BASIN WATER QUALITY COUNCIL
JANUARY 29, 2026, 3:00 PM

MEETING DETAILS

Virtual: Microsoft Teams, ID: 28945081456069, Pass: pK7gE2cG
In-Person: RRPC, 16 Evelyn Street, Second Floor, Rutland, VT 05701

MEETING AGENDA

3:00 WELCOME & INTRODUCTIONS

3:05 APPROVAL OF JANUARY 29, 2026, AGENDA

3:07 APPROVAL OF SEPTEMBER 18, 2025, MINUTES

3:10 OPEN TO THE PUBLIC

3:15 REVIEW OF NEW PROJECTS
- Castleton Village School Stormwater Remediation Implementation

3:35 MEETING SCHEDULE

3:40 CWSP STAFF UPDATES

4:00 ADJOURN

PROJECT APPLICATION FOR THE SOUTH LAKE CWSP
ROUND 11: JANUARY 2026

Cover Page Information

Contact Information: Town of Castleton

Mike Jones, Town Manager
263 Rte 30 N, Bomoseen, VT 05732
(802) 468-5319 (201) | manager@castletonvt.org

Project Name: Castleton Village School Stormwater Remediation Implementation

Project ID number: In Progress (Previous - 11753)

Project Location: South Lake Poultney Mettowee (Basin 2)

Project Type: Stormwater

Project Sector: Developed lands

Project Stage: Implementation

Funds being requested: $436,986.00
Matching funds: $1000

Project Summary

The Castleton Village School Stormwater Mitigation Implementation Project addresses untreated stormwater runoff from downtown Castleton that currently discharges to the Castleton River. The proposed project will treat runoff from approximately **17 acres of drainage area**, including **about 8 acres of impervious surface**, originating from Main Street, Elm Street, Seminary Street, and portions of the Vermont State University campus.

Using funding from a South Lake CWSP Formula Grant, the Town of Castleton hired contractors Fuss & O'Neill to complete a final, bid-ready stormwater design plan titled ***"Village School Stormwater Mitigation Project: Stormwater Final Design"*** (January 9, 2026). The design includes installation of a subsurface stormwater infiltration system beneath the former Village School basketball courts, supported by new and upgraded catch basins, improved stormwater conveyance piping, and an overflow diversion structure.

Based on Vermont DEC–approved stormwater treatment calculation tools, Fuss & O'Neill estimate that the system will remove **approximately 8–10 kg of phosphorus annually**, significantly reducing nutrient loading to the Castleton River while also alleviating localized flooding and drainage issues. The project represents a sustainable and cost-effective stormwater solution that will improve water quality, enhance downtown resilience, and support the Town of Castleton's long-term stormwater management strategy.

Project Description

The Town of Castleton used South Lake CWSP Formula Grant funds to support the development of a final stormwater design for this project. Fuss & O'Neill, in collaboration with PMNRCD and the Town, completed final plans for an underground stormwater infiltration system located beneath the existing basketball courts at the former Castleton Village School, now managed by the Town as a community recreation facility.

The objective of this project is to capture, infiltrate, and treat stormwater runoff from surrounding developed areas, reducing phosphorus and sediment loading before runoff reaches the Castleton River. The proposed system was designed to maximize phosphorus reduction and infiltration efficiency, using Vermont DEC–approved spreadsheets to quantify treatment performance and cost effectiveness. Earlier scoping estimated phosphorus reduction of approximately 7.2 kg per year, which was refined and increased during final design.

The Castleton Village School property is located within a downtown watershed that experiences frequent flooding and drainage challenges. Stormwater from Main Street, Elm Street, Seminary Street, and the Vermont State University campus is conveyed through an aging and undersized stormwater system that passes through the site before discharging untreated runoff to the Castleton River. Field observations during heavy rain events documented pooling, erosion, and sediment transport along Elm Street and adjacent areas.

This effort originated with the ***"Downtown Castleton Stormwater Scoping Study"*** *(2022),* which identified the Village School property as the most suitable site for a stormwater mitigation project due to:

- Its proximity to a major stormwater mainline draining over 10 acres,
- The presence of well-drained native soils,
- Its central location within the downtown drainage network.

Over the past three to four years, the project has advanced from scoping through final design and is now ready for implementation, pending full construction funding. Construction is anticipated for spring–summer 2026.

Proposed Improvements Include:

- Installation of a subsurface infiltration system beneath the former basketball courts to treat runoff from downtown Castleton and the Vermont State University campus
- Addition of a new catch basin on Main Street to improve capture of runoff from Main and Elm Streets and reduce localized flooding

- Replacement of an aging catch basin near the southwest corner of the Village School property
- Installation of a new 24-inch stormwater pipe to improve conveyance between catch basins
- An overflow diversion structure to safely manage larger storm events

The final design includes a detailed budget breakdown, including bid support, construction oversight, system installation, site safety measures, and site restoration. A long-term Operations and Maintenance (O&M) agreement (already prepared by Fuss and O'Neill) will be secured to ensure ongoing functionality and compliance.

Permitting, Land Access, and Coordination

CWSP staff will work closely with Vermont DEC regulators to ensure all relevant permits are in place prior to construction. The project does not create new impervious surface, does not alter any permitted stormwater systems, and does not exceed one acre of disturbance; therefore, it is not expected to require a state operational or construction stormwater discharge permit.

The Vermont Division for Historic Preservation reviewed the project and determined that no historic resources are present within the Area of Potential Effect.

The Town of Castleton Select Board has voted to support the project. Written site access and/or easement documentation will be secured prior to construction activities.

Project Goals

The goals of this project are to:

- Put the construction project out to bid and secure a contractor for spring - summer 2026 implementation
- Coordinate closely with the CWSP during construction planning and implementation
- Implement a stormwater management system that maximizes phosphorus reduction and stormwater infiltration
- Complete any required permitting and regulatory coordination (likely not any)
- Ensure full compliance with Vermont Clean Water Initiative standards
- Use Vermont DEC–approved tools to measure treatment performance and cost efficiency
- Secure a long-term Operations and Maintenance (O&M) agreement between the Town of Castleton and the CWSP (O & M contract has been drafted as part of the final report prepared by Fuss and O'Neill).

Project Budget (using Engineers Probable Cost Opinion)

Table 1: Preliminary budget for the Castleton Village School Infiltration Project Design.

Category	**Amount ($)**	**With 20% Contingency ($)**	**Match**	**Total**
Personnel			Town staff time	
Fringe				
Travel				
Materials/Supplies				
Professional Services	$344,155.00 construction $20,000 construction oversight and final design edits	$412,986.00 $24,000		
Indirect				
Total	$364,155	$436,986		**$436,986.00**

Budget Narrative

Personnel: The Town of Castleton will provide staff to manage this project. The project management costs will be covered by the town manager's salary. This will include overseeing necessary landowner outreach and contractor requests for proposals and bid process management.

Professional services: Up to $412,986.000 will be used to construct the project. Up to $24,000 will be used to oversee construction by the engineering firm.

Match will occur when town employees and volunteers, partners, and stakeholders are involved with site visits, meetings, and stakeholder meetings. Match will be recorded and submitted for DEC use, as requested.

Indirect: Indirect is included in the professional services costs.

Please find attached:

Design plans from Fuss and O'Neill from January 2026.

Project Eligibility Spreadsheet.

APPENDIX A. CLEAN WATER INITIATIVE PROGRAM - PROJECT ELIGIBILITY SCREENING FORM

This fillable PDF form is designed to assist with project review by systematically walking through all eligibility criteria. It should be completed for all projects seeking funding for 30% + design or implementation work. It may be applied to projects seeking funding for assessment or development if helpful for determining their alignment with eligibility criteria 2, 3, 6, and 8.

Step 1: Conduct Eligibility Criteria #1 Screening: Project Purpose

Table 1A: Project Purpose	
From the drop-down list to the right, please select which of the four objectives of Vermont's Surface Water Management Strategy this project addresses. If multiple, please list below:	Minimize anthropogenic nutrient and organic pollution

Step 2: Conduct Eligibility Criteria #2 Screening: Project Types and Standards

Table 2A: Project Types and Standards	
Please select the most representative project type from the drop-down list to the right.[1,2] If multiple BMPs are included in the project, please list below:	Stormwater - Implementation
Is the project type an eligible project type for the funding program you are applying to as listed in column B of the CWIP Project Types Table? (Answer must be YES to proceed)	Yes ◉ No ○
Does the project meet the project type definitions and minimum standards as provided in column C of the CWIP Project Types Table? (Answer must be YES to proceed)	Yes ◉ No ○
Will the project result in the standard performance measures, milestones, and deliverables as defined by project type in columns D-F of the CWIP Project Types Table? (Answer must be YES to proceed)	Yes ◉ No ○
Is the project listed as an ineligible project or activity in the CWIP Funding Policy? If Yes, please explain below how project meets the allowable exceptions within the CWIP Funding Policy. (Answer must be NO to proceed, unless reasonable justification is provided above)	Yes ○ No ◉

Step 3: Conduct Eligibility Criteria #3 Screening: Watershed Projects Database

Verify project has been recorded in the Watershed Project Database (WPD). Each project must have a Watershed Project Database number specific to the proposed project phase (for example,

[1] Note that Road/Stormwater Gully project-types must not otherwise be considered intermittent or perennial streams by the DEC Rivers Program and therefore project proponent must show documentation of this determination in order to select this project type.

[2] One project may include multiple best management practices (BMPs) that cross "project types." For example, a single project may include both stormwater and lake shoreland BMPs. Proponents should use their best judgement in selecting the most representative project type for the purposes of eligibility screening and reporting.

a final design will have a different WPD-ID from a preliminary design even if for the same project). If the project, or the specific phase, is not yet in the Watershed Project Database, follow directions provided in the CWIP Funding Policy to secure a WPD-ID. Please see CWIP Funding Policy for more information on the WPD-ID.

Table 3A. WPD-ID	
Watershed Project Database ID number assigned	In progress - child of 11753
Watershed Project Database Project Name	Castleton Village School Stormwater Remediation Implementation Project

Step 4: Conduct Eligibility Criteria #4 Screening: Natural Resource Impacts[3]

Agency of Natural Resources (ANR) permit screening for natural resource impacts includes 1) an initial desktop review to identify which ANR permitting programs should be contacted, 2) a review by the relevant ANR permitting staff, and 3) a response summary from the project proponent addressing any permitting staff concerns. [4]

1) **Table 4. Natural Resource Impacts** facilitates a high-level desktop review of the most likely ANR permits to apply to clean water projects. Project proponents should answer all the questions to identify likely permit needs. [5] Please note that "project site" may include both the active restoration location as well as any additional impact footprint related to staging, site access, or storage of waste or disposed materials.
2) If responses to the **Table 4. Natural Resource Impacts** desktop review trigger a permitting staff consultation, **Table 4** provides appropriate contact information.
    a. Proponents should send the identified permitting staff the following:
        i. The watersheds project database identification number (WPD-ID) (if available),
        ii. Project location (GPS coordinates)
        iii. Summary of proposed scope of work, and
        iv. Any other relevant information they request that will be utilized in their review.
    b. **Proponents should clarify they are seeking permitting staff input on potential permitting needs, permit-ability of proposed scope of work, and other design considerations but they are NOT seeking a formal permit determination.**
    c. Project proponents must attempt to communicate with the permitting staff and provide them with at least thirty days to review the project and provide a

[3] Easements and Riparian Buffer Plantings are excluded from this eligibility requirement/step.

[4] In cases where this screening may have already occurred in a prior project phase, project proponents may supply attachments or links to relevant permit needs assessment documents in place of completing Table 4.

[5] Entities selected for funding are expected to perform due diligence to ensure all applicable permits (including non-ANR state, local, and federal permits) are discovered and secured prior to implementation. The ANR Permit Navigator and an Environmental Compliance Division Community Assistance Specialist can help confirm ANR permitting needs for any projects once selected for funding.

response. Project proponents are encouraged to perform this screening during a project development phase as opposed to during a project solicitation round to allow for more time for feedback. Permitting feedback may be up to one year old.

3) Proponents should summarize permitting staff feedback and how the proposed scope of work will address this at the bottom of **Table 4**. Specifically, please include:
   a. Which permits or permit amendment are needed or might be needed? [6]
   b. What type might be needed? (e.g., a general or individual permit[7])?
   c. What concerns were voiced by permitting staff?
   d. How will the proposed scope of work address these concerns?[8]

Table 4A: Natural Resource Impacts		
I. Act 250 Permits		
1. Have any Act 250 (Vermont's Land Use and Development Control Law) Permits been issued in the project site's parcel location?[9]	Yes ○	No ◉
If ***yes***, please provide the permit number and list any water resource issues or natural resource issues found[10]: **PermitNumber:** **ResourceIssues:** If ***yes***, use the Water Quality Project Screening Tool to identify the appropriate regulatory contact for an Act 250 consultation. **Regulatory Point of Contact Name/Position:** Elaine McDevitt		
II. Lake and Shoreland		
1. Is the project site located within 250 feet of the mean water	Yes ○	No ◉

[6] Occasionally permit staff may indicate they need a field visit or to see more completed designs prior to making a permit need determination.

[7] Design phase projects that require an individual wetlands permit must have the permit in hand at the close of the final design phase. Implementation phase projects must have the individual permit in hand to be eligible for funding.

[8] Examples could include planned design changes or inviting permitting staff to stakeholder meetings.

[9] An Act 250 Permit is required for certain categories of development, such as subdivisions of 10 lots or more, commercial projects on more than one acre or ten acres (depending on whether the town has permanent zoning and subdivision regulations), and any development above the elevation of 2,500 feet. The ANR Atlas Clean Water Initiative Program Grant Screening tool can help answer this yes/no question. Follow the instructions on the link above to identify whether your project is located on an Act 250 parcel. Note that the layer to activate in ANR Atlas is now named "Clean Water Initiative Program Grant Screening."

