ITEM 2

Town of Kittery
Planning Board Meeting
February 9, 2023

ITEM 2– 35 Badgers Island West, Preliminary Site Plan and Shoreland Development Plan
Action: review for completeness, continue, approve, or deny plan: Pursuant to §16.4 Land Use Regulations §16.7 and §16.9.3 Shoreland Development Review requirements of the Town of Kittery Land Use and Development Code, owner B.I.W. Group, LLC and agent John Chagnon with Ambit Engineering request approval to expand a legally non-conforming office building to provide 10 residential units on a legally conforming lot located on real property with the address of 35 Badgers Island West, Tax Map 1, Lot 34, in the Mixed-Use Badgers Island Zone (MU-BI), Shoreland Overlay Zone (OZ-SL-250'), Resource Protection Overlay Zone (OZ-RP) and the Commercial Fisheries/Maritime Use (OZ-CFMU).

PROJECT TRACKING

REQ'D	ACTION	COMMENTS	STATUS
NO	Sketch Plan	October 27, 2022, February 9, 2023	Accepted on 2/9/23
NO	Site Visit	November 14, 2022	Held
YES	Preliminary Site Plan Review Completeness/Acceptance	Possible on 4/27/2023	Pending
YES	Public Hearing	TBD	
YES	Preliminary Site Plan Review Approval		
YES	Final Site Plan Review Approval		
YES	Shoreland Development Plan Review Plan Approval		

Applicant: Plan Review Notes reflect comments and recommendations regarding applicability of Town Land Use Development Code, and standard planning and development practices. Only the PB makes final decisions on code compliance and approves, approves with conditions or denies final plans. Prior to the signing of the approved Plan any **Conditions of Approval related to the Findings of Fact along with waivers and variances (by the BOA) must be placed on the Final Plan and, when applicable, recorded at the York County Registry of Deeds. PLACE THE MAP AND LOT NUMBER IN 1/4" HIGH LETTERS AT LOWER RIGHT BORDER OF ALL PLAN SHEETS.** As per Section 16.4.4.13 - Grading/Construction Final Plan Required. - Grading or construction of roads, grading of land or lots, or construction of buildings is prohibited until the original copy of the approved final plan endorsed has been duly recorded in the York County registry of deeds when applicable.

Project Summary

35 Badgers Island West ("Property") is located along the bank of the Piscataqua River within the Mixed-Use Badgers Island (MU-BI) zoning district, the Shoreland Overlay Zone (OZ-SL-250) and the Resource Protection Zone (OZ-RP). as well as Commercial Fisheries/Maritime Use (OZ-CFMU) The lot is legally conforming in size– there are 75-foot shoreland setbacks in the MU-BI base zone and the ability for the Planning Board to approve less than that (down to 25 feet) when certain conditions are met to the Board's satisfaction. See **Shoreland Zoning** section for details.

The proposed project expands the existing building and converts the use from an office building to 10 residential units. The existing building does not meet the 75-foot setback requirements from the Highest Annual Tide (HAT) with intrusion on the eastern side. This makes the existing building legally non-conforming because the office building replaced a marine warehouse that formerly existed on the site. The expansion proposes additions on both the north and south ends of the existing building and includes a 10-stall underground parking garage under each of the proposed 2-story additions.

ITEM 2

The sketch plan accepted by the Board on February 9th, 2023 showed that the northern addition encroached on the 75-foot setback to the HAT line in four places as did a portion of the proposed driveway. Packet for the February meeting here: Planning Board Feb 9 2023 39_badgers_island_west.pdf Preliminary Plan Update: The northern addition encroaches on the 75-foot setback in two places as does a portion of the proposed driveway and a portion of the proposed porous patio. The Applicant's plan states that the total land area of the lot is 58,985 square feet as measured from the mean high-water line (see **Development Standards** for more details). Preliminary Plan Update: The total land area has been modified per requirements noted in the February plan review notes under **Development Standards** to 54,883 square feet. The current building footprint is 5,922 square feet and was built on the footprint of a 4,000 square foot marine warehouse in 1994 and then added onto two years later. The proposed expansion of the building has a post construction footprint of 13,422 square feet. Preliminary Plan Update: The building has a post-construction footprint of 13,328 square feet.

Shoreland Zoning and Preliminary Site Plan

As stated previously, a portion of the existing building encroaches on the 75-foot shoreland setback for this zone. Parts of the northern addition, a patio and a driveway also encroach. Preliminary Plan Update: The Applicant is submitting the preliminary plan submission to provide additional details to the Board in regards to meeting both the submission requirements of §16.7 Site Plan Review and §16.4.24(3) special conditions of the MU-BI Zone found under §16.4.24(3) that allow a development to be located less than 75-feet from the HAT if one of three requirements are found to be met to the Board's satisfaction. The requirement the Applicant is proposing to meet is §16.4.24(3)(c) (included with the Applicant's cover letter materials) which requires preservation of environmental quality by providing wildlife habitat, conserving shore cover through plantings in the setback and implementation of stormwater BMPs to minimize water quality degradation.

To see information on DEP's verification of the 25-foot setback allowance and the Town attorney's opinion on the applicability of certain shoreland zoning regulations pertinent to this application, please look at the February 9th planning review notes available from the link above.

Previous Meetings

The Board first heard this application on October 27, 2022 and a site walk was held on November 22, 2022. The Board accepted the sketch plan on February 9th, 2023.. The project has now moved to preliminary site plan review.

Development Standards – updated for Preliminary Site Plan

This application contains detailed site information including shoreland, utility and grading plans, a revised planting plan done by a landscape architectural firm, a lighting plan albeit not yet including photometrics or fixture details, and a turning template plan. A parking plan shows parking underneath the two proposed additions. It also contains material describing the type of BMP proposed, called a Jellyfish, along with the stormwater (drainage) analysis. The Applicant is seeking guidance from the Board as to whether the revised landscape plan along with the advanced stormwater treatment satisfies the Board's requirements pertinent to §16.4.24(3) since that determination will affect the proposed additions' placement relative to the shoreland setback.

ITEM 2

Under §16.4.24 (D)(1)(a)-(h) dimensional requirements for the Mixed-use. Badgers Island (MU-BI) zone:

(a) Minimum land area per dwelling unit: 3,000 square feet.

[1] For each of the first two dwelling units and thereafter: 6,000 square feet.

The land area is 58,985 sf on plan note #4 on many of the plan sheets which represents land area above mean high water. However, Kittery's definition in 16.3.2 for Minimum land area per dwelling unit states that the land area is calculated from the HAT landward, not from the mean high water line.

The devegetation table on Sheet C2 shows the land area is 54,883 – perhaps that is calculated based on the definition above and if so, the plans should be consistent in all cases since this plan is also a shoreland zone plan.

For the lot size as presented (58,985 sf approximately) and number of units proposed, the density calculation looks like this:
(2 units x 3,000 sf = 6,000 sf) + (8 units x 6,000 sf = 48,000 sf) = 54,000 sf.
Result: There appears to be enough land area to support 10 units based on the devegetation table but the lot size should be consistent in the plan notes as well.

(b) Minimum lot size: 6,000 square feet.
(c) Minimum street frontage: 50 feet.
(d) Minimum front yard: five feet.
(e) Minimum rear and side yards: 10 feet.

All the above requirements appear to be met.

(f) Maximum building height: 40 feet.

The Applicant will be submitting elevation plans once guidance on whether the submission meets the special conditions of §16.4.24(3) *has been given by the Board to the Applicant.*

(g) Minimum setback from:
[1] Water body and wetland water-dependent uses: zero feet.
[2] All other uses (including buildings and parking): 75 feet unless modified, according to the terms of Subsection **E** of this section.

These standards are respectively, not applicable, and as stated earlier are subject to §16.4.24(3)(c).

(h) Minimum open space on the site: 40%. (Note: The Planning Board may reduce the required open space to 30% where it is clearly demonstrated that no practicable alternative exists to accommodate a water-dependent use.)

The devegetation table shows that 41.2% of the lot as proposed will be developed which leaves 58.8% as "green" but the Applicant should indicate in a plan note that the open space standard is being met.

ITEM 2

Under **§16.4.24(3)(c):**

[1] *There is little existing, significant, or otherwise, wildlife habitat for migratory songbirds or wading birds with the possible exception of the "sparse marsh grass" area to the north. Could additional saltmarsh grass be planted in this area?*

[2] *To meet the conservation of contiguous shore cover with contiguous plants requirement, a planting plan was submitted for the setback area between the building and the revetment wall. The revised landscape plan shows contiguous plantings that wrap the shoreline of the property with a grassed area between those plantings and additional plantings next to the building. The plant list includes some native species. A peer review of the landscaping plan will be done.*

[3] *Requires the implementation of a stormwater management plan which improves the quality of the water released to the Piscataqua River. The proposed stormwater management system includes the Jellyfish which is intended to handle stormwater not generated on the site, filter and treat it before it reaches the river. The Jellyfish system is approved by DEP. Like most stormwater systems, maintenance is required, the materials say it should be done every 6 months. The rest of the stormwater management system appears to utilize the existing Town-owned stormwater drains or propose new drains which empty into the river. Could the water quality be improved in more instances before the water enters the river? The Applicant also states that the underground parking with the evaporative trench drains and the proposed removal of the existing surface parking areas will remove the potential for automotive fluids and runoff from the parking areas reaching the river.*

Under §16.7.10 (C)(4)(a)-(w) Preliminary Site Plan – Plan Requirements

There is an extensive list of plan requirements – what is not yet included in the submission is noted below.

Under (4)(k):

[1] Structural plans including elevation and floorplan of the building and proposed additions and details such as building materials, colors and access points

[12] Some details on retaining walls, pedestrian ways and driveways are not yet included

Under (4)(n): Water District letter

Under (4)(o): Erosion and sedimentation control plan is not yet reviewed/approved by Town's peer review engineer

Under (4)(r): Vehicular traffic report – the applicant may want to request a waiver since a 10-unit residential building will have much less impact than the office use it is replacing.

Under (4)(v): Letters of evaluation by public safety officials, public works commissioner and school superintend which will be collected by Planning staff

Planning Board Procedural Steps

This plan is currently in preliminary plan phase while simultaneously being reviewed as a shoreland zone application. Preliminary phase: 1) requires the Applicant to submit a detailed development application per 16.7 10.C (4); 2) allows the Board to ask questions and request any needed additional information; and 3) requires the Board to hold a public hearing to hear from abutters. If the Board finds the application insufficient or requires additional information, the Board should request that information be provided for the next submission.

As mentioned earlier, the Applicant is seeking direction from the Board pertaining to their request to be allowed to proceed under §16.4.24(3)(c) with the proposed plan.

ITEM 2

Staff recommendation: Discuss the proposal pertaining to **§16.4.24(3)(c)** to give the Applicant direction on the building location relative to the shoreland setback without taking further action or continue the preliminary plan.

Recommended Motions

Move to continue the preliminary plan site plan application

Move to continue preliminary plan application from owner/applicant owner B.I.W. Group, LLC and agent John Chagnon with Ambit Engineering to request approval to expand a legally non-conforming building and convert an existing office building to 10 residential units on a legally conforming lot located on real property with the address of 35 Badgers Island West, Tax Map 44, Lot 71, in the Mixed-Use Badgers Island Zone (MU-BI), Shoreland Overlay Zone (OZ-SL-250'), Resource Protection Overlay Zone (OZ-RP) and the Commercial Fisheries/Maritime Use Zone (OZ-CFMU).

TOWN OF KITTERY, MAINE

SEWER DEPARTMENT
200 Rogers Road, Kittery, ME 03904
Telephone: (207) 439-4646 Fax: (207) 439-2799

35 Badgers Island West
Kittery, ME 03904

April 14, 2023

RE:Sewer Availability

This letter is to confirm that the sewer system (piping and pumping stations) and the treatment facility have the capacity and ability to handle the increased flow from the project located at 35 Badgers Island West.

This letter only confirms the sewer department capacity, Impact and Entrance Fees will be calculated after the project receives all required approvals.

If you have further questions or concerns, please contact me.

Sincerely Yours

Timothy Babkirk

Timothy Babkirk
Superintendent of Sewer Services
Town of Kittery
200 Rogers Rd
Kittery ME 03904
1-207-439-4646
tbabkirk@kitteryme.org

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

200 Griffin Road, Unit 3, Portsmouth, NH 03801
Phone (603) 430-9282 Fax 436-2315

6 April 2023

Dutch Dunkelberger, Chair
Kittery Planning Board
Town of Kittery
200 Rogers Road, Kittery, ME 03904

Re: Preliminary Site Plan Review Application; Conversion to Residential
Tax Map 1, Lot 32, 35 Badgers Island West

Dear Dutch and Planning Board Members:

On behalf of BIW Inc. we submitted a package for **Preliminary Site Plan Review Approval** to the town. The site was recently reviewed by the Planning Board at Sketch Plan and was accepted as complete. Previously a Shoreland Application for *Revetment Repair*, was approved and has been completed, with the exception of landscaping installation; which will be revised. This proposal is to expand an existing building and revise the site use from Office to 10 Residential units. Currently the office use has existed for some time with various additions and expansions over the years. The use was intensive from a traffic and parking perspective; with approximately 200 employees in the building at its peak use. The proposed re-use we believe will have some significant benefits for this end of Badgers Island. We request that the application be put on the agenda for the **April 27th, 2023, Planning Board** meeting.

This project proposes stormwater control and treatment of off-site runoff on the subject parcel. Runoff which comes from the town road will be captured and treated; instead of just being conveyed to the tidal resource. The Existing Conditions Plan reflects the state of the site today; the Grading Plan includes the proposed site improvements to provide permanent and appropriate treatment of this run-off. The Ordinance allows the Planning Board to approve projects if it finds that a development plan significantly contributes to the accomplishment of certain objectives. The project submission outlines how the proposed improvements meet the objectives of the Comprehensive Plan and the Codes – see the attached section.

The project conforms to the Kittery Land Use and Development Code for the zone it occupies for allowable number of dwelling units, devegetated surfaces (a reduction from existing), and open space. The additions will meet the height limitations. The only variation from the code is in the setback to the HAT line. While the existing building does not comply with the current HAT delineation (minor intrusion) the proposal seeks to impact the HAT setback with the north side addition and proposes a minimum setback of 68 feet where 75 feet is required. The plan shows that removal of existing de-vegetated areas within the wetland buffer (setback), taking into account the proposed additions within the wetland buffer (setback), the wetland buffer impact is reduced by 994 square feet, or 49%.

The Code allows for intrusions into the 75-foot setback, in this local, provided certain objectives of the Comprehensive Plan are met. Specifically, Section 16.3.2.14.E (copy of Code Section attached) allows a setback reduction to 25 feet from the HAT if the Planning Board finds that a development plan significantly contributes to the accomplishment of certain objectives. In the case of this application we hereby submit, and ask the Planning Board to concur, that the redevelopment satisfies Section (3) of Section 16.3.2.14.E. The proposal will remove existing surface parking areas which drain to the adjacent resource untreated and replace those area with covered underground parking. This reduces the discharge of vehicle drip pollutants to zero and is a significant benefit to the environment. The parking plan on Sheet C6 details the layout of the underground parking. In order to fully manage the parking expectations of the unit owners and comply with the code the plan show the creation of 20 parking spaces – 2 per unit. In order to provide adequate space for parking and maneuvering the north addition needs to intrude slightly into the HAT setback, to a point closer than 75 feet but well above 25 feet. This can't be avoided since *the location of the existing building as well as the lot depth are set already*.

In addition to this improvement the developer is willing to provide, at their expense and placement, a stormwater treatment device to deal with untreated storm water coming from the adjacent street and property area, including a boat storage yard. Also, the buffer plantings are proposed to be expanded along the entire lot waterfront to provide additional cover for birds as well as eliminating lawn areas running to the resource. The plan set contains a professionally prepared Landscape Plan showing the proposed plantings. The plantings have taken into account the need for salt tolerant vegetation. In addition, a review by the town's peer review engineer is welcomed; and the developer is ready to cooperate with any additional recommendations where possible. We hope that the Board agrees that this project will be a benefit to the community and the environment. **We request that the Planning Board complete the review of this issue with this submission package.**

The following plans are included in our submission:

- Cover Sheet – This plan shows the design team, site location, and Legend.
- Existing Conditions Plan C1 – This plan shows the current improvements on the property (including the recently completed revetment) and the site boundary lines.
- Shoreland Development Plan C2 – This plan shows the location of the proposed building additions, decks, patios, walkways, and driveway entrances. The plan highlights the existing landscaping (trees) that will be retained. The plan contains the De-vegetated Coverage Table and details the changes to de-vegetated surfaces in the buffer zone.
- Landscape Plan L1 – This plan shows the proposed site landscaping. Particular attention should be placed on review of the buffer plantings. This plan does need to be revised on the street side to adjust to some last-minute building revisions.
- Utility Plan C3 – This plan shows the utilities required to service the proposed additions.
- Grading Plan C4 – This plan shows the proposed site grading and the location of the proposed drainage treatment facilities.
- Demolition Plan C5 – This plan shows the proposed demolition taking place on the property.
- Parking Plan C6 – This plan shows the layout of the covered parking.
- Turning Template Plan T1 – This plan shows that a fire truck will be able to safely travel on Badgers Island West given the proposed minor reduction in the roadway width with the addition of a proposed sidewalk.

- Lighting Plan C7 – This plan shows proposed site lighting locations; styles and lumen intensities to be determined. All fixtures are building mounted.
- Detail Sheets D1 to D5 – These plans show the construction details for the project.

Please also find the attached in support of this proposal:

Client Authorization
Property Deed
Certificate of Good Standing
USGS Map
Vicinity map
Tax Map
Site Photographs
Drainage Analysis
Jellyfish Filter Information
Soil Report
Land Use Code Section - Highlighted

We look forward to the Planning Board review of this submission and our in-person presentation at the Planning Board meeting. For the reasons stated, we respectfully request the Planning Board schedule the application for presentation. Thank you for your time and attention to this proposal.

Please contact me if you have any questions or concerns regarding this application.

Sincerely,

John R. Chagnon, PE
Ambit Engineering – Haley Ward
CC: Project Team

P:\NH\5010135-Hampshire_Development\3050.72A-Badgers Island W.(35)-JRC\3050.72A Hampshire Development\2022 Site Permitting\Applications\Town of Kittery\Planning Board Letter 4-6-23.docx

18 August, 2022

To Whom It May Concern

RE: Client Representation for a proposed Amended Site Plan for BIW Group, LLC at 35 Badgers Island West, Kittery, Maine

This letter is to inform the Town of Kittery, and other parties in accordance with approval procedures that Ambit Engineering is authorized to represent the above-mentioned property as our agent in the approval process. This includes signatory powers on any and all applications.

Please feel free to call me if there is any question regarding this authorization.

Sincerely,

Shayne Forsley
BIW Group, LLC

Authorized Representative
41 Industrial Drive, Unit 20
Exeter, NH
03833

NANCY E HAMMOND, REGISTER OF DEEDS
E-RECORDED **Bk 18503 PG 331**
Instr # 2020067498
12/28/2020 01:37:44 PM
Pages 3 YORK CO

Maine R.E. Transfer Tax Paid

QUITCLAIM DEED WITH COVENANT

DLN: 1002040126646

GP Technology Solutions, LLC, a Delaware limited liability company with a mailing address of PO Box 9001, Kittery, ME 03904 (the "Grantor"), FOR CONSIDERATION PAID, grants to **B.I.W. Group, LLC**, a Maine limited liability company with a mailing address of 41 Industrial Drive, Unit 20, Exeter, NH 03833 (the "Grantee"), certain real property, together with any improvements thereon, located in the Town of Kittery, County of York, and State of Maine, more particularly described on **Exhibit A** attached hereto and made a part hereof.

Meaning and intending to convey the same premises conveyed to Grantor by Quitclaim Deed from GreenPages, Inc. dated November 19, 2020, and recorded in the York County Registry of Deeds in Book 18460, Page 790.

IN WITNESS WHEREOF, GP Technology Solutions, LLC has caused this instrument to be executed by Ronald Dupler, its duly-authorized Manager, thereunto duly authorized, as of this 22 day of December, 2020.

GP Technology Solutions, LLC

Witness

By:
Ronald Dupler
Its duly-authorized Manager

Commonwealth of Massachusetts
County of Middlesex

On this 22nd day of December, 2020 before me, the undersigned Notary Public, personally appeared Ronald Dupler and proved to me through satisfactory evidence of identification, which was personal knowledge of the undersigned, to be the person who signed the preceding document in my presence, and acknowledged to me that he signed it voluntarily for its stated purpose, that it was his free act and deed in his capacity as Manager of GP Technology Solutions, LLC, and that it was the free act and deed of said LLC.

Notary Public

Ashley Dotchin
Print Name
My Commission expires: 12/6/24

ASHLEY DOTCHIN
Notary Public
COMMONWEALTH OF MASSACHUSETTS
My Commission Expires On
December 06, 2024

Exhibit A

Land with all improvements thereon, situated in the Town of Kittery, County of York, State of Maine, bounded and described as follows:

Four certain lots or parcels of land, situated on the Northerly side of Badgers Island in said Kittery, being more particularly described as Lots No. 14, 15, 16 and 17 on a certain plan of land, Badgers Island, Maine, dated April 1936, John W. Durgin, C.E., which plan is recorded in the York County Registry of Deeds, Plan Book 22, Page 31, subject however, to the existing rights of and public use of Veta Messaro and Ella E. Messaro to lay and maintain an overflow pipe across said Lot 14 as more particularly described in the deed from Annie E. Horner dated April, 1955 and recorded in the York County Registry of Deeds in Book 1301, Page 275.

Subject to and together with the benefit of the terms and provisions of a Boundary Line Agreement by and between Terry Gagner and William Seaward dated April 5, 1988 and recorded in the said Registry of Deeds in Book 4676, Page 184.

Excepting from the above described premises the land conveyed to the Town of Kittery by virtue of a Release Deed granted by GreenPages, Inc. et al , dated September 13, 1995 and recorded in the York County Registry of Deeds in Book 7561, Page 300.

Subject to the restrictions that installation of groundwater extraction wells is prohibited except with the consent of the State of Maine Department of Environmental Protection, or any successor agency. Nothing herein shall obligate the Grantee herein, or its successors and assigns, to obtain the consent of any party other than the Maine Department of Environmental Protection or its successor agency, including without limitations the Grantor herein or its successors or assigns, in order to undertake any of the activities specific to this paragraph.

Also, all right, title and interest in and to any filled lands between the lots described above and the Piscataqua River and in and to the shore and flats between the lots described above and the Piscataqua River.

Meaning and intending to describe the same premises in a Warranty Deed granted by William W. Seaward, Jr. dated October 17, 1994 and recorded in the York County Registry of Deeds in Book 7224, Page 202.

Also another certain lot or parcel of land, together with the buildings thereon, situated on the westerly side of Badgers Island, in the Town of Kittery, County of York, State of Maine, said lot being bounded and described as follows:

Beginning at a capped rebar set in the ground in the northerly sideline of a road called Badgers Island, West, at the southwesterly corner of the land herein conveyed as land of Charles Patten and thence running by said Patten land N 24 degrees 18' 14" E one hundred sixty-seven and twenty-three hundredths (167.23') feet to capped rebar set as the sideline of said road; thence turning and running by said road the following course; thence by said road southeasterly along a curve to the right having a radius of eight (80.00') feet and an arc length of fourteen and forty-four hundredths (14.44') feet to an iron pipe found; thence by said road S 42 degrees 55' 17" E one hundred ninety and thirty-six hundredths (190.36') feet to a

capped rebar set; thence by said road southerly along a curve to the right having a radius of twenty-five (25.00') feet and as arc length of sixty-two and eighty-three hundredths (62.83') feet to a capped rebar set; N78 degrees 55' 26" W one hundred ninety and thirty-six hundredths (190.36') feet to the point of beginning.

Meaning and intending to describe the same premises in a Warranty Deed granted by Lil's GreenDream, Inc. dated January 31, 2003 and recorded in the York County Registry of Deeds in Book 12483, Page 210.

The above-described properties are conveyed subject to all easements, covenants, restrictions, and agreements of record to the extent applicable and in effect.

State of Maine

Department of the Secretary of State

I, the Secretary of State of Maine, certify that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and that the paper to which this is attached is a true copy from the records of this Department.

In testimony whereof, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this twenty-second day of February 2022.

Shenna Bellows

Shenna Bellows

Secretary of State

Additional Addresses

Legal Name	Title	Name	Charter #	Status
B.I.W. GROUP, LLC	Registered Agent		20215185DC	GOOD STANDING
Home Office Address (of foreign entity)	**Other Mailing Address**			

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors

USGS Map

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
SCALE: 1" = 1000'
SUBMITTED: 08-18-2022

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors

Vicinity Map

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

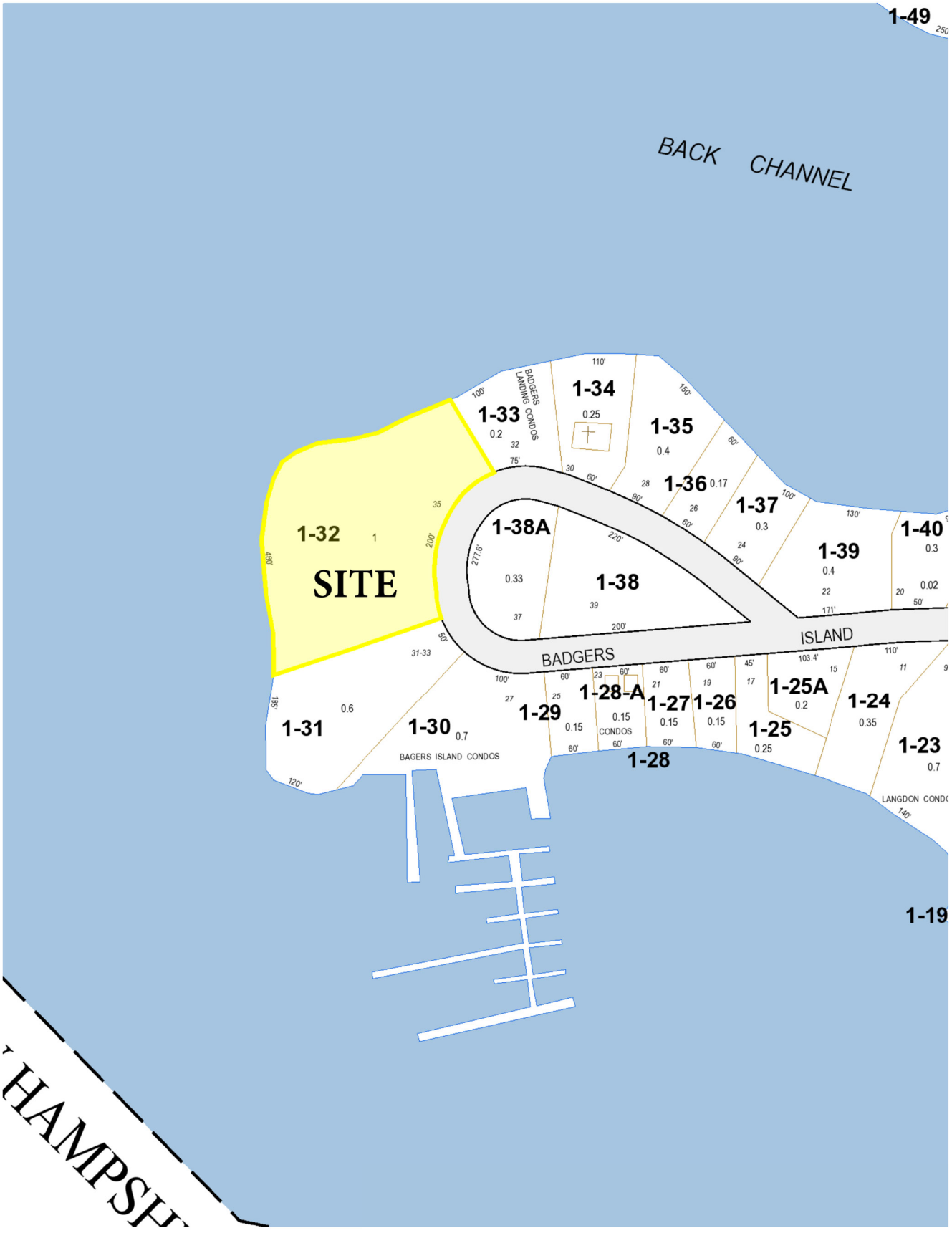
JOB NUMBER: 3050.72A
SCALE: 1" = 200'
SUBMITTED: 08-18-2022

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors

Tax Map

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
NTS
SUBMITTED: 08-18-2022



Site Photograph #1 August 2021

Site Photograph #2 August 2021

Site Photograph #3 August 2021

Site Photograph #4 August 2021

Site Photograph #5 August 2021

Site Photograph #6 August 2021

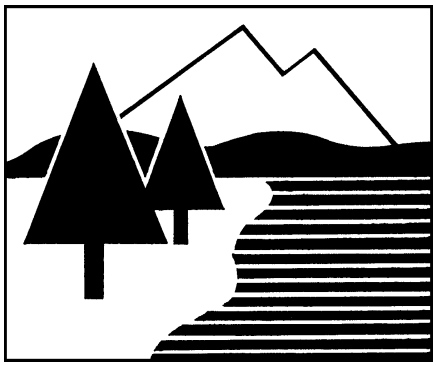
Site Photograph #7 August 2021

Site Photograph #7 August 2021

DRAINAGE ANALYSIS

SITE DEVELOPMENT

35 BADGERS ISLAND WEST
KITTERY, ME

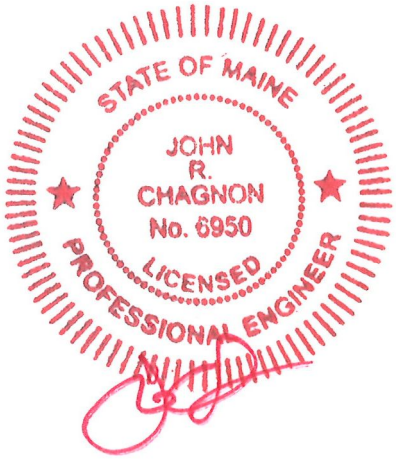


PREPARED FOR
HAMPSHIRE DEVELOPMENT

19 JANUARY 2023
AMENDED: 06 APRIL 2023

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

200 Griffin Road, Unit 3
Portsmouth, NH 03801
Phone: 603.430.9282; Fax: 603.436.2315
E-mail: jchagnon@haleyward.com
(Ambit Job Number 5010135.3050.72A)



6 April 2023

TABLE OF CONTENTS

REPORT

APPENDIX

EXECUTIVE SUMMARY

This drainage analysis examines the pre-development (existing) and post-development (proposed) stormwater drainage patterns for the Site Redevelopment at the property known as 35 Badgers Island West in Kittery, ME. The site is shown on the Town of Kittery Assessor's Tax Map 1 as Lot 32. The total size of the lot is 104,634± square-feet (2.402 acres) and the associated drainage area is 147,126± square-feet (3.378 acres).

The development will provide for building additions and associated utilities. The development has the potential to increase stormwater runoff to adjacent properties and should be designed in a manner to prevent that occurrence. The site contains an existing building and parking lot. The parking will be removed and replaced with the proposed structures, leading to a net decrease in contributing impervious area. The net decrease, as well as adhering to construction BMPs and the installation of a Jellyfish stormwater filter will offset the stormwater impact caused by the construction of the redevelopment.

INTRODUCTION / PROJECT DESCRIPTION

This drainage report is designed to assist the owner, contractor, regulatory reviewer, and others in understanding the impact of the proposed development project on local surface water runoff and quality. The project site is shown on the Town of Kittery, ME Assessor's Tax Map 1 as Lot 32. Bounding the site to the east is the cul-de-sac of Badger's Island West. Bounding the site to the west is the Piscataqua River. Bounding the site to the north is a condominium. Bounding the site to the south is a private business. A vicinity map is included in the Appendix to this report.

The proposed project includes two building additions, associated parking and utilities. This report uses the design to calculate the future impervious coverage of the proposed lot, as required by the Town.

This report includes information about the existing site and the proposed site necessary to analyze stormwater runoff and to design any required mitigation. The report includes impervious surface analyses and the associated operations and maintenance manual. The report will provide a narrative of the stormwater runoff. Proposed stormwater management and treatment structures and methods will also be described, as well as erosion and sediment control practices. To fully understand the proposed site development the reader should also review a complete site plan set in addition to this report.

SITE SPECIFIC INFORMATION

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 2301710008D (effective date July 3, 1986), the proposed development is located in Zone C and is determined to be inside of the 0.2% annual chance floodplain. A copy of the FIRM map is included in the Appendix.

PRE AND POST-DEVELOPMENT DRAINAGE

In the pre-development condition, the site has been analyzed as three subcatchment basins (E1, E2, and E2a) based on localized topography and discharge location. Subcatchment E1 contains the north half of the property and flows toward the west boundary of Badgers Island (Discharge Point 1 or DP1). Subcatchment E2 contains the south half of the property and flows toward DP1. Subcatchment E2a contains area east of the property and flows toward DP1 through a drainage network located in Subcatchment E2. Proposed subcatchments P1, P2, and P2a occupy the same approximate space as subcatchments E1, E2, and E2a respectively and flow to the same discharge points. Subcatchment P2a is slightly larger than E2a and is run through a Jellyfish stormwater filter integrated into a modified drainage network. The subcatchments were analyzed for peak discharges using HydroCAD.

Table 1: Impervious Surfaces Analysis

Structure	Pre-Construction Impervious (S.F.)	Post-Construction Impervious (S.F.)
Main Structure	5,922	13,328
Deck	0	85
Pavement	12,289	2,376
Gravel	2,277	0
Retaining Walls	86	169
Concrete Pads/Steps/Sidewalk	957	360
Patios/Walkways	0	726
Revetment/Riprap	5,392	5,392
Total	26,923	22,436
Lot Size	54,883	54,883
% Devegetated Area	49.1%	40.9%

Table 2: Development Watershed Basin Summary

Watershed Basin ID	Basin Area (SF)	Tc (MIN)	CN	2-Year Runoff (CFS)	10-Year Runoff (CFS)	25-Year Runoff (CFS)
E1	71,648	6.9	92	6.23	10.13	13.15
E2	36,164	5.0	93	3.43	5.51	7.11
E2a	39,314	6.7	96	3.75	5.83	7.44
P1	64,973	7.2	91	5.44	8.96	11.69
P2	31,171	5.0	90	2.70	4.51	5.92
P2a	50,983	6.7	96	4.86	7.56	9.65

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. A plan sheet detailing the subcatchments and direction of runoff are included in the Appendix.

Table 3: Pre-Development to Post-Development Comparison

	Q2 (CFS)		Q10 (CFS)		Q25 (CFS)		
Design Point	**Pre**	**Post**	**Pre**	**Post**	**Pre**	**Post**	**Description**
DP1	13.22	12.81	21.18	20.74	27.35	26.89	Piscataqua River

In the developed condition, the site will see a net reduction in impervious surfaces. As a result, discharge point DP1 will experience a net decrease in peak discharge for all design storms in the proposed condition.

OFFSITE INFRASTRUCTURE CAPACITY

There is an overall reduction in off-site flow due to the reduction in impervious surfaces proposed by the project. Any Town infrastructure utilized by the project, in particular drainage networks, will not see a change in peak flows from the existing conditions, as the receiving infrastructure is upstream of the proposed development. As a result, there is no anticipated negative impact to Town infrastructure.

EROSION AND SEDIMENT CONTROL PRACTICES

The erosion potential for this site as it exists is moderate due to the construction proposed in areas that are erodible when exposed. During construction, the major potential for erosion is wind and stormwater runoff. The contractor will be required to inspect and maintain all necessary erosion control measures, as well as installing any additional measures as required. All erosion control practices shall conform to "The Maine Stormwater Management Design Manual." Some examples of erosion and sediment control measures to be utilized for this project during construction may include:

- Silt Soxx (or approved alternative) located at the toe of disturbed slopes
- Stabilized construction entrance at access point to the site
- Temporary mulching and seeding for disturbed areas
- Spraying water over disturbed areas to minimize wind erosion

After construction, permanent stabilization will be accomplished by permanent seeding, landscaping, and compacting/surfacing the access drives with gravel.

CONCLUSION

The proposed development has been designed to match the pre-development drainage patterns to the greatest extent feasible. With the reduction in impervious surfaces and installation of the Jellyfish filter, the post-development quality of the site runoff will be sufficiently increased to mitigate any issues caused by the proposed construction. Erosion and sediment control practices will be implemented for both the temporary condition during construction and for final stabilization after construction. Therefore, there are no negative impacts to downstream receptors or adjacent properties anticipated as a result of this project.

REFERENCES

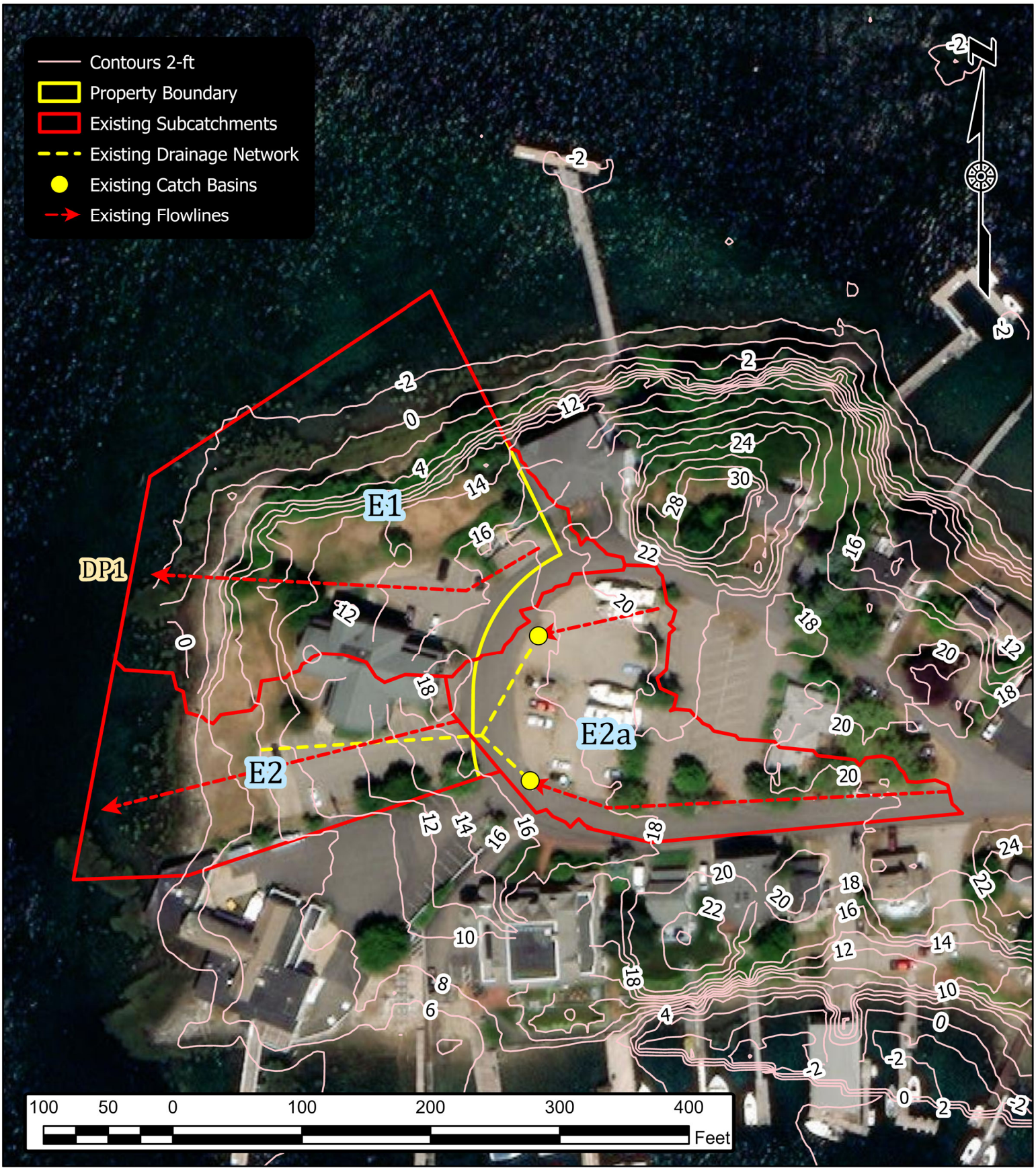
1. Town of Kittery, ME. Land Use Development Code, Amended January 24, 2022.
2. Maine Department of Environmental Protection, *Maine Stormwater Management Design Manual (Volumes I-III)*, March 2016.
3. HydroCAD Software Solution, LLC. *HydroCAD Stormwater Modeling System Version 10.0* copyright 2013.

