DATE: November 13, 2019
FILE: L-0700-019-C-DSGN.DWG
DRAWN BY: BKC
CHECKED: NAH/PMC
APPROVED: BLM

EXISTING CONDITIONS AND DEMOLITION PLAN

SCALE: AS SHOWN

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Plotted On: Jan 09, 2020 10:17am By: NAHansen
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Drawing Expansion\Drawings Figures\AutoCAD\Sheet\1-0700-019-C-DSGN.dwg
Drawing Expansion was 157665.019
Lonza Biologics Expansion

SITE DATA BLOCK
LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH NH, 03801
APPLICANT: LONZA BIOLOGICS, INC.
101 INTERNATIONAL DRIVE
PORTSMOUTH NH, 03801
LOCATION: 101 INTERNATIONAL DRIVE
PORTSMOUTH NH, 03801
MAP 305 LOT 6
ZONING DISTRICT: AIRPORT BUSINESS AND COMMERCIAL ZONE (ABC)
PROPOSED USES: OFFICE/MANUFACTURING/RESEARCH AND DEVELOPMENT

DEVELOPMENT STANDARDS

AREA, YARD, AND HEIGHT REQUIREMENTS	REQUIRED/ALLOWED	PROPOSED/PROVIDED
MINIMUM LOT AREA	5 ACRES	17.1 ACRES
MINIMUM LOT FRONTAGE	200 FEET	1038 FEET
MINIMUM FRONT YARD	70 FEET	118± FEET
MINIMUM SIDE YARD	30 FEET	30± FEET (EXISTING)
MINIMUM REAR YARD	50 FEET	50± FEET (EXISTING)
MAXIMUM BUILDING HEIGHT	FAA CRITERIA	86 FEET
MINIMUM OPEN SPACE	25% OF LOT AREA	34.2%

OFF-STREET PARKING REQUIREMENTS:

PARKING SPACES REQUIRED:	LARGEST SHIFT:	
INDUSTRIAL:	740 EMPLOYEES	494 SPACES
2 SPACES PER 3 EMPLOYEES ON LARGEST SHIFT		
COMPANY VEHICLES:	1 VEHICLE	1 SPACE
1 SPACE PER VEHICLE		
TOTAL MINIMUM PARKING SPACES REQUIRED =		495 SPACES

TOTAL PARKING SPACES PROVIDED:	(GARAGE & GARAGE OVERFLOW PARKING)	(SURFACE PARKING)
TOTAL PARKING SPACES PROVIDED =	419 SPACES	168 SPACES
		587 SPACES

HANDICAP ACCESSIBLE SPACES PROPOSED = 15 SPACES

SITE NOTES:

1. THE CONTRACTOR SHALL EMPLOY A NEW HAMPSHIRE LICENSED LAND SURVEYOR TO DETERMINE ALL LINES AND GRADES.
2. CLEAN AND COAT VERTICAL FACE OF EXISTING PAVEMENT AT SAW CUT LINE WITH RS-1 EMULSION IMMEDIATELY PRIOR TO PLACING NEW BITUMINOUS CONCRETE.
3. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES & SPECIFICATIONS.
4. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAY WITH THE CITY OF PORTSMOUTH.
5. CONTRACTOR TO SUBMIT AS-BUILT PLANS IN DIGITAL FORMAT (.DWG AND .PDF FILES) ON DISK TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR.
6. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
7. CONTRACTOR TO PROVIDE BACKFILL AND COMPACTION AT CURB LINE AFTER CONCRETE FORMS FOR SIDEWALKS AND PADS HAVE BEEN STRIPPED. COORDINATE WITH BUILDING CONTRACTOR.
8. ALL DIMENSIONS ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
9. ALL CONDITIONS ON THIS PLAN SHALL REMAIN IN EFFECT IN PERPETUITY PURSUANT TO THE REQUIREMENTS OF THE SITE PLAN REVIEW REGULATIONS.
10. UPON COMPLETION OF CONSTRUCTION AND PRIOR TO RELEASE OF BOND, THE APPLICANT SHALL SUBMIT A LETTER TO THE PEASE DEVELOPMENT AUTHORITY, SIGNED AND STAMPED BY A PROFESSIONAL ENGINEER, STATING CONSTRUCTION HAS BEEN COMPLETED IN CONFORMANCE WITH THE APPROVED PLANS.
11. WALL PACK LIGHTING WILL BE ADDED TO THE OUTSIDE OF THE GARAGE TO LIGHT THE NORTHERN EXPANSION AREA. LIGHTING WILL BE DESIGNED TO COMPLY WITH PDA SITE LIGHTING REGULATIONS.

GRADING AND DRAINAGE NOTES:

1. COMPACTION REQUIREMENTS:
BELOW PAVED OR CONCRETE AREAS 95%
TRENCH BEDDING MATERIAL AND SAND BLANKET BACKFILL 95%
BELOW LOAM AND SEED AREAS 90%
* ALL PERCENTAGES OF COMPACTION SHALL BE OF THE MAXIMUM DRY DENSITY AT THE OPTIMUM MOISTURE CONTENT AS DETERMINED AND CONTROLLED IN ACCORDANCE WITH ASTM D-1557, METHOD C FIELD DENSITY TESTS SHALL BE MADE IN ACCORDANCE WITH ASTM D-1556 OR ASTM-2922.
2. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION. CONTRACTOR TO VERIFY BENCHMARK LOCATIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
3. ALL STORM DRAINAGE PIPES SHALL BE HIGH DENSITY POLYETHYLENE (HANCOR HI-Q, ADS N-12 OR EQUAL).
4. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
5. CONTRACTOR SHALL PROVIDE A FINISH PAVEMENT SURFACE AND LAWN AREAS FREE OF LOW SPOTS AND PONDING AREAS. CRITICAL AREAS INCLUDE BUILDING ENTRANCES, EXITS, RAMP AND LOADING DOCK AREAS ADJACENT TO THE BUILDING.
6. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
7. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM WITH APPLICABLE FEDERAL, STATE AND LOCAL CODES.
8. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED FERTILIZER AND MULCH.
9. ALL STORM DRAIN CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NHDOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, LATEST EDITION.
10. ALL WORK SHALL CONFORM TO THE CITY OF PORTSMOUTH DEPARTMENT OF PUBLIC WORKS, STANDARD SPECIFICATIONS AND WITH THE STATE OF NEW HAMPSHIRE DEPARTMENT OF TRANSPORTATION, "STANDARD SPECIFICATIONS OF ROAD AND BRIDGE CONSTRUCTION", CURRENT EDITION.
11. SEE EXISTING CONDITIONS PLAN FOR BENCH MARK INFORMATION.

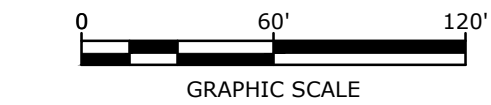
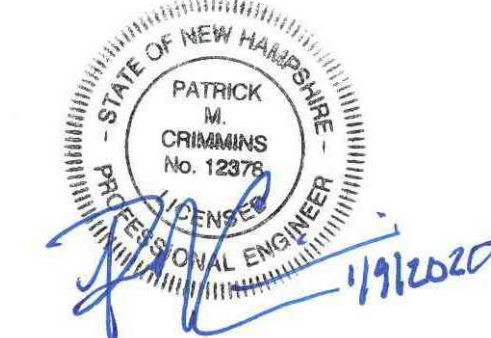
UTILITY NOTES:

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR ENGINEER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL UTILITIES, ANTICIPATE CONFLICTS, REPAIR EXISTING UTILITIES, AND RELOCATE EXISTING UTILITIES REQUIRED TO COMPLETE THE WORK AT NO ADDITIONAL COST TO THE OWNER.
2. COORDINATE ALL UTILITY WORK WITH APPROPRIATE UTILITY COMPANY.
• WATER - CITY OF PORTSMOUTH
3. SEE EXISTING CONDITIONS PLAN FOR BENCHMARK INFORMATION.
4. COORDINATE ALL WORK WITHIN PUBLIC RIGHT OF WAYS WITH THE CITY OF PORTSMOUTH.
5. CONTRACTOR SHALL MAINTAIN UTILITY SERVICES TO ABUTTING PROPERTIES THROUGHOUT CONSTRUCTION.
6. ALL ELECTRICAL MATERIAL WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE, LATEST EDITION, AND ALL APPLICABLE STATE AND LOCAL CODES.
7. THE CONTRACTOR SHALL OBTAIN, PAY FOR, AND COMPLY WITH ALL REQUIRED PERMITS, ARRANGE FOR ALL INSPECTIONS, AND SUBMIT COPIES OF ACCEPTANCE CERTIFICATES TO THE OWNER PRIOR TO THE COMPLETION OF THIS PROJECT.
8. THE CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANHOLES, BOXES, FITTINGS, CONNECTORS, COVER PLATES, AND OTHER MISCELLANEOUS ITEMS NOT NECESSARILY DETAILED ON THESE DRAWINGS TO RENDER INSTALLATION OF UTILITIES COMPLETE AND OPERATIONAL.
9. THE CONTRACTOR SHALL CONTACT "DIG-SAFE" 72 HOURS PRIOR TO COMMENCING CONSTRUCTION. THE CONTRACTOR SHALL HAVE THE "DIG-SAFE" NUMBER ON SITE AT ALL TIMES.
10. SAW CUT AND REMOVE PAVEMENT AND CONSTRUCT PAVEMENT TRENCH PATCHES FOR ALL PROPOSED UTILITIES LOCATED IN EXISTING PAVEMENT AREAS TO REMAIN.
11. HYDRANTS, GATE VALVES, FITTINGS, ETC. SHALL MEET THE REQUIREMENTS OF THE CITY OF PORTSMOUTH.

NORTHERN PARKING EXPANSION 22 SPACES

EASTERN PARKING EXPANSION 18 SPACES

WESTERN PARKING EXPANSION 20 SPACES



Parking Expansion

Lonza Biologics

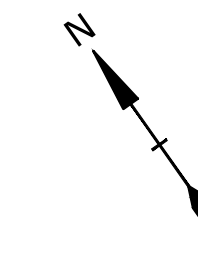
Portsmouth, NH

B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission
MARK	DATE	DESCRIPTION
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DATE:	November 13, 2019	
FILE:	L-0700-019-C-DSGN.DWG	
DRAWN BY:	BKC	
CHECKED:	NAH/PMC	
APPROVED:	BLM	

OVERALL SITE PLAN AND GENERAL NOTES

SCALE: AS SHOWN

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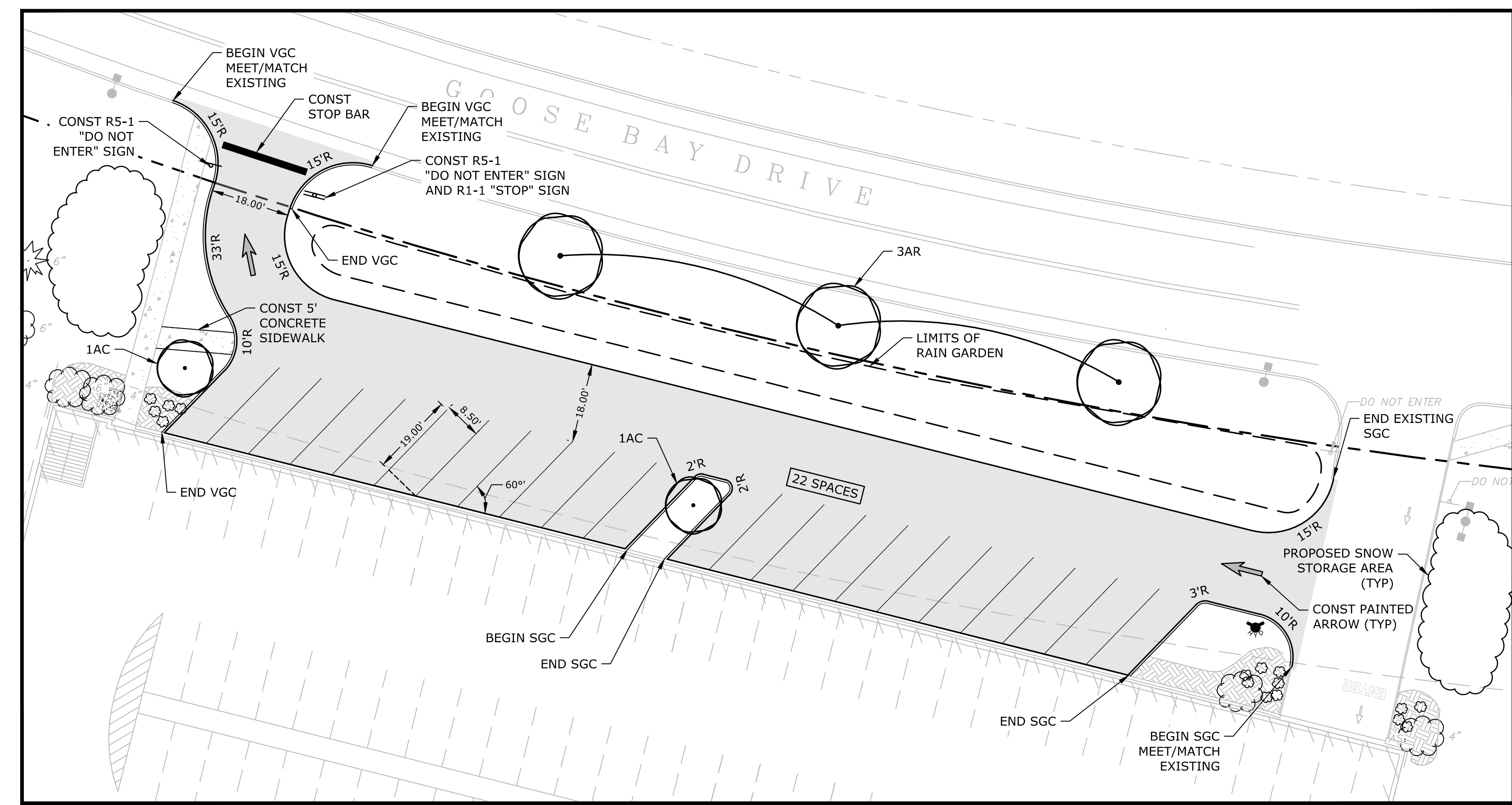
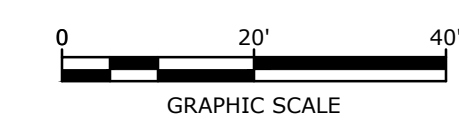
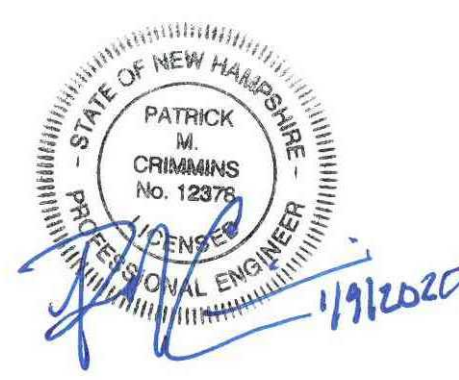
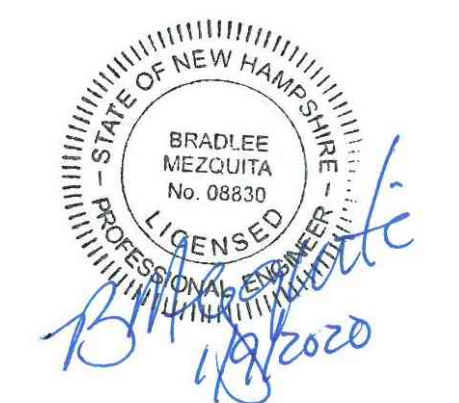


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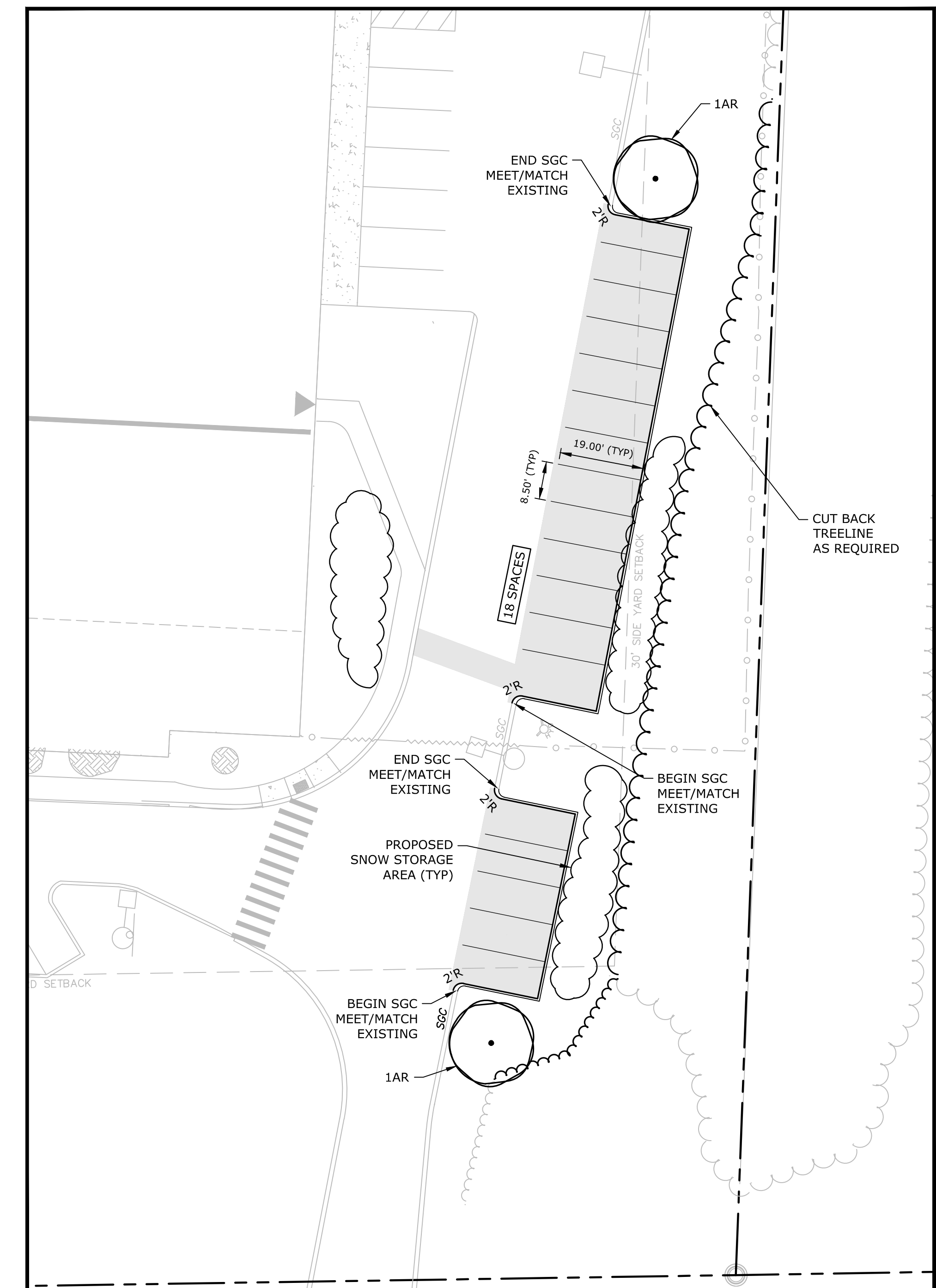
- PROPERTY LINE
- PROPOSED EDGE OF PAVEMENT
- PROPOSED TREE LINE
- PROPOSED SHRUB LINE
- PROPOSED PAVEMENT SECTION
- PROPOSED LIGHT POLE (RELOCATED)
- ADA PARKING SYMBOL
- TYP TYPICAL
- SGC SLOPED GRANITE CURB
- VGC VERTICAL GRANITE CURB
- CONST CONSTRUCT

PLANT SCHEDULE

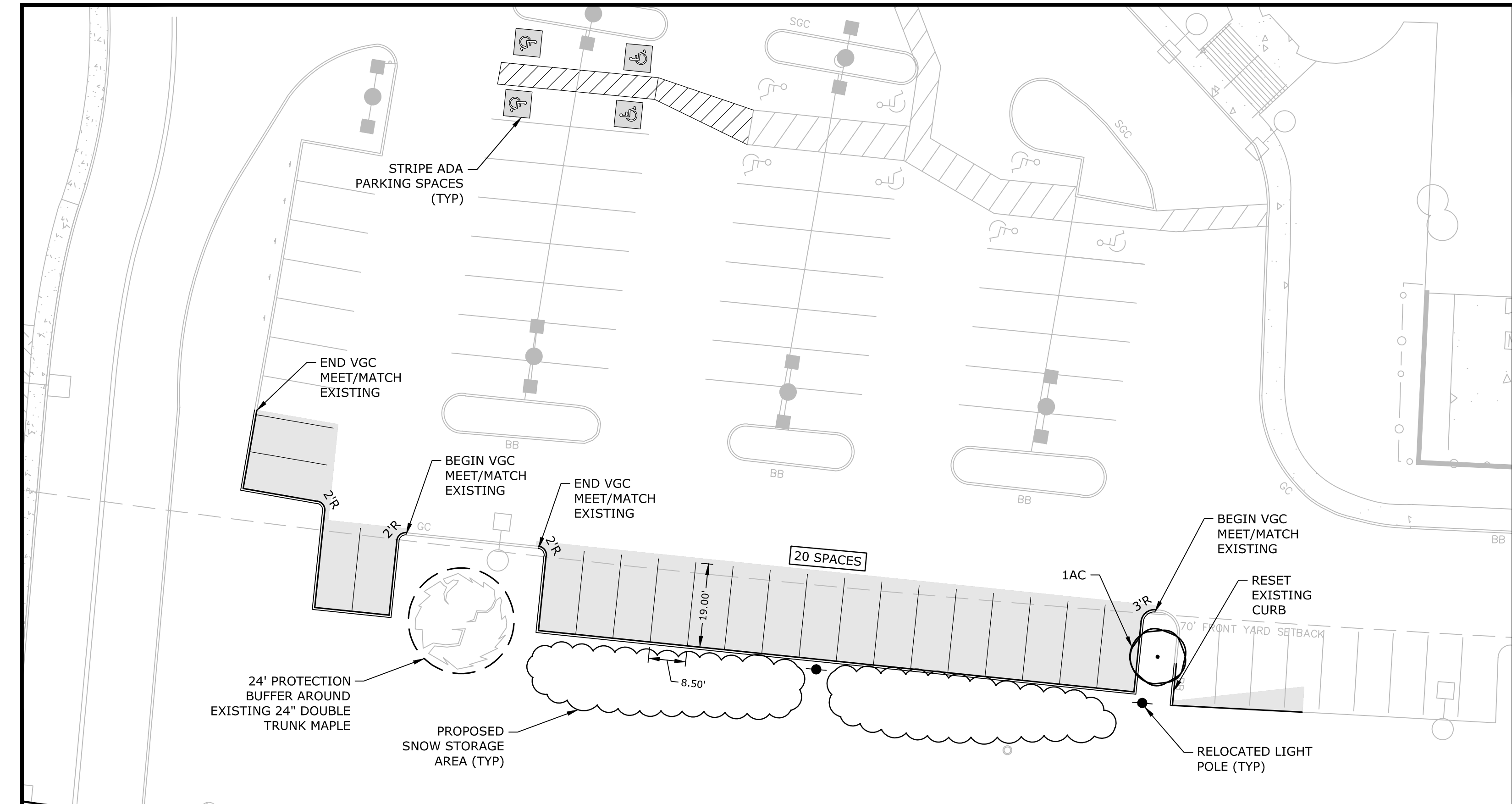
CODE	COMMON NAME	SIZE	REMARKS
TREES			
AC	ACERX FREEMANII 'ARMSTRONG'	ARMSTRONG MAPLE	2 1/2 - 3" CALIPER B & B
AR	ACER RUBRUM 'REDPOINTE'	REDPOINTE RED MAPLE	2 1/2 - 3" CALIPER B & B



NORTHERN PARKING EXPANSION
SCALE: 1"=20'



EASTERN PARKING EXPANSION
SCALE: 1"=20'



WESTERN PARKING EXPANSION
SCALE: 1"=20'

Parking Expansion

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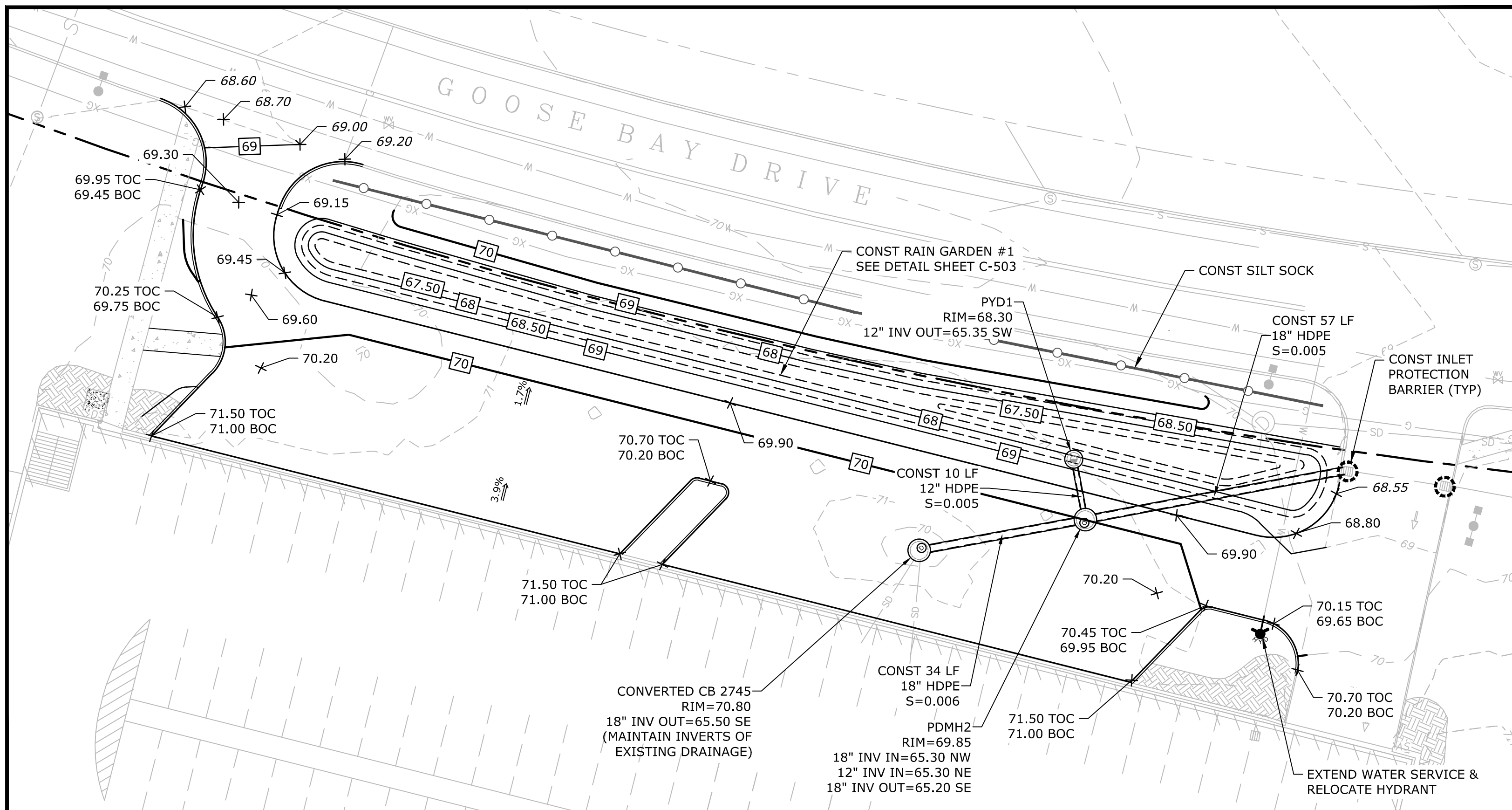
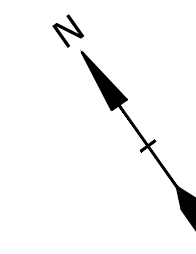
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SITE PLAN