[10] Note that Act 250 permit amendments may require more extensive review of project impacts to natural resources including wildlife habitat, significant natural communities, and riparian zones. Please consult with the Act 250 District Coordinator regarding the nature and scope of that review and what bearing it may have on your project design.

level (shoreline) of a lake or pond? [11]	
If ***yes***, you might need either a Shoreland Protection Act Permit or a Lake Encroachment Permit. Use the Water Quality Project Screening Tool to find the Lakes and Ponds Program contact for your project's region. **Regulatory Point of Contact Name/Position:** Laura Dlugolecki	
III. Rivers, River Corridors, and Flood Hazard Areas	
1. Is there any portion of the project site located within 100' of a river corridor and/or mapped Federal Emergency Management Agency (FEMA) flood hazard area[12]? (e.g. a stormwater pond's pipe draining into a river corridor area)? Any permanent excavation/filling or construction within a flood hazard area or river corridor may trigger regulatory requirements through municipal bylaws or through state authorities.	Yes ◉ No ○
If ***yes***, you will need to speak with a Floodplain Manager. Use the Water Quality Project Screening Tool to find the Floodplain Manager for your project's region. **Regulatory Point of Contact Name/Position:** Kyle Medash	
2. Is any portion of the project site within a perennial river or stream channel? [13]	Yes ○ No ◉
If ***yes***, you will need to speak with a Stream Alteration Engineer. Use the Water Quality Project Screening Tool to find the Stream Alteration Engineer for your project's region. **Regulatory Point of Contact Name/Position:** Josh Carvajal and Shannon Pytlik	
IV. Wetland	

[11] The ANR Atlas Clean Water Initiative Program Grant Screening tool can help answer this yes/no question. Follow the instructions on the link above to identify whether your project is located in the jurisdictional zone to trigger a Lakeshore permit. Note that the layer to activate in ANR Atlas is now named "Clean Water Initiative Program Grant Screening."

[12] FEMA mapped Flood Hazard Areas are not available statewide on the ANR Natural Resources Atlas. For projects located in Grand Isle, Franklin, Lamoille, Addison, Essex, Orleans, Caledonia, and Orange Counties, maps are available via the FEMA Flood Map Service Center: https://msc.fema.gov/portal/home. ANR Floodplain Managers are available to provide technical assistance if needed.

[13] Stream Alteration Permits regulate all activities that take place within perennial river and stream channels. Examples of regulated activities include streambank stabilization, dam removal, road improvements that encroach on streams, and bridge/culvert construction or repair. The ANR Atlas Clean Water Initiative Program Grant Screening tool can help answer this yes/no question. Follow the instructions on the link above to identify whether your project is located in the jurisdictional zone to trigger a Stream Alteration permit. Note that the layer to activate in ANR Atlas is now named "Clean Water Initiative Program Grant Screening."

1. Does the Wetland Screening Tool[14] provide a result of wetlands likely, very likely, or present at the project site?	Yes ◉ No ○
2. Does your project site involve land that is in or near an area that has any of the following characteristics: o Water is present – ponds, streams, springs, seeps, water filled depressions, soggy ground under foot, trees with shallow roots or water marks? o Wetland plants, such as cattails, ferns, sphagnum moss, willows, red maple, trees with roots growing along the ground surface, swollen trunk bases, or flat root bases when tipped over? o Wetland Soils – soil is dark over gray, gray/blue/green? Is there presence of rusty/red/dark streaks? Soil smells like rotten eggs, feels greasy, mushy or wet? Water fills holes within a few minutes of digging? (See Landowners Guide to Wetlands for additional information on identifying wetlands onsite.)	Yes ◉ No ○ Not Sure ○

If you answered ***yes*** or ***not sure*** to either of the above questions, you will need to contact your District Wetlands Ecologist using the Wetland Inquiry Form. The District Wetlands Ecologist can help determine the approximate locations of wetlands and whether you need to hire a Wetland Consultant to conduct a wetland delineation. Alternatively, if you answered ***yes*** or ***not sure*** to either of the above questions, you can simply budget for a Wetland Consultant in the proposed scope of work. Any activity within a Class I or II wetland or wetland buffer zone (minimum of 100 feet and 50 feet respectively) which is not exempt or considered an "allowed use" under the Vermont Wetland Rules requires a permit. All permits must go through review and public notice process, which takes at minimum 6 weeks for a General Permit and 5 months for an Individual Permit.

Regulatory Point of Contact Name/Position:

Zapata Courage

1. Is your project a Wetland Restoration project type?	Yes ○ No ◉

If you answered yes, under the Vermont Wetland Rules you will need an "allowed use" determination from the DEC Wetlands Program. Contact your District Wetlands Ecologist using the Wetland Inquiry Form.

Regulatory Point of Contact Name/Position:

V. Fish and Wildlife

State law protects endangered and threatened species. No person may take or possess such species without a Threatened & Endangered Species Takings permit. 1. **Does your project involve cutting down trees larger than 5 inches in diameter in any of the following towns?** Addison, Arlington, Benson, Brandon, Bridport, Bristol, Charlotte, Cornwall, Danby, Dorset, Fair Haven, Ferrisburgh, Hinesburg, Manchester, Middlebury, Monkton, New Haven, Orwell, Panton, Pawlet, Pittsford, Rupert, Salisbury, Sandgate, Shoreham, Starksboro, St. George, Sudbury, Sunderland, Vergennes, Waltham, West Haven, Weybridge, Whiting	Yes ○ No ◉

[14] To view the Wetland Screening Tool introduction video, see https://youtu.be/6lv5en0AB1o

2. Is the project site within 1 mile of a mapped[15] Significant Natural Community or Rare, Threatened, or Endangered Species?	Yes ○ No ◉
If *yes* to either of the above questions, connect with the VT Fish and Wildlife department (everett.marshall@vermont.gov 802-371-7333) to discuss your project and any necessary permitting. **Regulatory Point of Contact Name/Position:**	
VI. Stormwater	
1. Will the project disturb more than an acre of land during construction, add or redevelop impervious surface, create new development or otherwise require a Stormwater permit?	Yes ○ No ◉
If *yes*, forward to the appropriate Stormwater specialist to ensure necessary permitting. Use the Water Quality Project Screening Tool to find the Stormwater specialist for your project's region. **Regulatory Point of Contact Name/Position:**	
VII. Solid Waste	
2. Will you be creating any debris (including construction and demolition waste, stumps, brush, untreated wood, concrete, masonry, and mortar) with your project that you intend to bury on site? [16]	Yes ○ No ◉
If yes, connect with the Waste Management & Prevention Division (dennis.fekert@vermont.gov 802-522-0195) to discuss your project and any necessary permitting. **Regulatory Point of Contact Name/Position:**	
Provide below or attach a narrative summary of Table 4 findings. Please include: a. Which permits or permit amendment are needed or might be needed? b. What type might be needed? (e.g. a general or individual permit)? c. What concerns were voiced by permitting staff? d. How will the proposed scope of work address these concerns?	
Is the project, as proposed, reasonably considered permit-able by all applicable	Yes ◉ No ○

[15] Find both of these layers on the ANR Atlas under Atlas Layers/Fish and Wildlife. Use the Measurement tool to 1) Plot Coordinates for your project 2) select the coordinates from the left panel 3) select the Radius Tool 4) click on your project location 5) Indicate 1 mile distance 6) look for overlap with either of these mapped layers.

[16] If your project will result in the transfer and disposal of debris (including construction and demolition waste, stumps, brush, untreated wood, concrete, masonry and mortar), you do not need a permit from this office as long as you hire a licensed solid waste hauler and bring the material to a certified facility.

ANR permitting programs? (Answer must be Yes to continue)	

Step 5: Conduct Eligibility Criteria #5-8 Screenings

Table 5A. Eligibility Criteria 5-8	
Landowner and Operation and Maintenance Responsible Party Support. Project identifies and demonstrates commitment from a qualified and willing operation and maintenance responsible party. Project demonstrates landowner support for the proposed project phase. (Answer must be YES to proceed)	Yes ◉ No ○
Budget. Project budget includes ineligible expenses. (Answer must be NO to proceed)	Yes ○ No ◉
Leveraging. Proposed leveraging meets required leveraging levels (if applicable), meets the definition of leveraging, and comes from eligible sources (Answer must be YES or N/A to proceed)	Yes ○ No ○ N/A ◉
Funding Program Specific Eligibility. Project meets additional funding program eligibility requirements*. Please list applicable funding program below: WQ Restoration Formula Grant (Answer must be YES to proceed) *If Water Quality Restoration Formula Grant, complete Step 6 below	Yes ◉ No ○

Step 6: Screening Projects on Agricultural Lands (Water Quality Restoration Formula Grants Only)

For Water Quality Restoration Formula Grant projects, please complete the following information as part of your Funding Program Specific Eligibility Screening (Criteria 8). Please note this must be completed for all projects located on agricultural lands regardless of project type. See CWIP Project Types Table for eligible project types.

Table 6A. Screening Projects on Agricultural Lands	
1. Is the proposed project located on a jurisdictional farm operation[17]? Complete a preliminary review to	○ **Yes** - Proceed to next question below.

[17] Jurisdictional farm operations are required to meet Vermont's Required Agricultural Practices (RAPs).

determine if it is a jurisdictional farm operation, and any case that requires consultation with AAFM will occur via the farm determination process. Please note this form must be submitted by the farm operation/landowner seeking the determination.	◉ **No**[18] - There is no additional requirements related to agricultural review for these projects.
2. Is the proposed project an agricultural project? Examples of agricultural projects include but are not limited to Production Area Practices – (e.g. Waste Storage Facilities, Heavy Use Area, Diversion) Fence, Livestock Exclusion, Filter Strip, Cover Crop, Reduced Tillage, Manure Injection, Rotational Grazing. Please note this is not an exhaustive list of all agricultural practices.	○ **Yes** - Agricultural Projects on jurisdictional farms are not an eligible project type. You can provide a referral to an applicable state or federal agricultural assistance program, or a local organization. ◉ **No** - The natural resource, innovative, or other project type will require an agricultural project review and approval from the Vermont Agency of Agriculture, Food and Markets (VAAFM) to ensure a consistent approach on farms statewide that follows rules, regulations, and laws in place. Please follow Steps 1 & 2 below. **Step 1** - Please submit a detailed description of the project, project site, project details, landowner, farm operation, and any other relevant information to VAAFM at AGR.WaterQuality@Vermont.gov . **Step 2** - Once you complete this Agricultural Project Review, please allow 30 days for a response. Once that response has been received, please include a summary of the response in the next section.

Agricultural Project Review Status & Summary:	
Check as Applicable	**Status**
☐	Submitted/ Pending
☐	Approved
☐	Denied

[18] Note CWIP's Agricultural Pollution Prevention project type eligibility is limited to land where owner or operator is not a jurisdictional farm (i.e., not required to meet the Required Agricultural Practices (RAPs)). As such, projects that meet the definition of the Agricultural Pollution Prevention project type in the Appendix B. Project Types Table are not subject to review by VAAFM.

Please include a summary of the response here:

N/A - not on a farm - some of the anwers may signify otherwise, but it's just user error (the buttons are hard to unclick).

Please note that it is expected that all projects with the status "submitted/pending" will be "approved" prior to a project approval for funding.

Village School Stormwater Mitigation Project Final Report

47 Mechanics Street, Castleton, Vermont

Project Name: Village School Stormwater Mitigation Project
Project Type & Phase: Stormwater Final Design
WPD ID #: 11753
Prepared by: Fuss & O'Neill
On Behalf of: Town of Castleton & PMNRCD

Date: January 9th, 2026

Executive Summary

The Castleton Village School Stormwater Mitigation Project is a final design effort to reduce phosphorus loading and improve stormwater management in downtown Castleton. Funded by a South Lake CWSP Formula Grant, the project will install a subsurface infiltration system beneath the former school's basketball courts, supported by new catch basins, upgraded piping, and an overflow diversion structure. Designed to treat runoff from about 8-acres of impervious surface within a 17-acre drainage area, the system is expected to remove between 8 kg and 10 kg of phosphorus annually, enhance water quality in the Castleton River, and comply with Vermont DEC standards. The project provides a sustainable, cost-effective solution that strengthen the town's long-term stormwater management strategy.

Project Purpose

A 2023 Scoping Study titled "Downtown Castleton Stormwater Scoping Study" identified the Castleton Village School property as a potential location to site a stormwater remediation project because of its proximity to a stormwater mainline which receives runoff for a drainage area of over 10-acres and because it has well-drained soils. With the project now receiving funding from a South Lake CWSP Formula Grant, Fuss & O'Neill was hired to design a system which maximized phosphorus mitigation and stormwater infiltration.

The Castleton Village School Stormwater Mitigation Project has been designed to improve stormwater management and reduce phosphorus loading within the Castleton watershed. The plan includes installing a subsurface infiltration system beneath the former school's basketball courts to treat runoff from surrounding streets in Downtown Castleton and from the Vermont State University campus. By capturing and filtering stormwater before it reaches the Castleton River, the project will enhance water quality, comply with Vermont DEC Clean Water Initiative standards, and provide a cost-effective solution supported by a long-term operations and maintenance plan.

Project Goals

The goal of this project is to design a stormwater management system that maximizes phosphorus mitigation and stormwater infiltration at the Castleton Village School site. The design will utilize Vermont DEC-approved tools to measure treatment performance and cost efficiency. In addition, the project seeks to establish a long-term operations and maintenance agreement, complete all required permitting (if needed), and ensure full compliance with Vermont Clean Water Initiative standards. These efforts will deliver a practical, sustainable solution that improves water quality and supports community environmental objectives.

Project Objectives

The objective of this project is to deliver a final stormwater design that captures, infiltrates, and treats runoff from surrounding developed areas, and reduces nutrient and sediment pollution before it reaches the Castleton River. The proposed stormwater system was designed to maximize phosphorus reduction and infiltration, using the Vermont DEC-approved spreadsheets to quantify treatment performance and cost efficiency. The scoping study estimated that 7.2 kg per year of phosphorus could be remediated by a stormwater infiltration system.

Additional objectives include securing a long-term operations and maintenance agreement, completing all required permitting (if needed), and ensuring full compliance with Vermont Clean Water Initiative standards. These measures will provide a practical, sustainable solution that improves water quality and supports both community and state environmental goals.