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

Existing Subcatchments Plan

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
SCALE: 1" = 100'
SUBMITTED: 01-19-2023



AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

Proposed Subcatchments Plan

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 5010135.3050.72A
SCALE: 1" = 100'
SUBMITTED: 04-06-2023

APPENDIX A

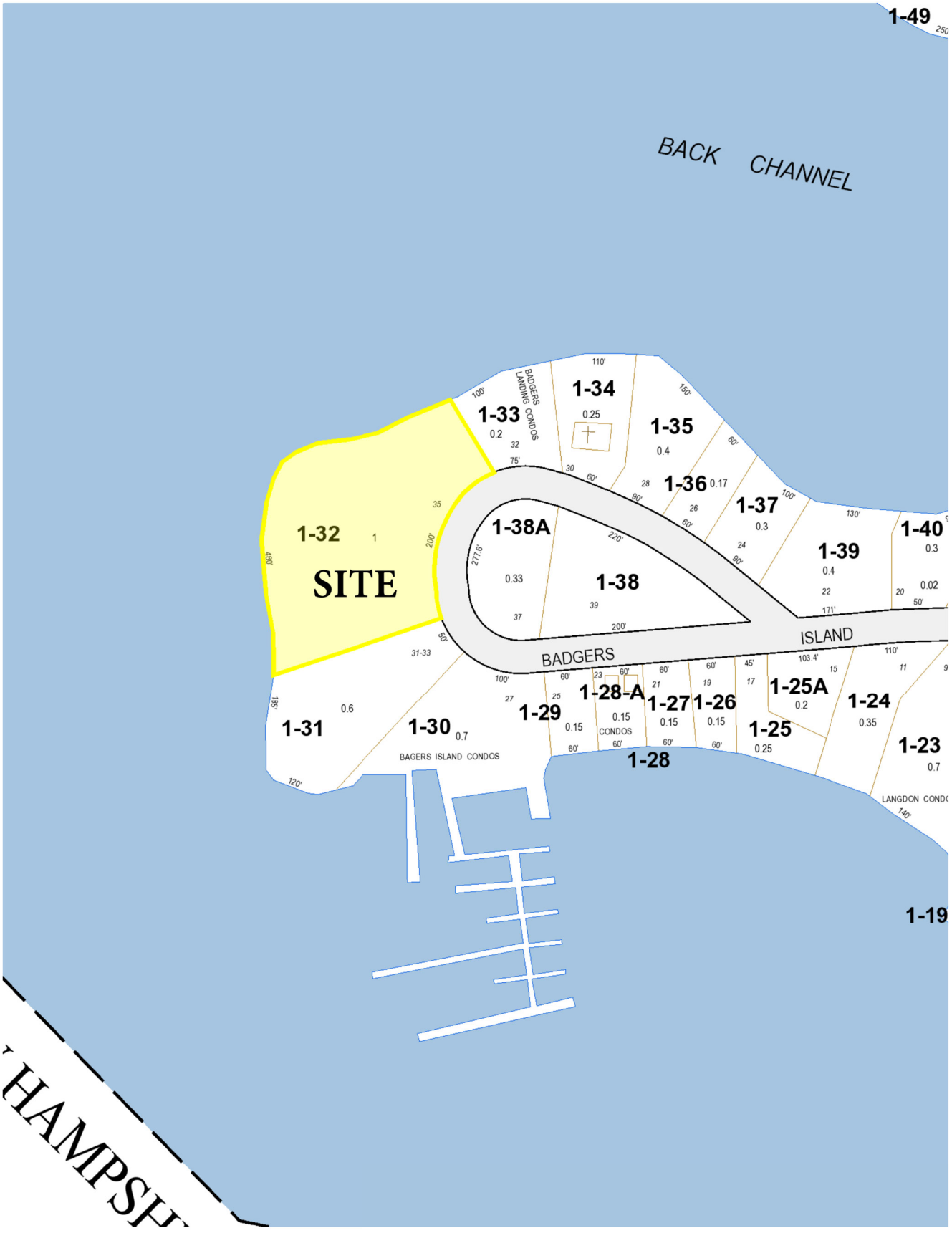
VICINITY (TAX) MAP

AMBIT ENGINEERING, INC.
Civil Engineers & Land Surveyors

Tax Map

B.I.W. GROUP, LLC
35 BADGERS ISLAND WEST
KITTERY, MAINE

JOB NUMBER: 3050.72A
NTS
SUBMITTED: 08-18-2022



APPENDIX B

FEMA FIRM MAP

APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
KITTERY, MAINE
YORK COUNTY

PANEL 8 OF 10

(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
230171 0008 D

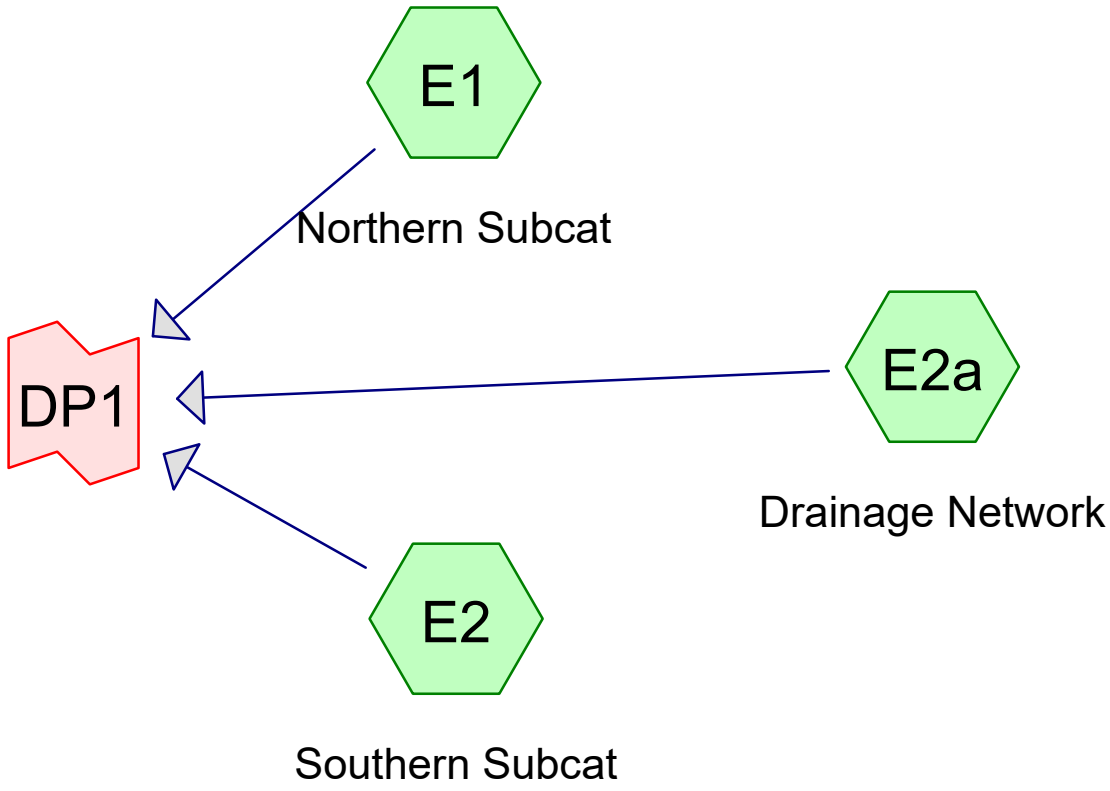
MAP REVISED:
JULY 3, 1986

Federal Emergency Management Agency

APPENDIX C

HYDROCAD DRAINAGE

ANALYSIS CALCULATIONS



Subcat Reach Pond Link

Routing Diagram for Existing Conditions 2023-01-18 David T
Prepared by Ambit Engineering, Printed 2023-01-19

Project Notes

Defined 5 rainfall events from output (39) IDF

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.20	2
2	10-yr	Type II 24-hr		Default	24.00	1	4.86	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.16	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.676	80	>75% Grass cover, Good, HSG D (E1, E2, E2a)
0.156	96	Gravel surface, HSG D (E1, E2)
1.160	98	Paved parking, HSG D (E1, E2, E2a)
0.166	98	Roofs, HSG D (E1, E2, E2a)
0.097	98	Water Surface, 0% imp, HSG D (E1)
0.924	98	Water Surface, HSG D (E1, E2)
0.199	77	Woods, Good, HSG D (E1)
3.378	**93**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.378	HSG D	E1, E2, E2a
0.000	Other	
3.378		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.676	0.000	0.676	>75% Grass cover, Good	E1, E2, E2a
0.000	0.000	0.000	0.156	0.000	0.156	Gravel surface	E1, E2
0.000	0.000	0.000	1.160	0.000	1.160	Paved parking	E1, E2, E2a
0.000	0.000	0.000	0.166	0.000	0.166	Roofs	E1, E2, E2a
0.000	0.000	0.000	0.924	0.000	0.924	Water Surface	E1, E2
0.000	0.000	0.000	0.097	0.000	0.097	Water Surface, 0% imp	E1
0.000	0.000	0.000	0.199	0.000	0.199	Woods, Good	E1
0.000	**0.000**	**0.000**	**3.378**	**0.000**	**3.378**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>2.20"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=6.23 cfs 0.302 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>2.29"
Tc=5.0 min CN=93 Runoff=3.43 cfs 0.159 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>2.57"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=3.75 cfs 0.193 af

Link DP1: below 1,000.00 cfs Inflow=13.22 cfs 0.654 af
Primary=13.22 cfs 0.654 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 0.654 af Average Runoff Depth = 2.32"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

Summary for Subcatchment E1: Northern Subcat

Runoff = 6.23 cfs @ 11.98 hrs, Volume= 0.302 af, Depth> 2.20"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		**Lag/CN Method,**

Summary for Subcatchment E2: Southern Subcat

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

Runoff = 3.43 cfs @ 11.95 hrs, Volume= 0.159 af, Depth> 2.29"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 3.75 cfs @ 11.97 hrs, Volume= 0.193 af, Depth> 2.57"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 2.32" for 2-yr event
Inflow = 13.22 cfs @ 11.97 hrs, Volume= 0.654 af
Primary = 13.22 cfs @ 11.97 hrs, Volume= 0.654 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>3.71"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=10.13 cfs 0.508 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>3.80"
Tc=5.0 min CN=93 Runoff=5.51 cfs 0.263 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>4.08"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=5.83 cfs 0.307 af

Link DP1: below 1,000.00 cfs Inflow=21.18 cfs 1.078 af
Primary=21.18 cfs 1.078 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.078 af Average Runoff Depth = 3.83"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

Summary for Subcatchment E1: Northern Subcat

Runoff = 10.13 cfs @ 11.98 hrs, Volume= 0.508 af, Depth> 3.71"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		**Lag/CN Method,**

Summary for Subcatchment E2: Southern Subcat

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

Runoff = 5.51 cfs @ 11.95 hrs, Volume= 0.263 af, Depth> 3.80"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 5.83 cfs @ 11.97 hrs, Volume= 0.307 af, Depth> 4.08"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 3.83" for 10-yr event
Inflow = 21.18 cfs @ 11.97 hrs, Volume= 1.078 af
Primary = 21.18 cfs @ 11.97 hrs, Volume= 1.078 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment E1: Northern Subcat Runoff Area=71,648 sf 55.59% Impervious Runoff Depth>4.89"
Flow Length=585' Slope=0.0374 '/' Tc=6.9 min CN=92 Runoff=13.15 cfs 0.671 af

Subcatchment E2: Southern Subcat Runoff Area=36,164 sf 64.89% Impervious Runoff Depth>4.99"
Tc=5.0 min CN=93 Runoff=7.11 cfs 0.345 af

Subcatchment E2a: Drainage Network Runoff Area=39,314 sf 88.35% Impervious Runoff Depth>5.27"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=7.44 cfs 0.396 af

Link DP1: below 1,000.00 cfs Inflow=27.35 cfs 1.412 af
Primary=27.35 cfs 1.412 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.412 af Average Runoff Depth = 5.02"
33.37% Pervious = 1.127 ac 66.63% Impervious = 2.250 ac

Summary for Subcatchment E1: Northern Subcat

Runoff = 13.15 cfs @ 11.98 hrs, Volume= 0.671 af, Depth> 4.89"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
15,046	80	>75% Grass cover, Good, HSG D
3,894	96	Gravel surface, HSG D
1,192	98	Paved parking, HSG D
8,075	98	Paved parking, HSG D
2,924	98	Roofs, HSG D
8,671	77	Woods, Good, HSG D
27,640	98	Water Surface, HSG D
4,206	98	Water Surface, 0% imp, HSG D
71,648	92	Weighted Average
31,817		44.41% Pervious Area
39,831		55.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.9	585	0.0374	1.41		**Lag/CN Method,**

Summary for Subcatchment E2: Southern Subcat

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

Runoff = 7.11 cfs @ 11.95 hrs, Volume= 0.345 af, Depth> 4.99"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
9,817	80	>75% Grass cover, Good, HSG D
2,880	96	Gravel surface, HSG D
7,292	98	Paved parking, HSG D
3,568	98	Roofs, HSG D
12,607	98	Water Surface, HSG D
36,164	93	Weighted Average
12,697		35.11% Pervious Area
23,467		64.89% Impervious Area

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

Summary for Subcatchment E2a: Drainage Network

Runoff = 7.44 cfs @ 11.97 hrs, Volume= 0.396 af, Depth> 5.27"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

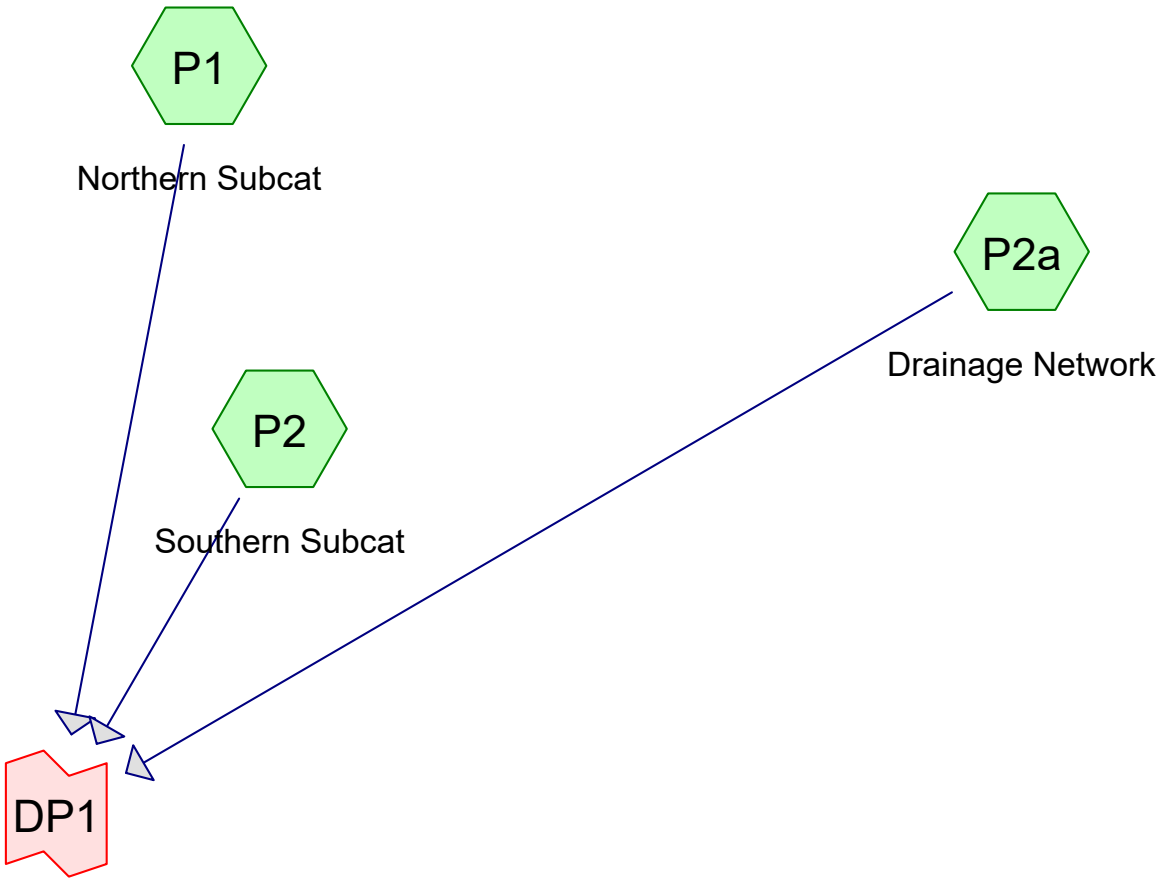
Area (sf)	CN	Description
4,581	80	>75% Grass cover, Good, HSG D
33,992	98	Paved parking, HSG D
741	98	Roofs, HSG D
39,314	96	Weighted Average
4,581		11.65% Pervious Area
34,733		88.35% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 66.63% Impervious, Inflow Depth > 5.02" for 25-yr event
Inflow = 27.35 cfs @ 11.97 hrs, Volume= 1.412 af
Primary = 27.35 cfs @ 11.97 hrs, Volume= 1.412 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 5.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



Subcat Reach Pond Link

Routing Diagram for Proposed Conditions 2023-04-06 David T
Prepared by Haley Ward, Printed 4/6/2023

Project Notes

Defined 5 rainfall events from output (39) IDF

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-yr	Type II 24-hr		Default	24.00	1	3.20	2
2	10-yr	Type II 24-hr		Default	24.00	1	4.86	2
3	25-yr	Type II 24-hr		Default	24.00	1	6.16	2

Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.798	80	>75% Grass cover, Good, HSG D (P1, P2, P2a)
0.109	96	Gravel surface, HSG D (P1, P2)
0.932	98	Paved parking, HSG D (P1, P2, P2a)
0.011	50	Permeable Pavers (P1, P2)
0.332	98	Roofs, HSG D (P1, P2, P2a)
0.097	98	Water Surface, 0% imp, HSG D (P1)
0.924	98	Water Surface, HSG D (P1, P2)
0.175	77	Woods, Good, HSG D (P1)
3.378	**92**	**TOTAL AREA**

Soil Listing (selected nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
3.367	HSG D	P1, P2, P2a
0.011	Other	P1, P2
3.378		**TOTAL AREA**

Ground Covers (selected nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.798	0.000	0.798	>75% Grass cover, Good	P1, P2, P2a
0.000	0.000	0.000	0.109	0.000	0.109	Gravel surface	P1, P2
0.000	0.000	0.000	0.932	0.000	0.932	Paved parking	P1, P2, P2a
0.000	0.000	0.000	0.000	0.011	0.011	Permeable Pavers	P1, P2
0.000	0.000	0.000	0.332	0.000	0.332	Roofs	P1, P2, P2a
0.000	0.000	0.000	0.924	0.000	0.924	Water Surface	P1, P2
0.000	0.000	0.000	0.097	0.000	0.097	Water Surface, 0% imp	P1
0.000	0.000	0.000	0.175	0.000	0.175	Woods, Good	P1
0.000	**0.000**	**0.000**	**3.367**	**0.011**	**3.378**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=2.26"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=5.44 cfs 0.281 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=2.17"
Tc=5.0 min CN=90 Runoff=2.70 cfs 0.129 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=2.75"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=4.86 cfs 0.268 af

Link DP1: below 1,000.00 cfs Inflow=12.81 cfs 0.678 af
Primary=12.81 cfs 0.678 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 0.678 af Average Runoff Depth = 2.41"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

Summary for Subcatchment P1: Northern Subcat

Runoff = 5.44 cfs @ 11.98 hrs, Volume= 0.281 af, Depth= 2.26"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
	14,676	80	>75% Grass cover, Good, HSG D
	3,570	96	Gravel surface, HSG D
	1,192	98	Paved parking, HSG D
	7,624	77	Woods, Good, HSG D
	27,640	98	Water Surface, HSG D
	4,206	98	Water Surface, 0% imp, HSG D
	3,148	98	Roofs, HSG D
*	441	50	Permeable Pavers
	2,476	98	Paved parking, HSG D
	64,973	91	Weighted Average
	30,517		46.97% Pervious Area
	34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		**Lag/CN Method,**

Summary for Subcatchment P2: Southern Subcat

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

Runoff = 2.70 cfs @ 11.95 hrs, Volume= 0.129 af, Depth= 2.17"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

	Area (sf)	CN	Description
	13,037	80	>75% Grass cover, Good, HSG D
	1,183	96	Gravel surface, HSG D
	12,607	98	Water Surface, HSG D
	4,315	98	Roofs, HSG D
*	23	50	Permeable Pavers
	6	98	Paved parking, HSG D
	31,171	90	Weighted Average
	14,243		45.69% Pervious Area
	16,928		54.31% Impervious Area

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 4.86 cfs @ 11.97 hrs, Volume= 0.268 af, Depth= 2.75"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-yr Rainfall=3.20"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 2.41" for 2-yr event
Inflow = 12.81 cfs @ 11.97 hrs, Volume= 0.678 af
Primary = 12.81 cfs @ 11.97 hrs, Volume= 0.678 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=3.85"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=8.96 cfs 0.478 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=3.74"
Tc=5.0 min CN=90 Runoff=4.51 cfs 0.223 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=4.39"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=7.56 cfs 0.429 af

Link DP1: below 1,000.00 cfs Inflow=20.74 cfs 1.130 af
Primary=20.74 cfs 1.130 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.130 af Average Runoff Depth = 4.01"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

Summary for Subcatchment P1: Northern Subcat

Runoff = 8.96 cfs @ 11.98 hrs, Volume= 0.478 af, Depth= 3.85"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

	Area (sf)	CN	Description
	14,676	80	>75% Grass cover, Good, HSG D
	3,570	96	Gravel surface, HSG D
	1,192	98	Paved parking, HSG D
	7,624	77	Woods, Good, HSG D
	27,640	98	Water Surface, HSG D
	4,206	98	Water Surface, 0% imp, HSG D
	3,148	98	Roofs, HSG D
*	441	50	Permeable Pavers
	2,476	98	Paved parking, HSG D
	64,973	91	Weighted Average
	30,517		46.97% Pervious Area
	34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		**Lag/CN Method,**

Summary for Subcatchment P2: Southern Subcat

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

Runoff = 4.51 cfs @ 11.95 hrs, Volume= 0.223 af, Depth= 3.74"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

	Area (sf)	CN	Description
	13,037	80	>75% Grass cover, Good, HSG D
	1,183	96	Gravel surface, HSG D
	12,607	98	Water Surface, HSG D
	4,315	98	Roofs, HSG D
*	23	50	Permeable Pavers
	6	98	Paved parking, HSG D
	31,171	90	Weighted Average
	14,243		45.69% Pervious Area
	16,928		54.31% Impervious Area

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 7.56 cfs @ 11.97 hrs, Volume= 0.429 af, Depth= 4.39"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-yr Rainfall=4.86"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 4.01" for 10-yr event
Inflow = 20.74 cfs @ 11.97 hrs, Volume= 1.130 af
Primary = 20.74 cfs @ 11.97 hrs, Volume= 1.130 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment P1: Northern Subcat Runoff Area=64,973 sf 53.03% Impervious Runoff Depth=5.11"
Flow Length=585' Slope=0.0374 '/' Tc=7.2 min CN=91 Runoff=11.69 cfs 0.636 af

Subcatchment P2: Southern Subcat Runoff Area=31,171 sf 54.31% Impervious Runoff Depth=5.00"
Tc=5.0 min CN=90 Runoff=5.92 cfs 0.298 af

Subcatchment P2a: Drainage Network Runoff Area=50,983 sf 86.16% Impervious Runoff Depth=5.69"
Flow Length=411' Slope=0.0155 '/' Tc=6.7 min CN=96 Runoff=9.65 cfs 0.555 af

Link DP1: below 1,000.00 cfs Inflow=26.89 cfs 1.489 af
Primary=26.89 cfs 1.489 af Secondary=0.00 cfs 0.000 af

Total Runoff Area = 3.378 ac Runoff Volume = 1.489 af Average Runoff Depth = 5.29"
35.22% Pervious = 1.190 ac 64.78% Impervious = 2.188 ac

Summary for Subcatchment P1: Northern Subcat

Runoff = 11.69 cfs @ 11.98 hrs, Volume= 0.636 af, Depth= 5.11"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

	Area (sf)	CN	Description
	14,676	80	>75% Grass cover, Good, HSG D
	3,570	96	Gravel surface, HSG D
	1,192	98	Paved parking, HSG D
	7,624	77	Woods, Good, HSG D
	27,640	98	Water Surface, HSG D
	4,206	98	Water Surface, 0% imp, HSG D
	3,148	98	Roofs, HSG D
*	441	50	Permeable Pavers
	2,476	98	Paved parking, HSG D
	64,973	91	Weighted Average
	30,517		46.97% Pervious Area
	34,456		53.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	585	0.0374	1.35		**Lag/CN Method,**

Summary for Subcatchment P2: Southern Subcat

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

Runoff = 5.92 cfs @ 11.95 hrs, Volume= 0.298 af, Depth= 5.00"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

	Area (sf)	CN	Description
	13,037	80	>75% Grass cover, Good, HSG D
	1,183	96	Gravel surface, HSG D
	12,607	98	Water Surface, HSG D
	4,315	98	Roofs, HSG D
*	23	50	Permeable Pavers
	6	98	Paved parking, HSG D
	31,171	90	Weighted Average
	14,243		45.69% Pervious Area
	16,928		54.31% Impervious Area

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

Summary for Subcatchment P2a: Drainage Network

Runoff = 9.65 cfs @ 11.97 hrs, Volume= 0.555 af, Depth= 5.69"
Routed to Link DP1 :

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type II 24-hr 25-yr Rainfall=6.16"

Area (sf)	CN	Description
7,056	80	>75% Grass cover, Good, HSG D
36,917	98	Paved parking, HSG D
7,010	98	Roofs, HSG D
50,983	96	Weighted Average
7,056		13.84% Pervious Area
43,927		86.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.7	411	0.0155	1.03		**Lag/CN Method,**

Summary for Link DP1:

Inflow Area = 3.378 ac, 64.78% Impervious, Inflow Depth = 5.29" for 25-yr event
Inflow = 26.89 cfs @ 11.97 hrs, Volume= 1.489 af
Primary = 26.89 cfs @ 11.97 hrs, Volume= 1.489 af, Atten= 0%, Lag= 0.0 min
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Primary outflow = Inflow below 1,000.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

APPENDIX D

INSPECTION & LONG TERM MAINTENANCE PLAN

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

INSPECTION & LONG-TERM MAINTENANCE PLAN
FOR
SITE DEVELOPMENT

35 BADGERS ISLAND WEST
KITTERY, ME

Introduction

The intent of this plan is to provide Hampshire Development (herein referred to as "owner") with a list of procedures that document the inspection and maintenance requirements of the stormwater management system for this development. Specifically, the proposed Jellyfish Stormwater Filter and associated drainage structures (collectively referred to as the "Stormwater Management System"). The contact information for the owner shall be kept current, and if there is a change of ownership of the property this plan must be transferred to the new owner.

The following inspection and maintenance program is necessary to keep the stormwater management system functioning properly and will help in maintaining a high quality of stormwater runoff to minimize potential environmental impacts. By following the enclosed procedures, the owner will be able to maintain the functional design of the stormwater management system and maximize its ability to remove sediment and other contaminants from site generated stormwater runoff.

Annual Report

The owner shall prepare an annual Inspection & Maintenance Report. The report shall include a summary of the system's maintenance and repair by transmission of the Inspection & Maintenance Log and other information as required. A copy of the report shall be delivered annually to the Kittery Code Enforcement Officer, if required.

Inspection & Maintenance Checklist/Log

The following pages contain the Stormwater Management System Inspection & Maintenance Requirements and a blank copy of the Stormwater Management System Inspection & Maintenance Log. These forms are provided to the owner as a guideline for performing the inspection and maintenance of the Stormwater Management System. This is a guideline and should be periodically reviewed for conformance with current practice and standards.

Stormwater Management System Components

The Stormwater Management System is designed to mitigate the quality of site-generated stormwater runoff. As a result, the design includes the following elements:

Non-Structural BMPs

Non-Structural best management practices (BMP's) include temporary and permanent measures that typically require less labor and capital inputs and are intended to provide protection against erosion of soils. Examples of non-structural BMP's on this project include but are not limited to:

- Temporary and Permanent mulching
- Temporary and Permanent grass cover
- Trees
- Shrubs and ground covers
- Miscellaneous landscape plantings
- Dust control
- Tree protection
- Topsoiling
- Sediment barriers
- Stabilized construction entrance
- Catch basin basket

Structural BMPs

Structural BMPs are more labor and capital-intensive structures or installations that require more specialized personnel to install. Examples on this project include but are not limited to:

- Contech Jellyfish Filter
- Bio Clean Downspout Filter
- Storm Drains
- Permeable Pavers

Inspection and Maintenance Requirements

The following summarizes the inspection and maintenance requirements for the various BMP's that may be found on this project.

1. **Grassed areas (until established):** After each rain event of 0.5" or more during a 24-hour period, inspect grassed areas for signs of disturbance, such as erosion. If damaged areas are discovered, immediately repair the damage. Repairs may include adding new topsoil, lime, seed, fertilizer and mulch.
2. **Plantings**: Planting and landscaping (trees, shrubs) shall be monitored bi-monthly during the first year to insure viability and vigorous growth. Replace dead or dying vegetation with new stock and

make adjustments to the conditions that caused the dead or dying vegetation. During dryer times of the year, provide weekly watering or irrigation during the establishment period of the first year. Make the necessary adjustments to ensure long-term health of the vegetated covers, i.e. provide more permanent mulch or compost or other means of protection.

3. **Bio Clean Downspout Filter:** Refer to the manufacturer's Operation and Maintenance manual for guidance, included herewith.
4. **Contech Jellyfish Filter:** Reference the attached operations and maintenance manual for proper maintenance of the system.
5. **Storm Drains:** Monitor accumulation of debris in catch basins monthly or after significant rain events. Remove sediments when they accumulate within the outlet pipe. During construction, maintain inlet protection until all roadways and parking areas have been stabilized. Prior to the end of construction, inspect the drains and basins for accumulations and remove and clean by jet-vacuuming.
6. **Permeable Pavers:** Ensure that sediments do not enter and plug pavement. Remove sediments, trash, and debris, as necessary. Repair outlet structures and appurtenances, as necessary. Vacuum at least twice annually.

Pollution Prevention

The following pollution prevention activities shall be undertaken to minimize potential impacts on stormwater runoff quality. The Contractor is responsible for all activities during construction. The Owner is responsible thereafter.

Spill Procedures

Any discharge of waste oil or other pollutant shall be reported immediately to the Maine Department of Environmental Protection (Maine DEP). The Contractor/Owner will be responsible for any incident of groundwater contamination resulting from the improper discharge of pollutants to the stormwater system, and may be required by Maine DEP to remediate incidents that may impact groundwater quality. If the property ownership is transferred, the new owner will be informed of the legal responsibilities associated with operation of the stormwater system, as indicated above.

Sanitary Facilities

Sanitary facilities shall be provided during all phases of construction.

Material Storage

No on site trash facility is provided until homes are constructed. The contractors are required to remove trash from the site. Hazardous material storage is prohibited.

Material Disposal

All waste material, trash, sediment, and debris shall be removed from the site and disposed of in accordance with applicable local, state, and federal guidelines and regulations. Removed sediments shall be if necessary dewatered prior to disposal.

Invasive Species

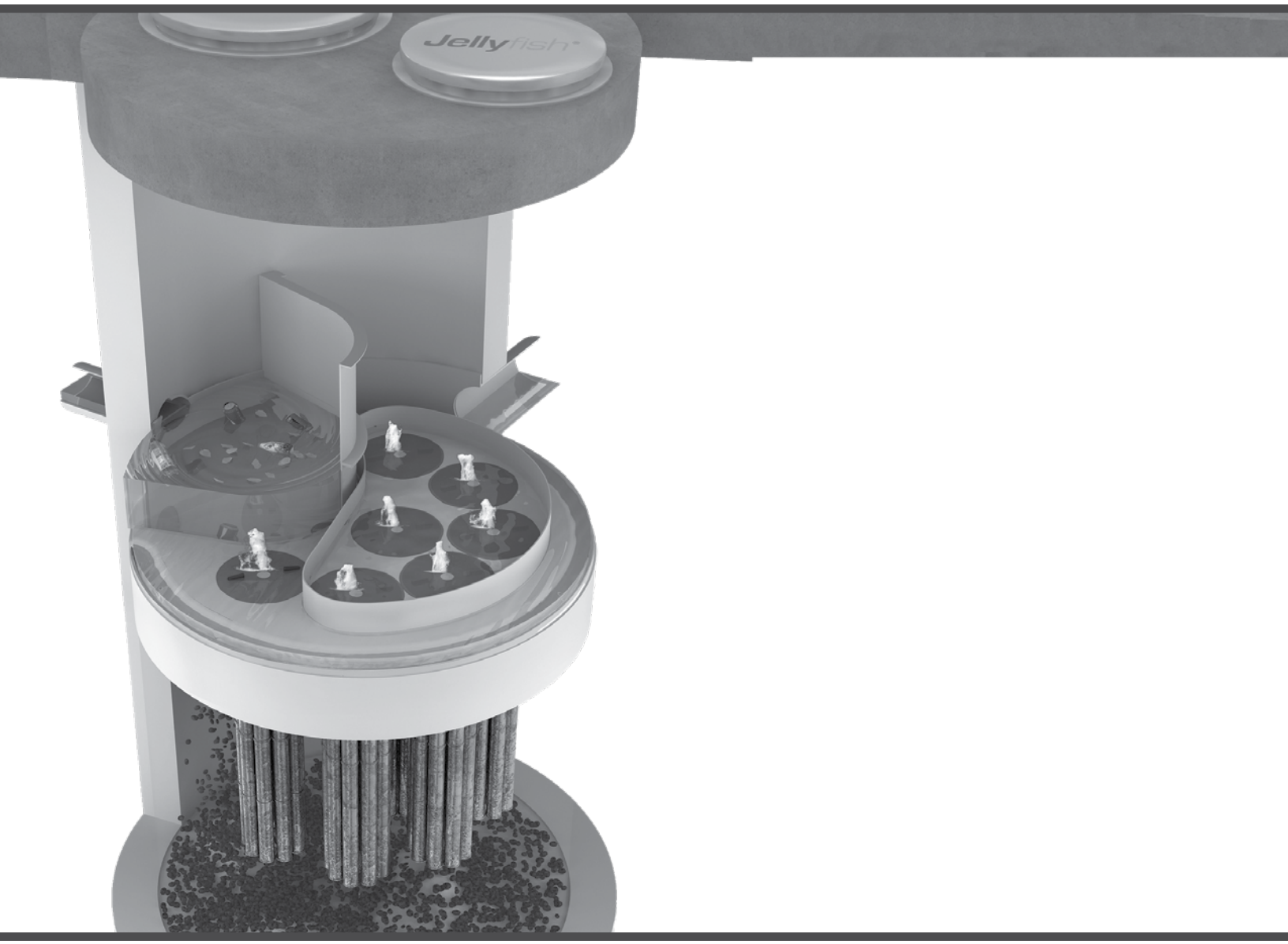
Monitor the Stormwater Management System for signs of invasive species growth. If caught early, their eradication is much easier. The most likely places where invasions start is in wetter, disturbed soils or detention ponds. Species such as phragmites and purple loose-strife are common invaders in these wetter areas. If they are found, the owner shall refer to the Invasive Plants List created by the Maine Department of Agriculture, Conservation & Forestry or contact a wetlands scientist with experience in invasive species control to implement a plan of action for eradication. Measures that do not require the application of chemical herbicides should be the first line of defense.

Figure 1: Lythrum salicaria, Purple Loosestrife. Photo by Liz West.

Figure 2: Phragmites australis. Photo by Le Loup Gris

CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter Maintenance Guide



Jellyfish®

JELLYFISH® FILTER
INSPECTION & MAINTENANCE GUIDE

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

TABLE OF CONTENTS

1.0 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.

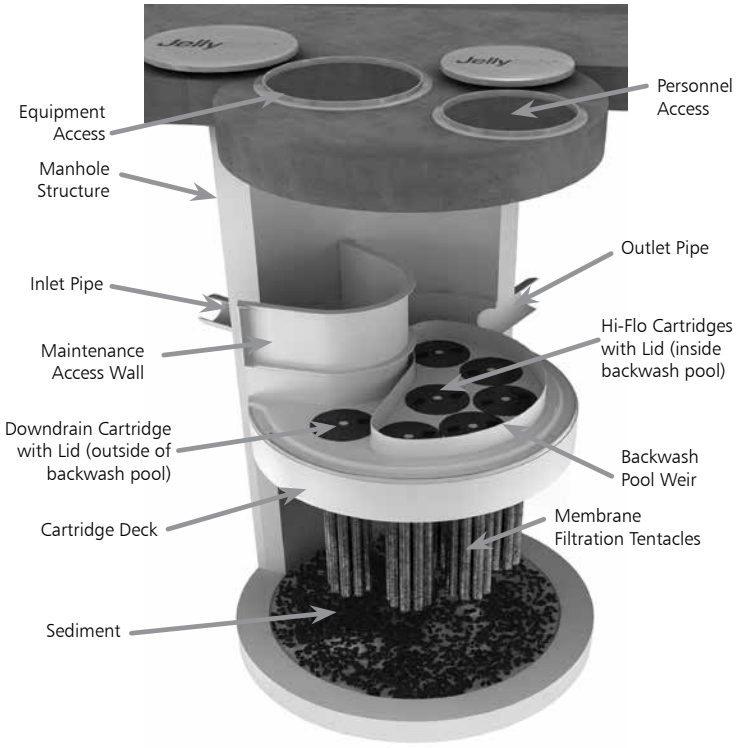
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion 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



Note: Separator Skirt not shown

2.0 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*.

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.

3.0 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.

3.1 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.

3.2 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.

4.0 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.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

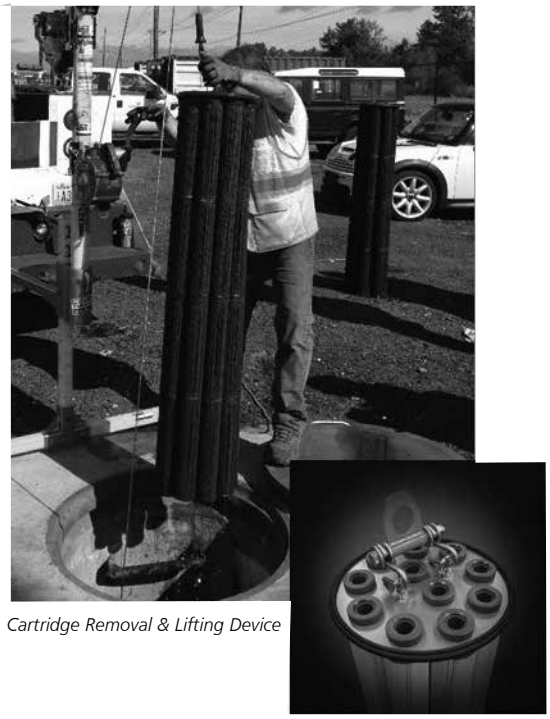
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. 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.

5.1 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.

5.2 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.



Cartridge Removal & Lifting Device

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.
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.

5.3 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.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all 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.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some 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.

5.4 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.

