L-0700-027
June 17, 2024

Mr. Peter Britz, Director of Planning & Sustainability
City of Portsmouth Planning Department
1 Junkins Avenue
Portsmouth, New Hampshire 03801

Re: **Site Review Permit Application**
Lonza Biologics – Proposed Industrial Wastewater Equalization System

Dear Peter:

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 the above referenced project:

- One (1) copy of the PDA Application for Site Review, dated June 17, 2024;
- One (1) full-size & one (1) half-size copy of the Site Plan Set, dated June 17, 2024;
- One (1) copy of the Drainage Memo, dated June 17, 2024;
- One (1) copy of the Operations and Maintenance Plan, dated June 17, 2024;
- One (1) application fee calculation form;

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 is to expand Lonza Biologics existing wastewater equalization system to better support the needs of their current operation.

The proposed project includes the addition of two (2) industrial equalization (EQ) tanks and one (1) pump house located between the EQ Tanks. The construction of the EQ Tanks will require portions of the existing detention basin to be regraded. A new outlet structure is being proposed to support the resized detention basin and a stormwater filtration system is proposed post detention, which is sized to provide treatment to the stormwater discharging from the detention basin, where none currently exists. The system will ultimately tie into the existing closed drainage system on site that discharges into Hodgson Brook.

On June 13, 2024, the PDA Board granted conceptual approval for these improvements. We respectfully request to be placed on the Technical Advisory Committee (TAC) meeting agenda for July 2, 2024. If you have any questions or need any additional information, please contact Neil Hansen by phone at (603) 294-9213 or by email at nahansen@tighebond.com.

Sincerely,

TIGHE & BOND, INC.

Neil A. Hansen, PE
Project Manager

Patrick M. Crimmins, PE
Vice President

Copy: Lonza Biologics (via email)
MWH Constructors (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: 603-610-5129	Business Phone: 603-433-8818
Mobile Phone:	Mobile Phone:
Fax:	Fax:

Site Information

Portsmouth Tax Map: 305	Lot #: 006	Zone: Airport, Business, Commercial
Site Address / Location : 101 International Drive, Portsmouth, NH 03801		
Site Address / Location :		Area of On-site Wetlands: 0 SF

Activity Information

Change of Use: Yes [ ] No [X]

Existing Use: Office/Research/Manufacturing

Proposed Use: Office/Research/Manufacturing

Description of Project:

The proposed project includes the addition of 2 industrial equalization (EQ) tanks and 1 pump house located between the EQ Tanks. The construction of the Tanks will require portions of the existing detention basin to be regraded. A new outlet structure is being proposed to support the resized detention basin and a stormwater filtration system is proposed post detention. The system will ultimately tie into the existing closed drainage system on site that discharges into Hodgson Brook.

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.

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.

Kurt J Kimball
Signature of Applicant

6/17/24
Date

KURT KIMBALL
Printed Name

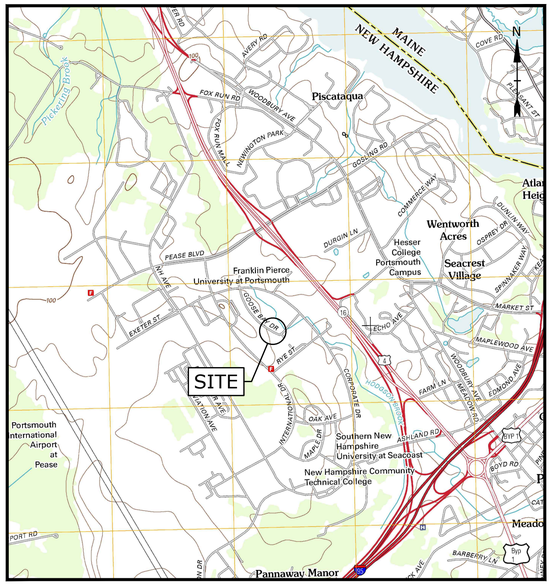
N:\Engineer\ ApplicationforSiteReview.xlsx

PROPOSED INDUSTRIAL WASTEWATER EQUALIZATION SYSTEM

LONZA BIOLOGICS
101 INTERNATIONAL DRIVE
PORTSMOUTH, NEW HAMPSHIRE
JUNE 17, 2024

LIST OF DRAWINGS		
SHEET NO.	SHEET TITLE	LAST REVISED
	COVER SHEET	6/17/2024
1 OF 1	TOPOGRAPHIC PLAN	3/22/2024
C-101	EXISTING CONDITIONS PLAN	6/17/2024
C-102	SITE AND LANDSCAPE PLAN	6/17/2024
C-103	GRADING, DRAINAGE, UTILITY AND EROSION CONTROL PLAN	6/17/2024
C-501	EROSION CONTROL NOTES AND DETAILS SHEET	6/17/2024
C-502	DETAILS SHEET	6/17/2024
C-503	DETAILS SHEET	6/17/2024
C-504	DETAILS SHEET	6/17/2024
A-102	ARCHITECTURAL OVERALL PLAN	6/17/2024
A-901	3D VIEW - 2	6/17/2024
S-101	STRUCTURAL PLAN	6/17/2024
S-301	STRUCTURAL SECTIONS	6/17/2024

LIST OF PERMITS		
LOCAL	STATUS	DATE
SITE PLAN REVIEW PERMIT	PENDING	
STATE		
NHDES - ALTERATION OF TERRAIN AMENDMENT		
NHDES - WETLAND DREDGE/FILL		



LOCATION MAP
SCALE: 1" = 2,000'

LESSOR:	PEASE DEVELOPMENT AUTHORITY 55 INTERNATIONAL DRIVE PORTSMOUTH, NEW HAMPSHIRE 03801
APPLICANT:	LONZA BIOLOGICS 101 INTERNATIONAL DRIVE PORTSMOUTH, NH 03801
CIVIL ENGINEER:	Tighe&Bond 177 CORPORATE DRIVE PORTSMOUTH, NEW HAMPSHIRE 03801
SURVEYOR:	DOUCET SURVEY, INC. 102 KENT PLACE NEWMARKET, NEW HAMPSHIRE 03857

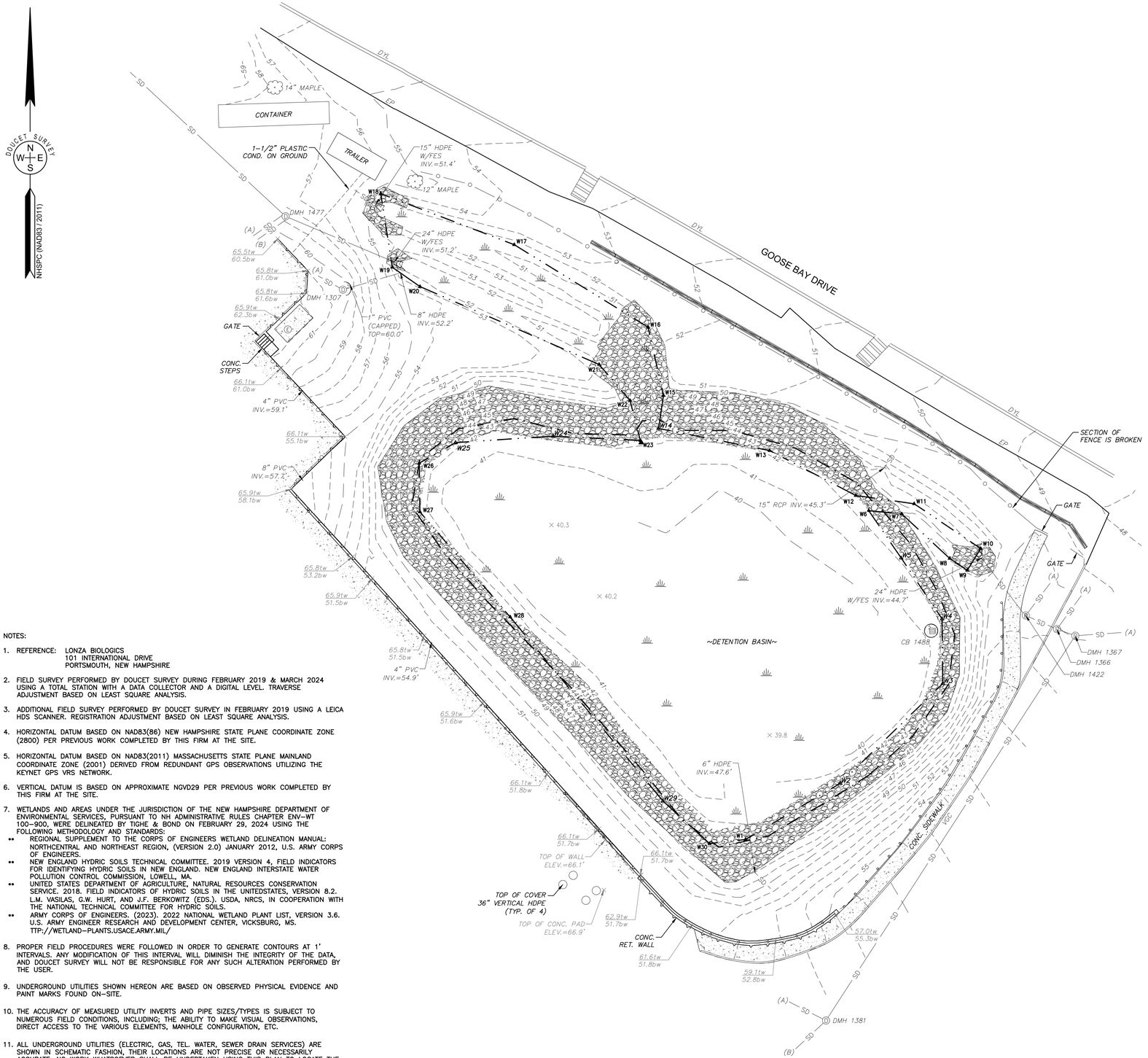
STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS – No. 12378 – LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN – No. 15227 – LICENSED PROFESSIONAL ENGINEER
06/17/2024

TAC SUBMISSION
COMPLETE SET 13 SHEETS

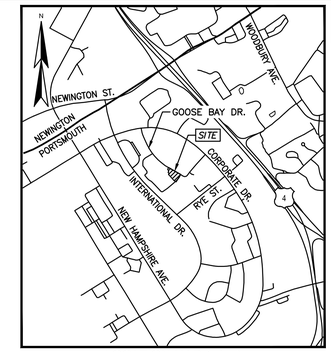
T&B PROJECT NO: L-0700-027

Last Save Date: June 13, 2024 10:50 AM By: NWILCOX
Plot Date: Monday, June 17, 2024 - 2:47pm By: Nate Wilcox
T&B File Location: J:\L\L0700 Lonza Biologics Expansion was 1576F\027 EQ Tank PDB 30%\Drawings\ACAD Sheets\L-0700-027-C-COVR.dwg Layout Tab: DSGN-CS



NOTES:

1. REFERENCE: LONZA BIOLOGICS
   101 INTERNATIONAL DRIVE
   PORTSMOUTH, NEW HAMPSHIRE
2. FIELD SURVEY PERFORMED BY DOUCET SURVEY DURING FEBRUARY 2019 & MARCH 2024 USING A TOTAL STATION WITH A DATA COLLECTOR AND A DIGITAL LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
3. ADDITIONAL FIELD SURVEY PERFORMED BY DOUCET SURVEY IN FEBRUARY 2019 USING A LEICA HDS SCANNER. REGISTRATION ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
4. HORIZONTAL DATUM BASED ON NAD83(86) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) PER PREVIOUS WORK COMPLETED BY THIS FIRM AT THE SITE.
5. HORIZONTAL DATUM BASED ON NAD83(2011) MASSACHUSETTS STATE PLANE MAINLAND COORDINATE ZONE (2001) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
6. VERTICAL DATUM IS BASED ON APPROXIMATE NGVD29 PER PREVIOUS WORK COMPLETED BY THIS FIRM AT THE SITE.
7. WETLANDS AND AREAS UNDER THE JURISDICTION OF THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES, PURSUANT TO NH ADMINISTRATIVE RULES CHAPTER ENV-WT 100-900, WERE DELINEATED BY TIGHE & BOND ON FEBRUARY 29, 2024 USING THE FOLLOWING METHODOLOGY AND STANDARDS:
   - REGIONAL SUPPLEMENT TO THE CORPS OF ENGINEERS WETLAND DELINEATION MANUAL: NORTHCENTRAL AND NORTHEAST REGION, (VERSION 2.0) JANUARY 2012, U.S. ARMY CORPS OF ENGINEERS.
   - NEW ENGLAND HYDRIC SOILS TECHNICAL COMMITTEE. 2019 VERSION 4, FIELD INDICATORS FOR IDENTIFYING HYDRIC SOILS IN NEW ENGLAND. NEW ENGLAND INTERSTATE WATER POLLUTION CONTROL COMMISSION, LOWELL, MA.
   - UNITED STATES DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE. 2018. FIELD INDICATORS OF HYDRIC SOILS IN THE UNITEDSTATES, VERSION 8.2. L.M. VASILAS, G.W. HURT, AND J.F. BERKOWITZ (EDS.). USDA, NRCS, IN COOPERATION WITH THE NATIONAL TECHNICAL COMMITTEE FOR HYDRIC SOILS.
   - ARMY CORPS OF ENGINEERS. (2023). 2022 NATIONAL WETLAND PLANT LIST, VERSION 3.6. U.S. ARMY ENGINEER RESEARCH AND DEVELOPMENT CENTER, VICKSBURG, MS. TTP://WETLAND-PLANTS.USACE.ARMY.MIL/
8. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 1' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.
9. UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON OBSERVED PHYSICAL EVIDENCE AND PAINT MARKS FOUND ON-SITE.
10. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
11. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.



LOCATION MAP (n.t.s.)

LEGEND

100	MAJOR CONTOUR LINE
98	MINOR CONTOUR LINE
	RETAINING WALL
O O	CHAIN LINK FENCE
	HANDRAIL
	GUARDRAIL
SD	DRAIN LINE
	EDGE OF DELINEATED WETLAND
	EDGE OF WATER
	WETLAND AREA
	CONCRETE
	RIP RAP
× 100.0	SPOT GRADE
D	DRAIN MANHOLE
	CATCH BASIN
FES	FLARED END SECTION
E	ELECTRIC MANHOLE
	DECIDUOUS TREE
▲A-1	WETLAND FLAG
△ WF9	WETLAND FLAG MISSING AT TIME OF SURVEY (LOCATION PROVIDED BY TIGHE & BOND)
	JERSEY BARRIER
BW	BOTTOM OF WALL ELEVATION
CONC.	CONCRETE
COND.	CONDUIT
DYL	DOUBLE YELLOW LINE
EP	EDGE OF PAVEMENT
HDPE	HIGH DENSITY POLYETHYLENE PIPE
PVC	POLYVINYL CHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
RET. WALL	RETAINING WALL
TOE	TOP OF PIPE ELBOW
TOP	TOP OF PIPE
TW	TOP OF WALL ELEVATION
TYP.	TYPICAL
VGC	VERTICAL GRANITE CURB
(X)	INVERT I.D. CONNECTION UNKNOWN

DRAINAGE STRUCTURES	
DMH 1307	DMH 1422
RIM ELEV.=60.6'	RIM ELEV.=49.9'
WALL 1 TOP=58.9'	WATER ELEV.=45.8'
SMALL OPENING INV.=57.9'	SUMP ELEV.=44.1'
WALL 2 TOP=57.0'	(1366) 24" HDPE INV.=44.5'
WATER ELEV.=56.6'	(OFL) 24" HDPE INV.=44.5'
FLOOR/ TOP OF OVERFLOW INV.=56.5'	(A) 15" HDPE INV.=44.5'
BOTTOM OF OVERFLOW INV.=49.3'	
(A) 6" HDPE INV.=57.1'	DMH 1477
(OFL) 6" HDPE INV.=56.6'	RIM ELEV.=58.6'
	WATER ELEV.=51.9'
DMH 1366	SUMP ELEV.=50.6'
RIM ELEV.=50.0'	(OFL) 24" HDPE INV.=50.9'
TOP OF BAFFLE WALL ELEV.=47.7'	(1596) 15" HDPE INV.=50.9'
WATER ELEV.=45.8'	(A) 12" PVC INV.=50.7'
SUMP ELEV.=44.4'	(B) 12" PVC INV.=50.7'
(1367) 24" HDPE INV.=44.9'	
(A) 15" RCP INV.=44.8'	CB 1488*
(1422) INACCESSIBLE DUE	RIM ELEV.=45.8'
TO BAFFLE WALL	*UNDERWATER AT TIME OF SURVEY
DMH 1367	CB 1596
RIM ELEV.=49.9'	RIM ELEV.=58.8'
WATER ELEV.=45.8'	WATER ELEV.=52.2'
SUMP ELEV.=44.5'	SUMP ELEV.=48.8'
(A) 12" HDPE INV.=45.0'	(A) 6" PVC INV.=54.5'
(1381) 24" HDPE INV.=44.9'	(1477) 15" HDPE INV.=52.2'
(1366) 24" HDPE INV.=44.6'	(B) 12" HDPE INV.=52.1'
DMH 1381	
RIM ELEV.=57.3'	
WATER ELEV.=49.8'	
SUMP ELEV.=49.5'	
(A) 24" HDPE INV.=50.2'	
(B) 24" HDPE INV.=49.8'	
(1367) 24" HDPE INV.=49.8'	

20 0 20 40

SCALE: 1 INCH = 20 FT.

TOPOGRAPHIC PLAN

FOR

TIGHE & BOND

AT

LONZA BIOLOGICS

101 INTERNATIONAL DRIVE

PORTSMOUTH, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	C.P.M.	DATE:	MARCH 22, 2024
CHECKED BY:	J.A.G.	DRAWING NO.	7794A
JOB NO.	7794	SHEET	1 OF 1

DOUCET SURVEY LLC
Serving Your Professional Surveying & Mapping Needs
102 Kent Place, Newmarket, NH 03857 (603) 659-6560
Offices in Bedford & Keene, NH and Kennebunk, ME
http://www.doucetsurvey.com

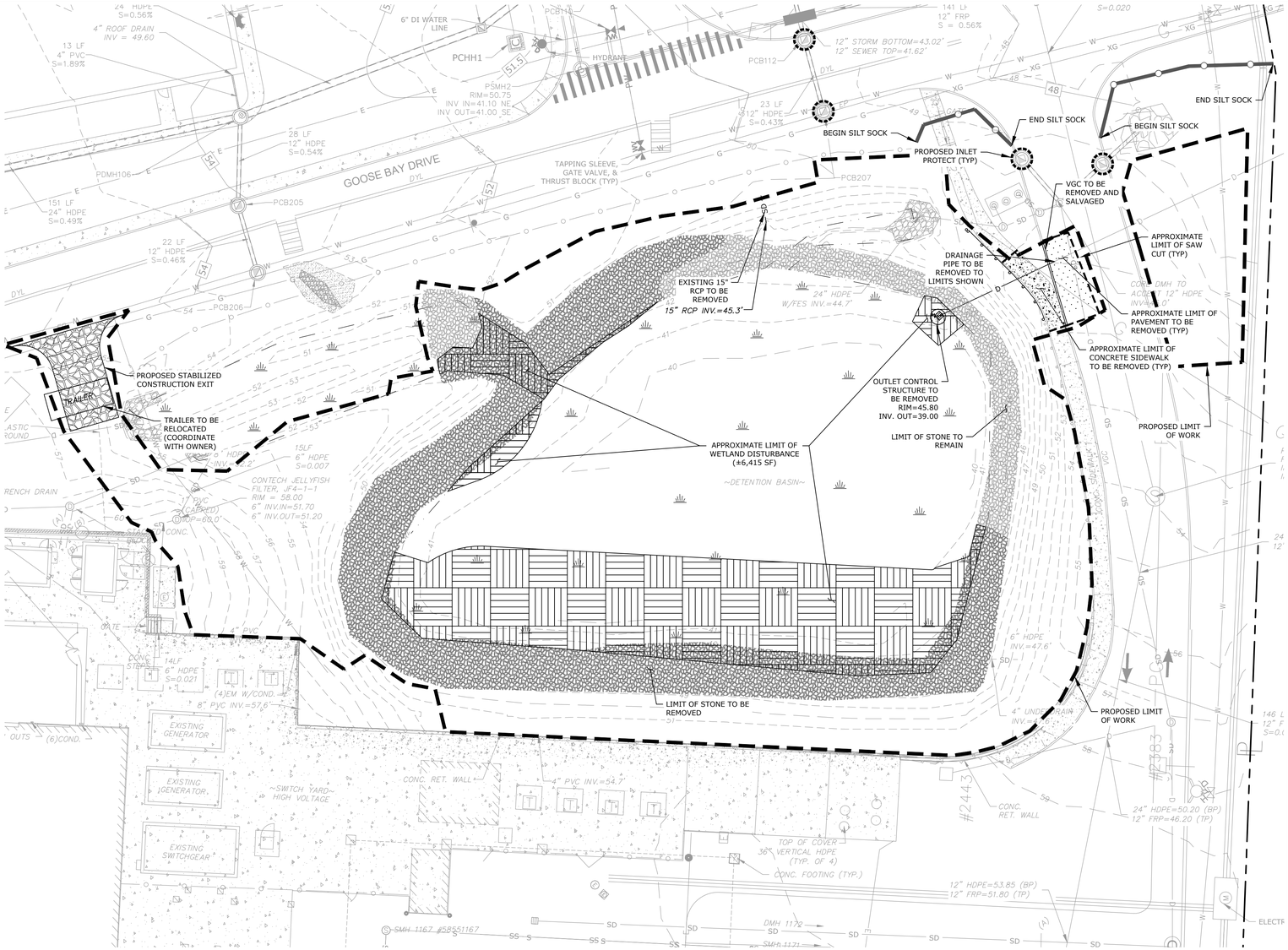
FILE NAME: Y:\PROJECTS\7794.COD\DWG\7794A.dwg LAYOUT NAME: 22X34 TOPO PLAN (1) PLOTTED: Wednesday, June 12, 2024 - 11:58am

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 EXCEPT AS SPECIFIED IN NOTE #22.
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 AND AS SPECIFIED IN NOTE #22.
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, SEWER GREASE TRAP, AND SEWER LINES.
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. AT A MINIMUM A NHDES TEMPORARY DISCHARGE PERMIT IS REQUIRED.
22. ALL EXCESS SOIL RESULTING FROM THE CONSTRUCTION SHALL REMAIN ON SITE. COORDINATE WITH OWNER AND PEASE DEVELOPMENT AUTHORITY ON FINAL LOCATION OF EXCESS MATERIALS. A SOIL MANAGEMENT PLAN SHALL BE PREPARED FOR THE RELOCATION OF ANY CONTAMINATED MATERIALS TO BE RELOCATED DURING CONSTRUCTION.
23. REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.
24. THE CONTRACTOR SHALL PHASE DEMOLITION AND CONSTRUCTION AS REQUIRED TO PROVIDE CONTINUOUS SERVICE TO THE EXISTING BUSINESS THROUGHOUT THE CONSTRUCTION PERIOD. EXISTING BUSINESS SERVICES INCLUDE, BUT ARE NOT LIMITED TO ELECTRICAL, COMMUNICATION, FIRE PROTECTION, DOMESTIC WATER AND SEWER SERVICES. TEMPORARY SERVICES, IF REQUIRED, SHALL COMPLY WITH ALL FEDERAL, STATE, LOCAL AND UTILITY COMPANY STANDARDS. CONTRACTOR SHALL PROVIDE DETAILED CONSTRUCTION SCHEDULE TO OWNER PRIOR TO ANY DEMOLITION/CONSTRUCTION ACTIVITIES AND SHALL COORDINATE TEMPORARY SERVICES TO ABUTTERS WITH THE UTILITY COMPANY AND AFFECTED. ABUTTER.
25. THE CONTRACTOR SHALL WASH ALL STONE THAT IS TO BE REMOVED FREE OF SOIL PRIOR TO REMOVAL FROM SITE.

EXISTING CONDITIONS NOTES:

1. THE EXISTING CONDITIONS INFORMATION SHOWN IS BASED ON SURVEY DRAWINGS PROVIDED BY DOUCET SURVEY TITLED "FOR TIGHE & BOND", DATED MAY 22, 2024.
2. THE DRAWINGS ARE BASED ON THE FOLLOWING DATUMS: HORIZONTAL NAD83; VERTICAL NAVD88.
3. CONTOUR LINES INDICATE ELEVATION CHANGE IN ONE FOOT INTERVALS.