Summary of Existing Conditions

The Castleton Village School property, now a Town managed recreation center, is located within a downtown watershed in an area that experiences frequent flooding and drainage issues. Stormwater from Main Street, Elm Street, Seminary Street, and the Vermont State University campus is conveyed through an aging, undersized drainage system that passed through the Castleton Village School property before ultimately discharging untreated runoff to the Castleton River. Field observations during heavy rain confirmed pooling and erosion along Elm Street and other areas, contributing to sediment and phosphorus loading downstream.

The Downtown Castleton Stormwater Scoping Study identified the Village School site as the most suitable location for infiltration and pollutant removal due to its proximity to the stormwater main and favorable soil conditions. Subsurface conditions were assessed by excavating four test pits and conducting field infiltration testing using a dual-ring infiltrometer. Infiltration testing at the basketball courts showed well-drained soil with rates of approximately 4.6 – 6.4 inches per hour, making the site ideal for a subsurface infiltration practice.

Summary of Proposed Conditions

Funded by a South Lake CWSP Formula Grant Fuss & O'Neill, in collaboration with the Poultney Mettowee Conservation District (PMNRCD), has completed final design plans for an underground stormwater infiltration system beneath the existing basketball court at the former Village School in Castleton, Vermont.

The project began in 2022 with solicitation for a scoping study and has advanced to a bid-ready design, with construction planning for spring 2026 should the project receive full funding. The final design includes adding an additional catch basin on Main Street to capture runoff from Main and Elm Streets and reduce flooding, the new basin will be connect to new catch basin near the southwest corner of Village School property that will replace an existing aging catch basin on Main Street, via a new 24-inch stormwater pipe to improve conveyance,

Water from new CB-2 will then flow across the Rehlen property to the Village School Property, the existing stone box stormwater line will be abandoned in place. The core feature of the project is a subsurface infiltration system consisting of one hundred twenty (120) Contech ChamberMaxx chambers arranged in six rows of twelve chambers. This system has been designed with an isolator row allowing for easy maintenance which flows to storage rows that temporarily store stormwater allowing it to infiltrate into underlying soils. The underground stormwater systems will also be supported by a diversion structure, during large storm events water will flow to the diversion structure built with a weir to overflow during period of very heavy rain. The overflow pip will connect back an existing manhole downstream of the treatment system allow runoff to by-pass the new system during large stormwater events. The system as designed is able to treat runoff from approximately 8 acres of impervious surface within a 17-acre drainage area. An estimated 8.97 kilograms per year of phosphorus is expected to be removed, significantly reducing pollutant loads to the Castleton River.

The project plans have been reviewed by the Vermont Division for Historic Preservation who found No Historic Resource Present in the Area of Potential Effect. In addition, the project does not create any new impervious or alter the existing conditions of any permitted stormwater projects or involve more than 1-acre of disturbance so the project will not trigger the need for a state operation stormwater discharge permit or stormwater construction permit.

Phosphorus Load

Fuss & O'Neill completed a detailed evaluation of the drainage patterns within the study area to determine how runoff is conveyed to the existing storm drain network. This analysis relied on a combination of LiDAR based elevation data, on-site field verification of drainage infrastructure, and ground survey information to confirm flow paths and connectivity. Based on this evaluation, approximately 16.8-acres were identified as contributing runoff to CB-2. Of the total contributing area, roughly 7.9-acres consist of impervious surfaces, including roadways, driveways, and building rooftops. Phosphorus loading from the contributing drainage area was estimated using the BMP Tracking Table for Poultney River Watershed published by the DEC which estimated **an annual phosphorus load before treatment of 11.8 kilograms per year.**

Runoff Volume

The VTANR Infiltration BMP Worksheet developed for 3-9050 stormwater permitting was used to establish the Water Quality Volume (WQv) and develop the associated HyrdoCAD water quality model. Based on the worksheet calculations, the required WQv for the contributing drainage area is 0.664 arce-feet. The proposed retrofit of Catch Basin CB-2 was then evaluated using HydroCAD, with model inputs from the BMP Worksheet assumptions and parameters. Under the proposed configuration, 100 percent of the total WQv is routed to the infiltration basin for treatment and volume reduction.

Phosphorus Credit Calculator

Phosphorus credits were calculated using the BMP Tracking Table with the underground infiltration system sized to treat 100% of the WQv (1" of runoff). The measured infiltration rates were 4.6 in/hr and 6.4 in/hr and modeled the system in HydroCAD using the average of 5.5 in/hr. To calculate the Phosphorus credits, we modeled the stie using both using the BMP Tracking Table, our infiltration rates were between 2.41 in/hr and 8.27 in/hr in the BMP Tracking Table. The lower infiltration rate yielded 7.99 kg/yr and the higher infiltration rate yielded 9.96 kg/yr

Using the conservative approach we have calculated the system will provide **an annual phosphorus reduction of 8.01 kilograms per year.**

Attachments:

1. 10-YR Operation and Maintenance (O&M) Plan
2. 100% Final Design Drawings
3. Engineers Opinion of Probable Costs
4. DEC BMP Tracking Table
5. VDHP Project Review Form
6. Scoping Study w/ 30% Design Drawings

Operation and Maintenance Plan

For **Village School Stormwater Mitigation Project**, **Subsurface Infiltration Chambers,** installed under the following agreement: Agreement Number.

The purpose of this Operation and Maintenance Plan and Agreement is to ensure that the projects and/or practices supported by the Vermont Department of Environmental Conservation (DEC) continue to function properly throughout their useful lives and contribute to improving water quality conditions of Vermont's waterways.

Responsible Party Name(s):	**Michael Jones, Town Manager**
Responsible Party Phone:	**(802) 468-5319 x203**
Responsible Party Email:	**Manager@castletonvt.org**
Landowner Name (if different):	**Town of Castleton c/o Michael Jones**
Landowner Phone:	( ) ___-_____
Landowner Email:	
Property Address/description: (or attach site plan)	**47 Mechanics Street, Castleton VT 05737 Castleton Village School**
Practice Latitude Longitude (center point in Decimal Degrees):	**43.61248 ^{o}N , -73.17940^{o}W**
BMP Construction Completion date:	
BMP Useful Life End Date (minimum of 10 years from construction):	**20 years**
BMP Type:	Subsurface Infiltration
Special Equipment Required, if any: (e.g., Vactor truck, anything other than hand tools)	**Vactor Truck**
Frequency of Regular Inspections: (recommend 2-3/yr for Stormwater, 1/yr for Natural Resource Projects)	**2 x year; spring and fall**

Regular Maintenance and Frequency: If engineer or designer had designed the project, engineer or designer shall complete the following. Include activities such as weeding, mowing, sediment and debris removal, inlet and/or outlet cleaning, and equipment maintenance per manufacturer.

Maintenance Item	Frequency
-Catch Basin; clean when sediment reaches ~50% of sump depth	1x/year
-Inlet and Outlet Pipes; clean or repair as needed if debris, blockage, or erosion is observed.	1x/year
-Chamber Inspection Ports/Observation Wells; monitor drawdown after large storm events (should drain within 48-72 hours). Flush System if sediment depth exceeds level noted in the manufacturer's requirements.	Year 1: Quarterly then 2x/year
-Sediment Accumulation within System; remove sediment as needed via a vacuum truck or jetting.	Every 3-5 years

As needed maintenance and repair: (e.g. replanting, major erosion or damage repair):

Operation and Maintenance Agreement

For **Village School Stormwater Mitigation Project**

Installed under the following agreement: [Agreement number]

This Operations and Maintenance Agreement, ("Agreement") is made and entered into this _____ day of_____ , 20___, between _____ (hereinafter referred to as the "Responsible Party") and _____ (hereinafter referred to as the "Landowner" if different from the Responsible party) and the Department of Environmental Conservation, (hereinafter referred to as the "DEC").

1. The Responsible Party agrees to inspect and maintain the above-mentioned project(s) or practice(s) at regular intervals, according to the attached Operation and Maintenance Plan.
2. The Responsible Party agrees to correct any maintenance issues or conduct needed repairs that are observed during inspections, such as the as-needed maintenance and repairs listed in the attached plan.
3. The Responsible Party agrees to maintain the practice outlined according to the attached plan for ___years from the date the project installation and/or construction.
4. DEC staff may periodically visit the project site to inspect the condition of the installed practice(s). If the project is on private land, the grantee and responsible party/landowner will be notified by DEC staff at least 48 hours prior to any site visit. The landowner agrees to provide DEC staff or contractors with access to the site during State of Vermont Business hours (8:00-4:30).
5. If a project or practice is found to be in need of maintenance or in a state of disrepair, DEC will conduct the following steps:
    a. Notify the Responsible Party of the items that need to be corrected.
    b. Provide the Responsible Party a reasonable schedule to correct the items in need of maintenance.
    c. If the items cannot be corrected within the allotted time, require the Responsible Party to establish a schedule to complete the correction
    d. If no adequate response or correction action has been taken within the allotted time, provide the Responsible Party a written warning that failure to meet all grant conditions could result in the Responsible Party being ineligible for future clean water grants.
6. The Responsible Party and/or Landowner shall not be able to transfer or modify its responsibilities with respect to this agreement without the DEC's written prior consent.
7. Any delays in or failures of performance by a party under this Agreement shall not be considered a breach of this Agreement if caused by occurrences beyond the reasonable control of the party affected, including but not limited to: severe storms, floods or other natural events and sabotage. Any time for performance hereunder shall be extended by the time of delay caused by such occurrence.

Signature of Responsible Party: _____ Date: _____

Signature of Landowner: _____ Date: _____

VILLAGE SCHOOL STORMWATER MITIGATION PROJECT

CASTLETON · VERMONT

47 MECHANIC STREET

JANUARY 9, 2026

SHEET INDEX

LOCATION MAP

SCALE: 1" = 200'

PREPARED BY

FUSS & O'NEILL

205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

PREPARED FOR

TOWN OF CASTLETON
263 VT ROUTE 30N
BOMOSEEN, VERMONT 05732

PREPARED FOR

POULTNEY METTOWEE NRCD
PO BOX 209
POULTNEY, VT 05764

Poultney Mettowee Natural Resources Conservation District

STATE OF VERMONT
BRIAN J. BERGSCHNEIDER
NO. 9475
CIVIL
LICENSED PROFESSIONAL ENGINEER

PROJ. No.: 20220286.B10
DATE: 01/09/2026

GI-001

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CIVIL GENERAL NOTES

GENERAL

1. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SHOWN ON THE DRAWINGS TO SCALE OR TO THEIR ACTUAL DIMENSION OR LOCATION. COORDINATE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
2. DO NOT RELY SOLELY ON ELECTRONIC VERSIONS OF DRAWINGS, SPECIFICATIONS, AND DATA FILES THAT ARE PROVIDED BY THE ENGINEER. FIELD VERIFY LOCATION OF PROJECT FEATURES.
3. PERFORM NECESSARY CONSTRUCTION NOTIFICATIONS, APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK AS REQUIRED BY THE CONTRACT DOCUMENTS.
3. TOPOGRAPHIC AND PLANIMETRIC INFORMATION IS BASED ON A FIELD SURVEY PERFORMED BY HOLT GILMORE SURVEY ASSOCIATES IN OCTOBER OF 2024. LIDAR SUPPLEMENT WAS PROVIDED BY FUSS & O'NEILL BASED ON PUBLICLY AVAILABLE LIDAR DATA.
4. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE CONTRACTING OFFICER.
4. GEOTECHNICAL DATA WAS OBTAINED BY FUSS & O'NEILL UTILIZING A DOUBLE RING INFILTROMETER.

WORK RESTRICTIONS

1. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, FIRE HYDRANTS, AND UTILITIES WITHOUT APPROPRIATE PERMITS.
2. WORK IS RESTRICTED TO THE HOURS OF TO THE HOURS 7:00 AM TO 7:00 PM MONDAY THROUGH SATURDAY.

REGULATORY REQUIREMENTS

1. WITHIN LOCAL RIGHTS–OF–WAY, PERFORM THE WORK IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS.
2. WITHIN STATE RIGHTS–OF–WAY, PERFORM THE WORK IN ACCORDANCE WITH THE LATEST EDITION OF THE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS AND ISSUED REVISIONS/SUPPLEMENTS.
3. PROVIDE TRAFFIC SIGNAGE AND PAVEMENT MARKINGS IN CONFORMANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
4. BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. PERFORM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
5. DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.

EROSION AND SEDIMENT CONTROL

1. INSTALL EROSION CONTROL MEASURES PRIOR TO STARTING ANY WORK ON THE SITE. SHOWN ON THE EROSION AND SEDIMENT CONTROL DRAWINGS.
2. IMPLEMENT ALL NECESSARY MEASURES REQUIRED TO CONTROL STORMWATER RUNOFF, DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE. PERFORM CORRECTIVE ACTION AS NEEDED FOR EROSION CLEANUP AND REPAIRS TO OFF SITE AREAS, IF ANY, AT NO COST TO OWNER.
3. INSPECT AND MAINTAIN EROSION CONTROL MEASURES AT A MINIMUM WEEKLY AND AFTER EACH STORM EVEN REPLACE ANY DAMAGED PRODUCT GOODS. DISPOSE OF SEDIMENT IN AN UPLAND AREA. DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
4. PERFORM CONSTRUCTION SEQUENCING IN SUCH A MANNER TO CONTROL EROSION AND TO MINIMIZE THE TIME THAT EARTH MATERIALS ARE EXPOSED BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL MEASURES. CLEAN SEDIMENT AND DEBRIS FROM TEMPORARY MEASURES AND FROM PERMANENT STORM DRAIN AND SANITARY SEWER SYSTEMS.

CONSTRUCTION LAYOUT

1. PROVIDE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS. FIELD VERIFY EXISTING PAVEMENT AND GROUND ELEVATIONS AT THE INTERFACE WITH EXPECTED PAVEMENTS AND DRAINAGE STRUCTURES BEFORE START OF CONSTRUCTION.
2. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, FIELD VERIFY PROPOSED UTILITY ROUTES AND IDENTIFY ANY INTERFERENCES OR OBSTRUCTIONS WITH EXISTING UTILITIES OR PUBLIC RIGHTS–OF–WAY.
3. IMMEDIATELY INFORM THE ENGINEER IN WRITING IF EXISTING UTILITY CONDITIONS CONFLICT OR DIFFER FROM THAT INDICATED AND IF THE WORK CANNOT BE COMPLETED AS INDICATED.
4. DIMENSIONS ARE FROM FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS NOTED OTHERWISE.
5. BOUNDS OR MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL LICENSED SURVEYOR IN THE STATE OF VERMONT.