5.5 Chemical Spills

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

5.6 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

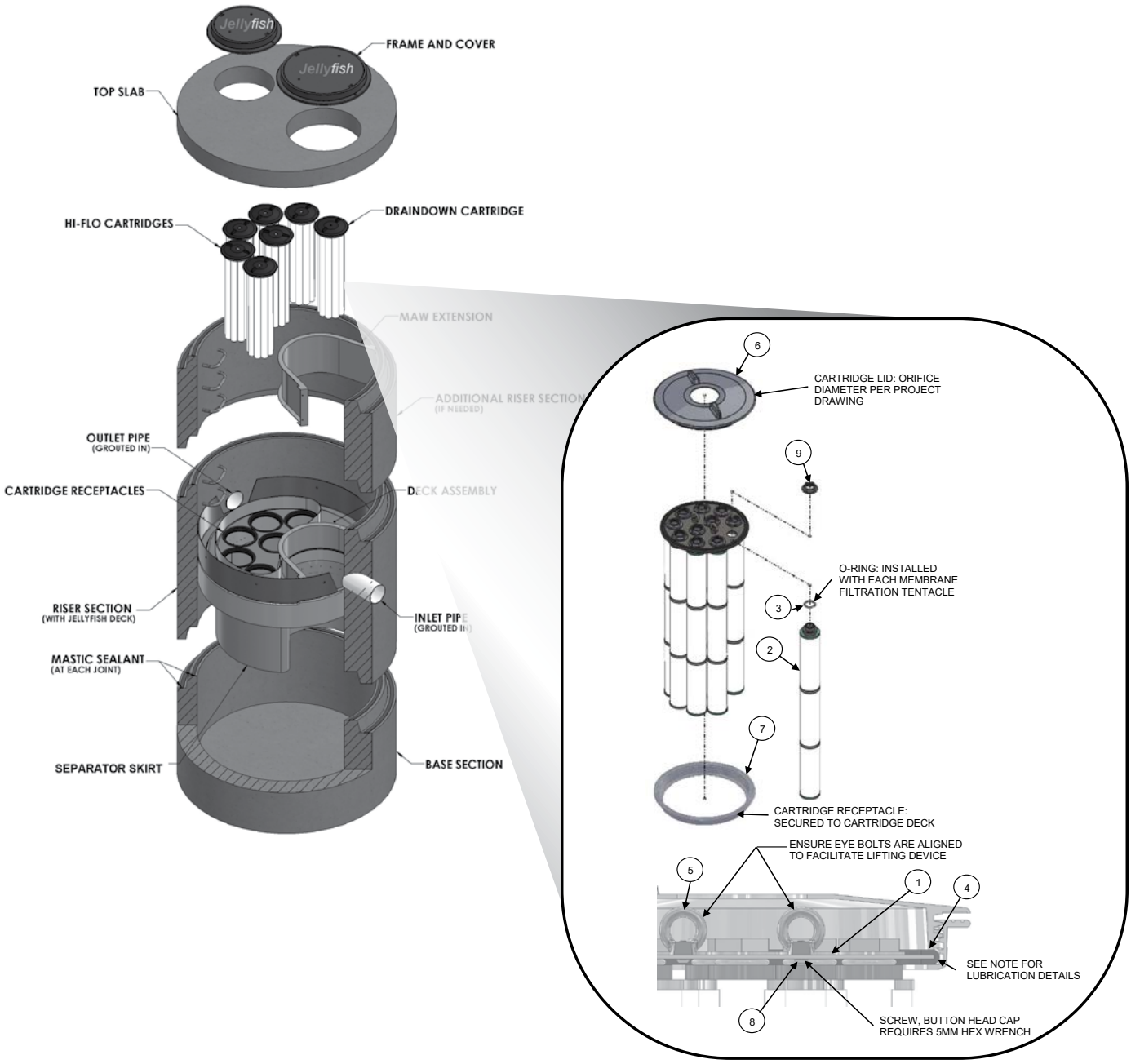


TABLE 1: BOM

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 Lide (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:	
	Roadway/Highway:		Airport:		Residential:	

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						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Draindown Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo 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:						

Jellyfish®

CONTECH ENGINEERED SOLUTIONS

Support

- Drawings and specifications are available at www.conteches.com/jellyfish.
- Site-specific design support is available from Contech Engineered Solutions.
- Find a Certified Maintenance Provider at www.conteches.com/ccmp

800.338.1122
www.ContechES.com

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, sanitary sewer, stormwater, wastewater treatment and earth stabilization products. For information on other Contech segment offerings, visit ContechES.com or call 800.338.1122

Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
American water lotus	*Nelumbo lutea*	Severely invasive
Amur honeysuckle*	*Lonicera maackii*	Severely invasive
Asiatic bittersweet*	*Celastrus orbiculatus*	Severely invasive
Bella honeysuckle*	*Lonicera x bella*	Severely invasive
Black locust*	*Robinia pseudoacacia*	Severely invasive
Black swallowwort	*Cynanchum louiseae*	Severely invasive
Bohemian knotweed	*Fallopia x bohemica*	Severely invasive
Brazilian waterweed**	*Egeria densa*	Severely invasive
Canada thistle	*Cirsium arvense*	Severely invasive
Chinese yam	*Dioscorea polystachya*	Severely invasive
Chocolate vine; five-leaf akebia	*Akebia quinata*	Severely invasive
Common buckthorn	*Rhamnus cathartica*	Severely invasive
Common reed	*Phragmites australis*	Severely invasive
Curly pondweed**	*Potamogeton crispus*	Severely invasive
Eurasian milfoil**	*Myriophyllum spicatum*	Severely invasive
European alder	*Alnus glutinosa*	Severely invasive
European frog's bit**	*Hydrocharis morsus-ranae*	Severely invasive
False indigo*	*Amorpha fruticosa*	Severely invasive
Fanwort**	*Cabomba caroliniana*	Severely invasive
Flowering rush	*Butomus umbellatus*	Severely invasive
Garlic mustard*	*Alliaria petiolata*	Severely invasive
Giant knotweed	*Fallopia sachalinensis*	Severely invasive
Glossy buckthorn*	*Frangula alnus*	Severely invasive
Goutweed*	*Aegopodium podagraria*	Severely invasive
Hydrilla**	*Hydrilla verticillata*	Severely invasive
Inflated bladderwort	*Utricularia inflata*	Severely invasive
Japanese barberry*	*Berberis thunbergii*	Severely invasive
Japanese honeysuckle*	*Lonicera japonica*	Severely invasive
Japanese knotweed*	*Fallopia japonica*	Severely invasive
Japanese stilt grass*	*Microstegium vimineum*	Severely invasive
Morrow's honeysuckle*	*Lonicera morrowii*	Severely invasive
Ornamental jewelweed*	*Impatiens glandulifera*	Severely invasive
Pale swallowwort	*Cynanchum rossicum*	Severely invasive
Parrot feather**	*Myriophyllum aquaticum*	Severely invasive
Porcelainberry*	*Ampelopsis glandulosa*	Severely invasive
Reed canary grass	*Phalaris arundinacea*	Severely invasive
Slender-leaved naiad**	*Najas minor*	Severely invasive
Starry stonewort	*Nitellopsis obtusa*	Severely invasive
Starwort	*Callitriche stagnalis*	Severely invasive
Tall pepperwort	*Lepidium latifolium*	Severely invasive
Tartarian honeysuckle*	*Lonicera tatarica*	Severely invasive
Tree of heaven*	*Ailanthus altissima*	Severely invasive
Variable milfoil**	*Myriophyllum heterophyllum*	Severely invasive
Water chestnut**	*Trapa natans*	Severely invasive
Water lettuce	*Pistia stratiotes*	Severely invasive

**Plant regulated by the Do Not Sell list, Horticulture Program, DACF*

***Aquatic plant regulated by Maine DEP*

Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
Water soldier	*Stratiotes aloides*	Severely invasive
Wavyleaf basketgrass	*Oplismenus hirtellus ssp. undulatifolius*	Severely invasive
White cottonwood*	*Populus alba*	Severely invasive
Wineberry	*Rubus phoenicolasias*	Severely invasive
Winged euonymous*	*Euonymus alatus*	Severely invasive
Yellow floating heart**	*Nymphoides peltata*	Severely invasive
Yellow iris*	*Iris pseudacorus*	Severely invasive
Amur cork tree*	*Phellodendron amurense*	Very invasive
Amur maple*	*Acer ginnala*	Very invasive
Autumn olive*	*Elaeagnus umbellata*	Very invasive
Black jetbead	*Rhodotypos scandens*	Very invasive
Border privet	*Ligustrum obtusifolium*	Very invasive
California privet	*Ligustrum ovalifolium*	Very invasive
Callery ("Bradford") pear	*Pyrus calleryana*	Very invasive
Common barberry*	*Berberis vulgaris*	Very invasive
Creeping buttercup	*Ranunculus repens*	Very invasive
Dame's rocket*	*Hesperis matronalis*	Very invasive
English water grass	*Glyceria maxima*	Very invasive
European blackberry	*Rubus fruticosus*	Very invasive
Giant hogweed	*Heracleum mantegazzianum*	Very invasive
Hairy willow-herb	*Epilobium hirsutum*	Very invasive
Hardy kiwi	*Actinidia arguta*	Very invasive
Japanese hops	*Humulus japonicus*	Very invasive
Kudzu	*Pueraria lobata*	Very invasive
Leafy spurge	*Euphorbia esula*	Very invasive
Lesser celandine	*Ficaria verna*	Very invasive
Linden arrowwood	*Viburnum dilatatum*	Very invasive
Mile-a-minute vine*	*Persicaria perfoliata*	Very invasive
Multiflora rose*	*Rosa multiflora*	Very invasive
Narrowleaf bittercress	*Cardamine impatiens*	Very invasive
Norway maple*	*Acer platanoides*	Very invasive
Oriental photinia	*Photinia villosa*	Very invasive
Privet*	*Ligustrum vulgare*	Very invasive
Purple loosestrife*	*Lythrum salicaria*	Very invasive
Rugosa rose	*Rosa rugosa*	Very invasive
Water forget-me-not	*Myosotis scorpioides*	Very invasive
Wintercreeper	*Euonymus fortunei*	Very invasive
Yam-leaved virgin's bower	*Clematis terniflora*	Very invasive
Bicolor lespedeza, two-colored bush-clover	*Lespedeza bicolor*	Invasive, habitat-specific threats
Brown knapweed	*Centaurea jacea*	Invasive, habitat-specific threats
Chinese bindweed*	*Fallopia baldschuanica*	Invasive, habitat-specific threats
Chinese bush-clover	*Lespedeza cuneata*	Invasive, habitat-specific threats
Coltsfoot	*Tussilago farfara*	Invasive, habitat-specific threats

**Plant regulated by the Do Not Sell list, Horticulture Program, DACF*

***Aquatic plant regulated by Maine DEP*

Maine Advisory List of Invasive Plants - 2019 revision

Common Name	Scientific Name	Ranking
Dalmation toadflax	*Linaria dalmatica*	Invasive, habitat-specific threats
February daphne; paradise plant	*Daphne mezereum*	Invasive, habitat-specific threats
Fine-leaved sheep fescue	*Festuca filiformis*	Invasive, habitat-specific threats
Gray willow	*Salix cinerea*	Invasive, habitat-specific threats
Japanese tree lilac	*Syringa reticulata*	Invasive, habitat-specific threats
Mudmat	*Glossostigma cleistanthum*	Invasive, habitat-specific threats
One-rowed watercress	*Nasturtium microphyllum*	Invasive, habitat-specific threats
Oriental lady's thumb smartweed	*Persicaria longiseta*	Invasive, habitat-specific threats
Russian olive	*Elaeagnus angustifolia*	Invasive, habitat-specific threats
Siberian elm	*Ulmus pumila*	Invasive, habitat-specific threats
Siebold viburnum	*Viburnum sieboldii*	Invasive, habitat-specific threats
Spotted knapweed	*Centaurea stoebe*	Invasive, habitat-specific threats
Watercress	*Nasturtium officinale*	Invasive, habitat-specific threats
Wood blue grass	*Poa nemoralis*	Invasive, habitat-specific threats
Woodland angelica	*Angelica sylvestris*	Invasive, habitat-specific threats
Bittersweet or climbing nightshade	*Solanum dulcamara*	Potential to be invasive, monitor
Bull thistle	*Cirsium vulgare*	Potential to be invasive, monitor
Common mugwort*	*Artemisia vulgaris*	Potential to be invasive, monitor
Common valerian	*Valeriana officinalis*	Potential to be invasive, monitor
Creeping jenny	*Lysimachia nummularia*	Potential to be invasive, monitor
Cypress spurge*	*Euphorbia cyparissias*	Potential to be invasive, monitor
Princess tree*	*Paulownia tomentosa*	Potential to be invasive, monitor
Small carpgrass	*Arthraxon hispidus*	Potential to be invasive, monitor
Sycamore maple	*Acer pseudoplatanus*	Potential to be invasive, monitor
Western lupine	*Lupinus polyphyllus*	Potential to be invasive, monitor
Wild parsnip	*Pastinaca sativa*	Potential to be invasive, monitor
Yellow hornpoppy	*Glaucium flavum*	Potential to be invasive, monitor

Also evaluated in 2018; not meeting criteria for inclusion as invasive:

Common Name	Scientific Name	Outcome
Canada bluegrass, flat-stemmed bluegrass	*Poa compressa*	Not invasive at this time
Wild thyme	*Thymus pulegioides*	Not invasive at this time
European spindle-tree	*Euonymus europaeus*	Insufficient data to evaluate
False spiraea	*Sorbaria sorbifolia*	Insufficient data to evaluate
Fly honeysuckle	*Lonicera xylosteum*	Insufficient data to evaluate
Great watercress, great yellow-cress	*Rorippa amphibia*	Insufficient data to evaluate
Japanese fuki	*Petasites japonicus*	Insufficient data to evaluate
Wall lettuce	*Mycelis muralis*	Insufficient data to evaluate

**Plant regulated by the Do Not Sell list, Horticulture Program, DACF*

***Aquatic plant regulated by Maine DEP*

CATCH BASIN BASKET CONSTRUCTION MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	**FREQUENCY**	**MAINTENANCE REQUIREMENTS**
-Check for damage to basket -Remove sediment from basket	Within 24 hours of rainfall, Daily during extended rainfall	*-Repair basket as necessary to prevent particles from reaching drainage system, or to prevent flooding.* *-Empty basket after every storm, or if clogged.*

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	**INSPECTOR CONTACT INFO**
DATE OF INSPECTION	**REASON FOR INSPECTION** ☐LARGE STORM EVENT ☐PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? ☐YES ☐NO	**DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE**
DATE OF MAINTENANCE	**PERFORMED BY**
NOTES	

CLOSED DRAINAGE STRUCTURE LONG-TERM MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	**FREQUENCY**	**MAINTENANCE REQUIREMENTS**
-Outlet Control Structures *-Drain Manholes* *-Catch Basins*	Every other Month	*Check for erosion or short-circuiting* *Check for sediment accumulation* *Check for floatable contaminants*
-Drainage Pipes	1 time per 2 years	*Check for sediment accumulation/clogging, or soiled runoff.* *Check for erosion at outlets.*

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	**INSPECTOR CONTACT INFO**
DATE OF INSPECTION	**REASON FOR INSPECTION** ☐LARGE STORM EVENT ☐PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? ☐YES ☐NO	**DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE**
DATE OF MAINTENANCE	**PERFORMED BY**
NOTES	

PERMEABLE PAVER LONG-TERM MAINTENANCE SHEET

INSPECTION REQUIREMENTS		
ACTION TAKEN	**FREQUENCY**	**MAINTENANCE REQUIREMENTS**
-Inspect pavement surface for the occurrence of sediment, trash, debris, or structural damage. *-Check pavement for surface ponding*	Frequently in first few months following construction, Bi-annually after	*-Ensure that sediments do not enter and plug pavement. Remove sediments, trash, and debris, as necessary.* *-Repair outlet structures and appurtenances, as necessary.* *-Vacuum pavement at least twice annually.* *-Prevent vehicles with muddy wheels from accessing permeable pavement.*
-No winter sanding permitted *-Minimize application of salt*	Continuous practice	

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	**INSPECTOR CONTACT INFO**
DATE OF INSPECTION	**REASON FOR INSPECTION** ☐LARGE STORM EVENT ☐PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? ☐YES ☐NO	**DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE**
DATE OF MAINTENANCE	**PERFORMED BY**
NOTES	

STABILIZED CONSTRUCTION ENTRANCE CONSTRUCTION MAINTENANCE SHEET

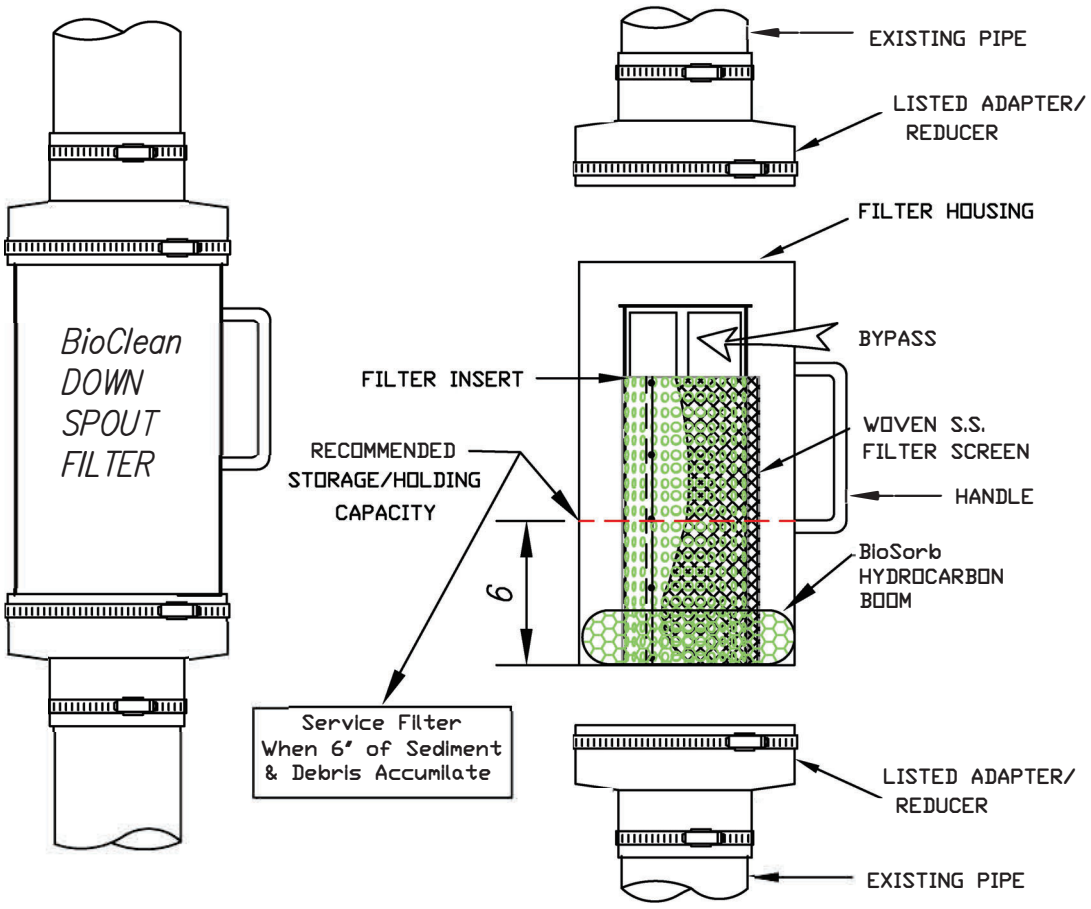
INSPECTION REQUIREMENTS		
ACTION TAKEN	**FREQUENCY**	**MAINTENANCE REQUIREMENTS**
ENTRANCE SURFACE *-Check for sediment accumulation/clogging of stone* *-Check Vegetative filter strips*	After heavy rains, as necessary	*-Top dress pad with new stone.* *-Replace stone completely if completely clogged.* *-Maintain vigorous stand of vegetation.*
WASHING FACILITIES (if applicable) *-Monitor Sediment Accumulation*	As often as necessary	*-Remove Sediments from traps.*

MAINTENANCE LOG	
PROJECT NAME	
INSPECTOR NAME	**INSPECTOR CONTACT INFO**
DATE OF INSPECTION	**REASON FOR INSPECTION** ☐LARGE STORM EVENT ☐PERIODIC CHECK-IN
IS CORRECTIVE ACTION NEEDED? ☐YES ☐NO	**DESCRIBE ANY PROBLEMS, NEEDED MAINTENANCE**
DATE OF MAINTENANCE	**PERFORMED BY**
NOTES	

SERVICE MANUAL

(Cleaning Procedures)

Bio Clean DOWNSPOUT FILTER
Screen Type With Hydrocarbon Boom



DETAIL OF PARTS

TOOLS AND EQUIPMENT NEEDED:

1. Medium size flat scred driver
2. BioSorb hydrocarbon boom. 25-1/2" X 2" dia.
   (Call Bio Clean to order)
3. Trash container or bag
4. Wooden dowel approx. 3' x 1/2' dia.

Bio Clean
A Forterra Company

P.O. BOX 869, Oceanside, Ca. 92049
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www.biocleanenvironmental.net

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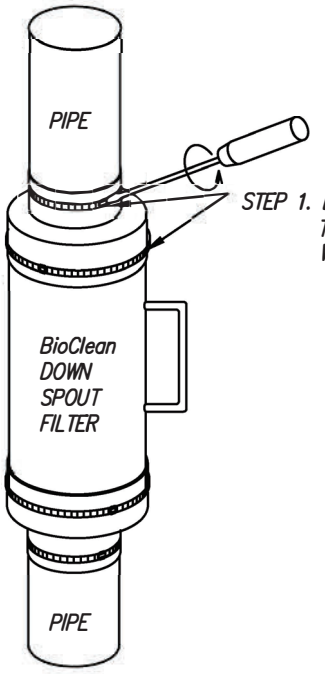
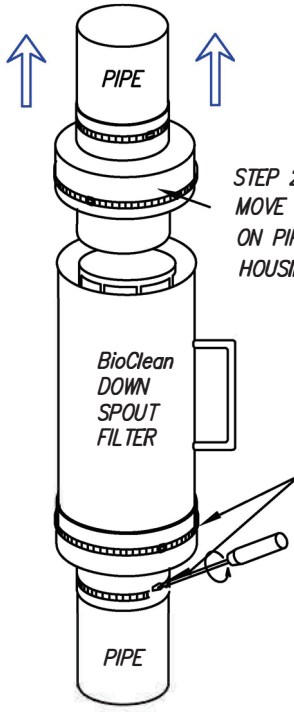
REMOVING FILTER



STEP 1. LOOSEN BOTH TOP CLAMPS WITH SCREW DRIVER.

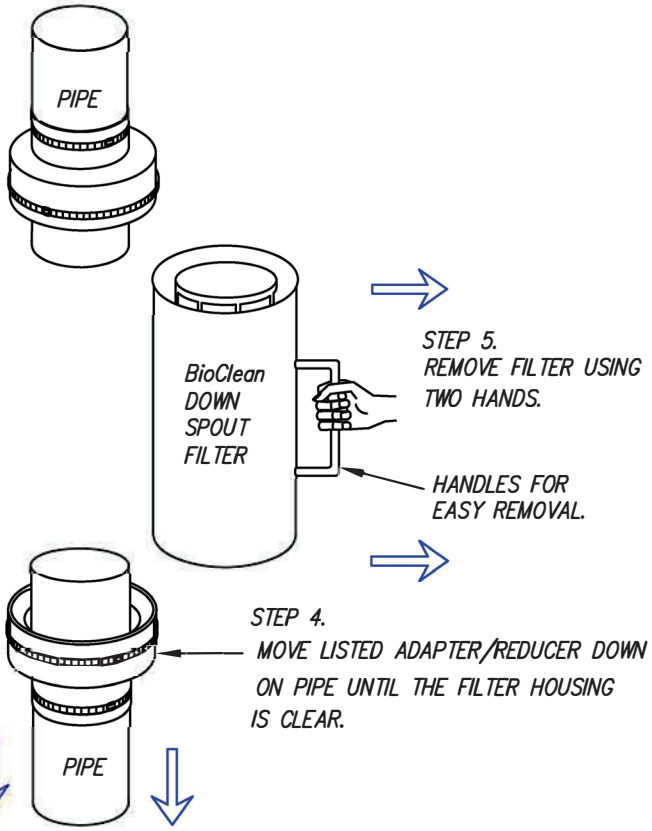


STEP 2.
MOVE LISTED ADAPTER/REDUCER UP ON PIPE UNTIL THE FILTER HOUSING IS CLEAR TO REMOVE.

STEP 3.
LOOSEN BOTH BOTTOM CLAMPS WITH SCREW DRIVER.

(STEP 4. AT BOTTOM LEFT OF PAGE)

CLEANING FILTER

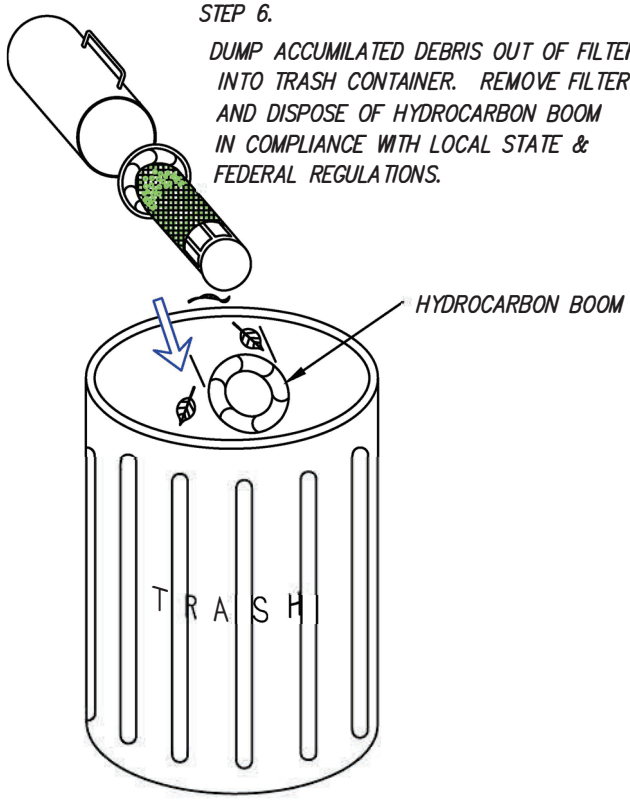


STEP 5.
REMOVE FILTER USING TWO HANDS.

HANDLES FOR EASY REMOVAL.

STEP 4.
MOVE LISTED ADAPTER/REDUCER DOWN ON PIPE UNTIL THE FILTER HOUSING IS CLEAR.

STEP 6.
DUMP ACCUMILATED DEBRIS OUT OF FILTER INTO TRASH CONTAINER. REMOVE FILTER INSERT AND DISPOSE OF HYDROCARBON BOOM IN COMPLIANCE WITH LOCAL STATE & FEDERAL REGULATIONS.



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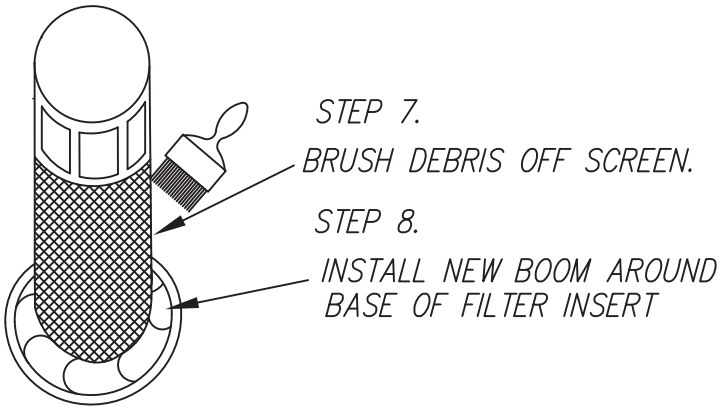
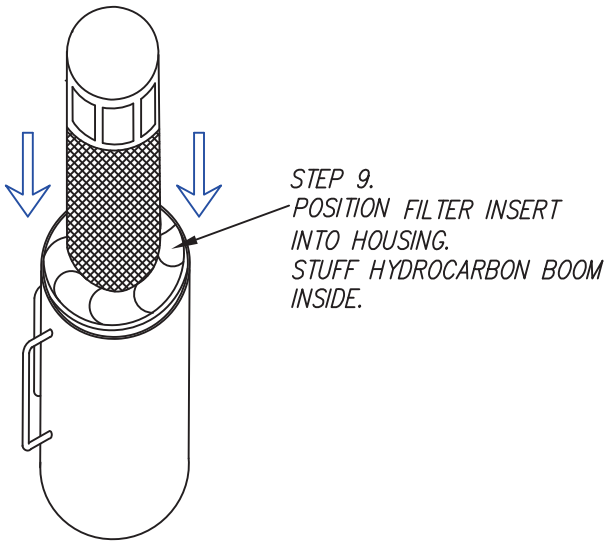
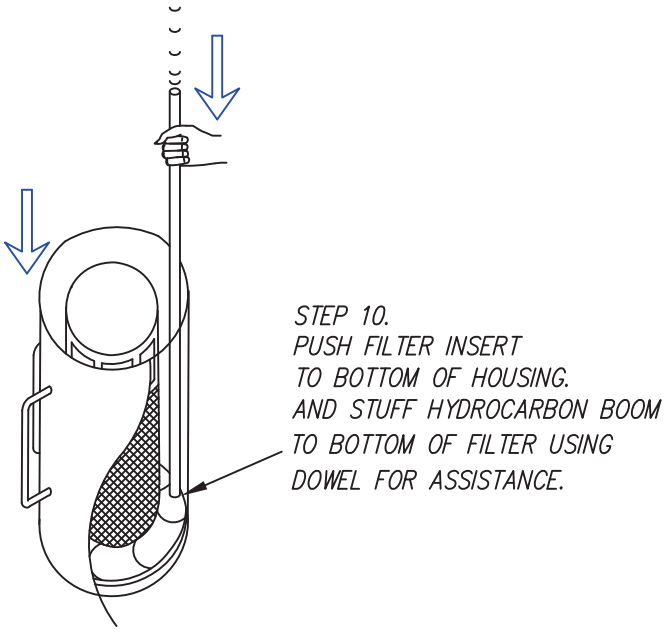


REPLACING FILTER INSERT





REPLACING FILTER

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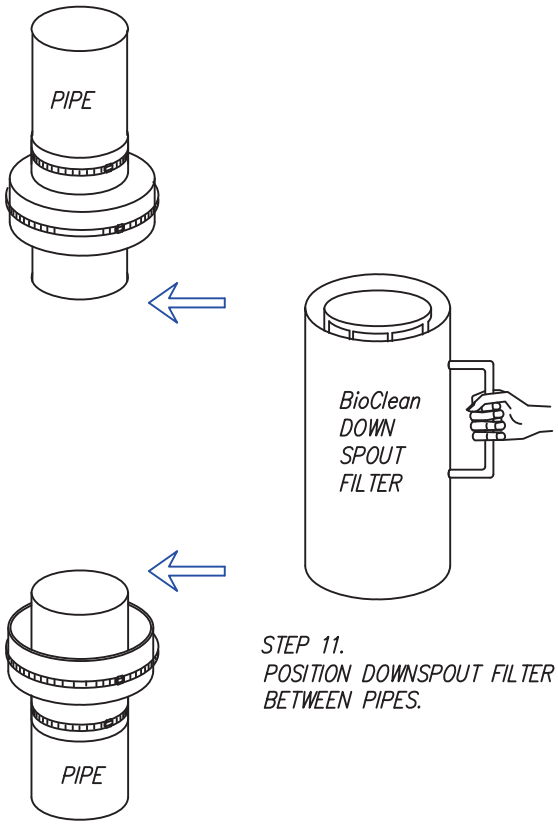
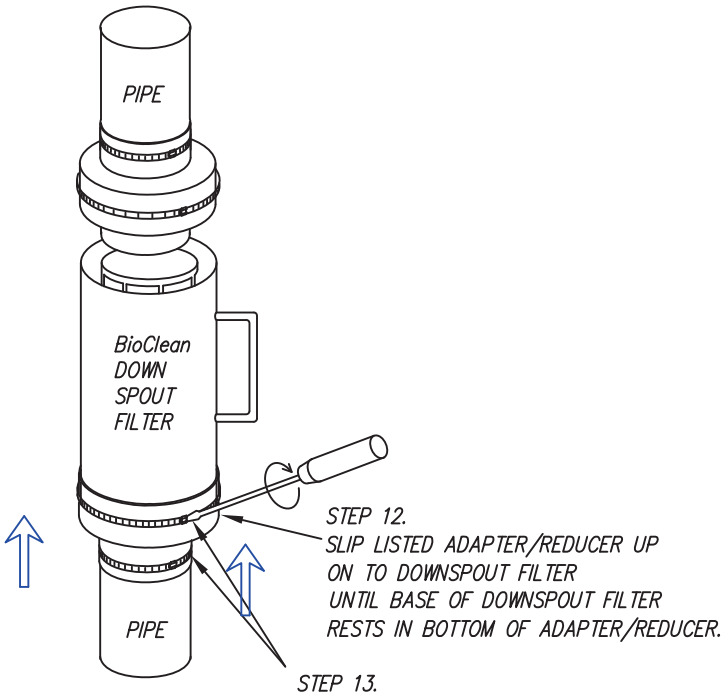
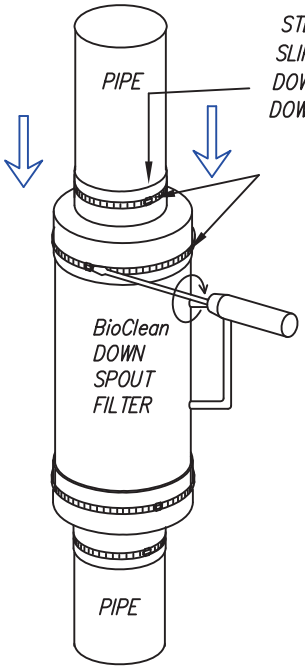


STEP 11.
POSITION DOWNSPOUT FILTER
BETWEEN PIPES.



STEP 12.
SLIP LISTED ADAPTER/REDUCER UP
ON TO DOWNSPOUT FILTER
UNTIL BASE OF DOWNSPOUT FILTER
RESTS IN BOTTOM OF ADAPTER/REDUCER.

STEP 13.
SECURE BY TIGHTENING
BOTH CLAMPS.



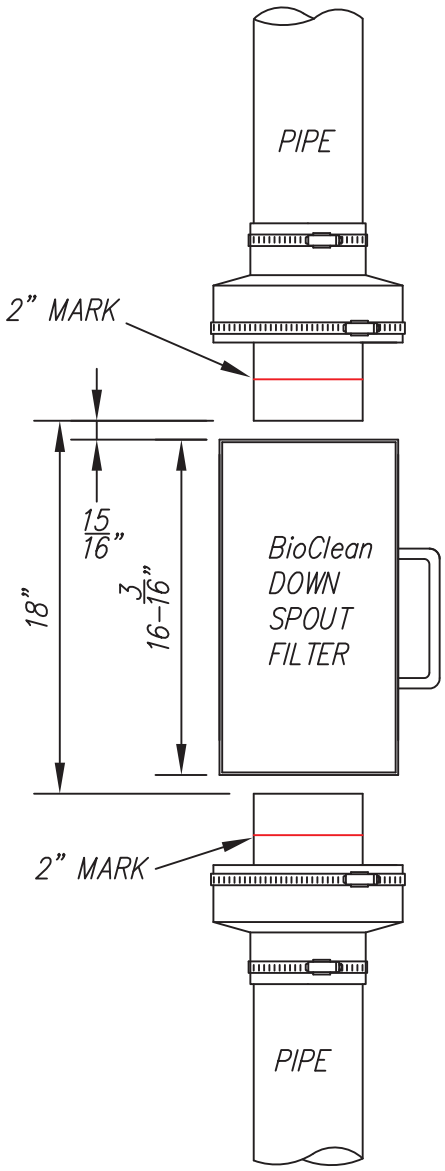
STEP 14.
SLIP LISTED ADAPTER/REDUCER
DOWNWARD ON TO
DOWNSPOUT FILTER.

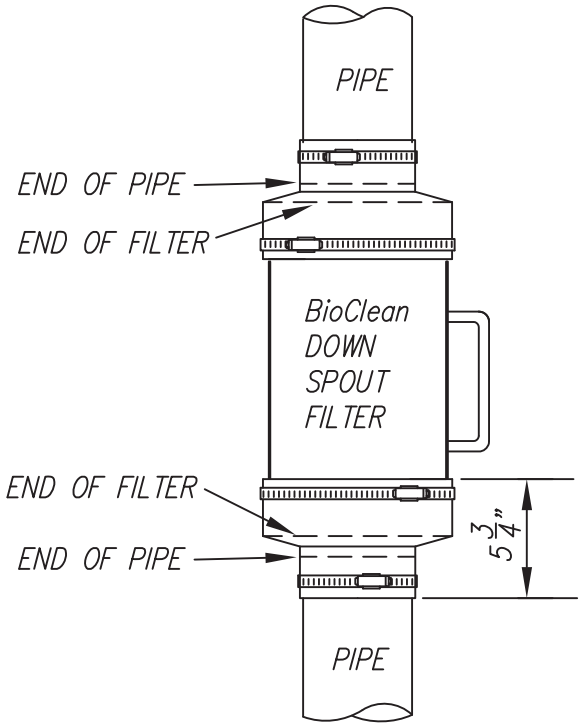
STEP 15.
SECURE BY TIGHTENING
BOTH CLAMPS
WITH SCREWDRIVER.

ENSURE CLAMPS
ARE PROPERLY TIGHTENED.
SERVICE COMLPLETE.

APPROPRIATE INSTALLATION

FILTER CENTERED BETWEEN PIPES WITH EVEN GAPS ON TOP AND BOTTOM





NOTE: GAP BETWEEN PIPE AND FILTER SHOULD BE 15/16" BOTH TOP AND BOTTOM

BioClean
A Forterra Company

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CONTECH®
ENGINEERED SOLUTIONS

Jellyfish® Filter
Stormwater Treatment

The experts you need to solve your stormwater challenges

Contech is the leader in stormwater solutions, helping engineers, contractors and owners with infrastructure and land development projects throughout North America.

With our responsive team of stormwater experts, local regulatory expertise and flexible solutions, Contech is the trusted partner you can count on for stormwater management solutions.

Your Contech Team

STORMWATER CONSULTANT

It's my job to recommend the best solution to meet permitting requirements.

STORMWATER DESIGN ENGINEER

I work with consultants to design the best approved solution to meet your project's needs.

REGULATORY MANAGER

I understand the local stormwater regulations and what solutions will be approved.

SALES ENGINEER

I make sure our solutions meet the needs of the contractor during construction.

Contech is your partner in stormwater management solutions

Setting new standards in Stormwater Treatment – Jellyfish® Filter

The Jellyfish Filter has been tested in the field and laboratory, and has received approval from numerous stormwater regulatory agencies.

The Jellyfish Filter is a stormwater quality treatment technology featuring high flow pretreatment and membrane filtration in a compact stand-alone system. Jellyfish removes floatables, trash, oil, debris, TSS, fine silt-sized particles, and a high percentage of particulate-bound pollutants; including phosphorus, nitrogen, metals and hydrocarbons. The high surface area membrane cartridges, combined with up-flow hydraulics, frequent, passive backwashing, and rinseable/ reusable cartridges ensure long-lasting performance.

Jellyfish® Filter

How the Jellyfish® Filter Treats Stormwater

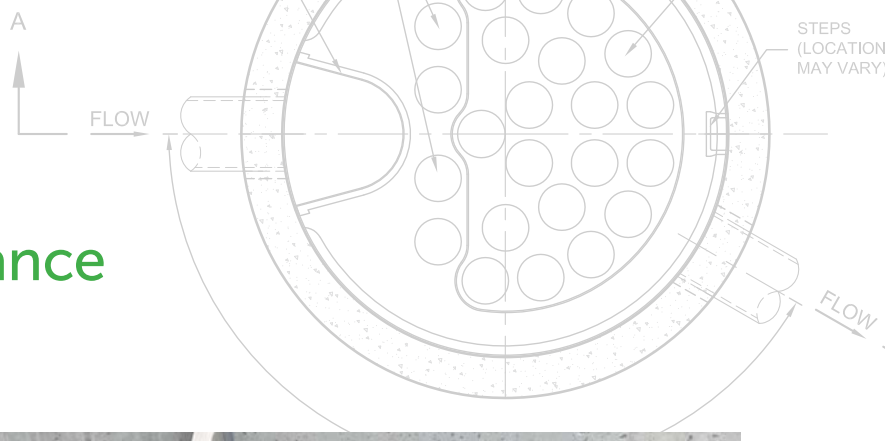
Tested in the field and laboratory ...

- Stormwater enters the Jellyfish through the inlet pipe and traps floating pollutants behind the maintenance access wall and below the cartridge deck.
- Water is conveyed below the cartridge deck where a separation skirt around the cartridges isolates oil, trash and debris outside the filtration zone.
- Water is directed to the filtration zone and up through the top of the cartridge where it exits via the outlet pipe.
- The membrane filters provide a very large surface area to effectively remove fine sand and silt-sized particles, and a high percentage of particulate-bound pollutants such as nitrogen, phosphorus, metals, and hydrocarbons while ensuring long-lasting treatment.
- As influent flow subsides, the water in the backwash pool flows back into the lower chamber. This passive backwash extends cartridge life.
- The draindown cartridge(s) located outside the backwash pool enables water levels to balance.

Jellyfish® Filter Standard Configuration

Learn More:
www.ContechES.com/jellyfish

Pretreat bioretention or infiltration with Jellyfish to extend service life.



Jellyfish® Filter Performance Testing Results

APPLICATION TIPS

- The Peak Diversion Jellyfish provides treatment and high-flow bypass in one structure, eliminating the need for a separate bypass structure.
- LID and GI are complemented by filtration solutions, as they help keep sites free from fine sediments that can impede performance, remove unsightly trash, and provide a single point of maintenance.
- Selecting a filter with a long maintenance cycle and low maintenance cost will result in healthy waterways and happy property owners.

The pleated tentacles of the Jellyfish® Filter provide a large surface area for pollutant removal.

POLLUTANT OF CONCERN	% REMOVAL
Total Trash	99%
Total Suspended Solids (TSS)	89%
Total Phosphorus (TP)	59%
Total Nitrogen (TN)	51%
Total Copper (TCu)	> 50%
Total Zinc (TZn)	> 50%

Sources:
TARP II Field Study – 2012 JF 4-2-1 Configuration
MRDC Floatables Testing – 2008 JF6-6-1 Configuration

Jellyfish® Filter Features and Benefits

FEATURE	BENEFITS
High surface area membrane filtration	Low flux rate promotes cake filtration and slows membrane occlusion
High design treatment flow rate per cartridge (up to 80 gpm (5 L/s))	Compact system with a small footprint, lower construction cost
Low driving head (typically 18 inches or less (457 mm))	Design flexibility, lower construction cost
Lightweight cartridges with passive backwash	Easy maintenance and low life-cycle cost

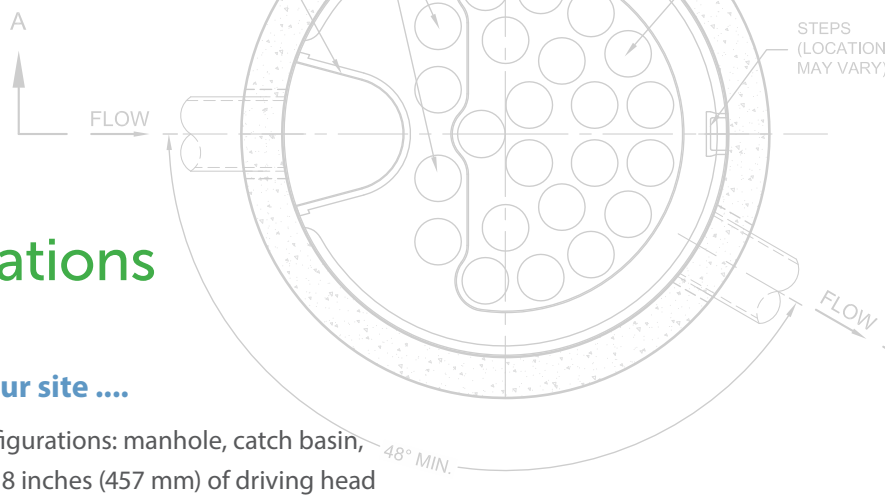
The Jellyfish Filter can be configured in a manhole, catch basin, or vault.