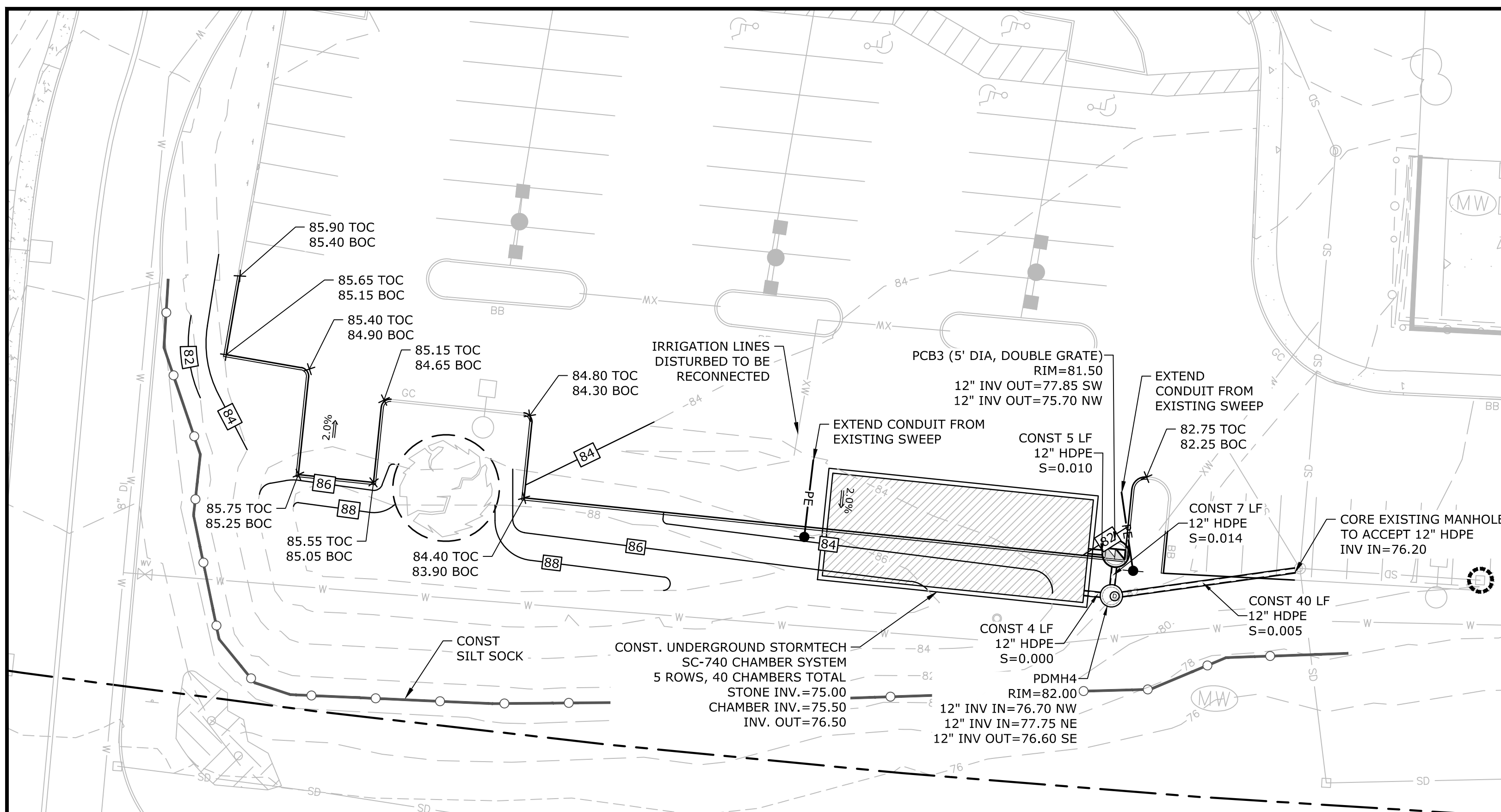
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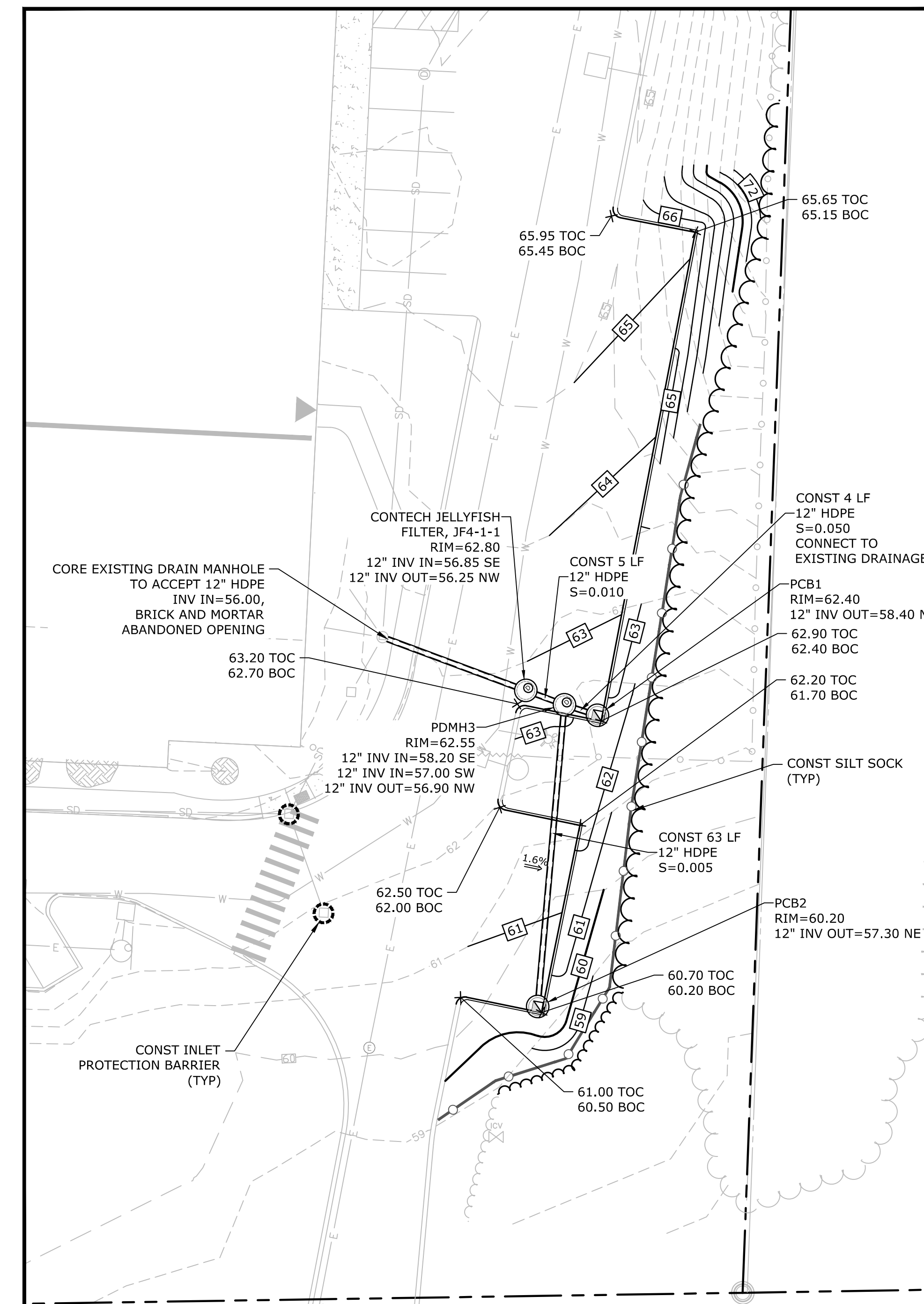
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NORTHERN PARKING EXPANSION
SCALE: 1"=20'



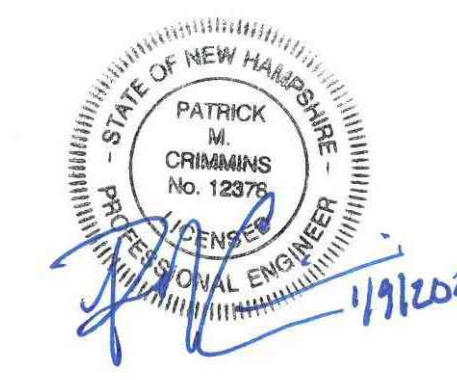
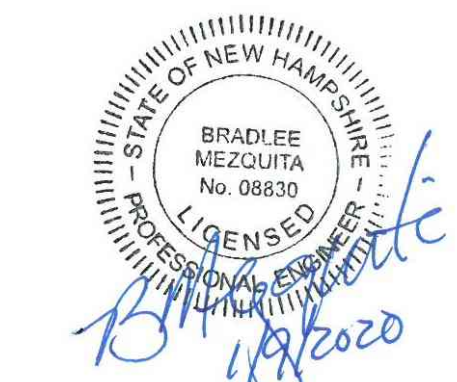
WESTERN PARKING EXPANSION
SCALE: 1"=20'



EASTERN PARKING EXPANSION
SCALE: 1"=20'

LEGEND

	EXISTING WATER		EXISTING CATCH BASIN
	EXISTING STORM DRAIN		EXISTING SEWER MANHOLE
	EXISTING GAS		EXISTING ELECTRIC MANHOLE
	APPROXIMATE EXISTING GAS		EXISTING WATER VALVE
	EXISTING UNDERGROUND ELECTRIC		EXISTING HYDRANT
	EXISTING SEWER		TYPICAL CATCH BASIN INVERT
	PROPOSED MAJOR CONTOUR LINE		CONSTRUCT DRAIN MANHOLE
	PROPOSED MINOR CONTOUR LINE		CONSTRUCT TOP OF CURB
	PROPOSED DRAIN LINE (TYP)		CONSTRUCT BOTTOM OF CURB
	PROPOSED SILT SOCK		
	INLET PROTECTION SILT SACK		
	PROPOSED DRAIN MANHOLE		
	PROPOSED CATCH BASIN		
	PROPOSED DOUBLE GRATE CATCH BASIN		
	EXISTING DRAIN MANHOLE		



Parking Expansion

Lonza Biologics

Portsmouth, NH

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GRADING, DRAINAGE, EROSION CONTROL, AND UTILITIES PLAN

SCALE: AS SHOWN

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 Figures: AutoCAD Sheet: L-0700-019-C-DSGN.dwg
 Parking Expansion Drawings Figures: AutoCAD Sheet: L-0700-019-C-DSGN.dwg

GENERAL PROJECT INFORMATION

PROJECT LESSOR: PEASE DEVELOPMENT AUTHORITY
55 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801
PROJECT APPLICANT: LONZA BIOLOGICS
101 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801
PROJECT ADDRESS: 101 INTERNATIONAL DRIVE
PORTSMOUTH, NH 03801
PROJECT LATITUDE: 43°-04'-59.0"N
PROJECT LONGITUDE: 71°-48'-09.7"W

PROJECT DESCRIPTION

THE PROPOSED PROJECT INCLUDES THE EXPANSION OF EXISTING PARKING FACILITIES AT LONZA BIOLOGICS, AS WELL AS DRAINAGE IMPROVEMENTS TO SUPPORT SOME OF THE ADDITIONAL IMPERVIOUS SURFACES.

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 0.96 ACRES.

SOIL CHARACTERISTICS

BASED ON THE HIGH INTENSITY SOIL SURVEY PREPARED BY GOVE ENVIRONMENTAL SERVICES, INC. IN DECEMBER 2015, THE SITE SOILS VARY FROM WELL DRAINED TO VERY POORLY DRAINED.

NAME OF RECEIVING WATERS

STORM WATER RUNOFF WILL ULTIMATELY DISCHARGE INTO HODGSON BROOK.

CONSTRUCTION SEQUENCE OF MAJOR ACTIVITIES:

- 1. CUT AND CLEAR TREES.
- 2. CONSTRUCT TEMPORARY AND PERMANENT SEDIMENT, EROSION AND DETENTION CONTROL FACILITIES. EROSION, SEDIMENT AND DETENTION MEASURES SHALL BE INSTALLED PRIOR TO ANY EARTH MOVING OPERATIONS THAT WILL INFLUENCE STORMWATER RUNOFF SUCH AS:
 - NEW CONSTRUCTION
 - CONTROL OF DUST
 - NEARNESS OF CONSTRUCTION SITE TO RECEIVING WATERS
 - CONSTRUCTION DURING LATE WINTER AND EARLY SPRING
- 3. ALL PERMANENT DITCHES, SWALES, DETENTION, RETENTION AND SEDIMENTATION BASINS TO BE STABILIZED USING THE VEGETATIVE AND NON-STRUCTURAL BMPS PRIOR TO DIRECTING RUNOFF TO THEM.
- 4. CLEAR AND DISPOSE OF DEBRIS.
- 5. CONSTRUCT TEMPORARY CULVERTS AND DIVERSION CHANNELS AS REQUIRED.
- 6. GRADE AND GRAVEL ROADWAYS AND PARKING AREAS - ALL ROADS AND PARKING AREA SHALL BE STABILIZED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
- 7. BEGIN PERMANENT AND TEMPORARY SEEDING AND MULCHING. ALL CUT AND FILL SLOPES SHALL BE SEEDED AND MULCHED WITHIN 72 HOURS OF ACHIEVING FINISHED GRADE.
- 8. DAILY, OR AS REQUIRED, CONSTRUCT TEMPORARY BERMS, DRAINS, DITCHES, PERIMETER EROSION CONTROL MEASURES, SEDIMENT TRAPS, ETC., MULCH AND SEED AS REQUIRED.
- 9. SEDIMENT TRAPS AND/OR BASINS SHALL BE USED AS NECESSARY TO CONTAIN RUNOFF UNTIL SOILS ARE STABILIZED.
- 10. FINISH PAVING ALL ROADWAYS AND PARKING LOTS.
- 11. INSPECT AND MAINTAIN ALL EROSION AND SEDIMENT CONTROL MEASURES.
- 12. COMPLETE PERMANENT SEEDING AND LANDSCAPING.
- 13. REMOVE TRAPPED SEDIMENTS FROM COLLECTOR DEVICES AS APPROPRIATE AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES.

SPECIAL CONSTRUCTION NOTES:

- 1. THE CONSTRUCTION SEQUENCE MUST LIMIT THE DURATION AND AREA OF DISTURBANCE.
- 2. THE PROJECT IS TO BE MANAGED IN A MANNER THAT MEETS THE REQUIREMENTS AND INTENT OF RSA 430:53 AND CHAPTER AGR 3800 RELATIVE TO INVASIVE SPECIES.

EROSION CONTROL NOTES:

- 1. ALL EROSION CONTROL MEASURES AND PRACTICES SHALL CONFORM TO THE "NEW HAMPSHIRE STORMWATER MANUAL VOLUME 3: EROSION AND SEDIMENT CONTROLS DURING CONSTRUCTION" PREPARED BY THE NHDES.
- 2. PRIOR TO ANY WORK OR SOIL DISTURBANCE, CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR EROSION CONTROL MEASURES AS REQUIRED IN THE PROJECT MANUAL.
- 3. CONTRACTOR SHALL INSTALL TEMPORARY EROSION CONTROL BARRIERS, INCLUDING HAY BALES, SILT FENCES, MULCH BERMS, SILT SACKS AND SILT SOCKS AS SHOWN IN THESE DRAWINGS AS THE FIRST ORDER OF WORK.
- 4. SILT SACK INLET PROTECTION SHALL BE INSTALLED IN ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AND BE MAINTAINED FOR THE DURATION OF THE PROJECT.
- 5. PERIMETER CONTROLS INCLUDING SILT FENCES, MULCH BERM, SILT SOCK, AND/OR HAY BALE BARRIERS SHALL BE MAINTAINED FOR THE DURATION OF THE PROJECT UNTIL NON-PAVED AREAS HAVE BEEN STABILIZED.
- 6. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
- 7. ALL DISTURBED AREAS NOT OTHERWISE BEING TREATED SHALL RECEIVE 6" LOAM, SEED AND FERTILIZER.
- 8. INSPECT ALL INLET PROTECTION AND PERIMETER CONTROLS WEEKLY AND AFTER EACH RAIN STORM OF 0.25 INCH OR GREATER. REPAIR/MODIFY PROTECTION AS NECESSARY TO MAXIMIZE EFFICIENCY OF FILTER. REPLACE ALL FILTERS WHEN SEDIMENT IS 1/3 THE FILTER HEIGHT.
- 9. CONSTRUCT EROSION CONTROL BLANKETS ON ALL SLOPES STEEPER THAN 3:1.

STABILIZATION:

- 1. AN AREA SHALL BE CONSIDERED STABLE WHEN ONE OF THE FOLLOWING HAS OCCURRED:
 - A. BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
 - B. A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
 - C. A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED;
 - D. EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.;
 - E. IN AREAS TO BE PAVED, "STABLE" MEANS THAT BASE COURSE GRAVELS MEETING THE REQUIREMENTS OF NHDOT STANDARD FOR ROAD AND BRIDGE CONSTRUCTION, 2016, ITEM 304.2 HAVE BEEN INSTALLED.
- 2. WINTER STABILIZATION PRACTICES:
 - A. ALL PROPOSED VEGETATED AREAS THAT DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED BY SEEDING AND INSTALLING EROSION CONTROL BLANKETS ON SLOPES GREATER THAN 3:1, AND SEEDING AND PLACING 3 TO 4 TONS OF MULCH PER ACRE, SECURED WITH ANCHORED NETTING, ELSEWHERE. THE INSTALLATION OF EROSION CONTROL BLANKETS OR MULCH AND NETTING SHALL NOT OCCUR OVER ACCUMULATED SNOW OR ON FROZEN GROUND AND SHALL BE COMPLETED IN ADVANCE OF THAW OR SPRING MELT EVENTS;
 - B. ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85 PERCENT VEGETATIVE GROWTH BY OCTOBER 15, OR WHICH ARE DISTURBED AFTER OCTOBER 15, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS;
 - C. AFTER NOVEMBER 15, INCOMPLETE ROAD OR PARKING SURFACES, WHERE WORK HAS STOPPED FOR THE WINTER SEASON, SHALL BE PROTECTED WITH A MINIMUM OF 3 INCHES OF CRUSHED GRAVEL PER NHDOT ITEM 304.3, OR IF CONSTRUCTION IS TO CONTINUE THROUGH THE WINTER SEASON BE CLEARED OF ANY ACCUMULATED SNOW AFTER EACH STORM EVENT;
- 3. STABILIZATION SHALL BE INITIATED ON ALL LOAM STOCKPILES, AND DISTURBED AREAS, WHERE CONSTRUCTION ACTIVITY SHALL NOT OCCUR FOR MORE THAN TWENTY-ONE (21) CALENDAR DAYS BY THE FOURTEENTH (14TH) DAY AFTER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED IN THAT AREA. STABILIZATION MEASURES TO BE USED INCLUDE:
 - A. TEMPORARY SEEDING;

- B. MULCHING.
- 4. ALL AREAS SHALL BE STABILIZED WITHIN 45 DAYS OF INITIAL DISTURBANCE.
- 5. WHEN CONSTRUCTION ACTIVITY PERMANENTLY OR TEMPORARILY CEASES WITHIN 100 FEET OF NEARBY SURFACE WATERS OR DELINEATED WETLANDS, THE AREA SHALL BE STABILIZED WITHIN SEVEN (7) DAYS OR PRIOR TO A RAIN EVENT. ONCE CONSTRUCTION ACTIVITY CEASES PERMANENTLY IN AN THESE AREAS, SILT FENCES, MULCH BERMS, HAY BALE BARRIERS AND ANY EARTH/DIKES SHALL BE REMOVED ONCE PERMANENT MEASURES ARE ESTABLISHED.
- 6. DURING CONSTRUCTION, RUNOFF WILL BE DIVERTED AROUND THE SITE WITH EARTH DIKES, PIPING OR STABILIZED CHANNELS WHERE POSSIBLE. SHEET RUNOFF FROM THE SITE WILL BE FILTERED THROUGH SILT FENCES, MULCH BERMS, HAY BALE BARRIERS, OR SILT SOCKS. ALL STORM DRAIN BASIN INLETS SHALL BE PROVIDED WITH FLARED END SECTIONS AND TRASH RACKS. THE SITE SHALL BE STABILIZED FOR THE WINTER BY NOVEMBER 15.

DUST CONTROL:

- 1. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST THROUGHOUT THE CONSTRUCTION PERIOD.
- 2. DUST CONTROL METHODS SHALL INCLUDE, BUT BE NOT LIMITED TO SPRINKLING WATER ON EXPOSED AREAS, COVERING LOADED DUMP TRUCKS LEAVING THE SITE, AND TEMPORARY MULCHING.
- 3. DUST CONTROL MEASURES SHALL BE UTILIZED SO AS TO PREVENT THE MIGRATION OF DUST FROM THE SITE TO ADJUTING AREAS.

STOCKPILES:

- 1. LOCATE STOCKPILES A MINIMUM OF 50 FEET AWAY FROM CATCH BASINS, SWALES, AND CULVERTS.
- 2. ALL STOCKPILES SHOULD BE SURROUNDED WITH TEMPORARY EROSION CONTROL MEASURES PRIOR TO THE ONSET OF PRECIPITATION.
- 3. PERIMETER BARRIERS SHOULD BE MAINTAINED AT ALL TIMES, AND ADJUSTED AS NEEDED TO ACCOMMODATE THE DELIVERY AND REMOVAL OF MATERIALS FROM THE STOCKPILE. THE INTEGRITY OF THE BARRIER SHOULD BE INSPECTED AT THE END OF EACH WORKING DAY.
- 4. PROTECT ALL STOCKPILES FROM STORMWATER RUN-OFF USING TEMPORARY EROSION CONTROL MEASURES SUCH AS BERMS, SILT SOCK, OR OTHER APPROVED PRACTICE TO PREVENT MIGRATION OF MATERIAL BEYOND THE IMMEDIATE CONFINES OF THE STOCKPILES.

OFF SITE VEHICLE TRACKING:

- 1. THE CONTRACTOR SHALL CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE(S) PRIOR TO ANY EXCAVATION ACTIVITIES.

VEGETATION:

- 1. TEMPORARY GRASS COVER:
 - A. SEEDBED PREPARATION:
 - a. APPLY FERTILIZER AT THE RATE OF 600 POUNDS PER ACRE OF 10-10-10. APPLY LIMESTONE (EQUIVALENT TO 50 PERCENT CALCIUM PLUS MAGNESIUM OXIDE) AT A RATE OF THREE (3) TONS PER ACRE;
 - B. SEEDING:
 - a. UTILIZE ANNUAL RYE GRASS AT A RATE OF 40 LBS/ACRE;
 - b. WHERE THE SOIL HAS BEEN COMPACTED BY CONSTRUCTION OPERATIONS, LOOSEN SOIL TO A DEPTH OF TWO (2) INCHES BEFORE APPLYING FERTILIZER, LIME AND SEED;
 - c. APPLY SEED UNIFORMLY BY HAND, CYCLONE SEEDER, OR HYDROSEEDER (SLURRY INCLUDING SEED AND FERTILIZER). HYDROSEEDINGS, WHICH INCLUDE MULCH, MAY BE LEFT ON SOIL SURFACE. SEEDING RATES MUST BE INCREASED 10% WHEN HYDROSEEDING;
 - C. MAINTENANCE:
 - a. TEMPORARY SEEDING SHALL BE PERIODICALLY INSPECTED. AT A MINIMUM, 95% OF THE SOIL SURFACE SHOULD BE COVERED BY VEGETATION. IF ANY EVIDENCE OF EROSION OR SEDIMENTATION IS APPARENT, REPAIRS SHALL BE MADE AND OTHER TEMPORARY MEASURES USED IN THE INTERIM (MULCH, FILTER BARRIERS, CHECK DAMS, ETC.).
- 2. VEGETATIVE PRACTICE:
 - A. FOR PERMANENT MEASURES AND PLANTINGS:
 - a. LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF THREE (3) TONS PER ACRE IN ORDER TO PROVIDE A PH VALUE OF 5.5 TO 6.5;
 - b. FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 800 POUNDS PER ACRE OF 10-20-20 FERTILIZER;
 - c. SOIL CONDITIONERS AND FERTILIZER SHALL BE APPLIED AT THE RECOMMENDED RATES AND SHALL BE THOROUGHLY WORKED INTO THE LOAM. LOAM SHALL BE RAKED UNTIL THE SURFACE IS FINELY PULVERIZED, SMOOTH AND EVEN, AND THEN COMPACTED TO AN EVEN SURFACE CONFORMING TO THE REQUIRED LINES AND GRADES WITH APPROVED ROLLERS WEIGHING BETWEEN 4-1/2 POUNDS AND 5-1/2 POUNDS PER INCH OF WIDTH;
 - d. SEED SHALL BE SOWN AT THE RATE SHOWN BELOW. SOWING SHALL BE DONE ON A CALM, DRY DAY, PREFERABLY BY MACHINE, BUT IF BY HAND, ONLY BY EXPERIENCED WORKMEN. IMMEDIATELY BEFORE SEEDING, THE SOIL SHALL BE LIGHTLY RAKED. ONE HALF THE SEED SHALL BE SOWN IN ONE DIRECTION AND THE OTHER HALF AT RIGHT ANGLES TO THE ORIGINAL DIRECTION. IT SHALL BE LIGHTLY RAKED INTO THE SOIL TO A DEPTH NOT OVER 1/4 INCH AND ROLLED WITH A HAND ROLLER WEIGHING NOT OVER 100 POUNDS PER LINEAR FOOT OF WIDTH;
 - e. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AS INDICATED ABOVE;
 - f. THE SURFACE SHALL BE WATERED AND KEPT MOIST WITH A FINE SPRAY AS REQUIRED, WITHOUT WASHING AWAY THE SOIL, UNTIL THE GRASS IS WELL ESTABLISHED. ANY AREAS WHICH ARE NOT SATISFACTORILY COVERED WITH GRASS SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED;
 - g. THE CONTRACTOR SHALL PROTECT AND MAINTAIN THE SEEDED AREAS UNTIL ACCEPTED;
 - h. A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE APPLIED AT THE INDICATED RATE:

SEED MIX	APPLICATION RATE
CREeping RED FESCUE	20 LBS/ACRE
TALL FESCUE	20 LBS/ACRE
REDTOP	2 LBS/ACRE

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE (1) PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH STATE AND FEDERAL SEED LAWS. SEEDING SHALL BE DONE NO LATER THAN SEPTEMBER 15. IN NO CASE SHALL SEEDING TAKE PLACE OVER SNOW.
 - 3. DORMANT SEEDING (SEPTEMBER 15 TO FIRST SNOWFALL):
 - A. FOLLOW PERMANENT MEASURES SLOPE, LIME, FERTILIZER AND GRADING REQUIREMENTS. APPLY SEED MIXTURE AT TWICE THE INDICATED RATE. APPLY MULCH AS INDICATED FOR PERMANENT MEASURES.

CONCRETE WASHOUT AREA:

- 1. THE FOLLOWING ARE THE ONLY NON-STORMWATER DISCHARGES ALLOWED. ALL OTHER NON-STORMWATER DISCHARGES ARE PROHIBITED ON SITE:
 - A. THE CONCRETE DELIVERY TRUCKS SHALL, WHENEVER POSSIBLE, USE WASHOUT FACILITIES AT THEIR OWN PLANT OR DISPATCH FACILITY;
 - B. IF IT IS NECESSARY, SITE CONTRACTOR SHALL DESIGNATE SPECIFIC WASHOUT AREAS AND DESIGN FACILITIES TO HANDLE ANTICIPATED WASHOUT WATER;
 - C. CONTRACTOR SHALL LOCATE WASHOUT AREAS AT LEAST 150 FEET AWAY FROM STORM DRAINS, SWALES AND SURFACE WATERS OR DELINEATED WETLANDS;
 - D. INSPECT WASHOUT FACILITIES DAILY TO DETECT LEAKS OR TEARS AND TO IDENTIFY WHEN MATERIALS NEED TO BE REMOVED.

ALLOWABLE NON-STORMWATER DISCHARGES:

- 1. FIRE-FIGHTING ACTIVITIES;
- 2. FIRE HYDRANT FLUSHING;
- 3. WATERS USED TO WASH VEHICLES WHERE DETERGENTS ARE NOT USED;
- 4. WATER USED TO CONTROL DUST;
- 5. POTABLE WATER INCLUDING UNCONTAMINATED WATER LINE FLUSHING;
- 6. ROUTINE EXTERNAL BUILDING WASH DOWN WHERE DETERGENTS ARE NOT USED;
- 7. PAVEMENT WASH WATERS WHERE DETERGENTS ARE NOT USED;
- 8. UNCONTAMINATED AIR CONDITIONING/COMPRESSOR CONDENSATION;
- 9. UNCONTAMINATED GROUND WATER OR SPRING WATER;
- 10. FOUNDATION OR FOOTING DRAINS WHICH ARE UNCONTAMINATED;

- 11. UNCONTAMINATED EXCAVATION DEWATERING;
- 12. LANDSCAPE IRRIGATION.

WASTE DISPOSAL:

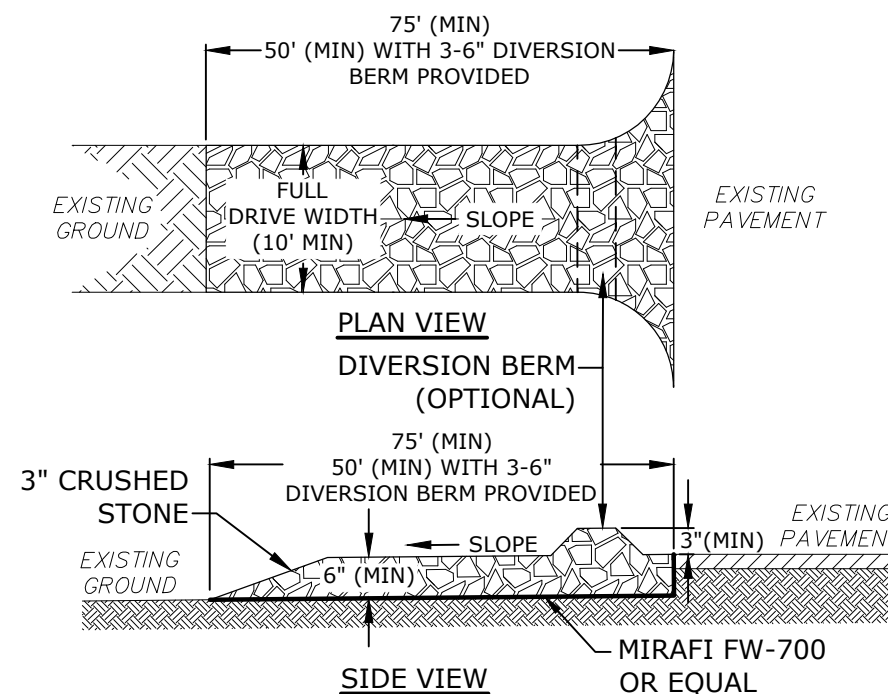
- 1. WASTE MATERIAL:
 - A. ALL WASTE MATERIALS SHALL BE COLLECTED AND STORED IN SECURELY LIDDED RECEPTACLES. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE SHALL BE DEPOSITED IN A DUMPSTER;
 - B. NO CONSTRUCTION WASTE MATERIALS SHALL BE BURIED ON SITE;
 - C. ALL PERSONNEL SHALL BE INSTRUCTED REGARDING THE CORRECT PROCEDURE FOR WASTE DISPOSAL BY THE SUPERINTENDENT.
- 2. HAZARDOUS WASTE:
 - A. ALL HAZARDOUS WASTE MATERIALS SHALL BE DISPOSED OF IN THE MANNER SPECIFIED BY LOCAL OR STATE REGULATION OR BY THE MANUFACTURER;
 - B. SITE PERSONNEL SHALL BE INSTRUCTED IN THESE PRACTICES BY THE SUPERINTENDENT.
- 3. SANITARY WASTE:
 - A. ALL SANITARY WASTE SHALL BE COLLECTED FROM THE PORTABLE UNITS A MINIMUM OF ONCE PER WEEK BY A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR.