EARTHWORK

1. NOTIFY UTILITY LOCATOR SERVICE AT LEAST 72 HOURS BEFORE STARTING EXCAVATION.
   VT: "DIG SAFE" AT 1–800–922–4455.
2. STOP WORK IN THE VICINITY OF SUSPECTED CONTAMINATED SOIL, GROUNDWATER OR OTHER MEDIA. IMMEDIATELY NOTIFY THE OWNER SO THAT APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN. RESUME WORK IN THE IMMEDIATE VICINITY ONLY UPON DIRECTION BY THE OWNER.

UTILITIES

1. TERMINATE EXISTING UTILITIES IN CONFORMANCE WITH LOCAL, STATE AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. COORDINATE UTILITY SERVICE DISCONNECTS WITH UTILITY REPRESENTATIVES.
2. THE TYPE, SIZE AND LOCATION OF DEPICTED UNDERGROUND UTILITIES ARE APPROXIMATE REPRESENTATIONS OF INFORMATION OBTAINED FROM FIELD LOCATIONS OF VISIBLE FEATURES, EXISTING MAPS AND PLANS OF RECORD, UTILITY MAPPING, AND OTHER SOURCES OF INFORMATION OBTAINED BY THE ENGINEER. ASSUME NO GUARANTEE AS TO THE COMPLETENESS, SERVICEABILITY, EXISTENCE, OR ACCURACY OF UNDERGROUND FACILITIES. FIELD VERIFY THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES.
3. PAY ALL FEES AND COSTS ASSOCIATED WITH UTILITY MODIFICATIONS AND CONNECTIONS, REGARDLESS OF THE ENTITY THAT PERFORMS THE WORK.
4. COORDINATE THE WORK AND WORK SCHEDULE WITH UTILITY COMPANIES. PROVIDE ADEQUATE NOTICE TO UTILITIES TO PREVENT DELAYS IN CONSTRUCTION.
5. INTERIOR DIAMETERS OF STORM DRAIN AND SANITARY SEWER STRUCTURES SHALL BE DETERMINED BY THE PRECAST MANUFACTURER, BASED ON THE INDICATED PIPE SYSTEM LAYOUT AND LOCAL MUNICIPAL STANDARDS.

   MINIMUM INTERIOR DIAMETERS:
   0 TO 20 FEET DEEP; 4 FEET.
   20 FEET OR GREATER; 5 FEET.

6. RIM ELEVATIONS FOR MANHOLES, VALVE COVERS, GATE AND PULL BOXES, AND OTHER STRUCTURES ARE APPROXIMATE. SET OR RESET RIM ELEVATIONS AS FOLLOWS:

   IN PAVEMENTS AND CONCRETE SURFACES: FLUSH
   IN SURFACES ALONG ACCESSIBLE ROUTES: FLUSH
   IN LANDSCAPE, SEEDED, AND OTHER EARTH SURFACE AREAS:
   1 INCH ABOVE SURROUNDING AREA; TAPER EARTH TO RIM ELEVATION.

PAVEMENT

1. AT A MINIMUM, CONSTRUCT ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).

SITE RESTORATION

5. PROVIDE 6 INCHES OF TOPSOIL AND SEED TO AREAS DISTURBED DURING CONSTRUCTION AND NOT DESIGNATED TO BE RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) UNLESS OTHERWISE NOTED.
6. RESTORE AREAS DISTURBED BY CONSTRUCTION OPERATIONS TO THEIR ORIGINAL CONDITION OR BETTER, AT NO ADDITIONAL COST TO OWNER.

EXISTING LEGEND

100 / 98	CONTOURS MAJOR & MINOR
	BASKETBALL COURT
	UTILITY POLE
WG	WATER GATE VALVE
	HYDRANT
	CATCH BASIN
S	SANITARY MANHOLE
D	STORM MANHOLE
	BOUNDARY MONUMENT
	LANDSCAPING
TP–1	TEST PIT
S	SANITARY SEWER LINE
T	TELEPHONE LINE
W	WATER MAIN
	PROPERTY LINE
x x x x	WIRE FENCE
	STOCKADE FENCE

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9815
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE: HORZ.: NOT TO SCALE VERT.:
DATUM: HORZ.: - VERT.: -

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

TOWN OF CASTLETON
GENERAL NOTES
47 MECHANIC STREET
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

GN-001

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PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

TEST PIT: TP-1
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 58 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN SILTY LOAM; ORGANIC MATERIAL.
6"-30" : SANDY LOAM; BROWN; MOIST; MODERATE STRUCTURE; FEW ROOTS.
30"-58": LOAMY SAND; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-2
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 60 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-5": TOPSOIL; DARK BROWN; LOAM; ORGANIC MATERIAL PRESENT.
5"-26": SANDY LOAM; BROWN; MOIST; MODERATE STRUCTURE; FEW ROOTS.
26"-60": SAND WITH GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-3
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 72 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN; SILTY LOAM; ORGANIC MATERIAL PRESENT.
6"-34": SANDY LOAM; BROWN; MOIST; WEAK STRUCTURE; NO ROOTS.
34"-72": COARSE SAND WITH GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-4
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 70 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN; SILTY LOAM; ORGANIC MATERIAL PRESENT.
6"-30": SANDY LOAM; BROWN; MOIST; WEAK GRANULAR STRUCTURE; NO ROOTS.
30"-70": COARSE SAND AND GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9815
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE:
HORZ.: 1" = 40'
VERT.: -
DATUM:
HORZ.: -
VERT.: -
0 20' 40' 80'
GRAPHIC SCALE

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

TOWN OF CASTLETON
EXISTING CONDITIONS PLAN
47 MECHANIC STREET
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CS-100

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MS VIEW:
LAYER STATE:

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BEERSCH
NO. 9815
CIVIL
LICENSED PROFESSIONAL ENGINEER

SCALE: HORZ.: 1" = 40'
VERT.: -
DATUM: HORZ.: -
VERT.: -
0 20' 40' 80'
GRAPHIC SCALE

FUSS & O'NEILL
205 BILLINGS FARMS RD. SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

TOWN OF CASTLETON
PROPOSED SITE PLAN
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CS-101

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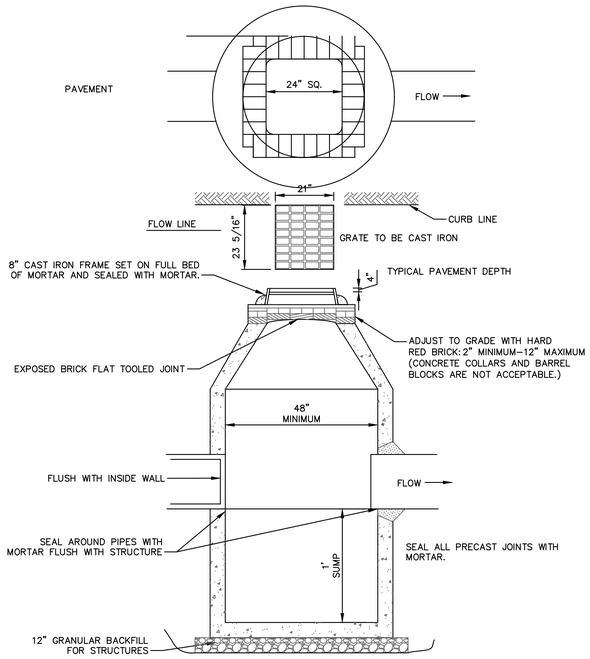
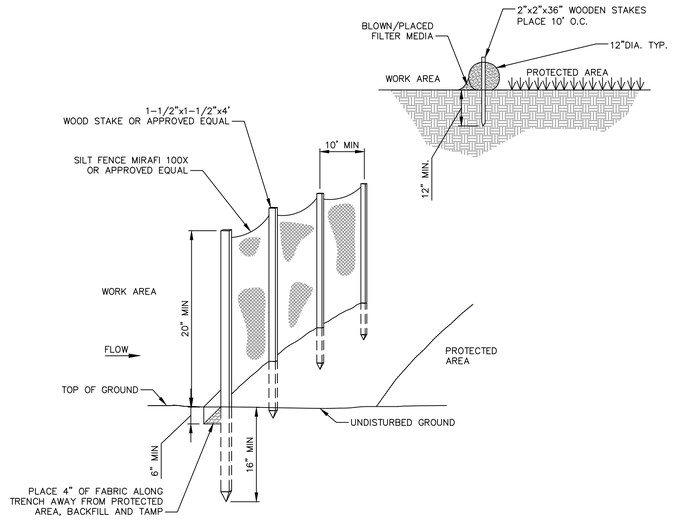


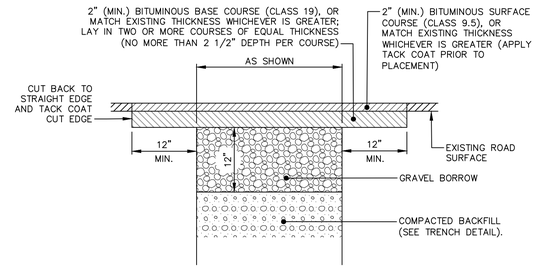
CATCH BASIN DETAIL

SCALE: N.T.S.



SILT FENCE OR SILT SOCK BARRIER

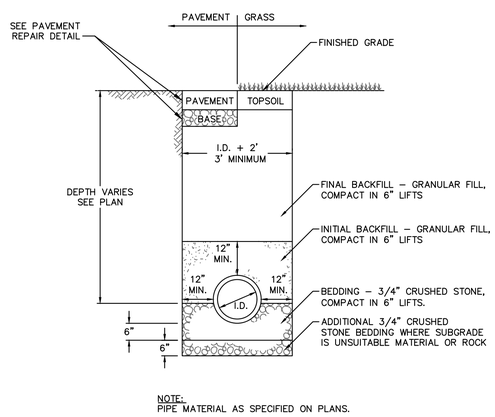
SCALE: N.T.S.



NOTE:
UNSUITABLE MATERIAL WITHIN SUBGRADE SHALL BE REMOVED AND REPLACED WITH GRAVEL BORROW.

PAVEMENT REPAIR DETAIL

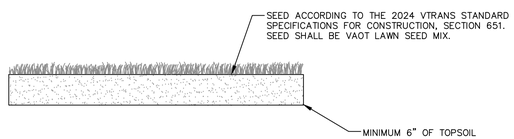
SCALE: N.T.S.



NOTE:
PIPE MATERIAL AS SPECIFIED ON PLANS.

DRAINAGE TRENCH DETAIL

SCALE: N.T.S.



LOAM AND SEED

SCALE: N.T.S.

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9875
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE: HORZ.: NOT TO SCALE
VERT.:
DATUM: HORZ.: -
VERT.: -

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
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TOWN OF CASTLETON
SITE DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-500

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PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

PROJECT SUMMARY

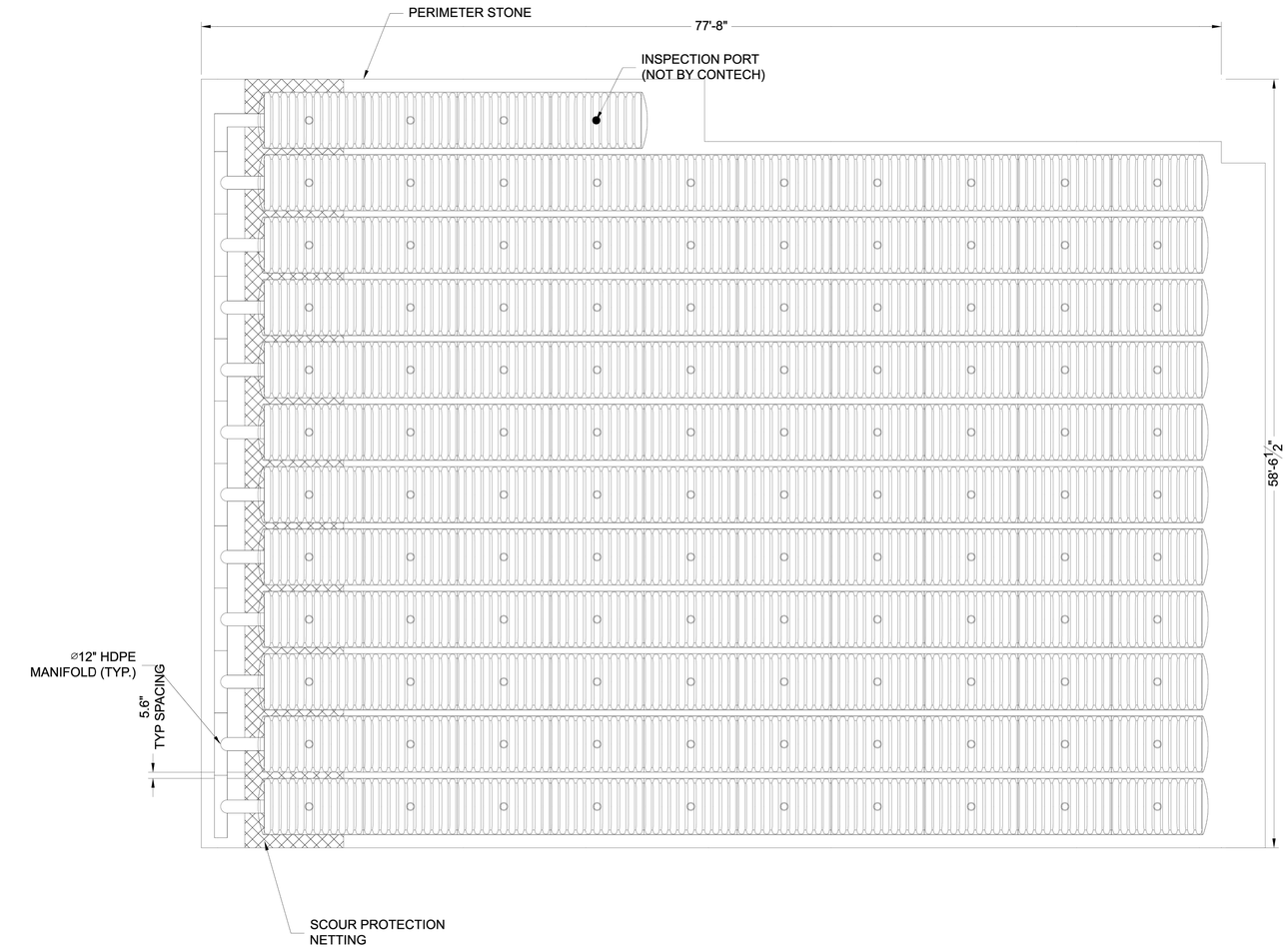
DESIGN PARAMETERS
- PRETREATMENT METHOD = None
- STORAGE VOLUME REQUIRED = 9365ft³
- INVERT DEPTH = 4.5ft
- MANIFOLD DIAMETER = 12in.
- SPACING BETWEEN CHAMBERS = 5.6in.
- SIDE PERIMETER STONE WIDTH = 12in.
- END PERIMETER STONE WIDTH = 12in.
- TOP PERIMETER STONE WIDTH = 6in.
- BOTTOM PERIMETER STONE WIDTH = 6in.
- STONE POROSITY = 40%