Select Jellyfish® Filter Certifications and Verifications

The Jellyfish Filter has been reviewed by numerous state and federal programs, including:

- Washington State Department of Ecology (TAPE) GULD – BASIC, Phosphorus
- Virginia Department of Environmental Quality (VA DEQ)
- Texas Commission of Environmental Quality (TCEQ)
- Canada ISO 14034 Environmental Management – Environmental Technology Verification (ETV)
- Philadelphia Water District (PWD)
- Maryland Department of the Environment (MD DOE)

Field tested and performance verified

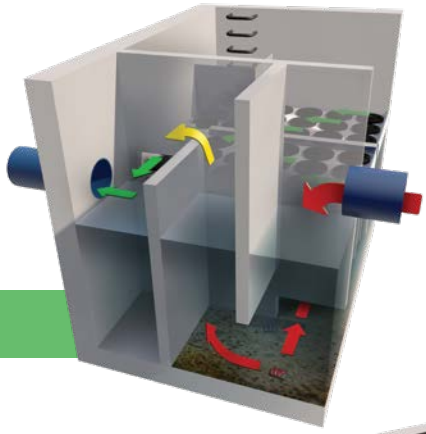


Jellyfish® Filter Configurations

Multiple system configurations to optimize your site ....

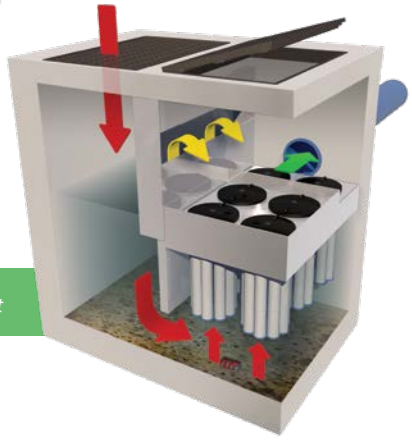
The Jellyfish Filter can be manufactured in a variety of configurations: manhole, catch basin, vault, fiberglass tank, or custom configurations. Typically, 18 inches (457 mm) of driving head is designed into the system. For low drop sites, the designed driving head can be less.

Manhole



Vault

Curb Inlet



Grated Inlet

Jellyfish® Filter Maintenance

- Jellyfish Filter cartridges are light weight and reusable
- Maintenance of the filter cartridges is performed by removing, rinsing and reusing the cartridge tentacles.
- Vacuum extraction of captured pollutants in the sump is recommended at the same time.
- Full cartridge replacement intervals differ by site due to varying pollutant loading and type, and maintenance frequency. Replacement is anticipated every 2-5 years.
- Contech® has created a network of Certified Maintenance Providers to provide maintenance on stormwater BMP's.

The Jellyfish® Filter tentacle is light and easy to clean.

A partner you can rely on

STORMWATER SOLUTIONS

PIPE SOLUTIONS

STRUCTURES SOLUTIONS

Few companies offer the wide range of high-quality stormwater resources you can find with us — state-of-the-art products, decades of expertise, and all the maintenance support you need to operate your system cost-effectively.

THE CONTECH WAY

Contech® Engineered Solutions provides innovative, cost-effective site solutions to engineers, contractors, and developers on projects across North America. Our portfolio includes bridges, drainage, erosion control, retaining wall, sanitary sewer and stormwater management products.

TAKE THE NEXT STEP

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STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PAUL R. LEPAGE
GOVERNOR

PATRICIA W. AHO
COMMISSIONER

January 21, 2015

CONTECH Engineered Solutions LLC
71 US Route 1, Suite F
Scarborough, ME 04074
ATTN: Derek Berg

Dear Mr. Berg:

This letter is to inform you that the Department of Environmental Protection (Department) will review and approve, on a case-by-case basis, applicants' requests to use the Jellyfish Filter, manhole or vault housing, a cartridge deck supporting membrane filtration cartridges, as a low flow rate filter meeting the requirements of the General Standards (Section 4.B.) of the Stormwater Management Rules (Chapter 500) when sized, installed and maintained in accordance with the following provisions:

1. The Jellyfish Filter must be sized in accordance with the tested hydraulic loading rate, and is approved for a maximum rate of 80 gallons per minute (gpm) for each 54-inch long membrane filter cartridge (1.48 gpm per inch of cartridge length). The structure must include at least one draindown cartridge, which is approved for a hydraulic loading rate of 40 gpm per 54" cartridge (0.74 gpm per inch of cartridge length).
2. Upstream storage must be provided for the water quality/channel protection volume (WQv) consisting of the first 1.0 inch of runoff from impervious areas and 0.4 inch of runoff from lawns and landscaped areas. The WQv should be hydraulically isolated from any additional storage provided onsite by weirs or other means so that only the WQv is routed through the Jellyfish Filter. Additionally, the WQv must be detained for a minimum of 24 hours and a maximum of 48 hours (emptying time). Storage can typically be provided in an underground facility such as corrugated metal pipe, polypropylene chambers, concrete vaults or similar means.
3. All storage systems must include sufficient maintenance access for the removal of accumulated sediment and debris. It is desirable that a pretreatment structure be located upstream of the WQv storage to facilitate capture of coarse solids and trash.
4. The Jellyfish Filter must be delivered to the site and installed under the supervision of the manufacturer's representative.
5. The system must be inspected at least once every six months, and the filters maintained yearly per the manufacturer's guidelines to maintain the established efficiency for pollutant removal. A five-year binding inspection and maintenance contract must be provided prior to review and approval by the Department, and must be renewed before contract expiration.
6. The overall stormwater management design must meet all Department criteria and sizing specifications and shall be reviewed and approved by the Department prior to use.
7. Review and approval by the manufacturer for the proposed use and sizing of the Jellyfish Filter at each specific project is required to ensure conformance with the manufacturer's design specifications.

8. This approval is conditional to on-the-ground experience confirming that the Jellyfish Filter's pollutant removal efficiency and sizing are appropriate. The "permit shield" provision (Section 14) of the Chapter 500 rules will apply, and the Department will not require the replacement of the system if pollutant removals do not satisfy the General Standard Best Management Practices.

We look forward to working with you as these stormwater management structures are installed on new projects. And, we hope that this stormwater BMP will be included in our manual in the near future.

Questions concerning this decision should be directed to Marianne Hubert at (207) 215-6485 or Jeff Dennis at (207) 215-6376.

Sincerely,

Mark Bergeron, P.E.
Director, Division of Land Resource Regulation
Bureau of Land & Water Quality

C: Don Witherill, Maine DEP

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Jellyfish® Filter JF4-2-1

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

August 3, 2017
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

Technology description and application

The Jellyfish® Filter is an engineered stormwater quality treatment technology designed to remove a variety of stormwater pollutants including floatable trash and debris, oil, coarse and fine suspended sediments, and particulate-bound pollutants such as nutrients, heavy metals, and hydrocarbons. The Jellyfish Filter combines gravitational pre-treatment (sedimentation and floatation) and membrane filtration in a single compact structure. The system utilizes membrane filtration cartridges comprised of multiple pleated filter elements ("filtration tentacles") that provide high filtration surface area with the associated advantages of high flow rate, high sediment capacity, and low filtration flux rate.

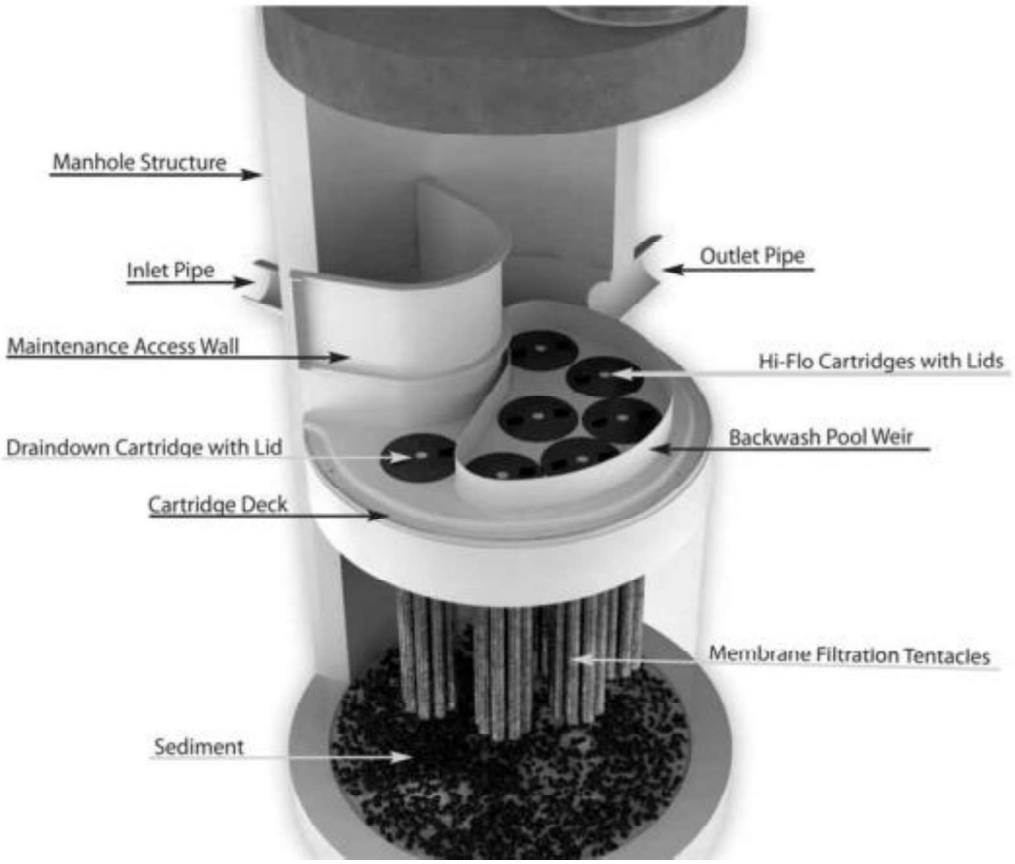

Figure 1. Cut-away graphic of a Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge

Figure 1 depicts a cut-away graphic of a typical 6-ft diameter Jellyfish® Filter manhole with 6 hi-flo cartridges and 1 draindown cartridge (JF6-6-1). Stormwater influent enters the system through the inlet pipe and builds a pond behind the maintenance access wall, with the pond elevation providing driving head. Flow is channeled downward into the lower chamber beneath the cartridge deck. A flexible separator skirt (not shown in the graphic) surrounds the filtration zone where the filtration tentacles of each cartridge are suspended, and the volume between the vessel wall and the outside surface of the separator skirt comprises a pretreatment channel. As flow spreads throughout the pretreatment channel, floatable pollutants accumulate at the surface of the pond behind the maintenance access wall and also beneath the cartridge deck in the pretreatment channel, while coarse sediments settle to the sump. Flow proceeds under the separator skirt and upward into the filtration zone, entering each filtration tentacle and depositing fine suspended sediment and associated particulate-bound pollutants on the outside surface of the membranes. Filtered water proceeds up the center tube of each tentacle, with the flow from each tentacle combining under the cartridge lid, and discharging to the top of the

cartridge deck through the cartridge lid orifice. Filtered effluent from the hi-flo cartridges enters a pool enclosed by a 15-cm high weir, and if storm intensity and resultant driving head is sufficient, filtered water overflows the weir and proceeds across the cartridge deck to the outlet pipe. Filtered effluent discharging from the draindown cartridge(s) passes directly to the outlet pipe, and requires only a minimal amount of driving head (2.5 cm) to provide forward flow. As storm intensity subsides and driving head drops below 15 cm, filtered water within the backwash pool reverses direction and passes backward through the hi-flo cartridges, and thereby dislodges sediment from the membranes which subsequently settles to the sump below the filtration zone. During this passive backwashing process, water in the lower chamber is displaced only through the draindown cartridge(s). Additional self-cleaning processes include gravity, as well as vibrational pulses emitted when flow exits the orifice of each cartridge lid, and these combined processes significantly extend the cartridge service life and maintenance cleaning interval. Sediment removal from the sump by vacuum is required when sediment depths reach 30 cm, and cartridges are typically removed, externally rinsed, and recommissioned on an annual basis, or as site-specific maintenance conditions require. Filtration tentacle replacement is typically required every 3 – 5 years.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from a field monitoring program conducted on a Jellyfish® Filter JF4-2-1 (4-ft diameter manhole with 2 hi-flo cartridges and 1 draindown cartridge), in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009). Testing was completed by researchers led by Dr. John Sansalone at the University of Florida's Engineering School of Sustainable Infrastructure and Environment. The drainage area providing stormwater runoff to the test unit varied between 502 m^2 and 799 m^2 (5400 ft^2 to 8600 ft^2) depending on storm intensity and wind direction. The unit was monitored for a total of 25 TARP qualifying storm events (i.e. $\geq$ 2.5 mm of rainfall) contributing cumulative rainfall of 381 mm (15 in) over the 13-month period between May 28, 2010 and June 27, 2011. Only TARP-qualified storms were routed through the unit, and maintenance was not required during the testing period based on sediment accumulation less than the depth indicated for maintenance, and also based on hydraulic testing performed on the system after the conclusion of monitoring.

Table 1 shows the specified and achieved amended TARP criteria for storm selection and sampling.
Table 2 shows the observed ranges of operational conditions that occurred over the testing period.

Table 1. Specified and achieved amended TARP criteria for storm selection and sampling

Description	Criteria value	Achieved value
Total rainfall	$\geq$ 2.5 mm (0.1 in)	> 2.5 mm (0.1 in)
Minimum inter-event period	6 hrs	10 hrs
Minimum flow-weighted composite sample storm coverage	70% including as much of the first 20% of the storm	100%
Minimum influent/effluent samples	10, but a minimum of 5 subsamples for composite samples	Minimum of 8 subsamples for composite samples
Total sampled rainfall	Minimum 381 mm (15 in)	384 mm (15.01 in)
Number of storms	Minimum 20	25

Table 2. Observed operational conditions for events monitored over the study period

Operational condition	Observed range
Storm durations	26 – 691 min
Previous dry hours	10 - 910 hrs
Rainfall depth	3 – 50 mm
Initial rainfall to runoff lag time	1 – 34 min
Runoff volume	206 – 13,229 L
Peak rainfall intensity	5 – 137 mm/hr
Peak runoff flow rate	0.5 – 14.3 L/s
Event median flow rate	0.01 – 5.5 L/s

The 4-ft diameter test unit has sedimentation surface area of 1.17 m^2 (12.56 ft^2). Each of the three filter cartridges employed in the test unit uses filtration tentacles of 137 cm (54 in) length, with filter surface area of 35.4 m^2 (381 ft^2) per cartridge, and total filter surface area of 106.2 m^2 (1143 ft^2) for the three cartridges combined. The design treatment flow rate is 5 L/s (80 gal/min) for each of the two hi-flo cartridges and 2.5 L/s (40 gal/min) for the single draindown cartridge, for a total design treatment flow rate of 12.6 L/s (200 gal/min) at design driving head of 457 mm (18 in). This translates to a filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m^2 (0.21 gal/min/ft^2) for each hi-flo cartridge and 0.07 L/s/m^2 (0.11 gal/min/ft^2) for the draindown cartridge. The design flow rate for each cartridge is controlled by the sizing of the orifice in the cartridge lid. The distance from the bottom of the filtration tentacles to the sump is 61 cm (24 in).

Performance claims

The Jellyfish® Filter demonstrated the removal efficiencies indicated in **Table 3** for respective constituents during field monitoring of 25 TARP qualified storm events with cumulative rainfall of 381 mm, conducted in accordance with the provisions of the TARP Tier II Protocol (TARP, 2003) and New Jersey Tier II Stormwater Test Requirements—Amendments to TARP Tier II Protocol (NJDEP, 2009), and using the following design parameters:

- System hydraulic loading rate (system treatment flow rate per unit of sedimentation surface area) of 10.8 L/s/m^2 (15.9 gal/min/ft^2) or lower
- Filtration flux rate (flow rate per unit filter surface area) of 0.14 L/s/m^2 (0.21 gal/min/ft^2) or lower for each hi-flo cartridge and 0.07 L/s/m^2 (0.11 gal/min/ft^2) or lower for each draindown cartridge
- Distance from the bottom of the filtration tentacles to the sump of 61 cm (24 in) or greater
- Driving head of 457 mm (18 in) or greater

Table 3. Mean, median and 95% confidence interval (median) for removal efficiencies of selected stormwater constituents

Parameter	Mean	Median	Median - 95% Lower Limit	Median - 95% Upper Limit
TSS	84.7	85.6	82.8	89.8
SSC	97.5	98.3	97.1	98.7
Total phosphorus	48.8	49.1	43.3	60.1
Total nitrogen	37.9	39.3	31.2	54.6
Zinc	55.3	69	39	75
Copper	83.0	91.7	75.1	98.9
Oil and grease	60.1	60	42.7	100

N.B. As with any field test of stormwater treatment devices, removal efficiencies will vary based on pollutant influent concentrations and other site specific conditions.

Performance results

The frequency of rainfall depths monitored during the study is presented in **Figure 2**. The median and 90th percentile rainfall depths were 11 mm and 31.7 mm, respectively. These values represent the depth of rainfall that is not exceeded in 50 and 90 percent of the monitored rainfall events.

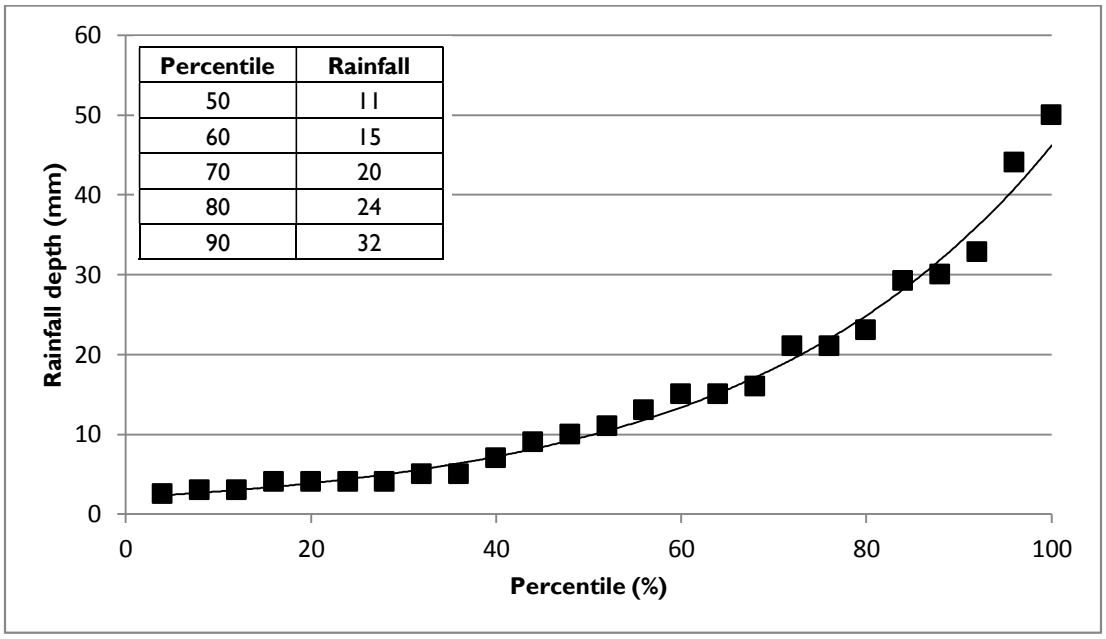

Figure 2. Rainfall depth frequency curve

Sediment removal performance was assessed by measuring the event mean concentration and mass of suspended sediment entering and leaving the unit during runoff events. This involved sampling the full cross-section of influent and effluent flows manually at 2 - 10 minute intervals for the full duration of each storm event and combining discrete samples into flow-weighted composites. Comparing the theoretical mass recovery from the sump calculated by the difference between the influent and effluent mass to the actual dry weight of the recovered sump mass showed an overall mass balance recovery of 94.5% over the study period.

The median d50 particle size (i.e. 50th percentile particle size) of the influent and effluent was 82 and 3 µm, respectively (**Figure 3**). The median influent particles sizes ranged between 22 and 263 µm, whereas median effluent particle sizes ranged between 1 and 11 µm.

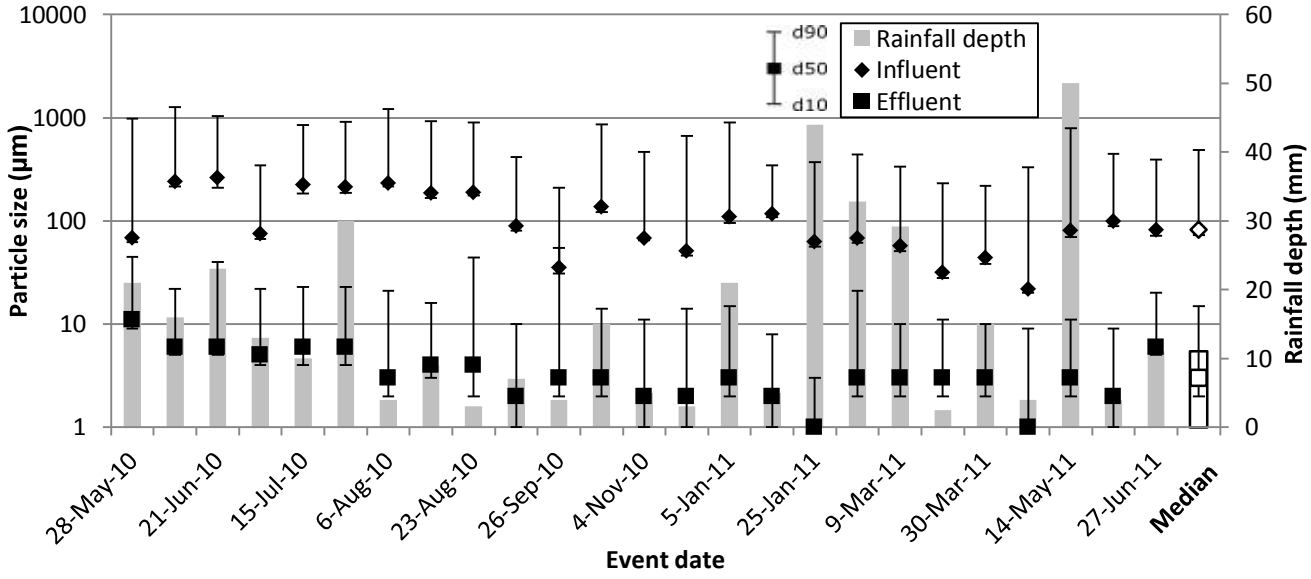

Figure 3. The rainfall depth and d10, d50, and d90 particle sizes of the influent and effluent composite samples for each monitored storm event over the 13-month testing period

Sampling of flows into and out of the Jellyfish Filter over the testing period showed statistically significant reductions ($p < 0.05$; Wilcoxon signed-rank test) in influent event mean concentrations for all selected stormwater constituents (**Table 4** and **Figure 4**). Effluent event mean Suspended Sediment Concentrations (SSC) were below 19 mg/L during all monitored events. Load-based removal rates were also calculated based on the sum of loads over the study period. These removal rages ranged from 46.3 for Total Nitrogen to 98.6 for SSC (**Table 4**).

Table 4. Summary statistics for influent and effluent event mean concentrations for selected constituents

Water Quality Variable	Sampling Location	Min	Max	Median	Range	Mean	SD	Load based removal efficiency (%)
TSS	Influent (mg/L)	16.30	261.00	79.30	244.70	86.26	51.37	87.2
	Effluent (mg/L)	3.20	21.70	11.80	18.50	10.99	4.79	
SSC	Influent (mg/L)	78.20	1401.70	444.50	1323.50	482.26	338.34	98.6
	Effluent (mg/L)	2.80	18.10	7.30	15.30	7.88	3.77	
TP	Influent (µg/L)	887.00	8793.00	3063.00	7906.00	3550.20	1914.50	64.2
	Effluent (µg/L)	472.00	4769.00	1480.00	4297.00	1688.08	1059.98	
TN	Influent (µg/L)	1170.00	10479.00	3110.00	9309.00	3519.32	2161.47	46.3
	Effluent (µg/L)	553.00	6579.00	1610.00	6026.00	2091.76	1613.61	
Zn	Influent (µg/L)	0.005	7600.00	1500.00	7600.00	1792.00	1852.91	76.1
	Effluent (µg/L)	0.005	2760.00	450.00	2760.00	561.64	594.70	
Cu	Influent (µg/L)	0.001	880.40	79.50	880.40	171.28	229.33	92.1
	Effluent (µg/L)	0.001	51.30	6.90	51.30	14.36	17.22	
Oil and Grease	Influent (mg/L)	0.20	4.06	0.93	3.86	1.07	0.82	46.4
	Effluent (mg/L)	0.00	2.32	0.35	2.32	0.50	0.60	

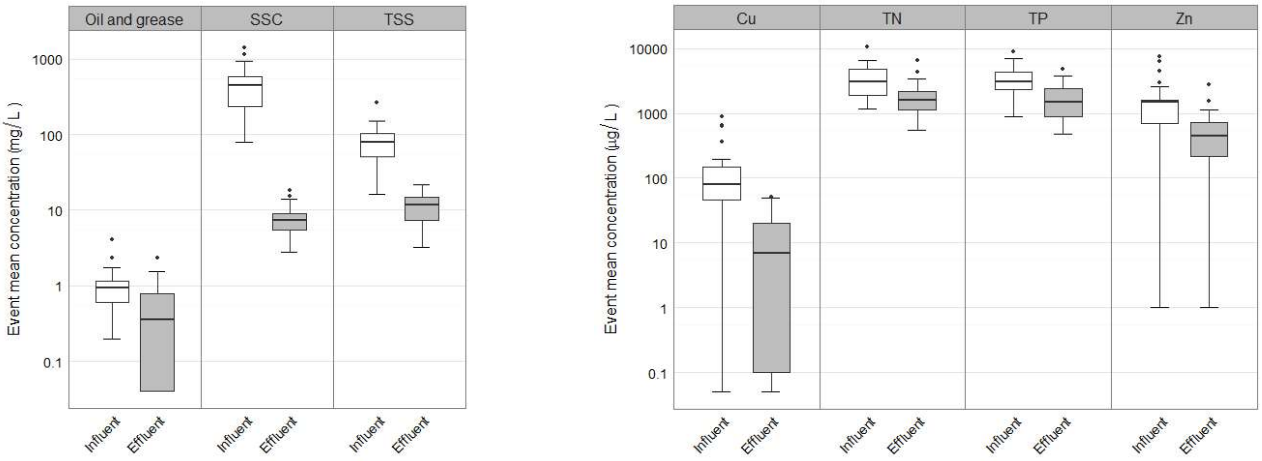

Figure 4. Boxplots showing the distribution of influent and effluent event mean concentrations (EMC) for selected stormwater constituents over the study period

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems to support the performance claim included the performance monitoring report prepared by University of Florida, Engineering School of Sustainable Infrastructure and Environment, and dated November 2011. This report is based on testing completed in accordance with the Technology Acceptance Reciprocity Partnership (TARP) Tier II Protocol (2003) and New Jersey Tier II Stormwater Test Requirements--Amendments to TARP Tier II Protocol (NJDEP, 2009).

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

For more information on the Jellyfish® Filter please contact:

Imbrium Systems, Inc.
407 Fairview Drive
Whitby, ON
L1N 3A9, Canada
Tel: 416-960-9900
info@imbriumsystems.com

For more information on ISO 14034:2016 / ETV please contact:

GLOBE Performance Solutions
World Trade Centre
404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

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:

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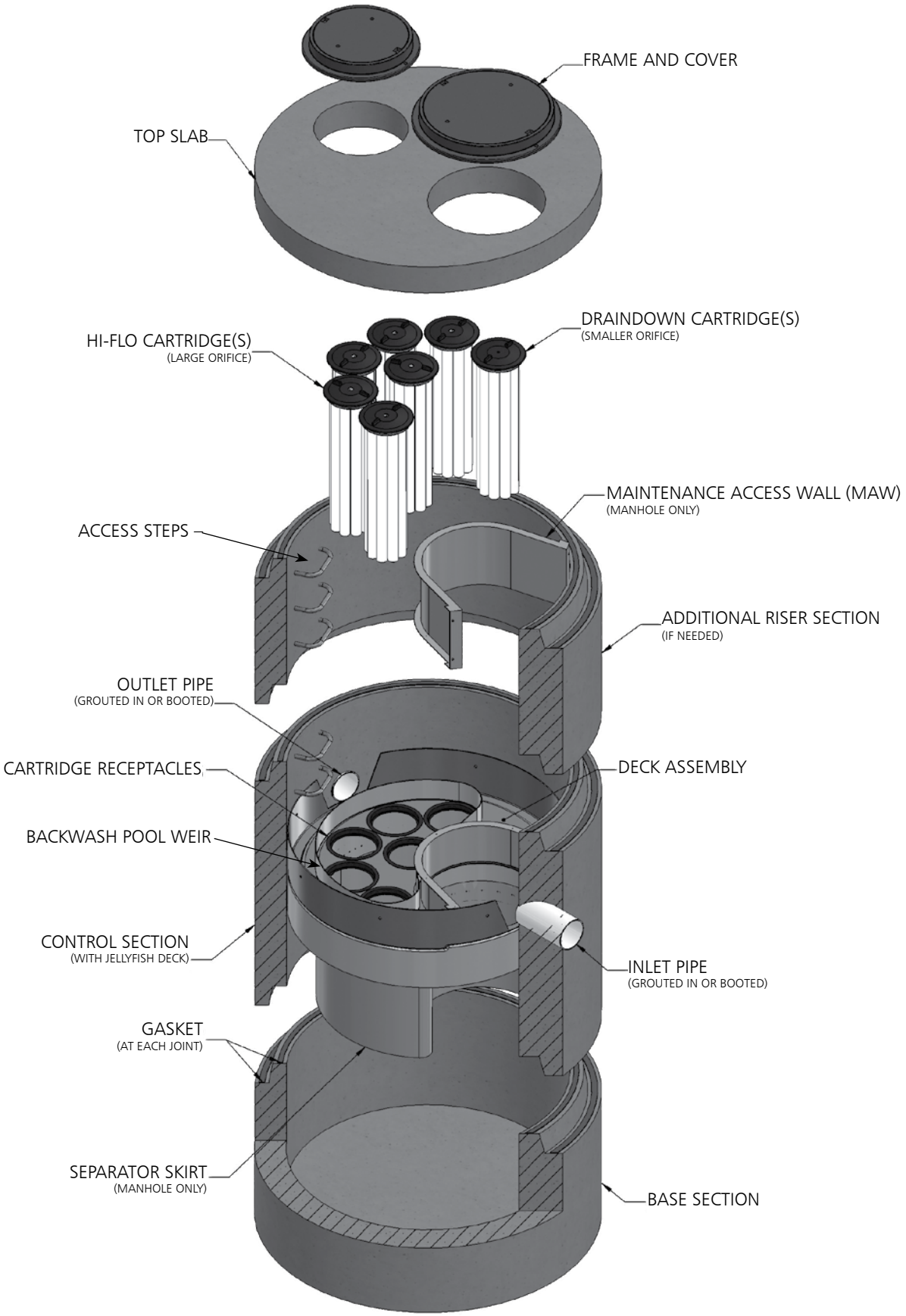

FRAME AND COVER
TOP SLAB
DRAINDOWN CARTRIDGE(S)
(SMALLER ORIFICE)
HI-FLO CARTRIDGE(S)
(LARGE ORIFICE)
MAINTENANCE ACCESS WALL (MAW)
(MANHOLE ONLY)
ACCESS STEPS
ADDITIONAL RISER SECTION
(IF NEEDED)
OUTLET PIPE
(GROUTED IN OR BOOTED)
CARTRIDGE RECEPTACLES
DECK ASSEMBLY
BACKWASH POOL WEIR
CONTROL SECTION
(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.

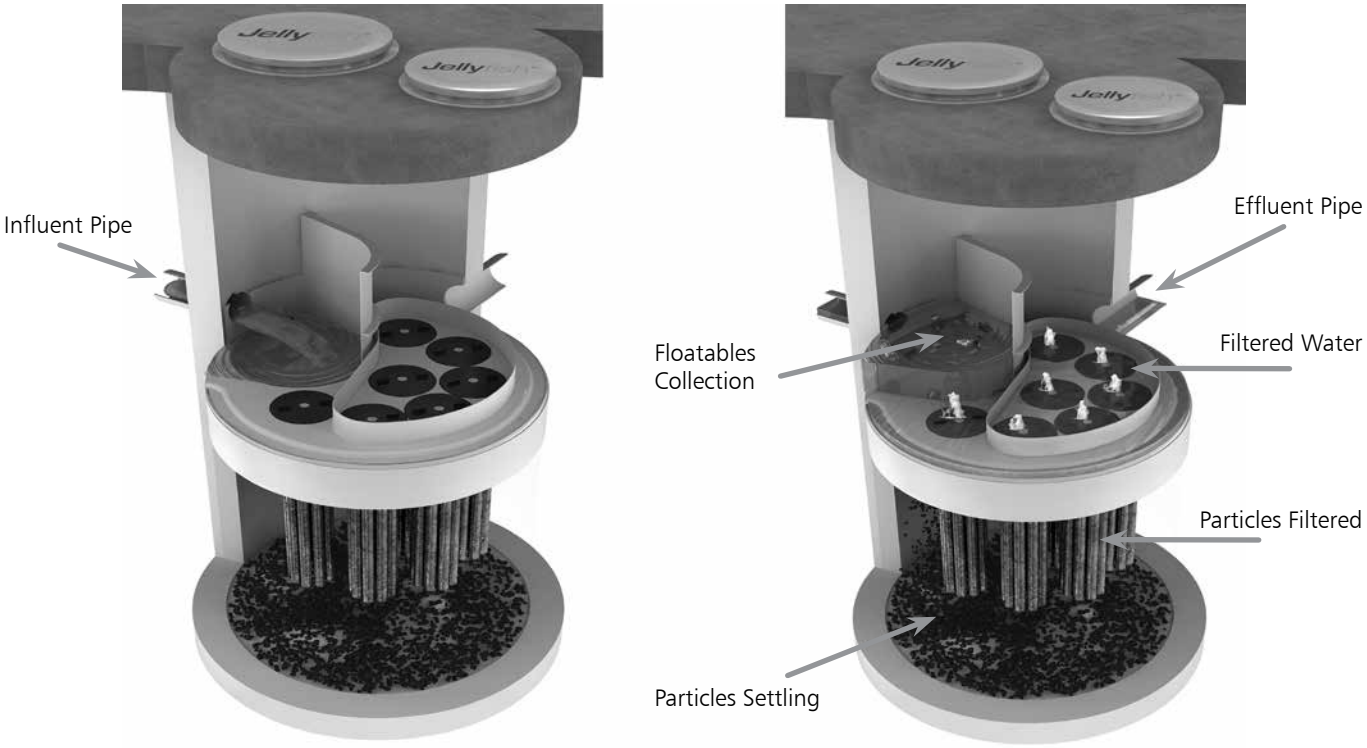
The Jellyfish Filter functions are depicted in Figure 1 below.

FIGURE 1

Jellyfish Filter Treatment Functions

Membrane Filtration

Section View with Maintenance Access Wall (MAW) Cutaway



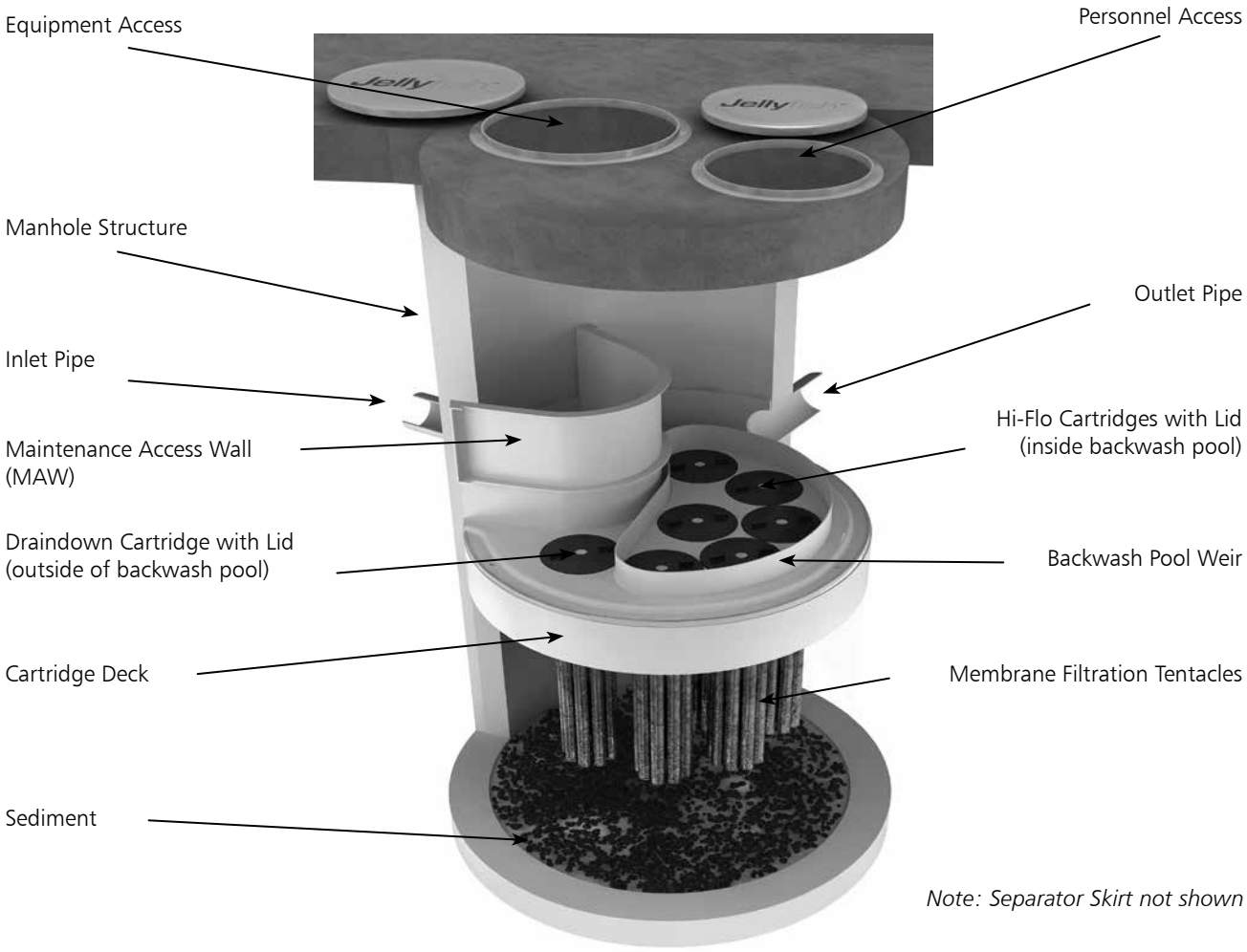
Jellyfish Filter cartridges are backwashed after each peak storm event, which removes accumulated sediment from the membranes. This backwash process extends the service life of the cartridges and increases the time between maintenance events.