SPILL PREVENTION:

- 1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
- 2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK OF SPILLS OR OTHER ACCIDENTAL EXPOSURE OF MATERIALS AND SUBSTANCES DURING CONSTRUCTION TO STORMWATER RUNOFF:
 - A. GOOD HOUSEKEEPING - THE FOLLOWING GOOD HOUSEKEEPING PRACTICE SHALL BE FOLLOWED ON SITE DURING CONSTRUCTION:
 - a. ONLY SUFFICIENT AMOUNTS OF PRODUCTS TO DO THE JOB SHALL BE STORED ON SITE;
 - b. ALL MATERIALS STORED ON SITE SHALL BE STORED IN A NEAT, ORDERLY MANNER IN THEIR PROPER (ORIGINAL IF POSSIBLE) CONTAINERS AND, IF POSSIBLE, UNDER A ROOF OR OTHER ENCLOSURE;
 - c. MANUFACTURER'S RECOMMENDATIONS FOR PROPER USE AND DISPOSAL SHALL BE FOLLOWED;
 - d. THE SITE SUPERINTENDENT SHALL INSPECT DAILY TO ENSURE PROPER USE AND DISPOSAL OF MATERIALS;
 - e. SUBSTANCES SHALL NOT BE MIXED WITH ONE ANOTHER UNLESS RECOMMENDED BY THE MANUFACTURER;
 - f. WHENEVER POSSIBLE ALL OF A PRODUCT SHALL BE USED UP BEFORE DISPOSING OF THE CONTAINER.
 - B. HAZARDOUS PRODUCTS - THE FOLLOWING PRACTICES SHALL BE USED TO REDUCE THE RISKS ASSOCIATED WITH HAZARDOUS MATERIALS:
 - g. PRODUCTS SHALL BE KEPT IN THEIR ORIGINAL CONTAINERS UNLESS THEY ARE NOT RESEALABLE;
 - h. ORIGINAL LABELS AND MATERIAL SAFETY DATA SHALL BE RETAINED FOR IMPORTANT PRODUCT INFORMATION;
 - i. SURPLUS PRODUCT THAT MUST BE DISPOSED OF SHALL BE DISCARDED ACCORDING TO THE MANUFACTURER'S RECOMMENDED METHODS OF DISPOSAL.
 - C. PRODUCT SPECIFIC PRACTICES - THE FOLLOWING PRODUCT SPECIFIC PRACTICES SHALL BE FOLLOWED ON SITE:
 - a. PETROLEUM PRODUCTS:
 - ALL ON SITE VEHICLES SHALL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE LEAKAGE;
 - PETROLEUM PRODUCTS SHALL BE STORED IN TIGHTLY SEALED CONTAINERS WHICH ARE CLEARLY LABELED. ANY ASPHALT BASED SUBSTANCES USED ON SITE SHALL BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS.
 - b. FERTILIZERS:
 - FERTILIZERS USED SHALL BE APPLIED ONLY IN THE MINIMUM AMOUNTS DIRECTED BY THE SPECIFICATIONS;
 - ONCE APPLIED FERTILIZER SHALL BE WORKED INTO THE SOIL TO LIMIT EXPOSURE TO STORMWATER;
 - STORAGE SHALL BE IN A COVERED SHED OR ENCLOSED TRAILERS. THE CONTENTS OF ANY PARTIALLY USED BAGS OF FERTILIZER SHALL BE TRANSFERRED TO A SEALABLE PLASTIC BIN TO AVOID SPILLS.
 - c. PAINTS:
 - ALL CONTAINERS SHALL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE;
 - EXCESS PAINT SHALL NOT BE DISCHARGED TO THE STORM SEWER SYSTEM;
 - EXCESS PAINT SHALL BE DISPOSED OF PROPERLY ACCORDING TO MANUFACTURER'S INSTRUCTIONS OR STATE AND LOCAL REGULATIONS.
 - D. SPILL CONTROL PRACTICES - IN ADDITION TO GOOD HOUSEKEEPING AND MATERIAL MANAGEMENT PRACTICES DISCUSSED IN THE PREVIOUS SECTION, THE FOLLOWING PRACTICES SHALL BE FOLLOWED FOR SPILL PREVENTION AND CLEANUP:
 - a. MANUFACTURER'S RECOMMENDED METHODS FOR SPILL CLEANUP SHALL BE CLEARLY POSTED AND SITE PERSONNEL SHALL BE MADE AWARE OF THE PROCEDURES AND THE LOCATION OF THE INFORMATION AND CLEANUP SUPPLIES;
 - b. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEANUP SHALL BE KEPT IN THE MATERIAL STORAGE AREA ON SITE. EQUIPMENT AND MATERIALS SHALL INCLUDE BUT NOT BE LIMITED TO BROOMS, DUSTPANS, MOPS, RAGS, GLOVES, GOGGLES, KITTY LITTER, SAND, SAWDUST AND PLASTIC OR METAL TRASH CONTAINERS SPECIFICALLY FOR THIS PURPOSE;
 - c. ALL SPILLS SHALL BE CLEANED UP IMMEDIATELY AFTER DISCOVERY;
 - d. THE SPILL AREA SHALL BE KEPT WELL VENTILATED AND PERSONNEL SHALL WEAR APPROPRIATE PROTECTIVE CLOTHING TO PREVENT INJURY FROM CONTACT WITH A HAZARDOUS SUBSTANCE;
 - e. SPILLS OF TOXIC OR HAZARDOUS MATERIAL SHALL BE REPORTED TO THE APPROPRIATE LOCAL, STATE OR FEDERAL AGENCIES AS REQUIRED;
 - f. THE SITE SUPERINTENDENT RESPONSIBLE FOR DAY-TO-DAY SITE OPERATIONS SHALL BE THE SPILL PREVENTION AND CLEANUP COORDINATOR.
 - E. VEHICLE FUELING AND MAINTENANCE PRACTICE:
 - a. CONTRACTOR SHALL MAKE AN EFFORT TO PERFORM EQUIPMENT/VEHICAL FUELING AND MAINTENANCE AT AN OFF-SITE FACILITY;
 - b. CONTRACTOR SHALL PROVIDE AN ON-SITE FUELING AND MAINTENANCE AREA THAT IS CLEAN AND DRY;
 - c. IF POSSIBLE THE CONTRACTOR SHALL KEEP AREA COVERED;
 - d. CONTRACTOR SHALL KEEP A SPILL KIT AT THE FUELING AND MAINTENANCE AREA;
 - e. CONTRACTOR SHALL REGULARLY INSPECT VEHICLES FOR LEAKS AND DAMAGE;
 - f. CONTRACTOR SHALL USE DRIP PANS, DRIP CLOTHS, OR ABSORBENT PADS WHEN REPLACING SPENT FLUID.

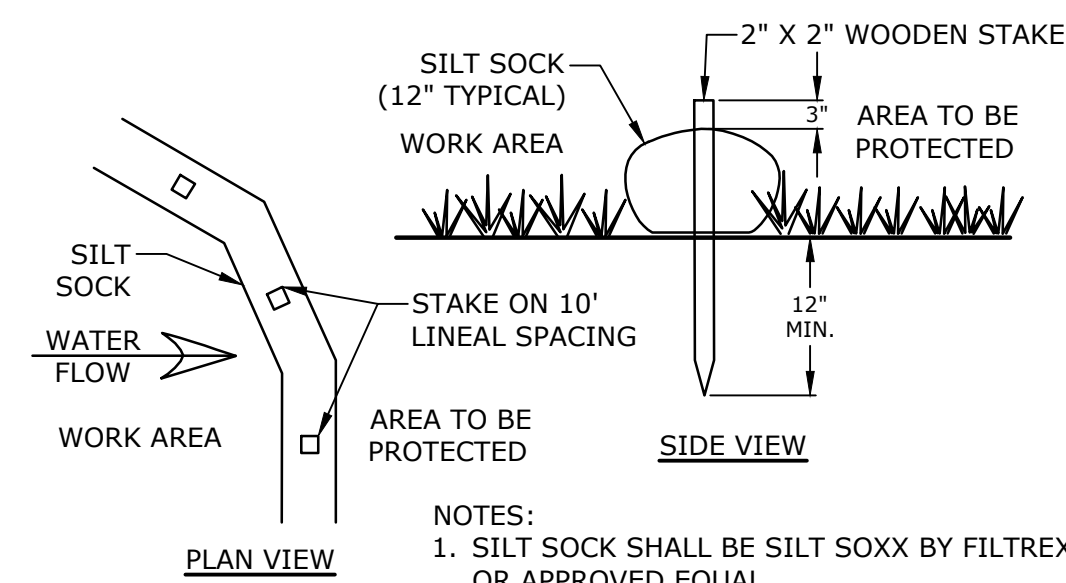
EROSION CONTROL OBSERVATIONS AND MAINTENANCE PRACTICES

- THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:
 - 1. OBSERVATIONS OF THE PROJECT SHALL BE MADE BY THE CONTRACTOR AT LEAST ONCE A WEEK OR WITHIN 24 HOURS OF A STORM 0.25 INCHES OR GREATER;
 - 2. AN OBSERVATION REPORT SHALL BE MADE AFTER EACH OBSERVATION AND DISTRIBUTED TO THE ENGINEER, THE OWNER, AND THE CONTRACTOR;
 - 3. A REPRESENTATIVE OF THE SITE CONTRACTOR, SHALL BE RESPONSIBLE FOR MAINTENANCE AND REPAIR ACTIVITIES;
 - 4. IF A REPAIR IS NECESSARY, IT SHALL BE INITIATED WITHIN 24 HOURS OF REPORT.

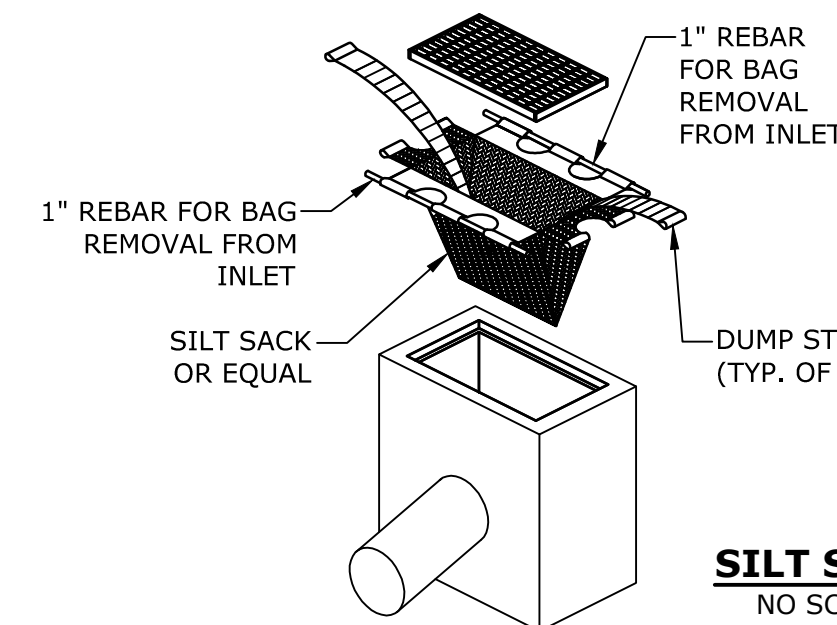


NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

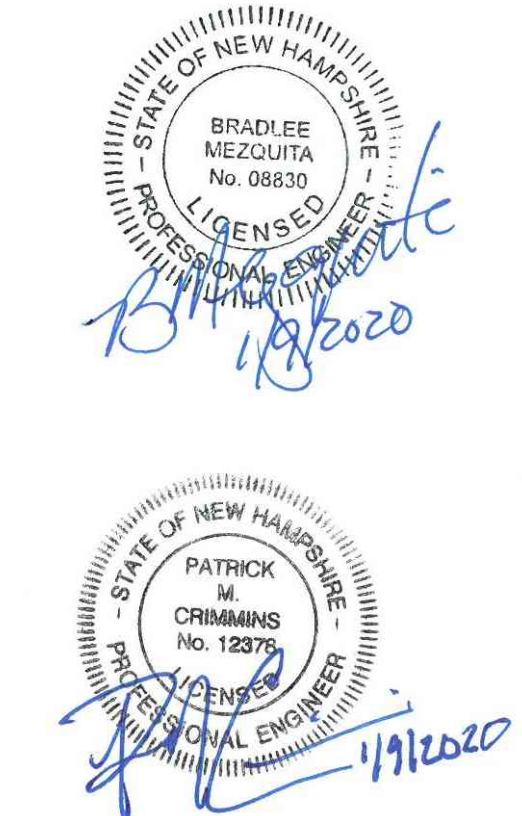
STABILIZED CONSTRUCTION ENTRANCE
NO SCALE



SILT SOCK
NO SCALE



SILT SACK
NO SCALE



Parking Expansion

Lonza Biologics

Portsmouth, NH

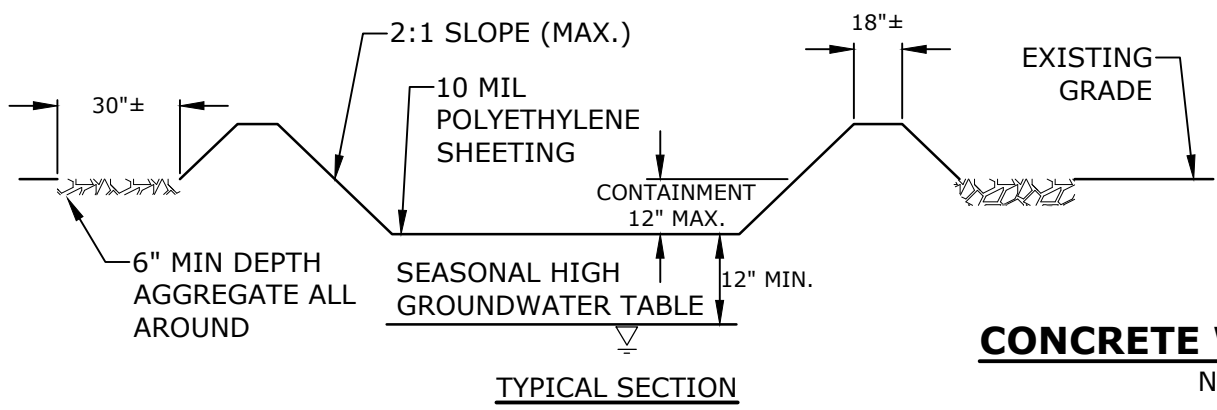
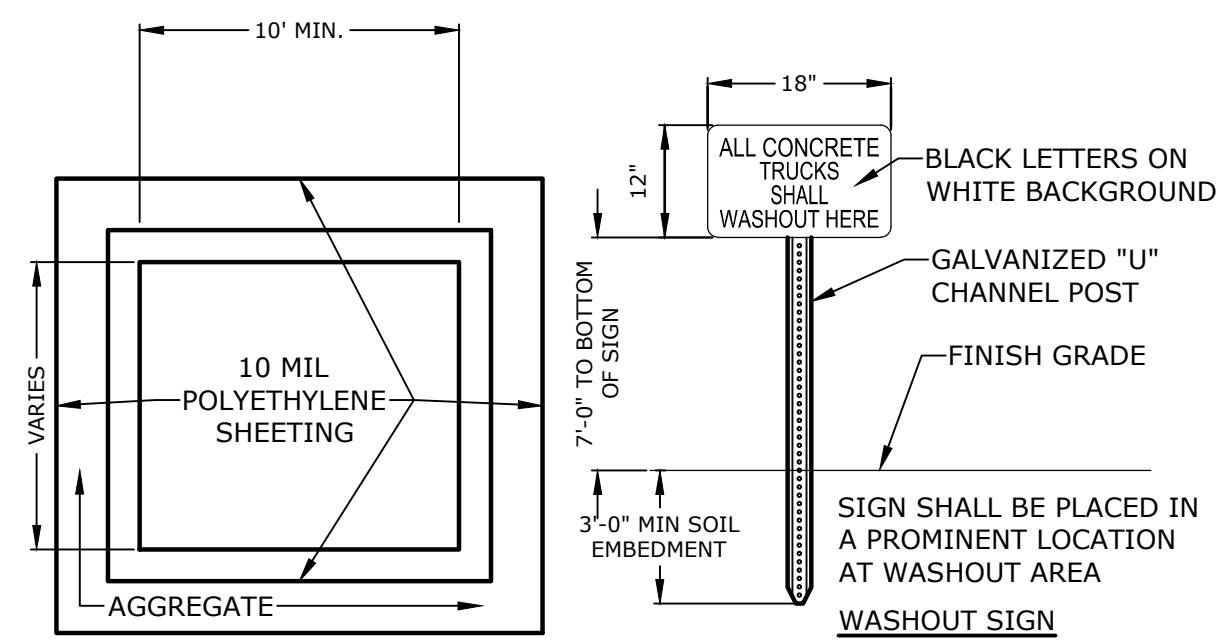
MARK	DATE	DESCRIPTION
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DRAWN BY:	BKC
CHECKED:	NAH/PMC
APPROVED:	BLM

EROSION CONTROL NOTES & DETAILS SHEET

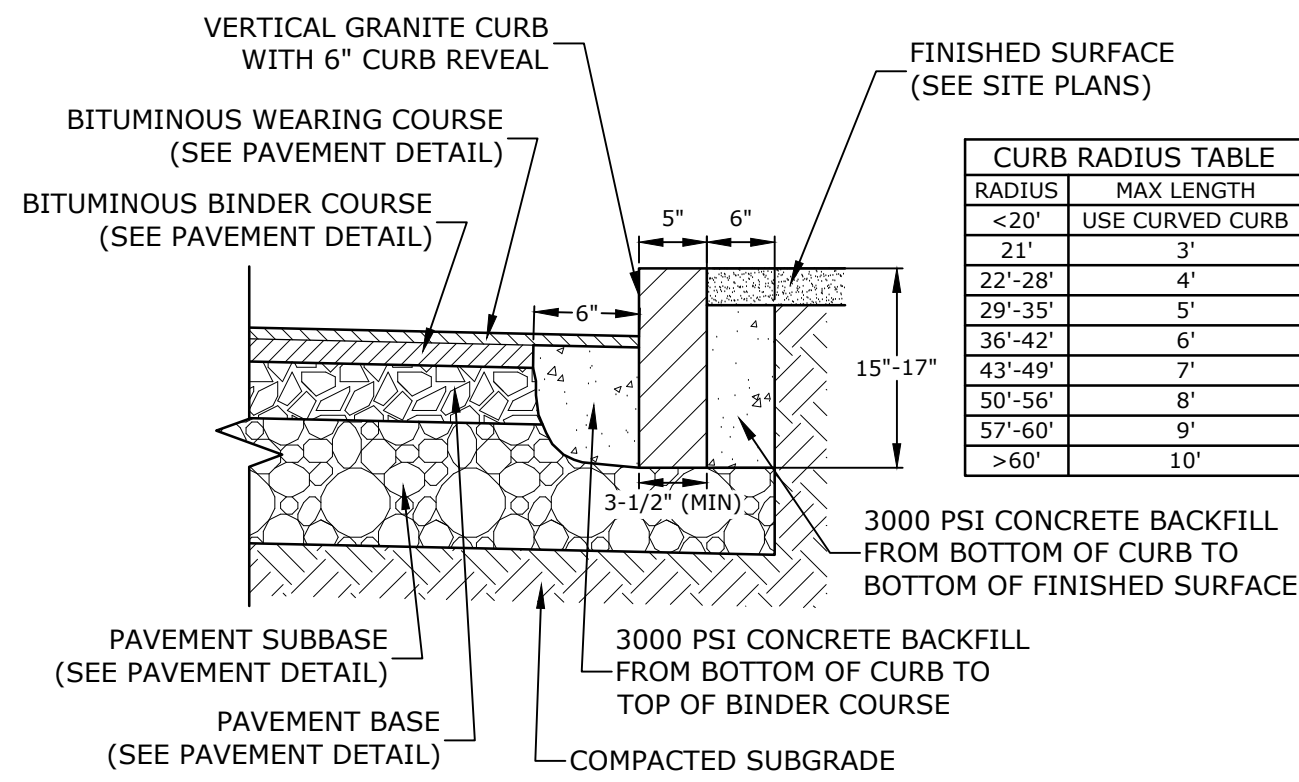
SCALE: AS SHOWN

C-501



- NOTES:**
1. CONTAINMENT MUST BE STRUCTURALLY SOUND AND LEAK FREE AND CONTAIN ALL LIQUID WASTES.
 2. CONTAINMENT DEVICES MUST BE OF SUFFICIENT QUANTITY OR VOLUME TO COMPLETELY CONTAIN THE LIQUID WASTES GENERATED.
 3. WASHOUT MUST BE CLEANED OR NEW FACILITIES CONSTRUCTED AND READY TO USE ONCE WASHOUT IS 75% FULL.
 4. WASHOUT AREA(S) SHALL BE INSTALLED IN A LOCATION EASILY ACCESSIBLE BY CONCRETE TRUCKS.
 5. ONE OR MORE AREAS MAY BE INSTALLED ON THE CONSTRUCTION SITE AND MAY BE RELOCATED AS CONSTRUCTION PROGRESSES.
 6. AT LEAST WEEKLY REMOVE ACCUMULATION OF SAND AND AGGREGATE AND DISPOSE OF PROPERLY.

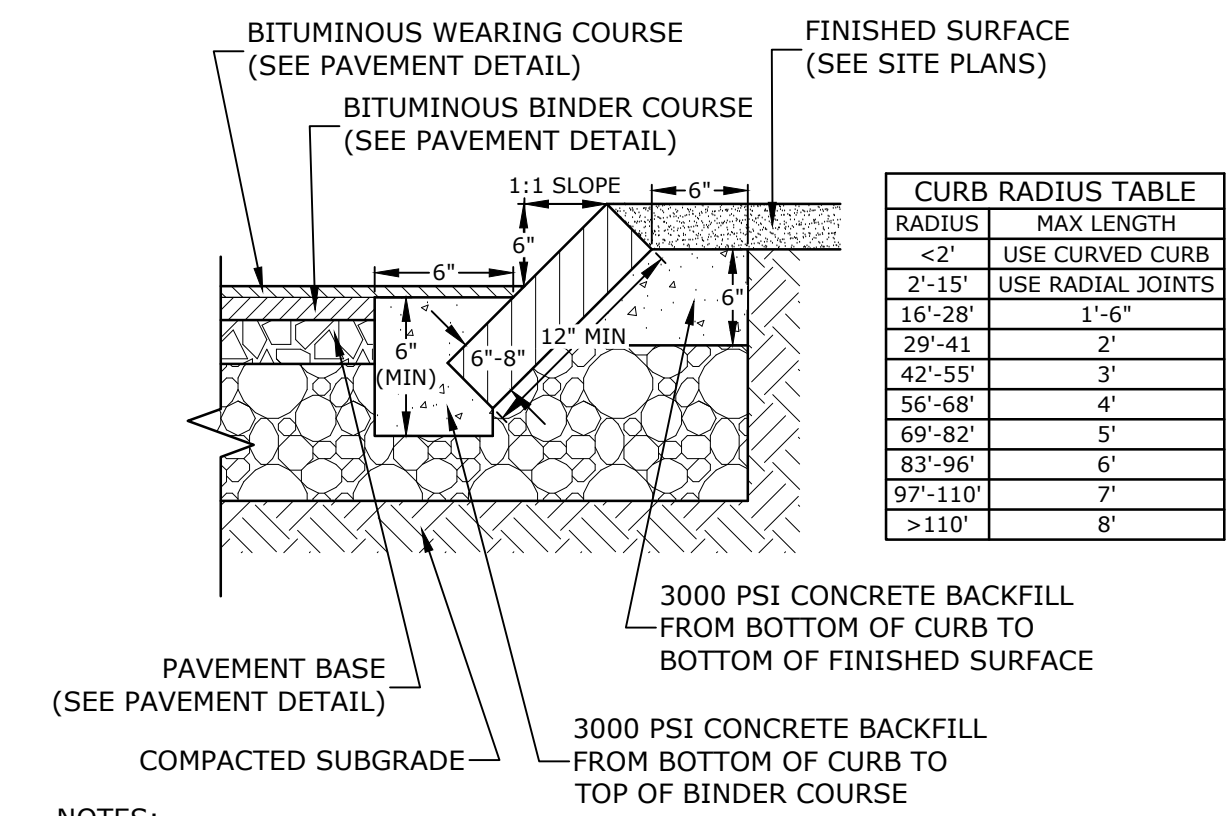
CONCRETE WASHOUT AREA
NO SCALE



RADIUS	MAX LENGTH
<20'	USE CURVED CURB
21'	3'
22'-28'	4'
29'-35'	5'
36'-42'	6'
43'-49'	7'
50'-56'	8'
57'-60'	9'
>60'	10'

- NOTES:**
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
 2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
 3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
 4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
 5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
 6. ALL RADII 20 FEET AND SMALLER SHALL BE CONSTRUCTED USING CURVED SECTIONS.
 7. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

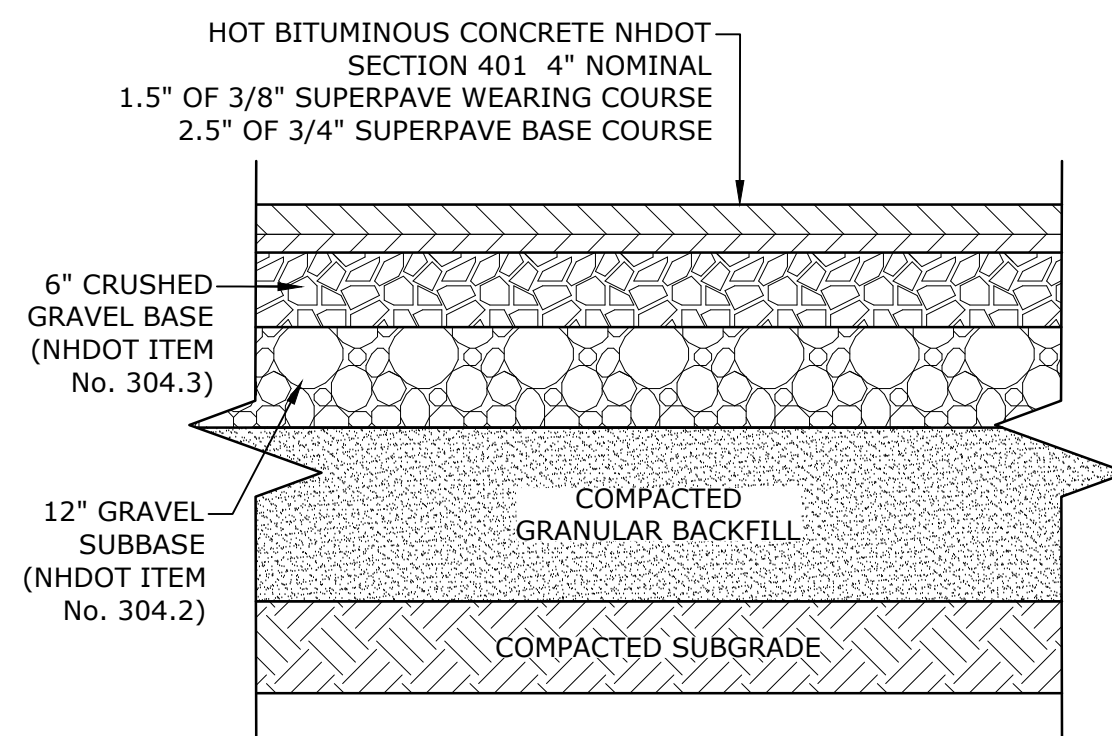
VERTICAL GRANITE CURB
NO SCALE



RADIUS	MAX LENGTH
<2'	USE CURVED CURB
2'-15'	USE RADIAL JOINTS
16'-28'	1'-6"
29'-41'	2'
42'-55'	3'
56'-68'	4'
69'-82'	5'
83'-96'	6'
97'-110'	7'
>110'	8'

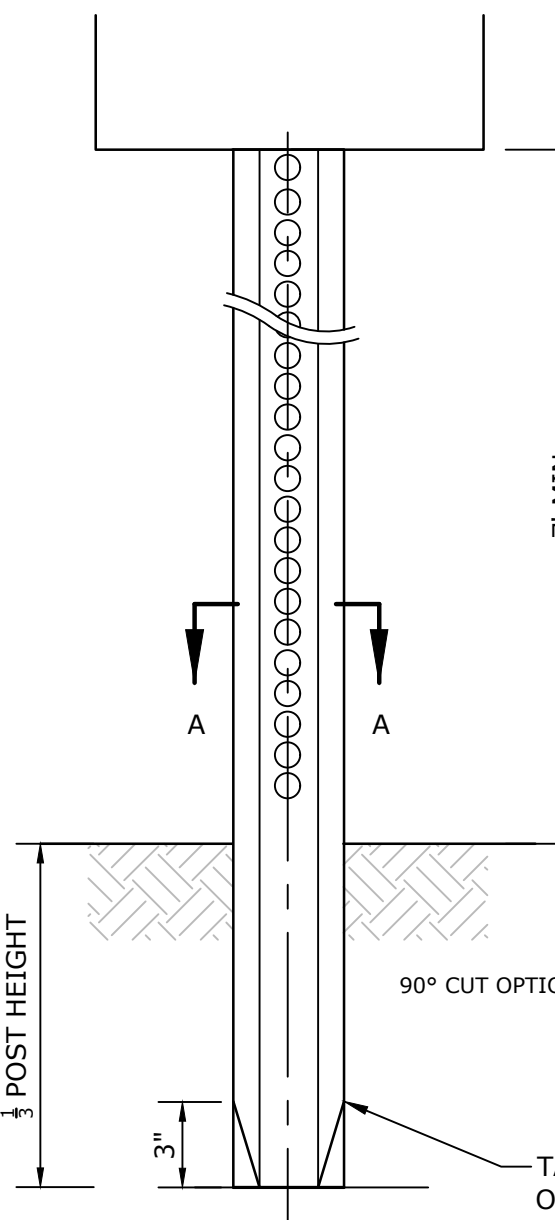
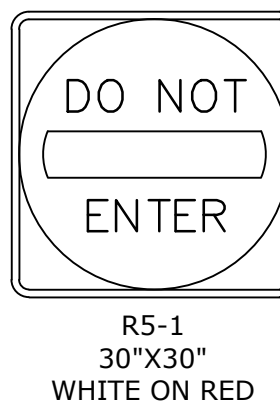
- NOTES:**
1. SEE SITE PLAN(S) FOR LIMITS OF SLOPED GRANITE CURB (SGC).
 2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
 3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 18"
 4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 8"
 5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE TABLE).
 6. JOINTS BETWEEN STONES SHALL HAVE A MAXIMUM SPACING OF 1/2" AND SHALL BE MORTARED.