LEGEND

	APPROXIMATE LIMIT OF PROPOSED SAW CUT
	LIMIT OF WORK
	PROPOSED SILT SOCK
	APPROXIMATE LIMIT OF PAVEMENT/CONCRETE TO BE REMOVED
	APPROXIMATE LIMIT OF WETLAND DISTURBANCE
	INLET PROTECTION SILT SACK
TBR	TO BE REMOVED
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
DMH	DRAIN MANHOLE
CB	CATCH BASIN
	EXISTING TREES/SHRUBS

Tighe&Bond

N

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS – No. 12378 – LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN – No. 15227 – LICENSED PROFESSIONAL ENGINEER
06/17/2024

0 20' 40'
GRAPHIC SCALE

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L0700-027-C-DSGN.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

EXISTING CONDITIONS, DEMOLITION, AND EROSION CONTROL PLAN

SCALE: AS SHOWN

C-101

Last Saved: 6/14/2024
Printed: June 17, 2024-1:33pm By: NWilcox
Tighe & Bond:J:\LL\0700 Lonza Biologics Expansion was 1576F\027_EQ Tank PDB 30%\Drawings\ACAD Sheets\L0700-027-C-DSGN.dwg

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

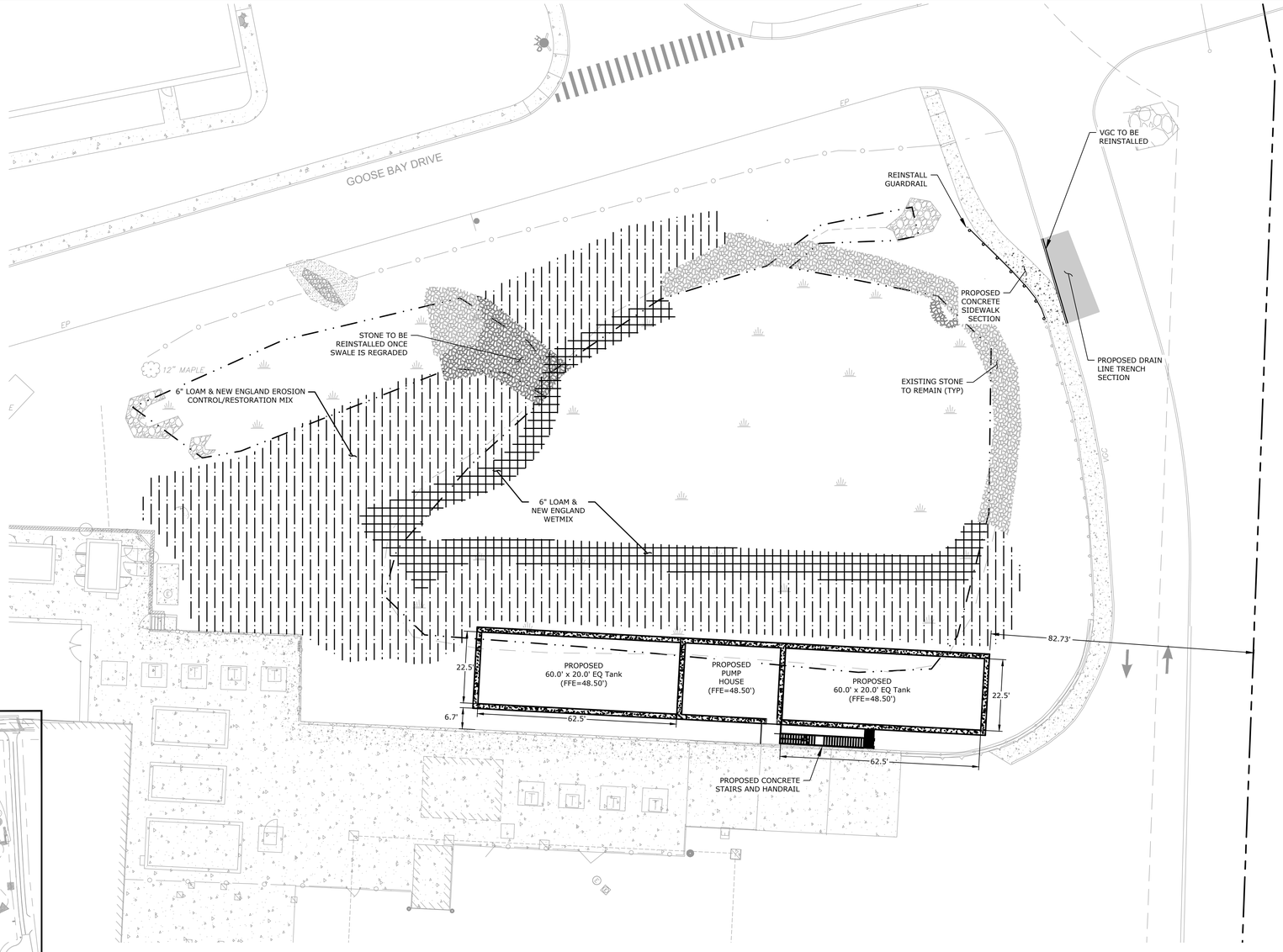
DEVELOPMENT STANDARDS

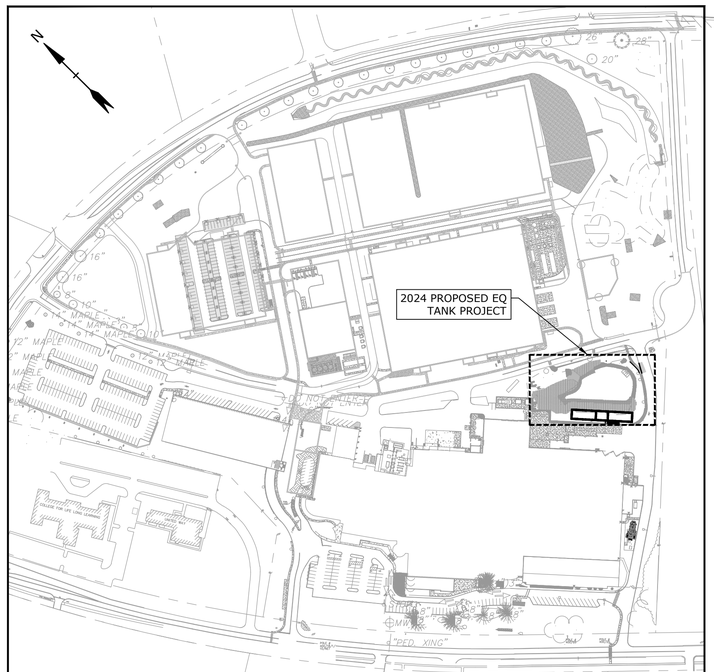
AREA, YARD, AND HEIGHT REQUIREMENTS

	REQUIRED/ALLOWED	PROPOSED/PROVIDED
MINIMUM LOT AREA	5 ACRES	46.02 ACRES
MINIMUM LOT FRONTAGE	200 FEET	1038 FEET (EXISTING)
MINIMUM FRONT YARD	70 FEET	112± FEET (EXISTING)
MINIMUM SIDE YARD	30 FEET	30± FEET (EXISTING)
MINIMUM REAR YARD	50 FEET	50± FEET (EXISTING)
MAXIMUM BUILDING HEIGHT	FAA CRITERIA	86 FEET (EXISTING)
MINIMUM OPEN SPACE	25% OF LOT AREA	38.1%

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.
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. STRIPE PARKING AREAS AS SHOWN, INCLUDING PARKING SPACES AND ARROWS SHALL BE CONSTRUCTED USING WHITE TRAFFIC PAINT. STOP BARS SHALL BE THERMOPLASTIC MATERIAL. THERMOPLASTIC MATERIAL SHALL MEET THE REQUIREMENTS OF AASHTO AASHTO M249. (ALL MARKINGS EXCEPT STOP BARS TO BE CONSTRUCTED USING WHITE TRAFFIC PAINT. ALL TRAFFIC PAINT SHALL MEET THE REQUIREMENTS OF AASHTO M248 TYPE "F").
12. ALL PAVEMENT MARKINGS AND SIGNS TO CONFORM TO "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES", "STANDARD ALPHABETS FOR HIGHWAY SIGNS AND PAVEMENT MARKINGS", AND THE AMERICANS WITH DISABILITIES ACT REQUIREMENTS, LATEST EDITIONS.
13. IF A CRANE IS TO BE UTILIZED FOR CONSTRUCTION, CONTRACTOR SHALL SUBMIT FAA FORM 7460-1.





KEY PLAN

GRAVEL WETLAND PLANTING PLAN

SPECIES	QUANTITY/ SPACING
NEW ENGLAND WETMIX, WETLAND SEED MIX OR EQUIVALENT	18 LB/ACRE
NEW ENGLAND EROSION CONTROL/RESTORATION MIX FOR DETENTION BASIN AND MOIST SITES OR EQUIVALENT	35 LB/ACRE

LEGEND

	PROPERTY LINE
	PROPOSED EDGE OF PAVEMENT
	PROPOSED BITUMINOUS SIDEWALK
	PROPOSED PAVEMENT SECTION
	PROPOSED CONCRETE PAD
	PROPOSED LOAM AND SEED
	PROPOSED STONE SECTION
	PROPOSED BUILDING
BLDG	BUILDING
TYP	TYPICAL
COORD	COORDINATE
VGC	VERTICAL GRANITE CURB
SF	SQUARE FOOT
W/	WITH
EQ	EQUALIZATION

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 – LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN No. 15227 – LICENSED PROFESSIONAL ENGINEER
06/17/2024

0 20' 40'
GRAPHIC SCALE

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L0700-027-C-DSGN.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

SITE AND LANDSCAPE PLAN

SCALE: AS SHOWN

C-102

EROSION CONTROL NOTES:

1. INSTALL EROSION CONTROL BARRIERS AS SHOWN AS FIRST ORDER OF WORK.
2. SEE GENERAL EROSION CONTROL NOTES ON "EROSION CONTROL NOTES & DETAILS SHEET".
3. PROVIDE INLET PROTECTION AROUND ALL EXISTING AND PROPOSED CATCH BASIN INLETS WITHIN THE WORK LIMITS AS WELL AS CATCH BASINS/CURB INLETS THAT RECEIVE RUNOFF FROM CONSTRUCTION ACTIVITIES. MAINTAIN FOR THE DURATION OF THE PROJECT.
4. INSTALL STABILIZED CONSTRUCTION EXIT(S).
5. INSPECT INLET PROTECTION AND PERIMETER EROSION CONTROL MEASURES DAILY 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.
6. ALL DISTURBED AREAS NOT TO BE PAVED OR OTHERWISE TREATED SHALL RECEIVE 6" LOAM, SEED, FERTILIZER AND MULCH.
7. CONSTRUCT EROSION CONTROL BLANKET ON ALL SLOPES STEEPER THAN 3:1.
8. PRIOR TO ANY WORK OR SOIL DISTURBANCE COMMENCING ON THE SUBJECT PROPERTY, INCLUDING MOVING OF EARTH, THE APPLICANT SHALL INSTALL ALL EROSION AND SILTATION MITIGATION AND CONTROL MEASURES AS REQUIRED BY STATE AND LOCAL PERMITS AND APPROVALS.
9. CONTRACTOR SHALL BE RESPONSIBLE TO CONTROL DUST AND WIND EROSION THROUGHOUT THE CONSTRUCTION PERIOD. DUST CONTROL MEASURES SHALL INCLUDE, BUT ARE NOT LIMITED TO, SPRINKLING WATER ON UNSTABLE SOILS SUBJECT TO ARID CONDITIONS.
10. THE CONTRACTOR SHALL REMOVE AND PROPERLY DISPOSE OF ALL TEMPORARY EROSION CONTROL DEVICES UPON COMPLETION OF CONSTRUCTION.
11. ALL CATCH BASIN SUMPS AND PIPING SHALL BE THOROUGHLY CLEANED TO REMOVE ALL SEDIMENT AND DEBRIS AFTER THE PROJECT HAS BEEN FULLY PAVED. PROVIDE COPIES OF REPORT TO PEASE DEVELOPMENT AUTHORITY.
12. TEMPORARY SOIL STOCKPILE SHALL BE SURROUNDED WITH PERIMETER CONTROLS AND SHALL BE STABILIZED BY TEMPORARY EROSION CONTROL SEEDING. STOCKPILE AREAS TO BE LOCATED AS FAR AS POSSIBLE FROM THE DELINEATED EDGE OF WETLANDS.
13. SAFETY FENCING SHALL BE PROVIDED AROUND STOCKPILES OVER 10 FT.
14. CONCRETE TRUCKS WILL BE REQUIRED TO WASH OUT (IF NECESSARY) SHOOTS ONLY WITHIN AREAS WHERE CONCRETE HAS BEEN PLACED. NO OTHER WASH OUT WILL BE ALLOWED.

GRADING AND DRAINAGE NOTES:

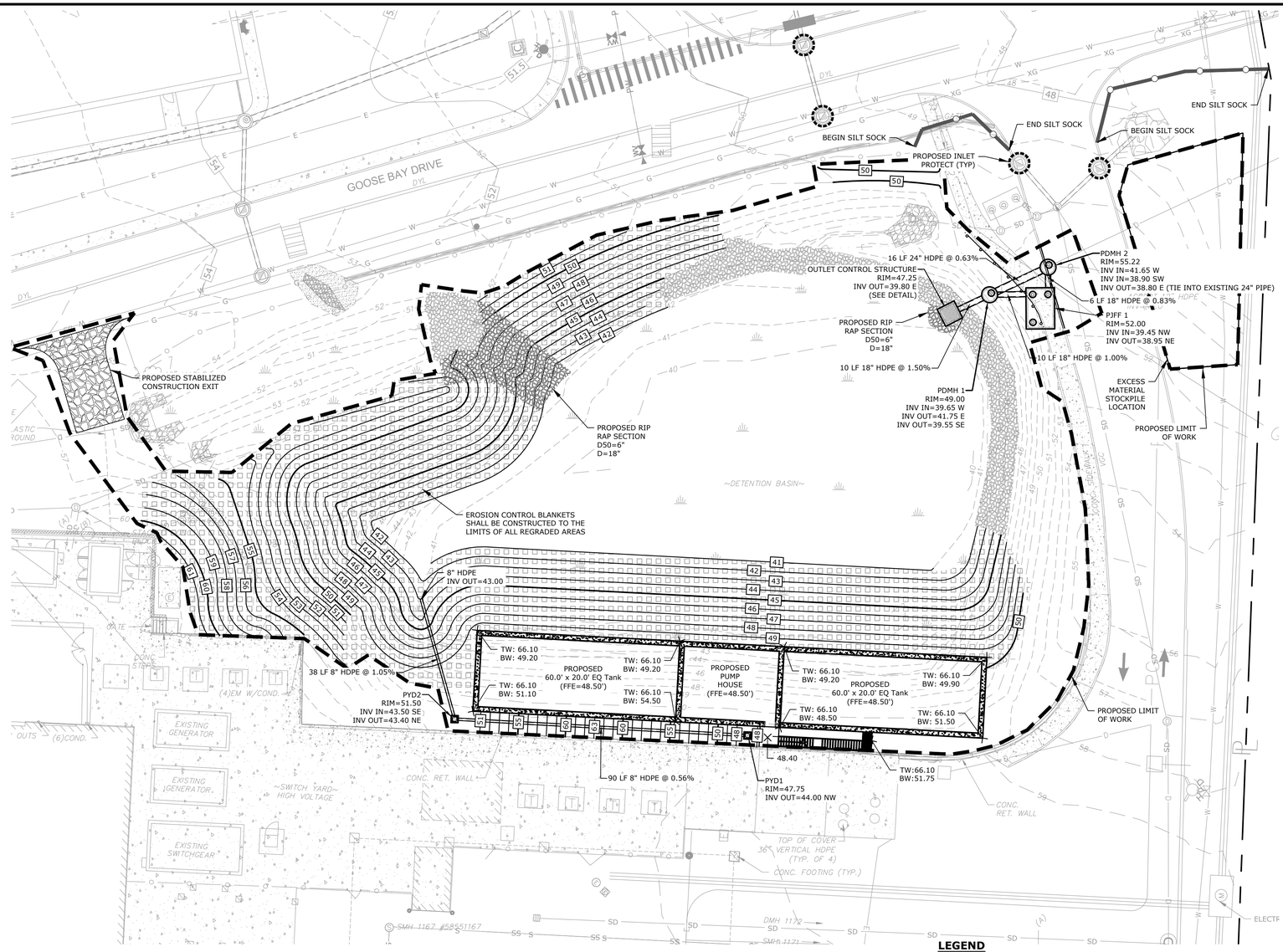
1. COMPACTION REQUIREMENTS:

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. CONTRACTOR AND/OR OWNER SHALL COORDINATE WITH SURVEYOR 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.
6. CONTRACTOR SHALL THOROUGHLY CLEAN ALL CATCH BASINS AND DRAIN LINES, WITHIN THE LIMIT OF WORK, OF SEDIMENT IMMEDIATELY UPON COMPLETION OF CONSTRUCTION. PROVIDE COPIES OF REPORT TO PEASE DEVELOPMENT AUTHORITY.
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.
12. SEE UTILITY PLAN FOR ALL SITE UTILITY INFORMATION.
13. 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.

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
   - SEWER - CITY OF PORTSMOUTH
   - COMMUNICATIONS - CONSOLIDATED COMMUNICATIONS
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 PEASE DEVELOPMENT AUTHORITY AND THE CITY OF PORTSMOUTH.
12. SEE GRADING, DRAINAGE & EROSION CONTROL PLAN FOR PROPOSED GRADING AND EROSION CONTROL MEASURES.
13. THE EXACT LOCATION OF NEW UTILITY SERVICES AND CONNECTIONS SHALL BE COORDINATED WITH THE BUILDING DRAWINGS AND THE APPLICABLE UTILITY COMPANIES.
14. ADJUST ALL MANHOLES, CATCH BASINS, CURB BOXES, ETC. WITHIN LIMITS OF WORK TO FINISH GRADE.
15. ALL UNDERGROUND CONDUITS SHALL HAVE NYLON PULL ROPES TO FACILITATE PULLING CABLES.
16. CONTRACTOR TO SUBMIT AS-BUILT PLANS ON REPRODUCIBLE MYLARS AND IN DIGITAL FORMAT (.DWG FILES) TO THE OWNER AND ENGINEER UPON COMPLETION OF THE PROJECT. AS-BUILTS SHALL BE PREPARED AND CERTIFIED BY A NEW HAMPSHIRE LICENSED LAND SURVEYOR OR PROFESSIONAL ENGINEER.
17. SOLID MATERIAL COUPLINGS SHALL BE USED FOR CONNECTIONS TO THE EXISTING SEWER. COUPLINGS SHALL BE APPROVED BY THE CITY OF PORTSMOUTH SEWER DEPARTMENT PRIOR TO INSTALLATION.
18. CONTRACTOR SHALL APPROPRIATELY DISPOSE OF ASBESTOS CEMENT PIPES SHOULD ANY BE FOUND DURING CONSTRUCTION.



LEGEND

	LIMIT OF WORK
50	PROPOSED MAJOR CONTOUR LINE
51	PROPOSED MINOR CONTOUR LINE
SD	PROPOSED DRAIN LINE (TYP)
	PROPOSED SILT SOCK
W	EXISTING WATER
D	EXISTING STORM DRAIN
G	EXISTING GAS
OHW	EXISTING OVERHEAD WIRE
SS	EXISTING SEWER
	PROPOSED EROSION CONTROL BLANKET
	INLET PROTECTION SILT SACK
	PROPOSED DRAIN MANHOLE
D	EXISTING DRAIN MANHOLE
	EXISTING CATCH BASIN

TYP	TYPICAL
PYD	PROPOSED YARD DRAIN
INV	INVERT
PDMH	PROPOSED DRAIN MANHOLE
CONST	CONSTRUCT
TW	TOP OF WALL
BW	BOTTOM OF WALL
COORD	COORDINATE
W/	WITH
LF	LINEAR FEET
HDPE	HIGH DENSITY POLYETHYLENE

Tighe&Bond

N

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS – No. 12378 – LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN – No. 15227 – LICENSED PROFESSIONAL ENGINEER
06/17/2024

0 20' 40'
GRAPHIC SCALE

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L0700-027-C-DSGN.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

GRADING, DRAINAGE, UTILITY AND EROSION CONTROL PLAN

SCALE: AS SHOWN

C-103

Last Saved: 6/14/2024
Plotted: Jun 14, 2024 - 1:52pm By: NWilcox
Tighe & Bond:J:\L\L0700 Lonza Biologics Expansion was 1576F\027. EQ Tank PDB 30%\Drawings\ACAD Sheets\L0700-027-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 CORPORATE DRIVE
PORTSMOUTH, NH 03801
PROJECT LATITUDE: 43°-04'-59.0"N
PROJECT LONGITUDE: 71°-48'-09.7"W

PROJECT DESCRIPTION

THE PROJECT CONSISTS OF THE CONSTRUCTION OF TWO EQUALIZATION TANKS AND ASSOCIATED DRAINAGE AND SITE IMPROVEMENTS.

DISTURBED AREA

THE TOTAL AREA TO BE DISTURBED IS APPROXIMATELY 0.92 ACRES.

SOIL CHARACTERISTICS

BASED ON THE SITE SPECIFIC SOIL MAP REPORT PREPARED BY TIGHE & BOND IN MAY 2021, THE SITE SOILS VARY FROM MODERATELY WELL DRAINED POORLY DRAINED AND PRIMARILY CONSIST OF MODERATELY WELL DRAINED SOILS.

NAME OF RECEIVING WATERS

THE 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 OCTOBER 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 ABUTTING 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 7.6;
      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 OF 40LB/AC OR APPROVED EQUAL:

SEED MIX	% BY WEIGHT
"REBEL II" TALL FESCUE	70%
"PALMER" PERENNIAL RYEGRASS	20%
"BARON" KENTUCKEY BLUEGRASS	10%

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:

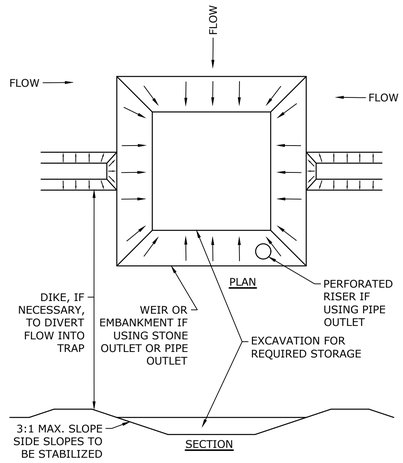
1. CONTRACTOR SHALL BE FAMILIAR WITH SPILL PREVENTION MEASURES REQUIRED BY LOCAL, STATE AND FEDERAL AGENCIES. AT A MINIMUM, CONTRACTOR SHALL FOLLOW THE BEST MANAGEMENT SPILL PREVENTION PRACTICES OUTLINED BELOW.
2. THE FOLLOWING ARE THE MATERIAL MANAGEMENT PRACTICES THAT SHALL BE USED TO REDUCE THE RISK 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 AND REPORTED TO PEASE DEVELOPMENT AUTHORITY;
      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/VEHICLE 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

THIS PROJECT EXCEEDS ONE (1) ACRE OF DISTURBANCE AND THUS REQUIRES A SWPPP. THE SWPPP SHALL BE PREPARED BY THE CONTRACTOR. THE CONTRACTOR SHALL BE FAMILIAR WITH THE SWPPP AND KEEP AN UPDATED COPY OF THE SWPPP ONSITE AT ALL TIMES.

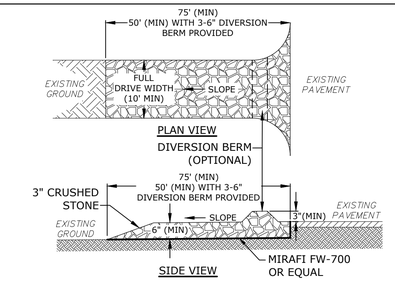
THE FOLLOWING REPRESENTS THE GENERAL OBSERVATION AND REPORTING PRACTICES THAT SHALL BE FOLLOWED AS PART OF THIS PROJECT:

1. OBSERVATIONS OF THE PROJECT FOR COMPLIANCE WITH THE SWPPP 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;
5. AN NPDES NOTICE OF INTENT SHALL BE SUBMITTED.



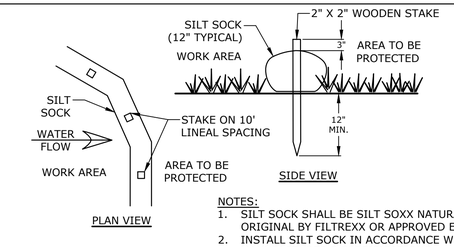
NOTES:
1. THE TRAP SHALL BE INSTALLED AS CLOSE TO THE DISTURBED AREA AS POSSIBLE.
2. THE MAXIMUM CONTRIBUTING AREA TO A SINGLE TRAP SHALL BE LESS THAN 5 ACRES.
3. THE MINIMUM VOLUME OF THE TRAP SHALL BE 3,600 CUBIC FEET OF STORAGE FOR EACH ACRE OF DRAINAGE AREA.
4. TRAP OUTLET SHALL BE MINIMUM OF ONE FOOT BELOW THE CREST OF THE TRAP.
5. TRAP SHALL DISCHARGE TO A STABILIZED AREA.
6. TRAP SHALL BE CLEANED WHEN 50 PERCENT OF THE ORIGINAL VOLUME IS FILLED.
7. MATERIALS REMOVED FROM THE TRAP SHALL BE PROPERLY DISPOSED OF AND STABILIZED.

SEDIMENT TRAP
NO SCALE



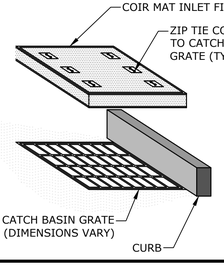
NOTES:
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OF SEDIMENT FROM THE SITE. WHEN WASHING IS REQUIRED, IT SHALL BE DONE SO RUNOFF DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING STORM DRAINS, DITCHES, OR WATERWAYS

STABILIZED CONSTRUCTION ENTRANCE
NO SCALE



NOTES:
1. SILT SOCK SHALL BE SILT SOXX NATURAL ORIGINAL BY FILTREXX OR APPROVED EQUAL.
2. INSTALL SILT SOCK IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

SILT SOCK
NO SCALE



NOTES:
1. COIR MAT INLET FILTER SHALL BE STORM WATER INLET FILTER BY BLOCKSOM & CO. OR APPROVED EQUAL.
2. INSTALL AND MAINTAIN INLET PROTECTION IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.