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:

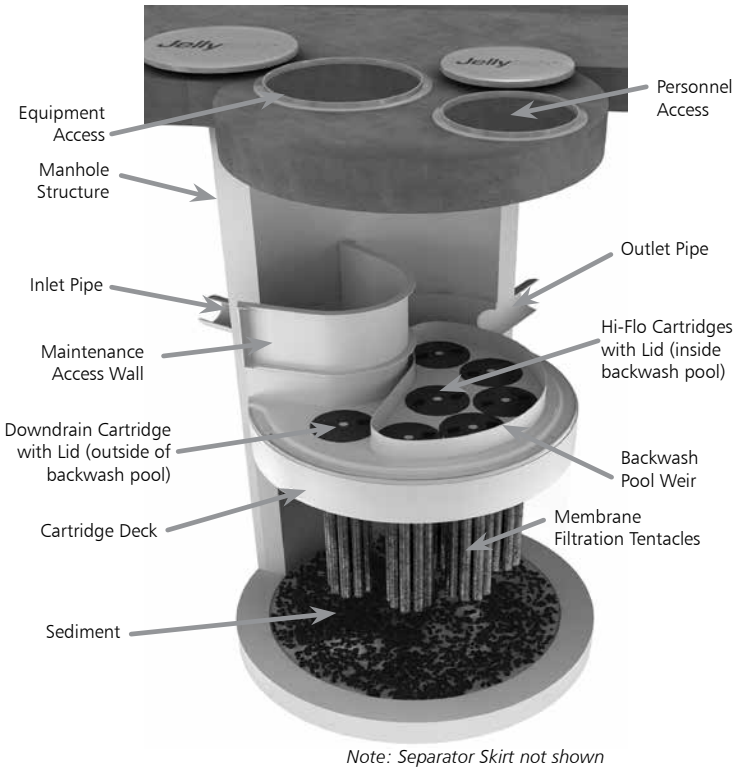
- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW) or inlet bay for vault systems

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:

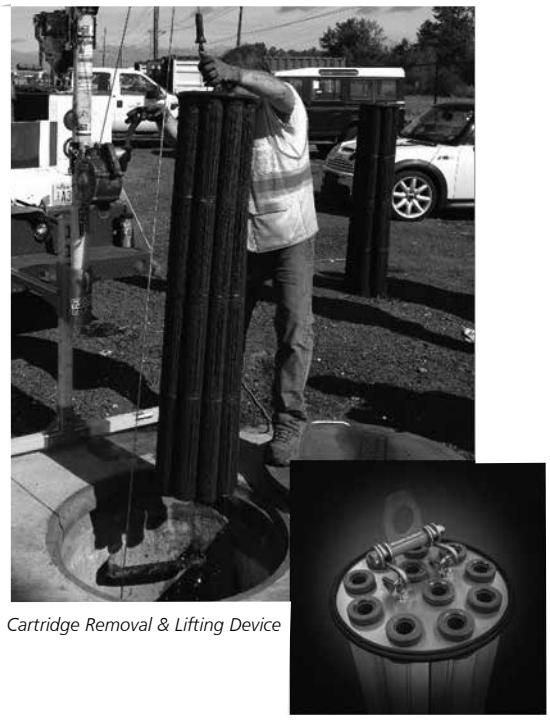
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. *Caution: Dropping objects onto the cartridge deck may cause damage*.
3. Perform Inspection Procedure prior to maintenance activity.
4. 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

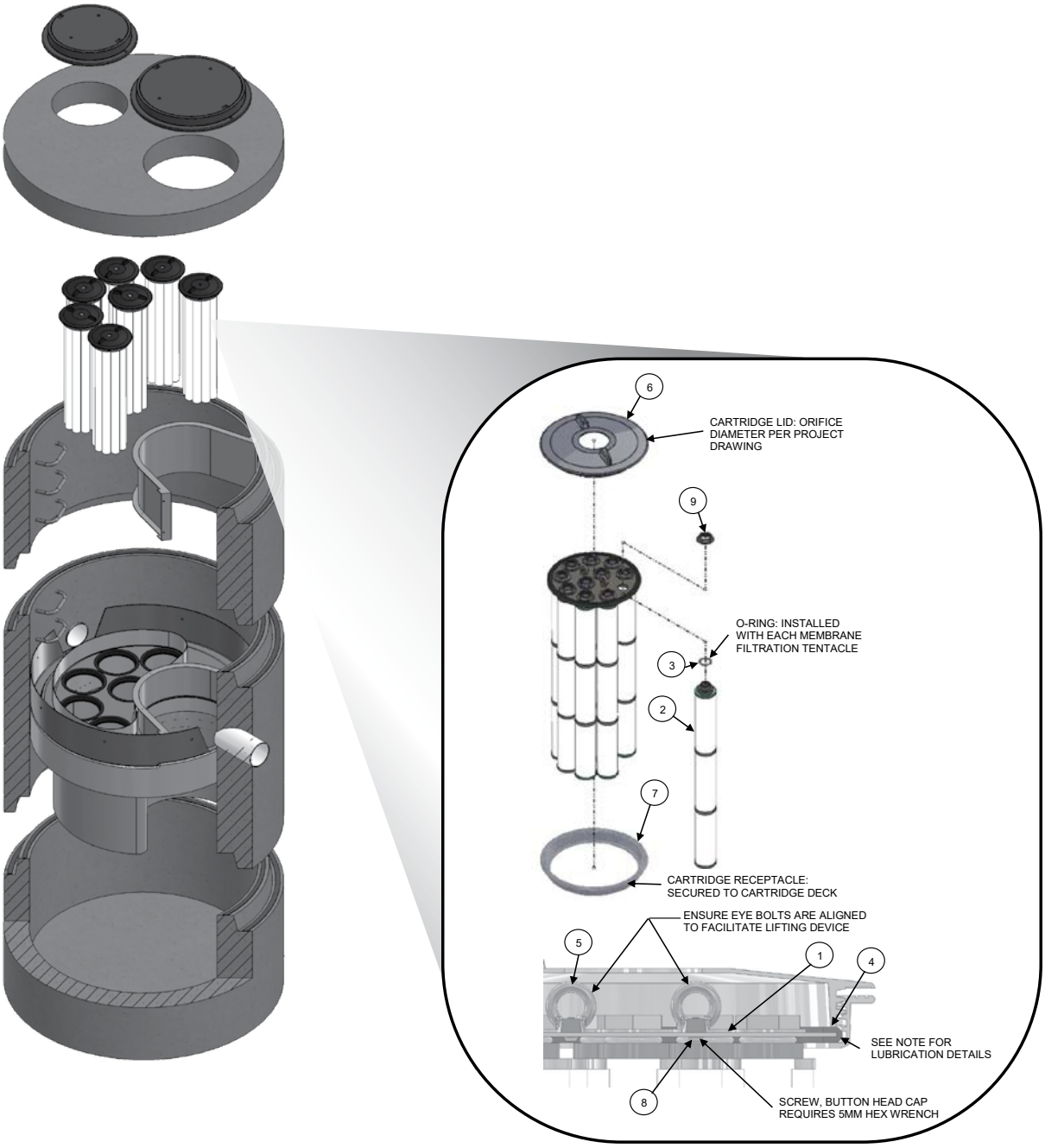


TABLE 1: BOM

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:					

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for York County, Maine

June 15, 2022

Custom Soil Resource Report
Soil Map

Map Scale: 1:886 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: York County, Maine
Survey Area Data: Version 20, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Sep 19, 2021—Nov 1, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UH	Urban land-Hooksan complex, 0 to 8 percent slopes	1.4	58.2%
W	Water bodies	1.0	41.8%
Totals for Area of Interest		**2.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

York County, Maine

UH—Urban land-Hooksan complex, 0 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2x1l1
Elevation: 0 to 50 feet
Mean annual precipitation: 36 to 71 inches
Mean annual air temperature: 39 to 55 degrees F
Frost-free period: 140 to 240 days
Farmland classification: Not prime farmland

Map Unit Composition

Urban land, coastal: 50 percent
Hooksan and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land, Coastal

Setting

Landform: Dunes
Down-slope shape: Linear
Across-slope shape: Linear

Typical profile

M - 0 to 10 inches: cemented material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: 0 inches to manufactured layer
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Frequency of flooding: Rare
Available water supply, 0 to 60 inches: Very low (about 0.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydrologic Soil Group: D
Hydric soil rating: Unranked

Description of Hooksan

Setting

Landform: Dunes
Landform position (two-dimensional): Summit, shoulder, backslope, footslope
Landform position (three-dimensional): Side slope, base slope, crest
Down-slope shape: Convex
Across-slope shape: Linear, convex
Parent material: Sandy eolian deposits

Typical profile

C1 - 0 to 20 inches: sand
C2 - 20 to 30 inches: sand
C3 - 30 to 64 inches: sand

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Very high (14.17 to 99.90 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Maximum salinity: Nonsaline (0.0 to 1.9 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R149BY002MA - Coastal Dunes
Hydric soil rating: No

W—Water bodies

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Water

Setting

Landform: Hills

D. Standards.

(1) The design and performance standards of Chapters 16.8 and 16.9 must be met, except where specifically altered in this subsection.

(2) The following space standards apply.

(a) Minimum land area per dwelling unit: 3,000 square feet.

[1] For each of the first two dwelling units and thereafter: 6,000 square feet.

(b) Minimum lot size: 6,000 square feet.

(c) Minimum street frontage: 50 feet.

(d) Minimum front yard: five feet.

(e) Minimum rear and side yards: 10 feet.

(f) Maximum building height: 40 feet.

(g) Minimum setback from:

[1] Water body and wetland water-dependent uses: zero feet.

[2] All other uses (including buildings and parking): 75 feet unless modified, according to the terms of Subsection E of this section.

(h) Minimum open space on the site: 40%. (NOTE: The Planning Board may reduce the required open space to 30% where it is clearly demonstrated that no practicable alternative exists to accommodate a water-dependent use.)

E. Appropriate waterfront activity incentives. To encourage objectives of the Comprehensive Plan to: 1) provide public access to the waterfront; 2) retain and expand commercial water-dependent uses; and 3) take extraordinary steps to preserve the environmental quality of the shoreline and tidal waters, the required setback from water bodies and wetlands may be reduced to 25 feet where the Planning Board finds a development plan significantly contributes to accomplishment of the above objectives by satisfactorily achieving one or more of the following:

(1) Public access. Grants an easement to the Town, or other acceptable party, providing public access to the waterfront at no charge to the general public via a developed accessible pedestrian route with appropriate signage or includes an outdoor deck or patio for customer seating at a restaurant open to the general public; or

(2) Retain/expand commercial water-dependent uses. Provides for inclusion of commercial water-dependent use(s) on the property for the duration of the portion of the project that encroaches closer

than the normal minimum setback from water bodies and wetlands. Provision of fewer than six boat slips for leisure/recreational boating do not constitute a commercial water-dependent use for the purposes of this section; or

(3) Preserve the environmental quality of coastal resources. Protect existing wildlife habitat, conserve shore cover and ensure the quality of stormwater runoff by satisfying all of the following standards:

(a) Retain and protect existing significant wildlife habitat that provides food, cover and/or nesting for migratory song birds and wading birds;

(b) In order to conserve shore cover, contiguous areas of shrubberies of varying height, such as dwarf species of barberry, serviceberry, holly, crabapple, dogwood, cotoneaster, euonymus, firethorn and/or rosa rugosa, as well as erosion-resistant ground cover plantings must be retained and planted, and existing trees retained, wherever practicable in the setback;

(c) Implementation of a stormwater management plan endorsed by the York County Soil and Water Conservation District (SCS), or the Town's engineering peer review consultant, that treats stormwater with appropriate BMPs and removes pollutants in accordance with the most-current edition of the Maine Department of Environmental Protection BMP Manual, Stormwater Management for Maine. Pollutants sought to be removed include suspended solids, nitrates, hydrocarbons and heavy metals. Such special treatment of the first flush of runoff may include detention, infiltration, filtering and trapping of pollutants. **[Amended 9-26-2011 by Ord. No. 11-15]**

F. Special parking standards.

(1) Revised off-street parking standards. Off-street parking must be provided in accordance with § 16.8.9.4 unless modified below for the following uses:

(a) Dwellings: 1 1/2 parking space for each dwelling unit;

(b) Retail stores: one parking space for each 400 square feet of gross floor area;

(c) Drive-in restaurants, snack bars and fast-food outlets, but excluding restaurants where ordering and/or pickup of food may take place from a motorized vehicle: one parking space for every three seats, but in no case less than four spaces;

(d) Conference centers: one parking space for every 60 square feet in the largest assembly or meeting room.

Ambit Engineering Abutter Research

Name	*Hampshire Development*
Address	*35 Badgers Island West*
City, State	*Kittery, ME*

Date	*9/8/2021*	**Job #**	*3050.72A*
Job Name	*Hampshire Development*		
Town	*Kittery*		
Research by	*PAD*		

Applicant/Owner(s)

Map	Lot	Deed	Owner (s) First/Trust	Owner(s) Last, Trustee	Mailing Address	City	State	Zip	Street Address
1	*32*	*18503/331*	*B.I.W. Group, LLC*		*41 Industrial Drive, Unit 20*	*Exeter*	*NH*	*03833*	*35 Badgers Island West*

Engineer			**Ambit Engineering Civil Engineers & Land Surveyors**		**200 Griffin Road, Unit #3**	**Portsmouth**	**NH**	**03801**

Other Consultants

Soil Scientist			*Soil Science of New England*		*999 Street Name*	*City*	*AA*	*12345*

Abutters

Job Name	npshire Developm	**Job #**	3050.72A

Map	Lot	Deed	Owner (s) First/Trust	Owner(s) Last, Trustee	Mailing Address	City	State	Zip	Street Address
1	*32*	*17123/71*	*31 Badgers LLC*		*PO Box 904*	*Kittery*	*ME*	*03904*	*31 Badgers Island West*
1	33	14235/553	Badgers Landing Condominium		32 Badgers Island West	Kittery	ME	03904	32 Badgers Island West
1	38A	12162/254	LaPierre Properties, LLC		32 Route 236	Kittery	ME	03904	37 Badgers Island West

RESIDENTIAL CONVERSION

35 BADGERS ISLAND WEST
KITTERY, MAINE

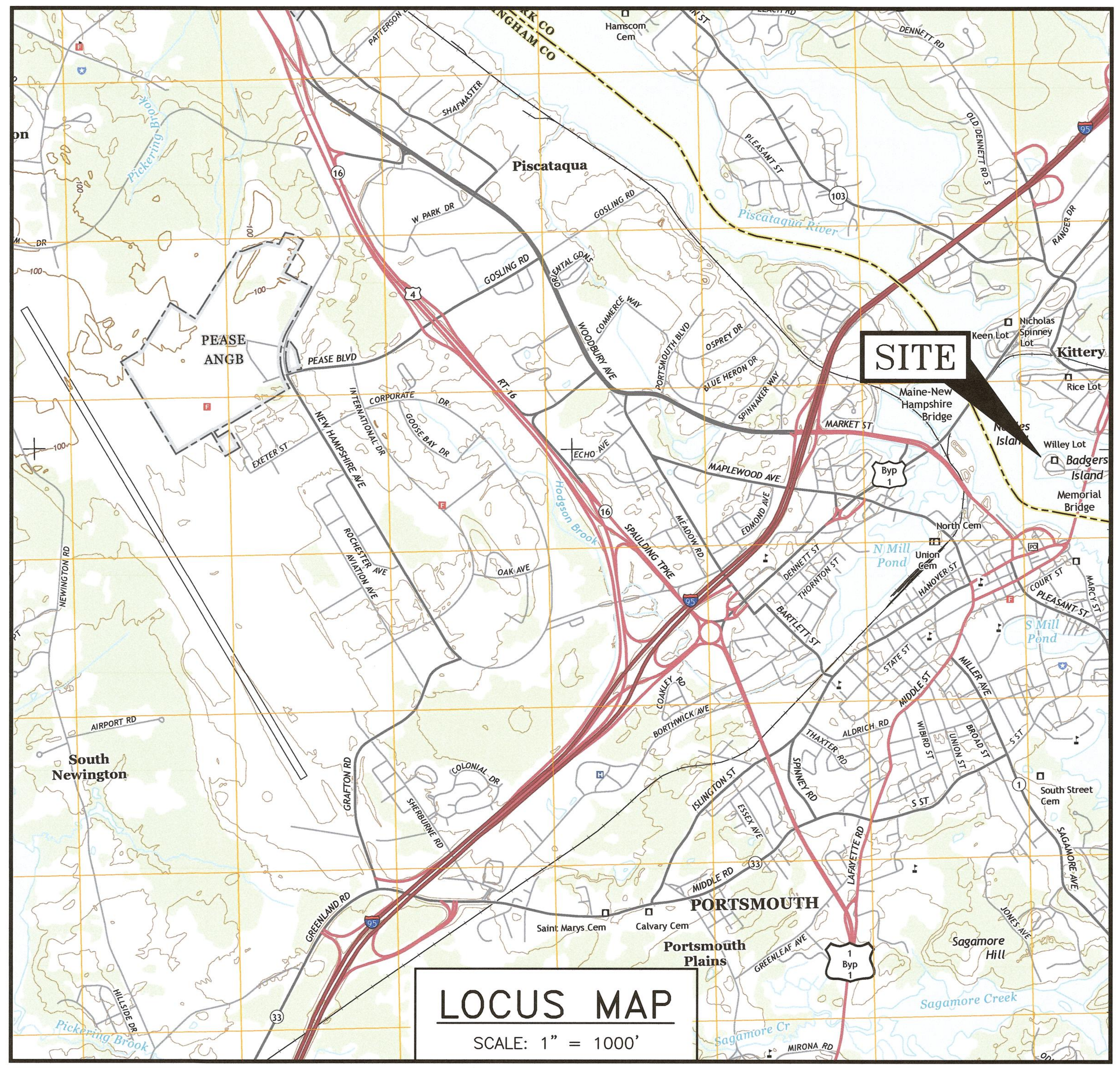
AMENDED SITE PLAN
SKETCH PLAN APPLICATION

OWNER & APPLICANT:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, N.H. 03833

CIVIL ENGINEER & LAND SURVEYOR:
AMBIT ENGINEERING, INC.
200 GRIFFIN ROAD, UNIT 3
PORTSMOUTH, N.H. 03801–7114
TEL: (603) 430–9282
FAX: (603) 436–2315

LANDSCAPE ARCHITECT:
WOODBURN & COMPANY
LANDSCAPE ARCHITECTURE
103 KENT PLACE
NEWMARKET, N.H. 03857
TEL: (603) 659–5949

INDEX OF SHEETS



LOCUS MAP
SCALE: 1" = 1000'

DIG SAFE
MA – ME – NH – RI – VT
1–888–344–7233
CALL TOLL FREE

LEGEND:

N/F		NOW OR FORMERLY
RP		RECORD OF PROBATE
YCRD		YORK COUNTY REGISTRY OF DEEDS
11/21		MAP 11/LOT 21
RR SPK FND	RR SPK SET	RAILROAD SPIKE FOUND / SET
IR FND	IR SET	IRON ROD FOUND / SET
IP FND	IP SET	IRON PIPE FOUND / SET
DH FND	DH SET	DRILL HOLE FOUND
BND w/DH	BND w/DH	BOUND WITH DRILL HOLE
ST BND w/DH	ST BND w/DH	STONE BOUND WITH DRILL HOLE

EXISTING	PROPOSED	
FM	FM	FORCE MAIN
S	S	SEWER LINE
G	G	GAS LINE
D	D	STORM DRAIN
W	W	WATER LINE
		UNDERGROUND ELECTRIC
		OVERHEAD ELECTRIC/WIRES
		EDGE/℄ OF WATER BODY
		EDGE OF WETLAND
		EDGE OF RESOURCE PROTECTION AREA
		AREA OF WETLAND DISTURBANCE
		℄ OF DITCH/SWALE
100	100	CONTOUR
97x3	98x0	SPOT ELEVATION
		EDGE OF PAVEMENT (EP)
		WOODS / TREE LINE
		SECURITY FENCE WETLANDS
BuB		SOIL SERIES
		UTILITY POLE
WSO	WSO	WATER SHUT OFF/CURB STOP
GSO	GSO	GAS SHUT OFF
GV	GV	GATE VALVE
HYD	HYD	HYDRANT
CB	CB	CATCH BASIN
T	TMH	TELEPHONE MANHOLE
S	SMH	SEWER MANHOLE
D	DMH	DRAIN MANHOLE
W	W	WELL
AC		ASBESTOS CEMENT PIPE
℄	℄	CENTERLINE
CI	CI	CAST IRON PIPE
CMP	CMP	CORRUGATED METAL PIPE
COP	COP	COPPER PIPE
CPP	CPP	CORRUGATED PLASTIC PIPE
DI	DI	DUCTILE IRON PIPE
EL.	EL.	ELEVATION
EP	EP	EDGE OF PAVEMENT
FF	FF	FINISHED FLOOR
INV	INV	INVERT
PVC	PVC	POLYVINYL CHLORIDE PIPE
RCP	RCP	REINFORCED CONCRETE PIPE
TBD	TBD	TO BE DETERMINED
TBM	TBM	TEMPORARY BENCH MARK
TYP	TYP	TYPICAL
VC	VC	VITRIFIED CLAY PIPE
	9	PARKING SPACE COUNT

OWNER:

SIGNATURE ____________ DATE ____________

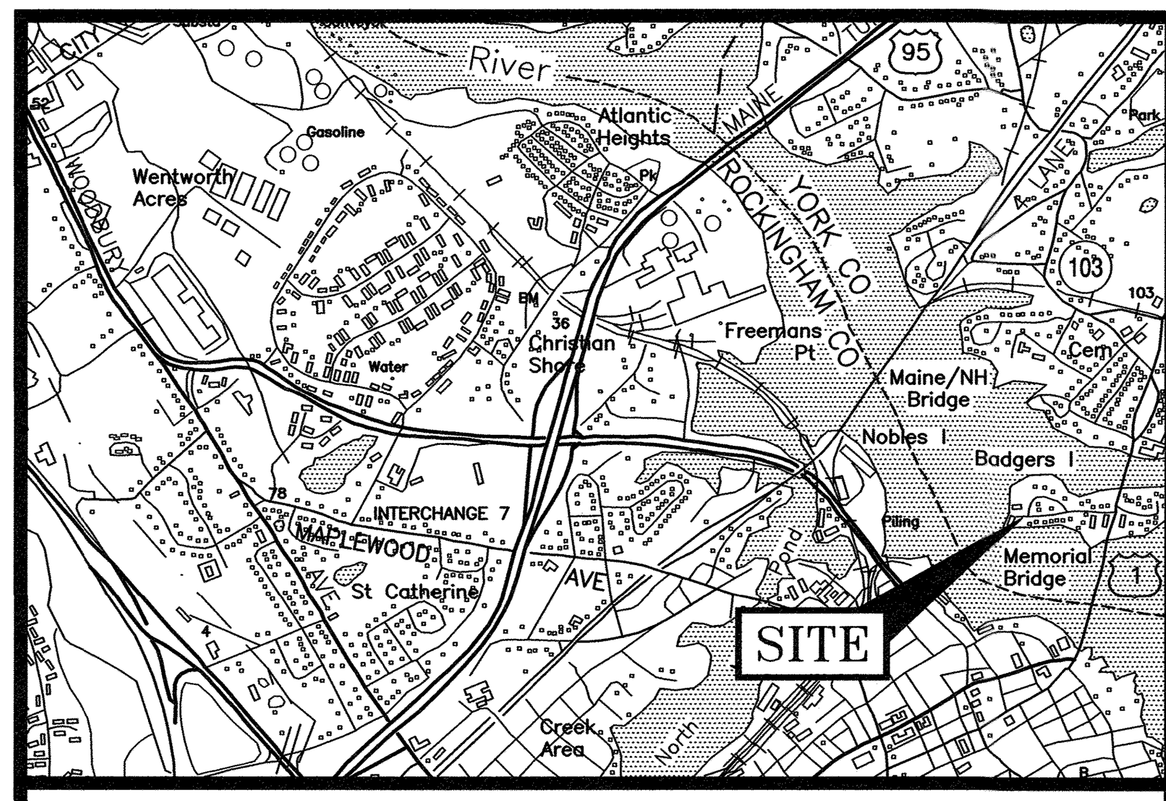
APPROVED BY THE KITTERY PLANNING BOARD

CHAIRMAN ____________ DATE ____________

AMENDED SITE PLAN
TAX MAP 1, LOT 32
RESIDENTIAL CONVERSION
35 BADGERS ISLAND WEST
KITTERY, MAINE

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315
WWW.HALEYWARD.COM

PLAN SET SUBMITTAL DATE: 6 APRIL 2023



LOCATION MAP SCALE 1"=2,000'

PLAN REFERENCES:

1) BADGERS LANDING CONDOMINIUM STANDARD BOUNDARY SURVEY & CONDOMINIUM SITE PLAN FOR PROPERTY AT 32 BADGERS ISLAND WEST, KITTERY, YORK COUNTY, MAINE CLIENT ISLAND PROPERTIES, LLC PREPARED BY EASTERLY SURVEY, INC. DATED SEPTEMBER 17, 2002, FINAL REVISION DATE SEPTEMBER 30, 2002. Y.C.R.D. PLAN BOOK 581, PAGE 1.

2) LAND TITLE SURVEY WEATHERVANE LOBSTER – SEAFOODS, THORNERS LANE, BADGERS ISLAND, KITTERY MAINE. PREPARED BY CIVIL CONSULTANTS. DATED AUGUST 21, 1996, FINAL REVISION SEPTEMBER 20, 1996. Y.C.R.D. PLAN BOOK 231/23.

3) LOCATION OF A PORTION OF THE TOWN ROAD KNOWN AS BADGERS ISLAND WEST ON BADGERS ISLAND, KITTERY MAINE, FOR THE TOWN OF KITTERY, MAINE. PREPARED BY DOUCET SURVEY, INC. DATED AUGUST 26, 1994, FINAL REVISION DATE SEPTEMBER 15, 1995. Y.C.R.D. PLAN BOOK 225/12.

4) BOUNDARY PLAN OF LAND, CHARLES & MARYANN D. PATTEN, KITTERY, MAINE. PREPARED BY THOMAS F. MORAN, INC. DATED MAY 17, 1982. Y.C.R.D. PLAN BOOK 118/37.

5) GAGNER / SEWARD PROPERTY LINE EVALUATION SURVEYED SITE PLAN, KITTERY, MAINE. PREPARED BY KIMBALL CHASE. DATED SEPTEMBER 16, 1987. Y.C.R.D. PLAN BOOK 167/17.

6) PLAN OF LOTS, BADGERS ISLAND, KITTERY, MAINE OWNED BY JOSEPH W. THORNER. PREPARED BY JOHN W. DURGIN, CIVIL ENGINEER. DATED APRIL 1936. Y.C.R.D. PLAN BOOK 22/31.

LEGEND:

N/F	NOW OR FORMERLY
RP	RECORD OF PROBATE
YCRD	YORK COUNTY REGISTRY OF DEEDS
11/21	MAP 11 / LOT 21
	RAILROAD SPIKE FOUND
	IRON ROD/IRON PIPE FOUND
	IRON PIPE FOUND
	STONE/CONCRETE BOUND FOUND
	RAILROAD SPIKE SET
	IRON ROD SET
	DRILL HOLE SET
	GRANITE BOUND SET
	BOUNDARY
	BUILDING SETBACK
MHW	MEAN HIGH WATER LINE
MSL	MEAN SEA LEVEL
MLW	MEAN LOW WATER
MLLW	MEAN LOWER LOW WATER
HAT	MAINE DEP HIGHEST ANNUAL TIDE LINE
WB	WETLAND BUFFER LINE
	UNDERGROUND ELECTRIC
	OVERHEAD ELECTRIC/WIRES
100	CONTOUR
97x3	SPOT ELEVATION
	EDGE OF PAVEMENT (EP)
	WOODS / TREE LINE
	UTILITY POLE (w/ GUY)
	GAS SHUT OFF
	WATER SHUT OFF/CURB STOP
GV	GATE VALVE
HYD	HYDRANT
G W E	METER (GAS, WATER, ELECTRIC)
	CATCH BASIN
S	SEWER MANHOLE
D	DRAIN MANHOLE

LEGEND: (CONTINUED)

AC	AIR CONDITIONING UNIT
HP	HEAT PUMP
	SIGNS
CPP	CORRUGATED PLASTIC PIPE
PVC	POLYVINYL CHLORIDE PIPE
EL.	ELEVATION
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
INV.	INVERT
TBM	TEMPORARY BENCHMARK
TYP.	TYPICAL
VGC/SGC	VERTICAL/SLOPED GRANITE CURB
LSA	LANDSCAPED AREA

UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

DEVEGETATED COVERAGE CALCULATION
(TO HAT LINE)

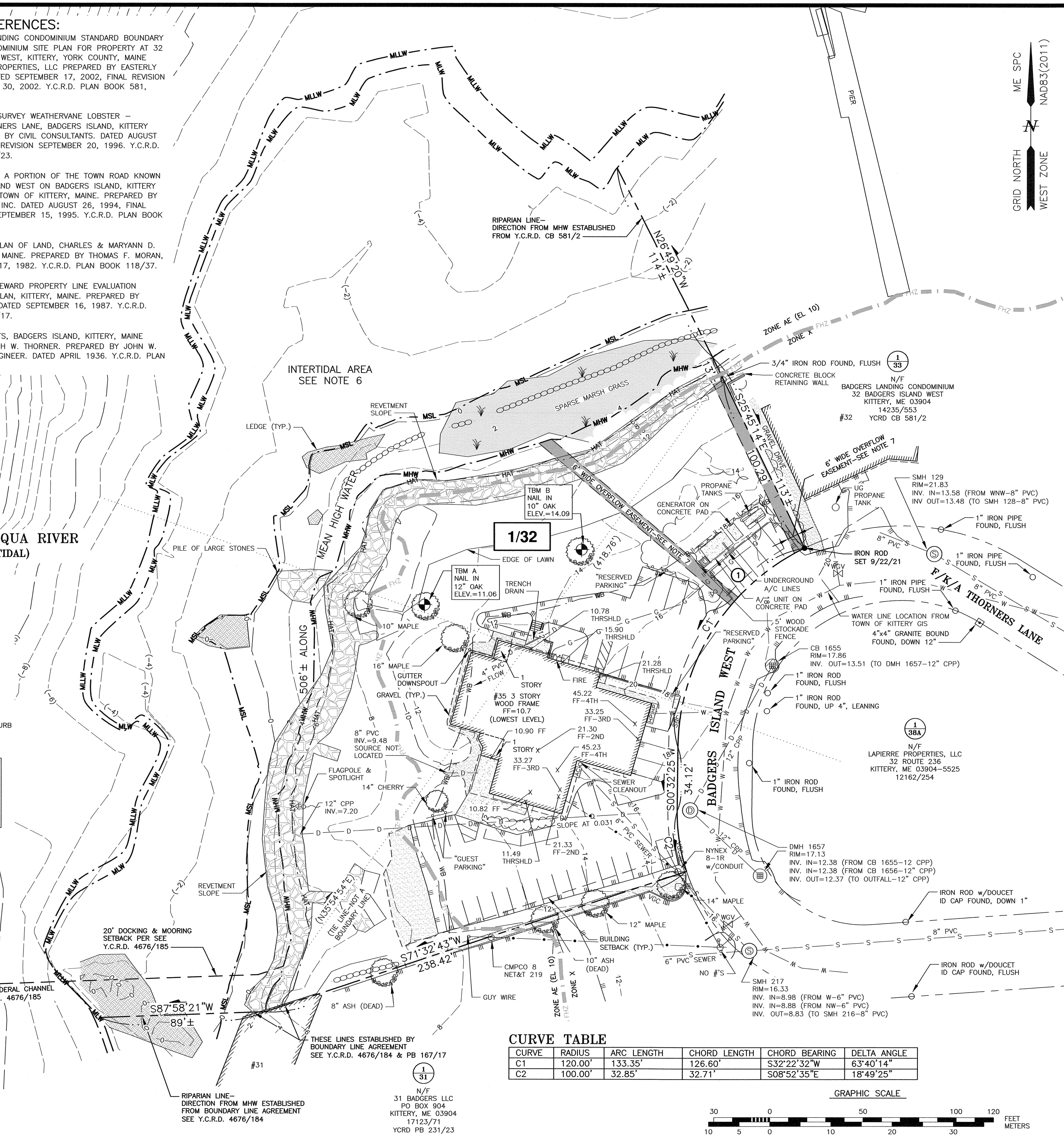
STRUCTURE	EXISTING (S.F.)
MAIN STRUCTURE	5,922
PAVEMENT	12,289
GRAVEL AREAS	2,277
RETAINING WALLS	86
CONCRETE PADS/STEPS	957
REVETMENT	5392
TOTAL	26,923
LOT SIZE	54,883
% LOT COVERAGE	49.1%

PURSUANT TO CHAPTER 90 PARTS 1 AND 2 OF THE SURVEY STANDARDS OF PRACTICE AS ADOPTED BY THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS, THE FOLLOWING EXCEPTIONS TO PART 2 ARE NOTED;

A) NO SURVEY REPORT HAS BEEN PREPARED.
B) NO LAND DESCRIPTION HAS BEEN PREPARED.
C) MONUMENTS HAVE NOT BEEN SET.

THIS SURVEY CONFORMS TO THE MAINE BOARD OF LICENSURE FOR PROFESSIONAL LAND SURVEYORS CHAPTER 90 STANDARDS OF PRACTICE, EFFECTIVE DATE APRIL 1, 2001 EXCEPT AS NOTED ON THIS PLAN.

JOHN R. CHAGNON, PLS #2276 — 2.24.23 DATE



CURVE TABLE

CURVE	RADIUS	ARC LENGTH	CHORD LENGTH	CHORD BEARING	DELTA ANGLE
C1	120.00'	133.35'	126.60'	S32°22'32"W	63°40'14"
C2	100.00'	32.85'	32.71'	S08°52'35"E	18°49'25"

GRAPHIC SCALE

30 0 50 100 120 FEET
10 5 0 10 20 30 METERS

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315
WWW.HALEYWARD.COM

NOTES:

1) PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.

2) OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)

3) A PORTION OF THE PARCEL IS IN A SPECIAL FLOOD HAZARD AREA, ZONE AE (EL 10), AS SHOWN ON PRELIMINARY FIRM PANEL 23031C0709G. REVISED PRELIMINARY 4/14/2017.

4) EXISTING LOT AREA:
58,985± S.F. (TO MEAN HIGH WATER)
1.3541± ACRES (TO MEAN HIGH WATER)

5) PARCEL IS LOCATED IN THE MIXED USE – BADGERS ISLAND (MU–BI) ZONING DISTRICT AND IS SUBJECT TO THE RESOURCE PROTECTION (OZ–RP) AND SHORELAND–WATER BODY / WETLAND PROTECTION AREA (OZ–SL–250') OVERLAY DISTRICTS.

6) DIMENSIONAL REQUIREMENTS:

MIN. LOT AREA:		6,000 SF
FRONTAGE:		50 FEET
SETBACKS:	FRONT	5 FEET
	SIDE	10 FEET
	REAR	10 FEET
MAXIMUM BUILDING HEIGHT:		40 FEET
MINIMUM OPEN SPACE:		40%

4) THE PURPOSE OF THIS PLAN IS TO SHOW THE EXISTING CONDITIONS ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.

5) VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS. MHW, MSL, MLW, AND MLLW BASED ON NOAA STATION 8419870–SEAVEY ISLAND, PORTSMOUTH HARBOR, ME.

6) AREA BETWEEN MEAN HIGH WATER AND MEAN LOW WATER ARE SUBJECT TO THE RIGHTS OF THE PUBLIC.

7) PARCEL IS SUBJECT TO A 6' WIDE EASEMENT FOR "LAYING AND MAINTAINING AN OVERFLOW PIPE FROM A CEPTIC (sic) TANK ON THE CONVEYED LOT UNDER THE ROADWAY". BENEFITING LOTS 1, 2, 3, 4, AND 5 ON PLAN REFERENCE 6 (NOW ASSESSOR'S MAP 1 LOTS 38 & 38A). SAID EASEMENT WAS GRANTED AS BEING ON LOT 14 BUT ALONG THE COMMON LOT LINE OF 14 & 15 OR COMMON LINE OF 13 & 14, SEE Y.C.R.D. 1301/275. IT IS NOT CLEAR IN WHICH LOCATION THE PIPE WAS CONSTRUCTED.

8) HIGHEST ANNUAL TIDE LINE SHOWN AT ELEVATION 5.8 PER LOCATION SEAVEY ISLAND IN MAINE DEP HIGHEST ANNUAL TIDE (HAT) LEVELS FOR YEAR 2018.

SITE DEVELOPMENT 35 BADGERS ISLAND WEST KITTERY, MAINE

NO.	DESCRIPTION	DATE
2	ADD PRELIMINARY FEMA FHZ LINES	2/24/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22

REVISIONS

STATE OF MAINE — JOHN R. CHAGNON No. 2276 — PROFESSIONAL LAND SURVEYOR — 2.24.23

SCALE 1"=30' AUGUST 2021

EXISTING CONDITIONS PLAN — C1

FB 423 PG 1 — 3050.72 — TAX MAP 1 LOT 32

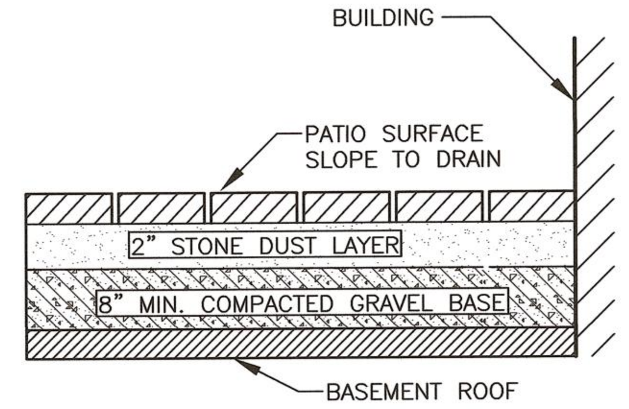
DEVEGETATED COVERAGE CALCULATION
(TO HAT LINE)

STRUCTURE	PRE-CONSTRUCTION (S.F.) *	POST-CONSTRUCTION (S.F.)
MAIN STRUCTURE	5,922	13,328
DECK	0	85
PAVEMENT	12,289	2,376
GRAVEL	2,277	0
RETAINING WALLS	86	169
CONCRETE PADS/STEPS/SIDEWALK	957	360
PATIOS/WALKWAYS	0	726
REVETMENT/RIPRAP	5,392	5,392
TOTAL	26,923	22,436
LOT SIZE	54,883	54,883
% DEVEGETATED AREA	49.1%	40.9%

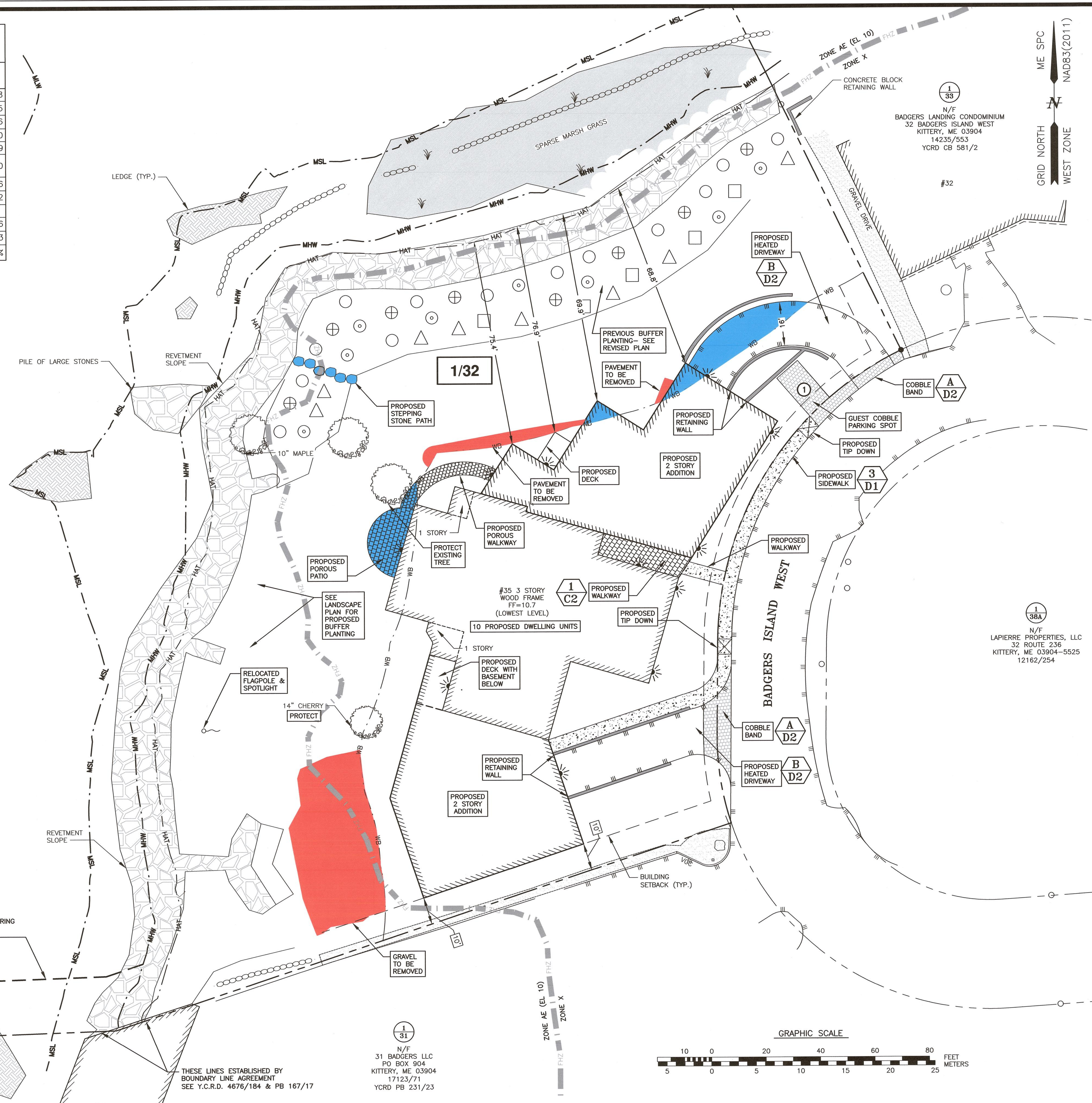
* FROM RECENT APPROVAL.

(red) 1,944 S.F. SUBTRACTED FROM WETLAND BUFFER

(blue) 950 S.F. ADDED TO WETLAND BUFFER



1 C2 PATIO DETAIL
NTS



AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

WWW.HALEYWARD.COM

NOTES:

1) PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.

2) OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
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1.3541± ACRES (TO MEAN HIGH WATER)

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6) DIMENSIONAL REQUIREMENTS:

MIN. LOT AREA:		6,000 SF
FRONTAGE:		50 FEET
SETBACKS:	FRONT	5 FEET
	SIDE	10 FEET
	REAR	10 FEET
MAXIMUM BUILDING HEIGHT:		40 FEET
MINIMUM OPEN SPACE:		40%

4) THE PURPOSE OF THIS PLAN IS TO SHOW A PROPOSED BUILDING EXPANSION CONCEPT ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.

5) VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS. MHW, MSL, MLW, AND MLLW BASED ON NOAA STATION 8419870–SEAVEY ISLAND, PORTSMOUTH HARBOR, ME.

6) AREA BETWEEN MEAN HIGH WATER AND MEAN LOW WATER ARE SUBJECT TO THE RIGHTS OF THE PUBLIC.

7) HIGHEST ANNUAL TIDE LINE SHOWN AT ELEVATION 5.8 PER LOCATION SEAVEY ISLAND IN MAINE DEP HIGHEST ANNUAL TIDE (HAT) LEVELS FOR YEAR 2018.

8) INTERIOR TRASH COLLECTION.