SLOPED GRANITE CURB
NO SCALE



- NOTES:**
1. SEE SITE PLAN FOR PAVEMENT WIDTH AND LOCATION.
 2. SEE GRADING, DRAINAGE AND EROSION CONTROL PLAN FOR PAVEMENT SLOPE AND CROSS-SLOPE.
 3. A TACK COAT SHALL BE PLACED ON TOP OF BINDER COURSE PAVEMENT PRIOR TO PLACING WEARING COURSE.

STANDARD DUTY PAVEMENT SECTION
NO SCALE



WT.	A	B	C
3 LBS	1 3/8" OR 1 1/2"	1 3/8" OR 1 1/2"	3 1/2"
4 LBS	1 5/8"	1 3/4"	3 1/2"

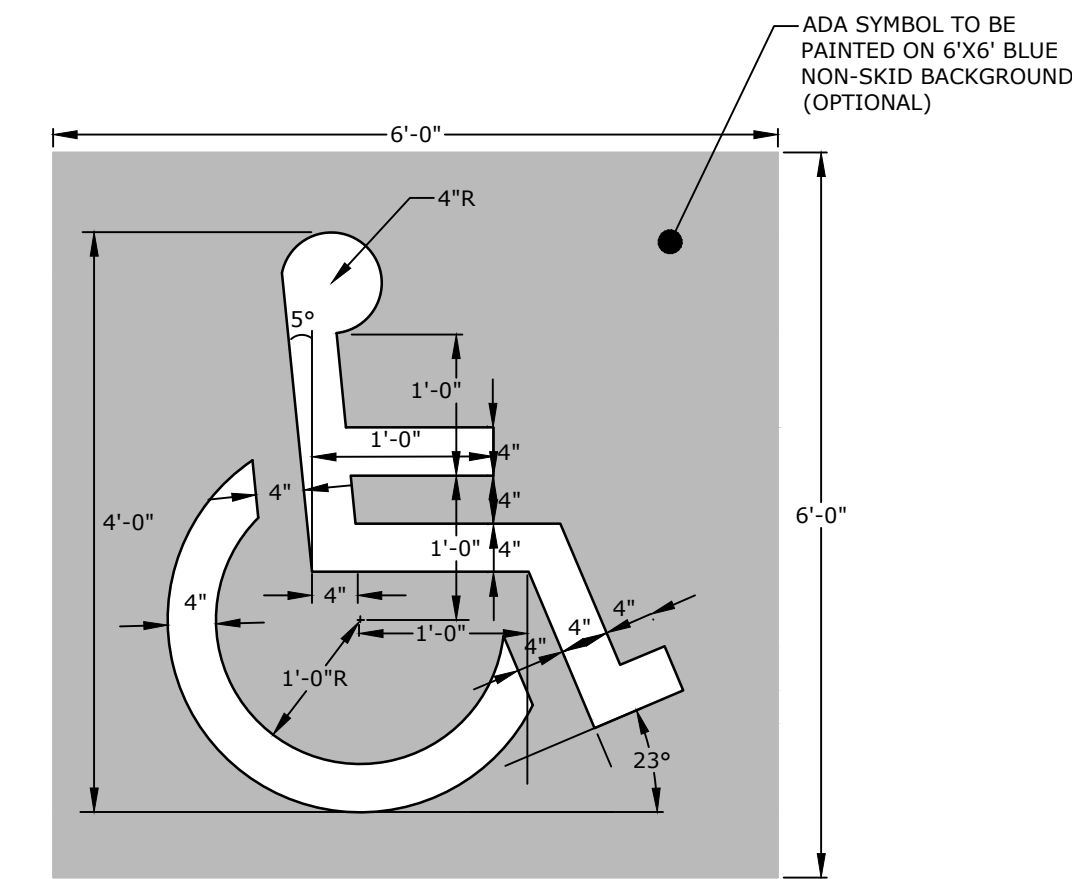
SIGN POST TO COMPLY WITH ALL ASPECTS OF NHDOT SECTION 615.

LENGTH: AS REQUIRED
WEIGHT PER LINEAR FOOT: 2.50 LBS (MIN.)
HOLES: 3/8" DIAMETER, 1" C-C FULL LENGTH
STEEL: SHALL CONFORM TO ASTM A-499 (GRADE 60) OR ASTM A-576 (GRADE 1070 - 1080)
FINISH: SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111.

- NOTES:**
1. STEEL FOR POSTS SHALL CONFORM TO THE MECHANICAL REQUIREMENTS OF ASTM A 499-81 GRADE 60 AND TO THE CHEMICAL REQUIREMENTS OF ASTM A1-76 CARBON STEEL TEE RAIL HAVING NOMINAL WEIGHT OF 91 LBS. OR GREATER PER LINEAR YARD.
 2. AFTER FABRICATION, ALL STEEL POSTS SHALL BE GALVANIZED TO MEET THE REQUIREMENTS OF ASTM A 123.
 3. ALL SIGN POSTS SHALL HAVE "BREAKAWAY" FEATURES THAT MEET AASHTO REQUIREMENTS CONTAINED IN "STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS-1985." THE "BREAKAWAY" FEATURES SHALL BE STRUCTURALLY ADEQUATE TO CARRY THE SIGNS SHOWN IN THE PLANS AT 60 MPH WIND LOADINGS. INSTALLATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
 4. TYPE A POSTS - 3 LB/FT TYPE B POSTS - 4 LB/FT.
 5. ALL SIGNS TO BE CONSTRUCTED PER THE LATEST EDITION OF THE FHWA STANDARD HIGHWAY SIGNS MANUAL AND INSTALLED AS INDICATED IN THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION.
 6. MEET REQUIREMENTS OF SECTION 615 SIGNS OF NHDOT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, 2010 EDITION, AS AMENDED.

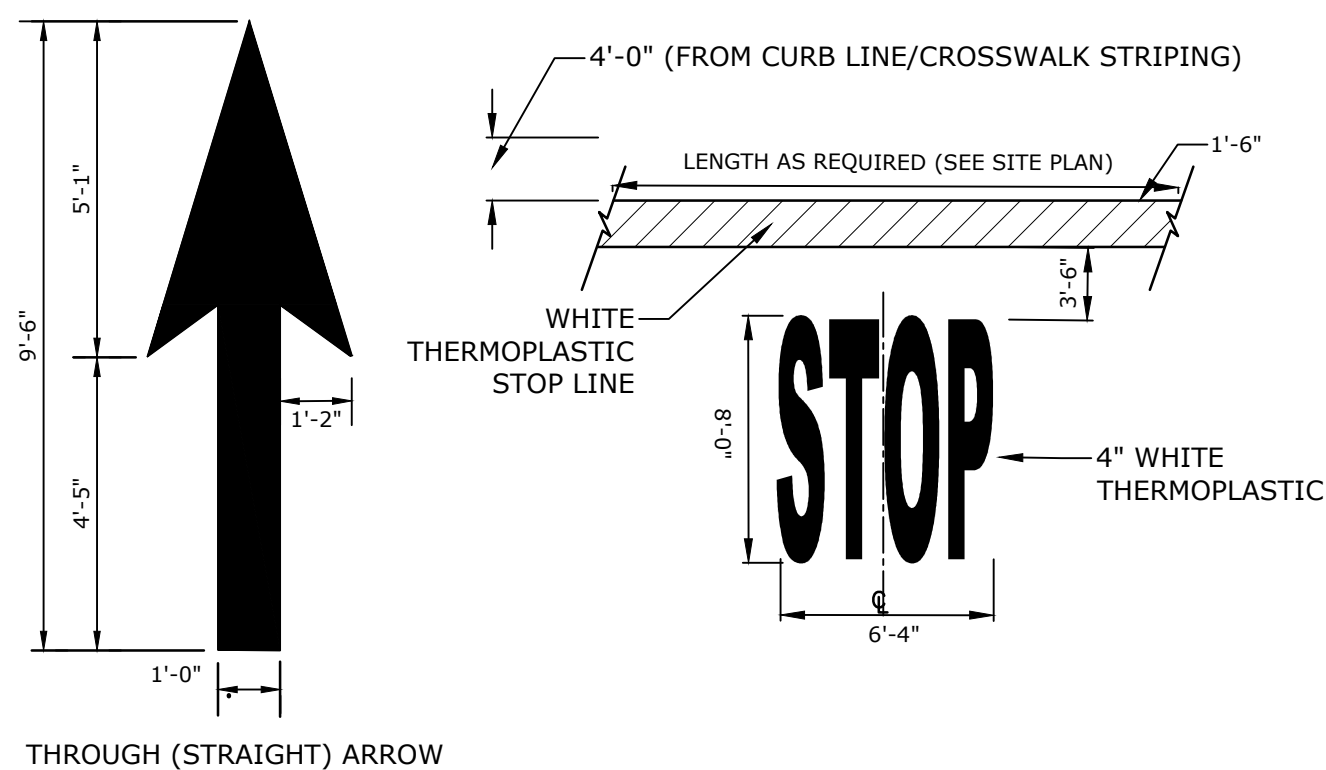
* IN LEDGE DRILL & GROUT TO A MIN OF 2'

SIGN POST
NO SCALE



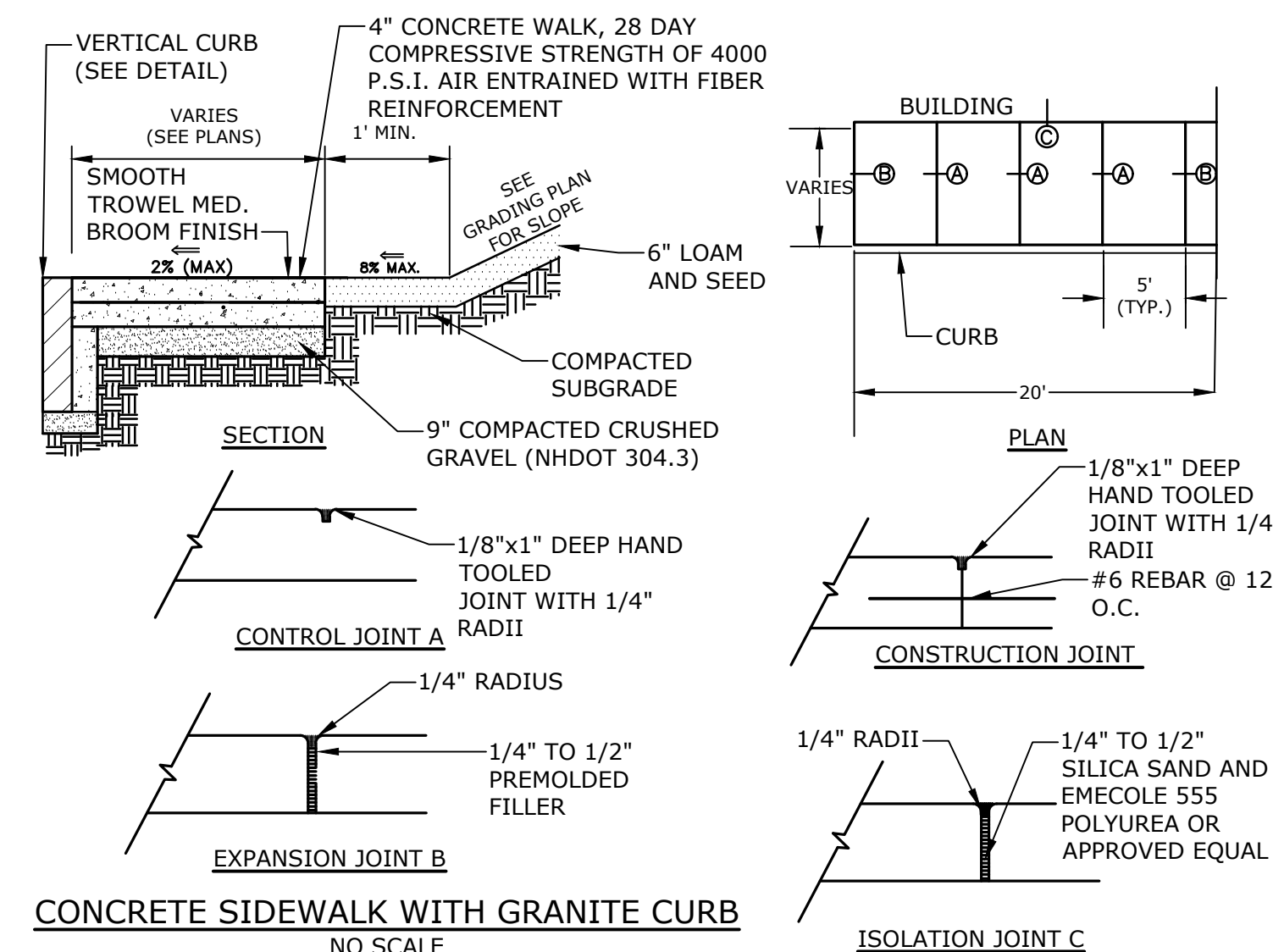
- NOTES:**
1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING FAST DRYING TRAFFIC PAINT, MEETING THE REQUIREMENTS OF AASHTO M248-TYPE F. PAINT SHALL BE APPLIED AS SPECIFIED BY MANUFACTURER.
 - OR
 1. SYMBOL SHALL BE CONSTRUCTED IN ALL ACCESSIBLE SPACES USING WHITE THERMOPLASTIC, REFLECTORIZED PAVEMENT PARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505.
 2. SYMBOL SHALL BE CONSTRUCTED TO THE LATEST ADA, STATE AND LOCAL REQUIREMENTS.

ACCESSIBLE SYMBOL
NO SCALE



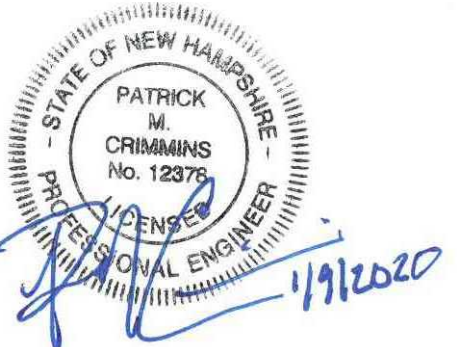
- NOTE:**
1. PAVEMENT MARKINGS TO BE INSTALLED IN LOCATIONS AS SHOWN ON SITE PLAN.
 2. STRIPING SHALL BE CONSTRUCTED USING WHITE THERMO PLASTIC, REFLECTORIZED PAVEMENT MARKING MATERIAL MEETING THE REQUIREMENTS OF ASTM D 4505

STOP BAR AND LEGEND
NO SCALE



CONCRETE SIDEWALK WITH GRANITE CURB
NO SCALE

ISOLATION JOINT C



Parking Expansion

Lonza Biologics

Portsmouth, NH

MARK	DATE	DESCRIPTION
B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission

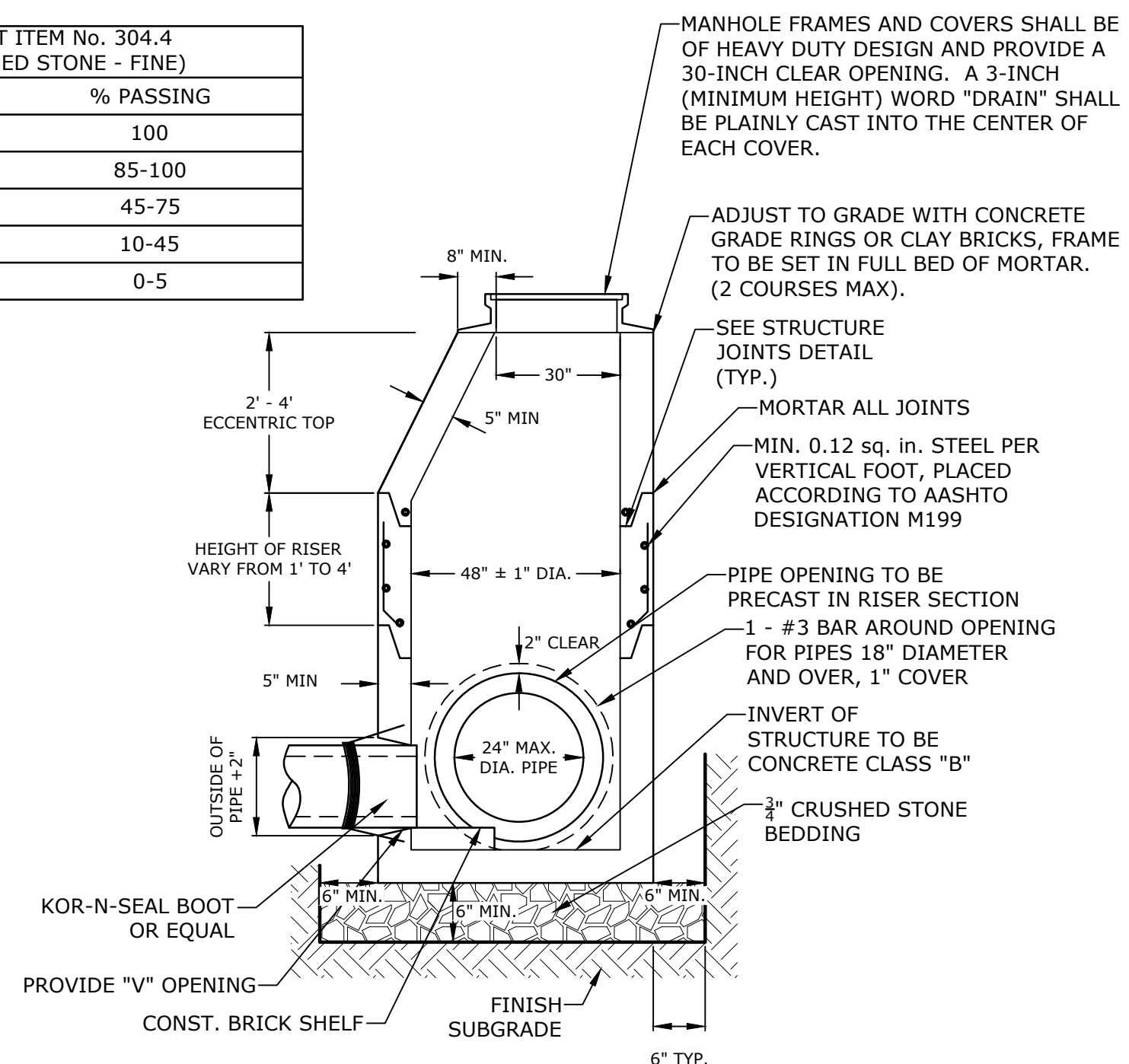
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DRAWN BY: BKC
CHECKED: NAH/PMC
APPROVED: BLM

DETAILS SHEET

SCALE: AS SHOWN

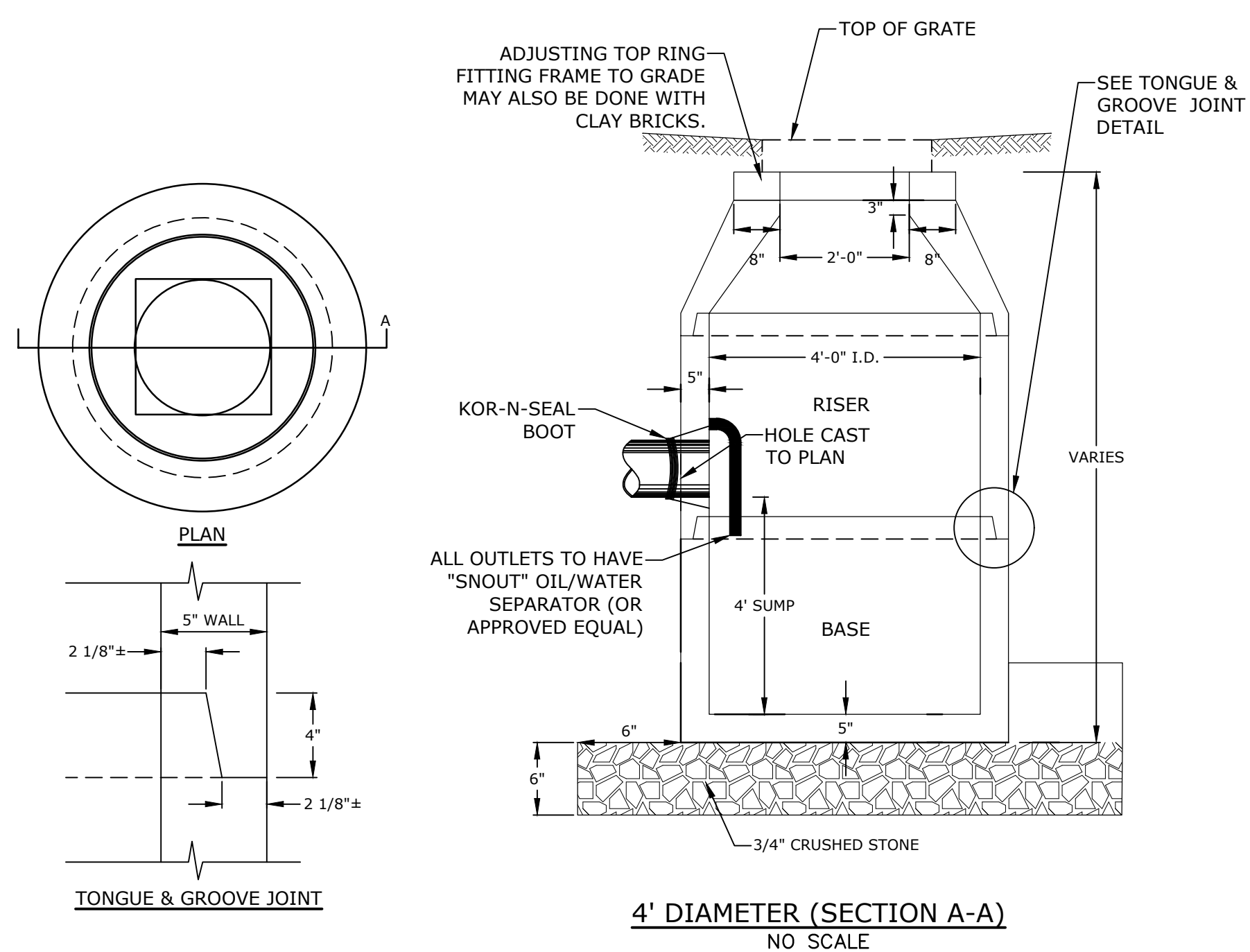
C-502

NHDOT ITEM No. 304.4 (CRUSHED STONE - FINE)	
STIEVE SIZE	% PASSING
2"	100
1-1/2"	85-100
3/4"	45-75
#4	10-45
#200	0-5



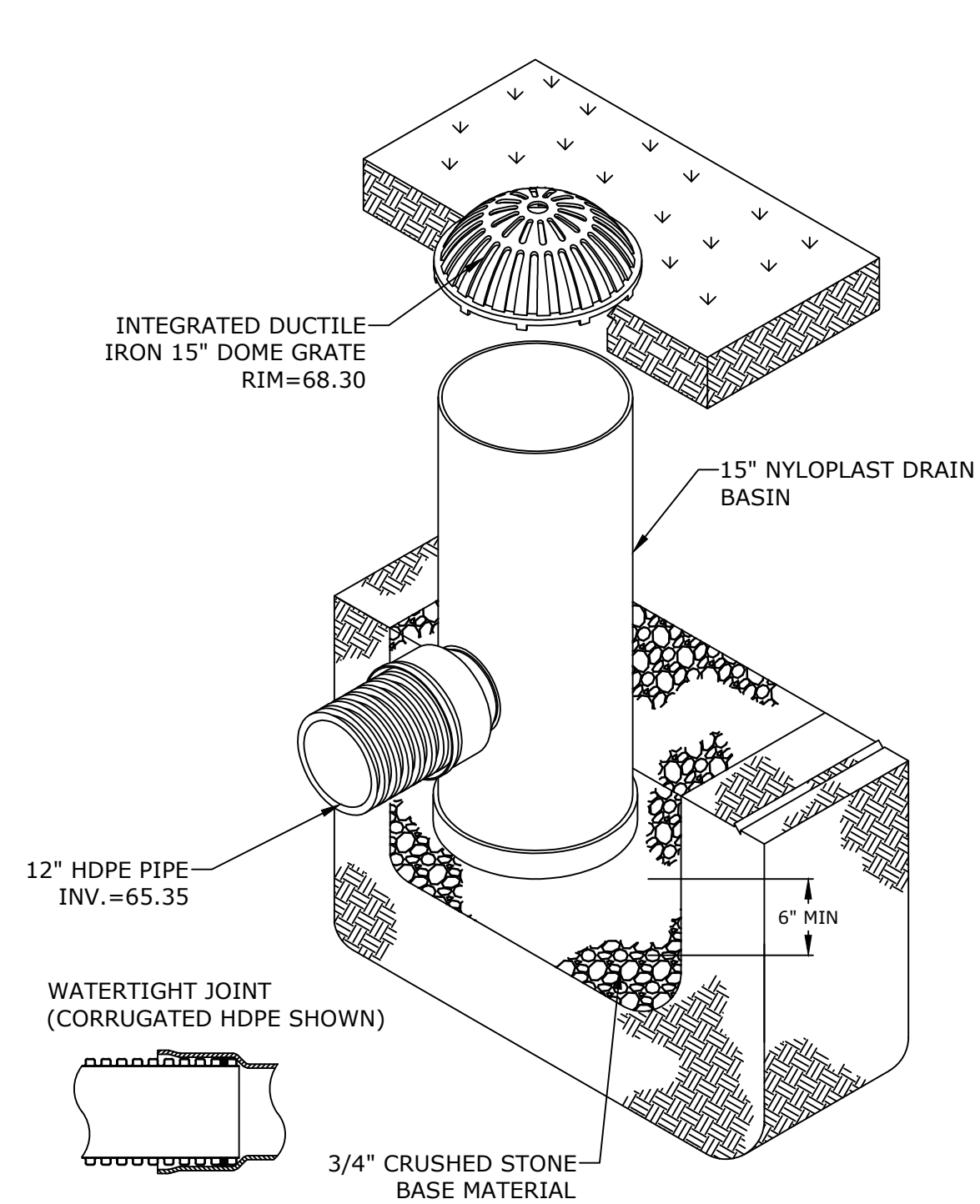
- NOTES:
- ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
 - CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF THE WALL.
 - THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
 - THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
 - CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
 - THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
 - PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
 - OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
 - PRECAST SECTIONS SHALL HAVE A TONGUE AND GROOVE JOINT 4" HIGH AT AN 11° ANGLE CENTERED IN THE WIDTH OF THE WALL AND SHALL BE ASSEMBLED USING AN APPROVED FLEXIBLE SEALANT IN JOINTS.
 - ALL STRUCTURES WITH MULTIPLE PIPES SHALL HAVE A MINIMUM OF 12" OF INSIDE SURFACE BETWEEN HOLES, NO MORE THAN 75% OF A HORIZONTAL CROSS SECTION SHALL BE HOLES, AND THERE SHALL BE NO HOLES CLOSER THAN 3" TO JOINTS.