INLET PROTECTION
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED PROFESSIONAL ENGINEER
06/17/2024

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

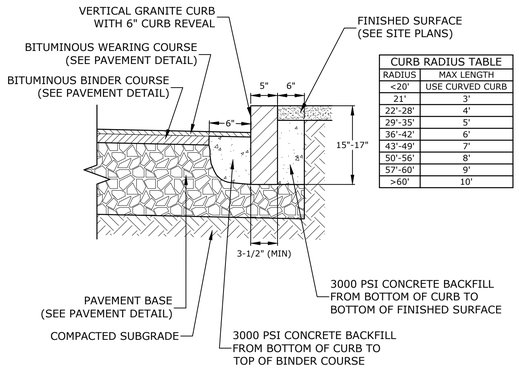
PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L-0700-027-C-DTLS.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

EROSION CONTROL NOTES & DETAILS

SCALE: AS SHOWN

C-501

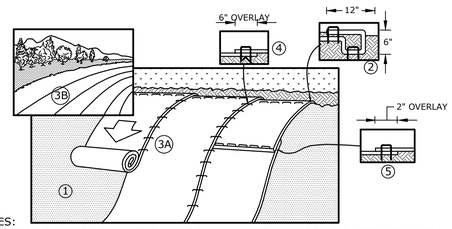
Last Saved: 6/12/2024
Plot Scale: 1.0 = 1.0 Plot Date: 6/14/2024 9:08am By: NWilcox
Tighe & Bond J:\LU\0700 Lonza Biologics Expansion was 1576\027_EQ Tank PDB 30%\Drawings\ACAD Sheets\L-0700-027-C-DTLS.dwg



CURB RADIUS TABLE	
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'

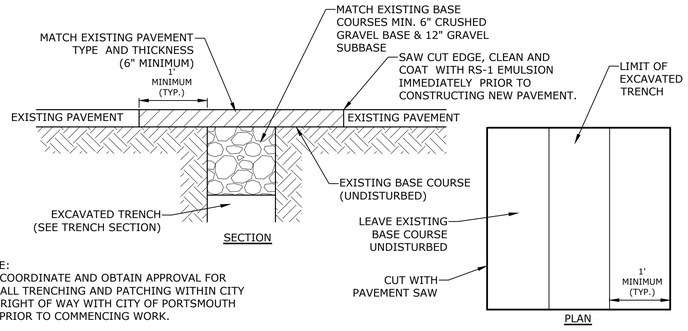
NOTES:
1. SEE SITE PLAN(S) FOR LIMITS OF VERTICAL GRANITE CURB (VGC).
2. ADJOINING STONES SHALL HAVE THE SAME OR APPROXIMATELY THE SAME LENGTH.
3. MINIMUM LENGTH OF STRAIGHT CURB STONES = 3'
4. MAXIMUM LENGTH OF STRAIGHT CURB STONES = 10'
5. MAXIMUM LENGTH OF STRAIGHT CURB STONES LAID ON CURVES (SEE 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



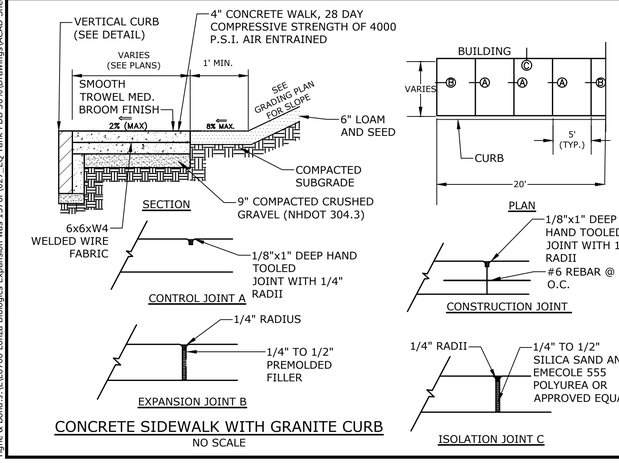
NOTES:
1. EROSION CONTROL BLANKET SHALL BE AN ALL NATURAL PRODUCT WITH NO PHOTO DEGRADABLE COMPONENTS, NORTH AMERICAN GREEN SC150BN OR APPROVED EQUAL.
2. STAKES SHALL BE BIODEGRADABLE BIOSTAKES OR ALL NATURAL WOOD ECOSTAKES OR APPROVED EQUAL. THE LENGTH OF STAKES SHALL BE BASED OFF OF THE MANUFACTURERS RECOMMENDATION.
3. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, COMPOST AND SEED.
4. BEGIN AT THE TOP OF THE SLOPE, 36" OVER THE GRADE BREAK, BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF STAKES IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAKING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAKES ACROSS THE WIDTH OF THE BLANKET.
5. ROLL THE BLANKETS DOWN THE SLOPE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE BY PLACING STAKES IN APPROPRIATE LOCATIONS AS SHOWN ON THE MANUFACTURERS PATTERN GUIDE.

EROSION CONTROL BLANKET
NO SCALE

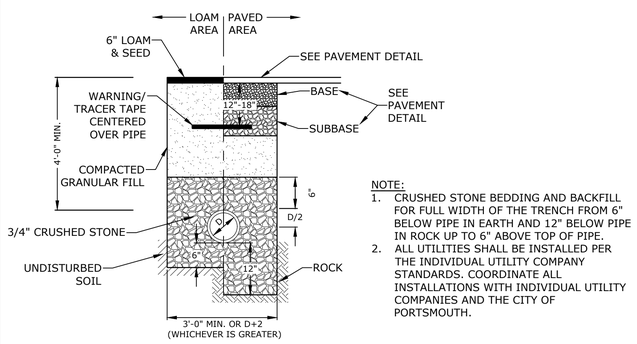


NOTE:
1. COORDINATE AND OBTAIN APPROVAL FOR ALL TRENCHING AND PATCHING WITHIN CITY RIGHT OF WAY WITH CITY OF PORTSMOUTH PRIOR TO COMMENCING WORK.

ROADWAY TRENCH PATCH
NO SCALE



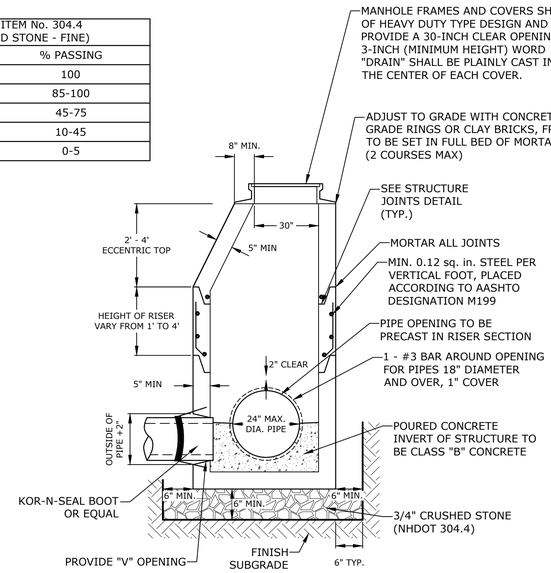
CONCRETE SIDEWALK WITH GRANITE CURB
NO SCALE



NOTE:
1. 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.
2. ALL UTILITIES SHALL BE INSTALLED PER THE INDIVIDUAL UTILITY COMPANY STANDARDS. COORDINATE ALL INSTALLATIONS WITH INDIVIDUAL UTILITY COMPANIES AND THE CITY OF PORTSMOUTH.

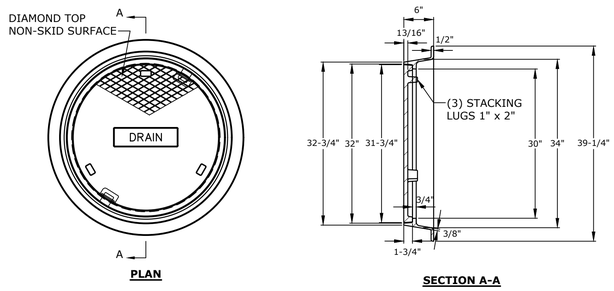
STORM DRAIN TRENCH
NO SCALE

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



NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE.
2. 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.
3. THE TONGUE AND THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. CONSTRUCT CRUSHED STONE BEDDING AND BACKFILL UNDER (6" MINIMUM THICKNESS)
6. THE TONGUE AND GROOVE JOINT SHALL BE SEALED WITH ONE STRIP OF BUTYL RUBBER SEALANT.
7. PIPE ELEVATIONS SHOWN ON PLANS SHALL BE FIELD VERIFIED PRIOR TO PRECASTING.
8. OUTSIDE EDGES OF PIPES SHALL PROJECT NO MORE THAN 3" BEYOND INSIDE WALL OF STRUCTURE.
9. 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.
10. 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:
1. ALL DIMENSIONS ARE NOMINAL.
2. FRAMES USING NARROWER DIMENSIONS FOR THICKNESS ARE ALLOWED PROVIDED:
   A. THE FRAMES MEET OR EXCEED THE SPECIFIED LOAD RATING.
   B. 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.
   C. ALL OTHER PERTINENT REQUIREMENTS OF THE SPECIFICATIONS ARE MET.
3. LABEL TYPE OF MANHOLE WITH 3" HIGH LETTERS IN THE CENTER OF THE COVER.

DRAIN MANHOLE FRAME & COVER
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE
PATRICK
CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE
NEIL A
HANSEN
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Proposed Industrial Wastewater Equalization System

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Portsmouth,
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APPROVED BY:	PMC

DETAILS

SCALE: AS SHOWN

C-502

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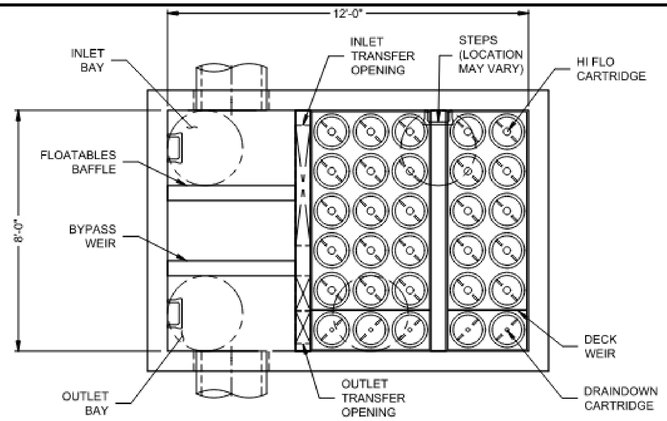
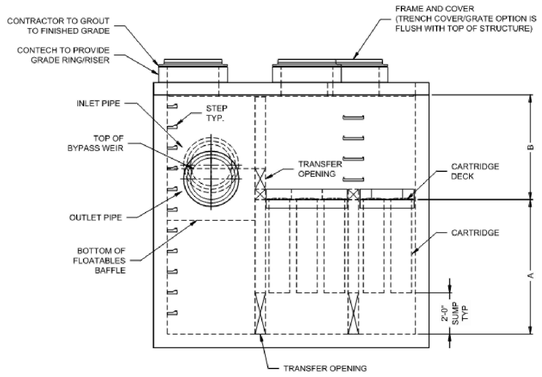


PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

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

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED (HF / DD)	*
CARTRIDGE LENGTH	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

JELLYFISH DESIGN NOTES

JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD

CARTRIDGE SELECTION

CARTRIDGE LENGTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"	5'-4"	4'-3"	3'-3"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089	0.133 / 0.067	0.089 / 0.045	0.049 / 0.025
MAX. TREATMENT (CFS)	4.91	3.68	2.45	1.35
DECK TO INSIDE TOP (MIN) (B)	5.00	4.00	4.00	4.00

GENERAL NOTES:
1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3. 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.
4. STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0' - 10', 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.
5. STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE AT EQUAL OR GREATER SLOPE.
8. 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
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. 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.

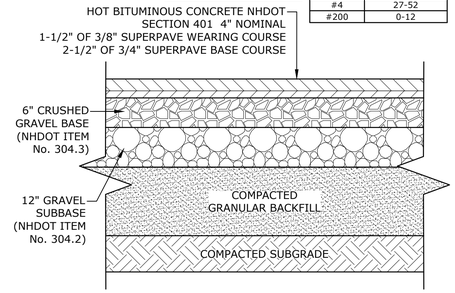
JELLYFISH® JFPD0812 FILTER DETAIL
NO SCALE

Jellyfish® Filter
THIS PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING: U.S. PATENT NO. 8,287,726, 8,221,618 & US 8,123,935. OTHER INTERNATIONAL PATENTS PENDING

CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

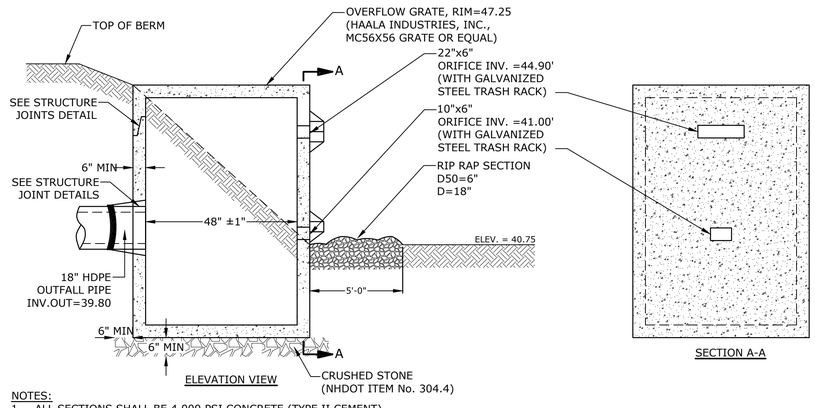
NHDOT ITEM No. 304.2 (GRAVEL)	
SIEVE SIZE	% PASSING
6"	100
#4	25-70
#200	0-12

NHDOT ITEM No. 304.3 (CRUSHED GRAVEL)	
SIEVE SIZE	% PASSING
3"	100
2"	95-100
1"	55-85
#4	27-52
#200	0-12



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.
4. FINAL PAVEMENT DESIGN TO BE DETERMINED BY GEOTECHNICAL ENGINEER.
5. NHDOT ITEM No. 304.2 MAY BE SUBSTITUTED FOR NHDOT ITEM No. 304.4, IF NHDOT ITEM No. 304.2 CAN NOT BE ACQUIRED.

TYPICAL PAVEMENT SECTION
NO SCALE



NOTES:
1. ALL SECTIONS SHALL BE 4,000 PSI CONCRETE (TYPE II CEMENT).
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQUARE INCHES PER LINEAR FOOT IN ALL SECTIONS AND SHALL BE PLACED IN THE CENTER OF THE THIRDE WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQUARE INCHES PER LINEAR FOOT.
4. THE STRUCTURES SHALL BE DESIGNED FOR H20 LOADING.
5. ALL JOINTS ON THE STRUCTURE AND PIPING SHALL BE WATERTIGHT.

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

OUTLET STRUCTURE (POS 01)
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 – LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN No. 15227 – LICENSED PROFESSIONAL ENGINEER
06/17/2024

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

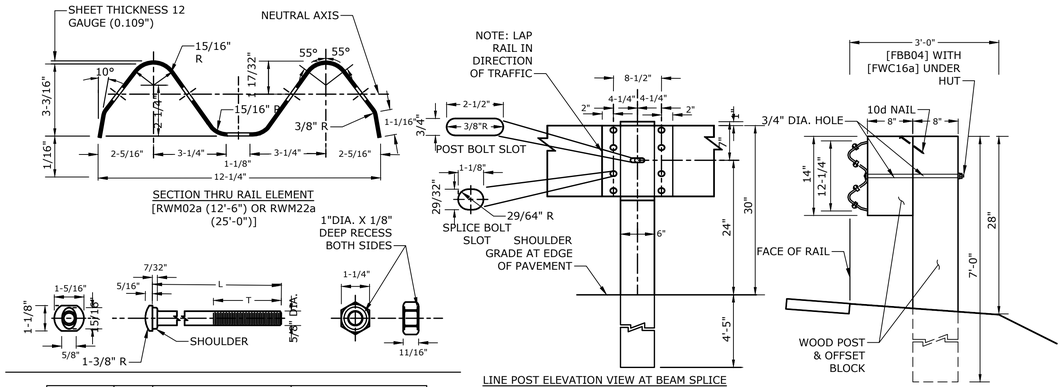
MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L-0700-027-C-DTLS.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

DETAILS

SCALE: AS SHOWN

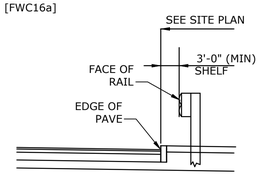
C-503



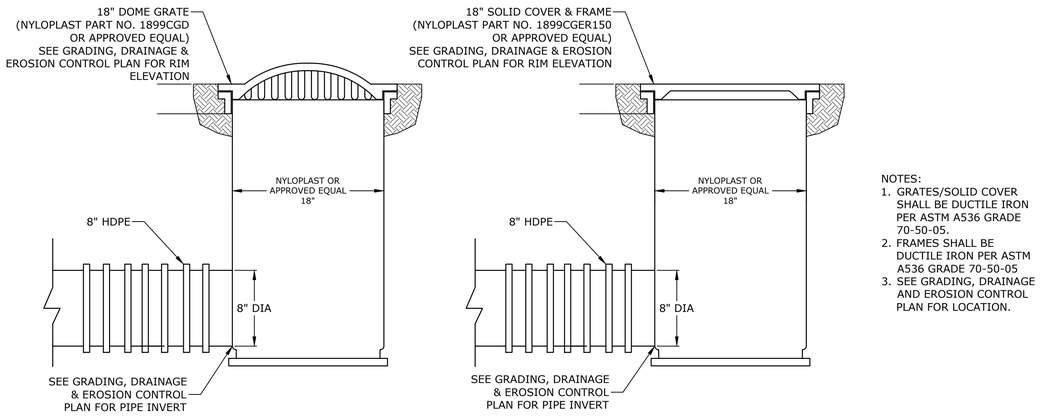
DESIGNATOR	L	T	INTENDED USE
FBB01	1-1/4"	FULL LENGTH THREAD	RAIL SPLICE BOLTS
FBB02	2"	1-3/4" MIN. THREAD LENGTH	POST BOLT (STEEL POSTS)
FBB03	10"	4" MIN. THREAD LENGTH	POST BOLT
FBB04	18"	4" MIN. THREAD LENGTH	POST BOLT (WOOD POSTS)

5/8" BUTTON HEAD BOLT AND RECESSED NUT
[FBB01-04]

NOTES:
1. SEE SITE PLAN FOR LIMITS OF GUARDRAIL.
2. DESIGNATION PROVIDED IN BRACKETS ( ) REFERENCE STANDARD ELEMENTS DETAILED IN "A GUIDE TO STANDARDIZED HIGHWAY BARRIER RAIL HARDWARE" (1979) - AASHTO - AGC - ARTBA JOINT COOPERATIVE COMMITTEE.
3. ALL DIMENSIONS SUBJECT TO MANUFACTURER'S TOLERANCES.
4. USE 6'-0" LONG POSTS WHEN FILL SLOPE IS 4:1 OR FLATTER AND/OR WHEN FIELD CONDITIONS DICTATE (e.g., LEDGE FILLS), AS DETERMINED BY THE ENGINEER.



WOOD POST/STEEL BEAM GUARDRAIL
NO SCALE



PYD1
NO SCALE

PYD2
NO SCALE

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

PROPOSED YARD DRAINS
NO SCALE

Tighe&Bond

STATE OF NEW HAMPSHIRE – PATRICK CRIMMINS No. 12378 LICENSED PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE – NEIL A HANSEN No. 15227 LICENSED PROFESSIONAL ENGINEER
06/17/2024

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

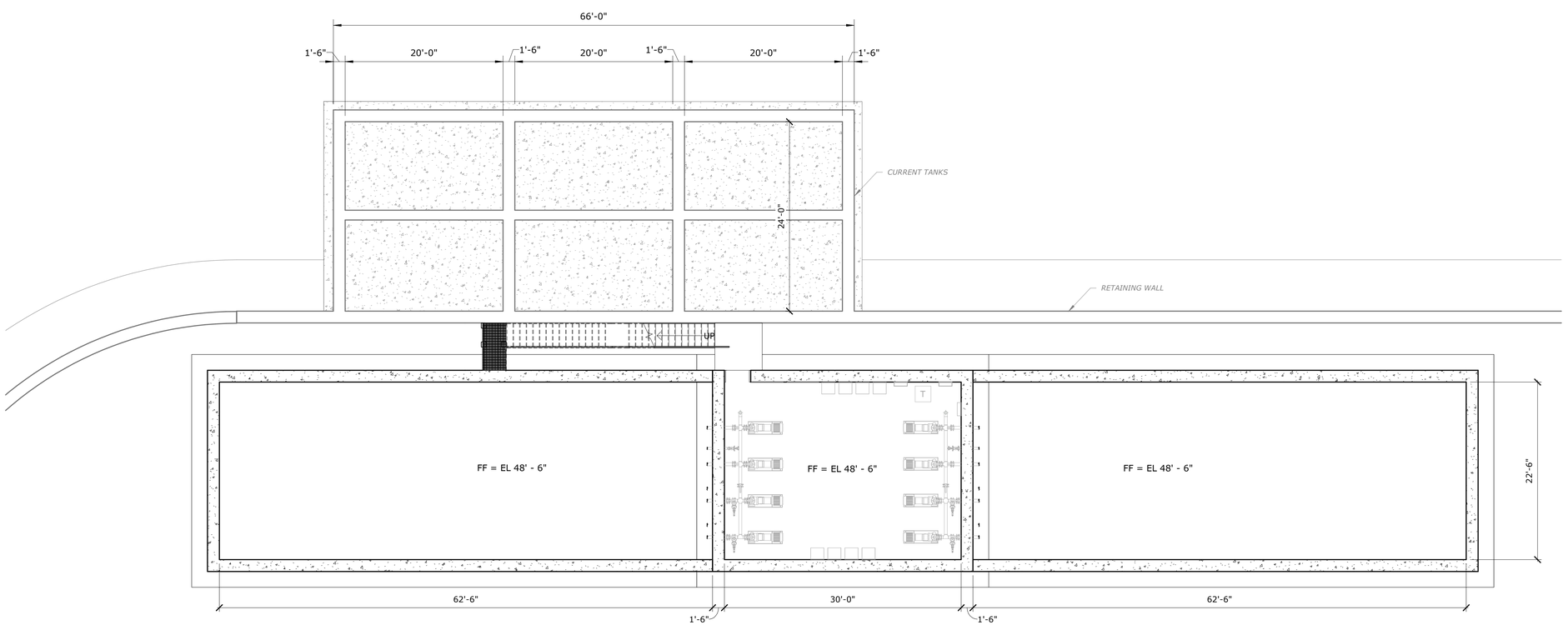
PROJECT NO:	L-0700-025
DATE:	JUNE 17, 2024
FILE:	L-0700-027-C-DTLS.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

DETAILS

SCALE: AS SHOWN

C-504

Last Saved: 6/12/2024
Printed: Monday, June 17, 2024 - 9:08am By: NWilcox
Tighe & Bond:J:\L\0700 Lonza Biologics Expansion was 1576F\027_EQ Tank PDB 30%\Drawings\ACAD Sheets\L-0700-027-C-DTLS.dwg



ARCHITECTURAL OVERALL PLAN
1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8"=1'-0"

Tighe&Bond

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

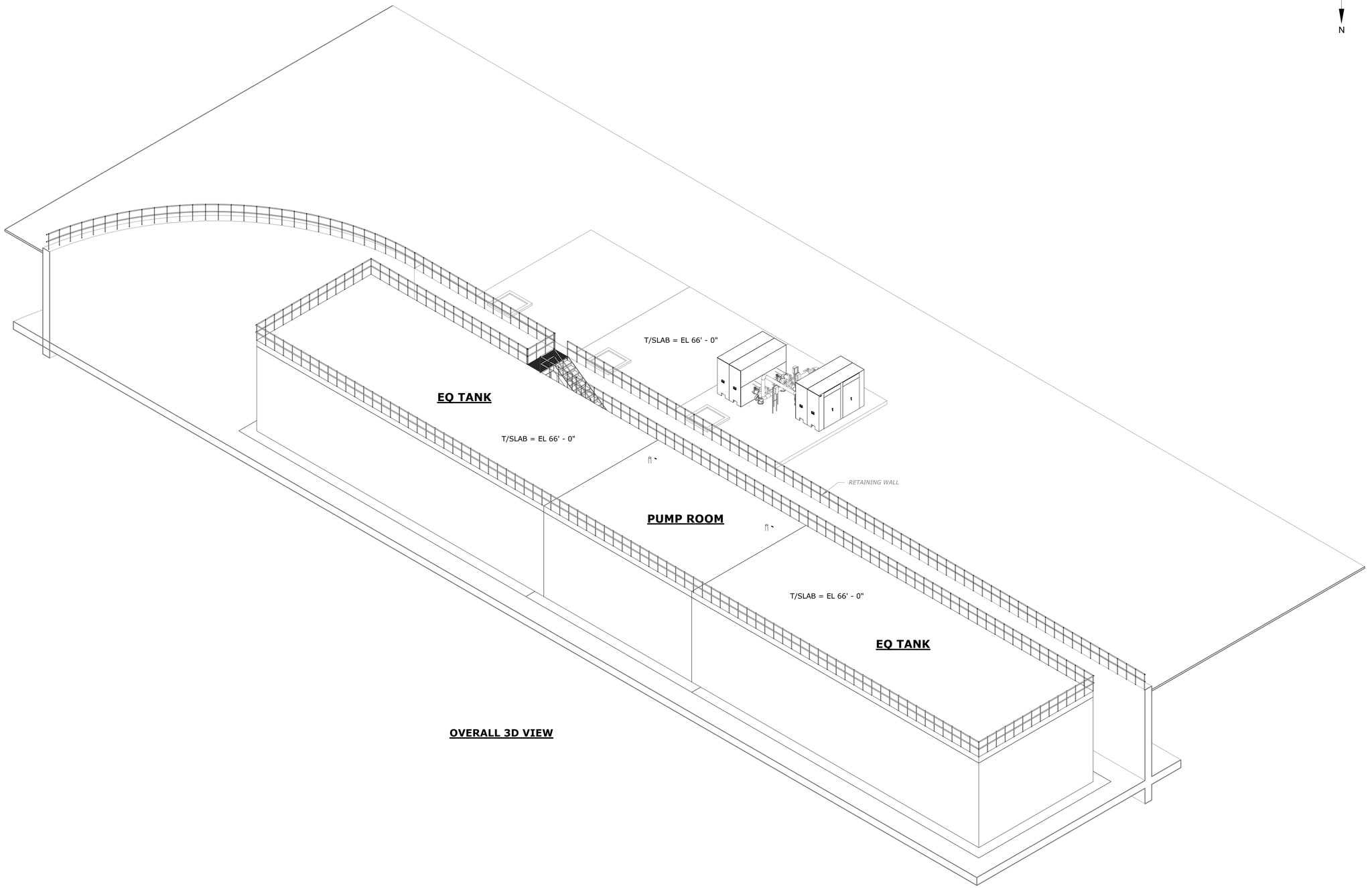
PROJECT NO:	L0700-027
DATE:	JUNE 17, 2024
FILE:	L0700-027-A-102
DRAWN BY:	AAA
DESIGNED/CHECKED BY:	Checker
APPROVED BY:	Approver