SITE DEVELOPMENT 35 BADGERS ISLAND WEST KITTERY, MAINE

NO.	DESCRIPTION	DATE
3	BUILDING	4/6/23
2	ADD PRELIMINARY FEMA FHZ LINES	2/24/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22

REVISIONS

STATE OF MAINE JOHN R. CHAGNON No. 2278 PROFESSIONAL LAND SURVEYOR

STATE OF MAINE JOHN R. CHAGNON 6950 LICENSED PROFESSIONAL ENGINEER

4.6.23

SCALE 1"=20'   AUGUST 2022

SHORELAND DEVELOPMENT PLAN

C2

FB 423 PG 1   3050.72   TAX MAP 1 LOT 32

View from the River
NTS

Plant List

TREES

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
Am	*Amelanchier grandiflora 'Autumn Brilliance'*	Autumn Brilliance Serviceberry	5	8-10' ht	BB multistemme
Ar	*Acer rubrum 'October Glory'*	October Glory Red Maple	6	3" cal.	BB
Ex	*Existing tree to remain*	*Existing tree to remain*			
Ham	*Hamamelis x 'Arnold Promis'*	Arnold Promise Witch Hazel	2	7-8' ht.	BB multistemme
Jv	*Juniperus virginiana ' Manhattan Blue'*	Manhattan Blue Eastern Red Cedar	6	7-8' ht.	BB
Mal	*Malus 'Tina'*	Tina Crabapple	2	2.5" cal.	BB
Mal2	*Malus 'Sugartyme'*	Sugar Tyme Crabapple	1	2.5" cal.	BB
QR	*Quercus rubra*	Northern Red Oak	2	3" cal	BB
UA	*Ulmus americana 'Princeton'*	Princeton Elm	3	3" cal	BB

SHRUBS

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
CIH	*Cornus 'Ivory Halo'*	Ivory Halo Dogwood	12	2-5'3' ht	BB
CL	*Clethra alnifolia 'Hummingbird'*	Hummingbird Clethra	177	3 gal	
HY	*Hydrangea macrophylla 'All Summer Beauty'*	All Summer Beauty Hydrangea (Blue	10	3 gal	
HY2	*Hydrangea paniculata 'Little Quickfire'*	Little Quickfile Panicle Hydrangea	10	5 gal	
HYA	*Hydrangea a. 'Incrediball'*	Incrediball Hydrangea	20	5 gal	
HyP	*Hydrangea paniculata 'Limelight'*	Limelight Hydrangea	4	10 gal	treeform
IG	*Ilex glabra 'Shamrock'*	Shamrock Inkberry	34	5 gal	
JC	*Juniperus communis*	Common Juniper	162	3 gal	
MP	*Myrica pennsylvanica*	Bayberry	60	5 gal	
RH	*Rhododendron chionoides*	Chioniodes Rhododendron	13	5 gal	
Rh2	*Rhododendron 'Wilsoni'*	Wilson Rhododendron	20	3 gal	
RHUS	*Rhus aromatica 'Grow Low'*	Grow Low Sumac	160	3 gal	
SP	*Spirea latifolia "Pink Mountain'*	Pink Mountain Spirea	96	3 gal	
Tax	*Taxus media 'Everlow'*	Everlow Yew	25	3 gal	

PERENNIALS, GROUNDCOVERS, VINES and ANNUALS

Symbol	Botanical Name	Common Name	Quantity	Size	Comments
CAL	*Calamagrostis acutifolia 'Karl Foerster'*	Feather Reed Grass		1 gal	
DAY	*Daylily mix*	Mixed Daylilies		1 gal	
SED	Sedum 'Autumn Joy'	Autumn Joy Sedum		1 gal	
PENN	*Pennisetum alopecuroides 'Hameln'*	Hameln Dwarf Fountain Grass		1 gal	

woodburn & company
LANDSCAPE ARCHITECTURE
103 Kent Place Newmarket, New Hampshire Phone: 603.659.5949

Residential Conversion

CONCEPTUAL LANDSCAPE PLAN

35 Badger's Island Kittery, Maine - B.I.W Group LLC

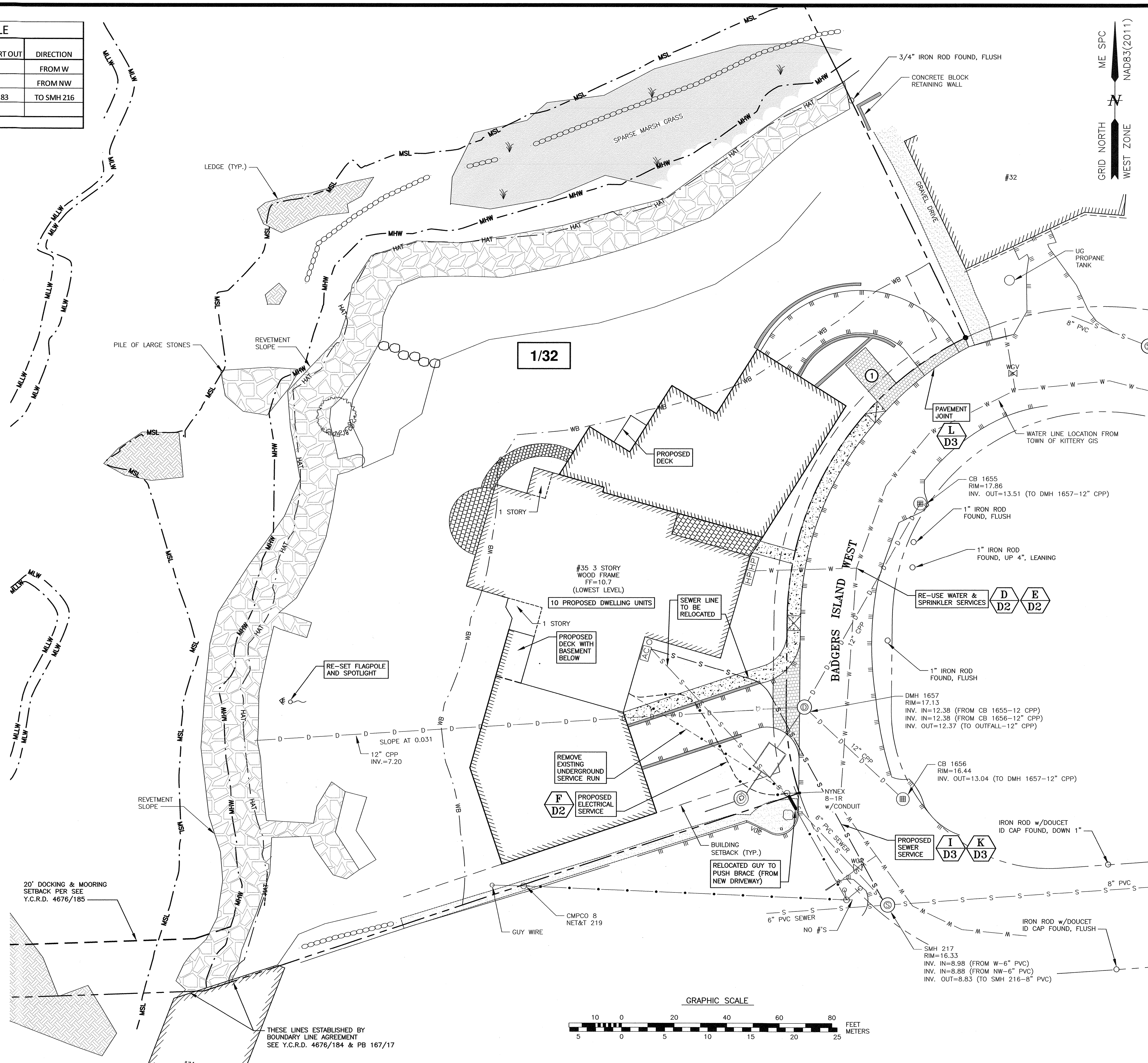
Drawn By:	RW
Checked By:	RW
Scale:	scale
Date:	date
Revisions:	

L-1

Sheet x of X

SEWER STRUCTURE SCHEDULE

STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYPE	INVERT IN	INVERT OUT	DIRECTION
SMH 217	EX	16.33	6" PVC	8.98		FROM W
			6" PVC	8.88		FROM NW
			8" PVC		8.83	TO SMH 216



AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315
WWW.HALEYWARD.COM

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1–888–DIG–SAFE (1–888–344–7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP's" PUBLISHED BY THE MAINE D.E.P. IN 2016.

4) CONTRACTOR SHALL FIELD VERIFY THE DEPTH OF EXISTING UTILITIES AND COORDINATE WITH THE ENGINEER PRIOR TO CONSTRUCTION OF THE PROPOSED UTILITIES.

5) ALL UTILITIES SHOWN ARE TO REMAIN UNLESS NOTED OTHERWISE.

6) COORDINATE UTILITY CONNECTIONS AND INSTALLATIONS WITH RESPECTIVE UTILITY COMPANIES AND SERVICE PROVIDERS.

7) CONTRACTOR SHALL MAINTAIN EXISTING UTILITY SERVICES TO ADJACENT PROPERTIES DURING CONSTRUCTION. PROVIDE PROPER NOTIFICATION OF ANY SERVICE INTERRUPTIONS.

8) ALL WATER, SEWER, AND ROADWAY WORK TO BE COMPLETED TO KITTERY WATER DISTRICT AND TOWN OF KITTERY STANDARDS. WORK IN BADGER'S ISLAND WEST SUBJECT TO TOWN MORATORIUM.

SITE DEVELOPMENT 35 BADGERS ISLAND WEST KITTERY, MAINE

NO.	DESCRIPTION	DATE
2	BUILDING	4/6/23
1	ISSUED FOR APPROVAL	1/19/23
0	ISSUED FOR COMMENT	8/18/22

REVISIONS

STATE OF MAINE JOHN R. CHAGNON No. 5950 LICENSED PROFESSIONAL ENGINEER
4-6-23

SCALE 1"=20' AUGUST 2022

UTILITY PLAN

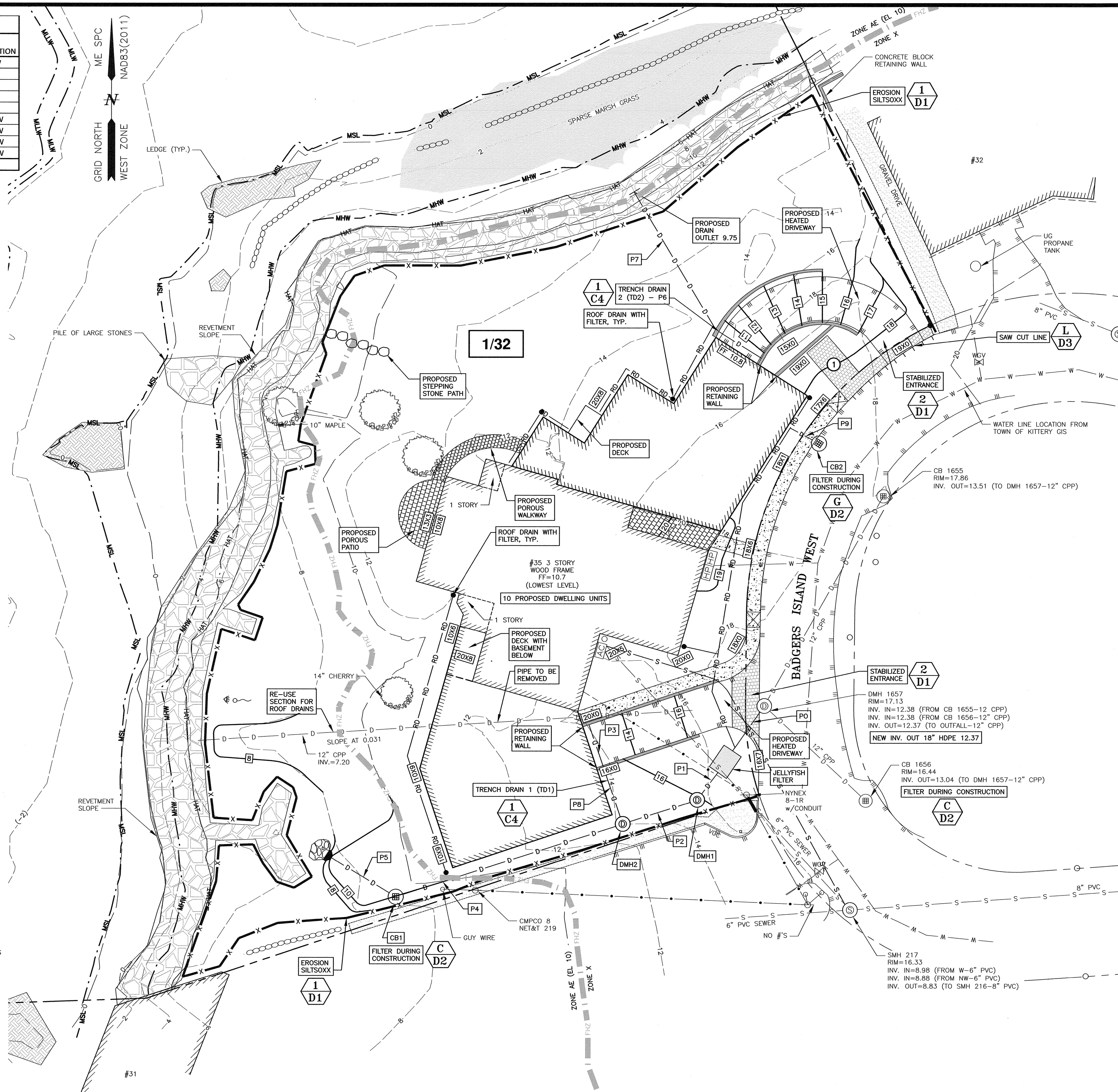
C3

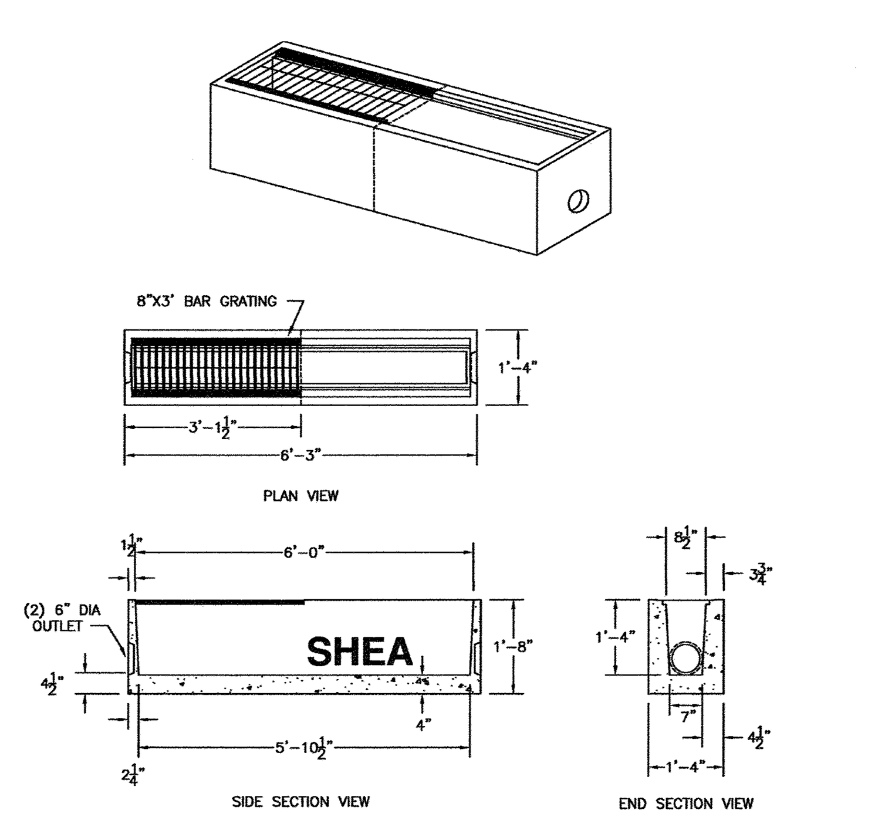
FB 423 PG 1 3050.72 TAX MAP 1 LOT 32

DRAINAGE STRUCTURE SCHEDULE						
STRUCTURE	PROP/EX	RIM	PIPE SIZE/TYPE	INVERT IN	INVERT OUT	DIRECTION
DMH 1657	EX	17.13	18" CPP	12.38	12.37	W
				12.38		
TD 1	PROP	12.50	6" PVC	11.37	11.17	
TD 2	PROP	11.5	6" PVC	10.17	9.97	
JF FILTER	PROP	18.0	18" CPP	12.23	11.00	S
DMH 1	PROP	16.0	18" CPP	10.91	10.81	SW
DMH 2	PROP	13.0	18" CPP	10.07	9.97	SW
CB 1	PROP	9.9	18" CPP	7.63	7.53	NW
CB 2	PROP	16.8	12" CPP	13.63		NW

PIPE SCHEDULE			
PIPE #	PIPE SIZE	LENGTH	SLOPE
P0	18"	19'	0.0074
P1	18"	27'	0.01
P2	18"	24'	0.032
P3	6"	20'	0.01
P4	18"	83'	0.028
P5	18"	25'	0.004
P6	12"	20'	0.01
P7	12"	56'	0.004
P8	6"	20'	0.01
P9	12"	10'	0.01

*ALL PIPE TO BE HDPE
**P3 AND P6 ARE STRIP DRAINS





NOTES:
1. CONCRETE: 4,000 PSI MINIMUM AFTER 28 DAYS.
2. AVAILABLE IN 3' AND 6' SECTIONS.
3. AVAILABLE IN END, MIDDLE, OR CLOSED SECTIONS.
4. DESIGNED FOR AASHTO HS-20 LOADING.

SHEA PRODUCT ID: TD3/TD6
TRENCH DRAIN 8"X16"
WEIGHT (LBS): 711#/1,315#

1 / C4 STRIP DRAIN
NTS

GRAPHIC SCALE
10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

"I CERTIFY THAT THIS PLAN WAS PREPARED UNDER MY DIRECT SUPERVISION, THAT IT IS THE RESULT OF A FIELD SURVEY BY THIS OFFICE AND HAS AN ACCURACY OF THE CLOSED TRAVERSE THAT EXCEEDS THE PRECISION OF 1:15,000."

JOHN R. CHAGNON, LLS DATE

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

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3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP's" PUBLISHED BY THE MAINE D.E.P. IN 2016.

4) TOTAL PROJECT DISTURBED AREA 41,535 S.F.

5) VERTICAL DATUM IS NAVD88. BASIS OF VERTICAL DATUM IS REDUNDANT RTN GNSS OBSERVATIONS.

SITE DEVELOPMENT 35 BADGERS ISLAND WEST KITTERY, MAINE

NO.	DESCRIPTION	DATE
1	BUILDING, DRAINAGE	4/6/23
0	ISSUED FOR COMMENT	1/19/23

REVISIONS

STATE OF MAINE JOHN R. CHAGNON No. 6050 LICENSED PROFESSIONAL ENGINEER
4.6.23

SCALE 1"=20' AUGUST 2022

GRADING PLAN C4

FB 423 PG 1 3050.72 TAX MAP 1 LOT 32

DEMOLITION NOTES:

A) THE LOCATIONS OF UNDERGROUND UTILITIES ARE APPROXIMATE AND THE LOCATIONS ARE NOT GUARANTEED BY THE OWNER OR THE DESIGNER. IT IS THE CONTRACTORS' RESPONSIBILITY TO LOCATE UTILITIES AND ANTICIPATE CONFLICTS. CONTRACTOR SHALL REPAIR EXISTING UTILITIES DAMAGED BY THEIR WORK AND RELOCATE EXISTING UTILITIES THAT ARE REQUIRED TO BE RELOCATED PRIOR TO COMMENCING ANY WORK IN THE IMPACTED AREA OF THE PROJECT.

B) ALL MATERIALS SCHEDULED TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTORS UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL DISPOSE OF ALL MATERIALS OFF-SITE IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS, ORDINANCES AND CODES. THE CONTRACTOR SHALL COORDINATE REMOVAL, RELOCATION, DISPOSAL, OR SALVAGE OF UTILITIES WITH THE OWNER AND APPROPRIATE UTILITY COMPANY.

C) ANY EXISTING WORK OR PROPERTY DAMAGED OR DISRUPTED BY CONSTRUCTION/ DEMOLITION ACTIVITIES SHALL BE REPLACED OR REPAIRED TO THE ORIGINAL EXISTING CONDITIONS BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.

D) THE CONTRACTOR SHALL VERIFY LOCATION OF ALL EXISTING UTILITIES AND CALL DIG SAFE AT LEAST 72 HOURS PRIOR TO THE COMMENCEMENT OF ANY DEMOLITION/CONSTRUCTION ACTIVITIES.

E) SAWCUT AND REMOVE PAVEMENT ONE FOOT OFF PROPOSED EDGE OF PAVEMENT TRENCH IN AREAS WHERE PAVEMENT IS TO BE REMOVED.

F) IT IS THE CONTRACTOR'S RESPONSIBILITY TO FAMILIARIZE THEMSELVES WITH THE CONDITIONS OF ALL THE PERMIT APPROVALS.

G) THE CONTRACTOR SHALL OBTAIN AND PAY FOR ADDITIONAL CONSTRUCTION PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK AND ARRANGE FOR AND PAY FOR ANY INSPECTIONS AND APPROVALS FROM THE AUTHORITIES HAVING JURISDICTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ADDITIONAL AND OFF-SITE DISPOSAL OF MATERIALS REQUIRED TO COMPLETE THE WORK.

H) THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, CONCRETE, UTILITIES, VEGETATION, PAVEMENT, AND CONTAMINATED SOIL WITHIN THE WORK LIMITS SHOWN UNLESS SPECIFICALLY IDENTIFIED TO REMAIN. ANY EXISTING DOMESTIC / IRRIGATION SERVICE WELLS IN THE PROJECT AREA IDENTIFIED DURING THE CONSTRUCTION AND NOT CALLED OUT ON THE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER AND ENGINEER FOR PROPER CAPPING / RE-USE.

I) ALL WORK WITHIN THE TOWN OF KITTERY RIGHT OF WAY SHALL BE COORDINATED WITH THE TOWN OF KITTERY DEPARTMENT OF PUBLIC WORKS (DPW).

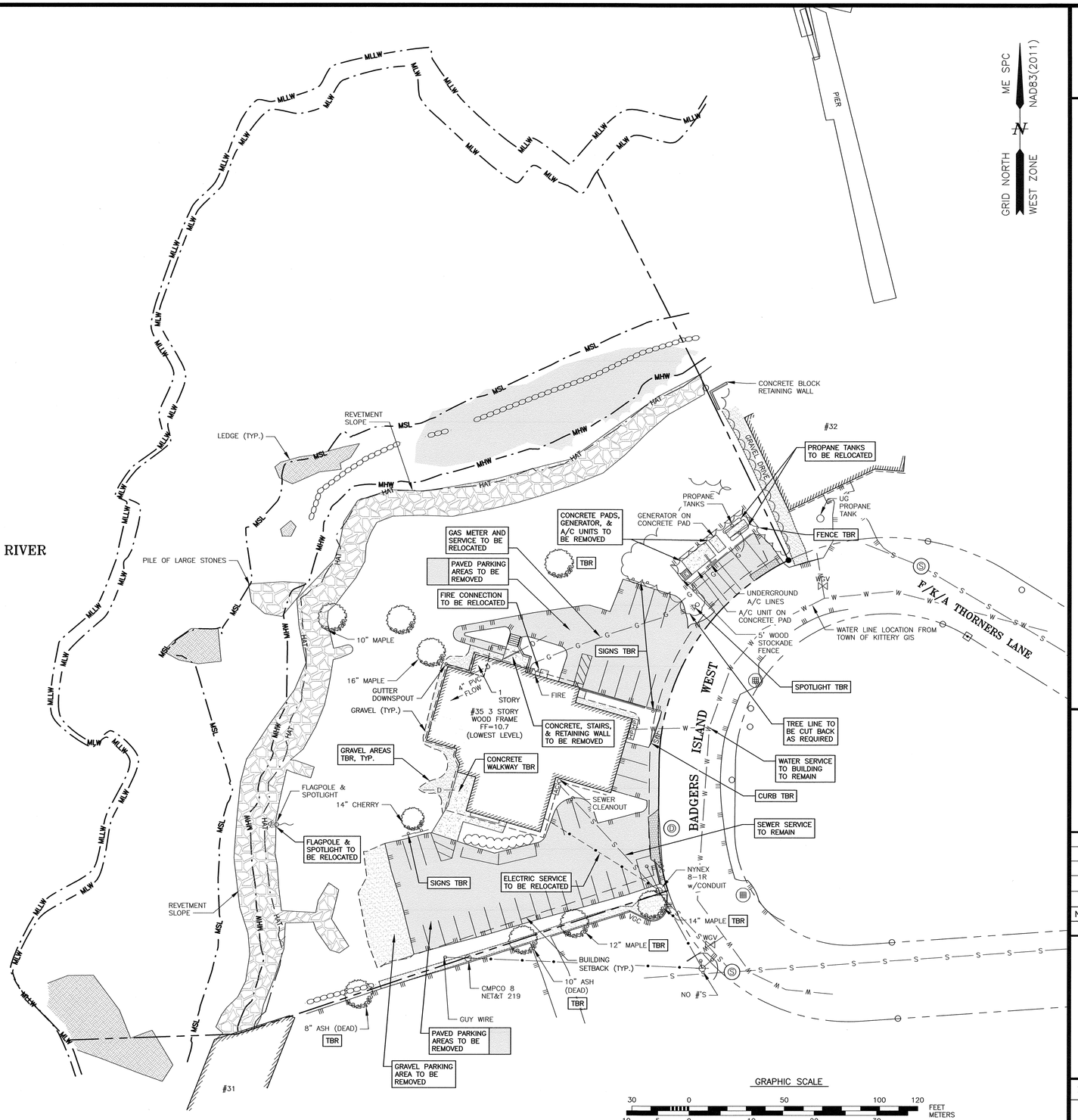
J) REMOVE TREES AND BRUSH AS REQUIRED FOR COMPLETION OF WORK. CONTRACTOR SHALL GRUB AND REMOVE ALL STUMPS WITHIN LIMITS OF WORK AND DISPOSE OF OFF-SITE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS AND REGULATIONS.

K) CONTRACTOR SHALL PROTECT ALL PROPERTY MONUMENTATION THROUGHOUT DEMOLITION AND CONSTRUCTION OPERATIONS. SHOULD ANY MONUMENTATION BE DISTURBED, THE CONTRACTOR SHALL EMPLOY A LAND SURVEYOR TO REPLACE THEM.

L) PROVIDE INLET PROTECTION BARRIERS AT ALL CATCH BASINS WITHIN CONSTRUCTION LIMITS AND MAINTAIN FOR THE DURATION OF THE PROJECT. INLET PROTECTION BARRIERS SHALL BE HIGH FLOW SILT SACK BY ACF ENVIRONMENTAL OR APPROVED EQUAL. INSPECT BARRIERS WEEKLY AND AFTER EACH RAIN 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 WARRANTED OR FABRIC BECOMES CLOGGED. EROSION CONTROL MEASURES SHALL BE INSTALLED PRIOR TO THE START OF ANY CLEARING OR DEMOLITION ACTIVITIES.

M) THE CONTRACTOR SHALL PAY ALL COSTS NECESSARY FOR TEMPORARY PARTITIONING, BARRICADING, FENCING, SECURITY AND SAFELY DEVICES REQUIRED FOR THE MAINTENANCE OF A CLEAN AND SAFE CONSTRUCTION SITE.

N) ANY CONTAMINATED MATERIAL REMOVED DURING THE COURSE OF THE WORK WILL REQUIRE HANDLING IN ACCORDANCE WITH MEDEP REGULATIONS. CONTRACTOR SHALL HAVE A HEALTH AND SAFETY PLAN IN PLACE, AND COMPLY WITH ALL APPLICABLE PERMITS, APPROVALS, AUTHORIZATIONS, AND REGULATIONS



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C) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP's" PUBLISHED BY THE MAINE D.E.P. IN 2014.

SITE DEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, MAINE

NO.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	1/19/23

REVISIONS

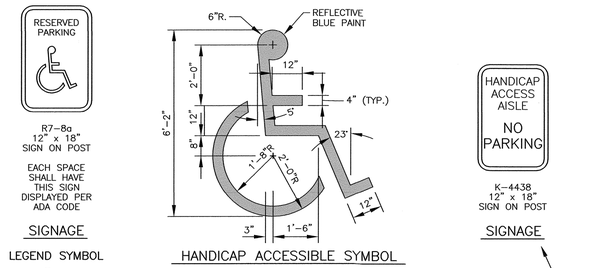
STATE OF MAINE — JOHN R. CHAGNON — NO. 9656 — LICENSED PROFESSIONAL ENGINEER
STATE OF MAINE — JOHN R. CHAGNON — PROFESSIONAL LAND SURVEYOR
4.6.23

SCALE 1"=30' AUGUST 2021

DEMOLITION PLAN — **C5**

FB 423 PG 1 3050.72 TAX MAP 1 LOT 32

P:\NH\2019\19-Hampshire_Development\3050.72A-Badgers Island W\3D\-RO-3050.72A-Hampshire Development\3052 Site Permitting\Plan & Specs\Dsn\3050_72A Site NEW 2022.dwg, 4/5/2023 10:03:09 AM



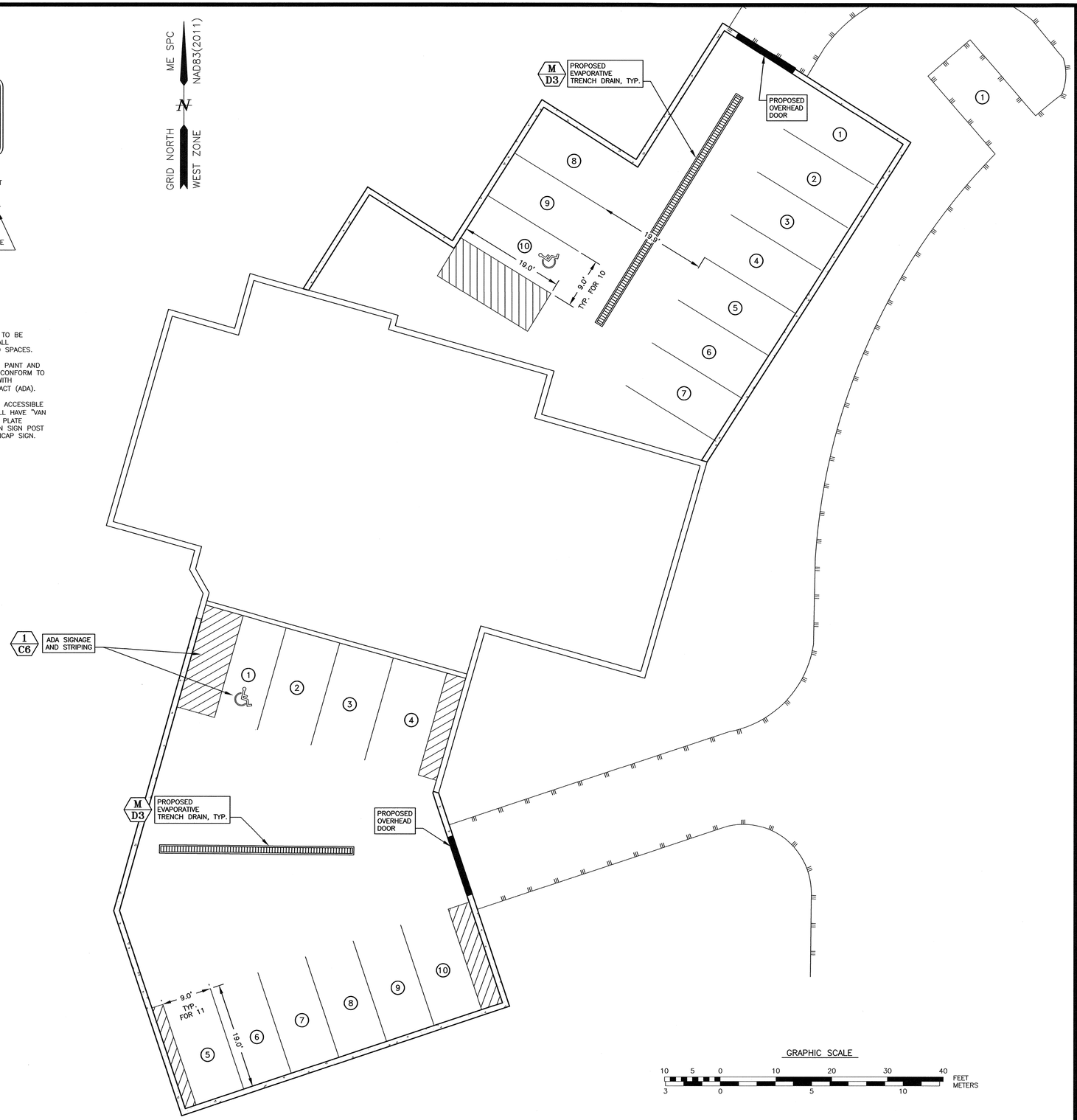
NOTES:

1) SYMBOL TO BE PAINTED IN ALL HANDICAPPED SPACES.

2) SYMBOL, PAINT AND SIGNAGE TO CONFORM TO AMERICANS WITH DISABILITIES ACT (ADA).

3) ALL VAN ACCESSIBLE SPACES SHALL HAVE "VAN ACCESSIBLE" PLATE INSTALLED ON SIGN POST BELOW HANDICAP SIGN.

1 / C6 HANDICAP PARKING DETAIL
NTS



NOTES:

1) PARCEL IS SHOWN ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.

2) OWNER OF RECORD:
B.I.W. GROUP, LLC
41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)

3) THE PURPOSE OF THIS PLAN IS TO SHOW THE PARKING FOR THE PROPOSED SITE DEVELOPMENT ON ASSESSOR'S MAP 1 LOT 32 IN THE TOWN OF KITTERY.

4) REQUIRED PARKING:

TOTAL REQUIRED: 2 VEHICLES PER DWELLING UNIT
2X10=20 SPACES
TOTAL PROVIDED: 20 SPACES (2 ADA)
PLUS 1 OUTSIDE GUEST SPACE

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SITE DEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, MAINE

NO.	DESCRIPTION	DATE
1	BUILDING	4/6/23
0	ISSUED FOR APPROVAL	1/19/23

REVISIONS

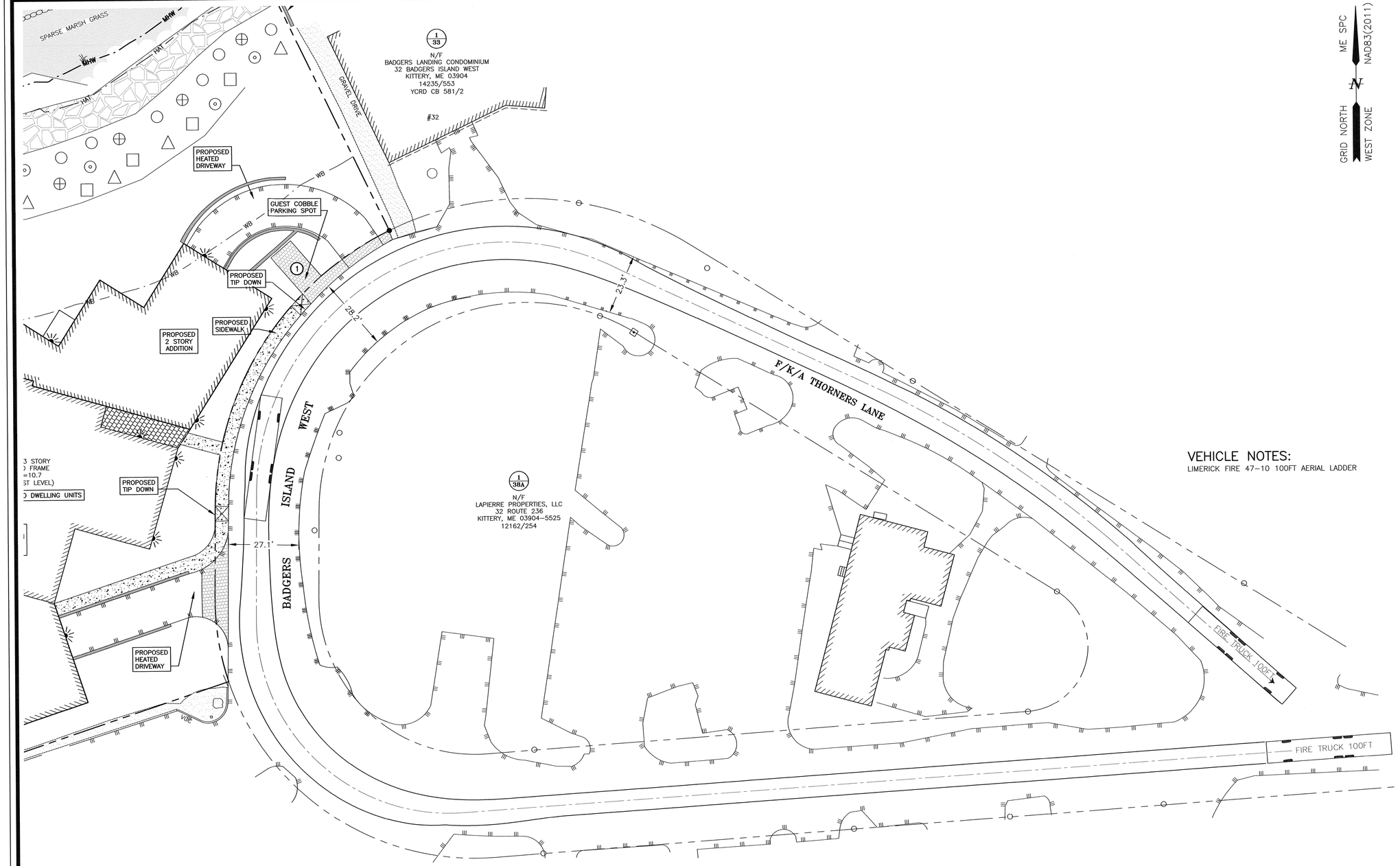
STATE OF MAINE
JOHN R. CHAGNON
No. 6950
LICENSED PROFESSIONAL ENGINEER
4.6.23

SCALE 1"=10' AUGUST 2022

PARKING PLAN

C6

FB 423 PG 1 3050.72 TAX MAP 1 LOT 32



VEHICLE NOTES:

LIMERICK FIRE 47-10 100FT AERIAL LADDER

GRAPHIC SCALE

10 0 20 40 60 80 FEET
5 0 5 10 15 20 25 METERS

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SITE DEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, MAINE

NO.	DESCRIPTION	DATE
1	BUILDING	4/6/23
0	ISSUED FOR COMMENT	1/19/23

REVISIONS

STATE OF MAINE
JOHN R. CHAGNON
No. 9950
LICENSED PROFESSIONAL ENGINEER

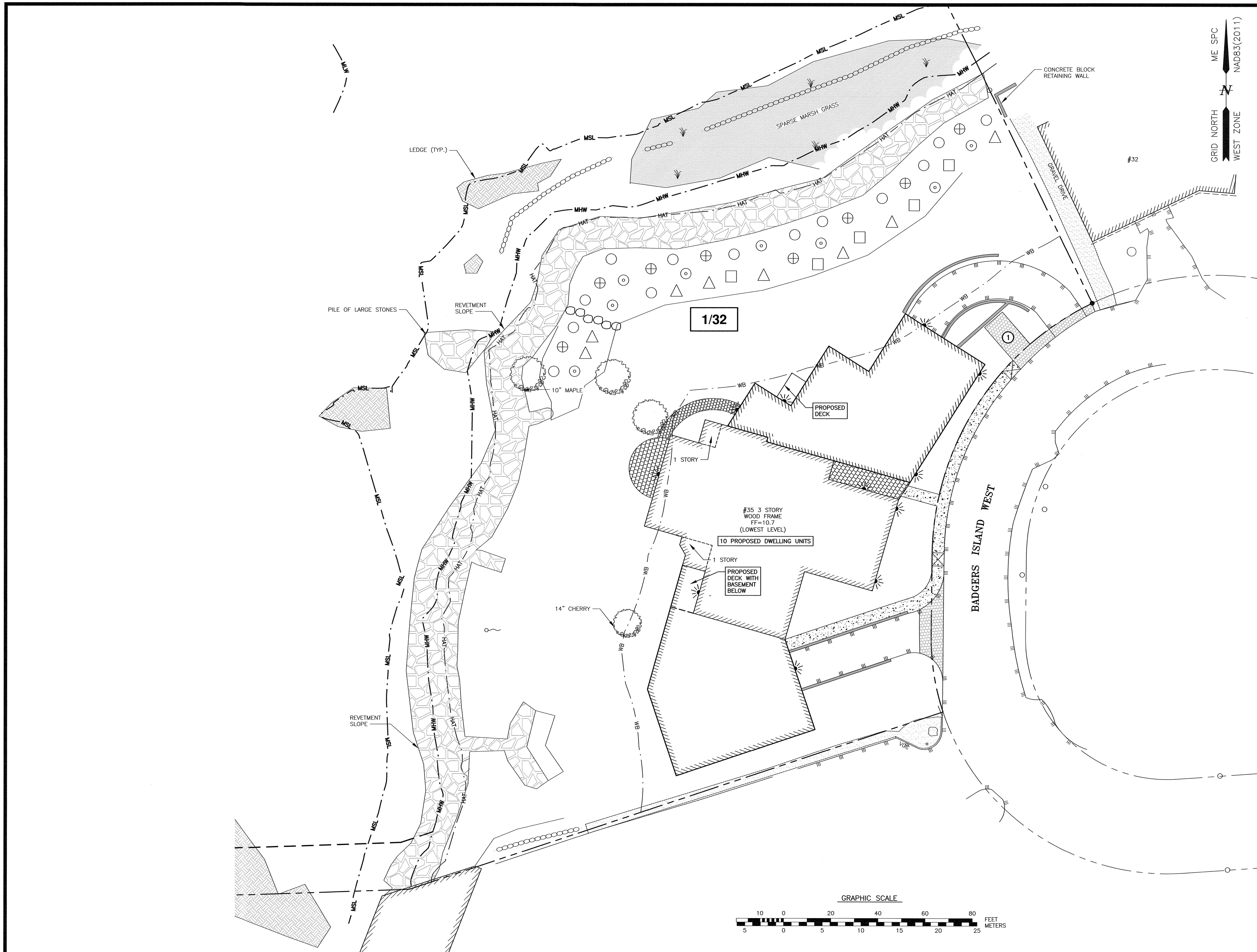
4.6.23

SCALE 1"=20' AUGUST 2022

TURNING TEMPLATE PLAN — **T1**

FB 423 PG 1 3050.72 TAX MAP 1 LOT 32

P:\NH\50\3\3-Hampton_Development\3050.72A-Badgers Island W (35)-JRC\3050.72A Hampton Development\2022 Site Permitting\Plans & Specs\Dwg\3050_72A Turning Template 2023 NEW.dwg, 4/6/2023 3:56:43 PM, Portsmouth Plotter Canon TX3000 (temporary).pc3



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NOTES:

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2) OWNER OF RECORD:
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41 INDUSTRIAL DRIVE, UNIT 20
EXETER, NH 03833
18503/331 (FIRST PARCEL)
PLAN BOOK 22/31 (LOTS 14, 15, 16, & 17)

3) THE PURPOSE OF THIS PLAN IS TO SHOW THE PROPOSED LIGHTING ON THE TOWN OF KITTERY ASSESSOR'S MAP 1 AS LOT 32.