4' DIAMETER DRAIN MANHOLE
NO SCALE



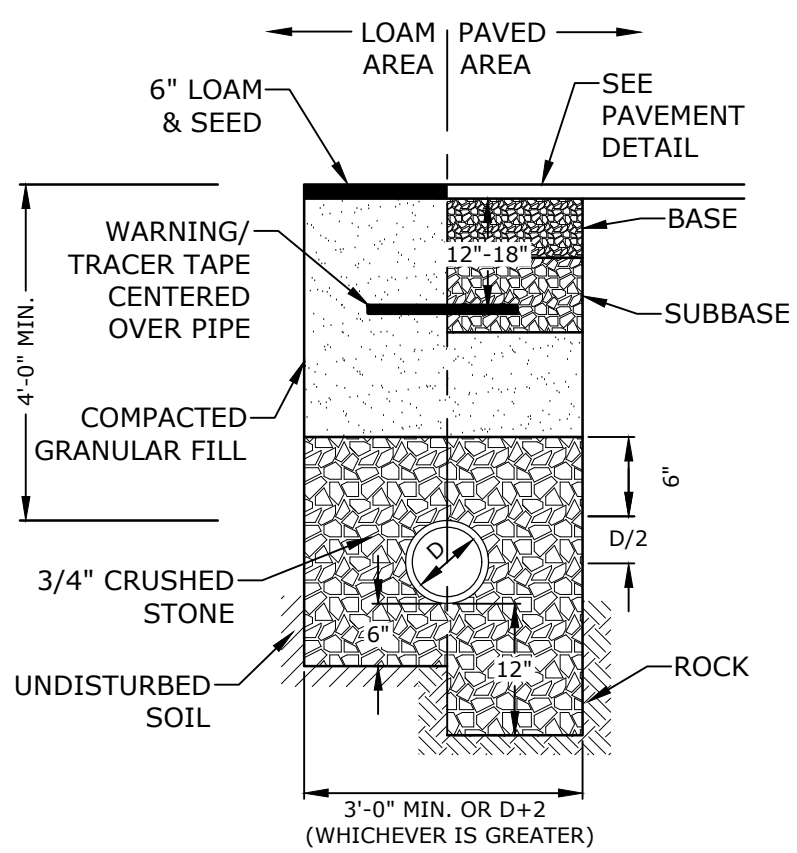
- NOTES:
- ALL SECTIONS SHALL BE CONCRETE CLASS AA(4000 psi).
 - CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ.IN. PER LINEAR FT. IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER THIRD OF WALL.
 - THE TONGUE AND GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
 - RISERS OF 1', 2', 3', & 4' CAN BE USED TO REACH DESIRED DEPTH.
 - THE STRUCTURES SHALL BE DESIGN FOR H20 LOADING.
 - THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.

DEEP SUMP CATCHBASIN WITH OIL SEPARATOR
NO SCALE



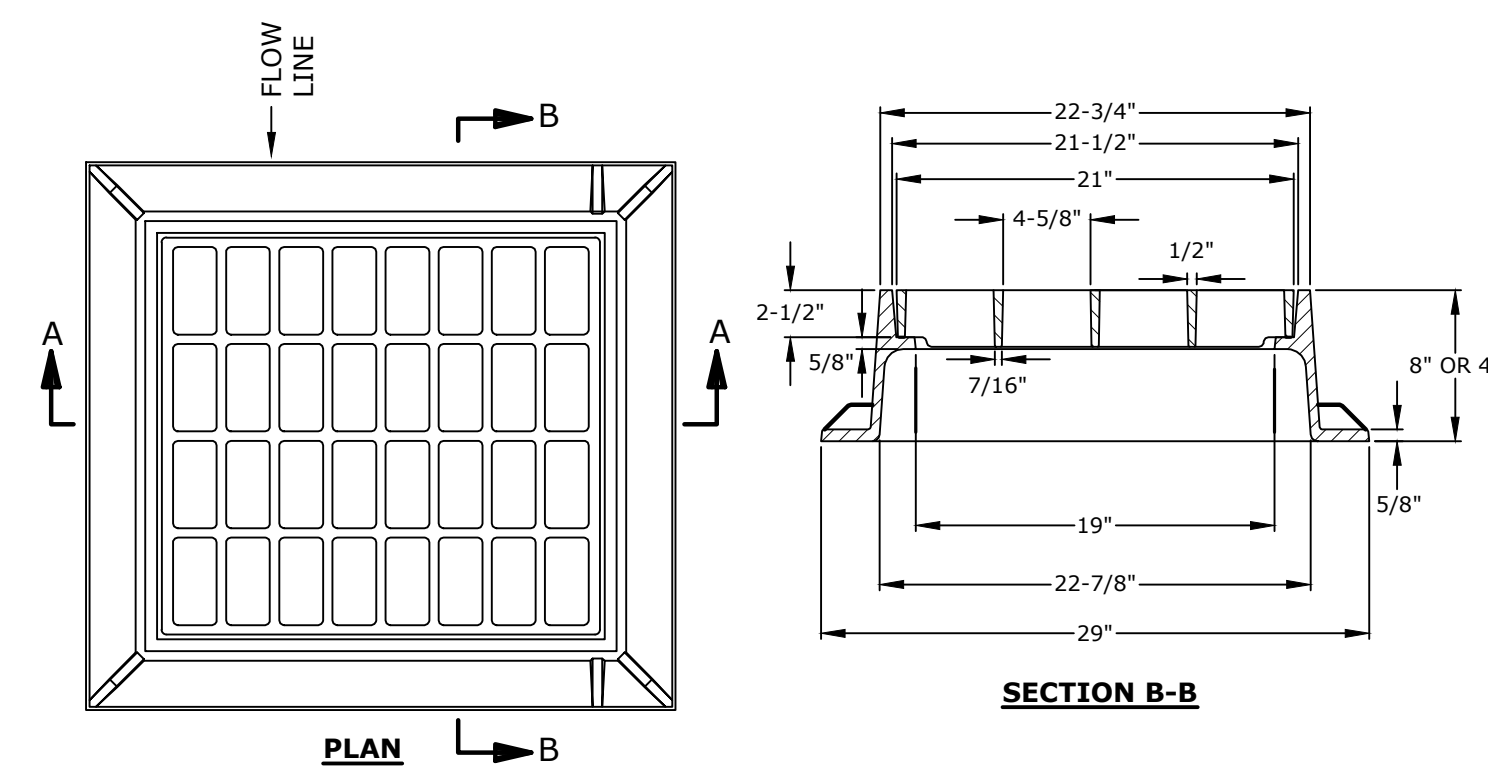
- NOTES:
- GRATES/SOLID COVER SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.
 - FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05
 - SEE GRADING, DRAINAGE, AND EROSION CONTROL PLAN FOR LOCATIONS.

YARD DRAIN #1
NO SCALE



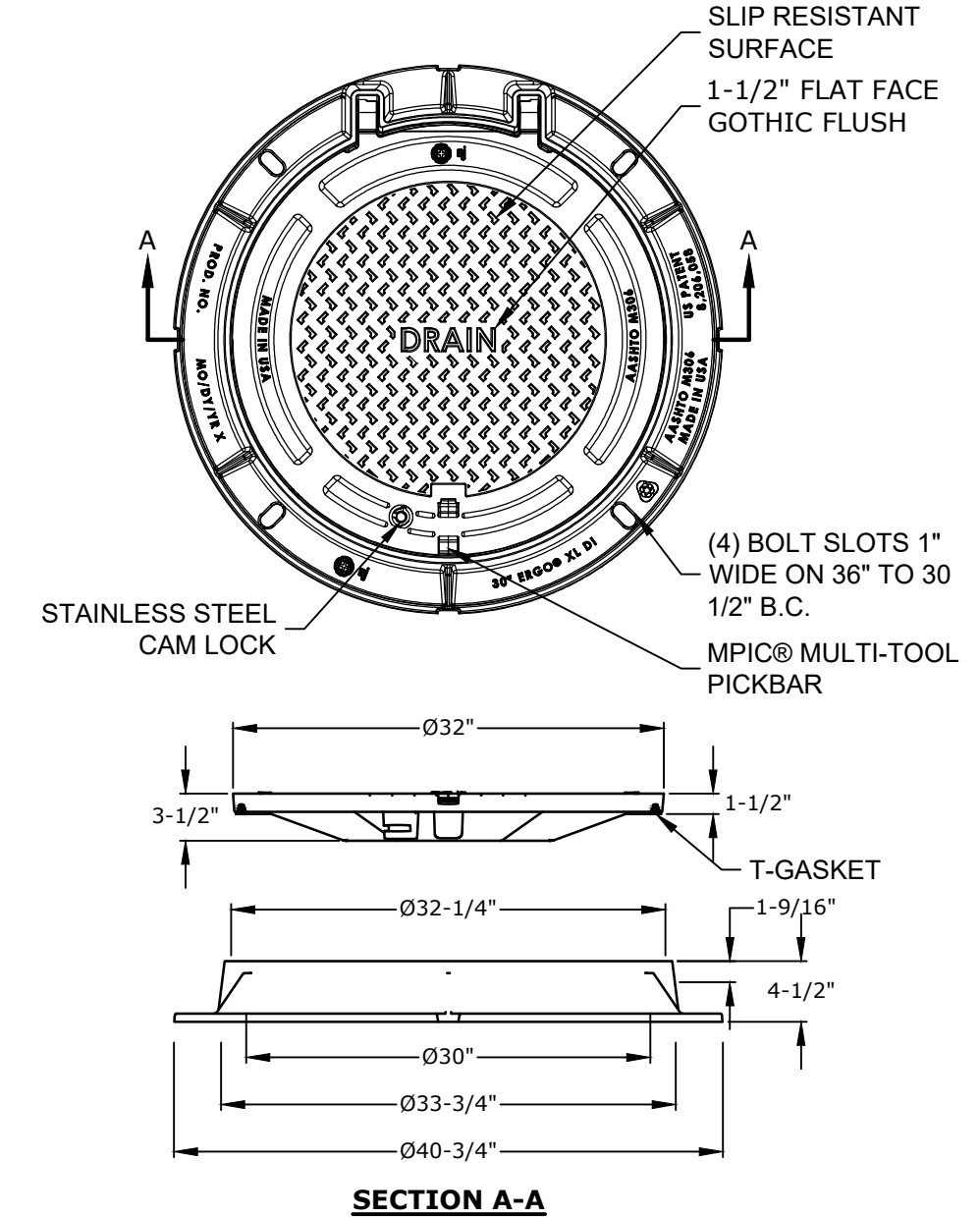
- NOTE:
- CRUSHED STONE BEDDING AND BACKFILL FOR FULL WIDTH OF THE TRENCH FROM 6" BELOW PIPE IN EARTH AND 12" BELOW PIPE IN ROCK UP TO 6" ABOVE TOP OF PIPE.
 - ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

STORM DRAIN TRENCH
NO SCALE



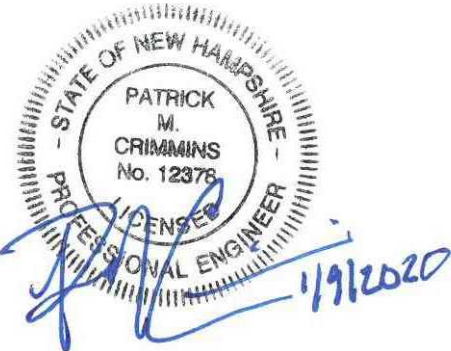
- NOTES:
- FRAME AND GRATES SHALL BE NEENAH FOUNDRY R-3570-A OR APPROVED EQUAL.
 - FRAME AND GRATES SHALL BE HEAVY DUTY AND RATED FOR H-20 LOADING.
 - ALL DIMENSIONS ARE NOMINAL.
 - FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
 - THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
 - THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
 - ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
 - FRAME AVAILABLE IN 4" OR 8" HEIGHTS
 - FREE OPEN AREA = 2.4 SQ. FT.
 - USE 3-FLANGE FRAME IF INSTALLED ADJACENT TO GRANITE CURB.

DOUBLE CATCHBASIN FRAME & GRATE
NO SCALE



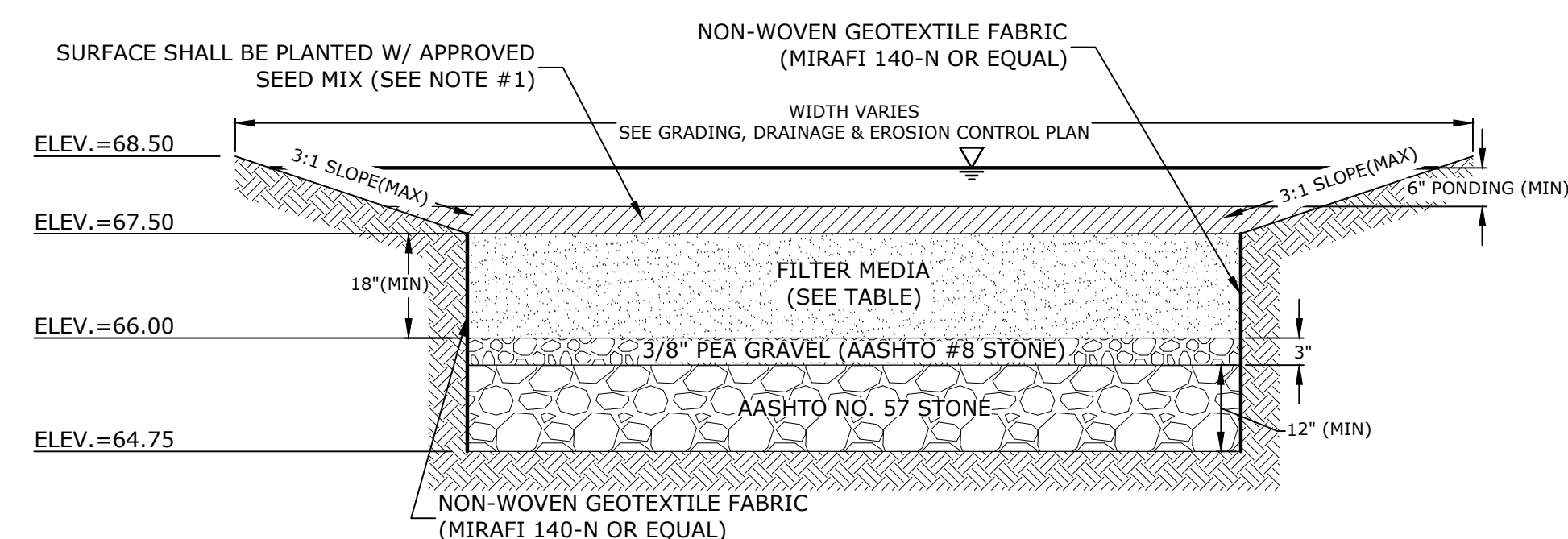
- NOTES:
- MANHOLE FRAME AND COVER SHALL BE 32" HINGED ERGO XL BY EJ CO.
 - ALL DIMENSIONS ARE NOMINAL.
 - FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
 - THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
 - THE INTERIOR PERIMETER (SEAT AREA) DIMENSIONS OF THE FRAMES REMAIN THE SAME TO ALLOW CONTINUED USE OF EXISTING GRATES/COVERS AS THE EXISTING FRAMES ALLOW, WITHOUT SHIMS OR OTHER MODIFICATIONS OR ACCOMMODATIONS.
 - ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
 - LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN THE CENTER OF THE COVER.

DRAIN MANHOLE FRAME & COVER
NO SCALE



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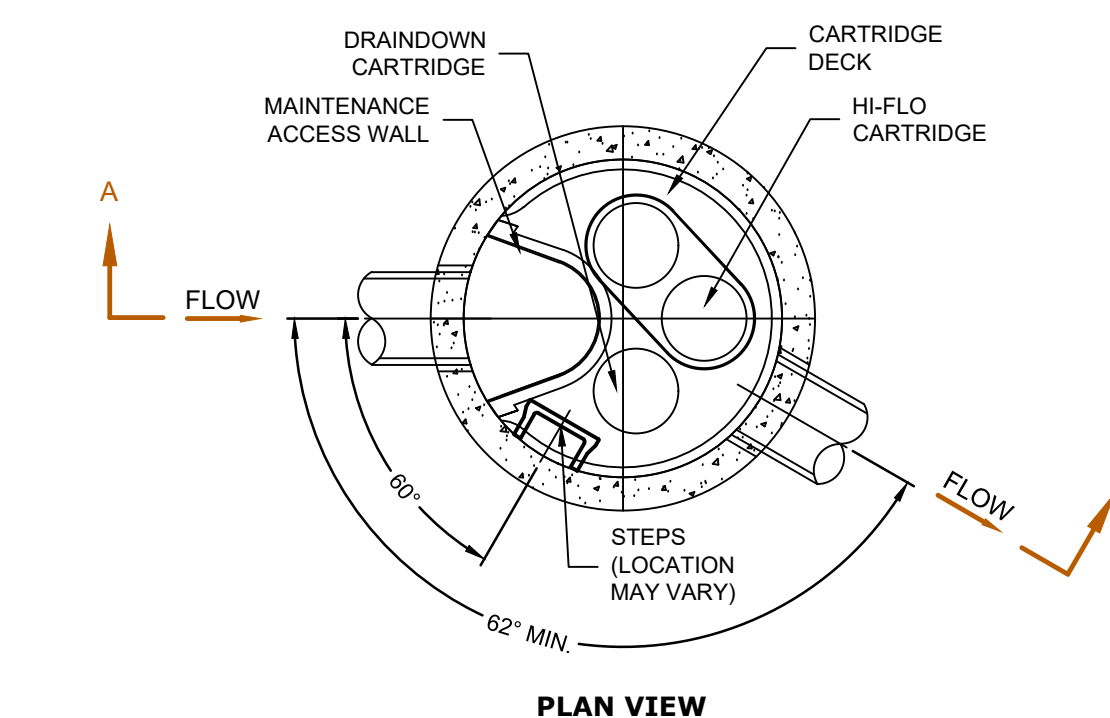


FILTER MEDIA COMPOSITION:		
COMPONENT MATERIAL	PERCENT OF MIXTURE BY VOLUME	GRADATION OF MATERIAL SIEVE NO. PERCENT PASSING
ASTM C-33 CONCRETE SAND	50-55	SEE NOTE #5
LOAMY SAND TOPSOIL	20-30	15-25
MODERATELY FINE SHREDDED BARK OR WOOD FIBER MULCH	20-30	5 MAX

- NOTES:
- SEED MIX SHALL CONSIST OF:
 - 50% NEW ENGLAND PLANTS -- NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASINS & MOIST SITES
 - 50% NEW ENGLAND PLANTS -- NEW ENGLAND CONSERVATION WILDLIFE MIX
 - RAIN GARDENS SHALL NOT BE PLACED INTO SERVICE UNTIL THE PRACTICE HAS BEEN PLANTED AND ITS CONTRIBUTING AREAS HAVE BEEN FULLY STABILIZED.
 - DO NOT TRAFFIC EXPOSED SOIL SURFACES WITH CONSTRUCTION EQUIPMENT. CONTRACTOR SHALL KEEP ALL EXCAVATION EQUIPMENT OUTSIDE OF THE LIMIT OF THE RAIN GARDEN.
 - SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR LOCATIONS, LAYOUTS, AND ELEVATIONS.
 - THE SAND PORTION OF THE FILTER MEDIA SHALL MEET THE FOLLOWING GRADATION (ASTM C-33):

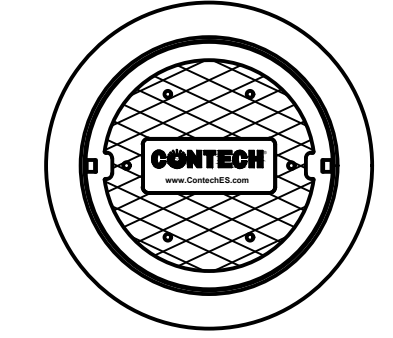
SIEVE SIZE	PERCENT PASSING	AASHTO #8 STONE (#8 to 3/8")	AASHTO #57 STONE (#4 to 1")
3/8"	100		
#4	95-100	SIEVE SIZE % PASSING	SIEVE SIZE % PASSING
#8	80-100	1/2" 100	1-1/2" 100
#16	50-85	3/8" 85-100	1" 95-100
#30	25-60	#4 10-30	1/2" 25-60
#50	5-30	#8 0-10	#4 0-10
#100	0-10	#16 0-5	#8 0-5

RAIN GARDEN #1
NO SCALE



JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN. Ø48" MANHOLE JELLYFISH PEAK TREATMENT CAPACITY IS 0.45 CFS. IF THE SITE CONDITIONS EXCEED 0.45 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION	
CARTRIDGE DEPTH	54"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-5"
FLOW RATE HIGH-FLO / DRAINDOWN (cfs) (per cart)	0.18 / 0.09
MAX. CARTS HIGH-FLO / DRAINDOWN	2 / 1

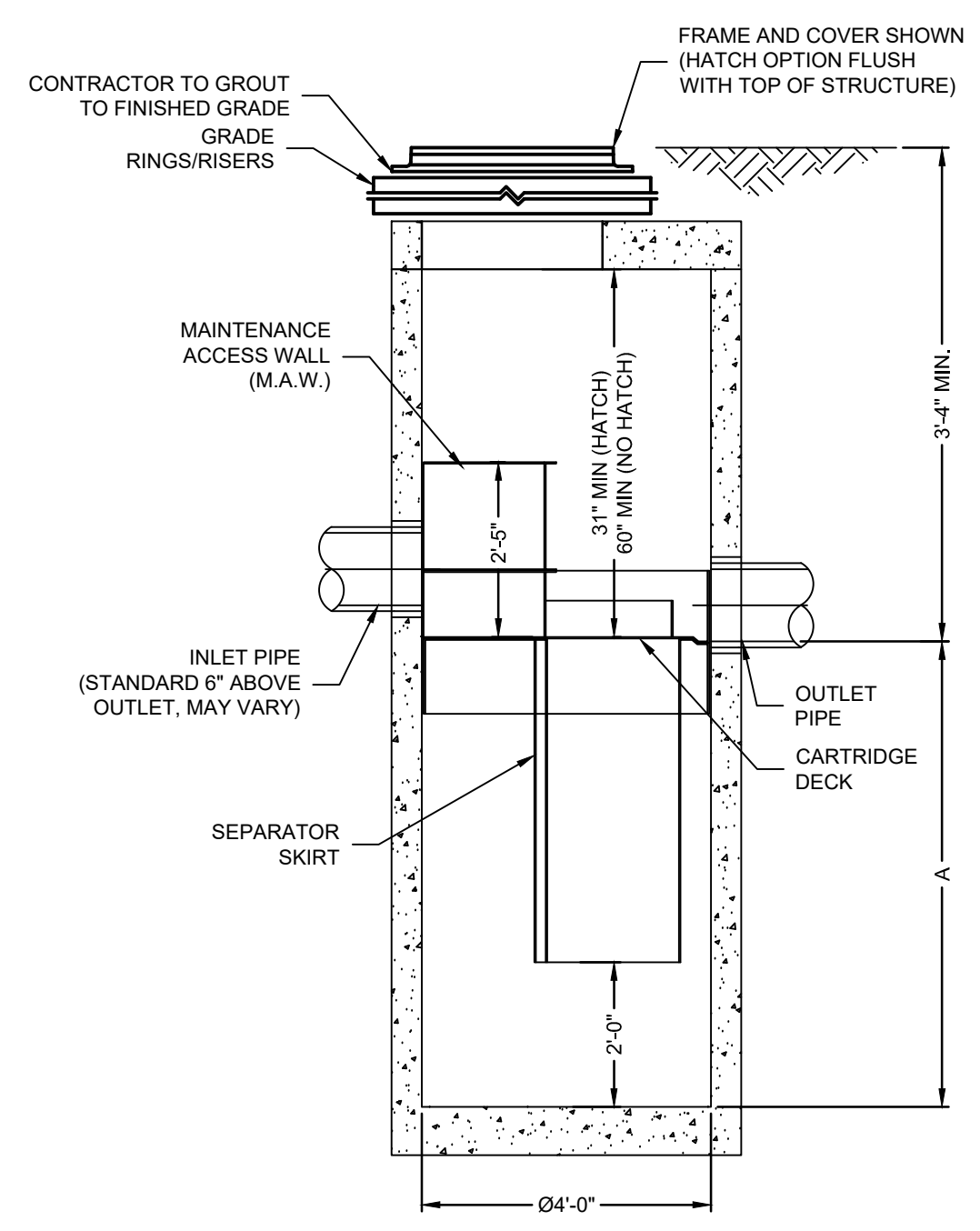


SITE SPECIFIC DATA REQUIREMENTS	
STRUCTURE ID	4'
WATER QUALITY FLOW RATE (cfs)	0.14
# OF CARTRIDGES REQUIRED (HF / DD)	(1/1)
CARTRIDGE SIZE	54"

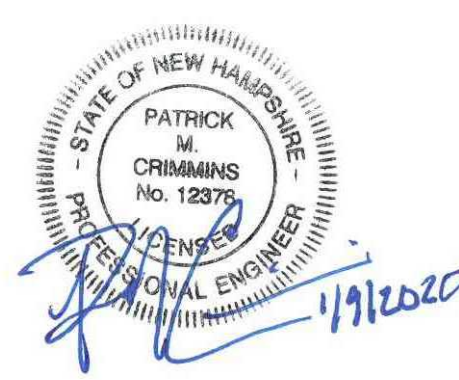
FRAME AND COVER
(DIAMETER VARIES)
N.T.S.

- GENERAL NOTES:
- CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
 - FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
 - JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
 - STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 3', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
 - STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-478 AND AASHTO LOAD FACTOR DESIGN METHOD.
 - NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

- INSTALLATION NOTES
- ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
 - CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
 - CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
 - CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.
 - CARTRIDGE INSTALLATION, BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION AT (866) 740-3318.



CONTECH JELLYFISH JF4-1-1
NO SCALE



Parking Expansion

Lonza Biologics

Portsmouth, NH

B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission
MARK	DATE	DESCRIPTION
PROJECT NO:	L-0700-019	
DATE:	November 13, 2019	
FILE:	L-0700-019_C-DTLS.DWG	
DRAWN BY:	BKC	
CHECKED:	NAH/PMC	
APPROVED:	BLM	

DETAILS SHEET

SCALE: AS SHOWN

C-504

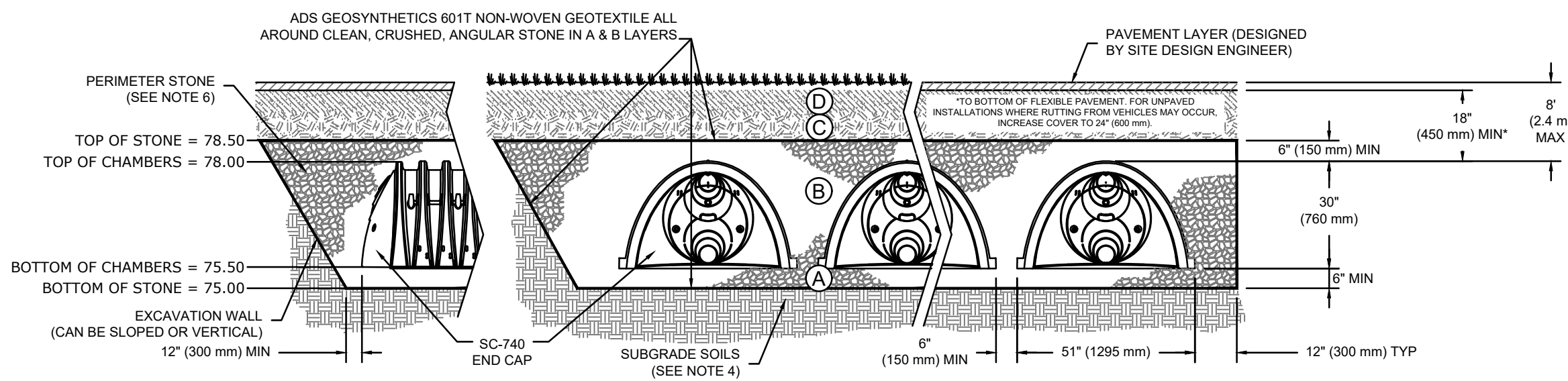
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ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION	DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	FINAL FILL: FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	INITIAL FILL: FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	AASHTO M145 ¹ A-1, A-2.4, A-3 OR AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	EMBEDMENT STONE: FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	FOUNDATION STONE: FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	AASHTO M43 ¹ 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. ^{1,2}

PLEASE NOTE:

- THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO #4) STONE"
- STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERS WITH A VIBRATORY COMPACTOR.
- WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

- SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
- THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
- PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
- ONCE LAYER 'C' IS PLACED, ANY SOIL MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
- PLACE MINIMUM 12.5' OF ADS GEOSYNTHETICS 315WTK WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

INSPECTION & MAINTENANCE

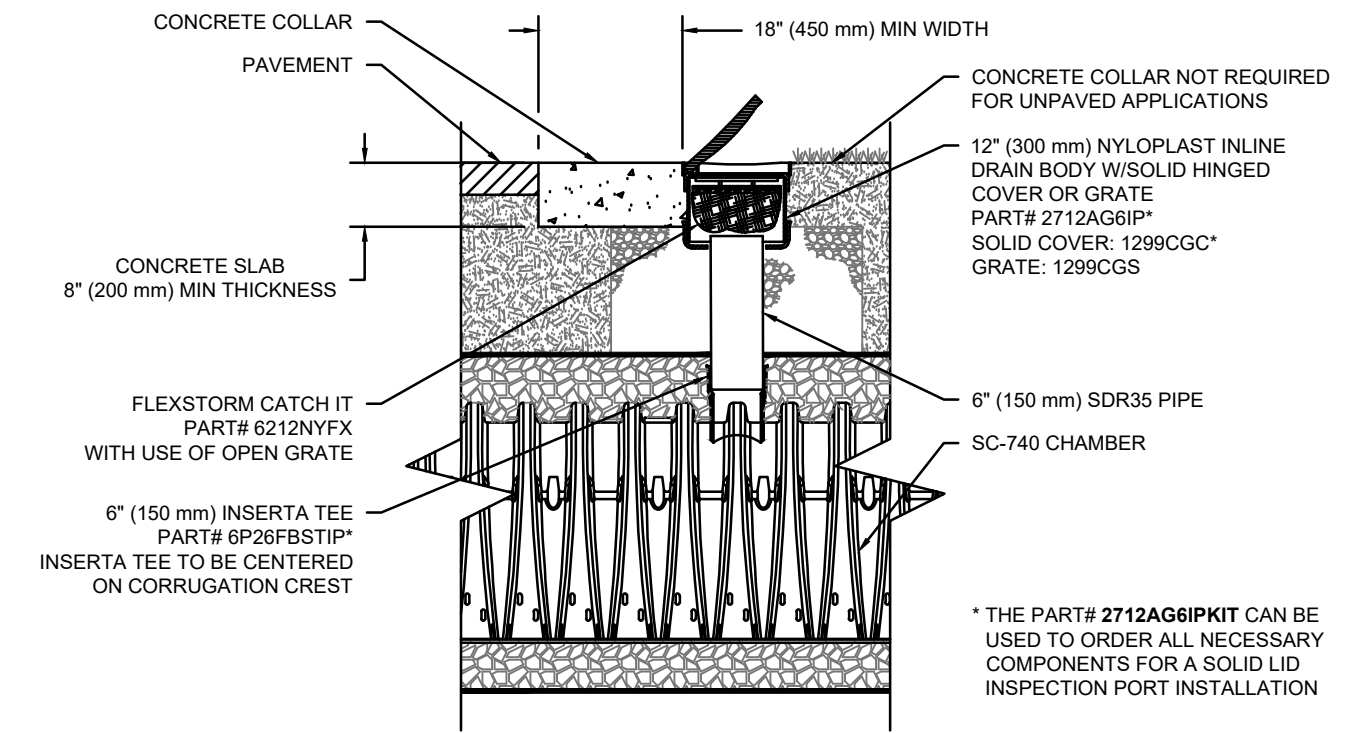
- STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
- REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
 - REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
 - USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
 - LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
 - IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
- REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
 - USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
 - MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
 - FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
 - IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45° (1.1 m) OR MORE IS PREFERRED
 - APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
 - VACUUM STRUCTURE SUMP AS REQUIRED
- STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.
- STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

- INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
- CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.