ARCHITECTURAL OVERALL PLAN

SCALE: NOT TO SCALE

A-102
SHEET # OF #

Last Saved:6/14/2024 10:55:23 By:AAA
Printed On: 6/14/2024 10:55:23 By:AAA
Tighe & Bond Autodesk Docs://L0700-027-LONZA BIO EXPANSION/L0700-027-Arch-24'.rvt



OVERALL 3D VIEW

N

0 1 2' 4' 8'
SCALE: 1/4"=1'-0"

Tighe&Bond

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L0700-027
DATE:	JUNE 17, 2024
FILE:	L0700-027-A-901
DRAWN BY:	AAA
DESIGNED/CHECKED BY:	Checker
APPROVED BY:	Approver

3D VIEWS - 2

SCALE: NOT TO SCALE

A-901
SHEET # OF #

Last Saved:6/14/2024 10:55:25 By:AAA
Plotted On: 6/14/2024 10:55:25 By:AAA
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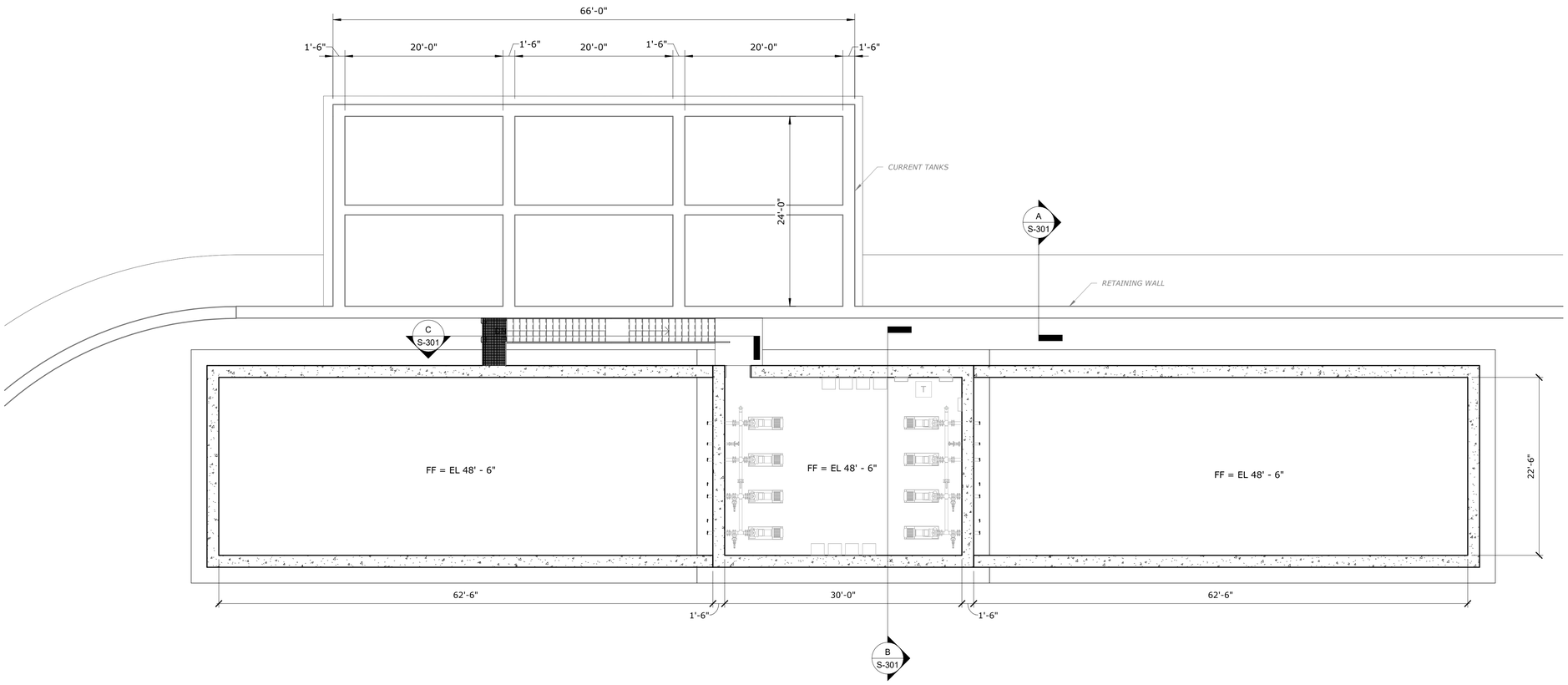

STRUCTURAL FLOOR PLAN
1/8" = 1'-0"

0 4' 8' 16'
SCALE: 1/8"=1'-0"

Tighe&Bond

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L0700-027
DATE:	JUNE 17, 2024
FILE:	L0700-027-S-101
DRAWN BY:	AAA
DESIGNED/CHECKED BY:	Checker
APPROVED BY:	Approver

STRUCTURAL PLAN

SCALE: NOT TO SCALE

S-101
SHEET # OF #

Last Saved:6/14/2024 10:55:25 By:AAA
Plotted On: 6/14/2024 10:55:25
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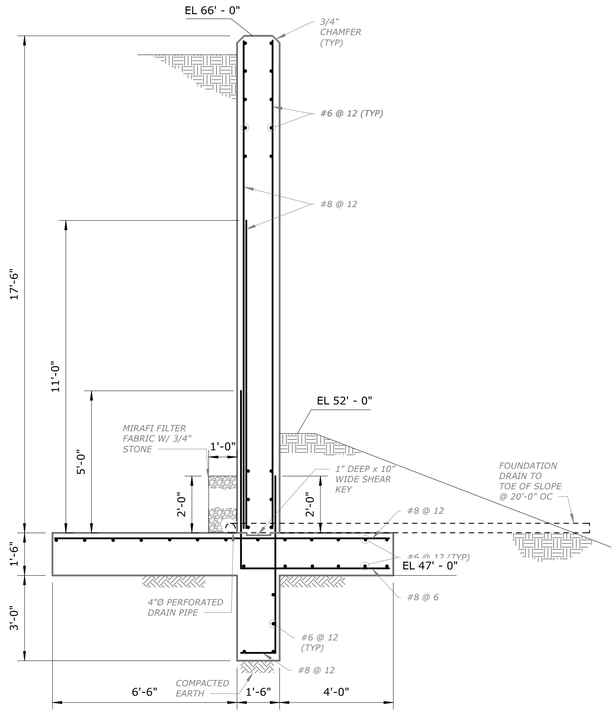
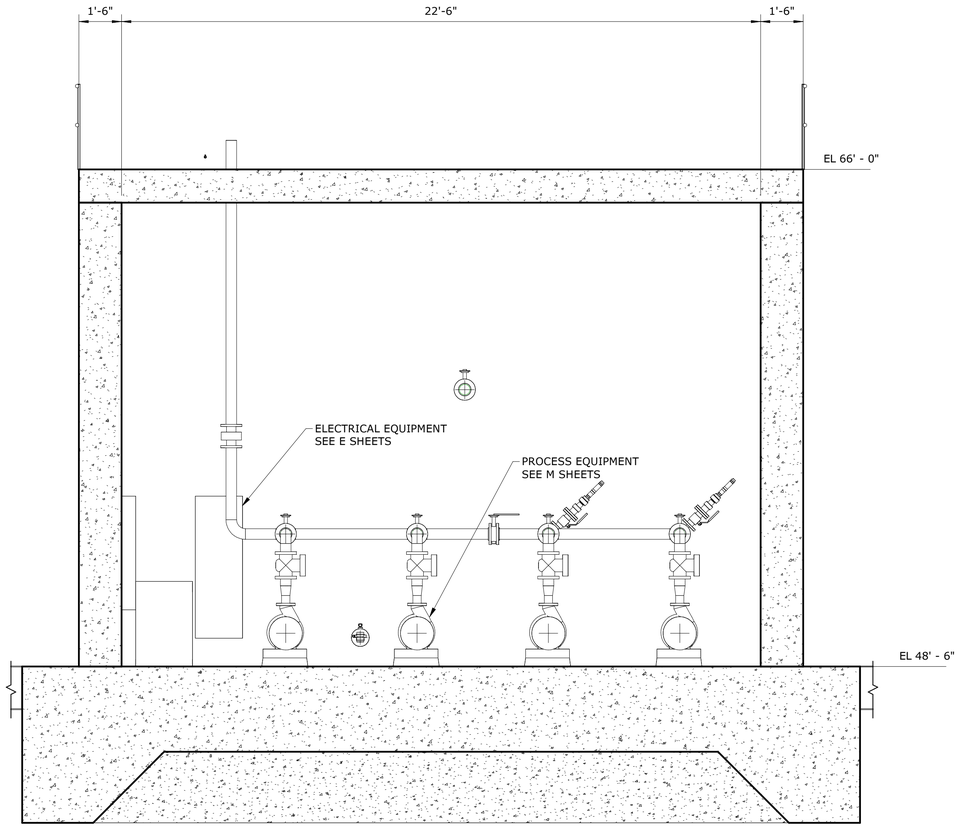
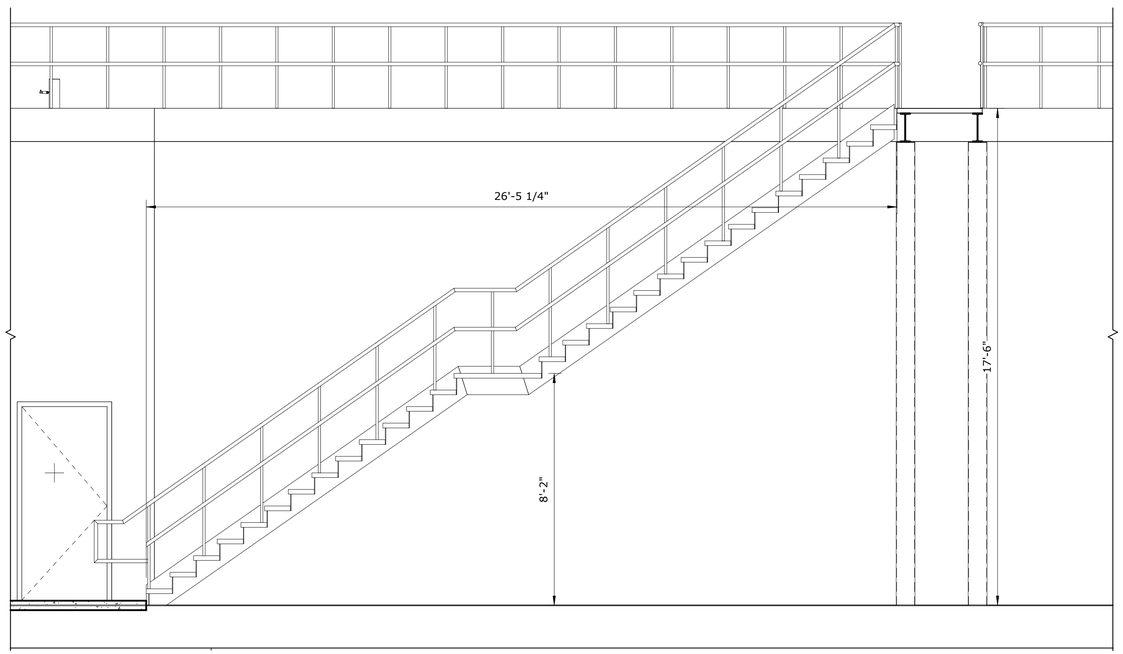


SECTION A
3/8" = 1'-0" S-101



SECTION B
3/8" = 1'-0" S-101



SECTION C
3/8" = 1'-0" S-101

0 1' 2' 4'
SCALE: 1/2"=1'-0"

Tighe&Bond

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth,
New Hampshire

MARK	DATE	DESCRIPTION
A	6/17/2024	TAC SUBMISSION

PROJECT NO:	L0700-027
DATE:	JUNE 17, 2024
FILE:	L0700-027-S-301
DRAWN BY:	AAA
DESIGNED/CHECKED BY:	Checker
APPROVED BY:	Approver

STRUCTURAL SECTIONS

SCALE: NOT TO SCALE

S-301
SHEET # OF #

Last Saved:6/14/2024 10:55:26 By:AAA
Plotted On: 6/14/2024 10:55:26
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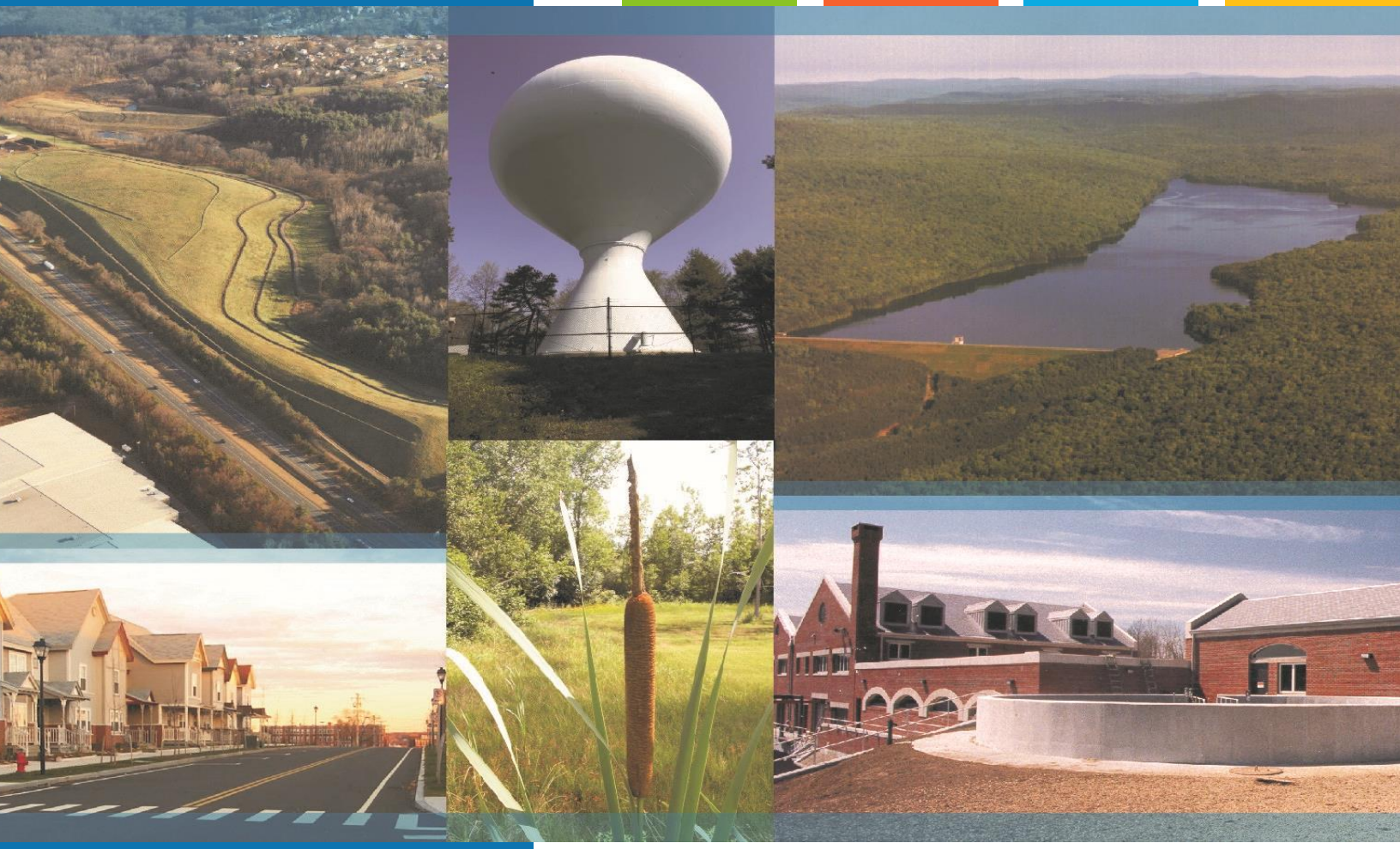


Proposed Industrial Wastewater Equalization System
101 International Drive
Portsmouth, NH

Drainage Analysis

Lonza Biologics

June 17, 2024

STATE OF NEW HAMPSHIRE
PATRICK CRIMMINS
No. 12378
LICENSED
PROFESSIONAL ENGINEER
6/17/24

STATE OF NEW HAMPSHIRE
NEIL A HANSEN
No. 15227
LICENSED
PROFESSIONAL ENGINEER
06/17/2024

Tighe&Bond

100% Recyclable

Drainage Analysis

TO: City of Portsmouth Technical Advisory Committee (TAC)

FROM: Neil A. Hansen, PE
Patrick M. Crimmins, PE

COPY: Lonza Biologics

DATE: June 17, 2024

1.0 Project Description

The project is located at 101 International Drive, identified as Map 305 Lot 6 on the City of Portsmouth Tax Maps.

The proposed project consists of the construction of two (2) - 125,000-gallon equalization tanks and a pump room along the existing retaining wall at the rear of the 101C portion of Lonza's 101 International Drive facility to support their current operations. The proposed project will require grading and resizing of the existing stormwater detention basin, replacement of the outlet control structure, and construction of a stormwater treatment system post-detention.

2.0 Drainage Analysis

The proposed project is anticipated to add approximately 3,400 SF of impervious surface over the existing condition. As required by the Pease Development Authority (PDA), the proposed impervious surface is required to be treated to advanced stormwater treatment standards. A large portion of the watershed area that discharges to the existing detention basin does not currently receive advanced treatment prior to discharging to Hodgson Brook. The proposed Jellyfish Treatment unit will provide treatment for the entire watershed to meet current NHDES requirements for redevelopment.

The watershed area that directs runoff to the proposed stormwater management system was analyzed to determine the Water Quality Volume (WQV) and Water Quality Flow (WQF) required to size the systems (See table 2.3). The watershed area 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 Pre- and Post-Development Comparison

The pre-development and post-development watershed areas have been analyzed using one (1) distinct point of analysis (PA-1.) PA-1 is located at the point at which the proposed drainage system ties into the existing closed drainage system. In addition to the point of analysis remaining unchanged, the contributing sub-catchment areas will also remain the same in the Pre & Post-Development conditions. The Post-Development Watershed area will be comprised primarily of the same conditions that are present in the existing conditions. The key difference is the addition of the two (2) 62.5' x 22.5' EQ Tanks and one (1) Pump House between the EQ Tanks. These will add approximately ±3,400 SF of impervious area in the Post-Development conditions.

2.2 Peak Rate Comparison

The peak discharge rates at these points of analysis were determined by analyzing Type III, 24-hour storm events. The rainfall data for these storm events were obtained from the data

published by the Northeast Regional Climate Center at Cornell University, which can be found in Appendix B.

Furthermore, the site is located within a Coastal and Great Bay Community, therefore an added factor of safety of 15% was included as required by Env-Wq 1503.08(l).

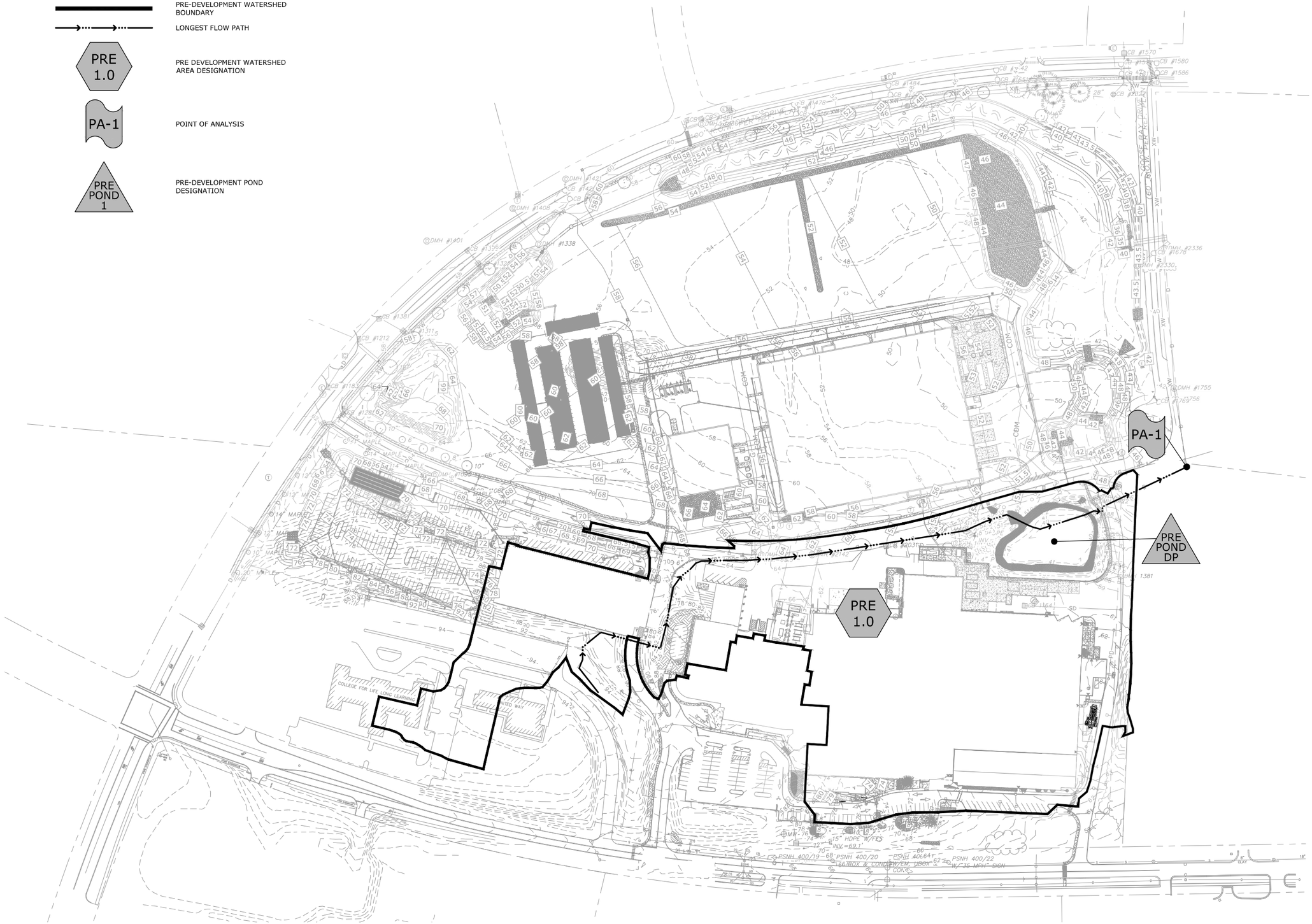
The following table summarizes and compares the pre- and post-development peak runoff rates for the 2-year, 10-year, 25-year and 50-year storm events at the point of analysis.