SITE DEVELOPMENT 35 BADGERS ISLAND WEST KITTERY, MAINE

NO.	DESCRIPTION	DATE
1	BUILDING	4/6/23
0	ISSUED FOR COMMENT	1/19/23

REVISIONS

SCALE 1"=20' AUGUST 2022

LIGHTING PLAN C7

FB 423 PG 1 3050.72 TAX MAP 1 LOT 32

EROSION CONTROL NOTES

CONSTRUCTION SEQUENCE

DO NOT BEGIN CONSTRUCTION UNTIL ALL LOCAL, STATE, AND FEDERAL PERMITS HAVE BEEN APPLIED FOR AND RECEIVED.

INSTALL PERIMETER CONTROLS, i.e., SILT FENCING OR SILTSOXX AROUND THE LIMITS OF DISTURBANCE BEFORE ANY EARTH MOVING OPERATIONS. THE USE OF HAY BALES IS NOT ALLOWED.

CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE.

PERFORM CLEARING & GRUBBING

CUT AND GRUB ALL TREES, SHRUBS, SAPLINGS, BRUSH, VINES AND REMOVE OTHER DEBRIS AND RUBBISH AS REQUIRED.

REMOVE PAVEMENT AS NEEDED.

BULLDOZE TOPSOIL INTO STOCKPILES, AND CIRCLE WITH SILT FENCING OR SILTSOXX. IF EROSION IS EXCESSIVE, THEN COVER WITH MULCH.

ROUGH GRADE SITE, IN LANDSCAPED AREAS OUT OF THE WAY OF SUBSEQUENT CONSTRUCTION ACTIVITY, INSTALL TOPSOIL, MULCH, SEED AND FERTILIZE. STABILIZE PER DETAILS.

CONSTRUCT FOUNDATIONS.

LAYOUT AND INSTALL ALL BURIED UTILITIES AND SERVICES TO THE PROPOSED BUILDING FOUNDATIONS. CAP AND MARK TERMINATIONS OR LOG SWING TIES.

CONSTRUCT BUILDING FRAMES.

FINISH GRADE SITE, DRIVEWAY & PARKING SUBBASE GRAVEL IN TWO, COMPACTED LIFTS. PROVIDE TEMPORARY EROSION PROTECTION TO DITCHES AND SWALES IN THE FORM OF MULCHING, JUTE MESH OR DITCH DAMS. CONSTRUCT BINDER COURSE.

BUILDING EXTERIOR WORK & LIGHT FIXTURES.

AFTER BUILDING IS COMPLETED FINISH ALL REMAINING LANDSCAPED WORK.

CONSTRUCT ASPHALT WEARING COURSE.

REMOVE TRAPPED SEDIMENTS FROM COLLECTION DEVICES AS APPROPRIATE, AND THEN REMOVE TEMPORARY EROSION CONTROL MEASURES UPON COMPLETION OF FINAL STABILIZATION OF THE SITE.

GENERAL CONSTRUCTION NOTES

THE EROSION CONTROL PROCEDURES SHALL CONFORM TO "MAINE EROSION AND SEDIMENT CONTROL BMP'S" PUBLISHED BY THE MAINE D.E.P. IN 2016.

DURING CONSTRUCTION AND THEREAFTER, EROSION CONTROL MEASURES ARE TO BE IMPLEMENTED AS NOTED. THE SMALLEST PRACTICAL AREA OF LAND SHOULD BE EXPOSED AT ANY ONE TIME DURING CONSTRUCTION, BUT IN NO CASE SHALL EXCEED 5 ACRES AT ANY ONE TIME BEFORE DISTURBED AREAS ARE STABILIZED.

AN AREA SHALL BE CONSIDERED STABLE IF ONE OF THE FOLLOWING HAS OCCURRED:
- BASE COURSE GRAVELS HAVE BEEN INSTALLED IN AREAS TO BE PAVED;
- A MINIMUM OF 85% VEGETATED GROWTH HAS BEEN ESTABLISHED;
- A MINIMUM OF 3" OF NON-EROSIVE MATERIAL SUCH AS STONE OR RIPRAP HAS BEEN INSTALLED; OR,
- EROSION CONTROL BLANKETS HAVE BEEN PROPERLY INSTALLED.

ANY DISTURBED AREAS WHICH ARE TO BE LEFT TEMPORARILY, AND WHICH WILL BE REGRADED LATER DURING CONSTRUCTION SHALL BE MACHINE HAY MULCHED AND SEEDED WITH RYE GRASS TO PREVENT EROSION.

DUST CONTROL: IF TEMPORARY STABILIZATION PRACTICES, SUCH AS TEMPORARY VEGETATION AND MULCHING, DO NOT ADEQUATELY REDUCE DUST GENERATION, APPLICATION OF WATER OR CALCIUM CHLORIDE SHALL BE APPLIED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES.

ALL EROSION CONTROLS SHALL BE INSPECTED WEEKLY DURING THE LIFE OF THE PROJECT AND AFTER EACH STORM OF 0.5" OR GREATER. ALL DAMAGED SILT FENCES SHALL BE REPAIRED. SEDIMENT DEPOSITS SHALL PERIODICALLY BE REMOVED AND DISPOSED IN A SECURED LOCATION.

AVOID THE USE OF FUTURE OPEN SPACES (LOAM AND SEED AREAS) WHEREVER POSSIBLE DURING CONSTRUCTION. CONSTRUCTION TRAFFIC SHALL USE THE ROADBEDS OF FUTURE ACCESS DRIVES AND PARKING AREAS.

TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED IN AMOUNTS NECESSARY TO COMPLETE FINISHED GRADING OF ALL EXPOSED AREAS. CONSTRUCT SILT FENCE AROUND TOPSOIL STOCKPILE.

AREAS TO BE FILLED SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS OR OTHER OBJECTIONABLE MATERIAL. STUMPS SHALL BE DISPOSED BY GRINDING OR FILL IN AN APPROVED FACILITY.

ALL FILLS SHALL BE PLACED AND COMPACTED TO REDUCE EROSION, SLIPPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS.

ALL FILL SHALL BE PLACED AND COMPACTED IN LAYERS NOT EXCEEDING 8 INCHES IN THICKNESS UNLESS OTHERWISE NOTED.

FROZEN MATERIAL OR SOFT, MUCKY OR HIGHLY COMPRESSIBLE MATERIAL SHALL NOT BE INCORPORATED INTO FILLS.

FILL MATERIAL SHALL NOT BE PLACED ON FROZEN FOUNDATION SUBGRADE.

DISTURBED AREAS SHALL BE SEEDED WITHIN 72 HOURS FOLLOWING FINISHED GRADING.

AT NO TIME SHALL ANY DISTURBED AREA REMAIN UNSTABILIZED FOR LONGER THAN 72 HOURS. ALL AREAS WHERE CONSTRUCTION IS NOT COMPLETE WITHIN THIRTY DAYS OF THE INITIAL DISTURBANCE SHALL BE MACHINE HAY MULCHED AND SEEDED WITH RYE GRASS TO PREVENT EROSION.

VEGETATIVE PRACTICE

FOR PERMANENT MEASURES AND PLANTINGS:

LIMESTONE SHALL BE THOROUGHLY INCORPORATED INTO THE LOAM LAYER AT A RATE OF 2 TONS PER ACRE.

FERTILIZER SHALL BE SPREAD ON THE TOP LAYER OF LOAM AND WORKED INTO THE SURFACE. FERTILIZER APPLICATION RATE SHALL BE 500 POUNDS PER ACRE OF 10-20-20 FERTILIZER.

SEED SHALL BE SOWN AT THE RATES SHOWN IN THE TABLE BELOW. 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. HAY MULCH SHALL BE APPLIED IMMEDIATELY AFTER SEEDING AT A RATE OF 1.5 TO 2 TONS PER ACRE, AND SHALL BE HELD IN PLACE USING APPROPRIATE TECHNIQUES FROM THE EROSION AND SEDIMENT CONTROL HANDBOOK.

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 SHALL BE RESEEDED, AND ALL NOXIOUS WEEDS REMOVED.

A GRASS SEED MIXTURE CONTAINING THE FOLLOWING SEED REQUIREMENTS SHALL BE:

GENERAL COVER	PROPORTION	SEEDING RATE
CREEPING RED FESCUE	50%	100 LBS/ACRE
KENTUCKY BLUEGRASS	50%	

SLOPE SEED (USED ON ALL SLOPES GREATER THAN OR EQUAL TO 3:1)		
CREEPING RED FESCUE	42%	
TALL FESCUE	42%	48 LBS/ACRE
BIRDSFOOT TREFOIL	16%	

IN NO CASE SHALL THE WEED CONTENT EXCEED ONE PERCENT BY WEIGHT. ALL SEED SHALL COMPLY WITH APPLICABLE STATE AND FEDERAL SEED LAWS.

FOR TEMPORARY PROTECTION OF DISTURBED AREAS:
MULCHING AND SEEDING SHALL BE APPLIED AT THE FOLLOWING RATES:
PERENNIAL RYE: 0.7 LBS/1,000 S.F.
MULCH: 1.5 TONS/ACRE

MAINTENANCE AND PROTECTION

THE CONTRACTOR SHALL MAINTAIN ALL LOAM & SEED AREAS UNTIL FINAL ACCEPTANCE AT THE COMPLETION OF THE CONTRACT. MAINTENANCE SHALL INCLUDE WATERING, WEEDING, REMOVAL OF STONES AND OTHER FOREIGN OBJECTS OVER 1/2 INCHES IN DIAMETER WHICH MAY APPEAR AND THE FIRST TWO (2) CUTTINGS OF GRASS NO CLOSER THEN TEN (10) DAYS APART. THE FIRST CUTTING SHALL BE ACCOMPLISHED WHEN THE GRASS IS FROM 2 1/2 TO 3 INCHES HIGH. ALL BARE AND DEAD SPOTS WHICH BECOME APPARENT SHALL BE PROPERLY PREPARED, LIMED AND FERTILIZED, AND RESEEDED BY THE CONTRACTOR AT HIS EXPENSE AS MANY TIMES AS NECESSARY TO SECURE GOOD GROWTH. THE ENTIRE AREA SHALL BE MAINTAINED, WATERED AND CUT UNTIL ACCEPTANCE OF THE LAWN BY THE OWNER'S REPRESENTATIVE.

THE CONTRACTOR SHALL TAKE WHATEVER MEASURES ARE NECESSARY TO PROTECT THE GRASS WHILE IT IS DEVELOPING.

TO BE ACCEPTABLE, SEEDED AREAS SHALL CONSIST OF A UNIFORM STAND OF AT LEAST 90 PERCENT ESTABLISHED PERMANENT GRASS SPECIES, WITH UNIFORM COUNT OF AT LEAST 100 PLANTS PER SQUARE FOOT.

SEEDED AREAS WILL BE FERTILIZED AND RESEEDED AS NECESSARY TO INSURE VEGETATIVE ESTABLISHMENT.

THE SWALES WILL BE CHECKED WEEKLY AND REPAIRED WHEN NECESSARY UNTIL ADEQUATE VEGETATION IS ESTABLISHED.

THE SILT FENCE BARRIER SHALL BE CHECKED AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.

SILT FENCING SHALL BE REMOVED ONCE VEGETATION IS ESTABLISHED, AND DISTURBED AREAS RESULTING FROM SILT FENCE REMOVAL SHALL BE PERMANENTLY SEEDED.

WINTER NOTES

ALL PROPOSED VEGETATED AREAS WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, 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.

ALL DITCHES OR SWALES WHICH DO NOT EXHIBIT A MINIMUM OF 85% VEGETATIVE GROWTH BY OCTOBER 15TH, OR WHICH ARE DISTURBED AFTER OCTOBER 15TH, SHALL BE STABILIZED TEMPORARILY WITH STONE OR EROSION CONTROL BLANKETS APPROPRIATE FOR THE DESIGN FLOW CONDITIONS.

AFTER NOVEMBER 15TH, 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.

INSPECTION AND MAINTENANCE PLAN

INTRODUCTION

THE INTENT OF THIS IS TO PROVIDE HAMPSHIRE DEVELOPMENT A LIST OF PROCEDURES THAT DOCUMENT THE INSPECTION AND MAINTENANCE REQUIREMENTS OF THE STORMWATER MANAGEMENT SYSTEM FOR THIS DEVELOPMENT. SPECIFICALLY, THE PROPOSED CONSTRUCTION DRAINAGE AND ASSOCIATED STRUCTURES ON THE PROJECT SITE (COLLECTIVELY REFERRED TO AS THE "STORMWATER MANAGEMENT SYSTEM")

THE FOLLOWING INSPECTION AND MAINTENANCE PROGRAM IS NECESSARY TO KEEP THE STORMWATER MANAGEMENT SYSTEM FUNCTIONING PROPERLY. THESE MEASURES WILL ALSO HELP MINIMIZE POTENTIAL ENVIRONMENTAL IMPACTS. BY FOLLOWING THE ENCLOSED PROCEDURES, THE OWNER WILL BE ABLE TO MAINTAIN THE FUNCTIONAL DESIGN OF THE STORMWATER MANAGEMENT SYSTEM AND MAXIMIZED ITS ABILITY TO REMOVE SEDIMENT AND OTHER CONTAMINANTS FROM THE SITE GENERATED STORMWATER RUNOFF.

STORMWATER MANAGEMENT SYSTEM COMPONENTS

THE STORMWATER MANAGEMENT SYSTEM IS DESIGNED TO MITIGATE BOTH THE QUANTITY AND QUALITY OF SITE-GENERATED RUNOFF. AS THE RESULT, THE DESIGN INCLUDES THE FOLLOWING ELEMENTS:

NON-STRUCTURAL BMP'S

NON-STRUCTURAL BEST MANAGEMENT PRACTICES (BMP'S) INCLUDE TEMPORARY AND PERMANENT MEASURES THAT TYPICALLY REQUIRE LESS LABOR AND CAPITAL INPUTS AND ARE INTENDED TO PROVIDE PROTECTION AGAINST EROSION OF SOILS. EXAMPLES OF NON-STRUCTURAL BMP'S ON THIS PROJECT INCLUDE BUT ARE NOT LIMITED TO: TEMPORARY AND PERMANENT MULCHING, TEMPORARY AND PERMANENT GRASS COVER, TREES, SHRUBS AND GROUND COVERS, MISCELLANEOUS LANDSCAPE PLANTINGS, DUST CONTROL, TREE PROTECTION, TOPSOILING, SEDIMENT BARRIERS, AND DURING CONSTRUCTION, STABILIZED CONSTRUCTION ENTRANCES AND CATCH BASIN BASKETS. IN THIS SITE TOTAL IMPERVIOUS AREA IS REDUCED.

STRUCTURAL BMP'S

STRUCTURAL BMP'S REQUIRE MORE SPECIALIZED PERSONNEL TO INSTALL. EXAMPLES ON THE PROJECT INCLUDE BUT ARE NOT LIMITED TO: STORM DRAINS, THE FILTRATION BASIN, THE JELLYFISH FILTER, AND ASSOCIATED OUTLET CONTROL STRUCTURES.

INSPECTION AND MAINTENANCE REQUIREMENTS

THE FOLLOWING SUMMARIZES THE INSPECTION AND MAINTENANCE REQUIREMENTS FOR THE VARIOUS BMP'S THAT MAY BE FOUND ON THIS PROJECT:

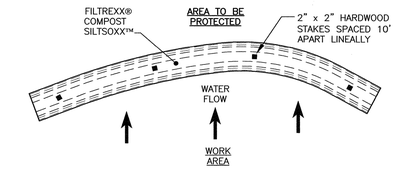
1. GRASSED AREAS: AFTER EACH RAIN EVEN OF 0.5" OR MORE DURING A 24 HOUR PERIOD, INSPECT GRASSED AREAS FOR SIGNS OF DISTURBANCE, SUCH AS EROSION. IF DAMAGED AREAS ARE DISCOVERED, IMMEDIATELY REPAIR THE DAMAGE. REPAIRS MAY INCLUDE ADDING NEW TOPSOIL, LIME, SEED, FERTILIZER AND MULCH.

2. PLANTINGS: PLANTING AND LANDSCAPING (TREES, SHRUBS) SHALL BE MONITORED BI-MONTHLY DURING THE FIRST YEAR TO INSURE VIABILITY AND VIGOROUS GROWTH. REPLACE DEAD OR DYING VEGETATION WITH NEW STOCK AND MAKE ADJUSTMENTS TO THE CONDITIONS THAT CAUSED THE DEAD OR DYING VEGETATION. DURING DRYER TIMES OF THE YEAR, PROVIDED WEEKLY WATERING OR IRRIGATION DURING THE ESTABLISHMENT PERIOD OF THE FIRST YEAR. MAKE NECESSARY ADJUSTMENTS TO ENSURE LONG-TERM HEALTH OF VEGETATED COVER, I.E. PROVIDE MORE PERMANENT MULCH OR COMPOST OR OTHER MEANS OF PROTECTION.

3. INVASIVE SPECIES
MONITOR STORMWATER MANAGEMENT SYSTEM FOR SIGNS OF INVASIVE SPECIES GROWTH. IF CAUGHT EARLIER ENOUGH, THEIR ERADICATION IS MUCH EASIER. THE MOST LIKELY PLACES WHERE INVASIONS START ARE IN WETTER, DISTURBED SOILS OR DETENTION PONDS. SPECIES SUCH AS PHRAGMITES AND PURPLE LOOSE-STRIFE ARE COMMON INVADERS IN THESE WETTER AREAS. IF THEY ARE FOUND THEN THE OWNER SHALL CONTACT A WETLAND SCIENTIST WITH EXPERIENCE IN INVASIVE SPECIES CONTROL TO IMPLEMENT A PLAN OF ACTION TO ERADICATE THE INVADERS. MEASURES THAT DO NOT REQUIRE THE APPLICATION OF CHEMICAL HERBICIDES SHOULD BE THE FIRST LINE OF DEFENSE.

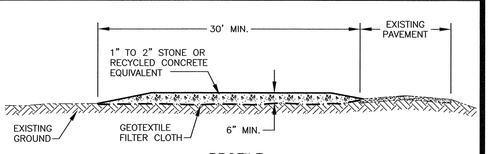
4. JELLYFISH FILTER: REFERENCE SHEET D4 FOR COMPLETE MAINTENANCE DETAILS. FILTER SHOULD BE INSPECTED QUARTERLY FOR THE FIRST YEAR AND YEARLY THEREAFTER AS WELL AS AFTER MAJOR STORM EVENTS, AT MINIMUM. SEDIMENT DEPTHS GREATER THAN 12 INCHES SHOULD BE REMOVED, AS WELL AS FLOATABLES, TRASH AND DEBRIS, AND OIL. THE DECK MUST BE CLEANED AND FREE FROM SEDIMENT DURING INSPECTIONS. FILTER CARTRIDGES SHOULD BE RINSED EVERY 12 MONTHS. FILTER CARTRIDGES SHOULD BE REPLACED AT A MAXIMUM OF 5 YEARS, OR IF THEY FAIL TO RESTORE ADEQUATE HYDRAULIC CAPACITY.

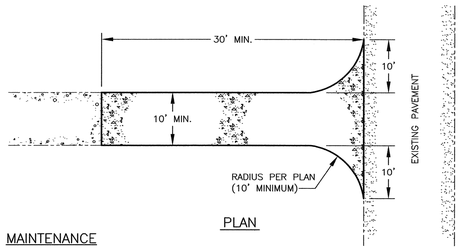
5. DOWNSPOUT FILTERS: REFERENCE SHEET D5 FOR MAINTENANCE SCHEDULE.



NOTES:
1. ALL MATERIAL TO MEET FILTREXX SPECIFICATIONS.
2. FILLTREXX SYSTEM SHALL BE INSTALLED BY A CERTIFIED FILTREXX INSTALLER.
3. THE CONTRACTOR SHALL MAINTAIN THE COMPOST FILTRATION SYSTEM IN A FUNCTIONAL CONDITION AT ALL TIMES. IT WILL BE ROUTINELY INSPECTED AND REPAIRED WHEN REQUIRED.
4. SILTSOXX DEPICTED IS FOR MINIMUM SLOPES, GREATER SLOPES MAY REQUIRE ADDITIONAL PLACEMENTS.
5. THE COMPOST FILTER MATERIAL WILL BE DISPERSED ON SITE WHEN NO LONGER REQUIRED, AS DETERMINED BY THE ENGINEER.

1 / C4 FILTREXX® SILTSOXX™ FILTRATION SYSTEM (AS NEEDED) NTS





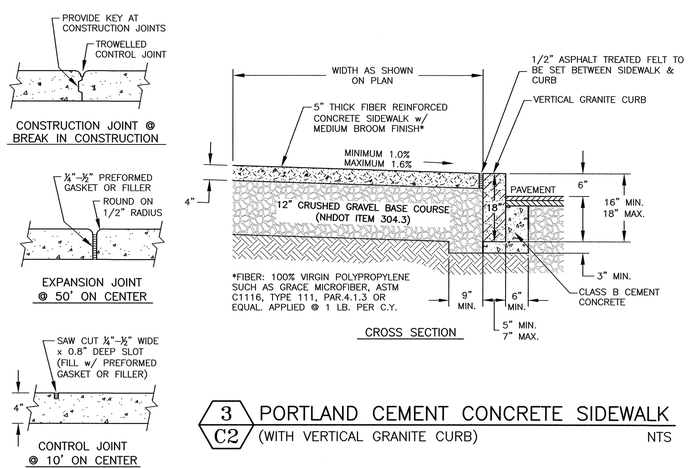
MAINTENANCE

1) MUD AND SOIL PARTICLES WILL EVENTUALLY CLOG THE VOIDS IN THE GRAVEL AND THE EFFECTIVENESS OF THE GRAVEL PAD WILL NOT BE SATISFACTORY. WHEN THIS OCCURS, THE PAD SHOULD BE TOP DRESSED WITH NEW STONE. COMPLETE REPLACEMENT OF THE PAD MAY BE NECESSARY WHEN THE PAD BECOMES COMPLETELY CLOGGED.
2) IF WASHING FACILITIES ARE USED, THE SEDIMENT TRAPS SHOULD BE CLEANED OUT AS OFTEN AS NECESSARY TO ASSURE THAT ADEQUATE TRAPPING EFFICIENCY AND STORAGE VOLUME IS AVAILABLE. VEGETATIVE FILTER STRIPS SHOULD BE MAINTAINED TO INSURE A VIGOROUS STAND OF VEGETATION AT ALL TIMES.

CONSTRUCTION SPECIFICATIONS

1) STONE FOR A STABILIZED CONSTRUCTION ENTRANCE SHALL BE 2 TO 4 INCH STONE, RECLAIMED STONE, OR RECYCLED CONCRETE EQUIVALENT.
2) THE LENGTH OF THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 30 FEET FOR A SINGLE RESIDENTIAL LOT.
3) THE THICKNESS OF THE STONE FOR THE STABILIZED ENTRANCE SHALL NOT BE LESS THAN 6 INCHES.
4) THE WIDTH OF THE ENTRANCE SHALL NOT BE LESS THAN THE FULL WIDTH OF THE ENTRANCE WHERE INGRESS OR EGRESS OCCURS OR 10 FEET, WHICHEVER IS GREATER.
5) GEOTEXTILE FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING THE STONE. FILTER CLOTH IS NOT REQUIRED FOR A SINGLE FAMILY RESIDENCE LOT.
6) ALL SURFACE WATER THAT IS FLOWING TO OR DIVERTED TOWARD THE CONSTRUCTION ENTRANCE SHALL BE PIPED BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A BERM WITH 5:1 SLOPES THAT CAN BE CROSSED BY VEHICLES MAY BE SUBSTITUTED FOR THE PIPE.
7) THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, WASHED, OR TRACKED ONTO PUBLIC RIGHT-OF-WAY MUST BE REMOVED PROMPTLY.
8) WHEELS SHALL BE CLEANED TO REMOVE MUD PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY, WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

2 / C4 STABILIZED CONSTRUCTION ENTRANCE
SUBSTITUTE FODS IF DESIRED NTS



3 / C2 PORTLAND CEMENT CONCRETE SIDEWALK
(WITH VERTICAL GRANITE CURB) NTS

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

1) THE CONTRACTOR SHALL NOTIFY DIG SAFE AT 1-888-DIG-SAFE (1-888-344-7233) AT LEAST 72 HOURS PRIOR TO COMMENCING ANY EXCAVATION ON PUBLIC OR PRIVATE PROPERTY.

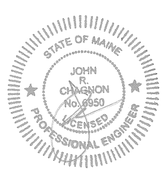
2) UNDERGROUND UTILITY LOCATIONS ARE BASED UPON BEST AVAILABLE EVIDENCE AND ARE NOT FIELD VERIFIED. LOCATING AND PROTECTING ANY ABOVEGROUND OR UNDERGROUND UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR AND/OR THE OWNER. UTILITY CONFLICTS SHOULD BE REPORTED AT ONCE TO THE DESIGN ENGINEER.

3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP'S" PUBLISHED BY THE MAINE D.E.P. IN 2016.

SITE REDEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, ME

NO.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	1/19/23

REVISIONS



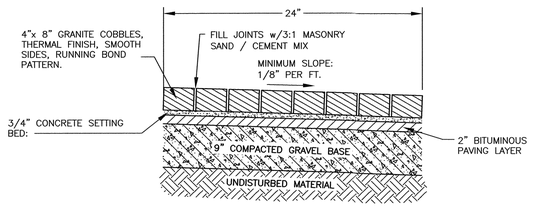
SCALE: AS SHOWN DECEMBER 2022

EROSION CONTROL NOTES AND DETAILS

D1

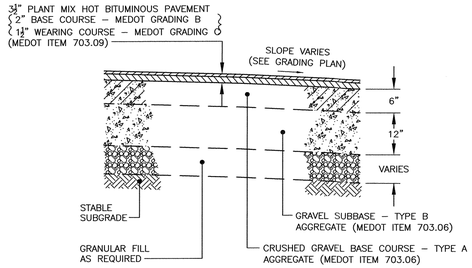
FB 423 PG 1

3050.72



A C2 COBBLE BAND

NTS

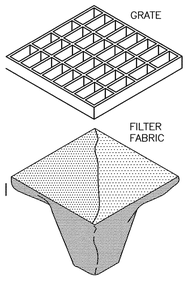


NOTE:
1) AGGREGATE BASE AND SUBBASE COURSES SHALL CONFORM TO SECTIONS 304 AND 703 OF MAINE DOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, APRIL 1995.

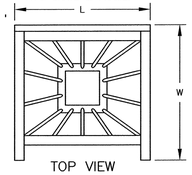
2) PLANT MIX HOT BITUMINOUS PAVEMENT SHALL CONFORM TO SECTIONS 401, 403, 702 AND 703 OF MAINE DOT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES, APRIL 1995.

B C2 TYPICAL PAVEMENT CROSS–SECTION

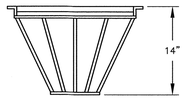
NTS



LENGTH (L) & WIDTH (W) AS REQUIRED TO FIT MAINEDOT TYPE GRATE & FRAME.



TOP VIEW



SIDE VIEW

1) INLET BASKETS SHALL BE INSTALLED IMMEDIATELY AFTER CATCH BASIN CONSTRUCTION IS COMPLETE AND SHALL REMAIN IN PLACE AND BE MAINTAINED UNTIL PAVEMENT BINDER COURSE IS COMPLETE.

2) FILTER FABRIC SHALL BE PUSHED DOWN AND FORMED TO THE SHAPE OF THE BASKET. THE SHEET OF FABRIC SHALL BE LARGE ENOUGH TO BE SUPPORTED BY THE BASKET FRAME WHEN HOLDING SEDIMENT AND, SHALL EXTEND AT LEAST 6" PAST THE FRAME. THE INLET GRATE SHALL BE PLACED OVER THE BASKET/FRAME AND WILL SERVE AS THE FABRIC ANCHOR.

3) THE FILTER FABRIC SHALL BE A GEOTEXTILE FABRIC; POLYESTER, POLYPROPYLENE, STABILIZED NYLON, POLYETHYLENE, OR POLYVINYLIDENE CHLORIDE MEETING THE FOLLOWING SPECIFICATIONS:
- –RAB STRENGTH: 45 LB. MIN. IN ANY PRINCIPAL DIRECTION (ASTM D1682)
- –MULLEN BURST STRENGTH: MIN. 60 psi (ASTM D774)

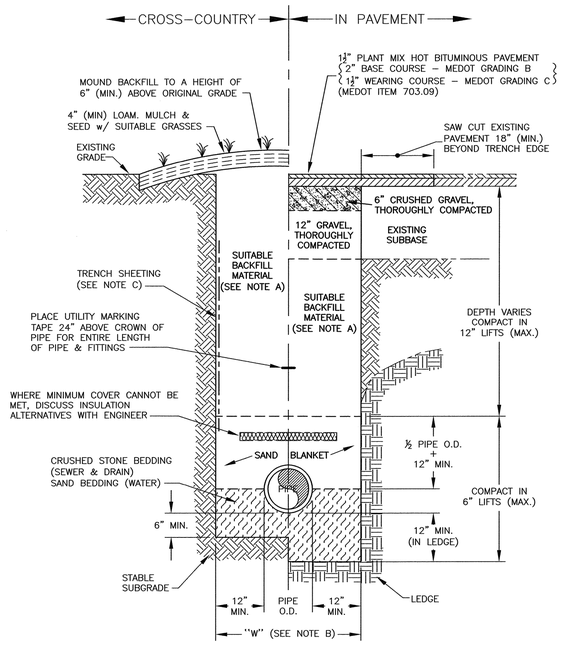
4) THE FABRIC SHALL HAVE AN OPENING NO GREATER THAN A NUMBER 20 U.S. STANDARD SIEVE AND A MINIMUM PERMEABILITY OF 120 gpm/s.f. (MULTIPLY THE PERMITTIVITY IN SEC.–1 FROM ASTM 54491–85 CONSTANT HEAD TEST USING THE CONVERSION FACTOR OF 74.)

5) THE INLET BASKET SHALL BE INSPECTED WITHIN 24 HOURS AFTER EACH RAINFALL OR DAILY DURING EXTENDED PERIODS OF PRECIPITATION. REPAIRS SHALL BE MADE IMMEDIATELY, AS NECESSARY, TO PREVENT PARTICLES FROM REACHING THE DRAINAGE SYSTEM AND/OR CAUSING SURFACE FLOODING.

6) SEDIMENT DEPOSITS SHALL BE REMOVED AFTER EACH STORM EVENT, OR MORE OFTEN IF THE FABRIC BECOMES CLOGGED.

C C4 CATCH BASIN INLET BASKET

NTS



D C3 TYPICAL PIPE TRENCH

NTS

TRENCH NOTES:

A) TRENCH BACKFILL:
– IN PAVED AREAS, SUITABLE MATERIAL FOR TRENCH BACKFILL SHALL BE THE NATURAL MATERIAL EXCAVATED DURING CONSTRUCTION, BUT SHALL EXCLUDE DEBRIS, PIECES OF PAVEMENT, ORGANIC MATTER, TOP SOIL, ALL WET OR SOFT MUCK, PEAT OR CLAY, ALL EXCAVATED LEDGE MATERIAL, AND ALL ROCKS OVER SIX INCHES IN LARGEST DIMENSION, OR ANY MATERIALS DEEMED TO BE UNACCEPTABLE BY THE ENGINEER.

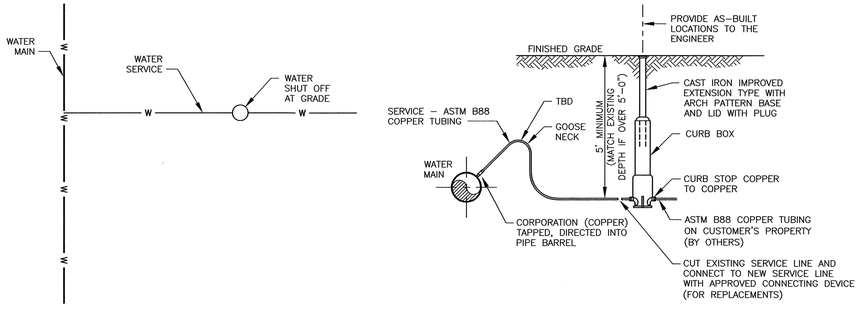
– IN CROSS–COUNTRY CONSTRUCTION, SUITABLE MATERIAL SHALL BE AS DESCRIBED ABOVE, EXCEPT THAT THE ENGINEER MAY PERMIT THE USE OF TOP SOIL, LOAM, MUCK OR PEAT, IF HE IS SATISFIED THAT THE COMPLETED CONSTRUCTION WILL BE ENTIRELY STABLE.

B) "W" = MAXIMUM ALLOWABLE TRENCH WIDTH TO A PLANE 12 INCHES ABOVE THE PIPE. FOR PIPES 15 INCHES NOMINAL DIAMETER OR LESS, W SHALL BE NO MORE THAN 36 INCHES. FOR PIPES GREATER THAN 15 INCHES NOMINAL DIAMETER, W SHALL BE 24 INCHES PLUS PIPE O.D..

C) TRENCH SHEETING:
IF REQUIRED. WHERE SHEETING IS PLACED ALONGSIDE THE PIPE AND EXTENDS BELOW MID–DIAMETER, IT SHALL BE CUT OFF AND LEFT IN PLACE TO AN ELEVATION NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE. WHERE SHEETING IS ORDERED BY THE ENGINEER TO BE LEFT IN PLACE, IT SHALL BE CUT OFF AT LEAST 3 FEET BELOW FINISHED GRADE, BUT NOT LESS THAN 1 FOOT ABOVE THE TOP OF THE PIPE.

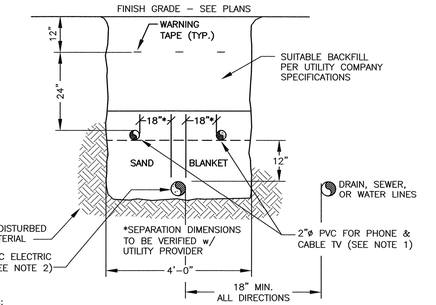
D) MINIMUM PIPE COVER FOR UTILITY MAINS (UNLESS GOVERNED BY OTHER CODES):
- 6' MINIMUM FOR SEWER
- 3' MINIMUM FOR STORMWATER DRAINS
- 5' MINIMUM FOR WATER MAINS

E) ALL PAVEMENT CUTS SHALL BE REPAIRED BY THE INFRARED HEAT METHOD.



E C3 TYPICAL WATER SERVICE CONNECTION

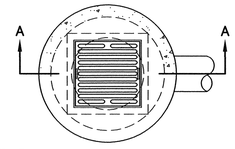
NTS



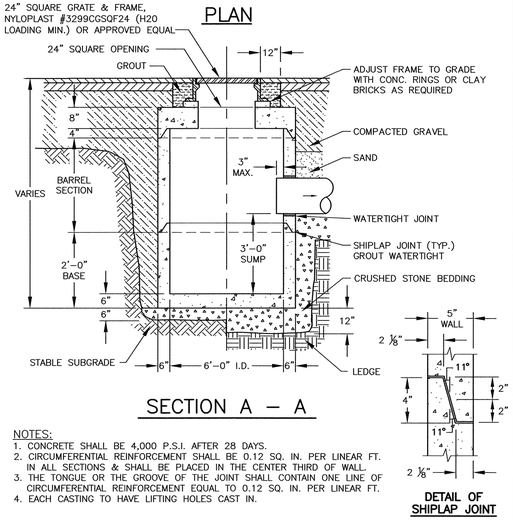
NOTES:
1) ALL CONDUIT TO BE U.L. LISTED, SCH. 80 UNDER ALL TRAVEL WAYS, & SCH. 40 FOR THE REMAINDER.
2) NORMAL CONDUIT SIZES FOR CMP ARE 3 INCH FOR SINGLE PHASE PRIMARY AND SECONDARY VOLTAGE CABLES, 4 INCH FOR THREE PHASE SECONDARY, AND 5 INCH FOR THREE PHASE PRIMARY.
3) ALL WORK TO CONFORM TO THE NATIONAL ELECTRICAL CODE (LATEST REVISION)
4) INSTALL A 200# PULL ROPE FOR EACH CONDUIT
5) VERIFY ALL CONDUIT SPECIFICATIONS WITH UTILITY COMPANIES PRIOR TO ANY CONSTRUCTION.

F C3 UTILITY TRENCH
ELECTRIC/PHONE/CABLE

NTS



PLAN



SECTION A – A

DETAIL OF SHIPLAP JOINT

NOTES:
1. CONCRETE SHALL BE 4,000 P.S.I. AFTER 28 DAYS.
2. CIRCUMFERENTIAL REINFORCEMENT SHALL BE 0.12 SQ. IN. PER LINEAR FT. IN ALL SECTIONS & SHALL BE PLACED IN THE CENTER THIRD OF WALL.
3. THE TONGUE OR THE GROOVE OF THE JOINT SHALL CONTAIN ONE LINE OF CIRCUMFERENTIAL REINFORCEMENT EQUAL TO 0.12 SQ. IN. PER LINEAR FT.
4. EACH CASTING TO HAVE LIFTING HOLES CAST IN.

G C4 REINFORCED CONCRETE CATCH BASIN

NTS

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

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3) CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL MEASURES IN ACCORDANCE WITH THE "MAINE EROSION AND SEDIMENT CONTROL BMP'S" PUBLISHED BY THE MAINE D.E.P. IN 2016.

SITE REDEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, ME

NO.	DESCRIPTION	DATE
0	ISSUED FOR APPROVAL	1/19/23

REVISIONS

STATE OF MAINE
JOHN R. CHAGNON
NO. 10050
LICENSED
PROFESSIONAL ENGINEER

1.19.23

SCALE: AS SHOWN

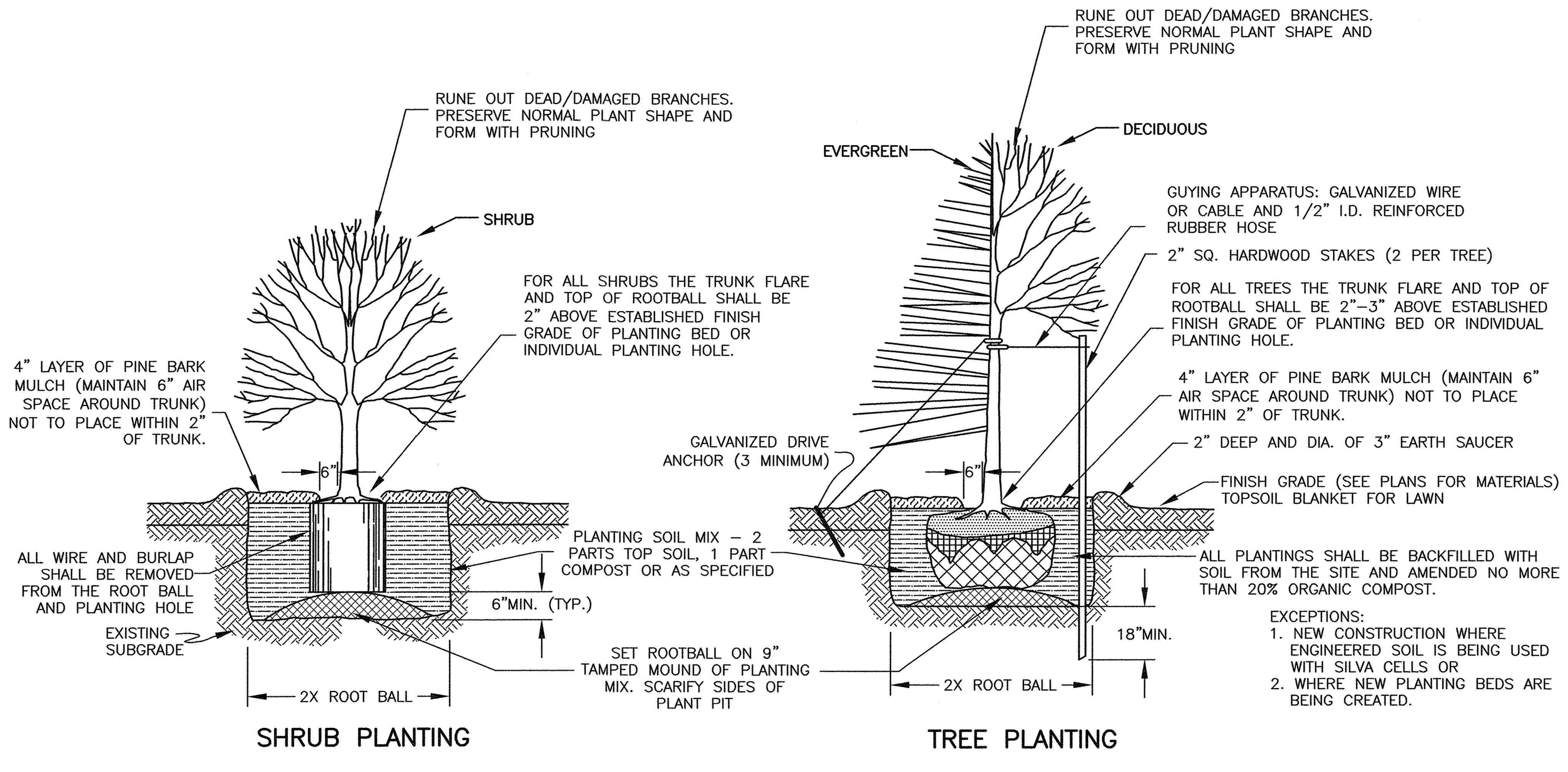
DECEMBER 2022

DETAILS

D2

FB 423 PG 1

3050.72



H / L1 — SHRUB & TREE PLANTING DETAIL — NTS

(SHRUB PLANTING DETAIL APPLIES TO EVERGREEN AND DECIDUOUS SHRUBS)

SERVICE CONNECTION NOTES:

1) SEE NOTES FOR SERVICE CONNECTION REQUIREMENTS.