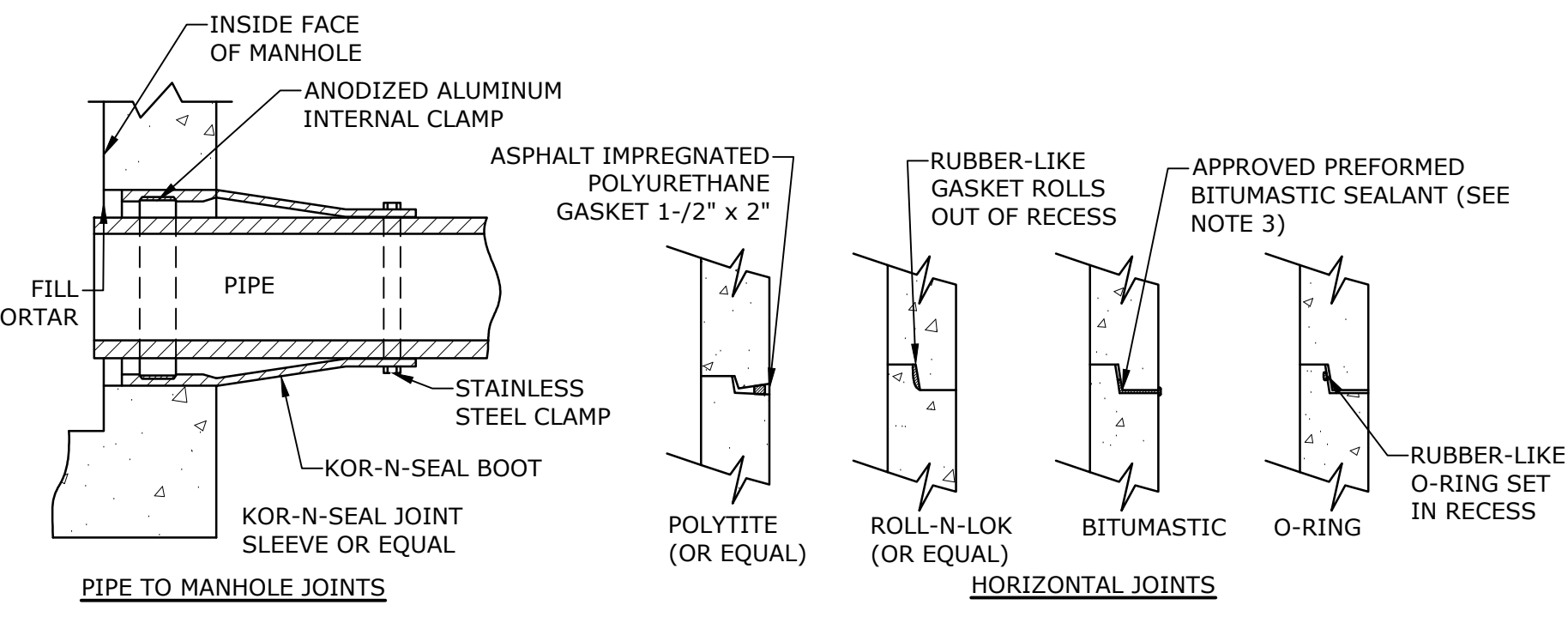
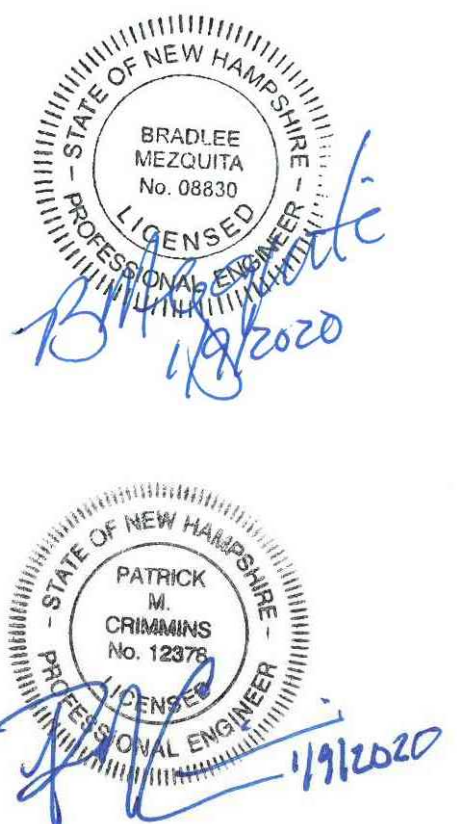
STORMTECH CHAMBER SPECIFICATIONS

- CHAMBERS SHALL BE STORMTECH SC-740, SC-310, OR APPROVED EQUAL.
- CHAMBERS SHALL BE MANUFACTURED FROM VIRGIN POLYPROPYLENE OR POLYETHYLENE RESINS. ^J
- CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORT PANELS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
- THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
- CHAMBERS SHALL MEET ASTM F2922 (POLYETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". ^J
- CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOADS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
- ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. THE CHAMBER MANUFACTURER SHALL SUBMIT THE FOLLOWING UPON REQUEST TO THE SITE DESIGN ENGINEER FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE:
 - A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY AASHTO FOR THERMOPLASTIC PIPE.
 - A STRUCTURAL EVALUATION SEALED BY A REGISTERED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET. THE 50 YEAR CREEP MODULUS DATA SPECIFIED IN ASTM F2418 OR ASTM F2922 MUST BE USED AS PART OF THE AASHTO STRUCTURAL EVALUATION TO VERIFY LONG-TERM PERFORMANCE.
 - STRUCTURAL CROSS SECTION DETAIL ON WHICH THE STRUCTURAL EVALUATION IS BASED.
- CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.



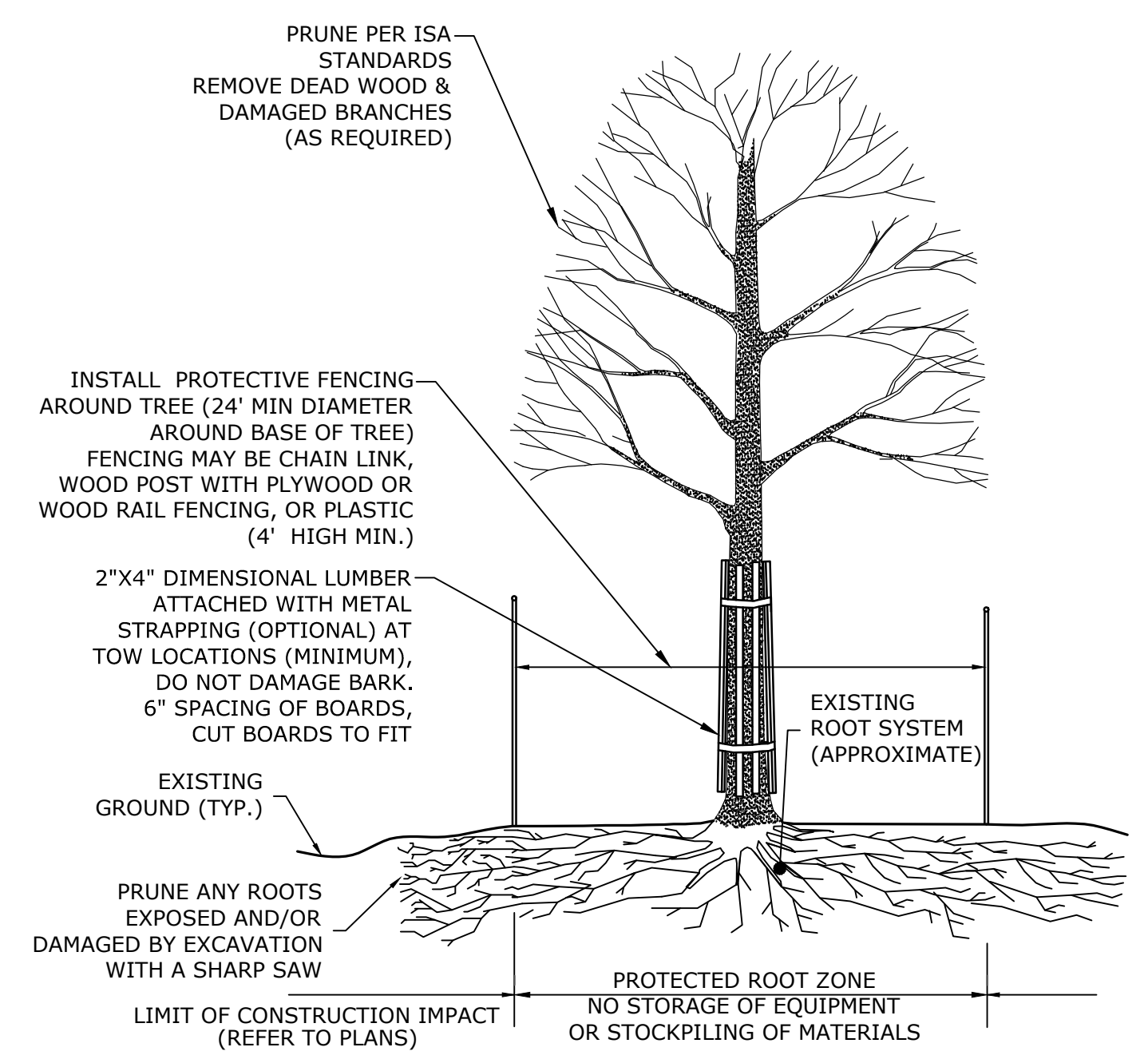
SC-740 6" INSPECTION PORT DETAIL
NTS

* THE PART# 2712AG6IPKIT CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

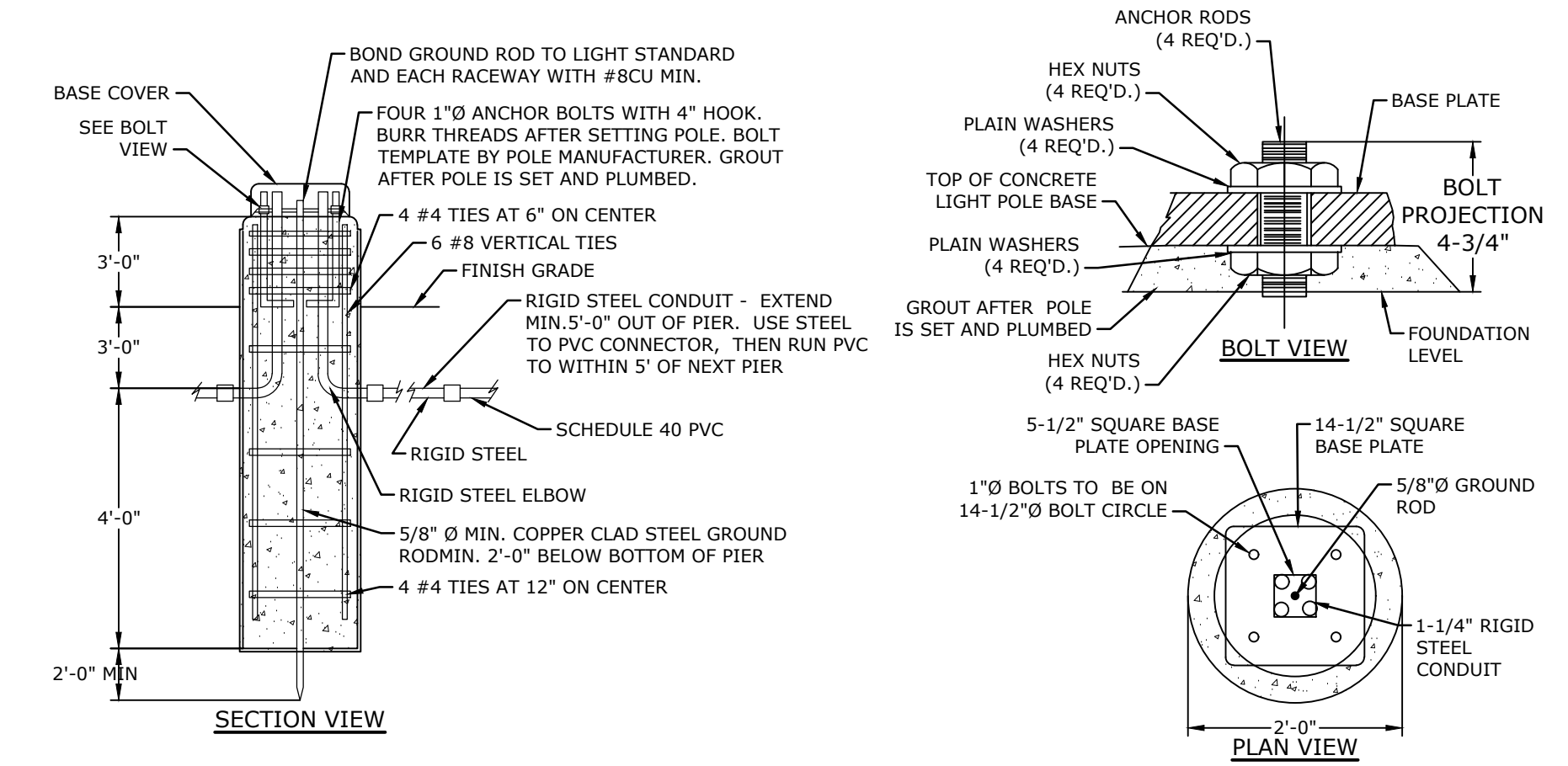


- NOTES:**
- HORIZONTAL JOINTS BETWEEN THE SECTIONS OF PRECAST CONCRETE BARRELS SHALL BE PER CITY OF PORTSMOUTH DPW STANDARD AND SHALL BE SEALED FOR WATERTIGHTNESS USING A DOUBLE ROW ELASTOMERIC OR MASTIC-LIKE GASKET.
 - PIPE TO MANHOLE JOINTS SHALL BE PER CITY OF PORTSMOUTH STANDARD.
 - FOR BITUMASTIC TYPE JOINTS THE AMOUNT OF SEALANT SHALL BE SUFFICIENT TO FILL AT LEAST 75% OF THE JOINT CAVITY.
 - ALL GASKETS, SEALANTS, MORTAR, ETC. SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS' WRITTEN INSTRUCTIONS.

MANHOLE JOINTS
NO SCALE



TREE PROTECTION FOR EXISTING TREE
NO SCALE



- NOTES:**
- PAINT BASE SAFETY YELLOW (UNLESS PROTECTED BY CURBED ISLAND).
 - CONCRETE TO BE CLASS A, 4000 PSI, AIR ENTRAINED STEEL TO BE 60 KSI
 - REFER TO ELECTRICAL PLANS FOR WIRING DETAILS.
 - LIGHT POLE BASE DETAIL FOR BIDDING PURPOSES ONLY. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL, TO INCLUDE PERFORMANCE SPECIFICATIONS, CALCULATIONS AND NH LICENSED STRUCTURAL ENGINEER'S STAMP FOR LIGHT POLE FOUNDATION.

TYPICAL LIGHT POLE BASE
NO SCALE

Parking Expansion

Lonza Biologics

Portsmouth, NH

MARK	DATE	DESCRIPTION
B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission

PROJECT NO: L-0700-019
DATE: November 13, 2019
FILE: L-0700-019_C-DTLS.DWG
DRAWN BY: BKC
CHECKED: NAH/PMC
APPROVED: BLM

DETAILS SHEET

SCALE: AS SHOWN

C-505

Drainage Analysis

To: City of Portsmouth Planning Board
FROM: Neil A. Hansen, PE
 Patrick M. Crimmins, PE
COPY: Lonza Biologics
DATE: December 23, 2019
LAST REVISED: January 9, 2020

1.0 Project Description

The proposed project is located at 101 International Drive which is identified as Map 305 Lot 6 on the City of Portsmouth Tax Maps. The proposed project includes parking expansions at three (3) different locations on site. The work at each location, referenced as the Northern, Eastern, and Western Expansions, can be summarized as follows:

- Northern Expansion: twenty-two (22) proposed parking spaces with drainage improvements and driveway access, including a rain garden to collect and treat runoff.
- Eastern Expansion: eighteen (18) proposed parking spaces along the existing access road and drainage improvements including deep sump catch basins with oil separator hoods which discharge to a Contech Jellyfish stormwater filtration unit that will provide treatment before tying into the existing stormwater management system.
- Western Expansion: twenty (20) proposed parking spaces built out from the existing lot, relocation of two (2) light poles, and drainage improvements including a deep sump catch basin with oil separator hood tied to an underground infiltration system.

The proposed project will be adding 15,348 SF of impervious area to the existing 13.75-acre watershed. The existing watershed is 67.70% impervious. The additional impervious surfaces will account for a 2.6% increase. Runoff from the proposed surfaces will be directed to stormwater treatment systems prior to entering the existing on-site drainage system. A rain garden is proposed to treat runoff from the additional impervious area of the northern parking expansion. Runoff from the eastern and western parking expansions are proposed to be treated by Contech Jellyfish Filter filtration systems.

2.0 Drainage Analysis

The stormwater management systems for each of the proposed expansions have been designed to provide stormwater treatment for the additional impervious area, as well as an equivalent amount of existing untreated impervious area as required by the Pease Development Authority (PDA) (Table 2.0).

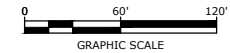
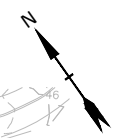
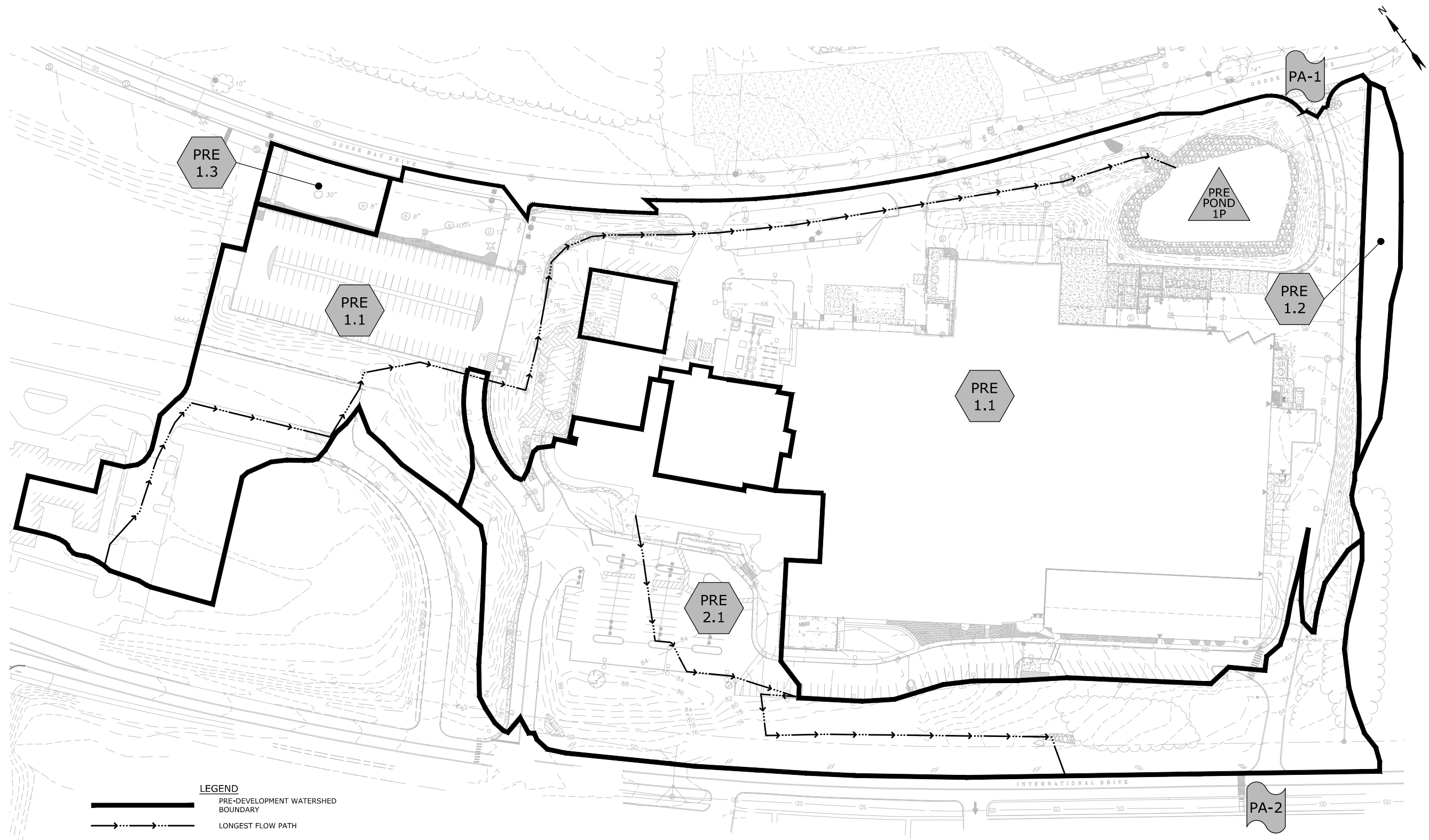
Proposed Impervious Area	15,348 sf
Impervious Required to be Treated (2x Proposed)	30,696 sf
Proposed Treated Impervious Area	37,266 sf






The sub-watershed areas that direct runoff to the proposed stormwater management systems were analyzed to determine the respective Water Quality Volume (WQV) or Water Quality Flow (WQF) required to size each of the systems. The full site was also analyzed for the pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events.

2.1 Peak Rate Comparisons

The following table summarizes and compares the pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events at each point of analysis. Point of Analysis 1 (PA1) is located along Goose Bay Drive and Point of Analysis 2 (PA2) is located along International Drive.

Point of Analysis	Pre/ Post 2-Year Storm (cfs)	Pre/ Post 10-Year Storm (cfs)	Pre/ Post 25-Year Storm (cfs)	Pre/ Post 50-Year Storm (cfs)
PA1	3.04/ 2.99	7.89/ 7.79	14.62/ 14.50	24.10/ 24.06
PA2	6.04/ 4.58	13.37/ 11.99	19.62/ 18.24	25.67/ 23.94



- LEGEND**
-  PRE-DEVELOPMENT WATERSHED BOUNDARY
 -  LONGEST FLOW PATH
 -  PRE DEVELOPMENT WATERSHED AREA DESIGNATION
 -  PRE-DEVELOPMENT POND DESIGNATION
 -  POINT OF ANALYSIS

Parking Expansion

Lonza Biologics

Portsmouth, NH

B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission
MARK	DATE	DESCRIPTION

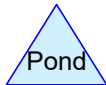
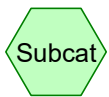
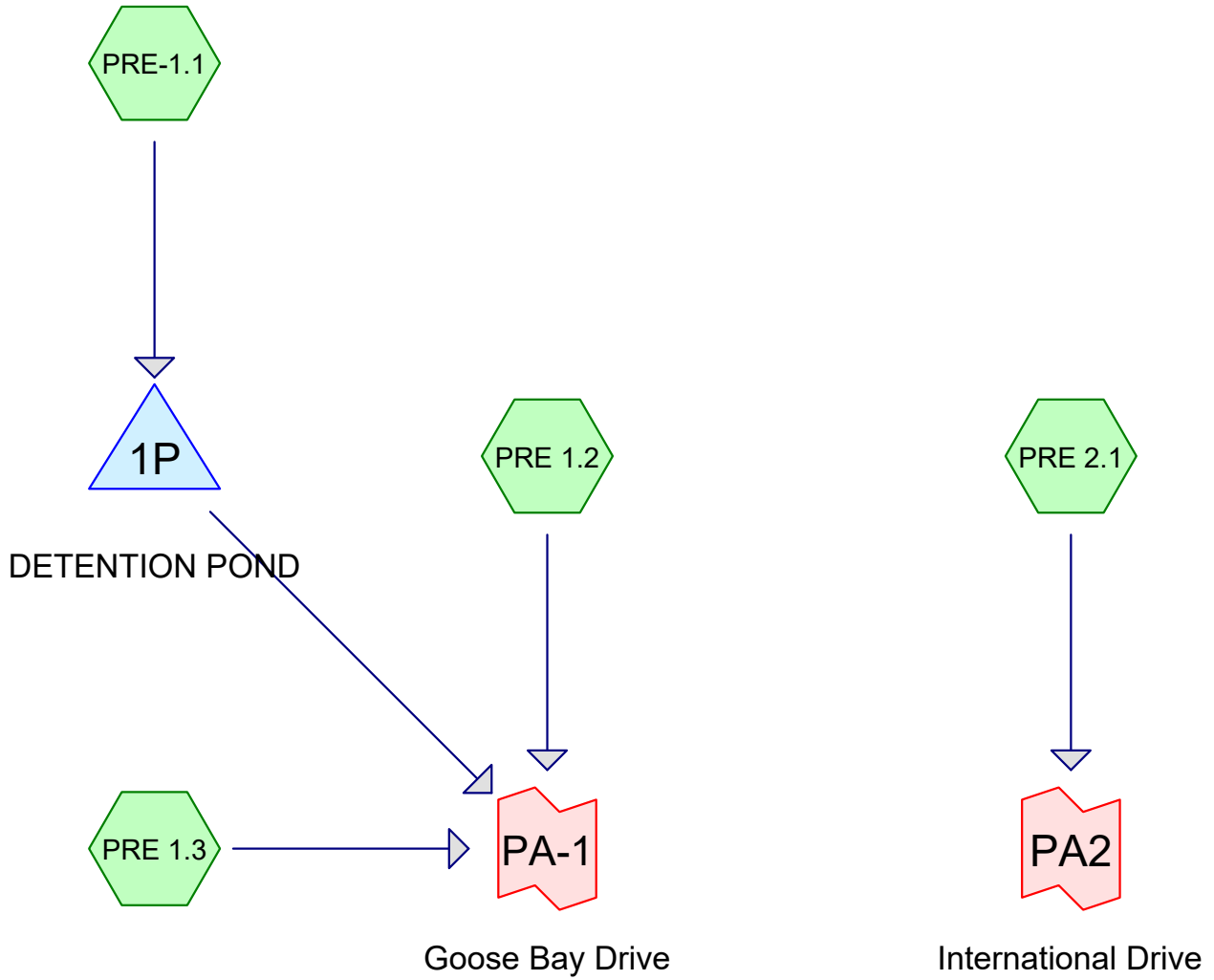
PROJECT NO:	L-0700-019
DATE:	November 13, 2019
FILE:	L-0700-019-C-DSGN.DWG
DRAWN BY:	BKC
CHECKED:	NAH/PMC
APPROVED:	BLM

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Last Saved: 1/9/2020 10:08am By: Mahamen
 Plotted On: Jan 09, 2020 - 10:08am By: Mahamen
 Tighe & Bond: L:\0700 Lonza Biologics Expansion was 157661019 Parking Expansion\Drawings Figures\AutoCAD\Sheet\0700-019-C-DSGN.dwg



Routing Diagram for L-0700-019-PRE-FULL
 Prepared by Tighe & Bond, Printed 1/8/2020
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L-0700-019-PRE-FULL

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
8.235	61	>75% Grass cover, Good, HSG B (PRE 1.2, PRE 1.3, PRE 2.1, PRE-1.1)
1.861	98	Paved parking, HSG B (PRE 2.1)
9.592	98	Unconnected pavement, HSG B (PRE 1.3, PRE-1.1)
19.688	83	TOTAL AREA

L-0700-019-PRE-FULL

Prepared by Tighe & Bond

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
19.688	HSG B	PRE 1.2, PRE 1.3, PRE 2.1, PRE-1.1
0.000	HSG C	
0.000	HSG D	
0.000	Other	
19.688		TOTAL AREA

L-0700-019-PRE-FULL

Type III 24-hr 2-YR Rainfall=3.20"

Prepared by Tighe & Bond

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Page 4

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>0.44"
Tc=11.4 min CN=61 Runoff=0.09 cfs 0.013 af

SubcatchmentPRE 1.3: Runoff Area=10,047 sf 4.03% Impervious Runoff Depth>0.48"
Tc=5.0 min CN=62 Runoff=0.09 cfs 0.009 af