Table 2.2 – Comparison of Pre- and Post- Development Flows

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	4.20/**3.20**	14.03/**8.97**	22.15/**14.64**	26.56/**16.33**

LEGEND

- PRE-DEVELOPMENT WATERSHED BOUNDARY
- LONGEST FLOW PATH
- PRE 1.0 — PRE DEVELOPMENT WATERSHED AREA DESIGNATION
- PA-1 — POINT OF ANALYSIS
- PRE POND 1 — PRE-DEVELOPMENT POND DESIGNATION



Tighe&Bond

DRAFT

0 100' 200'
GRAPHIC SCALE

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION

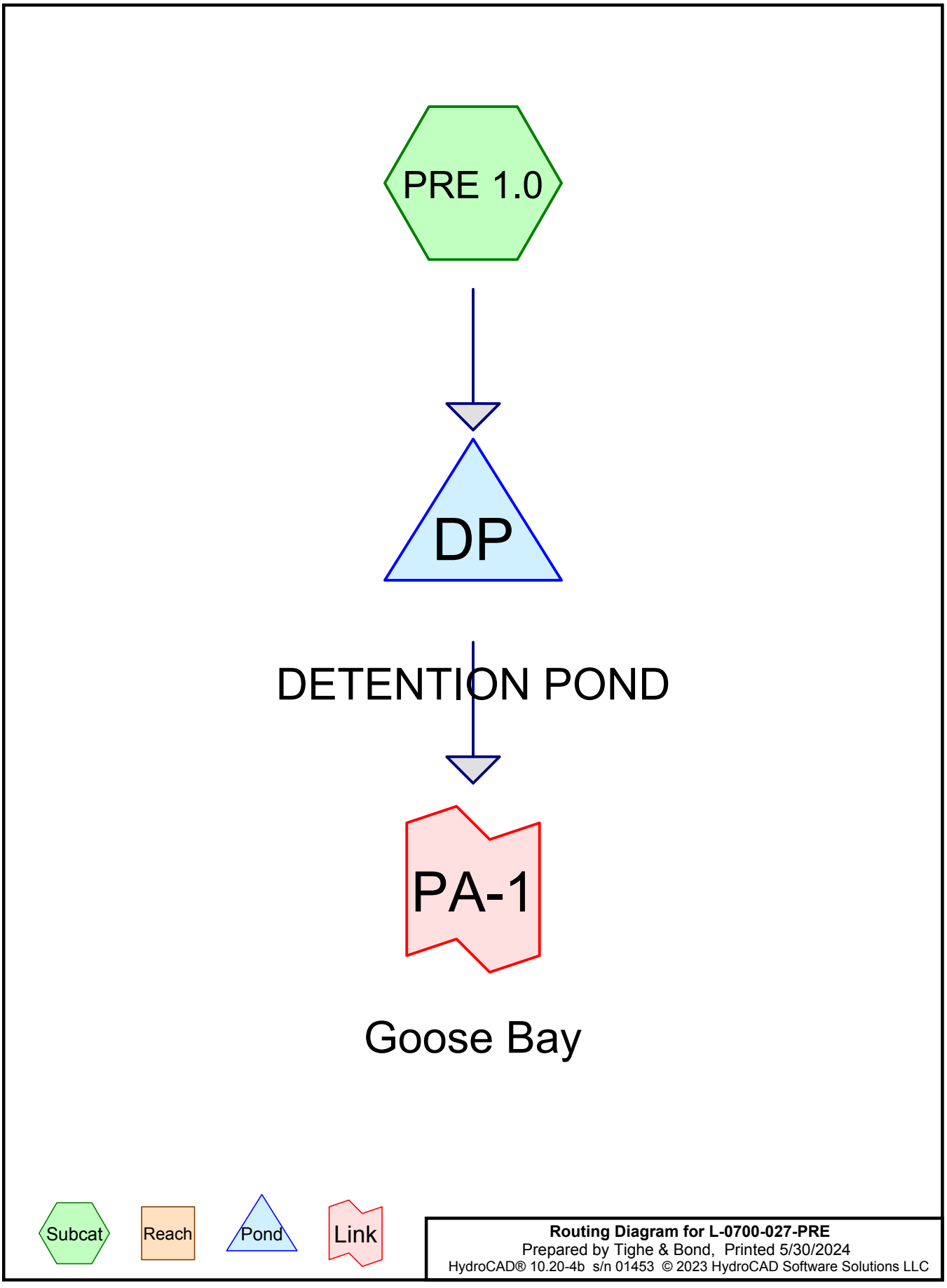
PROJECT NO:	L-0700-025
DATE:	MAY 31, 2024
FILE:	L0700-027-C-DSGN.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

PRE-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-801

Last Saved: 5/30/2024
Plotted: Thursday, May 30, 2024 9:28am By: NWilcox
Tighe & Bond J:\L\L0700 Lonza Biologics Expansion was 1576\027_EQ Tank PDB 30%\Drawings\ACAD Sheets\L0700-027-C-DSGN.dwg



Routing Diagram for L-0700-027-PRE
Prepared by Tighe & Bond, Printed 5/30/2024

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
200,329	61	>75% Grass cover, Good, HSG B (PRE 1.0)
414,045	98	Pavement/Roof, HSG B (PRE 1.0)
614,374	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
614,374	HSG B	PRE 1.0
0	HSG C	
0	HSG D	
0	Other	
614,374		**TOTAL AREA**

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

Subcatchment PRE 1.0: Runoff Area=614,374 sf 67.39% Impervious Runoff Depth>2.25"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=28.78 cfs 115,347 cf

Pond DP: DETENTION POND Peak Elev=44.42' Storage=59,890 cf Inflow=28.78 cfs 115,347 cf
Outflow=4.20 cfs 94,822 cf

Link PA-1: Goose Bay Inflow=4.20 cfs 94,822 cf
Primary=4.20 cfs 94,822 cf

Total Runoff Area = 614,374 sf Runoff Volume = 115,347 cf Average Runoff Depth = 2.25"
32.61% Pervious = 200,329 sf 67.39% Impervious = 414,045 sf

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

Subcatchment PRE 1.0: Runoff Area=614,374 sf 67.39% Impervious Runoff Depth>4.00"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=50.35 cfs 204,938 cf

Pond DP: DETENTION POND Peak Elev=46.32' Storage=100,792 cf Inflow=50.35 cfs 204,938 cf
Outflow=14.03 cfs 177,209 cf

Link PA-1: Goose Bay Inflow=14.03 cfs 177,209 cf
Primary=14.03 cfs 177,209 cf

Total Runoff Area = 614,374 sf Runoff Volume = 204,938 cf Average Runoff Depth = 4.00"
32.61% Pervious = 200,329 sf 67.39% Impervious = 414,045 sf

Summary for Subcatchment PRE 1.0:

[47] Hint: Peak is 678% of capacity of segment #3
[47] Hint: Peak is 678% of capacity of segment #5

Runoff = 50.35 cfs @ 12.19 hrs, Volume= 204,938 cf, Depth> 4.00"
Routed to Pond DP : DETENTION POND

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 Year Storm Rainfall=5.58"

	Area (sf)	CN	Description
*	414,045	98	Pavement/Roof, HSG B
	200,329	61	>75% Grass cover, Good, HSG B
	614,374	86	Weighted Average
	200,329		32.61% Pervious Area
	414,045		67.39% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.9	104	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	240	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.0	192	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	461	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
2.4	142	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	1,189	Total			

Summary for Pond DP: DETENTION POND

Inflow Area = 614,374 sf, 67.39% Impervious, Inflow Depth > 4.00" for 10 Year Storm event
Inflow = 50.35 cfs @ 12.19 hrs, Volume= 204,938 cf
Outflow = 14.03 cfs @ 12.64 hrs, Volume= 177,209 cf, Atten= 72%, Lag= 27.1 min
Primary = 14.03 cfs @ 12.64 hrs, Volume= 177,209 cf
Routed to Link PA-1 : Goose Bay

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.32' @ 12.64 hrs Surf.Area= 22,903 sf Storage= 100,792 cf
Flood Elev= 49.00' Surf.Area= 26,680 sf Storage= 167,134 cf

Plug-Flow detention time= 209.5 min calculated for 177,209 cf (86% of inflow)
Center-of-Mass det. time= 150.7 min (957.1 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	41.00'	167,134 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
41.00	13,451	0	0
42.00	16,710	15,081	15,081
43.00	18,275	17,493	32,573
44.00	19,608	18,942	51,515
45.00	21,006	20,307	71,822
46.00	22,471	21,739	93,560
47.00	23,826	23,149	116,709
48.00	25,172	24,499	141,208
49.00	26,680	25,926	167,134

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 Limited to weir flow at low heads
#3	Device 1	43.15'	**8.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	45.80'	**19.0" x 19.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=14.00 cfs @ 12.64 hrs HW=46.32' TW=0.00' (Dynamic Tailwater)
- **1=Culvert** (Passes 14.00 cfs of 23.82 cfs potential flow)
  - **2=Orifice/Grate** (Orifice Controls 3.46 cfs @ 9.91 fps)
  - **3=Orifice/Grate** (Orifice Controls 2.83 cfs @ 8.11 fps)
  - **4=Orifice/Grate** (Weir Controls 7.71 cfs @ 2.35 fps)

Summary for Link PA-1: Goose Bay

Inflow Area = 614,374 sf, 67.39% Impervious, Inflow Depth > 3.46" for 10 Year Storm event
Inflow = 14.03 cfs @ 12.64 hrs, Volume= 177,209 cf
Primary = 14.03 cfs @ 12.64 hrs, Volume= 177,209 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

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

Subcatchment PRE 1.0: Runoff Area=614,374 sf 67.39% Impervious Runoff Depth>5.42"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=67.31 cfs 277,584 cf

Pond DP: DETENTION POND Peak Elev=47.34' Storage=124,957 cf Inflow=67.31 cfs 277,584 cf
Outflow=22.15 cfs 245,863 cf

Link PA-1: Goose Bay Inflow=22.15 cfs 245,863 cf
Primary=22.15 cfs 245,863 cf

Total Runoff Area = 614,374 sf Runoff Volume = 277,584 cf Average Runoff Depth = 5.42"
32.61% Pervious = 200,329 sf 67.39% Impervious = 414,045 sf

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

Subcatchment PRE 1.0: Runoff Area=614,374 sf 67.39% Impervious Runoff Depth>6.76"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=83.04 cfs 346,321 cf

Pond DP: DETENTION POND Peak Elev=48.40' Storage=151,460 cf Inflow=83.04 cfs 346,321 cf
Outflow=26.56 cfs 311,490 cf

Link PA-1: Goose Bay Inflow=26.56 cfs 311,490 cf
Primary=26.56 cfs 311,490 cf

Total Runoff Area = 614,374 sf Runoff Volume = 346,321 cf Average Runoff Depth = 6.76"
32.61% Pervious = 200,329 sf 67.39% Impervious = 414,045 sf

LEGEND

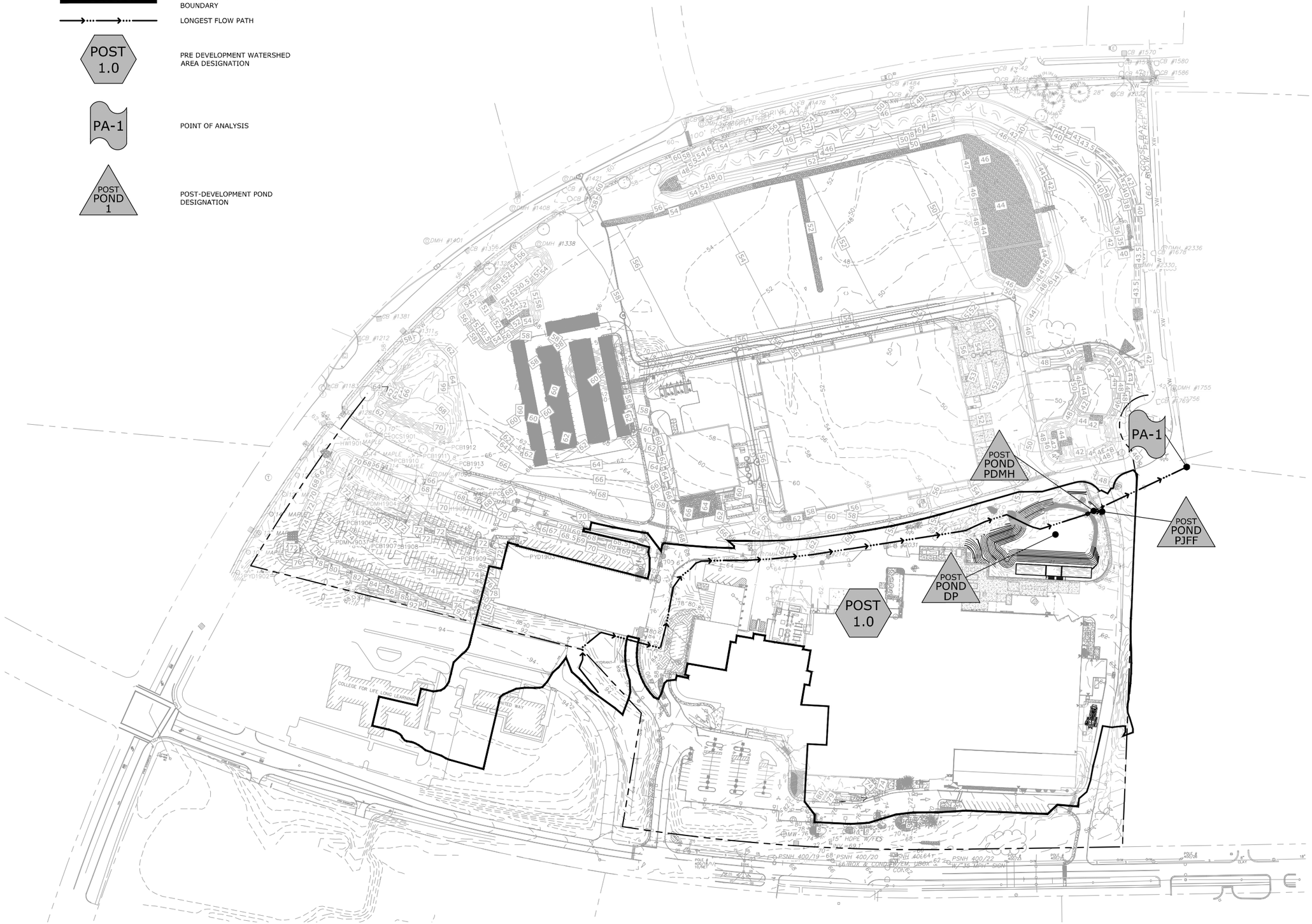
POST-DEVELOPMENT WATERSHED BOUNDARY

LONGEST FLOW PATH

POST 1.0 — PRE DEVELOPMENT WATERSHED AREA DESIGNATION

PA-1 — POINT OF ANALYSIS

POST POND 1 — POST-DEVELOPMENT POND DESIGNATION



N

0 100' 200'
GRAPHIC SCALE

Tighe&Bond

DRAFT

Proposed Industrial Wastewater Equalization System

Lonza Biologics

Portsmouth, New Hampshire

MARK	DATE	DESCRIPTION

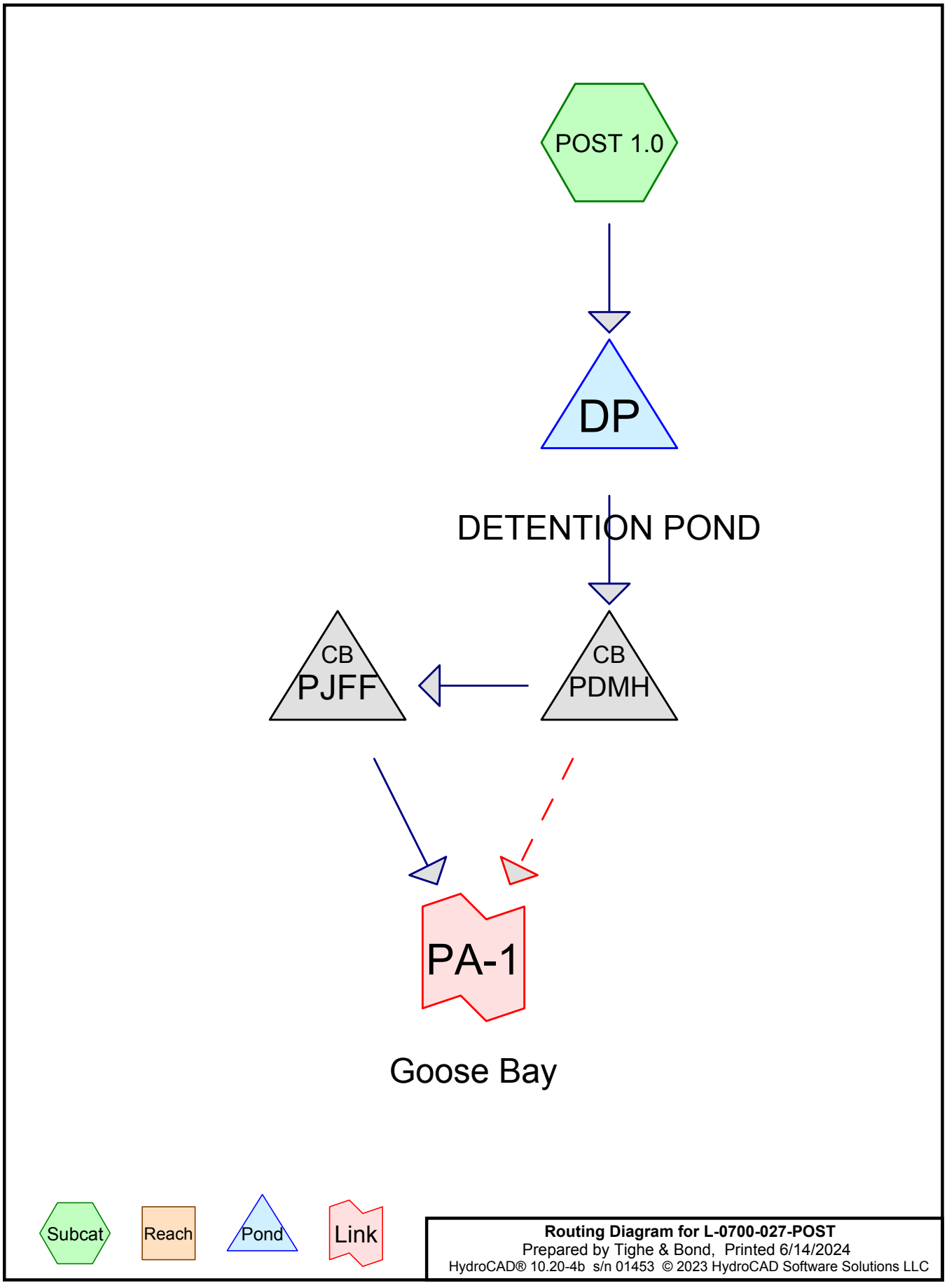
PROJECT NO:	L-0700-025
DATE:	MAY 31, 2024
FILE:	L0700-027-C-DSGN.dwg
DRAWN BY:	NHW
DESIGNED/CHECKED BY:	NAH
APPROVED BY:	PMC

POST-DEVELOPMENT WATERSHED PLAN

SCALE: AS SHOWN

C-802

Last Saved: 5/30/2024
Printed: May 30, 2024-9:29am By: NWilcox
Tighe & Bond:J:\L\0700 Lonza Biologics Expansion was 1576F\027_EQ Tank PDB 30%\Drawings\ACAD Sheets\L0700-027-C-DSGN.dwg



Routing Diagram for L-0700-027-POST
Prepared by Tighe & Bond, Printed 6/14/2024

Area Listing (selected nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
196,929	61	>75% Grass cover, Good, HSG B (POST 1.0)
417,445	98	Pavement/Roof, HSG B (POST 1.0)
614,374	**86**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
0	HSG A	
614,374	HSG B	POST 1.0
0	HSG C	
0	HSG D	
0	Other	
614,374		**TOTAL AREA**

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

Subcatchment POST 1.0: Runoff Area=614,374 sf 67.95% Impervious Runoff Depth>2.25"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=28.78 cfs 115,347 cf

Pond DP: DETENTION POND Peak Elev=44.92' Storage=55,220 cf Inflow=28.78 cfs 115,347 cf
Outflow=3.20 cfs 110,410 cf

Pond PDMH: Peak Elev=42.40' Inflow=3.20 cfs 110,410 cf
Primary=2.82 cfs 105,564 cf Secondary=0.37 cfs 4,846 cf Outflow=3.20 cfs 110,410 cf

Pond PJFF: Peak Elev=41.33' Inflow=2.82 cfs 105,564 cf
18.0" Round Culvert n=0.130 L=12.0' S=0.0083 '/' Outflow=2.82 cfs 105,564 cf

Link PA-1: Goose Bay Inflow=3.20 cfs 110,410 cf
Primary=3.20 cfs 110,410 cf

Total Runoff Area = 614,374 sf Runoff Volume = 115,347 cf Average Runoff Depth = 2.25"
32.05% Pervious = 196,929 sf 67.95% Impervious = 417,445 sf

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

Subcatchment POST 1.0: Runoff Area=614,374 sf 67.95% Impervious Runoff Depth>4.00"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=50.35 cfs 204,938 cf

Pond DP: DETENTION POND Peak Elev=46.90' Storage=93,245 cf Inflow=50.35 cfs 204,938 cf
Outflow=8.97 cfs 190,385 cf

Pond PDMH: Peak Elev=44.48' Inflow=8.97 cfs 190,385 cf
Primary=4.08 cfs 139,643 cf Secondary=4.97 cfs 50,742 cf Outflow=8.97 cfs 190,385 cf

Pond PJFF: Peak Elev=42.34' Inflow=4.08 cfs 139,643 cf
18.0" Round Culvert n=0.130 L=12.0' S=0.0083 '/' Outflow=4.08 cfs 139,643 cf

Link PA-1: Goose Bay Inflow=8.97 cfs 190,385 cf
Primary=8.97 cfs 190,385 cf

Total Runoff Area = 614,374 sf Runoff Volume = 204,938 cf Average Runoff Depth = 4.00"
32.05% Pervious = 196,929 sf 67.95% Impervious = 417,445 sf

Summary for Subcatchment POST 1.0:

[47] Hint: Peak is 678% of capacity of segment #3
[47] Hint: Peak is 678% of capacity of segment #5

Runoff = 50.35 cfs @ 12.19 hrs, Volume= 204,938 cf, Depth> 4.00"
Routed to Pond DP : DETENTION POND

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 Year Storm Rainfall=5.58"

	Area (sf)	CN	Description
*	417,445	98	Pavement/Roof, HSG B
	196,929	61	>75% Grass cover, Good, HSG B
	614,374	86	Weighted Average
	196,929		32.05% Pervious Area
	417,445		67.95% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	50	0.0100	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.68"
0.9	104	0.0150	1.84		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.0	240	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
1.0	192	0.0500	3.35		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
1.8	461	0.0050	4.20	7.43	**Pipe Channel,** 18.0" Round Area= 1.8 sf Perim= 4.7' r= 0.38' n= 0.013 Corrugated PE, smooth interior
2.4	142	0.0200	0.99		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
14.0	1,189	Total			

Summary for Pond DP: DETENTION POND

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=12)

Inflow Area = 614,374 sf, 67.95% Impervious, Inflow Depth > 4.00" for 10 Year Storm event
Inflow = 50.35 cfs @ 12.19 hrs, Volume= 204,938 cf
Outflow = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf, Atten= 82%, Lag= 27.7 min
Primary = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf
Routed to Pond PDMH :

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 46.90' @ 12.80 hrs Surf.Area= 20,970 sf Storage= 93,245 cf
Flood Elev= 50.00' Surf.Area= 30,000 sf Storage= 168,561 cf

Plug-Flow detention time= 184.1 min calculated for 189,989 cf (93% of inflow)

Center-of-Mass det. time= 147.6 min (954.0 - 806.4)

Volume	Invert	Avail.Storage	Storage Description
#1	41.00'	168,561 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
41.00	9,874	0	0
42.00	12,706	11,290	11,290
43.00	14,322	13,514	24,804
44.00	15,896	15,109	39,913
45.00	17,596	16,746	56,659
46.00	19,417	18,507	75,166
47.00	21,151	20,284	95,450
48.00	22,877	22,014	117,464
49.00	24,659	23,768	141,232
50.00	30,000	27,330	168,561

Device	Routing	Invert	Outlet Devices
#1	Primary	39.80'	**18.0" Round Culvert** L= 4.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 39.80' / 39.65' S= 0.0375 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf
#2	Device 1	41.00'	**10.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	44.90'	**22.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	47.25'	**4.0" x 4.0" Horiz. Orifice/Grate X 104.00** C= 0.600

Primary OutFlow Max=8.85 cfs @ 12.65 hrs HW=46.85' TW=44.46' (Dynamic Tailwater)
↑└─**1=Culvert** (Passes 8.85 cfs of 13.16 cfs potential flow)
  ├─**2=Orifice/Grate** (Orifice Controls 3.10 cfs @ 7.45 fps)
  ├─**3=Orifice/Grate** (Orifice Controls 5.75 cfs @ 6.27 fps)
  └─**4=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond PDMH:

Inflow Area = 614,374 sf, 67.95% Impervious, Inflow Depth > 3.72" for 10 Year Storm event
Inflow = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf
Outflow = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.08 cfs @ 12.65 hrs, Volume= 139,643 cf
Routed to Pond PJFF :
Secondary = 4.97 cfs @ 13.06 hrs, Volume= 50,742 cf
Routed to Link PA-1 : Goose Bay

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 44.48' @ 12.80 hrs
Flood Elev= 52.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	39.55'	**18.0" Round TREATMENT** L= 14.0' Ke= 0.500 Inlet / Outlet Invert= 39.55' / 39.45' S= 0.0071 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf
#2	Secondary	41.75'	**24.0" Round BYPASS** L= 16.0' Ke= 0.500 Inlet / Outlet Invert= 41.75' / 41.65' S= 0.0063 '/' Cc= 0.900 n= 0.130, Flow Area= 3.14 sf

Primary OutFlow Max=3.97 cfs @ 12.65 hrs HW=44.46' TW=42.34' (Dynamic Tailwater)
↑—**1=TREATMENT** (Outlet Controls 3.97 cfs @ 2.24 fps)

Secondary OutFlow Max=4.96 cfs @ 13.06 hrs HW=44.26' TW=0.00' (Dynamic Tailwater)
↑—**2=BYPASS** (Barrel Controls 4.96 cfs @ 1.62 fps)

Summary for Pond PJFF:

Inflow Area = 614,374 sf, 67.95% Impervious, Inflow Depth > 2.73" for 10 Year Storm event
Inflow = 4.08 cfs @ 12.65 hrs, Volume= 139,643 cf
Outflow = 4.08 cfs @ 12.65 hrs, Volume= 139,643 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.08 cfs @ 12.65 hrs, Volume= 139,643 cf
Routed to Link PA-1 : Goose Bay

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Peak Elev= 42.34' @ 12.65 hrs
Flood Elev= 52.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	39.00'	**18.0" Round Culvert** L= 12.0' Ke= 0.500 Inlet / Outlet Invert= 39.00' / 38.90' S= 0.0083 '/' Cc= 0.900 n= 0.130, Flow Area= 1.77 sf

Primary OutFlow Max=4.08 cfs @ 12.65 hrs HW=42.34' TW=0.00' (Dynamic Tailwater)
↑—**1=Culvert** (Barrel Controls 4.08 cfs @ 2.31 fps)

Summary for Link PA-1: Goose Bay

Inflow Area = 614,374 sf, 67.95% Impervious, Inflow Depth > 3.72" for 10 Year Storm event
Inflow = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf
Primary = 8.97 cfs @ 12.65 hrs, Volume= 190,385 cf, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 1L

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

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

Subcatchment POST 1.0: Runoff Area=614,374 sf 67.95% Impervious Runoff Depth>5.42"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=67.31 cfs 277,584 cf

Pond DP: DETENTION POND Peak Elev=48.35' Storage=125,690 cf Inflow=67.31 cfs 277,584 cf
Outflow=14.64 cfs 255,473 cf

Pond PDMH: Peak Elev=46.59' Inflow=14.64 cfs 255,473 cf
Primary=5.68 cfs 160,375 cf Secondary=9.33 cfs 95,099 cf Outflow=14.64 cfs 255,473 cf

Pond PJFF: Peak Elev=44.16' Inflow=5.68 cfs 160,375 cf
18.0" Round Culvert n=0.130 L=12.0' S=0.0083 '/' Outflow=5.68 cfs 160,375 cf

Link PA-1: Goose Bay Inflow=14.64 cfs 255,473 cf
Primary=14.64 cfs 255,473 cf

Total Runoff Area = 614,374 sf Runoff Volume = 277,584 cf Average Runoff Depth = 5.42"
32.05% Pervious = 196,929 sf 67.95% Impervious = 417,445 sf

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

Subcatchment POST 1.0: Runoff Area=614,374 sf 67.95% Impervious Runoff Depth>6.76"
Flow Length=1,189' Tc=14.0 min CN=86 Runoff=83.04 cfs 346,321 cf

Pond DP: DETENTION POND Peak Elev=49.71' Storage=160,122 cf Inflow=83.04 cfs 346,321 cf
Outflow=16.33 cfs 317,752 cf

Pond PDMH: Peak Elev=47.39' Inflow=16.33 cfs 317,752 cf
Primary=6.06 cfs 178,683 cf Secondary=10.53 cfs 139,069 cf Outflow=16.33 cfs 317,752 cf

Pond PJFF: Peak Elev=44.67' Inflow=6.06 cfs 178,683 cf
18.0" Round Culvert n=0.130 L=12.0' S=0.0083 '/' Outflow=6.06 cfs 178,683 cf

Link PA-1: Goose Bay Inflow=16.33 cfs 317,752 cf
Primary=16.33 cfs 317,752 cf

Total Runoff Area = 614,374 sf Runoff Volume = 346,321 cf Average Runoff Depth = 6.76"
32.05% Pervious = 196,929 sf 67.95% Impervious = 417,445 sf

2.3 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 the development area is detailed below.