SYSTEM DETAILS
- TOTAL ELBOW MANIFOLDS = 1
- TOTAL TEE MANIFOLDS = 11
- TOTAL START CHAMBERS = 12
- TOTAL MID CHAMBERS = 90
- TOTAL END CHAMBERS = 12
- TOTAL NUMBER OF CHAMBERS = 114
- NUMBER OF ROWS = 12
- CHAMBERS PER ROW = 10
- CHAMBER STORAGE VOLUME = 5404.8ft³
- MANIFOLD STORAGE VOLUME = 70ft³
- BACKFILL STORAGE VOLUME = 3933.38ft³
- TOTAL STORAGE PROVIDED = 9408.19ft³

SYSTEM DIMENSIONS AND OTHER MATERIALS
- RECTANGULAR FOOTPRINT = 77.66x58.53ft
- TOTAL EXCAVATION = 841.78y³
- STONE BACKFILL = 364.2y³
- REMAINING BACKFILL TO PAVEMENT = 248.32y³
- WOVEN GEOTEXTILE QTY = 0y²
- NON-WOVEN GEOTEXTILE QTY = 505.07y²
- SCOUR PROTECTION FITTING = 58.53x7.5ft
- APPROXIMATE TRUCKLOADS = 1

GENERAL NOTES

1. ALL ELEVATIONS, DIMENSIONS AND LOCATIONS OF RISERS AND INLETS SHALL BE VERIFIED BY THE ENGINEER OF RECORD.
2. PRIOR TO INSTALLATION OF THE CHAMBERMAXX SYSTEM A PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED. THOSE REQUIRED TO ATTEND ARE THE SUPPLIER OF THE SYSTEM, THE GENERAL CONTRACTOR, SUB-CONTRACTORS AND THE ENGINEER.
3. CHAMBERMAXX CHAMBERS ARE MANUFACTURED FROM POLYPROPYLENE PLASTIC.
4. CHAMBERMAXX SYSTEM TO MEET AASHTO HS20/HS25 LIVE LOADING, PER AASHTO LRFD SECTION 12.
5. ACCESS COVERS TO MEET AASHTO HS20/HS25 LIVE LOADING.
6. MINIMUM COVER IS 18-INCHES TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. FOR COVER HEIGHTS GREATER THAN 96-INCHES CONTACT YOUR LOCAL REPRESENTATIVE.
7. ALL PARTS PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.
8. FOR INFORMATION ON PRE-TREATMENT SYSTEMS, REFERENCE CONTECH PRE-TREATMENT SYSTEM STANDARD DETAILS OR CONTACT YOUR LOCAL REPRESENTATIVE.
9. CHAMBERMAXX BY CONTECH ENGINEERED SOLUTIONS (800) 925-5240



ASSEMBLY
SCALE: 1"=10'

MARK	DATE	REVISION DESCRIPTION	BY

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8301 State Highway 29 North, Alexandria, MN 56308
800-328-2047 320-852-7500 320-852-7067 FAX

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DYO96832 Parks & Rec Building

CHAMBERMAXX

Castleton, VT

CHAMBERMAXX

PROJECT No.:	SEQ. No.:	DATE:
70762	96832	01/12/2026
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D1 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9815
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE: HORZ.: NOT TO SCALE VERT.:
DATUM: HORZ.: - VERT.: -

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
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TOWN OF CASTLETON
CONTECH DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-501

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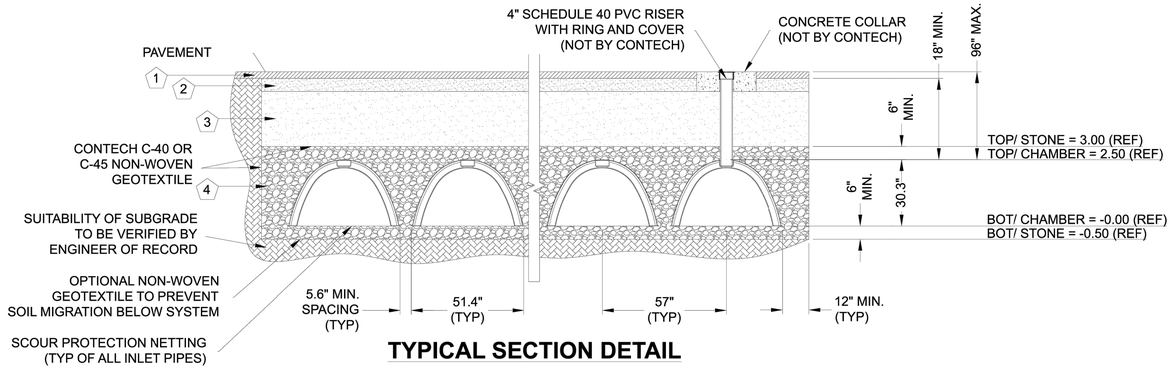
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

INSTALLATION NOTES

1.CHAMBERMAXX INSTALLATION GUIDE TO BE REVIEWED BY CONTRACTOR PRIOR TO INSTALLATION.
2.PRIOR TO PLACING BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, UNSUITABLE MATERIAL SHALL BE REMOVED AND BROUGHT BACK TO GRADE WITH FILL MATERIAL AS APPROVED BY THE ENGINEER OF RECORD. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE BEDDING MATERIAL CAN BE PLACED.
3.THE SCOUR PROTECTION NETTING TO EXTEND 1'-0" BEYOND OUTSIDE EDGE OF INLET CHAMBERS.
4.COVER ANY OPEN VOID SPACES GREATER THAN 3/4" ON CHAMBERS WITH A NON-WOVEN GEOTEXTILE TO PREVENT INFILTRATION OF BACKFILL MATERIAL.
5.STONE EMBEDMENT MATERIAL SHALL BE INSTALLED TO 95% STANDARD PROCTOR DENSITY AND PLACED IN 6-INCH TO 8-INCH LIFTS SUCH THAT THERE IS NO MORE THAN A TWO LIFT DIFFERENTIAL BETWEEN ANY OF THE CHAMBERS AT ANY TIME. GRANULAR BACKFILL MATERIAL SHALL BE COMPACTED TO 90% SPD. BACKFILLING SHALL BE ADVANCED ALONG THE LENGTH OF THE CHAMBER ROWS AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING AND DISPLACEMENT OF THE CHAMBERS. THE MINIMUM CHAMBER SPACING MUST BE MAINTAINED.
6.REFER TO CHAMBERMAXX INSTALLATION GUIDE FOR TEMPORARY CONSTRUCTION LOADING GUIDELINES.
7.IT IS ALWAYS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.
8.GENERAL INSTALLATION METHODS AND MATERIALS TO BE IN ACCORDANCE WITH ASTM D2321.



TYPICAL SECTION DETAIL

NOT TO SCALE

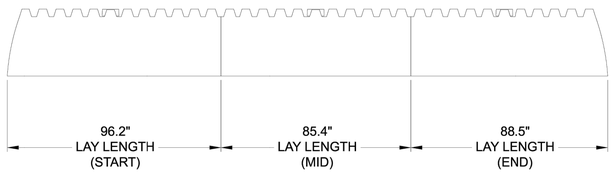
KEY
1. FLEXIBLE PAVEMENT.
2. GRANULAR ROAD BASE.
3. ANY SUITABLE NATIVE OR GENERAL BACKFILL, SEE ENGINEER PLANS.
4. THE BACKFILL MATERIAL SHALL BE FREE-DRAINING ANGULAR WASHED STONE 3/4" - 2" PARTICLE SIZE. MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. MATERIAL SHALL BE WORKED INTO THE CHAMBER SPACING BY MEANS OF SHOVEL-SLICING, RODDING, AIR-TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS. COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE PROJECT ENGINEER OR THEIR REPRESENTATIVE IS SATISFIED WITH THE LEVEL OF COMPACTION. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY CHAMBER IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE CHAMBERS. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT, AND MAINTAIN BALANCED LOADING ON ALL CHAMBERS IN THE SYSTEM, DURING ALL SUCH OPERATIONS.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. CONTACT YOUR LOCAL CONTECH REPRESENTATIVE FOR DETAILS.

CHAMBERMAXX DESIGN DETAILS

FEATURE	START CHAMBER	MIDDLE CHAMBER	END CHAMBER
OVERALL CHAMBER HEIGHT - IN	30.3	30.3	30.3
OVERALL CHAMBER WIDTH - IN	51.4	51.4	51.4
ACTUAL LENGTH - IN	98.4	91.0	92.0
INSTALLED LAY LENGTHS - IN	96.2	85.4	88.5
CHAMBER STORAGE VOLUME - CF	50.2	47.2	46.2
CHAMBER STORAGE PER LINEAR FOOT - CF/LF	6.3	6.6	6.3
*MIN. INSTALLED CHAMBER VOLUME - CF	78.1	75.1	74.1
*MIN. INSTALLED CHAMBER VOLUME PER LINEAR FOOT - CF/LF	9.7	10.6	10.0
CHAMBER WEIGHT - LB	83	73	76
*6" OF STONE ABOVE AND BELOW CHAMBER, 5.6" CHAMBER SPACING AND 40% POROSITY			



TYPICAL ELEVATION VIEW

NOT TO SCALE

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CHAMBERMAXX
Castleton, VT
CHAMBERMAXX

PROJECT No.:	SEQ. No.:	DATE:
70762	96832	01/12/2026
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D2 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9815
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE: HORZ.: NOT TO SCALE VERT.:
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FUSS & O'NEILL
205 BILLINGS FARMS RD. SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.037D
www.fando.com

TOWN OF CASTLETON
CONTECH DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-502

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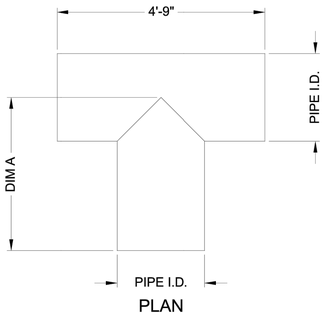
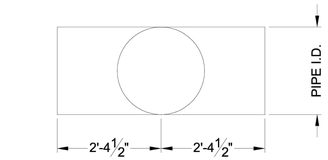
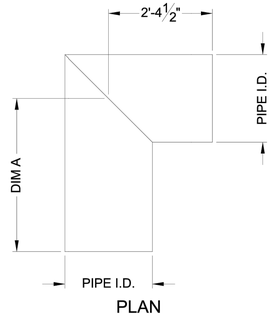


PLAN



ELEVATION

TEE



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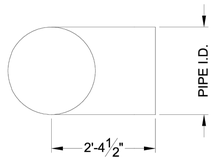
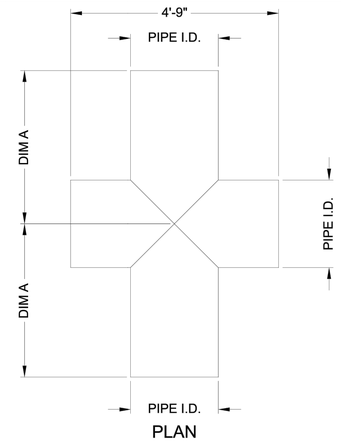


ELEVATION

ELBOW



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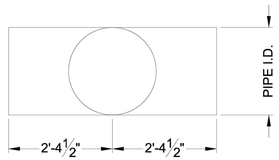
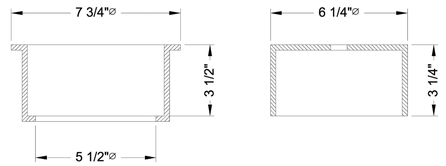


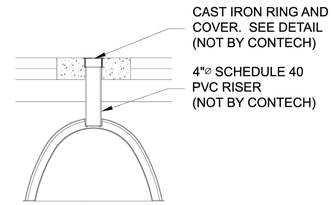
ELEVATION

CROSS-OVER



RING AND COVER DETAIL

NOT TO SCALE



INSPECTION PORT DETAIL

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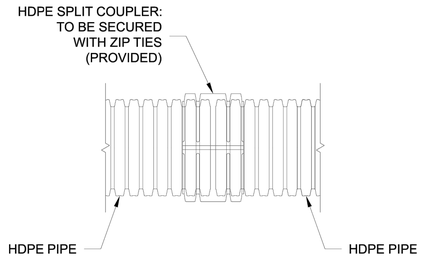

HDPE SPLIT COUPLER DETAIL

STANDARD MANIFOLD COMPONENTS - NOT TO SCALE				
	AVAILABLE DIAMETERS - INCHES			
TEE	12	15	18	24
ELBOW	12	15	18	24
DIM A	42	42	48	48

GENERAL NOTES:
1. FITTING MATERIAL TO BE MANUFACTURED FROM CORRUGATED HIGH DENSITY POLYETHYLENE, AASHTO M294 PIPE.
2. FITTINGS TO BE FABRICATED IN ACCORDANCE WITH THE REQUIREMENT OF AASHTO M294.
3. FITTINGS DESIGNED TO PROTRUDE 6" INTO THE END OF THE INLET CHAMBERS.
4. MANIFOLD TEE AND ELBOW JOINT TO BE CONNECTED UTILIZING HDPE SPLIT COUPLERS.