SubcatchmentPRE 2.1: Runoff Area=213,064 sf 38.06% Impervious Runoff Depth>1.09"
Tc=5.0 min CN=75 Runoff=6.04 cfs 0.446 af

SubcatchmentPRE-1.1: Runoff Area=619,660 sf 67.36% Impervious Runoff Depth>1.83"
Flow Length=1,573' Tc=9.6 min CN=86 Runoff=26.69 cfs 2.172 af

Pond 1P: DETENTION POND Peak Elev=44.28' Storage=46,969 cf Inflow=26.69 cfs 2.172 af
Outflow=3.00 cfs 1.951 af

Link PA-1: Goose Bay Drive Inflow=3.04 cfs 1.973 af
Primary=3.04 cfs 1.973 af

Link PA2: International Drive Inflow=6.04 cfs 0.446 af
Primary=6.04 cfs 0.446 af

Total Runoff Area = 19.688 ac Runoff Volume = 2.639 af Average Runoff Depth = 1.61"
41.83% Pervious = 8.235 ac 58.17% Impervious = 11.453 ac

L-0700-019-PRE-FULL

Type III 24-hr 10-YR Rainfall=4.86"

Prepared by Tighe & Bond

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Page 5

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>1.28"
Tc=11.4 min CN=61 Runoff=0.38 cfs 0.036 af

SubcatchmentPRE 1.3: Runoff Area=10,047 sf 4.03% Impervious Runoff Depth>1.35"
Tc=5.0 min CN=62 Runoff=0.34 cfs 0.026 af

SubcatchmentPRE 2.1: Runoff Area=213,064 sf 38.06% Impervious Runoff Depth>2.33"
Tc=5.0 min CN=75 Runoff=13.37 cfs 0.952 af

SubcatchmentPRE-1.1: Runoff Area=619,660 sf 67.36% Impervious Runoff Depth>3.33"
Flow Length=1,573' Tc=9.6 min CN=86 Runoff=47.95 cfs 3.950 af

Pond 1P: DETENTION POND Peak Elev=45.95' Storage=81,979 cf Inflow=47.95 cfs 3.950 af
Outflow=7.72 cfs 3.557 af

Link PA-1: Goose Bay Drive Inflow=7.89 cfs 3.619 af
Primary=7.89 cfs 3.619 af

Link PA2: International Drive Inflow=13.37 cfs 0.952 af
Primary=13.37 cfs 0.952 af

Total Runoff Area = 19.688 ac Runoff Volume = 4.964 af Average Runoff Depth = 3.03"
41.83% Pervious = 8.235 ac 58.17% Impervious = 11.453 ac

Summary for Subcatchment PRE 1.2:

Runoff = 0.38 cfs @ 12.18 hrs, Volume= 0.036 af, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
14,829	61	>75% Grass cover, Good, HSG B
14,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4					Direct Entry,

Summary for Subcatchment PRE 1.3:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.026 af, Depth> 1.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
405	98	Unconnected pavement, HSG B
9,642	61	>75% Grass cover, Good, HSG B
10,047	62	Weighted Average
9,642		95.97% Pervious Area
405		4.03% Impervious Area
405		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment PRE 2.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 13.37 cfs @ 12.08 hrs, Volume= 0.952 af, Depth> 2.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

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Type III 24-hr 10-YR Rainfall=4.86"

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Area (sf)	CN	Description
81,083	98	Paved parking, HSG B
131,981	61	>75% Grass cover, Good, HSG B
213,064	75	Weighted Average
131,981		61.94% Pervious Area
81,083		38.06% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment PRE-1.1:

Runoff = 47.95 cfs @ 12.14 hrs, Volume= 3.950 af, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
417,403	98	Unconnected pavement, HSG B
202,257	61	>75% Grass cover, Good, HSG B
619,660	86	Weighted Average
202,257		32.64% Pervious Area
417,403		67.36% Impervious Area
417,403		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	36	0.0560	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.2	348	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	391	0.0410	12.04	21.27	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.0	203	0.0390	3.27	22.91	Channel Flow, Area= 7.0 sf Perim= 23.5' r= 0.30' n= 0.040 Earth, cobble bottom, clean sides
2.3	450	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.7	145	0.0390	3.27	22.91	Channel Flow, Area= 7.0 sf Perim= 23.5' r= 0.30' n= 0.040 Earth, cobble bottom, clean sides
9.6	1,573	Total			

Summary for Pond 1P: DETENTION POND

Inflow Area = 14.225 ac, 67.36% Impervious, Inflow Depth > 3.33" for 10-YR event
 Inflow = 47.95 cfs @ 12.14 hrs, Volume= 3.950 af
 Outflow = 7.72 cfs @ 12.70 hrs, Volume= 3.557 af, Atten= 84%, Lag= 33.8 min
 Primary = 7.72 cfs @ 12.70 hrs, Volume= 3.557 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 45.95' @ 12.70 hrs Surf.Area= 22,067 sf Storage= 81,979 cf
 Flood Elev= 48.00' Surf.Area= 25,450 sf Storage= 130,998 cf

Plug-Flow detention time= 193.6 min calculated for 3.557 af (90% of inflow)
 Center-of-Mass det. time= 145.8 min (953.7 - 807.9)

Volume	Invert	Avail.Storage	Storage Description
#1	41.75'	130,998 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
41.75	16,151	0	0
42.00	16,633	4,098	4,098
43.20	18,948	21,349	25,447
43.75	20,008	10,713	36,159
44.00	20,491	5,062	41,222
44.25	20,632	5,140	46,362
45.80	21,243	32,453	78,815
46.00	22,371	4,361	83,177
46.80	23,603	18,390	101,566
48.00	25,450	29,432	130,998

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	24.0" Round Culvert L= 650.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 39.00' / 35.75' S= 0.0050 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	41.75'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	43.75'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	44.25'	8.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	44.25'	6.0" Vert. Orifice/Grate C= 0.600
#6	Device 1	46.80'	19.0" x 19.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.72 cfs @ 12.70 hrs HW=45.95' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 7.72 cfs of 23.29 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 3.30 cfs @ 9.46 fps)
- 3=Orifice/Grate (Orifice Controls 1.32 cfs @ 6.72 fps)
- 4=Orifice/Grate (Orifice Controls 1.96 cfs @ 5.62 fps)
- 5=Orifice/Grate (Orifice Controls 1.14 cfs @ 5.79 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)

Summary for Link PA-1: Goose Bay Drive

Inflow Area = 14.797 ac, 64.82% Impervious, Inflow Depth > 2.94" for 10-YR event
Inflow = 7.89 cfs @ 12.63 hrs, Volume= 3.619 af
Primary = 7.89 cfs @ 12.63 hrs, Volume= 3.619 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA2: International Drive

Inflow Area = 4.891 ac, 38.06% Impervious, Inflow Depth > 2.33" for 10-YR event
Inflow = 13.37 cfs @ 12.08 hrs, Volume= 0.952 af
Primary = 13.37 cfs @ 12.08 hrs, Volume= 0.952 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25-YR Rainfall=6.16"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>2.11"
 Tc=11.4 min CN=61 Runoff=0.67 cfs 0.060 af

SubcatchmentPRE 1.3: Runoff Area=10,047 sf 4.03% Impervious Runoff Depth>2.20"
 Tc=5.0 min CN=62 Runoff=0.58 cfs 0.042 af

SubcatchmentPRE 2.1: Runoff Area=213,064 sf 38.06% Impervious Runoff Depth>3.42"
 Tc=5.0 min CN=75 Runoff=19.62 cfs 1.393 af

SubcatchmentPRE-1.1: Runoff Area=619,660 sf 67.36% Impervious Runoff Depth>4.56"
 Flow Length=1,573' Tc=9.6 min CN=86 Runoff=64.74 cfs 5.400 af

Pond 1P: DETENTION POND Peak Elev=47.17' Storage=110,308 cf Inflow=64.74 cfs 5.400 af
 Outflow=14.29 cfs 4.884 af

Link PA-1: Goose Bay Drive Inflow=14.62 cfs 4.986 af
 Primary=14.62 cfs 4.986 af

Link PA2: International Drive Inflow=19.62 cfs 1.393 af
 Primary=19.62 cfs 1.393 af

Total Runoff Area = 19.688 ac Runoff Volume = 6.895 af Average Runoff Depth = 4.20"
41.83% Pervious = 8.235 ac 58.17% Impervious = 11.453 ac

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Type III 24-hr 50-YR Rainfall=7.38"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>2.97"
Tc=11.4 min CN=61 Runoff=0.97 cfs 0.084 af

SubcatchmentPRE 1.3: Runoff Area=10,047 sf 4.03% Impervious Runoff Depth>3.08"
Tc=5.0 min CN=62 Runoff=0.82 cfs 0.059 af

SubcatchmentPRE 2.1: Runoff Area=213,064 sf 38.06% Impervious Runoff Depth>4.48"
Tc=5.0 min CN=75 Runoff=25.67 cfs 1.827 af

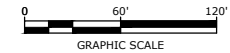
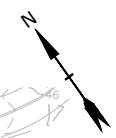
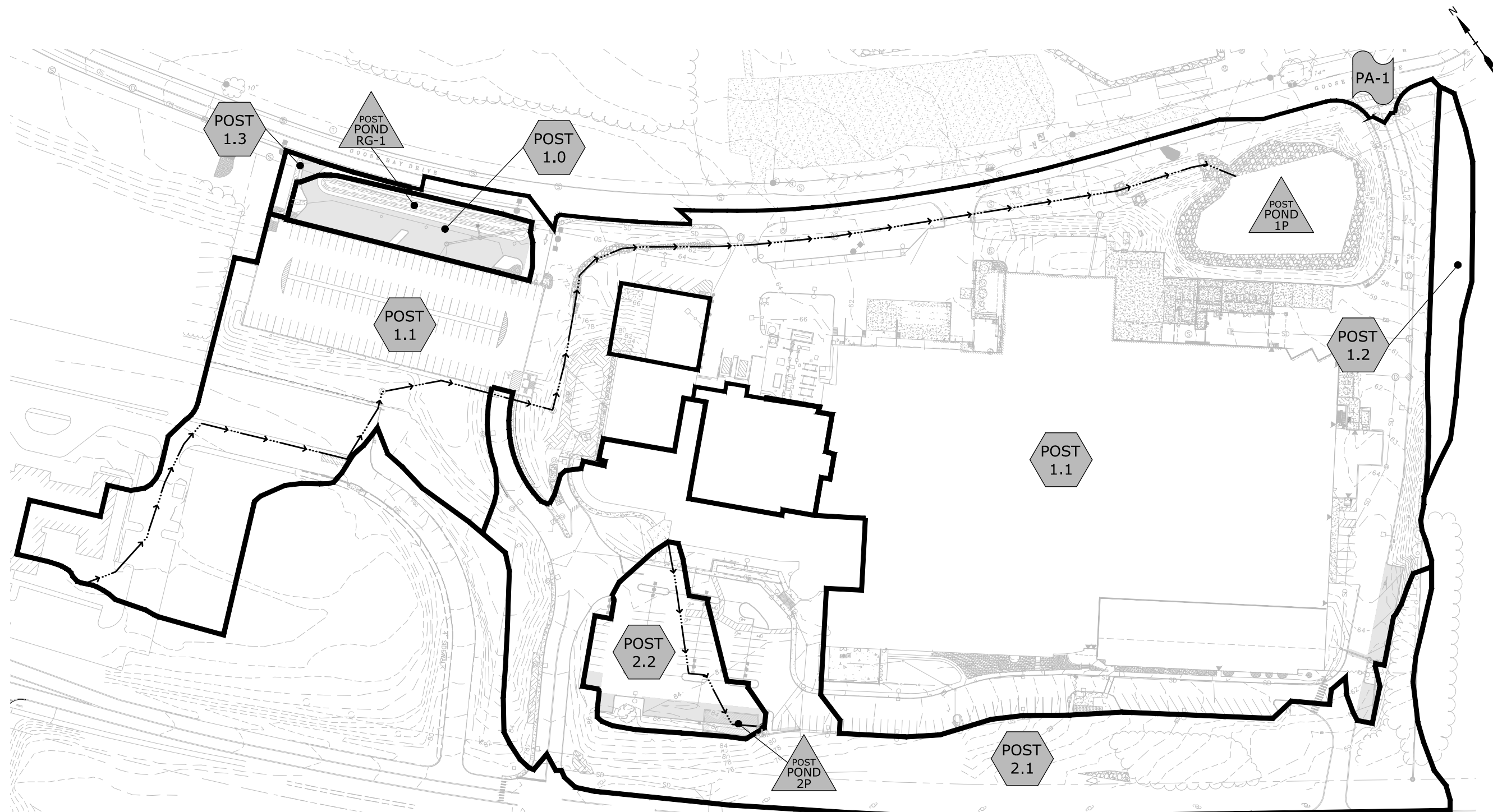
SubcatchmentPRE-1.1: Runoff Area=619,660 sf 67.36% Impervious Runoff Depth>5.72"
Flow Length=1,573' Tc=9.6 min CN=86 Runoff=80.46 cfs 6.786 af

Pond 1P: DETENTION POND Peak Elev=47.92' Storage=129,038 cf Inflow=80.46 cfs 6.786 af
Outflow=23.49 cfs 6.178 af






Link PA-1: Goose Bay Drive Inflow=24.10 cfs 6.322 af
Primary=24.10 cfs 6.322 af

Link PA2: International Drive Inflow=25.67 cfs 1.827 af
Primary=25.67 cfs 1.827 af

Total Runoff Area = 19.688 ac Runoff Volume = 8.757 af Average Runoff Depth = 5.34"
41.83% Pervious = 8.235 ac 58.17% Impervious = 11.453 ac



LEGEND

	POST-DEVELOPMENT WATERSHED BOUNDARY
	LONGEST FLOW PATH
	PRE DEVELOPMENT WATERSHED AREA DESIGNATION
	POST-DEVELOPMENT POND DESIGNATION
	POINT OF ANALYSIS

Parking Expansion

Lonza Biologics

Portsmouth, NH

B	1/8/2020	PB Submission
A	12/23/2019	TAC Submission
MARK	DATE	DESCRIPTION

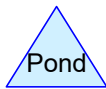
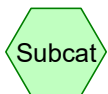
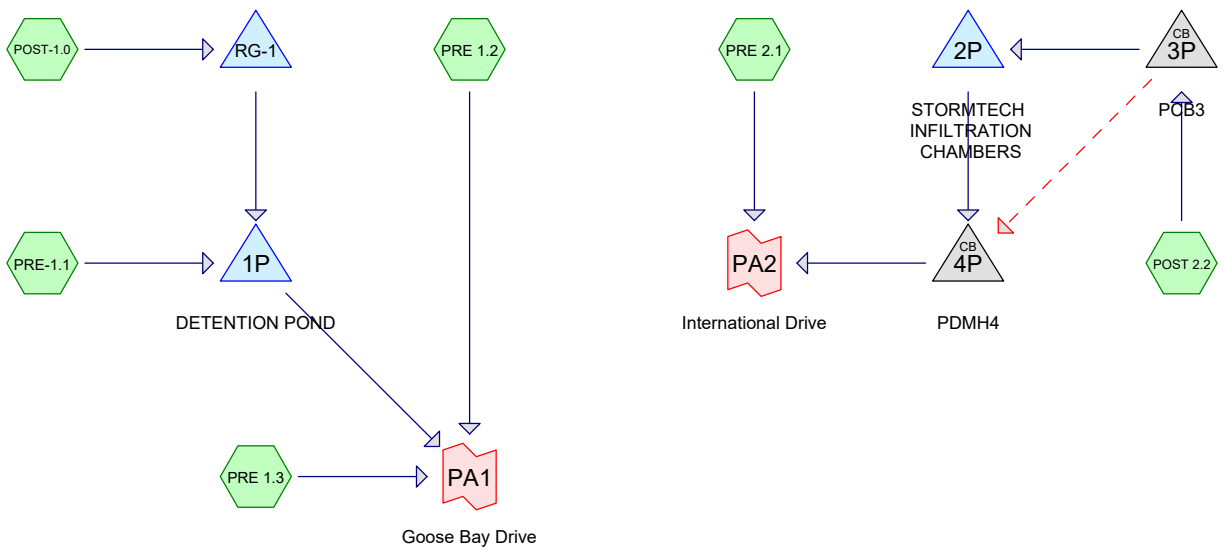
PROJECT NO:	L-0700-019
DATE:	November 13, 2019
FILE:	L-0700-019-C-DSGN.DWG
DRAWN BY:	BKC
CHECKED:	NAH/PMC
APPROVED:	BLM

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

FIGURE 2

Last Saved: 1/9/2020 10:07:am By: Mahamen
 Plotted On: Jan 09, 2020 - 10:07:am By: Mahamen
 Tighe & Bond: L:\0700 Lonza Biologics Expansion was 157661019 Parking Expansion\Drawings Figures\AutoCAD\Sheet\0700-019-C-DSGN.dwg



L-0700-019-POST-FULL

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Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
343,131	61	>75% Grass cover, Good, HSG B (POST 2.2, POST-1.0, PRE 1.2, PRE 1.3, PRE 2.1, PRE-1.1)
92,104	98	Paved parking, HSG B (POST 2.2, POST-1.0, PRE 2.1)
422,368	98	Unconnected pavement, HSG B (PRE 1.3, PRE-1.1)
857,603	83	TOTAL AREA

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Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
857,603	HSG B	POST 2.2, POST-1.0, PRE 1.2, PRE 1.3, PRE 2.1, PRE-1.1
0	HSG C	
0	HSG D	
0	Other	
857,603		TOTAL AREA

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Type III 24-hr 2-YR Rainfall=3.20"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST 2.2: Runoff Area=26,313 sf 81.98% Impervious Runoff Depth>2.26"
 Tc=5.0 min CN=91 Runoff=1.58 cfs 4,949 cf

SubcatchmentPOST-1.0: Runoff Area=16,866 sf 57.80% Impervious Runoff Depth>1.54"
 Tc=5.0 min CN=82 Runoff=0.70 cfs 2,160 cf

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>0.44"
 Tc=11.4 min CN=61 Runoff=0.09 cfs 547 cf

SubcatchmentPRE 1.3: Runoff Area=2,771 sf 28.11% Impervious Runoff Depth>0.64"
 Tc=5.0 min UI Adjusted CN=66 Runoff=0.04 cfs 148 cf

SubcatchmentPRE 2.1: Runoff Area=183,591 sf 33.11% Impervious Runoff Depth>0.98"
 Tc=5.0 min CN=73 Runoff=4.58 cfs 15,022 cf

SubcatchmentPRE-1.1: Runoff Area=613,233 sf 68.75% Impervious Runoff Depth>1.83"
 Flow Length=1,573' Tc=9.6 min CN=86 Runoff=26.42 cfs 93,629 cf

Pond 1P: DETENTION POND Peak Elev=44.26' Storage=46,500 cf Inflow=26.42 cfs 93,629 cf
 Outflow=2.96 cfs 84,142 cf

Pond 2P: STORMTECHINFILTRATION Peak Elev=77.07' Storage=2,146 cf Inflow=1.58 cfs 4,949 cf
 Discarded=0.04 cfs 2,025 cf Primary=0.32 cfs 1,433 cf Outflow=0.35 cfs 3,458 cf

Pond 3P: PCB3 Peak Elev=77.08' Inflow=1.58 cfs 4,949 cf
 Primary=1.58 cfs 4,949 cf Secondary=0.00 cfs 0 cf Outflow=1.58 cfs 4,949 cf

Pond 4P: PDMH4 Peak Elev=76.93' Inflow=0.32 cfs 1,433 cf
 12.0" Round Culvert n=0.013 L=40.0' S=0.0050 ' Outflow=0.32 cfs 1,433 cf

Pond RG-1: Peak Elev=67.89' Storage=1,127 cf Inflow=0.70 cfs 2,160 cf
 Discarded=0.04 cfs 1,515 cf Primary=0.00 cfs 0 cf Outflow=0.04 cfs 1,515 cf

Link PA1: Goose Bay Drive Inflow=2.99 cfs 84,837 cf
 Primary=2.99 cfs 84,837 cf

Link PA2: International Drive Inflow=4.58 cfs 16,455 cf
 Primary=4.58 cfs 16,455 cf

Total Runoff Area = 857,603 sf Runoff Volume = 116,455 cf Average Runoff Depth = 1.63"
40.01% Pervious = 343,131 sf 59.99% Impervious = 514,472 sf

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Type III 24-hr 10-YR Rainfall=4.86"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST 2.2:	Runoff Area=26,313 sf 81.98% Impervious Runoff Depth>3.84" Tc=5.0 min CN=91 Runoff=2.63 cfs 8,429 cf
SubcatchmentPOST-1.0:	Runoff Area=16,866 sf 57.80% Impervious Runoff Depth>2.95" Tc=5.0 min CN=82 Runoff=1.34 cfs 4,149 cf
SubcatchmentPRE 1.2:	Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>1.28" Tc=11.4 min CN=61 Runoff=0.38 cfs 1,584 cf
SubcatchmentPRE 1.3:	Runoff Area=2,771 sf 28.11% Impervious Runoff Depth>1.63" Tc=5.0 min UI Adjusted CN=66 Runoff=0.12 cfs 377 cf
SubcatchmentPRE 2.1:	Runoff Area=183,591 sf 33.11% Impervious Runoff Depth>2.17" Tc=5.0 min CN=73 Runoff=10.66 cfs 33,192 cf
SubcatchmentPRE-1.1:	Runoff Area=613,233 sf 68.75% Impervious Runoff Depth>3.33" Flow Length=1,573' Tc=9.6 min CN=86 Runoff=47.45 cfs 170,262 cf
Pond 1P: DETENTION POND	Peak Elev=45.92' Storage=81,334 cf Inflow=47.45 cfs 170,836 cf Outflow=7.67 cfs 153,885 cf
Pond 2P: STORMTECH INFILTRATION	Peak Elev=77.65' Storage=2,693 cf Inflow=2.63 cfs 8,428 cf Discarded=0.04 cfs 2,239 cf Primary=1.51 cfs 4,480 cf Outflow=1.55 cfs 6,719 cf
Pond 3P: PCB3	Peak Elev=77.76' Inflow=2.63 cfs 8,429 cf Primary=2.63 cfs 8,428 cf Secondary=0.00 cfs 0 cf Outflow=2.63 cfs 8,428 cf
Pond 4P: PDMH4	Peak Elev=77.39' Inflow=1.51 cfs 4,480 cf 12.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=1.51 cfs 4,480 cf
Pond RG-1:	Peak Elev=68.31' Storage=1,913 cf Inflow=1.34 cfs 4,149 cf Discarded=0.05 cfs 2,315 cf Primary=0.32 cfs 574 cf Outflow=0.37 cfs 2,889 cf
Link PA1: Goose Bay Drive	Inflow=7.79 cfs 155,846 cf Primary=7.79 cfs 155,846 cf
Link PA2: International Drive	Inflow=11.99 cfs 37,672 cf Primary=11.99 cfs 37,672 cf

Total Runoff Area = 857,603 sf Runoff Volume = 217,994 cf Average Runoff Depth = 3.05"
40.01% Pervious = 343,131 sf 59.99% Impervious = 514,472 sf

L-0700-019-POST-FULL

Type III 24-hr 10-YR Rainfall=4.86"

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Summary for Subcatchment POST 2.2:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.63 cfs @ 12.07 hrs, Volume= 8,429 cf, Depth> 3.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
21,572	98	Paved parking, HSG B
4,741	61	>75% Grass cover, Good, HSG B
26,313	91	Weighted Average
4,741		18.02% Pervious Area
21,572		81.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment POST-1.0:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.34 cfs @ 12.08 hrs, Volume= 4,149 cf, Depth> 2.95"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
9,749	98	Paved parking, HSG B
7,117	61	>75% Grass cover, Good, HSG B
16,866	82	Weighted Average
7,117		42.20% Pervious Area
9,749		57.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment PRE 1.2:

Runoff = 0.38 cfs @ 12.18 hrs, Volume= 1,584 cf, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

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Type III 24-hr 10-YR Rainfall=4.86"

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Area (sf)	CN	Description
14,829	61	>75% Grass cover, Good, HSG B
14,829		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4					Direct Entry,

Summary for Subcatchment PRE 1.3:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.12 cfs @ 12.09 hrs, Volume= 377 cf, Depth> 1.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Adj	Description
779	98		Unconnected pavement, HSG B
1,992	61		>75% Grass cover, Good, HSG B
2,771	71	66	Weighted Average, UI Adjusted
1,992			71.89% Pervious Area
779			28.11% Impervious Area
779			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment PRE 2.1:

[49] Hint: Tc<2dt may require smaller dt

Runoff = 10.66 cfs @ 12.08 hrs, Volume= 33,192 cf, Depth> 2.17"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
60,783	98	Paved parking, HSG B
122,808	61	>75% Grass cover, Good, HSG B
183,591	73	Weighted Average
122,808		66.89% Pervious Area
60,783		33.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Summary for Subcatchment PRE-1.1:

Runoff = 47.45 cfs @ 12.14 hrs, Volume= 170,262 cf, Depth> 3.33"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 10-YR Rainfall=4.86"

Area (sf)	CN	Description
421,589	98	Unconnected pavement, HSG B
191,644	61	>75% Grass cover, Good, HSG B
613,233	86	Weighted Average
191,644		31.25% Pervious Area
421,589		68.75% Impervious Area
421,589		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	36	0.0560	0.21		Sheet Flow, Grass: Short n= 0.150 P2= 3.20"
2.2	348	0.0170	2.65		Shallow Concentrated Flow, Paved Kv= 20.3 fps
0.5	391	0.0410	12.04	21.27	Pipe Channel, 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.0	203	0.0390	3.27	22.91	Channel Flow, Area= 7.0 sf Perim= 23.5' r= 0.30' n= 0.040 Earth, cobble bottom, clean sides
2.3	450	0.0050	3.21	2.52	Pipe Channel, 12.0" Round Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.013 Corrugated PE, smooth interior
0.7	145	0.0390	3.27	22.91	Channel Flow, Area= 7.0 sf Perim= 23.5' r= 0.30' n= 0.040 Earth, cobble bottom, clean sides
9.6	1,573	Total			

Summary for Pond 1P: DETENTION POND

Inflow Area = 630,099 sf, 68.46% Impervious, Inflow Depth > 3.25" for 10-YR event
 Inflow = 47.45 cfs @ 12.14 hrs, Volume= 170,836 cf
 Outflow = 7.67 cfs @ 12.71 hrs, Volume= 153,885 cf, Atten= 84%, Lag= 34.2 min
 Primary = 7.67 cfs @ 12.71 hrs, Volume= 153,885 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 45.92' @ 12.71 hrs Surf.Area= 21,902 sf Storage= 81,334 cf
 Flood Elev= 48.00' Surf.Area= 25,450 sf Storage= 130,998 cf

Plug-Flow detention time= 193.9 min calculated for 153,885 cf (90% of inflow)
 Center-of-Mass det. time= 146.2 min (954.1 - 807.9)

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Type III 24-hr 10-YR Rainfall=4.86"

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Volume	Invert	Avail.Storage	Storage Description
#1	41.75'	130,998 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
41.75	16,151	0	0
42.00	16,633	4,098	4,098
43.20	18,948	21,349	25,447
43.75	20,008	10,713	36,159
44.00	20,491	5,062	41,222
44.25	20,632	5,140	46,362
45.80	21,243	32,453	78,815
46.00	22,371	4,361	83,177
46.80	23,603	18,390	101,566
48.00	25,450	29,432	130,998

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	24.0" Round Culvert L= 650.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 39.00' / 35.75' S= 0.0050 ' / Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Device 1	41.75'	8.0" Vert. Orifice/Grate C= 0.600
#3	Device 1	43.75'	6.0" Vert. Orifice/Grate C= 0.600
#4	Device 1	44.25'	8.0" Vert. Orifice/Grate C= 0.600
#5	Device 1	44.25'	6.0" Vert. Orifice/Grate C= 0.600
#6	Device 1	46.80'	19.0" x 19.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=7.67 cfs @ 12.71 hrs HW=45.92' TW=0.00' (Dynamic Tailwater)

- 1=Culvert (Passes 7.67 cfs of 23.25 cfs potential flow)
- 2=Orifice/Grate (Orifice Controls 3.29 cfs @ 9.43 fps)
- 3=Orifice/Grate (Orifice Controls 1.31 cfs @ 6.67 fps)
- 4=Orifice/Grate (Orifice Controls 1.94 cfs @ 5.56 fps)
- 5=Orifice/Grate (Orifice Controls 1.13 cfs @ 5.73 fps)
- 6=Orifice/Grate (Controls 0.00 cfs)

Summary for Pond 2P: STORMTECH INFILTRATION CHAMBERS

[80] Warning: Exceeded Pond 3P by 0.07' @ 11.95 hrs (0.99 cfs 355 cf)

Inflow Area =	26,313 sf, 81.98% Impervious, Inflow Depth > 3.84" for 10-YR event
Inflow =	2.63 cfs @ 12.07 hrs, Volume= 8,428 cf
Outflow =	1.55 cfs @ 12.17 hrs, Volume= 6,719 cf, Atten= 41%, Lag= 6.1 min
Discarded =	0.04 cfs @ 8.80 hrs, Volume= 2,239 cf
Primary =	1.51 cfs @ 12.17 hrs, Volume= 4,480 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 77.65' @ 12.19 hrs Surf.Area= 1,530 sf Storage= 2,693 cf
 Flood Elev= 78.50' Surf.Area= 1,530 sf Storage= 3,244 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)