Runoff generated from the proposed impervious areas as a result of the EQ Tanks will be treated by a Contech Jellyfish Filter filtration system. The Jellyfish Filter was sized to treat at the very minimum 30% the Water Quality Flow (WQF) for all existing impervious area, as required by Env-Wq 1507.03(i)(1). The WQV & WQF calculations are shown in Table 2.3. The Jellyfish Filter Design Summary prepared by Contech Engineered Solutions is also provided in Appendix B. The subcatchment area (POST-1.0) for this EQ Tank addition can be referenced on the post-development watershed plan (Sheet C-802).

Table 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	14.10 AC
Ai	Impervious Area Draining to Design Structure	9.58 AC
I	% Impervious Area Draining to Design Structures	68%
Rv	Runoff Coefficient, Rv = 0.05 + (0.9*I)	0.66
WQV	**Water Quality Volume, WQV = P*A*Rv**	**33,857 cf**
Tc	Time of Concentration (min.)	14.0
q_u	Unit Peak Discharge (cfs/mi^2/in)	540
WQF	**Total Treatment Flow, WQF = WQV*q_u**	**7.870 cfs**

3.0 Conclusion

The proposed project will result in a reduction to the peak flow rates in the post-development condition. The net increase in impervious areas resulting from the proposed project and all existing untreated impervious area within the watershed will be treated to the current NHDES stormwater management requirements for a redevelopment project site. The proposed stormwater filtration system will treat the surface runoff from the expansion area prior to discharging to the existing closed drainage system.

Appendices

A Extreme Precipitation Tables

B Contech Jellyfish Sizing Memo

C Plan Set (Bound Seperately)

Tighe&Bond

APPENDIX A

Extreme Precipitation Tables

Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Metadata for Point

Smoothing	Yes
State	New Hampshire
Location	New Hampshire, United States
Latitude	43.085 degrees North
Longitude	70.802 degrees West
Elevation	10 feet
Date/Time	Thu May 30 2024 08:55:43 GMT-0400 (Eastern Daylight Time)

Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.65	0.81	1.04	**1yr**	0.70	0.98	1.21	1.56	2.02	2.65	2.91	**1yr**	2.35	2.79	3.20	3.92	4.52	**1yr**
2yr	0.32	0.50	0.62	0.81	1.02	1.30	**2yr**	0.88	1.18	1.51	1.93	2.48	3.20	3.55	**2yr**	2.83	3.42	3.92	4.66	5.30	**2yr**
5yr	0.37	0.58	0.72	0.97	1.24	1.60	**5yr**	1.07	1.46	1.88	2.42	3.13	4.05	4.56	**5yr**	3.59	4.38	5.01	5.91	6.67	**5yr**
10yr	0.41	0.64	0.81	1.11	1.44	1.88	**10yr**	1.24	1.71	2.21	2.87	3.73	4.85	5.50	**10yr**	4.29	5.29	6.04	7.07	7.94	**10yr**
25yr	0.47	0.75	0.96	1.32	1.75	2.31	**25yr**	1.51	2.12	2.75	3.60	4.71	6.15	7.06	**25yr**	5.44	6.79	7.74	8.97	10.01	**25yr**
50yr	0.53	0.85	1.09	1.52	2.04	2.72	**50yr**	1.76	2.50	3.25	4.28	5.62	7.36	8.54	**50yr**	6.51	8.21	9.34	10.75	11.93	**50yr**
100yr	0.60	0.96	1.24	1.75	2.38	3.20	**100yr**	2.05	2.95	3.84	5.09	6.71	8.82	10.33	**100yr**	7.80	9.93	11.28	12.88	14.23	**100yr**
200yr	0.66	1.08	1.40	2.01	2.78	3.78	**200yr**	2.40	3.47	4.55	6.06	8.02	10.57	12.49	**200yr**	9.35	12.01	13.62	15.45	16.97	**200yr**
500yr	0.78	1.29	1.68	2.43	3.41	4.68	**500yr**	2.94	4.32	5.67	7.61	10.13	13.43	16.07	**500yr**	11.89	15.46	17.47	19.64	21.43	**500yr**

Lower Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.73	0.89	**1yr**	0.63	0.87	0.92	1.31	1.66	2.23	2.50	**1yr**	1.97	2.41	2.83	3.17	3.88	**1yr**
2yr	0.31	0.49	0.60	0.81	1.00	1.19	**2yr**	0.86	1.16	1.36	1.82	2.34	3.05	3.44	**2yr**	2.70	3.31	3.81	4.53	5.05	**2yr**
5yr	0.35	0.54	0.67	0.92	1.17	1.40	**5yr**	1.01	1.37	1.61	2.13	2.74	3.78	4.18	**5yr**	3.34	4.02	4.69	5.51	6.22	**5yr**
10yr	0.38	0.59	0.73	1.02	1.32	1.60	**10yr**	1.14	1.56	1.81	2.41	3.08	4.36	4.86	**10yr**	3.86	4.67	5.42	6.39	7.18	**10yr**
25yr	0.44	0.67	0.83	1.18	1.56	1.90	**25yr**	1.34	1.86	2.10	2.78	3.57	4.69	5.90	**25yr**	4.15	5.67	6.63	7.78	8.67	**25yr**
50yr	0.48	0.73	0.91	1.31	1.76	2.17	**50yr**	1.52	2.12	2.35	3.11	3.98	5.30	6.82	**50yr**	4.69	6.56	7.71	9.02	10.00	**50yr**
100yr	0.53	0.81	1.01	1.46	2.01	2.47	**100yr**	1.73	2.42	2.63	3.46	4.41	5.95	7.88	**100yr**	5.27	7.58	8.97	10.48	11.53	**100yr**
200yr	0.59	0.89	1.13	1.63	2.28	2.82	**200yr**	1.96	2.76	2.93	3.85	4.88	6.67	9.10	**200yr**	5.90	8.75	10.43	12.19	13.33	**200yr**
500yr	0.69	1.02	1.31	1.91	2.71	3.37	**500yr**	2.34	3.30	3.40	4.41	5.58	7.75	11.02	**500yr**	6.86	10.59	12.73	14.91	16.12	**500yr**

Upper Confidence Limits

	5min	10min	15min	30min	60min	120min		1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.28	0.44	0.53	0.72	0.88	1.08	**1yr**	0.76	1.06	1.25	1.75	2.21	2.99	3.13	**1yr**	2.65	3.01	3.57	4.36	5.02	**1yr**
2yr	0.33	0.52	0.63	0.86	1.06	1.26	**2yr**	0.91	1.23	1.48	1.96	2.51	3.41	3.68	**2yr**	3.02	3.53	4.06	4.81	5.61	**2yr**
5yr	0.40	0.61	0.76	1.04	1.33	1.61	**5yr**	1.15	1.57	1.88	2.53	3.24	4.32	4.92	**5yr**	3.82	4.73	5.34	6.33	7.11	**5yr**
10yr	0.46	0.71	0.88	1.23	1.59	1.96	**10yr**	1.38	1.92	2.27	3.09	3.93	5.31	6.15	**10yr**	4.70	5.91	6.74	7.78	8.68	**10yr**
25yr	0.57	0.87	1.08	1.54	2.02	2.54	**25yr**	1.74	2.48	2.93	4.04	5.09	7.73	8.25	**25yr**	6.84	7.94	9.02	10.25	11.33	**25yr**
50yr	0.66	1.01	1.25	1.80	2.42	3.09	**50yr**	2.09	3.02	3.56	4.96	6.23	9.67	10.34	**50yr**	8.56	9.94	11.25	12.61	13.86	**50yr**
100yr	0.77	1.17	1.47	2.12	2.91	3.75	**100yr**	2.51	3.67	4.33	6.10	7.63	12.09	12.94	**100yr**	10.70	12.45	14.03	15.54	16.96	**100yr**
200yr	0.90	1.36	1.72	2.50	3.48	4.57	**200yr**	3.00	4.47	5.28	7.50	9.34	15.15	16.23	**200yr**	13.41	15.60	17.53	19.14	20.77	**200yr**
500yr	1.12	1.66	2.14	3.11	4.42	5.91	**500yr**	3.81	5.78	6.84	9.88	12.24	20.44	21.88	**500yr**	18.09	21.04	23.53	25.23	27.17	**500yr**

Powered by ACIS Northeast Regional Climate Center

Coastal and Great Bay Region Precipitation Increase		
	24-hr Storm Event (in.)	24-hr Storm Event + 15% (in.)
2 Year	3.20	3.68
10 Year	4.85	5.58
25 Year	6.15	7.07
50 Year	7.36	8.46

APPENDIX B

Jellyfish Filter Design Calculation

Contech Engineered Solutions, LLC Engineer:	DRA
Date Prepared:	**6/12/2024**

Site Information

Project Name	**Lonza Biologics**	
Project City	**Portsmouth**	
Project State	**NH**	
Site Designation	**PJFF**	
Total Drainage Area, Ad	**14.10**	ac
Post Development Impervious Area, Ai	**9.58**	ac
Pervious Area, Ap	**4.52**	ac
% Impervious	**68%**	
Runoff Coefficient, Rc	**0.66**	
Upstream pretreatment credit	**50%**	

Mass Loading Calculations

Mean Annual Rainfall, P	**49**	in
Agency Required % Removal	**80%**	
Percent Runoff Capture	**90%**	
Mean Annual Runoff, Vt	**1,493,664**	ft^3
Event Mean Concentration of Pollutant, EMC	**70**	mg/l
Annual Mass Load, M total	**6,523**	lbs

Filter System

Filtration Brand	**Jellyfish**	
Cartridge Length	**54**	in

Jellyfish Sizing

Mass removed by pretreatment system	**3,262**	lbs
Mass load to filters after pretreatment	**3,262**	lbs
Mass to be Captured by System	**2,609**	lbs
Water Quality Flow	**3.28**	cfs

Method to Use **MASS LOADING**

Summary			
Mass	Treatment Mass	2,627	lbs
	Required Size	**JFPD0812-19-4**	
	WQ Flow provided	3.74	cfs
Flow	Treatment Flow Rate	3.39	cfs
	Required Size	**JFPD0812-17-4**	
	Mass Capture provided	2,377	lbs

APPENDIX C

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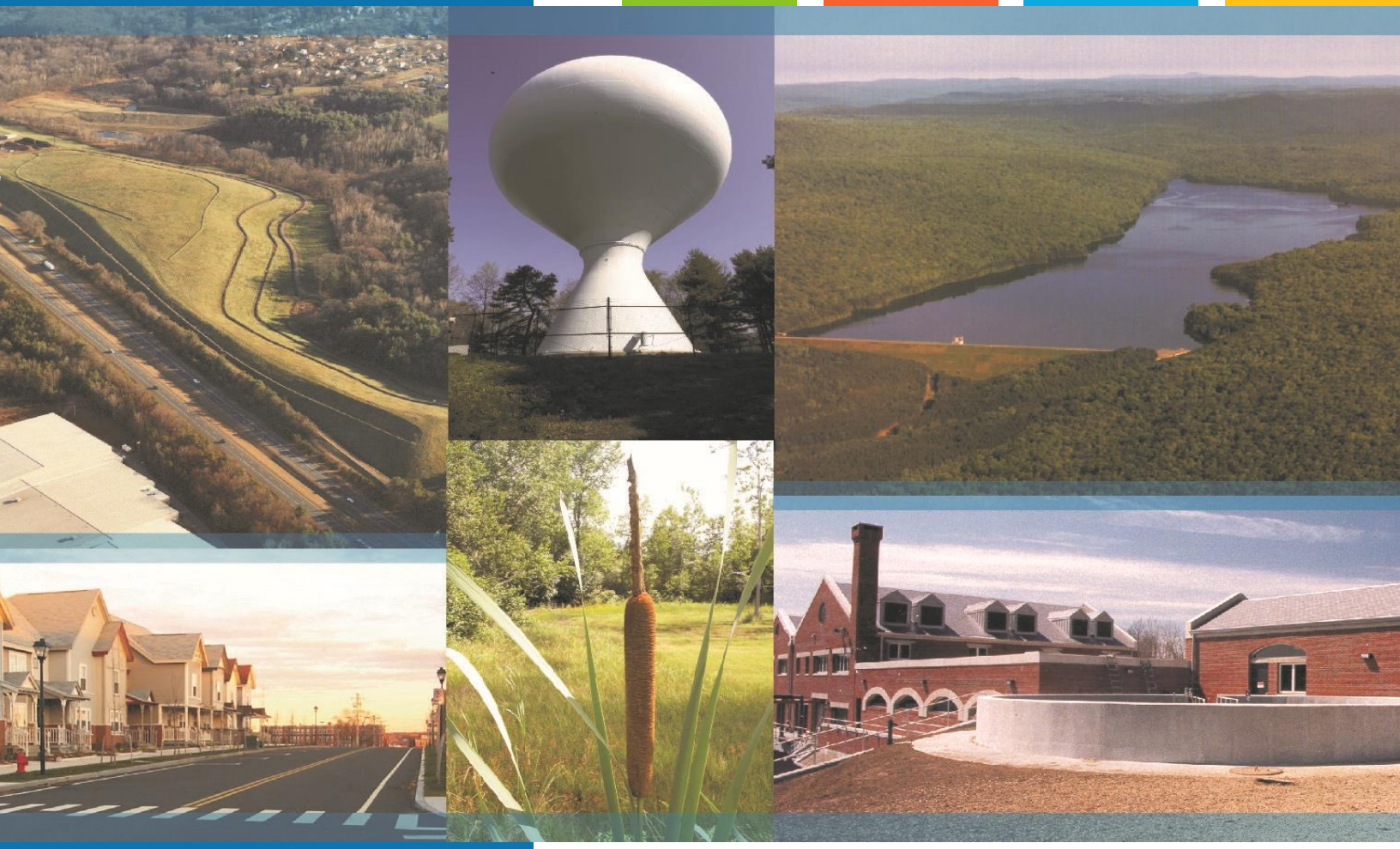
100% Recyclable



Proposed Industrial Wastewater Equalization System
101 International Drive
Portsmouth, NH

Long-Term Operation & Maintenance Plan

Lonza Biologics

June 17, 2024

Tighe&Bond

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Section 1
Long-Term Operation & Maintenance Plan

It is the intent of this Operation and Maintenance Plan to identify the areas of this site that need special attention and consideration, as well as implement a plan to assure routine maintenance. By identifying the areas of concern as well as implementing a frequent and routine maintenance schedule the site will maintain a high-quality stormwater runoff.

1.1 Contact/Responsible Party

Lonza Biologics
101 International Drive
Portsmouth, NH 03801

(Note: The contact information for the Contact/Responsible Party shall be kept current. If ownership changes, the Operation and Maintenance Plan must be transferred to the new party.)

1.2 Maintenance Items

Maintenance of the following items shall be recorded:

- Litter/Debris Removal
- Pavement Sweeping
- Landscaping
- Catch Basin Cleaning
- Contech Jellyfish Filter Units
- Detention/Sediment Basin

The following maintenance items and schedule represent the minimum action required. Periodic site inspections shall be conducted, and all measures must be maintained in effective operating condition. The following items shall be observed during site inspection and maintenance:

- Inspect vegetated areas, particularly slopes and embankments for areas of erosion. Replant and restore as necessary
- Inspect catch basins for sediment buildup
- Inspect site for trash and debris

1.3 Overall Site Operation & Maintenance Schedule

Maintenance Item	Frequency of Maintenance
Litter/Debris Removal	Weekly
Pavement Sweeping - Sweep impervious areas to remove sand and litter.	Annually
Landscaping - Landscaped islands to be maintained and mulched.	Maintained as required and mulched each Spring
Catch Basin (CB) Cleaning - CB to be cleaned of solids and oils.	Annually
Contech Jelly Fish Units	In accordance with Manufacturer's Recommendations

1.3.1 Disposal Requirements

Disposal of debris, trash, sediment and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

1.4 Detention/Sediment Basin Maintenance Requirements

Detention/Sediment Basin Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Monitor Sediment Accumulation	Annually	- Install and maintain a staff gage or other measuring devise, to indicate depth of sediment accumulation and level at which clean-out is required.
Visual Inspection	Annually	- Remove trash and debris as needed - Remove any woody vegetation - Inspect and repair embankments - Inspect check dam
Mowing	Periodically (At least two (2) times annually)	- Embankments shall be mowed

1.5 Proprietary Systems Maintenance Requirements

1.5.1 Contech Jellyfish System Maintenance Requirements

Contech Jellyfish Filter System Inspection/Maintenance Requirements		
Inspection/ Maintenance	**Frequency**	**Action**
Inspect vault for sediment build up, static water, plugged media, and bypass condition	One (1) time annually and after any rainfall event exceeding 2.5" in a 24-hr period	Maintenance required for any of the following: - >4" of sediment on the vault floor - >1/4" of sediment on top of the cartridge - 0.4" of static water above the cartridge bottom more than 24 hours after a rain event - If pore space between media is absent. - If vault is in bypass condition during an average rainfall event.
Replace Cartridges	As required by inspection, 1-5 years.	- Remove filter cartridges per manufacturer methods. - Vacuum sediment from vault. - Install new cartridges per manufacturer methods

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter
Owner's Manual

Jellyfish® Filter

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THANK YOU FOR PURCHASING THE JELLYFISH® FILTER!

Contech Engineered Solutions would like to thank you for selecting the Jellyfish Filter to meet your project's stormwater treatment needs. With proper inspection and maintenance, the Jellyfish Filter is designed to deliver ongoing, high levels of stormwater pollutant removal.

If you have any questions, please feel free to call us or e-mail us:

Contech Engineered Solutions
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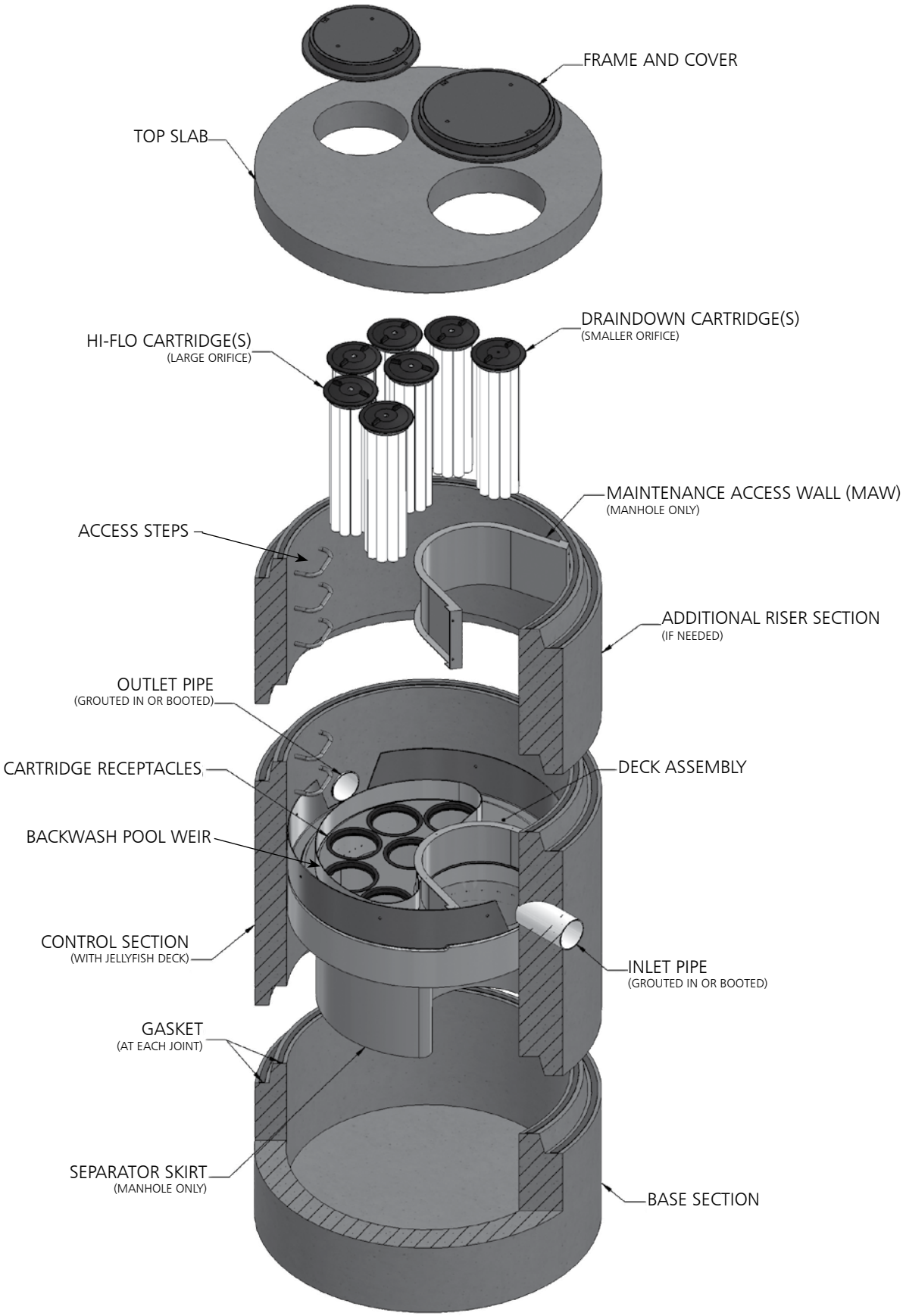
513-645-7000 | 800-338-1122
www.ContechES.com
info@conteches.com


FRAME AND COVER
TOP SLAB
DRAINDOWN CARTRIDGE(S)
(SMALLER ORIFICE)
HI-FLO CARTRIDGE(S)
(LARGE ORIFICE)
MAINTENANCE ACCESS WALL (MAW)
(MANHOLE ONLY)
ACCESS STEPS
ADDITIONAL RISER SECTION
(IF NEEDED)
OUTLET PIPE
(GROUTED IN OR BOOTED)
CARTRIDGE RECEPTACLES
DECK ASSEMBLY
BACKWASH POOL WEIR
CONTROL SECTION
(WITH JELLYFISH DECK)
INLET PIPE
(GROUTED IN OR BOOTED)
GASKET
(AT EACH JOINT)
SEPARATOR SKIRT
(MANHOLE ONLY)
BASE SECTION

WARNINGS / CAUTION

1. FALL PROTECTION may be required.
2. WATCH YOUR STEP if standing on the Jellyfish Filter Deck at any time; Great care and safety must be taken while walking or maneuvering on the Jellyfish Filter Deck. Attentive care must be taken while standing on the Jellyfish Filter Deck at all times to prevent stepping onto a lid, into or through a cartridge hole or slipping on the deck.
3. The Jellyfish Filter Deck can be SLIPPERY WHEN WET.
4. If the Top Slab, Covers or Hatches have not yet been installed, or are removed for any reason, great care must be taken to NOT DROP ANYTHING ONTO THE JELLYFISH FILTER DECK. The Jellyfish Filter Deck and Cartridge Receptacle Rings can be damaged under high impact loads. This type of activity voids all warranties. All damaged items to be replaced at owner's expense.
5. Maximum deck load 2 persons, total weight 450 lbs.

Safety Notice

Jobsite safety is a topic and practice addressed comprehensively by others. The inclusions here are intended to be reminders to whole areas of Safety Practice that are the responsibility of the Owner(s), Manager(s) and Contractor(s). OSHA and Canadian OSH, and Federal, State/Provincial, and Local Jurisdiction Safety Standards apply on any given site or project. The knowledge and applicability of those responsibilities is the Contractor's responsibility and outside the scope of Contech Engineered Solutions.

Confined Space Entry

Secure all equipment and perform all training to meet applicable local and OSHA regulations regarding confined space entry. It is the Contractor's or entry personnel's responsibility to proceed safely at all times.

Personal Safety Equipment

Contractor is responsible to provide and wear appropriate personal protection equipment as needed including, but not limited to safety boots, hard hat, reflective vest, protective eyewear, gloves and fall protection equipment as necessary. Make sure all equipment is staffed with trained and/or certified personnel, and all equipment is checked for proper operation and safety features prior to use.

- Fall protection equipment
- Eye protection
- Safety boots
- Ear protection
- Gloves
- Ventilation and respiratory protection
- Hard hat
- Maintenance and protection of traffic plan

Chapter 1

1.0 – Owner Specific Jellyfish Filter Product Information

Below you will find a reference page that can be filled out according to your Jellyfish Filter specification to help you easily inspect, maintain and order parts for your system.

Owner Name:	
Phone Number:	
Site Address:	
Site GPS Coordinates/unit location:	
Unit Location Description:	
Jellyfish Filter Model No.:	
Contech Project & Sequence Number	
No. of Hi-Flo Cartridges	
No. of Cartridges:	
Length of Draindown Cartridges:	
No. of Blank Cartridge Lids:	
Bypass Configuration (Online/Offline):	

Notes:

_____

_____

_____

_____

Chapter 2

2.0 – Jellyfish Filter System Operations and Functions

The Jellyfish Filter is an engineered stormwater quality treatment technology that removes a high level and wide variety of stormwater pollutants. Each Jellyfish Filter cartridge consists of eleven membrane - encased filter elements ("filtration tentacles") attached to a cartridge head plate. The filtration tentacles provide a large filtration surface area, resulting in high flow and high pollutant removal capacity.