TYPICAL MANIFOLD DETAILS

HDPE SPLIT COUPLERS	
COUPLER SIZE	PART NUMBER
12"⌀ SPLIT COUPLER	PEF12SPCP
15"⌀ SPLIT COUPLER	PEF15SPCP
18"⌀ SPLIT COUPLER	PEF18SPCP
24"⌀ SPLIT COUPLER	PEF24SPCP

MARK	DATE	REVISION DESCRIPTION	BY

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CHAMBERMAXX

Castleton, VT

CHAMBERMAXX

PROJECT No.:	SEQ. No.:	DATE:
70762	96832	01/12/2026
DES/GNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D3 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSCH
NO. 9815
CIVIL
LICENSED
PROFESSIONAL ENGINEER

SCALE: HORZ.: NOT TO SCALE VERT.:
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FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

TOWN OF CASTLETON
CONTECH DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-503

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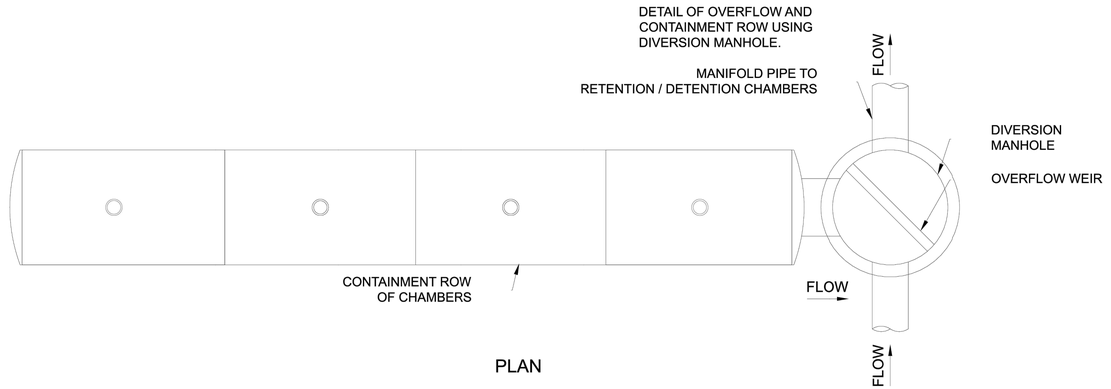
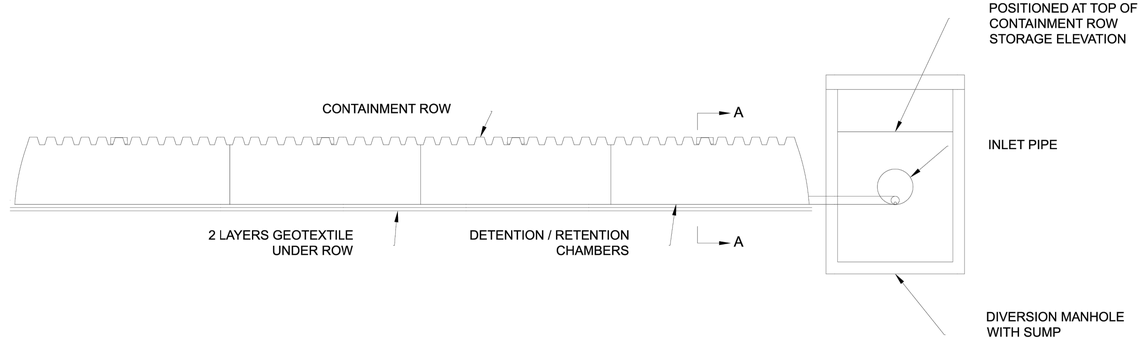
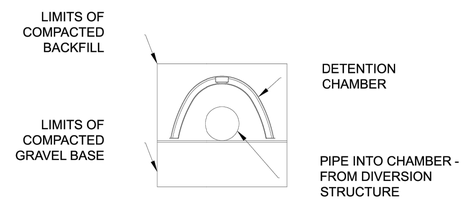


PLAN



ELEVATION



SECTION A-A

CONTAINMENT ROW DETAILS

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PROJECT No.:	SEQ. No.:	DATE:
70762	96832	01/12/2026
DESIGNED: DYO		DRAWN: DYO
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SHEET NO.: D4 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

STATE OF VERMONT
BRIAN J. BERTSON
NO. 9815
CIVIL
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PROFESSIONAL ENGINEER

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TOWN OF CASTLETON
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CD-504

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LAYER STATE:
MS VIEW:

Project Name Castleton Stormwater
Project Location Castleton , VT
Prepared by: J. Fowler **Date:** 12/29/2025
Reviewed by: B. Bertsch **Date:** 1/9/2026

Engineers Probable Cost Opinion

ITEM	ITEM	UNIT	QTY	UNIT PRICE	SUB TOTAL
1	15" CPEP (SL)	LF	160	$ 65.00	$ 10,400.00
2	18" CPEP (SL)	LF	140	$ 110.00	$ 15,400.00
3	24" CPEP (SL)	LF	350	$ 120.00	$ 42,000.00
4	BITUMINOUS CONCRETE PAVEMENT, NON-PAVER PLACED, TYPE IVS	SY	50	$ 30.00	$ 1,500.00
5	BITUMINOUS CONCRETE PAVEMENT, TYPE IVS, QA TIER III	Ton	50	$ 200.00	$ 10,000.00
6	COMMON EXCAVATION	CY	2000	$ 25.00	$ 50,000.00
7	PRECAST REINFORCED CONCRETE CATCH BASIN WITH CAST IRON GRATE (4')	EA	2	$ 4,000.00	$ 8,000.00
8	TRENCH EXCAVATION	CY	500	$ 40.00	$ 20,000.00
9	PRECAST REINFORCED CONCRETE MANHOLE WITH CAST IRON COVER (5')	EA	4	$ 8,500.00	$ 34,000.00
10	CORING CONCRETE	EA	1	$ 875.00	$ 875.00
11	CRUSHED STONE BEDDING	CY	180	$ 125.00	$ 22,500.00
12	GRANULAR BACKFILL FOR STRUCTURES	CY	10	$ 100.00	$ 1,000.00
13	HAY MULCH	TON	1	$ 1,000.00	$ 1,000.00
14	SILT FENCE, TYPE I	LF	400	$ 4.00	$ 1,600.00
15	SPECIAL PROVISION (CONTECH CHAMBERMAX)	LS	1	$ 100,000.00	$ 100,000.00
16	TOPSOIL	CY	40	$ 60.00	$ 2,400.00
17	TURF ESTABLISHMENT, GENERAL SEED	SY	240	$ 2.00	$ 480.00
18	MOBILIZATION/DEMOBILIZATION (12%)	LS	1	$ 16,000.00	$ 16,000.00
19	TRAFFIC CONTROL, ALL-INCLUSIVE (5%)	LS	1	$ 7,000.00	$ 7,000.00
	TOTAL:				$ 344,155.00
	TOTAL + 20% CONTINGENCY:				$ 412,986.00

BMP Identification / **Design, Construction and Maintence**

Unique ID	Project Name	Land Owner	Responsible Party	Latitude (decimal degrees)	Longitude (decimal degrees)	Existing SW permit number (if applicable)	Watershed Projects Database ID (if known)	Part of MS4/ Incorporated into MS4	Cost Estimate (optional)	BMP Status	Year Planned Construction	Date Constructed	Date of last inspection	Maintence needed?
WPD 11753	Castleton Village School Stormwater Remediation	Town of Castleton		43.61248	-73.17940	N/A	11753	No		Final Design (100%)	2026	7/1/2018	7/1/2018	No
WPD 11753	Castleton Village School Stormwater Remediation	Town of Castleton		43.61248	-73.17940	N/A	11753	No		Final Design (100%)	2026			

Basin Information / **BMP Tracking Specifications**

Unique ID	Applicable FRP	LC TMDL Drainage Area	LC TMDL Lake Segment	Eligible for Phosphorus Credit?	BMP Type	Impervious area (acres)	Pervious Entry Method	Pervious HSG A	Pervious HSG B	Pervious HSG C	Pervious HSG D	Total Pervious area (acres)	Storage volume (ft^3)	Infiltration rate (in/hr)
WPD 11753	n/a	Poultney River	South Lake B	Yes	Infiltration Chambers	7.9	Total Pervious					8.9	9,408	2.41 in/hr
WPD 11753	n/a	Poultney River	South Lake B	Yes	Infiltration Chambers	7.9	Total Pervious					8.9	9,408	8.27 in/hr

Phosphorus Calculations

Unique ID	* Load Before Treatment (kg/ac/yr)	* Storage Depth (inches)	* Practice Efficiency	* P Reduction (kg/year)	Manual P Reduction (kg/yr)	Is this an upgrade to an existing BMP?	Does the upgrade changed the drainage area?	% Credit to MS4	* P Credit (kg/yr)
WPD 11753	11.81	0.30	67.81%	8.01		No	Yes	100%	8.01
WPD 11753	11.81	0.30	84.36%	9.96		No		100%	9.96
								100%	

Drainage Area Prior to Upgrade / **BMP Specifications Prior to Upgrade**

Unique ID	Prior Impervious area (acres)	Pervious Entry Method 2	HSG A	HSG B	HSG C	HSG D	Total Pervious Area	BMP type prior to upgrade	Previous storage volume (ft^3)	Infiltration rate prior to upgrade (in/hr)	* Prior Load Before Treatment (kg/acre/year)	* Prior Storage Depth (inches)	Upper Efficiency - Lower Efficiency4	Percent of Storage Depth Step5	* Prior Practice Efficiency	* Estimated P removal of Prior Practice (kg/yr)	Manual P Reduction - Prior Practice (kg/yr)
WPD 11753	7.90	Total Pervious					8.90					0.00		0.00			
WPD 11753												0.00		0.00			

Vermont Division for Historic Preservation
Project Review Form

This form is to be used for both the Preliminary and Final Project Review for clean water projects funded by the Department of Environmental Conservation (DEC) Clean Water Initiative Program (CWIP). See applicable sections below.

Preliminary Project Review Section

To start the VDHP review process for CWIP-funded Clean Water Projects, please complete this form and submit it to the Vermont Division for Historic Preservation (VDHP) at ACCD.projectreview@vermont.gov with the information requested below. This Preliminary Project Review form, once completed and signed by VDHP, should be submitted as a project deliverable.

This is for non-exempt CWIP project types or conditionally exempt that have failed to meet the project qualifications. Exempt project types should NOT submit this form. Please refer to the CWIP Funding Policy for a listing of exempt and conditionally exempt project types. The CWIP Funding Policy can be found here: https://dec.vermont.gov/water-investment/cwi/grants#policy

For questions on architectural resources, archaeology, and below-ground resources, please contact Scott Dillon at (802) 272-7358 or scott.dillon@vermont.gov.

1. **Contact information**:
    a. Contact name: Hilary Solomon
    b. Email address: hilary@pmnrcd.org
    c. Phone number: (802) 558-3515
2. **WPD Project Title**: Castleton Village School Stormwater Remediation
3. **WPD – ID**: 11753
4. **Project site map**: Please attach a project site map. An annotated Google map or ANR Atlas map will suffice but professional design plans are also welcome. An example image is provided below. Site map should outline:
    a. Project Area of Potential Effects[1] with clearly marked GPS coordinates for project boundaries.

[1] The project APE or "area of potential effects" means the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The

b. Proposed ground disturbance locations. Note that stream bank regrading is considered ground disturbance.

Section 4 Map: See attached Concept Design for the Castleton Village School location.

5. **Project information**:
   a. Select CWIP project type from drop down (if not listed, it's categorically exempt)
      i. Stormwater - Implementation
   a. Please provide a short description of the project's proposed scope of work (CWIP Preliminary Design Report is acceptable instead)

      Project will utilize buried infiltration technology to infiltrate storm water from the Castleton Elm and Seminary St storm drains under a basketball court.

   b. Are there other Agencies or funding partners involved?: Yes ◯ No ◯
      i. **If yes**, who? South Lake CWSP and DEC
   c. Does the project involves ground disturbance?: Yes ◯ No ◯
      i. **If yes,** please describe type and extent of ground disturbance. Specifically,
         1. Whether disturbance will be performed by hand or heavy machinery,
         2. The estimated total acreage and maximum depth of disturbance, and

APE is influenced by the scale and nature of an undertaking and may be different from different kinds of effects caused by the undertaking [36 C.F.R. § 800.16(d)]. When determining a project's APE remember to consider/include extent of restoration footprint; new, upgraded or existing access or haul roads; staging, storage, and stockpile areas; disposal sites or waste areas; borrow areas and other source locations for fill material; and areas impacted by drainage diversions or mechanical tree clearing and similar landscape alterations.

3. The history of prior naturally-caused or man-made ground disturbance to the site (if known):

Yes, equipment will be used to to bury infiltration modules under a basketball court in the old Village School playground, and thus an area will be excavated. The plans show the extent and depth of disturbance, which is roughly the size of the basketball court.

d. Will the project cause direct or indirect impact or disturbance to any man-made building or structure more than 50 years old (including dams, culverts, and bridges) or to any federally listed historic building or structure?

Yes ◯ No ◯ Unknown ◯

i. **If yes or unknown**, provide any known details on the buildings or structure(s) location/condition and extent of proposed impact or disturbance. Please include whether the structure is listed in the National Register of Historic Places if known:

e. Is the project APE located within, intersect with, or adjacent to a state- or federally listed historic district, Designated Downtown or Village Center?