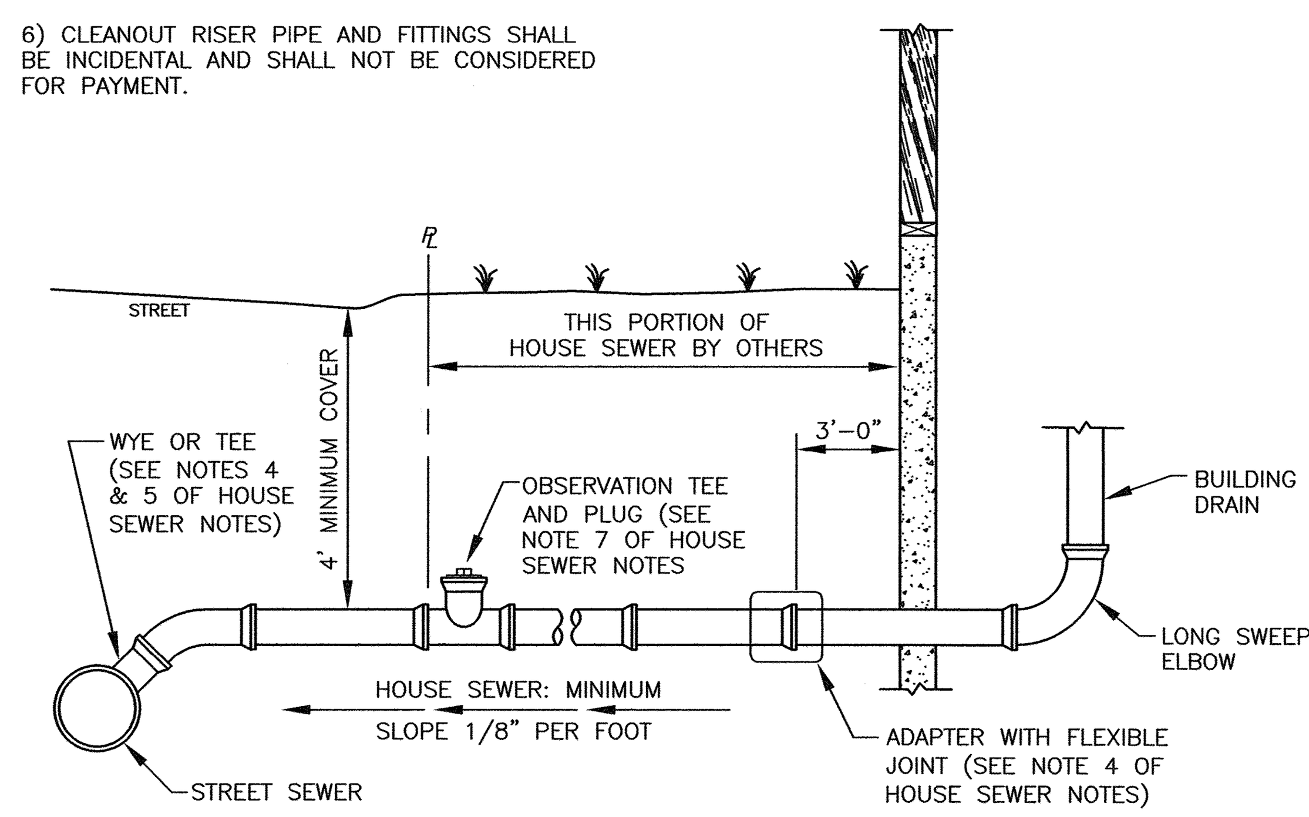
2) SERVICE CONNECTION SHALL BE INSTALLED BELOW WATER MAIN WHERE POSSIBLE.

3) CLEANOUTS SHALL BE INSTALLED AT EACH SERVICE CONNECTION.

4) REBAR SHALL BE PLACED AT SIDE OF CLEANOUT.

5) CLEANOUT SHALL BE USED TO PLUG AND TEST ALL NEW LATERALS WITH MINIMAL INTERRUPTION TO OPERATION OF HOMEOWNER SANITARY SYSTEM.

6) CLEANOUT RISER PIPE AND FITTINGS SHALL BE INCIDENTAL AND SHALL NOT BE CONSIDERED FOR PAYMENT.



I / C3 — TYPICAL SEWER SERVICE CONNECTION — NTS

HOUSE SEWER NOTES

1) MINIMUM PIPE SIZE FOR HOUSE SERVICE SHALL BE FOUR INCHES.

2) PIPE AND JOINT MATERIALS:

A. PLASTIC SEWER PIPE

1. PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING ASTM STANDARDS:

ASTM STANDARDS	GENERIC PIPE MATERIAL	SIZES APPROVED
D3034	*PVC (SOLID WALL)	8" THROUGH 15" (SDR 35)
F679	PVC (SOLID WALL)	18" THROUGH 27" (T–1 & T–2)
F789	PVC (SOLID WALL)	4" THROUGH 18" (T–1 To T–3)
F794	PVC (RIBBED WALL)	8" THROUGH 36"
D2680	*ABS (COMPOSITE WALL)	8" THROUGH 15"

*PVC: POLYVINYL CHLORIDE
*ABS: ACRYLONITRILE–BUTADIENE–STYRENE

2. JOINT SEALS FOR PVC PIPE SHALL BE OIL RESISTANT COMPRESSION RINGS OF ELASTOMERIC MATERIAL CONFORMING TO ASTM D–3212 AND SHALL BE PUSH–ON BELL AND SPIGOT TYPE.

ABS TRUSS PIPE AND FITTINGS SHALL CONFORM TO ASTM D–2680. POLYMER COMPOUNDING SHALL BE TO ASTM D–1788 (CLASS 322).

JOINTS FOR ABS TRUSS PIPE SHALL BE CHEMICAL WELDED COUPLINGS TYPE SC IN ACCORDANCE WITH ASTM D–2680, FORMING A CHEMICAL WELDED JOINT.

B. DUCTILE IRON PIPE, FITTINGS AND JOINTS.

1. DUCTILE IRON PIPE AND FITTINGS SHALL CONFORM TO THE FOLLOWING STANDARDS OF THE UNITED STATES OF AMERICA STANDARDS INSTITUTE:

A21.50 THICKNESS DESIGN OF DUCTILE IRON PIPE AND WITH ASTM A–536 DUCTILE IRON CASTINGS.

A21.51 DUCTILE IRON PIPE, CENTRIFUGALLY CAST IN METAL MOLDS OR SAND LINED MOLDS FOR WATER OR OTHER LIQUIDS.

2. JOINTS SHALL BE OF THE MECHANICAL OR PUSH ON TYPE. JOINTS AND GASKETS SHALL CONFORM TO:

A21.11 RUBBER GASKET JOINTS FOR CAST IRON PRESSURE PIPE & FITTINGS.

3) DAMAGED PIPE SHALL BE REJECTED AND REMOVED FROM THE JOB SITE.

4) JOINTS SHALL BE DEPENDENT UPON A NEOPRENE OR ELASTOMERIC GASKET FOR WATER TIGHTNESS. ALL JOINTS SHALL BE PROPERLY MATCHED WITH THE PIPE MATERIALS USED. WHERE DIFFERING MATERIALS ARE TO BE CONNECTED, AS AT THE STREET SEWER WYE OR AT THE FOUNDATION, APPROPRIATE MANUFACTURED ADAPTERS SHALL BE USED.

5) HOUSE SEWER INSTALLATION: THE PIPE SHALL BE HANDLED, PLACED AND JOINTED IN ACCORDANCE WITH INSTALLATION GUIDES OF THE APPROPRIATE MANUFACTURER. IT SHALL BE CAREFULLY BEDDED ON A 4 INCH LAYER OF CRUSHED STONE AND/OR GRAVEL AS SPECIFIED IN NOTE 10. BEDDING AND REFILL FOR DEPTH OF 12 INCHES ABOVE THE TOP OF THE PIPE SHALL BE CAREFULLY AND THOROUGHLY TAMPED BY HAND OR WITH APPROPRIATE MECHANICAL DEVICES. THE PIPE SHALL BE LAID AT A CONTINUOUS AND CONSTANT GRADE FROM THE STREET SEWER CONNECTION TO THE FOUNDATION AT A GRADE OF NOT LESS THAN 1/8th INCH PER FOOT. PIPE JOINTS MUST BE MADE UNDER DRY CONDITIONS. IF WATER IS PRESENT, ALL NECESSARY STEPS SHALL BE TAKEN TO DEWATER THE TRENCH.

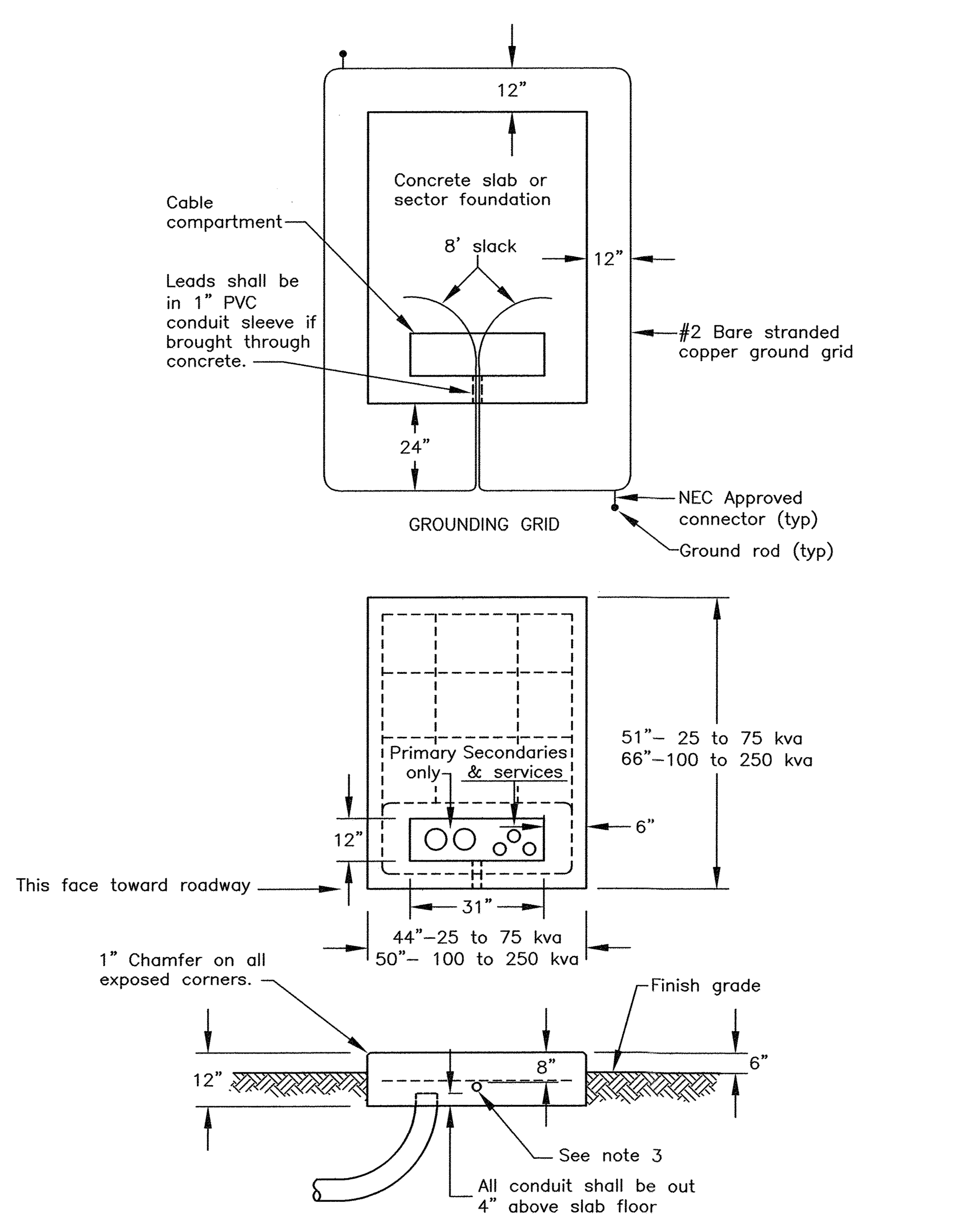
6) TESTING: THE COMPLETED HOUSE SEWER SHALL BE SUBJECTED TO A LEAKAGE TEST IN ANY OF THE FOLLOWING MANNERS: (PRIOR TO BACKFILLING)

A. AN OBSERVATION TEE SHALL BE INSTALLED AS SHOWN AND WHEN READY FOR TESTING, AN INFLATABLE BLADDER OR PLUG SHALL BE INSERTED JUST UPSTREAM FROM THE OPENING IN THE TEE. AFTER INFLATION, WATER SHALL BE INTRODUCED INTO THE SYSTEM ABOVE THE PLUG TO A HEIGHT OF 5 FEET ABOVE THE LEVEL OF THE PLUG.

B. THE PIPE SHALL BE LEFT EXPOSED AND LIBERALLY HOSED WITH WATER, TO SIMULATE, AS NEARLY AS POSSIBLE, WET TRENCH CONDITIONS OR, IF TRENCH IS WET, THE GROUND WATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. INSPECTIONS FOR LEAKS SHALL BE MADE THROUGH THE CLEANOUT WITH A FLASHLIGHT.

C. DRY FLUORESCENE DYE SHALL BE SPRINKLED INTO THE TRENCH OVER THE PIPE. IF THE TRENCH IS DRY, THE PIPE SHALL BE LIBERALLY HOSED WITH WATER, OR IF THE TRENCH IS WET, GROUNDWATER SHALL BE PERMITTED TO RISE IN THE TRENCH OVER THE PIPE. OBSERVATION FOR LEAKS SHALL BE MADE IN THE FIRST DOWN STREAM MANHOLE.

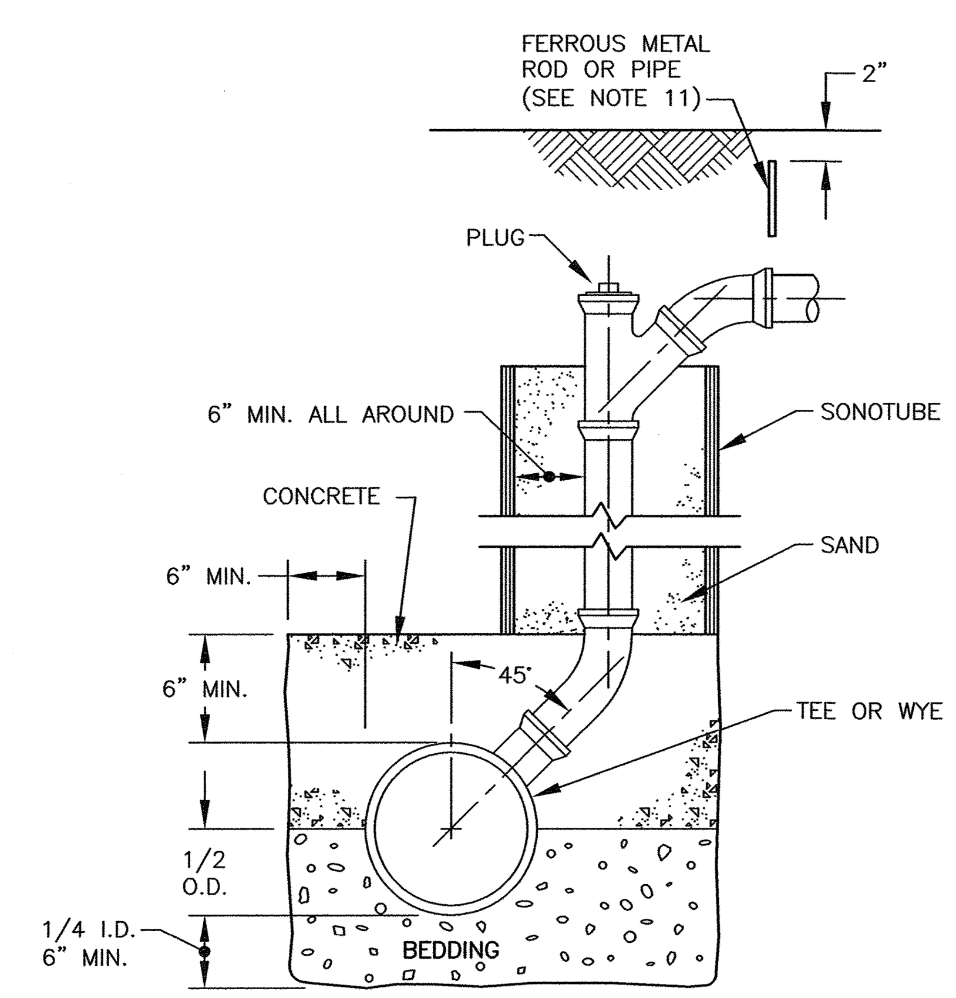
LEAKAGE OBSERVED IN ANY ONE OF THE ABOVE ALTERNATE TESTS SHALL BE CAUSE FOR NON–ACCEPTANCE AND THE PIPE SHALL BE DUG UP IF NECESSARY AND RE–LAID SO AS TO ASSURE WATER TIGHTNESS.



NOTES

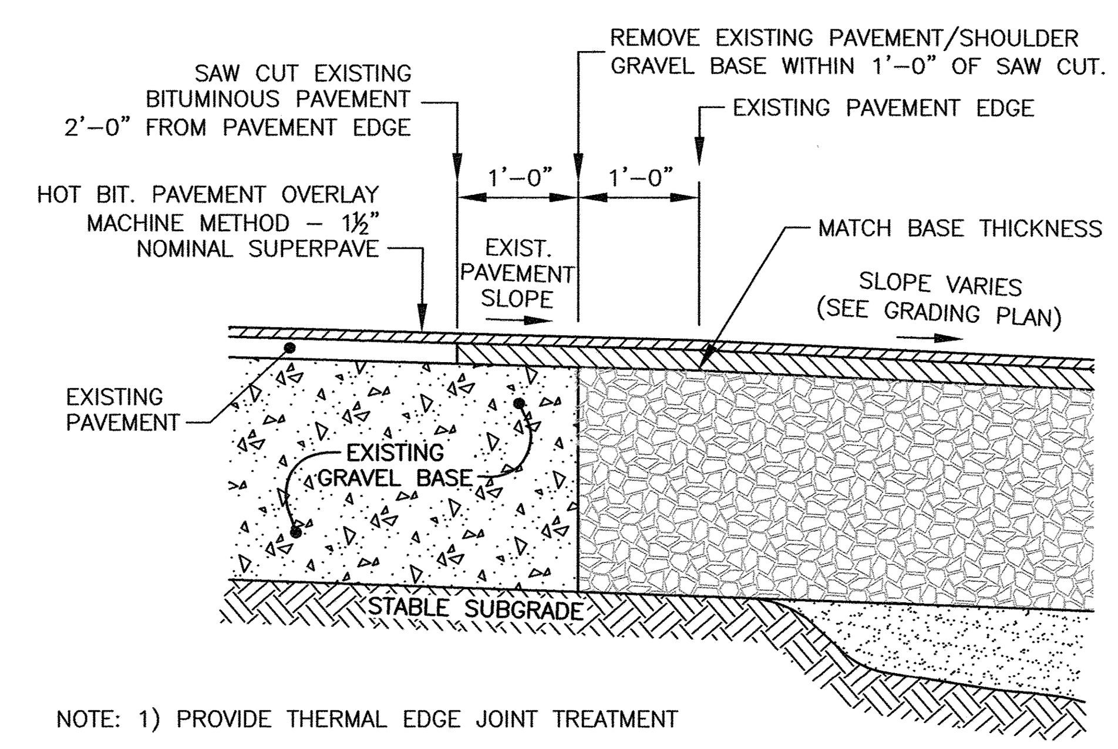
1. See sheet "Requirements for Padmounted Transformer Slab Details".
2. All reinforcing to be #6 bars.
3. 1" PVC conduit sleeve for ground grid leads.
4. The ground grid shall be supplied and installed by the customer and is to be buried at least 12" below grade. Eight feet of extra wire for each ground grid leg shall be left exposed in the cable compartment to allow for the connection to the transformer. the two 8' ground rods may be either galvanized steel or copperweld and they shall be connected to the grid with NEC approved connectors.

J / C3 — TRANSFORMER PAD — CMP – IF NEEDED — NTS



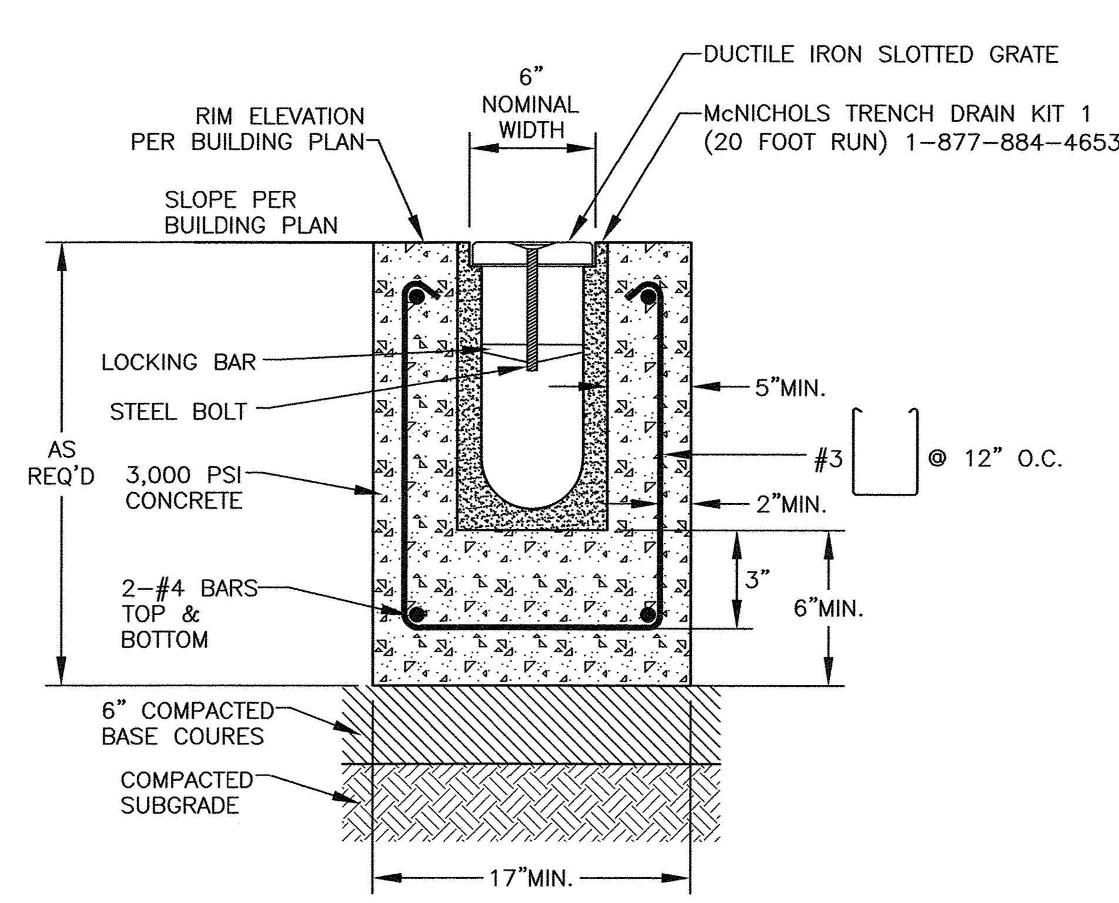
NO BACKFILLING BEFORE CONCRETE HAS TAKEN INITIAL SET (7 HRS. MIN.). BACKFILLING TO BE BROUGHT UP EVENLY ON ALL SIDES.

K / C3 — SEWER CHIMNEY — IF NEEDED — NTS



NOTE: 1) PROVIDE THERMAL EDGE JOINT TREATMENT

L / C3 — PAVEMENT JOINT DETAIL — NTS



M / C6 — EVAPORATION TRENCH DETAIL — NTS

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.

WWW.HALEYWARD.COM

200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

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SITE REDEVELOPMENT
35 BADGERS ISLAND WEST
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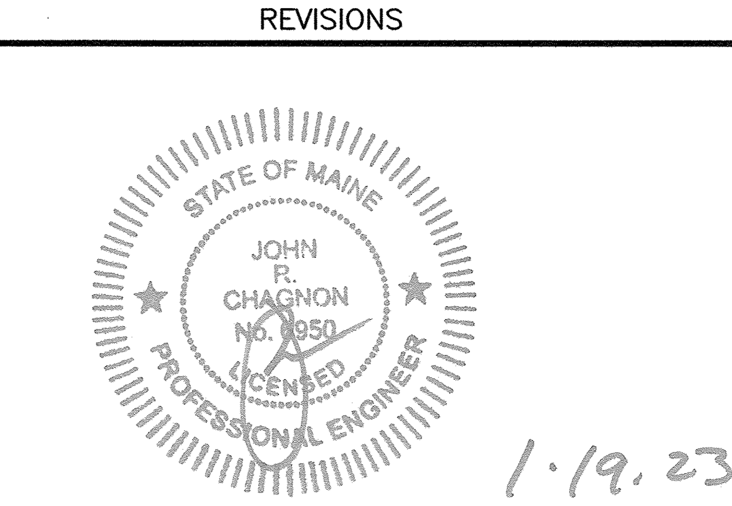


SCALE: AS SHOWN | DECEMBER 2022

DETAILS — D3

FB 423 PG 1 | 3050.72

JELLYFISH DESIGN NOTES

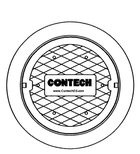
JELLYFISH TREATMENT CAPACITY IS A FUNCTION OF THE CARTRIDGE LENGTH AND THE NUMBER OF CARTRIDGES. THE STANDARD PEAK DIVERSION STYLE WITH PRECAST TOP SLAB IS SHOWN. ALTERNATE OFFLINE VAULT AND/OR SHALLOW ORIENTATIONS ARE AVAILABLE. PEAK CONVEYANCE CAPACITY TO BE DETERMINED BY ENGINEER OF RECORD.

CARTRIDGE SELECTION

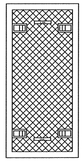
CARTRIDGE LENGTH	54"	40"	27"	15"
OUTLET INVERT TO STRUCTURE INVERT (A)	6'-6"	5'-4"	4'-3"	3'-3"
FLOW RATE HI-FLO / DRAINDOWN (CFS) (PER CART)	0.178 / 0.089	0.133 / 0.067	0.089 / 0.045	0.049 / 0.025
MAX. TREATMENT (CFS)	1.96	1.47	0.98	0.54
DECK TO INSIDE TOP (MIN) (B)	5.00	4.00	4.00	4.00

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.



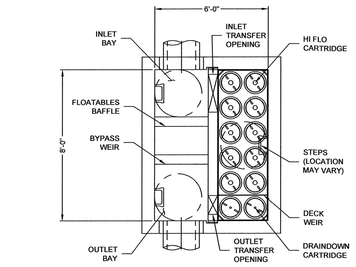
FRAME AND COVER
(DIAMETER VARIES)
N.T.S.



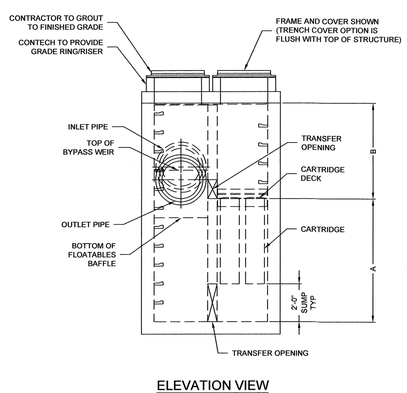
24" TRENCH COVER
(LENGTH VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID					ID
WATER QUALITY FLOW RATE (cfs)					WQFLOW
PEAK FLOW RATE (cfs)					PEAK
RETURN PERIOD OF PEAK FLOW (yrs)					RETURN
# OF CARTRIDGES REQUIRED (HF / DD)					CART
CARTRIDGE LENGTH					SIZE
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	ELEV	MAT'L	DIA	SLOPE	HGL
INLET #2	ELEV	MAT'L	DIA	SLOPE	HGL
OUTLET	ELEV	MAT'L	DIA	SLOPE	HGL
SEE GENERAL NOTES 6-7 FOR INLET AND OUTLET HYDRAULIC AND SIZING REQUIREMENTS.					
RIM ELEVATION					RIMELEV
ANTI-FLOTATION BALLAST		WIDTH		HEIGHT	
		WIDTH		HEIGHT	
NOTES/SPECIAL REQUIREMENTS:					
* PER ENGINEER OF RECORD					



PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)



ELEVATION VIEW

N C4 JELLYFISH FILTER DETAIL
NTS

1.0 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.

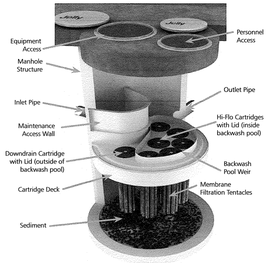
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion 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



Note: Separator Skirt not shown

2.0 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.*

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.

3.0 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.

3.1 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.

3.2 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.

4.0 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.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

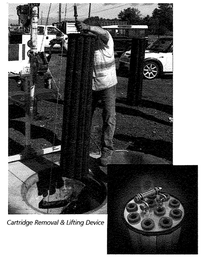
1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures. ***Caution: Dropping objects onto the cartridge deck may cause damage.***
3. Perform Inspection Procedure prior to maintenance activity.
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.

5.1 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.

5.2 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.



Cartridge Removal & Lifting Device

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.
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.

5.3 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.

Vacuuming Sump Through MAW

3. Pressure wash cartridge deck and receptacles to remove all 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.

Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥8-ft) and some 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.

5.4 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.

5.5 Chemical Spills

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

5.6 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

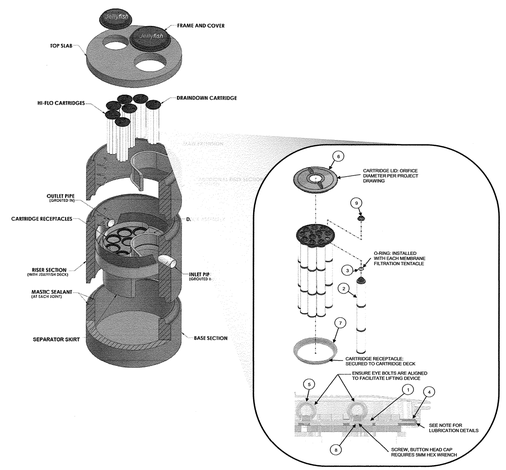


TABLE 1: BOM

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 M6X1-HMM SS
9	JF CARTRIDGE NUT

TABLE 2: APPROVED GASKET LUBRICANTS

PART NO.	MFR	DESCRIPTION
79713	LA-CO	LUBRI-JOINT
40501	HERCULES	DUCK BUTTER
30600	OATEY	PIPE LUBRICANT
PSLUB3L1Q	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 Lids (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.

AMBIT ENGINEERING, INC.
A DIVISION OF HALEY WARD, INC.
WWW.HALEYWARD.COM
200 Griffin Road, Unit 3
Portsmouth, NH 03801
603.436.2315

NOTES:

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SITE REDEVELOPMENT
35 BADGERS ISLAND WEST
KITTERY, ME

NO.	DESCRIPTION	DATE
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REVISIONS

STATE OF MAINE
JOHN R. CHAGNON
No. 6960
LICENSED
PROFESSIONAL ENGINEER
1.19.23

SCALE: AS SHOWN
DECEMBER 2022

DETAILS

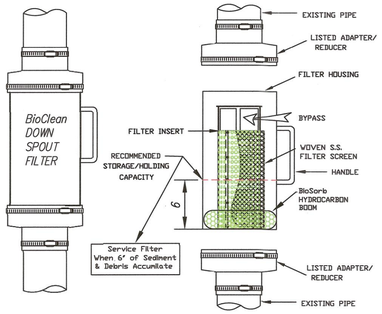
D4

FB 423 PG 1

3050.72

SERVICE MANUAL
(Cleaning Procedures)

Bio Clean DOWNSPOUT FILTER
Screen Type With Hydrocarbon Boom



DETAIL OF PARTS

TOOLS AND EQUIPMENT NEEDED:

1. Medium size flat scred driver
2. BioSorb hydrocarbon boom. 25-1/2" X 2" dia. (Call Bio Clean to order)
3. Trash container or bag
4. Wooden dowel approx. 3' x 1/2' dia.

Bio Clean
A Forterra Company

P.O. BOX 869, Oceanside, Ca. 92049
(760) 433-7640 Fax (760) 433-3176
www.biocleanenvironmental.net

REMOVING FILTER

Bio Clean
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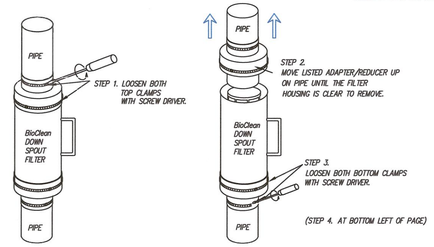
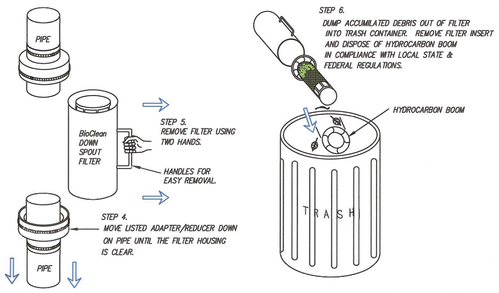


(STEP 4. AT BOTTOM LEFT OF PAGE)

CLEANING FILTER



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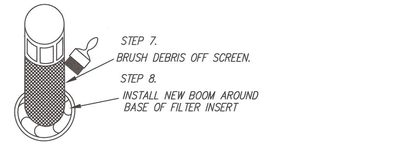
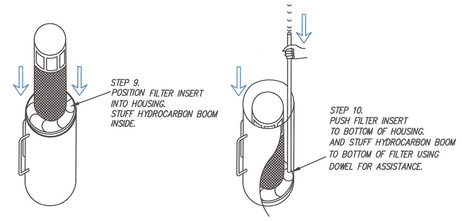


REPLACING FILTER INSERT



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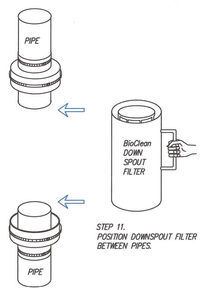
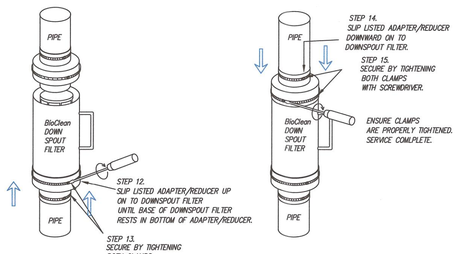
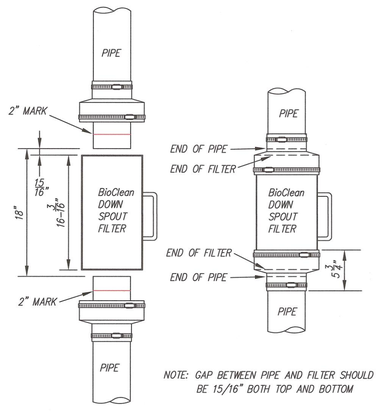




APPROPRIATE INSTALLATION

FILTER CENTERED BETWEEN PIPES WITH EVEN GAPS ON TOP AND BOTTOM



NOTE: GAP BETWEEN PIPE AND FILTER SHOULD BE 15/16" BOTH TOP AND BOTTOM

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DOWNSPOUT FILTER

MAINTENANCE:

THE FILTER IS DESIGNED TO ALLOW FOR THE USE OF MANUAL OR VACUUM REMOVAL OF CAPTURED MATERIALS IN THE FILTER STRUCTURE. FILTERS CAN BE CLEANED EASILY BY SIMPLY LOOSENING THE METAL CLAMPS AND REMOVING THE FILTER. THE HYDROCARBON ADSORBENT MEDIA THEN IS REMOVED AND THE TRASH AND DEBRIS CAN BE REMOVED FROM THE STRUCTURE. AT EACH CLEANING, NEW HYDROCARBON ADSORBENT MEDIA SHOULD BE REINSTALLED.

MAINTENANCE NOTES:

1. BIO CLEAN ENVIRONMENTAL SERVICES, INC. RECOMMENDS CLEANING AND DEBRIS REMOVAL MAINTENANCE A MINIMUM OF TWO TO FOUR TIMES PER YEAR, AND REPLACEMENT OF MEDIA BOOMS A MINIMUM OF TWICE A YEAR.
2. THE DOWNSPOUT FILTER CAN BE CLEANED BY LOOSING THE METAL CLAMPS AT BOTTOM AND TOP OF RUBBER BOOTS. REMOVE THE FILTER BY GRASPING THE HANDLES, SLIDE DOWN THE BOTTOM BOOT OVER THE OUTFLOW PIPE AND SLIDE UP THE TOP BOOT OVER INFLOW PIPE. PLACE THE FILTER ON THE GROUND. DISPOSE OF ANY TRASH AND SEDIMENTS COLLECTED IN FILTER.
3. ONCE THE FILTER IS FREE, REMOVE THE INTERIOR INSERT. REMOVE THE HYDROCARBON ADSORBENT MEDIA BY UNWRAPPING IT FROM THE INTERIOR INSERT AND REPLACING WITH A NEW MEDIA, WRAPPING IT THE SAME WAY.
4. PLACE THE INTERIOR INSERT BACK INTO THE FILTER.
5. PLACE THE FILTER BACK IN LINE WITH THE PIPE AND SLIDE BACK THE TOP AND BOTTOM BOOTS IN PLACE AND TIGHTEN THE METAL CLAMPS SECURELY.
6. EVALUATION OF THE HYDROCARBON MEDIA SHALL BE PERFORMED AT EACH CLEANING. IF THE MEDIA IS FILLED WITH HYDROCARBONS AND OILS IT SHOULD BE REPLACED.
7. TRANSPORT ALL DEBRIS, TRASH, ORGANICS AND SEDIMENTS TO APPROVED FACILITY FOR DISPOSAL IN ACCORDANCE WITH LOCAL AND STATE REQUIREMENTS.
8. THE HYDROCARBON MEDIA WITH ABSORBED HYDROCARBONS IS CONSIDERED HAZARDOUS WASTE AND NEEDS TO BE HANDLED AND DISPOSED OF AS HAZARDOUS MATERIAL. PLEASE REFER TO STATE AND LOCAL REGULATIONS FOR THE PROPER DISPOSAL OF USED MOTOR OIL/FILTERS.
9. FOLLOWING MAINTENANCE AND/OR INSPECTION, THE MAINTENANCE OPERATOR SHALL PREPARE A MAINTENANCE/INSPECTION RECORD. THE RECORD SHALL INCLUDE ANY MAINTENANCE ACTIVITIES PERFORMED, AMOUNT AND DESCRIPTION OF DEBRIS COLLECTED, AND CONDITION OF FILTER.
10. THE OWNER SHALL RETAIN THE MAINTENANCE/INSPECTION RECORD FOR A MINIMUM OF FIVE YEARS FROM THE DATE OF MAINTENANCE. THESE RECORDS SHALL BE MADE AVAILABLE TO THE GOVERNING MUNICIPALITY FOR INSPECTION UPON REQUEST AT ANY TIME.
11. ANY TOXIC SUBSTANCE OR ITEM FOUND IN THE FILTER IS CONSIDERED AS HAZARDOUS MATERIAL AND CAN ONLY BE HANDLED BY A CERTIFIED HAZARDOUS WASTE TRAINED PERSON (MINIMUM 24-HOUR HAZWOPER).

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