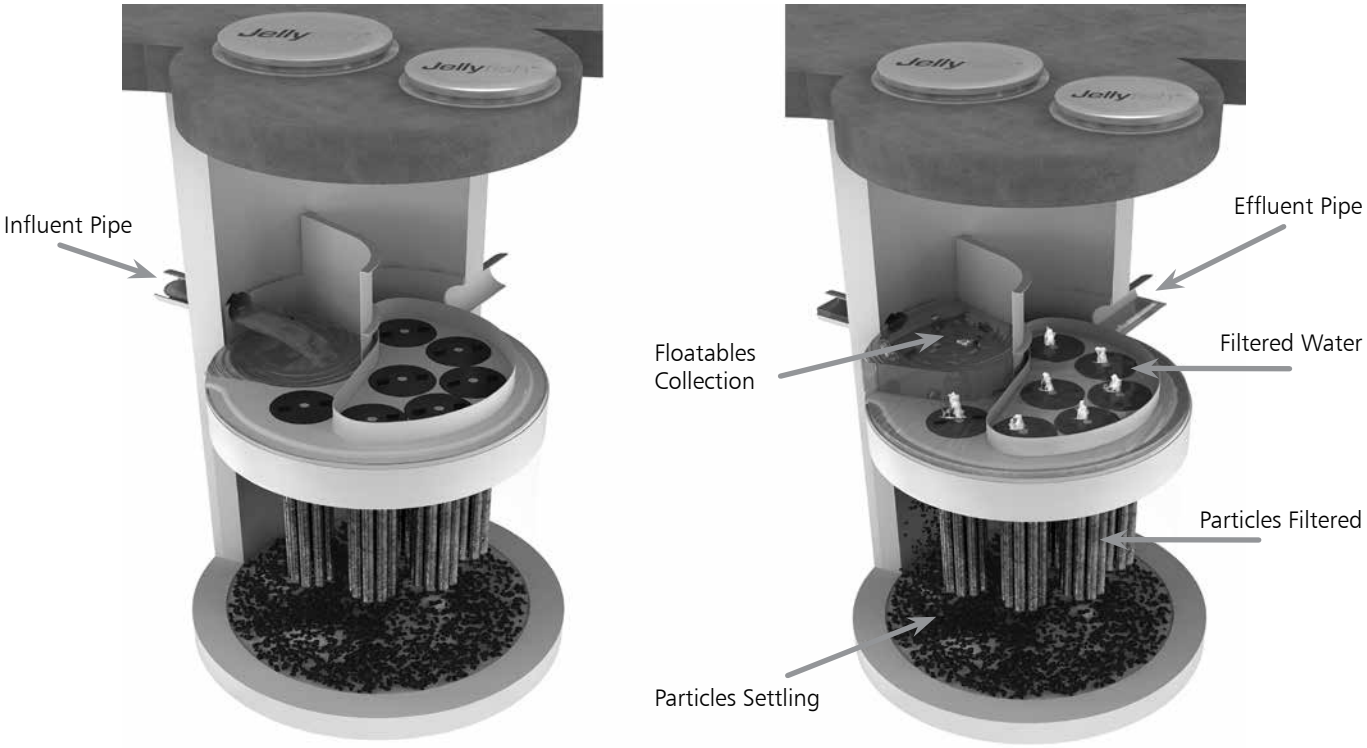
The Jellyfish Filter functions are depicted in Figure 1 below.

FIGURE 1

Jellyfish Filter Treatment Functions

Membrane Filtration

Section View with Maintenance Access Wall (MAW) Cutaway



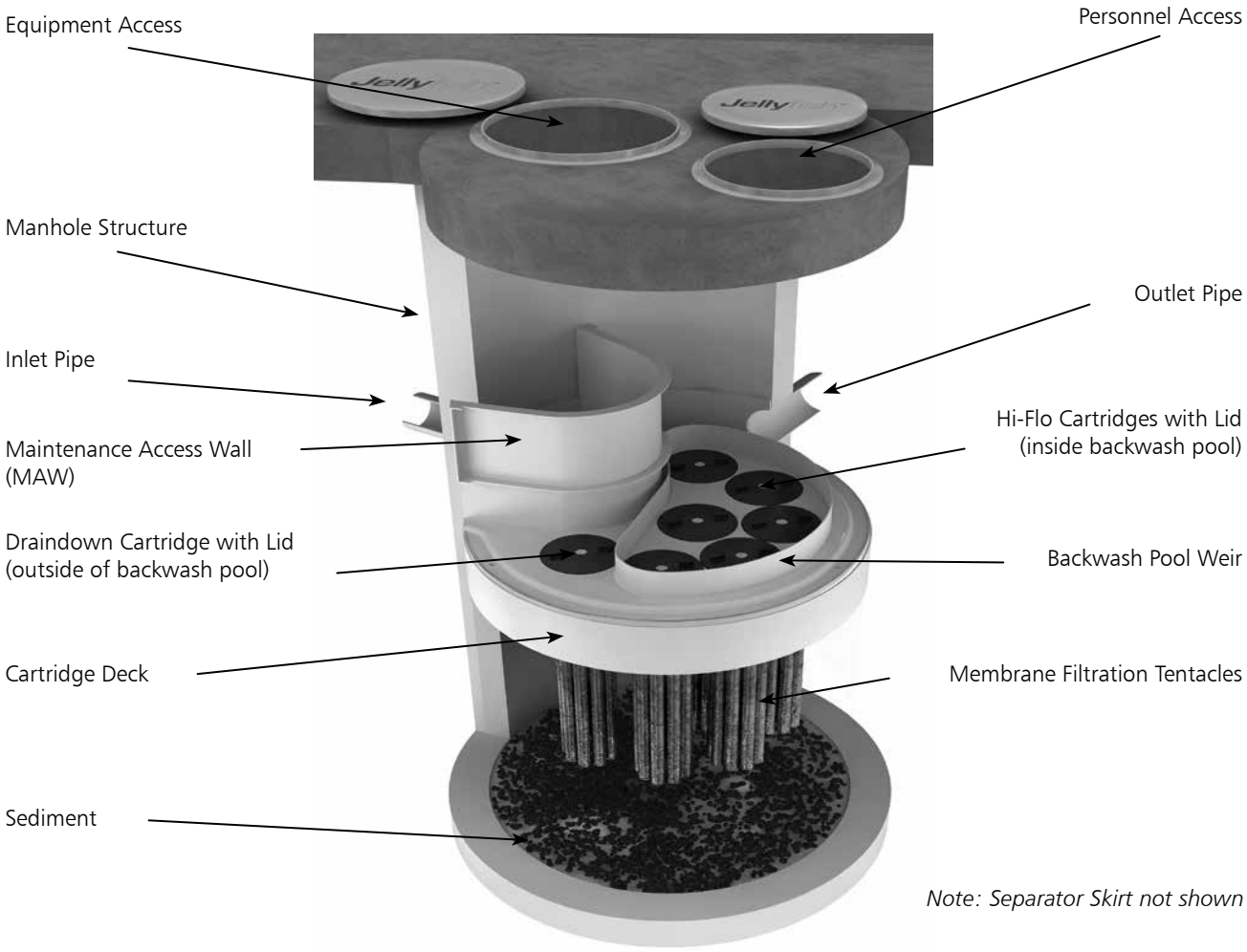
Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

For additional details on the operation and pollutant capabilities of the Jellyfish Filter please refer to additional details on our website at www.ContechES.com.

2.1 – Components and Cartridges

The Jellyfish Filter and components are depicted in Figure 2 below.

FIGURE 2 **Jellyfish Filter Components**



Tentacles are available in various lengths as depicted in Table 1 below.

Table 1 – Cartridge Lengths / Weights and Cartridge Lid Orifice Diameters

Cartridge Lengths	Dry Weight	Hi-Flo Orifice Diameter	Draindown Orifice Diameter
15 inches (381 mm)	10 lbs (4.5 kg)	35 mm	20 mm
27 inches (686 mm)	14.5 lbs (6.6 kg)	45 mm	25 mm
40 inches (1,016 mm)	19.5 lbs (8.9 kg)	55 mm	30 mm
54 inches (1,372 mm)	25 lbs (11.4 kg)	70 mm	35 mm

2.2 – Jellyfish Membrane Filtration Cartridge Assembly

The Jellyfish Filter utilizes multiple membrane filtration cartridges. Each cartridge consists of removable cylindrical filtration "tentacles" attached to a cartridge head plate. Each filtration tentacle has a threaded pipe nipple and o-ring. To attach, insert the top pipe nipples with the o-ring through the head plate holes and secure with locking nuts. Hex nuts to be hand tightened and checked with a wrench as shown below.

2.3 – Jellyfish Membrane Filtration Cartridge Installation

- Cartridge installation will be performed by trained individuals and coordinated with the installing site Contractor. Flow diversion devices are required to be in place until the site is stabilized (final paving and landscaping in place). Failure to address this step completely will reduce the time between required maintenance.
- Descend to the cartridge deck (see Safety Notice and page 3).
- Refer to Contech's submittal drawings to determine proper quantity and placement of Hi-Flo, Draindown and Blank cartridges with appropriate lids. Lower the Jellyfish membrane filtration cartridges into the cartridge receptacles within the cartridge deck. It is possible that not all cartridge receptacles will be filled with a filter cartridge. In that case, a blank headplate and blank cartridge lid (no orifice) would be installed.

Cartridge Assembly

Do not force the tentacles down into the cartridge receptacle, as this may damage the membranes. Apply downward pressure on the cartridge head plate to seat the lubricated rim gasket (thick circular gasket surrounding the circumference of the head plate) into the cartridge receptacle. (See Figure 3 for details on approved lubricants for use with rim gasket.)

- Examine the cartridge lids to differentiate lids with a small orifice, a large orifice, and no orifice.
  - Lids with a small orifice are to be inserted into the Draindown cartridge receptacles, outside of the backwash pool weir.
  - Lids with a large orifice are to be inserted into the Hi-Flo cartridge receptacles within the backwash pool weir.
  - Lids with no orifice (blank cartridge lids) and a blank headplate are to be inserted into unoccupied cartridge receptacles.
- To install a cartridge lid, align both cartridge lid male threads with the cartridge receptacle female threads before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation.

3.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.
Inspection activities are typically conducted from surface observations and include:

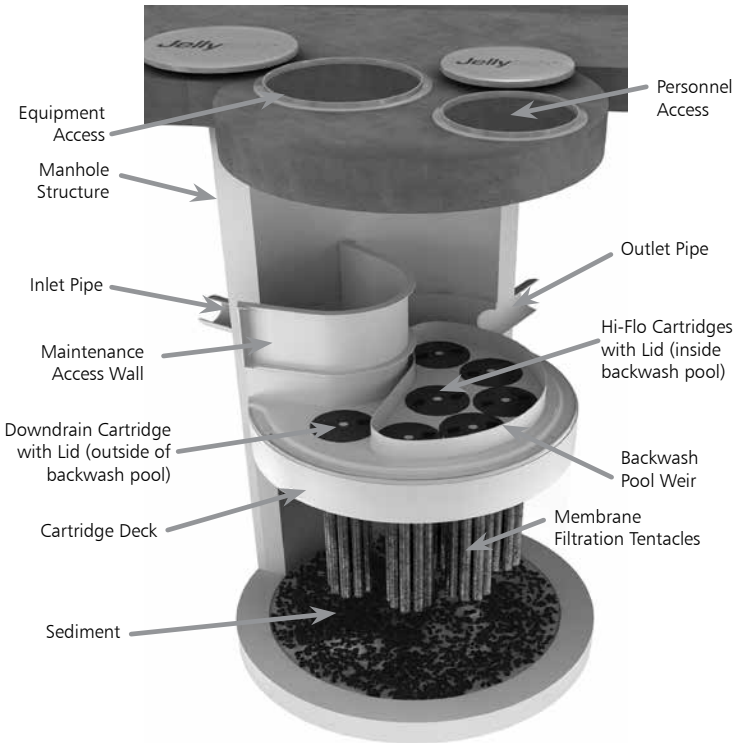
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

Maintenance activities include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed

4.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of, the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent*.



Note: Separator Skirt not shown

1. A minimum of quarterly inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
2. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
3. Inspection is recommended after each major storm event.
4. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

5.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW or inlet bay for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW (where appropriate), cartridge deck and receptacles, and backwash pool weir, for damaged or broken components.

5.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates, that the filter cartridges need to be rinsed.

Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool is not anticipated and may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment (≥1/16") accumulated on the deck surface should be removed.

5.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW or inlet bay.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges need to be rinsed.

6.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

7.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

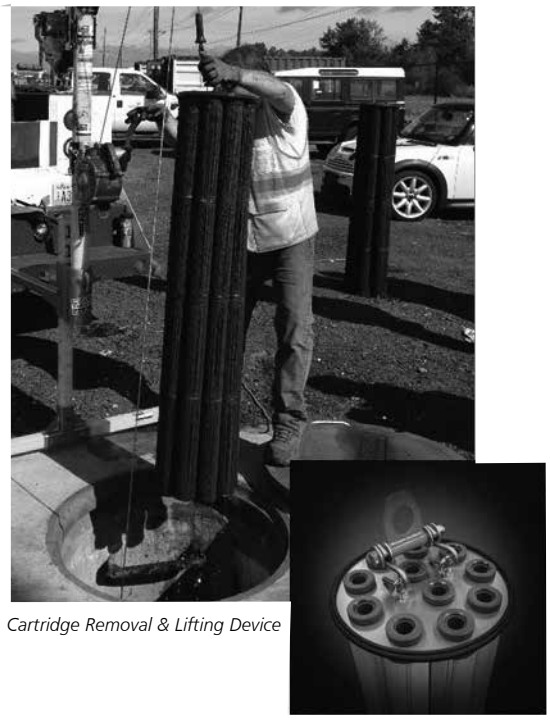
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. To access the cartridge deck for filter cartridge service, descend into the structure and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
5. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

7.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. *Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs*.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

7.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to lose or damage the O-ring seal as well as the plastic threaded nut and connector.
2. Position tentacles in a container (or over the MAW), with the threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.



Cartridge Removal & Lifting Device

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. *Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane*.
4. Collected rinse water is typically removed by vacuum hose.

5. Reassemble cartridges as detailed later in this document. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

7.3 Sediment and Flotables Extraction

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening. Be careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck on manhole systems. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening or inlet bay. Alternatively, floatable solids may be removed by a net or skimmer.
3. Pressure wash cartridge deck and receptacles to remove all

Rinsing Cartridge with Contech Rinse Tool

sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.

4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW or inlet bay.
5. Remove the sediment from the bottom of the unit through the MAW or inlet bay opening.
6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some

Vacuuming Sump Through MAW

vaults complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7.4 Filter Cartridge Reinstallation and Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. *Caution: Do not force the cartridge downward; damage may occur.*
3. Replace the cartridge lid and check to see that both male threads are properly seated before rotating approximately 1/3 of a full rotation until firmly seated. Use of an approved rim gasket lubricant may facilitate installation. See next page for additional details.
4. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.

7.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

7.6 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge Assembly and Installation

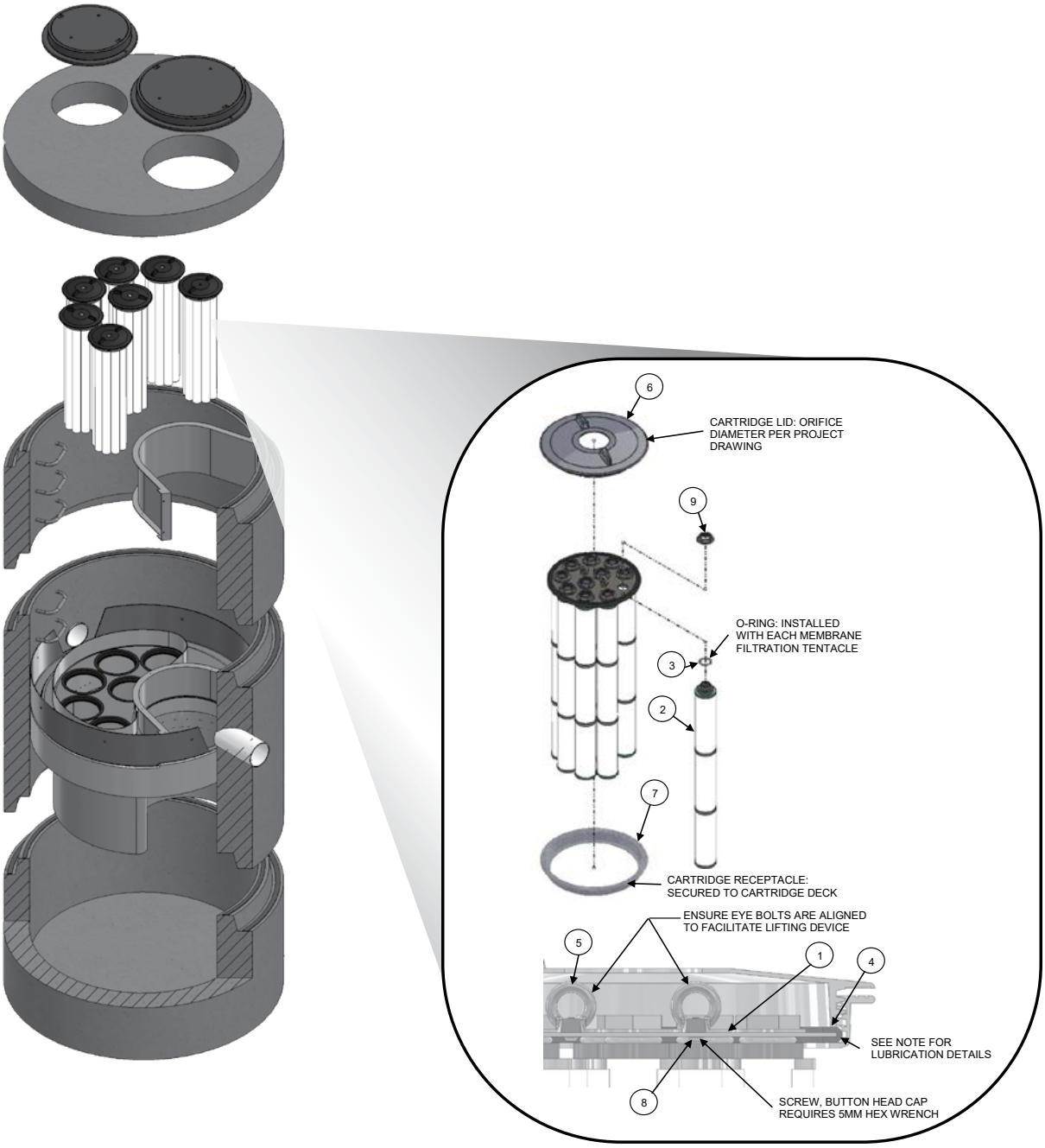


TABLE 1: BOM

ITEM NO.	DESCRIPTION
1	JF HEAD PLATE
2	JF TENTACLE
3	JF O-RING
4	JF HEAD PLATE GASKET
5	JF CARTRIDGE EYELET
6	JF 14IN COVER
7	JF RECEPTACLE
8	BUTTON HEAD CAP SCREW M6X14MM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
78713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUBXL1Q	PROSELECT	PIPE JOINT LUBRICANT

NOTES:

Head Plate Gasket Installation:
Install Head Plate Gasket (Item 4) onto the Head Plate (Item 1) and liberally apply a lubricant from Table 2: Approved Gasket Lubricants onto the gasket where it contacts the Receptacle (Item 7) and Cartridge Lid (Item 6). Follow Lubricant manufacturer's instructions.

Lid Assembly:
Rotate Cartridge Lid counter-clockwise until both male threads drop down and properly seat. Then rotate Cartridge Lid clock-wise approximately one-third of a full rotation until Cartridge Lid is firmly secured, creating a watertight seal.

Jellyfish Filter Inspection and Maintenance Log

Owner: _____ Jellyfish Model No.:_____

Location: _____ GPS Coordinates: _____

Land Use: Commercial:_____ Industrial: _____ Service Station:_____

Road/Highway:____ Airport: _____ Residential: _____ Parking Lot:_____

Date/Time:					
Inspector:					
Maintenance Contractor:					
Visible Oil Present: (Y/N)					
Oil Quantity Removed					
Floatable Debris Present: (Y/N)					
Floatable Debris removed: (Y/N)					
Water Depth in Backwash Pool					
Cartridges externally rinsed/re-commissioned: (Y/N)					
New tentacles put on Cartridges: (Y/N)					
Sediment Depth Measured: (Y/N)					
Sediment Depth (inches or mm):					
Sediment Removed: (Y/N)					
Cartridge Lids intact: (Y/N)					
Observed Damage:					
Comments:					

1.6 Snow & Ice Management for Standard Asphalt and Walkways

Snow storage areas shall be located such that no direct untreated discharges are possible to receiving waters from the storage site (snow storage areas have been shown on the Site Plan). The property manager will be responsible for timely snow removal from all private sidewalks, driveways, and parking areas. Any snow accumulation beyond a height of 3' in the snow storage areas will be hauled off-site and legally disposed of. Salt storage areas shall be covered or located such that no direct untreated discharges are possible to receiving waters from the storage site. Salt and sand shall be used to the minimum extent practical (refer to the attached for de-icing application rate guideline from the New Hampshire Stormwater Management Manual, Volume 2,).

Deicing Application Rate Guidelines

24' of pavement (typcial two-lane road)

These rates are not fixed values, but rather the middle of a range to be selected and adjusted by an agency according to its local conditions and experience.

			Pounds per two-lane mile			
Pavement Temp. (°F) and Trend (↑↓)	Weather Condition	Maintenance Actions	Salt Prewetted / Pretreated with Salt Brine	Salt Prewetted / Pretreated with Other Blends	Dry Salt*	Winter Sand (abrasives)
> 30° ↑	Snow	Plow, treat intersections only	80	70	100*	Not recommended
	Freezing Rain	Apply Chemical	80 - 160	70 - 140	100 - 200*	Not recommended
30° ↓	Snow	Plow and apply chemical	80 - 160	70 - 140	100 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↑	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	150 - 200	130 - 180	180 - 240*	Not recommended
25° - 30° ↓	Snow	Plow and apply chemical	120 - 160	100 - 140	150 - 200*	Not recommended
	Freezing Rain	Apply Chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↑	Snow or Freezing Rain	Plow and apply chemical	160 - 240	140 - 210	200 - 300*	400
20° - 25° ↓	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↑	Snow	Plow and apply chemical	200 - 280	175 - 250	250 - 350*	Not recommended
	Freezing Rain	Apply Chemical	240 - 320	210 - 280	300 - 400*	400
15° - 20° ↓	Snow or Freezing Rain	Plow and apply chemical	240 - 320	210 - 280	300 - 400*	500 for freezing rain
0° - 15° ↑↓	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	300 - 400	Not recommended	500 - 750 spot treatment as needed
< 0°	Snow	Plow, treat with blends, sand hazardous areas	Not recommended	400 - 600**	Not recommended	500 - 750 spot treatment as needed

* Dry salt is not recommended. It is likely to blow off the road before it melts ice.

** A blend of 6 - 8 gal/ton $MgCl_2$ or $CaCl_2$ added to NaCl can melt ice as low as -10°.

Anti-icing Route Data Form				
Truck Station:				
Date:				
Air Temperature	Pavement Temperature	Relative Humidity	Dew Point	Sky
Reason for applying:				
Route:				
Chemical:				
Application Time:				
Application Amount:				
Observation (first day):				
Observation (after event):				
Observation (before next application):				
Name:				

Section 2
Chloride Management Plan

Winter Operational Guidelines

The following Chloride Management Plan is for the Lonza Biologics – Iron Parcel Redevelopment in Portsmouth, New Hampshire. The Plan includes operational guidelines including: winter operator certification requirements, weather monitoring, equipment calibration requirements, mechanical removal, and salt usage evaluation and monitoring. Due to the evolving nature of chloride management efforts, the Chlorides Management Plan will be reviewed annually, in advance of the winter season, to reflect the current management standards.

2.1 Background Information

The Lonza Biologics – Iron Parcel Redevelopment located within the Upper Hodgson Brook Watershed in Newington and Portsmouth, New Hampshire. The Upper Hodgson Brook is identified as a chloride-impaired waterbody.

2.2 Operational Guidelines – Chloride Management

All Lonza Biologics private contractors engaged at the Lonza Biologics premises for the purposes of winter operational snow removal and surface maintenance, are responsible for assisting in meeting compliance for the following protocols. Lonza Biologics private contractors are expected to minimize the effects of the use of de-icing, anti-icing and pretreatment materials by adhering to the strict guidelines outlined below.

The Lonza Biologics winter operational de-icing, anti-icing and pretreatment materials will adhere to the following protocols:

2.2.1 Winter Operator Certification Requirements

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance must be current UNHT2 Green SnowPro Certified operators or equivalent and will use only pre-approved methods for spreading abrasives on private roadways and parking lots. All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide to Lonza Biologics management two copies of the annual UNHT2 Green SnowPro certificate or equivalent for each operator utilized on the Lonza Biologics premises. The annual UNHT2 Green SnowPro certificate or equivalent for each operator will be available on file in the Lonza Biologics Facilities Management office and be present in the vehicle/carrier at all times.

2.2.2 Improved Weather Monitoring

Lonza Biologics will coordinate weather information for use by winter maintenance contractors. This information in conjunction with site specific air/ground surface temperature monitoring will ensure that private contractors engaged at the Lonza Biologics premises for the purpose of winter operational

snow removal and surface maintenance will make more informed decisions as to when and to what extent de-icing, anti-icing and pretreatment materials are applied to private roadways, sidewalks, and parking lots.

2.2.3 Equipment Calibration Requirements

All equipment utilized on the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance will conform to the following calibration requirements.