Yes ◯ No ◯ Unknown ◯

Email this form and supporting materials to ACCD.ProjectReview@vermont.gov
Please copy scott.dillon@vermont.gov

TO BE COMPLETED BY VDHP:

◯ Historic Properties/Sites Affected

☐ Potential for Architectural Historic Properties to be affected – A Qualified Architectural Historian or Historian Consultant* is required (**please see* pre-approved list of consultants)

☐ Determination of Eligibility required

Comments:

☐ Potential for Archaeological Historic Properties to be affected – a Qualified Archaeological Consultant* is required (**please see* pre-approved list of consultants)

☐ Archaeological Resource Assessment (ARA) required

☐ Phase 1 archaeological investigation required

Comments:

◯ No Historic Properties/Sites Affected/No Effect

☑ No Historic Resource Present in Area of Potential Effect

☐ Work will have No Effect on Historic Resource

Comments: Previous disturbance in project area.

Vermont State Historic Preservation Office Concurrence and Date:

X: _____

Final Project Review Section

To complete Final Project Review, re-submit this VDHP Project Review Form with the following additional elements included. Note that this should be added to the VDHP-signed version of the Preliminary Review Form so VDHP can reference their prior guidance on this project. This Final Project Review Form, once completed and signed by VDHP, should be submitted as a CWIP project deliverable.

1. Please provide a short description of any changes to the project's proposed scope of work since the Preliminary Project Review:

2. Please attach:
    a. Final (100%) Design Plans
    b. Project narrative description of scope of work (CWIP Final Design Report will suffice)
    c. Any historical resource assessments, or determination of eligibility forms
    d. Any archaeological resource assessments, other archaeological reports, or end-of-field documents
    e. Any Treatment Plans

Email this form and supporting materials to ACCD.ProjectReview@vermont.gov
Please copy scott.dillon@vermont.gov

TO BE COMPLETED BY VDHP:

◯ No Historic Properties/Sites Affected/No Effect
- ☐ No Historic Resource Present in Area of Potential Effect
- ☐ Work will have No Effect on Historic Resource

Comments:

◯ No Adverse Effect

◯ Adverse Effect
- ☐ Project Treatment Plan or other agreement documents executed

Other:

Vermont State Historic Preservation Office Concurrence and Date:

X: _____

Downtown Castleton Stormwater Scoping

Poultney Mettowee Natural Resources Conservation District

Castleton, VT

June 2023

205 Billings Farm Road
Suite 6B
White River, VT 05001

20220286.A10

1 Introduction

1.1 Background

The Poultney Mettowee Natural Resources Conservation District (PMNCRD) in partnership with the Town of Castleton and the Rutland Regional Planning Commission has retained Fuss & O'Neill to conduct a stormwater scoping study on Main Street in Castleton, Vermont. This includes assessing existing stormwater infrastructure, identifying a list of reasonable alternatives, and providing recommendations for improvements to stormwater management in downtown Castleton. The Town is aware of consistent flooding and drainage issues along Main Street relating to stormwater runoff from the uphill areas in the downtown watershed. This creates hazardous conditions and generates polluted stormwater that drains towards the Castleton River to an outfall that has been designed for retrofit by Vermont DEC. The scoping process includes assessing existing conditions, developing and evaluating alternatives for improvements, gathering public input and selection of a preferred alternative. This report presents potential alternatives to improve stormwater management. These alternatives will be discussed with PMNCRD and the Town and two alternatives will be advanced to roughly 30% design.

2 Existing Conditions

2.1 Existing Conditions

The project is bounded by Ellis Orchard Road and South Street, focusing on inputs from Seminary Street, Elm Street, and the surrounding area. Stormwater runoff from Main Street and from side streets and their watersheds is collected in a closed drainage system that is antiquated, in poor condition, and likely undersized as evidenced by frequent flooding. Based on field observations, water flows from Seminary Street and other areas and pools on Main Street. This stormwater ultimately drains towards the Castleton River to an outfall designated for retrofit by Vermont DEC, meaning that DEC believes it could be improved to address water quality concerns. This neighborhood is underlain by glacial outwash associated with the Castleton River (Vermont Center for Geographic Information) and soils are indicated to be Windsor loamy sands. These soils are well suited for stormwater infiltration. A site walk was conducted during a rain event on September 20th, 2022. The field visit was conducted to gain a better understanding of the project area and surrounding water quality and safety issues. During the field visit, drainage infrastructure along Main Street, Seminary Street, and through Castleton University were identified as locations that have the most potential for improving stormwater management conditions in downtown Castleton. The rainstorm was severe, providing a unique opportunity to observe firsthand where stormwater runoff is directed

and how the drainage system is handling rain events. Flooding was observed and prominent on Elm Street and Packing House Road. There was evidence of stone inlets and stone culverts on Elm Street. The condition and extent of this historic system are unknown.

Flooding and Stone Inlet at 75 Elm Street

Seminary Street, South Street, and Glennbrook Road had drainage systems that were more modern and appeared to be functioning. The condition of the pipes and structures was evaluated visually from the surface and compared to record drawings and other available information. Sources of siltation and untreated urban runoff were identified during the site walk. Elm Street terminates south at the gravel driveway for 114 Elm Street (Wooldridge Art Annex) which is a Castleton University owned parcel abutting the rail trail. The driveway was eroding and roof runoff and lot runoff was observed to be turbid.

Looking Southeast at Driveway to 107 & 114 Elm Street

Gravel Driveway Erosion at 114 Elm St. – A source of siltation

Minor areas of concern were also identified at the intersection of the Delaware and Hudson Rail-Trail and Packing House Road. In this location the driveway to 180 Packing House Road was also eroding and sediment was discharging into a wooded area and eventually traveling into open drainage flowing Northeast in the direction of Mill St. where an outfall to the Castleton River was located.

Driveway erosion at 180 Packing House Road

Stormwater along Seminary Street and South Street was conveyed north toward Main Street through closed systems and little to no flooding was observed. These systems appeared to be in fair condition however frames needed adjustment and corrugated metal piping could be nearing service life expectation.

Catch basin on Seminary Street Functioning

Campus stormwater west of South Street and along Glennbrook Road (University Drive)

was carried to a manmade pond behind dormitories (North and Audet Halls). The pond is impounded by an earthen dam. The dam's outlet structure piping had completely failed. This pond discharges to a stream that runs west of Cemetery Drive to the Castleton River. The parcel on which the pond is located is owned by Vermont State Collages Scott Dikeman per Vermont online parcel data. It is recommended that the Town notify the owner and discuss repairs to the outlet piping before a dam failure occurs.

Campus Stormwater Pond Outlet Structure

Pond Outlet Pipe Failed

The Main Street corridor had minor puddling and sediment deposited near the library drive and on the library property. This puddling was due to flat graded site and lack of positive drainage.

Puddling at Library Drive

Material deposited at drop inlet near library driveway

On the north side of Main Street there was no flooding or erosion activity observed. Major outfall locations where stormwater crosses the railroad tracks to the Castleton River were identified. Culverts were located at Cemetery Drive, behind 846 Main Street, near the intersection of Old North Road and the railroad, behind the elementary school and Mill Street. These were steel and corrugated metal culverts of varying diameters under the railroad bed. The culverts discharged to wetland areas and flat graded wooded areas between the railroad tracks and the river.

Culvert crossing the railroad tracks north of 846 Main Street

The Castleton Village Historic District is located along Main Street between Cemetery Road and the D&H trailhead and extends down South Street to the edge of the Castleton University Campus. This historic district is both State Registered Listed and National Register Listed. There are also several State Register Listed buildings within the project area. The Castleton Village Historic District retains a high degree of integrity and retains its National Register status. There are many mature plantings, private sidewalks leading from front doors to the street, fences, stone walls, and other contributing amenities associated with these structures. We do not anticipate these historic areas will conflict with proposed stormwater management practices.

Several areas within the vicinity of the project area have previously undergone assessment for archeological sensitivity. Areas with significant prior disturbance are unlikely to impact archeological remains. These areas include the north side of Main Street west of North Road, the south side of Main Street east of South Street, and the east side of South Street. However, a prior archeological survey identified a concentration of historic cultural material in close proximity to Main Street, so the remainder of the study area has a high potential for intact historic deposits and moderate potential for precontact deposits.

The Town of Castleton in conjunction with the Rutland Regional Planning Commission has also retained Fuss and O'Neill to complete a scoping study for adding sidewalks and bike lanes to the Main Street Corridor in Castleton. The alternative selected by the Castleton Selectboard voted for pursuit includes constructing 6-foot concrete sidewalks on the north side of Main Street from North Road to the Amtrak Station, on the south side of Main Street from west of Glennbrook Road to the D&H trailhead, and on the east side of South Street. This sidewalk design will need to be taken into consideration for potential stormwater treatment alternatives. This provides an opportunity to incorporate stormwater infrastructure into the new sidewalk construction.

3 Alternatives Assessment

Stormwater retrofits and infiltration practice alternatives were developed with the project's goals and needs in mind. Factors influencing alternatives include, the results of subsurface investigations (test pits) performed during our site visit, areas where drainage and flooding issues were observed during our site visit, concerns expressed by the town, stakeholder's comments, and long-term maintenance needs. Five alternatives were identified and developed, including the No Build Alternative. Our site visit performed on September 9, 2022, informed the locations of the alternatives and drainage catchment areas.

Alternative 1: No Build

As with any project, the alternatives analysis should always consider that doing nothing may be the best option. There are no direct costs or impacts associated with this alternative, but none of the needs outlined in our proposal letter will be addressed. Stormwater management and frequent flooding will not be improved. In addition, no water quality issues will be addressed and the amount of stormwater entering the Castleton River will not be reduced. This alternative has no impacts to right-of-way, utilities, natural and cultural resources, or future maintenance costs. This alternative would treat 0 acre-feet of stormwater runoff. Because stormwater management and water quality concerns are a priority within the project area, the No Build Alternative is not recommended.

Alternative 2: Infiltration Basin; Main Street West of Glennbrook Road

Alternative 2 is the installation of an infiltration basin in the right of way on the south side of Main Street, west of Glennbrook Road (see *Figure 1*). The existing area is grassed, with a contributing catchment area of approximately 10 acres. The site currently does not receive storm water runoff from Main Street due to curbing. Based on the test pit data, the soils in this location are primarily sandy loam and have an assumed minimum infiltration rate of 2 inches/hour. The proposed infiltration basin will capture stormwater runoff from the Castleton University grounds as well as from Main Street. The proposed design will include curb cuts to capture run off from Main Street, an outlet control structure to convey runoff above the design volume back into the existing closed drainage system, and pre-treatment measures (such as sediment forebay or filter strip) to be

determined during 30% design. This proposed alternative has a potential Water Quality Volume (WQv) of 0.65 acre-feet. This site is within the ROW and coincides with the location of the proposed sidewalk on the south side of Main Street as part of the Castleton Pedestrian Scoping Study. This offers the possibility of incorporating stormwater management into the sidewalk and bike lane improvements on Main Street.

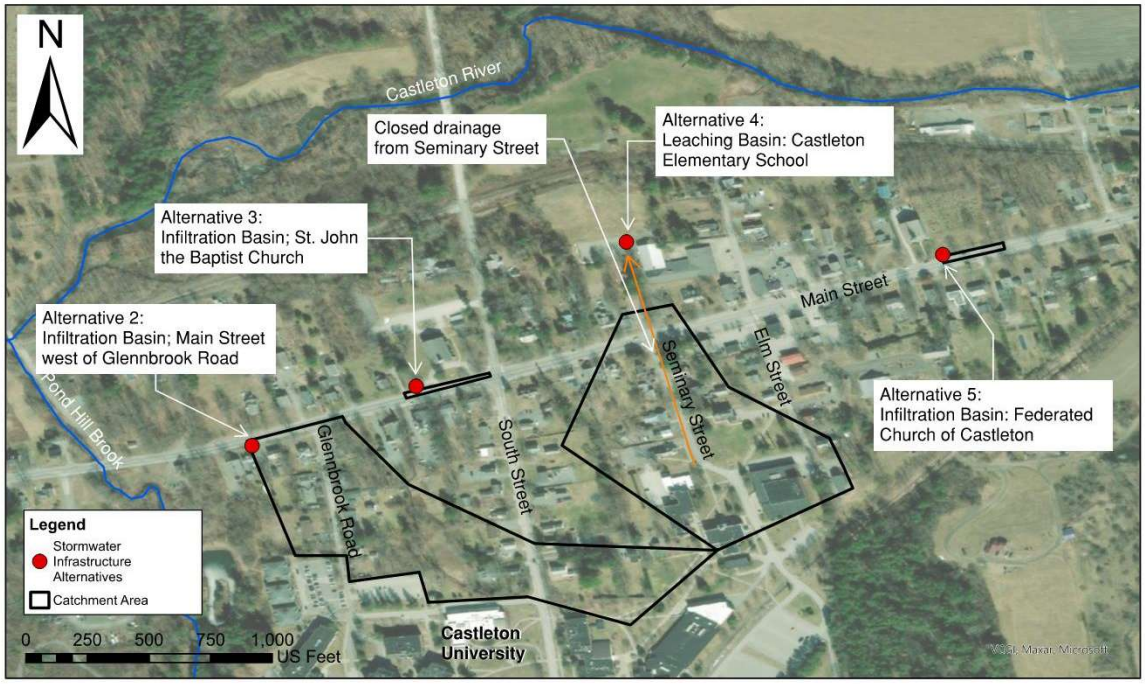


Figure 1 – soil investigation areas and approximate catchment areas

Alternative 3: Infiltration Basin; St. John the Baptist Church

Alternative 3 is the installation of an infiltration basin in the right of way on the north side of Main Street, in front of St. John the Baptist Church. (see *Figure 1*). The existing area is grassed, with a contributing catchment area of approximately 1/10th of an acre. Closed drainage through Main Street in this area captures most of the runoff from the road and other impervious surfaces. Additionally, any precipitation falling north of Main Street will drain away from the site and towards the Castleton River. Based on the test pit data, the soils in this location are primarily sand, and have an assumed minimum infiltration rate of 1.5 in/hr (NRCS Soil Survey). The proposed design will include curb cuts to capture run off from Main Street, an outlet control structure to convey runoff above the design volume back into the existing closed drainage system, and pre-treatment measures (such as sediment forebay or filter strip) to be determined during 30% design. Considering this area is already grassed and currently captures stormwater runoff from Main Street, and the existing soils have been found suitable for infiltration, infiltration is likely already occurring at this site. Constructing a green infrastructure practice at this location will likely not add much additional benefit to stormwater management. This proposed

alternative has a potential Water Quality Volume (WQv) of 0.01 acre-feet. This site is within the ROW and coincides with the location of the proposed sidewalk on the north side of Main Street as part of the Castleton Pedestrian Scoping Study. This offers the possibility of incorporating stormwater management into the sidewalk and bike lane improvements on Main Street.