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Center-of-Mass det. time= 49.3 min (835.7 - 786.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	75.00'	1,406 cf	25.25'W x 60.58'L x 3.50'H Field A 5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids
#2A	75.50'	1,838 cf	ADS_StormTech SC-740 +Cap x 40 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 8 Chambers
		3,244 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Discarded	75.00'	1.000 in/hr Exfiltration over Surface area
#2	Primary	76.70'	12.0" Round Culvert L= 20.0' CPP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 76.70' / 76.40' S= 0.0150 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Discarded OutFlow Max=0.04 cfs @ 8.80 hrs HW=75.04' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.04 cfs)**Primary OutFlow** Max=1.48 cfs @ 12.17 hrs HW=77.64' TW=77.38' (Dynamic Tailwater)↑**2=Culvert** (Inlet Controls 1.48 cfs @ 1.93 fps)**Summary for Pond 3P: PCB3**

Inflow Area = 26,313 sf, 81.98% Impervious, Inflow Depth > 3.84" for 10-YR event
 Inflow = 2.63 cfs @ 12.07 hrs, Volume= 8,429 cf
 Outflow = 2.63 cfs @ 12.07 hrs, Volume= 8,428 cf, Atten= 0%, Lag= 0.0 min
 Primary = 2.63 cfs @ 12.07 hrs, Volume= 8,428 cf
 Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 77.76' @ 12.20 hrs

Flood Elev= 81.85'

Device	Routing	Invert	Outlet Devices
#1	Primary	75.70'	12.0" Round Culvert L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 75.70' / 75.65' S= 0.0100 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#2	Secondary	77.85'	12.0" Round Culvert L= 7.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 77.85' / 77.75' S= 0.0143 '/ Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

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Type III 24-hr 10-YR Rainfall=4.86"

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Primary OutFlow Max=1.61 cfs @ 12.07 hrs HW=77.54' TW=77.36' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 1.61 cfs @ 2.05 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=75.70' TW=76.60' (Dynamic Tailwater)

↑2=Culvert (Controls 0.00 cfs)

Summary for Pond 4P: PDMH4

[57] Hint: Peaked at 77.39' (Flood elevation advised)

Inflow Area =	26,313 sf, 81.98% Impervious,	Inflow Depth = 2.04"	for 10-YR event
Inflow =	1.51 cfs @ 12.17 hrs,	Volume=	4,480 cf
Outflow =	1.51 cfs @ 12.17 hrs,	Volume=	4,480 cf, Atten= 0%, Lag= 0.0 min
Primary =	1.51 cfs @ 12.17 hrs,	Volume=	4,480 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 77.39' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	76.60'	12.0" Round Culvert L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 76.60' / 76.40' S= 0.0050 ' / Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.50 cfs @ 12.17 hrs HW=77.38' TW=0.00' (Dynamic Tailwater)

↑1=Culvert (Barrel Controls 1.50 cfs @ 3.13 fps)

Summary for Pond RG-1:

Inflow Area =	16,866 sf, 57.80% Impervious,	Inflow Depth > 2.95"	for 10-YR event
Inflow =	1.34 cfs @ 12.08 hrs,	Volume=	4,149 cf
Outflow =	0.37 cfs @ 12.47 hrs,	Volume=	2,889 cf, Atten= 72%, Lag= 23.7 min
Discarded =	0.05 cfs @ 12.47 hrs,	Volume=	2,315 cf
Primary =	0.32 cfs @ 12.47 hrs,	Volume=	574 cf

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 68.31' @ 12.47 hrs Surf.Area= 2,200 sf Storage= 1,913 cf
Flood Elev= 68.50' Surf.Area= 2,479 sf Storage= 2,365 cf

Plug-Flow detention time= 250.4 min calculated for 2,889 cf (70% of inflow)
Center-of-Mass det. time= 155.2 min (971.3 - 816.1)

Volume	Invert	Avail.Storage	Storage Description
#1	64.75'	2,365 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

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Type III 24-hr 10-YR Rainfall=4.86"

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Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
64.75	963	0.0	0	0
66.00	963	40.0	482	482
67.50	963	10.0	144	626
68.00	1,757	100.0	680	1,306
68.50	2,479	100.0	1,059	2,365

Device	Routing	Invert	Outlet Devices
#1	Discarded	64.75'	1.000 in/hr Exfiltration over Surface area
#2	Primary	65.35'	12.0" Round Culvert L= 10.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 65.35' / 65.30' S= 0.0050 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf
#3	Device 2	68.30'	11.1" x 11.1" Horiz. Orifice/Grate C= 0.600

Discarded OutFlow Max=0.05 cfs @ 12.47 hrs HW=68.30' (Free Discharge)↑**1=Exfiltration** (Exfiltration Controls 0.05 cfs)**Primary OutFlow** Max=0.28 cfs @ 12.47 hrs HW=68.30' TW=45.77' (Dynamic Tailwater)↑**2=Culvert** (Passes 0.28 cfs of 5.93 cfs potential flow)↑**3=Orifice/Grate** (Orifice Controls 0.28 cfs @ 0.33 fps)**Summary for Link PA1: Goose Bay Drive**

Inflow Area = 647,699 sf, 66.72% Impervious, Inflow Depth > 2.89" for 10-YR event
 Inflow = 7.79 cfs @ 12.64 hrs, Volume= 155,846 cf
 Primary = 7.79 cfs @ 12.64 hrs, Volume= 155,846 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Summary for Link PA2: International Drive

Inflow Area = 209,904 sf, 39.23% Impervious, Inflow Depth > 2.15" for 10-YR event
 Inflow = 11.99 cfs @ 12.09 hrs, Volume= 37,672 cf
 Primary = 11.99 cfs @ 12.09 hrs, Volume= 37,672 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

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Type III 24-hr 25-YR Rainfall=6.16"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST 2.2: Runoff Area=26,313 sf 81.98% Impervious Runoff Depth>5.11"
 Tc=5.0 min CN=91 Runoff=3.44 cfs 11,208 cf

SubcatchmentPOST-1.0: Runoff Area=16,866 sf 57.80% Impervious Runoff Depth>4.13"
 Tc=5.0 min CN=82 Runoff=1.87 cfs 5,808 cf

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>2.11"
 Tc=11.4 min CN=61 Runoff=0.67 cfs 2,605 cf

SubcatchmentPRE 1.3: Runoff Area=2,771 sf 28.11% Impervious Runoff Depth>2.56"
 Tc=5.0 min UI Adjusted CN=66 Runoff=0.19 cfs 591 cf

SubcatchmentPRE 2.1: Runoff Area=183,591 sf 33.11% Impervious Runoff Depth>3.22"
 Tc=5.0 min CN=73 Runoff=15.93 cfs 49,256 cf

SubcatchmentPRE-1.1: Runoff Area=613,233 sf 68.75% Impervious Runoff Depth>4.56"
 Flow Length=1,573' Tc=9.6 min CN=86 Runoff=64.07 cfs 232,795 cf

Pond 1P: DETENTION POND Peak Elev=47.16' Storage=110,252 cf Inflow=64.82 cfs 234,717 cf
 Outflow=14.24 cfs 212,381 cf

Pond 2P: STORMTECHINFILTRATION Peak Elev=78.10' Storage=2,998 cf Inflow=3.08 cfs 10,830 cf
 Discarded=0.04 cfs 2,370 cf Primary=1.94 cfs 6,687 cf Outflow=1.98 cfs 9,057 cf

Pond 3P: PCB3 Peak Elev=78.26' Inflow=3.44 cfs 11,208 cf
 Primary=3.08 cfs 10,830 cf Secondary=0.53 cfs 378 cf Outflow=3.44 cfs 11,208 cf

Pond 4P: PDMH4 Peak Elev=77.70' Inflow=2.44 cfs 7,064 cf
 12.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=2.44 cfs 7,064 cf

Pond RG-1: Peak Elev=68.36' Storage=2,035 cf Inflow=1.87 cfs 5,808 cf
 Discarded=0.05 cfs 2,460 cf Primary=1.02 cfs 1,922 cf Outflow=1.07 cfs 4,382 cf

Link PA1: Goose Bay Drive Inflow=14.50 cfs 215,577 cf
 Primary=14.50 cfs 215,577 cf

Link PA2: International Drive Inflow=18.24 cfs 56,320 cf
 Primary=18.24 cfs 56,320 cf

Total Runoff Area = 857,603 sf Runoff Volume = 302,261 cf Average Runoff Depth = 4.23"
40.01% Pervious = 343,131 sf 59.99% Impervious = 514,472 sf

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Type III 24-hr 50-YR Rainfall=7.38"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

SubcatchmentPOST 2.2: Runoff Area=26,313 sf 81.98% Impervious Runoff Depth>6.31"
 Tc=5.0 min CN=91 Runoff=4.20 cfs 13,835 cf

SubcatchmentPOST-1.0: Runoff Area=16,866 sf 57.80% Impervious Runoff Depth>5.27"
 Tc=5.0 min CN=82 Runoff=2.36 cfs 7,407 cf

SubcatchmentPRE 1.2: Runoff Area=14,829 sf 0.00% Impervious Runoff Depth>2.97"
 Tc=11.4 min CN=61 Runoff=0.97 cfs 3,673 cf

SubcatchmentPRE 1.3: Runoff Area=2,771 sf 28.11% Impervious Runoff Depth>3.50"
 Tc=5.0 min UI Adjusted CN=66 Runoff=0.26 cfs 809 cf

SubcatchmentPRE 2.1: Runoff Area=183,591 sf 33.11% Impervious Runoff Depth>4.26"
 Tc=5.0 min CN=73 Runoff=21.07 cfs 65,204 cf

SubcatchmentPRE-1.1: Runoff Area=613,233 sf 68.75% Impervious Runoff Depth>5.72"
 Flow Length=1,573' Tc=9.6 min CN=86 Runoff=79.63 cfs 292,522 cf

Pond 1P: DETENTION POND Peak Elev=47.94' Storage=129,430 cf Inflow=81.23 cfs 295,804 cf
 Outflow=23.60 cfs 269,516 cf

Pond 2P: STORMTECHINFILTRATION Peak Elev=78.41' Storage=3,191 cf Inflow=3.16 cfs 12,724 cf
 Discarded=0.04 cfs 2,471 cf Primary=2.00 cfs 8,451 cf Outflow=2.04 cfs 10,922 cf

Pond 3P: PCB3 Peak Elev=78.52' Inflow=4.20 cfs 13,835 cf
 Primary=3.16 cfs 12,724 cf Secondary=1.26 cfs 1,112 cf Outflow=4.20 cfs 13,835 cf

Pond 4P: PDMH4 Peak Elev=78.12' Inflow=3.20 cfs 9,563 cf
 12.0" Round Culvert n=0.013 L=40.0' S=0.0050 '/' Outflow=3.20 cfs 9,563 cf

Pond RG-1: Peak Elev=68.46' Storage=2,257 cf Inflow=2.36 cfs 7,407 cf
 Discarded=0.06 cfs 2,572 cf Primary=1.63 cfs 3,282 cf Outflow=1.68 cfs 5,854 cf

Link PA1: Goose Bay Drive Inflow=24.06 cfs 273,997 cf
 Primary=24.06 cfs 273,997 cf

Link PA2: International Drive Inflow=23.94 cfs 74,767 cf
 Primary=23.94 cfs 74,767 cf

Total Runoff Area = 857,603 sf Runoff Volume = 383,450 cf Average Runoff Depth = 5.37"
40.01% Pervious = 343,131 sf 59.99% Impervious = 514,472 sf

2.2 Stormwater Treatment

The stormwater management system has been designed to provide stormwater treatment to meet NHDES AoT Regulations as required by the Pease Development Authority. Stormwater treatment for each development area is detailed Sections 2.2.1 through 2.2.3.

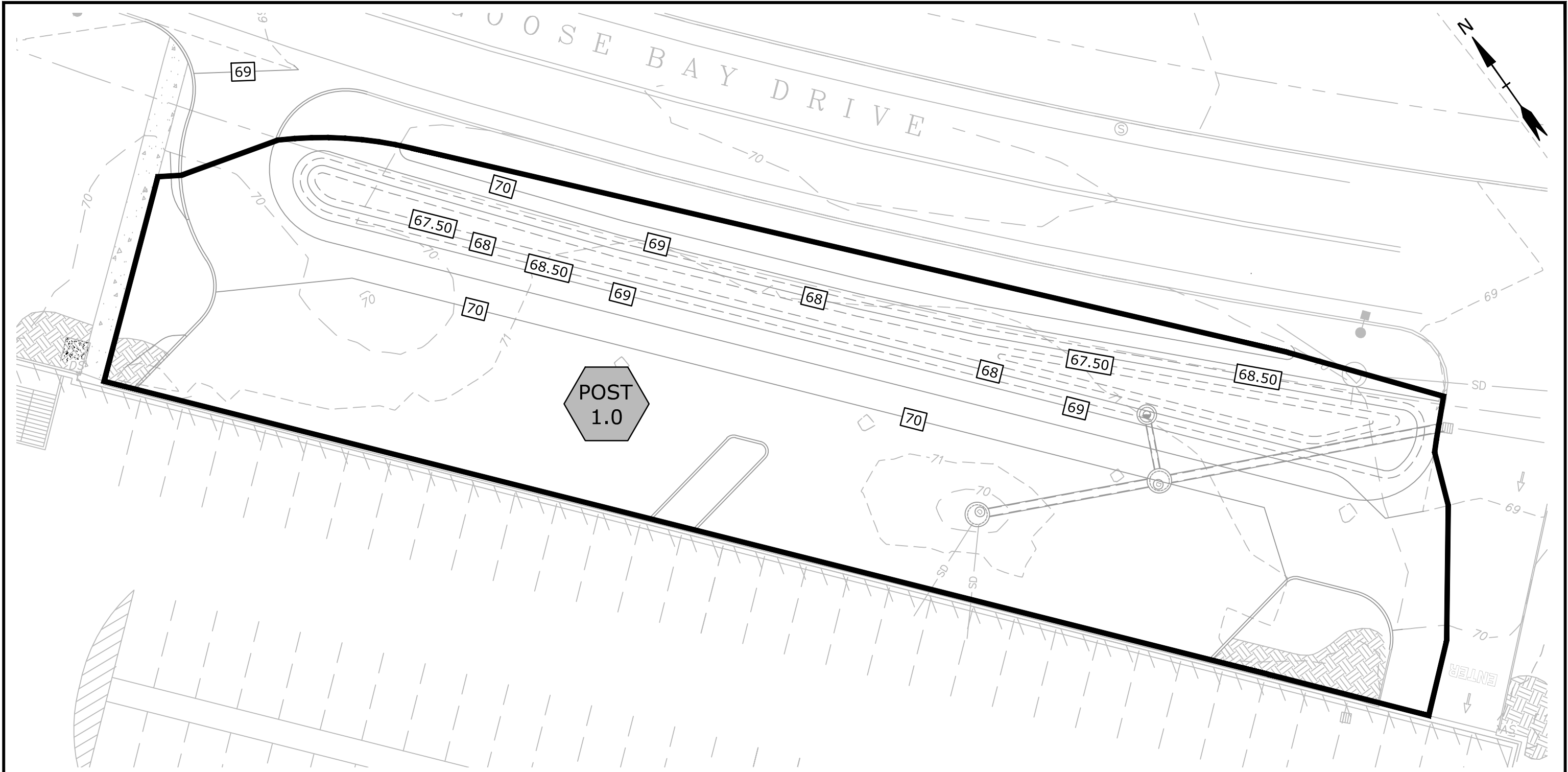
2.2.1 Northern Expansion

Runoff generated from the proposed impervious area within the northern expansion area will be treated by a proposed rain garden. The rain garden has been sized in order to treat the Water Quality Volume (WQV), as referenced in Table 2.2.1. The subcatchment area and rain garden footprint within this expansion can be referenced in Figure 2.1.

Table 2.2.1 - Treatment Area Proposed Rain Garden Water Quality Volume Calculations		
VARIABLE	DESCRIPTION	VALUE
P	1 Inch of Rainfall	1 inch
A	Total Area Draining to Design Structure	0.39 AC
A _i	Impervious Area Draining to Design Structure	0.22 AC
I	% Impervious Area Draining to Design Structures	57%
R _v	Runoff Coefficient, $R_v = 0.05 + (0.9 \cdot I)$	0.56
WQV	Water Quality Volume, $WQV = P \cdot A \cdot R_v$	789 CF
V	Volume of Storage¹	1,416 CF

¹Storage above the filter media but below the overflow invert, as well as filter media void space

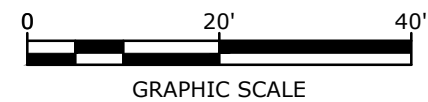
Dec 03, 2019 8:23am Plotted By: NAHansen Tighe & Bond, Inc. J:\L\0700 Lonza Biologics Expansion was 1576F019_Parking Expansion\Drawings_Figures\AutoCAD\Sheet\0700-019-C-DSCN.dwg



LEGEND

— POST-DEVELOPMENT WATERSHED BOUNDARY

POST 1.0 POST-DEVELOPMENT WATERSHED AREA



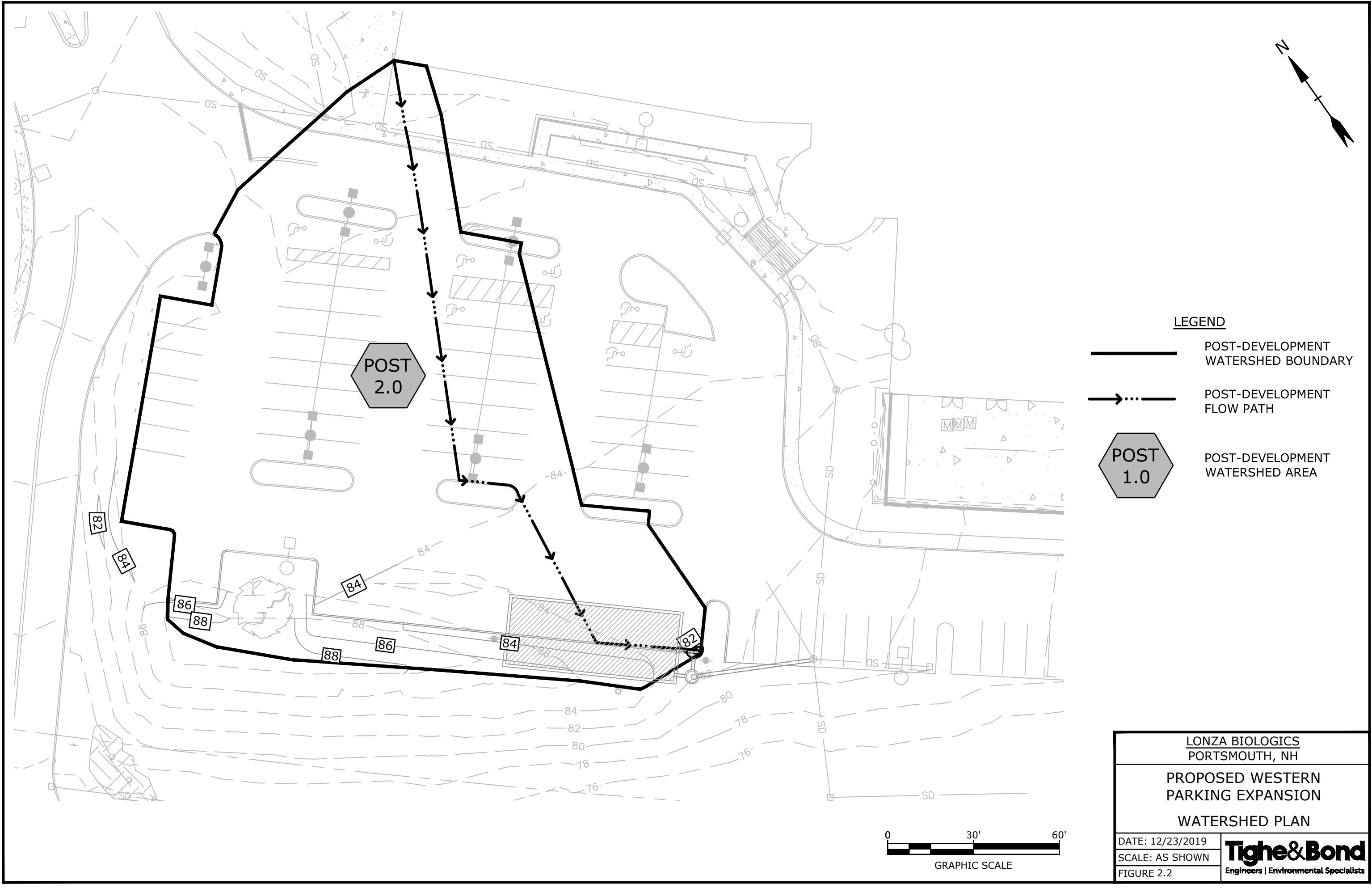
LONZA BIOLOGICS PORTSMOUTH, NH	
PROPOSED NORTHERN PARKING EXPANSION	
WATERSHED PLAN	
DATE: 12/23/2019	Tighe & Bond Engineers Environmental Specialists
SCALE: AS SHOWN	
FIGURE 2.1	

2.2.2 Western Expansion




Runoff generated from both the proposed and existing impervious areas within the Western Expansion will be captured in a new deep sump catch basin with oil separator hood which will be tied to an underground infiltration system to provide stormwater treatment and to mitigate additional flows generated by the new pavement. The underground Stormtech chamber system has been sized to treat the Water Quality Volume (WQV), as referenced in Table 2.2.2. The subcatchment area for this expansion can be referenced in Figure 2.2.

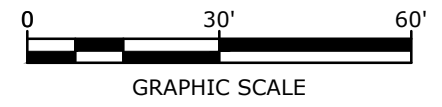
Table 2.2.2 - Treatment Area Proposed Underground Chamber System Water Quality Volume Calculations		
VARIABLE	DESCRIPTION	VALUE
P	1 Inch of Rainfall	1 inch
A	Total Area Draining to Design Structure	0.60 AC
A _i	Impervious Area Draining to Design Structure	0.49 AC
I	% Impervious Area Draining to Design Structures	82%
R _v	Runoff Coefficient, $R_v = 0.05 + (0.9 \cdot I)$	0.79
WQV	Water Quality Volume, $WQV = P \cdot A \cdot R_v$	1,710 CF
V	Volume of Storage¹	1,742 CF

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LEGEND

-  POST-DEVELOPMENT WATERSHED BOUNDARY
-  POST-DEVELOPMENT FLOW PATH
-  POST 1.0 POST-DEVELOPMENT WATERSHED AREA



LONZA BIOLOGICS PORTSMOUTH, NH	
PROPOSED WESTERN PARKING EXPANSION	
WATERSHED PLAN	
DATE: 12/23/2019	Tighe & Bond Engineers Environmental Specialists
SCALE: AS SHOWN	
FIGURE 2.2	

2.2.3 Eastern Expansion

Runoff generated from both proposed and existing impervious areas within the Eastern Expansion will be treated by a Contech Jellyfish Filter filtration system. The Jellyfish Filter was sized to treat the Water Quality Flow (WQF), as shown in Table 2.2.3. The Jellyfish Filter Design Summary prepared by Contech Engineered Solutions is also provided. The subcatchment area for this expansion can be referenced in Figure 2.3.

Table 2.2.3 - Treatment Area Proposed Filtration System Water Quality Flow Calculations		
VARIABLE	DESCRIPTION	VALUE
P	1 Inch of Rainfall	1 inch
A	Total Area Draining to Design Structure	0.16 AC
Ai	Impervious Area Draining to Design Structure	0.13 AC
I	% Impervious Area Draining to Design Structures	84%
Rv	Runoff Coefficient, $R_v = 0.05 + (0.9 \cdot I)$	0.80
WQV	Water Quality Volume, $WQV = P \cdot A \cdot R_v$	467 cf
Tc	Time of Concentration (min.)	5.0
qu	Unit Peak Discharge (cfs/mi ² /in)	700
WQF	Total Treatment Flow, $WQF = WQV \cdot q_u$	0.141 cfs



Project Name:	Lonza Biologics	Date:	11/25/19
Site Designation:	Eastern Parking Expansion	Designer:	DRA
County or Independent City:	Portsmouth		
State:	NH		

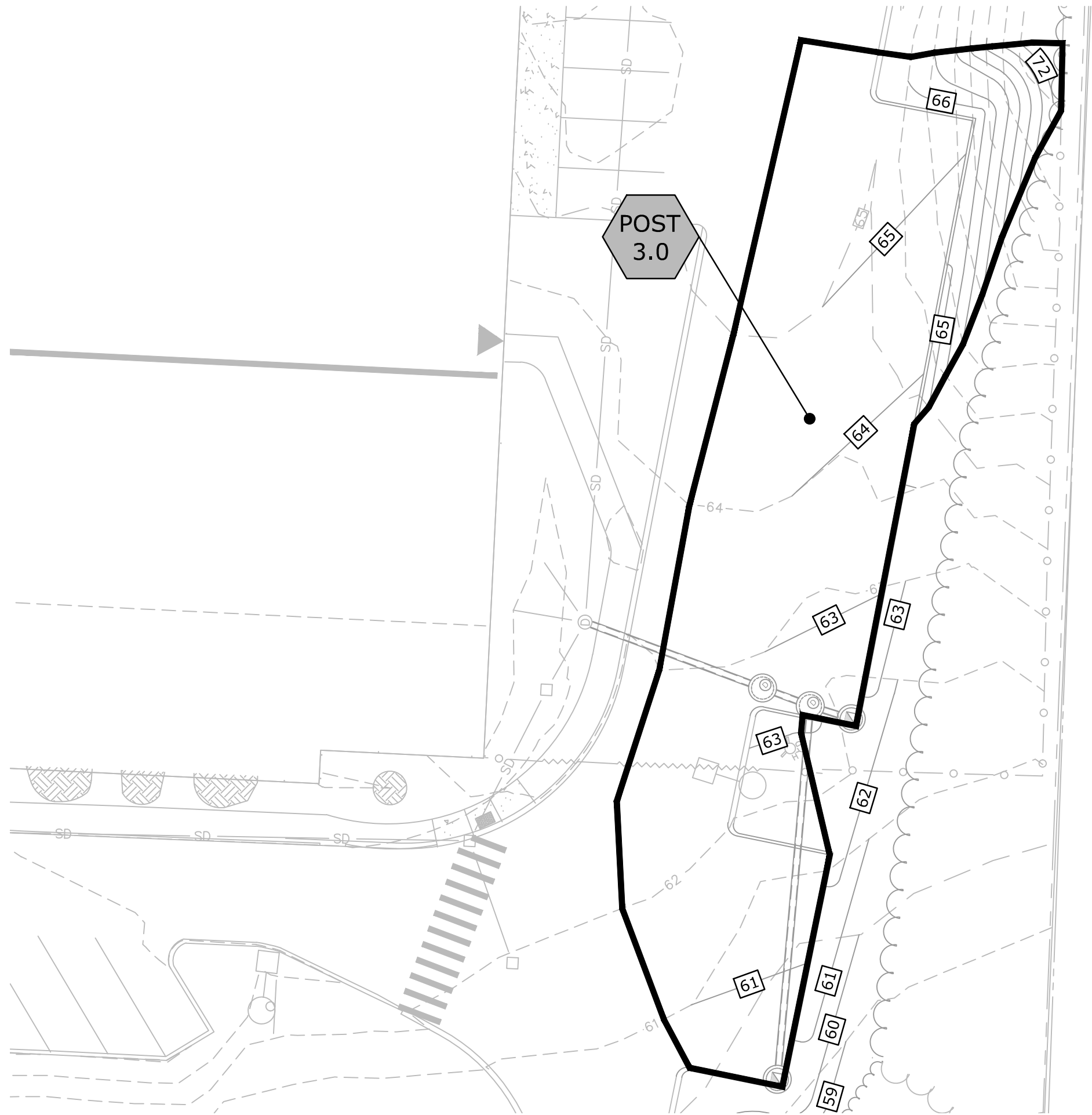
Flow Based Data:

Water Quality Flow (cfs)	0.14
Total Drainage Area, A (ac)	0.16
Post Development Impervious Area, A _i (ac)	0.13
Pervious Area, A _p (ac)	0.03
Impervious Runoff Coefficient, R _v	0.95
Pervious Runoff Coefficient, R _v	0.25
% Impervious	81%
Runoff Coefficient, R _c	0.82



Flow Based Filter Sizing:

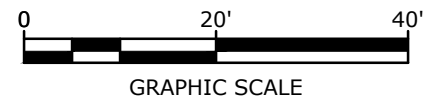
Filter Type	Jellyfish
Structure Type	Manhole
Cartridge Length	54"
# Hi-Flo Cartridges Required	1
# Draindown Cartridges Required	1
Recommended Model	JF4-1-1
Maximum Water Quality Flow	0.27 cfs

Dec 03, 2019 8:25am Plotted By: NAHansen
Tighe & Bond, Inc. J:\0700 Lonza Biologics Expansion was 1576F019_Parking Expansion\Drawings_Figures\AutoCAD\Sheet\0700-019-C-DSCGN.dwg



LEGEND

-  POST-DEVELOPMENT WATERSHED BOUNDARY
-  POST-DEVELOPMENT WATERSHED AREA



LONZA BIOLOGICS PORTSMOUTH, NH	
PROPOSED EASTERN PARKING EXPANSION	
WATERSHED PLAN	
DATE: 12/23/2019	Tighe&Bond Engineers Environmental Specialists
SCALE: AS SHOWN	
FIGURE 2.3	

3.0 Conclusion

The proposed project will result in a reduction in post-development peak runoff rates from the pre-development condition. The impervious areas resulting from the proposed project and an equivalent amount of existing impervious area will be treated as required by the Pease Development Authority. The proposed raingarden, underground infiltration system and stormwater filtration system will treat the surface runoff from the three expansion areas prior to discharging to the existing on-site stormwater system.