2.2.3.1 Annual Calibration Requirements

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide two copies of the annual calibration report for each piece of equipment utilized on the Lonza Biologics premises. Each calibration report shall include the vehicle/carrier VIN number and the serial numbers for each component including, but not limited to, spreader control units, salt aggregate spreader equipment, brining/pre-wetting equipment, ground speed orientation unit, and air/ground surface temperature monitor. Annual calibration reports will be available on file in the Lonza Biologics Facilities Management office and be present in the vehicle/carrier at all times.

Prior to each use, each vehicle/carrier operator will perform a systems check to verify that unit settings remain within the guidelines established by the Lonza Biologics Management Team in order to accurately dispense material. All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance will be subject to spot inspections by members of the Lonza Biologics Management Team to ensure that each vehicle/carrier is operating in a manner consistent with the guidelines set herein or State and Municipal regulations. All units will be recalibrated, and the updated calibration reports will be provided each time repairs or maintenance procedures affect the hydraulic system of the vehicle/carrier.

2.2.4 Increased Mechanical Removal Capabilities

All private contractors engaged at the Lonza Biologics premises will endeavor to use mechanical removal means on a more frequent basis for roadways, parking lots and sidewalks. Dedicating more manpower and equipment to increase snow removal frequencies prevents the buildup of snow and the corresponding need for de-icing, anti-icing and pretreatment materials. Shortened maintenance routes, with shorter service intervals, will be used to stay ahead of snowfall. Minimized snow and ice packing will reduce the need for abrasives, salt aggregates, and/or brining solution to restore surfaces back to bare surface states after winter precipitation events.

After storm events the Lonza Biologics management team will be responsible for having the streets swept to recapture un-melted de-icing materials, when practical.

2.3 Salt Usage Evaluation and Monitoring

All private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance shall provide two copies of a storm report, which includes detailed information regarding treatment areas and the use of de-icing, anti- icing and pretreatment materials applied for the removal of snow and surface maintenance on the Lonza Biologics premises. Lonza Biologics will maintain copies of Summary Documents, including copies of the Storm Reports, operator certifications, equipment used for roadway and sidewalk winter maintenance, calibration reports and amount of de-icing materials used.

2.4 Summary

The above-described methodologies are incorporated into the Lonza Biologics Operational Manual and are to be used to qualify and retain all private contractors engaged at the Lonza Biologics premises for the purpose of winter operational snow removal and surface maintenance. This section of the Manual, is intended to be an adaptive management document that is modified as required based on experience gained from past practices and technological advancements that reflect chloride BMP standards. All Lonza Biologics employees directly involved with winter operational activities are required to review this document and the current standard Best Management Practices published by the UNH Technology Transfer (T2) program annually. All Lonza Biologics employees directly involved with winter operational activities, and all private contractors engaged at the Lonza Biologics premises for the purposes of winter operational snow removal and surface maintenance, must be current UNHT2 Green SnowPro Certified operators or equivalent and undergo the necessary requirements to maintain this certification annually.

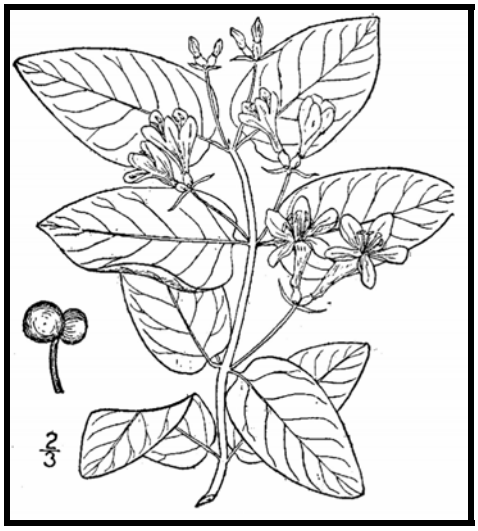
Section 3
Invasive Species

With respect to a particular ecosystem, any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem is classified as an invasive species. Refer to the following fact sheet prepared by the University of New Hampshire Cooperative Extension entitled Methods for Disposing Non-Native Invasive Plants for recommended methods to dispose of invasive plant species.

UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

Methods for Disposing Non-Native Invasive Plants

Prepared by the Invasives Species Outreach Group, volunteers interested in helping people control invasive plants. Assistance provided by the Piscataquog Land Conservancy and the NH Invasives Species Committee. Edited by Karen Bennett, Extension Forestry Professor and Specialist.



Tatarian honeysuckle
Lonicera tatarica
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 3: 282.

Non-native invasive plants crowd out natives in natural and managed landscapes. They cost taxpayers billions of dollars each year from lost agricultural and forest crops, decreased biodiversity, impacts to natural resources and the environment, and the cost to control and eradicate them.

Invasive plants grow well even in less than desirable conditions such as sandy soils along roadsides, shaded wooded areas, and in wetlands. In ideal conditions, they grow and spread even faster. There are many ways to remove these non-native invasives, but once removed, care is needed to dispose the removed plant material so the plants don't grow where disposed.

Knowing how a particular plant reproduces indicates its method of spread and helps determine the appropriate disposal method. Most are spread by seed and are dispersed by wind, water, animals, or people. Some reproduce by vegetative means from pieces of stems or roots forming new plants. Others spread through both seed and vegetative means.

Because movement and disposal of viable plant parts is restricted (see NH Regulations), viable invasive parts can't be brought to most transfer stations in the state. Check with your transfer station to see if there is an approved, designated area for invasives disposal. This fact sheet gives recommendations for rendering plant parts non-viable.

Control of invasives is beyond the scope of this fact sheet. For information about control visit www.nhinvasives.org or contact your UNH Cooperative Extension office.

New Hampshire Regulations

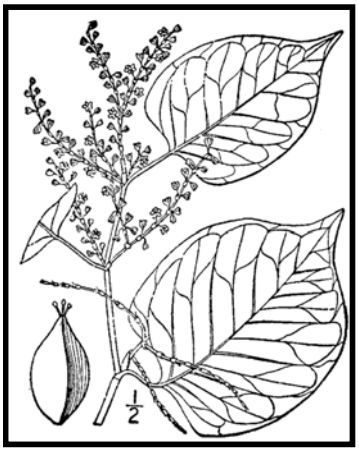
Prohibited invasive species shall only be disposed of in a manner that renders them nonliving and nonviable. (Agr. 3802.04)

No person shall collect, transport, import, export, move, buy, sell, distribute, propagate or transplant any living and viable portion of any plant species, which includes all of their cultivars and varieties, listed in Table 3800.1 of the New Hampshire prohibited invasive species list. (Agr 3802.01)

How and When to Dispose of Invasives?

To prevent seed from spreading remove invasive plants before seeds are set (produced). Some plants continue to grow, flower and set seed even after pulling or cutting. Seeds can remain viable in the ground for many years. If the plant has flowers or seeds, place the flowers and seeds in a heavy plastic bag "head first" at the weeding site and transport to the disposal site. The following are general descriptions of disposal methods. See the chart for recommendations by species.

Burning: Large woody branches and trunks can be used as firewood or burned in piles. For outside burning, a written fire permit from the local forest fire warden is required unless the ground is covered in snow. Brush larger than 5 inches in diameter can't be burned. Invasive plants with easily airborne seeds like black swallow-wort with mature seed pods (indicated by their brown color) shouldn't be burned as the seeds may disperse by the hot air created by the fire.



Japanese knotweed
Polygonum cuspidatum
USDA-NRCS PLANTS Database / Britton, N.L., and A. Brown. 1913. *An illustrated flora of the northern United States, Canada and the British Possessions*. Vol. 1: 676.

Bagging (solarization): Use this technique with softer-tissue plants. Use heavy black or clear plastic bags (contractor grade), making sure that no parts of the plants poke through. Allow the bags to sit in the sun for several weeks and on dark pavement for the best effect.

Tarping and Drying: Pile material on a sheet of plastic and cover with a tarp, fastening the tarp to the ground and monitoring it for escapes. Let the material dry for several weeks, or until it is clearly nonviable.

Chipping: Use this method for woody plants that don't reproduce vegetatively.

Burying: This is risky, but can be done with watchful diligence. Lay thick plastic in a deep pit before placing the cut up plant material in the hole. Place the material away from the edge of the plastic before covering it with more heavy plastic. Eliminate as much air as possible and toss in soil to weight down the material in the pit. Note that the top of the buried material should be at least three feet underground. Japanese knotweed should be at least 5 feet underground!

Drowning: Fill a large barrel with water and place soft-tissue plants in the water. Check after a few weeks and look for rotted plant material (roots, stems, leaves, flowers). Well-rotted plant material may be composted. A word of caution- seeds may still be viable after using this method. Do this before seeds are set. This method isn't used often. Be prepared for an awful stink!

Composting: Invasive plants can take root in compost. Don't compost any invasives unless you know there is no viable (living) plant material left. Use one of the above techniques (bagging, tarping, drying, chipping, or drowning) to render the plants nonviable before composting. Closely examine the plant before composting and avoid composting seeds.

Be diligent looking for seedlings for *years* in areas where removal and disposal took place.

Suggested Disposal Methods for Non-Native Invasive Plants

This table provides information concerning the disposal of removed invasive plant material. If the infestation is treated with herbicide and left in place, these guidelines don't apply. Don't bring invasives to a local transfer station, unless there is a designated area for their disposal, or they have been rendered non-viable. This listing includes wetland and upland plants from the New Hampshire Prohibited Invasive Species List. The disposal of aquatic plants isn't addressed.

<table>
<tr><th>Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">Norway maple
(Acer platanoides)
European barberry
(Berberis vulgaris)
Japanese barberry
(Berberis thunbergii)
autumn olive
(Elaeagnus umbellata)
burning bush
(Euonymus alatus)
Morrow's honeysuckle
(Lonicera morrowii)
Tatarian honeysuckle
(Lonicera tatarica)
showy bush honeysuckle
(Lonicera x bella)
common buckthorn
(Rhamnus cathartica)
glossy buckthorn
(Frangula alnus)</td><td rowspan="2">Fruit and Seeds
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Use as firewood.
▪ Make a brush pile.
▪ Chip.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip once all fruit has dropped from branches.
▪ Leave resulting chips on site and monitor.</td></tr>
<tr><td rowspan="2">oriental bittersweet
(Celastrus orbiculatus)
multiflora rose
(Rosa multiflora)</td><td rowspan="2">Fruits, Seeds, Plant Fragments
  </td><td>Prior to fruit/seed ripening
Seedlings and small plants
▪ Pull or cut and leave on site with roots exposed. No special care needed.
Larger plants
▪ Make a brush pile.
▪ Burn.</td></tr>
<tr><td>After fruit/seed is ripe
Don't remove from site.
▪ Burn.
▪ Make a covered brush pile.
▪ Chip – only after material has fully dried (1 year) and all fruit has dropped from branches. Leave resulting chips on site and monitor.</td></tr>
</table>

<table>
<tr><th>Non-Woody Plants</th><th>Method of Reproducing</th><th>Methods of Disposal</th></tr>
<tr><td rowspan="2">garlic mustard
(Alliaria petiolata)
spotted knapweed
(Centaurea maculosa)
▪ Sap of related knapweed can cause skin irritation and tumors. Wear gloves when handling.
black swallow-wort
(Cynanchum nigrum)
▪ May cause skin rash. Wear gloves and long sleeves when handling.
pale swallow-wort
(Cynanchum rossicum)
giant hogweed
(Heracleum mantegazzianum)
▪ Can cause major skin rash. Wear gloves and long sleeves when handling.
dame’s rocket
(Hesperis matronalis)
perennial pepperweed
(Lepidium latifolium)
purple loosestrife
(Lythrum salicaria)
Japanese stilt grass
(Microstegium vimineum)
mile-a-minute weed
(Polygonum perfoliatum)</td><td rowspan="2">Fruits and Seeds
  </td><td>Prior to flowering
Depends on scale of infestation
Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile. (You can pile onto or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>During and following flowering
Do nothing until the following year or remove flowering heads and bag and let rot.

Small infestation
▪ Pull or cut plant and leave on site with roots exposed.

Large infestation
▪ Pull or cut plant and pile remaining material. (You can pile onto plastic or cover with plastic sheeting).
▪ Monitor. Remove any re-sprouting material.</td></tr>
<tr><td>common reed
(Phragmites australis)
Japanese knotweed
(Polygonum cuspidatum)
Bohemian knotweed
(Polygonum x bohemicum)</td><td>Fruits, Seeds, Plant Fragments
Primary means of spread in these species is by plant parts. Although all care should be given to preventing the dispersal of seed during control activities, the presence of seed doesn’t materially influence disposal activities.</td><td>Small infestation
▪ Bag all plant material and let rot.
▪ Never pile and use resulting material as compost.
▪ Burn.

Large infestation
▪ Remove material to unsuitable habitat (dry, hot and sunny or dry and shaded location) and scatter or pile.
▪ Monitor and remove any sprouting material.
▪ Pile, let dry, and burn.</td></tr>
</table>

January 2010

Managing Invasive Plants
Methods of Control

by Christopher Mattrick

They're out there. The problem of invasive plants is as close as your own backyard.

Maybe a favorite dogwood tree is struggling in the clutches of an Oriental bittersweet vine. Clawlike canes of multiflora rose are scratching at the side of your house. That handsome burning bush you planted few years ago has become a whole clump in practically no time … but what happened to the azalea that used to grow right next to it?

If you think controlling or managing invasive plants on your property is a daunting task, you're not alone. Though this topic is getting lots of attention from federal, state, and local government agencies, as well as the media, the basic question for most homeowners is simply, "How do I get rid of the invasive plants in my own landscape?" Fortunately, the best place to begin to tackle this complex issue is in our own backyards and on local conservation lands. We hope the information provided here will help you take back your yard. We won't kid you—there's some work involved, but the payoff in beauty, wildlife habitat, and peace of mind makes it all worthwhile.

PLAN OF ATTACK

Three broad categories cover most invasive plant control: mechanical, chemical, and biological. Mechanical control means physically removing plants from the environment through cutting or pulling. Chemical control uses herbicides to kill plants and inhibit regrowth. Techniques and chemicals used will vary depending on the species. Biological controls use plant diseases or insect predators, typically from the targeted species' home range. Several techniques may be effective in controlling a single species, but there is usually one preferred method—the one that is most resource efficient with minimal impact on non-target species and the environment.

Spraying chemicals to control invasive plants.

MECHANICAL CONTROL METHODS

Mechanical treatments are usually the first ones to look at when evaluating an invasive plant removal project. These procedures do not require special licensing or introduce chemicals into the environment. They do require permits in some situations, such as wetland zones. [See sidebar on page 23.] Mechanical removal is highly labor intensive and creates a significant amount of site disturbance, which can lead to rapid reinvasion if not handled properly.

Pulling and digging

Many herbaceous plants and some woody species (up to about one inch in diameter), if present in limited quantities, can be pulled out or dug up. It's important to remove as much of the root system as possible; even a small portion can restart the infestation. Pull plants by hand or use a digging fork, as shovels can shear off portions of the root system, allowing for regrowth. To remove larger woody stems (up to about three inches in diameter), use a Weed Wrench™, Root Jack, or Root Talon. These tools, available from several manufacturers, are designed to remove the aboveground portion of the plant as well as the entire root system. It's easiest to undertake this type of control in the spring or early summer when soils are moist and plants come out more easily.

Using tools to remove woody stems.

Volunteers hand pulling invasive plants.

Suffocation

Try suffocating small seedlings and herbaceous plants. Place double or triple layers of thick UV-stabilized plastic sheeting, either clear or black (personally I like clear), over the infestation and secure the plastic with stakes or weights. Make sure the plastic extends at least five feet past the edge of infestation on all sides. Leave the plastic in place for at least two years. This technique will kill everything beneath the plastic—invasive and non-invasive plants alike. Once the plastic is removed, sow a cover crop such as annual rye to prevent new invasions.

Cutting or mowing

This technique is best suited for locations you can visit and treat often. To be effective, you will need to mow or cut infested areas three or four times a year for up to five years. The goal is to interrupt the plant's ability to photosynthesize by removing as much leafy material as possible. Cut the plants at ground level and remove all resulting debris from the site. With this treatment, the infestation may actually appear to get worse at first, so you will need to be as persistent as the invasive plants themselves. Each time you cut the plants back, the root system gets slightly larger, but must also rely on its energy reserves to push up new growth. Eventually, you will exhaust these reserves and the plants will die. This may take many years, so you have to remain committed to this process once you start; otherwise the treatment can backfire, making the problem worse.

CHEMICAL CONTROL METHODS

Herbicides are among the most effective and resource-efficient tools to treat invasive species. Most of the commonly known invasive plants can be treated using only two herbicides—glyphosate (the active ingredient in Roundup™ and Rodeo™) and triclopyr (the active ingredient in Brush-B-Gone™ and Garlon™). Glyphosate is non-selective, meaning it kills everything it contacts. Triclopyr is selective and does not injure monocots (grasses, orchids, lilies, etc.). Please read labels and follow directions precisely for both environmental and personal safety. These are relatively benign herbicides, but improperly used they can still cause both short- and long-term health and environmental problems. Special aquatic formulations are required when working in wetland zones. You are required to have a state-issued pesticide applicator license when applying these chemicals on land you do not own. To learn more about the pesticide regulations in your state, visit or call your state's pesticide control division, usually part of the state's Department of Agriculture. In wetland areas, additional permits are usually required by the Wetlands Protection Act. [See sidebar on page 23.]

Foliar applications

When problems are on a small scale, this type of treatment is usually applied with a backpack sprayer or even a small handheld spray bottle. It is an excellent way to treat large monocultures of herbaceous plants, or to spot-treat individual plants that are difficult to remove mechanically, such as goutweed, swallowwort, or purple loosestrife. It is also an effective treatment for some woody species, such as Japanese barberry, multiflora rose, Japanese honeysuckle, and Oriental bittersweet that grow in dense masses or large numbers over many acres. The herbicide mixture should contain no more than five percent of the active ingredient, but it is important to follow the instructions on the product label. This treatment is most effective when the plants are actively growing, ideally when they are flowering or beginning to form fruit. It has been shown that plants are often more susceptible to this type of treatment if the existing stems are cut off and the regrowth is treated. This is especially true for Japanese knotweed. The target plants should be thoroughly wetted with the herbicide on a day when there is no rain in the forecast for the next 24 to 48 hours.

Cut stem treatments

There are several different types of cut stem treatments, but here we will review only the one most commonly used. All treatments of this type require a higher concentration of the active ingredient than is used in foliar applications. A 25 to 35 percent solution of the active ingredient should be used for cut stem treatments, but read and follow all label instructions. In most cases, the appropriate herbicide is glyphosate, except for Oriental bittersweet, on which triclopyr should be used. This treatment can be used on all woody stems, as well as phragmites and Japanese knotweed.

For woody stems, treatments are most effective when applied in the late summer and autumn—between late August and November. Stems should be cut close to the ground, but not so close that you will lose track of them. Apply herbicide directly to the cut surface as soon as possible after cutting. Delaying the application will reduce the effectiveness of the treatment. The herbicide can be applied with a sponge, paintbrush, or spray bottle.

Cut stem treatment tools.

For phragmites and Japanese knotweed, treatment is the same, but the timing and equipment are different. Plants should be treated anytime from mid-July through September, but the hottest, most humid days of the summer are best for this method. Cut the stems halfway between two leaf nodes at a comfortable height. Inject (or squirt) herbicide into the exposed hollow stem. All stems in an infestation should be treated. A wash bottle is the most effective application tool, but you can also use an eyedropper, spray bottle, or one of the recently developed high-tech injection systems.

It is helpful to mix a dye in with the herbicide solution. The dye will stain the treated surface and mark the areas that have been treated, preventing unnecessary reapplication. You can buy a specially formulated herbicide dye, or use food coloring or laundry dye.

There is not enough space in this article to describe all the possible ways to control invasive plants. You can find other treatments, along with more details on the above-described methods, and species-specific recommendations on The Nature Conservancy Web site (tncweeds.ucdavis.edu). An upcoming posting on the Invasive Plant Atlas of New England (www.ipane.org) and the New England Wild Flower Society (www.newfs.org) Web sites will also provide further details.

Hollow stem injection tools.

Biological controls—still on the horizon

Biological controls are moving into the forefront of control methodology, but currently the only widely available and applied biocontrol relates to purple loosestrife. More information on purple loosestrife and other biological control projects can be found at www.invasiveplants.net.

DISPOSAL OF INVASIVE PLANTS

Proper disposal of removed invasive plant material is critical to the control process. Leftover plant material can cause new infestations or reinfest the existing project area. There are many appropriate ways to dispose of invasive plant debris. I've listed them here in order of preference.

1. **Burn it**—Make a brush pile and burn the material following local safety regulations and restrictions, or haul it to your town's landfill and place it in their burn pile.

2. **Pile it**—Make a pile of the woody debris. This technique will provide shelter for wildlife as well.

3. **Compost it**—Place all your herbaceous invasive plant debris in a pile and process as compost. Watch the pile closely for resprouts and remove as necessary. Do not use the resulting compost in your garden. The pile is for invasive plants only.

Injecting herbicide into the hollow stem of phragmites.

4. **Dry it/cook it**—Place woody debris out on your driveway or any asphalt surface and let it dry out for a month. Place herbaceous material in a doubled-up black trash bag and let it cook in the sun for one month. At the end of the month, the material should be non-viable and you can dump it or dispose of it with the trash. The method assumes there is no viable seed mixed in with the removed material.

Care should be taken in the disposal of all invasive plants, but several species need extra attention. These are the ones that have the ability to sprout vigorously from plant fragments and should ideally be burned or dried prior to disposal: Oriental bittersweet, multiflora rose, Japanese honeysuckle, phragmites, and Japanese knotweed.

Christopher Mattrick is the former Senior Conservation Programs Manager for New England Wild Flower Society, where he managed conservation volunteer and invasive and rare plant management programs. Today, Chris and his family work and play in the White Mountains of New Hampshire, where he is the Forest Botanist and Invasive Species Coordinator for the White Mountain National Forest.

Controlling Invasive Plants in Wetlands

Special concerns; special precautions

Control of invasive plants in or around wetlands or bodies of water requires a unique set of considerations. Removal projects in wetland zones can be legal and effective if handled appropriately. In many cases, herbicides may be the least disruptive tools with which to remove invasive plants. You will need a state-issued pesticide license to apply herbicide on someone else's property, but all projects in wetland or aquatic systems fall under the jurisdiction of the Wetlands Protection Act and therefore require a permit. ***Yes, even hand-pulling that colony of glossy buckthorn plants from your own swampland requires a permit.*** Getting a permit for legal removal is fairly painless if you plan your project carefully.

1. Investigate and understand the required permits and learn how to obtain them. The entity charged with the enforcement of the Wetlands Protection Act varies from state to state. For more information in your state, contact:

   ME: Department of Environmental Protection
   www.state.me.us/dep/blwq/docstand/nrpapage.htm

   NH: Department of Environmental Services
   www.des.state.nh.us/wetlands/

   VT: Department of Environmental Conservation
   www.anr.state.vt.us/dec/waterq/permits/htm/pm_cud.htm

   MA: Consult your local town conservation commission

   RI: Department of Environmental Management
   www.dem.ri.gov/programs/benviron/water/permits/fresh/index.htm

   CT: Consult your local town Inland Wetland and Conservation Commission

2. Consult an individual or organization with experience in this area. Firsthand experience in conducting projects in wetland zones and navigating the permitting process is priceless. Most states have wetland scientist societies whose members are experienced in working in wetlands and navigating the regulations affecting them. A simple Web search will reveal the contact point for these societies. Additionally, most environmental consulting firms and some nonprofit organizations have skills in this area.

3. Develop a well-written and thorough project plan. You are more likely to be successful in obtaining a permit for your project if you submit a project plan along with your permit application. The plan should include the reasons for the project, your objectives in completing the project, how you plan to reach those objectives, and how you will monitor the outcome.

4. Ensure that the herbicides you plan to use are approved for aquatic use. Experts consider most herbicides harmful to water quality or aquatic organisms, but rate some formulations as safe for aquatic use. Do the research and select an approved herbicide, and then closely follow the instructions on the label.

5. If you are unsure—research, study, and most of all, ask for help. Follow the rules. The damage caused to aquatic systems by the use of an inappropriate herbicide or the misapplication of an appropriate herbicide not only damages the environment, but also may reduce public support for safe, well-planned projects.

Section 4
Annual Updates and Log Requirements

The Owner and/or Contact/Responsible Party shall review this Operation and Maintenance Plan once per year for its effectiveness and adjust the plan and deed as necessary.

A log of all preventative and corrective measures for the stormwater system shall be kept on-site and be made available upon request by any public entity with administrative, health environmental or safety authority over the site including NHDES.

Copies of the Stormwater Maintenance report shall be submitted to the City of Portsmouth on an annual basis.

Stormwater Management Report						
Proposed Industrial Wastewater Equalization System		**Lonza Biologics – 101 International Drive, Portsmouth, NH 03801**				
BMP Description	**Date of Inspection**	**Inspector**	**BMP Installed and Operating Properly?**	**Cleaning / Corrective Action Needed**	**Date of Cleaning / Repair**	**Performed By**
Jellyfish Filter			❑Yes ❑No			
Detention Basin			❑Yes ❑No			

City of Portsmouth Planning Department

Site Plan Review Application Fee

Project: 101 International Drive **Map/Lot:** 305/6

Applicant: Lonza Biologics, Inc.

All development

Base fee $600			$600.00
Plus $5.00 per $1,000 of site costs			
Site costs	$400,000	+	$2,000.00
Plus $10.00 per 1,000 S.F. of site development area			
Site development area	38,500 S.F.	+	$385.00
		Fee	**$2,985.00**

Maximum fee: $20,000

Fee received by: _____ Date: _____

Note: Initial application fee may be based on the applicant's estimates of site costs and site development area. Following site plan approval, the application fee will be recalculated based on the approved site plan and site engineer's corresponding site cost estimate as approved by the Department of Public Works, and any additional fee shall be paid prior to the issuance of a building permit.