Alternative 4: Infiltration Chamber; Castleton Elementary School

Alternative 4 is the installation of an infiltration chamber behind Castleton Elementary School (see *Figure 1*). An infiltration chamber is an open bottomed, perforated, subsurface, structure surrounded by crushed stone and a layer of filter fabric. The basin temporarily stores stormwater before it infiltrates into subsurface soils. The existing area is a basketball court, with a contributing catchment area of approximately 10 acres. Based on the test pit data, the soils in this location are primarily a sandy loam and have an assumed minimum infiltration rate of 1.5 in/hr (NRCS Soil Survey). An infiltration chamber will be connected to closed drainage that runs along Seminary Street and crosses Main Street. This practice will capture stormwater runoff before it reaches the Castleton River. The proposed design will likely require a pre-treatment measure such as a separator row or bypass chamber with a deep sump. An infiltration chamber could be designed such that additional flow bypasses the basin once it reaches full capacity, or with an outlet connected back into the closed drainage system. This alternative will likely have the greatest impact on treating stormwater prior to it entering the Castleton River since it will treat stormwater already captured in closed drainage. Additionally, it will not be impacted by the construction of new sidewalks along Main Street and could be sized to treat stormwater from new sidewalks. This proposed alternative has a potential Water Quality Volume (WQv) of 0.82 acre-feet.

Alternative 5: Infiltration Basin; Federated Church of Castleton

Alternative 5 is the installation of an infiltration basin in the right of way on the north side of Main Street, in front of the Federated Church of Castleton (see *Figure 1*). The existing area is grassed, with a contributing catchment area of approximately 1/10th of an acre. While there is no closed drainage in the vicinity of the proposed site, the topography is very flat and will only capture stormwater runoff from the north half of Main Street immediately in the vicinity of the proposed infiltration practice. Based on the test pit data, the soils in this location are primarily a sandy loam and have an assumed minimum infiltration rate of 1.5 in/hr (NRCS Soil Survey). Considering this area is already grassed, currently captures stormwater runoff from Main Street, and soils have been found suitable for infiltration, infiltration is likely already occurring at this site. The proposed design will include curb cuts to capture run off from Main Street, an outlet control structure to convey runoff above the design volume back into the existing closed drainage system, and pre-treatment measures (such as sediment forebay or filter strip) to be determined during 30% design. This proposed alternative has a potential Water Quality Volume (WQv) of 0.01 acre-feet. This site is within the ROW and coincides with the location of the proposed sidewalk on the north side of Main Street as part of the Castleton Pedestrian Scoping Study. This offers the possibility of incorporating stormwater management into

the sidewalk and bike lane improvements on Main Street.

4 Alternatives Recommendation

We recommend advancing Alternative 2 (infiltration basin on the south side of Main Street west of Glennbrook Road) and Alternative 4 (infiltration chamber at Castleton Elementary School). All alternatives require regular maintenance to ensure the Pre-treatment measures will minimize maintenance needs. An evaluation matrix is illustrated below:

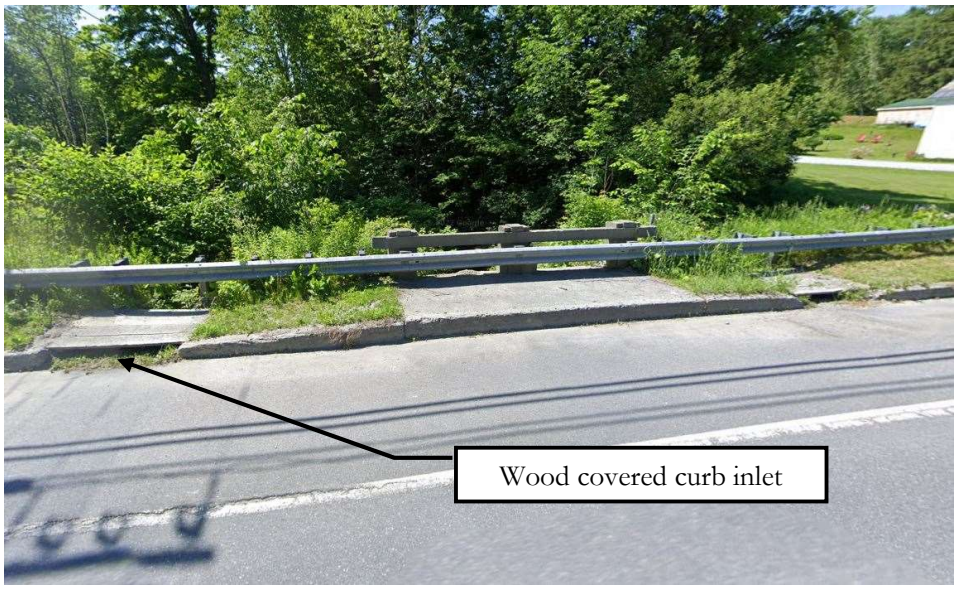
Alternatives Evaluation Matrix					
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5
	No Build	Infiltration Basin; Main St West of Glennbrook Road	Infiltration Basin; St. John the Baptist Church	Infiltration Chamber; Castleton Elementary School	Infiltration Basin; Federated Church of Castleton
Impacts					
ROW	No	Yes	Yes	No	Yes
Utilities	No	Yes	Possible	Yes	Possible
Historic	No	Potential Impact to Setting	Potential Impact to Setting	Minimal	Potential Impact to Setting
Archeological	No	High Sensitivity	High Sensitivity	Low Potential	High Sensitivity
Wetlands	No	No	No	No	No
Hazardous Materials	No	No	No	No	No
Floodplain	No	No	No	No	No
Incorporated into New Sidewalk Construction	No	Yes	Yes	Potential to be incorporated	Yes
Benefits					
Meets Project Purpose	No	Yes	Yes	Yes	Yes
WQ_v Treated (acre-feet)	None	Moderate	Minimal	Significant	Minimal
Stormwater Practice Tier	N/A	Tier 1	Tier 1	Tier 1	Tier 1
Improve Closed Drainage	No	No	No	Yes	No
Operation					
Snow Removal	No	No Change	No Change	N/A	No Change
Parking	No	No Change	No Change	N/A	No Change
Maintenance	No	High	High	Moderate	High

The matrix is broken down into categories for quick comparison of alternatives. These categories are potential impacts, benefits and future maintenance and operational considerations. Alternatives 2 and 4 have the highest potential for meaningful treatment of stormwater from larger catchment areas.

This scoping studies focus was locating potential areas for infiltration and treatment devices, however upon completing the site walk and evaluating the existing downtown stormwater infrastructure it is also evident that Elm Street and Packing House Lane have inadequate closed drainage systems and continued flooding. We recommend that in conjunction with alternatives 2 and 4, a drainage system design be completed on Elm Street to replace stone culverts and evaluate pipe sizing. A lawn area directly behind Castleton Pizza Place and Deli (Irving Station) would also be a suitable location for a rain garden or open-air infiltration basin. This is property owned by Ellis Orchards Inc. and is an existing water collection low area that could be improved.

Lawn area owned by Ellis Orchard LLC. which is an existing low area

Alternative 2 describes a stormwater basin west of Glennbrook Road. Outside the limits of the study area, a private property at 949 Main Street appears to have adequate land area for a larger more encompassing stormwater treatment area and would capture a large area of inflow. This would be upstream of the wood covered curb openings at the bridge that discharge directly to a stream, discharge that is currently untreated.



Bridge on Route 4A west of Glennbrook Road over stream from Castleton University Pond dam

The Ellis Orchard LLC. property and the 949 Main Street property would require easements and further review to evaluate soils and catchment size.

5 Alternatives Selection

5.1 Presentation and Selection of the Preferred Alternatives

The preliminary alternatives, matrix, and recommended alternatives were presented to the project team at a meeting on February 16, 2023. Alternatives 2 and 4 were selected to be pursued as a future project and developed to a 30% design. The location of Alternative 2 was considered and agreed that 949 Main Street would be a suitable location. Along with the 30% designs it was recommended that preliminary cost estimates be developed along with preliminary contaminant removal. Both Alternatives are part of the Lake Champlain watershed and are potential areas of phosphorous removal in line with watershed planning efforts. Sheets of the 30% design effort are included in *Appendix A*.

The Poultney Mettowee Natural Resources Conservation District conducted phosphorous sampling on several locations located inside the watersheds analyzed on 5/2/2023. The lab samples were sent for testing at an Endyne Inc. facility, a report was formulated, and returned to the Town. The lab data shows multiple areas of high phosphorous levels of 0.12 mg/L and one sample on Elm Street with a reading of 0.52 mg/L, whereas the typical level is assumed to be .044 mg/L based on the sample taken from Pond Hill Brook. The document "Developing Nutrient Criteria for Vermont's Lakes and Wadeable Streams" dated October 30, 2014 and revised 2016 lists phosphorous criteria ranges from 0.010 to 0.054 mg/L. Data received including location and time of sample is included in *Appendix B*.

Alternative 2 at 949 Main Street was designed to be two 100-foot-long treatment swales with a small detention pond at the lower end. A drive culvert with headwalls is required and an outlet structure along with an emergency weir will need to be used to control pond level. The side slopes for the swale will be a maximum 4:1 slope and will have a 2-foot bottom width. Most closely identifiable as a dry pond this Alternative provides slight reduction in contaminant removal.

Alternative 4 at the Castleton Elementary School consists of subsurface infiltration chambers and two manholes to redirect existing stormwater. The chambers considered for this design were ChamberMaxx manufactured by Contech. The chambers are a total of 59 feet long and 58 feet wide and will be set on a bed of stone 6 inches deep. An isolator row will be installed as pretreatment for the infiltration system. A drain manhole will be installed to intercept an existing 2-foot concrete box pipe from Main Street closed drainage. An overflow pipe will be included and directed toward a second drain manhole placed in line with the existing 2-foot concrete box. Another overflow pipe from the chambers will be directed to the downstream manhole. This alternative provides moderate contaminant removal.

FUSS & O'NEILL

Appendix A

30% Design Plans

File: J:\DWG\P2022\0286\A10\Civil\Plan\20220286.A10-STP.dwg Layout: ALT - 2 Plotted: 2023-05-26 10:37 AM Saved: 2023-05-26 10:37 AM User: JFowler
MS VIEW: | LAYER STATE: | PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

NOTES:
1. THIS PLAN IS INTENDED TO SHOW SITE DESIGN CONDITIONS AND IS NOT SUITABLE FOR CONSTRUCTION.
2. PROPERTY LINES SHOWN ARE REFERENCED FROM PUBLICLY AVAILABLE GIS LAYERS. PROPERTY LINES SHOWN DO NOT SUPPORT REAL OWNERSHIP AND DO NOT CONSTITUTE A LEGAL RIGHT.

SHT-01

PROJ. No: 20220286.A10
DATE: 02/20/2023

TOWN OF CASTLETON

ALTERNATIVE - 2

MAIN STREET

CASTLETON VERMONT

FUSS & O'NEILL
205 BILLINGS FARMS ROAD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

SCALE:
HORZ.: 1" = 20'
VERT.:
DATUM:
HORZ.: VT83F
VERT.:
20 10 0 20
GRAPHIC SCALE

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

NOTES:
1. THIS PLAN IS INTENDED TO SHOW 30% DESIGN CONDITIONS AND IS NOT SUITABLE FOR CONSTRUCTION.
2. EXISTING DRAINAGE STRUCTURES AND SIZES REFERENCED FROM PLAN BY ENMAN KESSELRING CONSULTING ENGINEERS, TITLED "SEMINARY & MAIN ST. STORM SEWER REPAIR PLAN" DATED 06/01/12.
3. PROPERTY LINES SHOWN ARE REFERENCED FROM PUBLICLY AVAILABLE GIS LAYERS. PROPERTY LINES SHOWN DO NOT SUPPORT REAL OWNERSHIP AND DO NOT CONSTITUTE A LEGAL RIGHT.

48 INFILTRATION CHAMBERS, CONTECH CHAMBERMAXX

PRE-TREATMENT ISOLATOR ROW

NEW OVERFLOW PIPE

INTERCEPT STONE PIPE WITH DIVERSION STRUCTURE.

EXISTING BASKETBALL COURT TO BE RESURFACED

CASTLETON ELEMENTARY SCHOOL

MECHANIC STREET

U.S. POST OFFICE

CASTLETON FREE LIBRARY

VT ROUTE 4A

ELM STREET

THIRD PLACE PIZZERIA

CASTLETON VILLAGE STORE

FORMER TEXACO

HERITAGE FAMILY CREDIT UNION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SCALE: HORZ.: 1" = 30'
VERT.:
DATUM: HORZ.:
VERT.:
30 15 0 30
GRAPHIC SCALE

FUSS & O'NEILL
295 BILLINGS FARMS ROAD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.295.0170
www.fussoneill.com

TOWN OF CASTLETON

ALTERNATIVE - 4

MAIN STREET

CASTLETON VERMONT

PROJ. No.: 20220286.A10
DATE: 02/20/2023

SHT-02

File: J:\DWG\P2022\0286\A10\Civil\Plan\20220286.A10-STP.dwg Layout: ALT-4 Plotted: 2023-05-26 10:37 AM Saved: 2023-05-26 10:37 AM User: JFowler
MS VIEW: LAYER STATE: PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB

FUSS & O'NEILL

Appendix B

Phosphorous Sampling Data

ENDYNE Inc.
Environmental Laboratories

PMNRCD	
PO Box 209	100725
Poultney, VT 05764	
Atten: Heath	

PROJECT: Castleton
WORK ORDER: **2305-11537**
DATE RECEIVED: May 03, 2023
DATE REPORTED: May 08, 2023
SAMPLER: Heath

Laboratory Report

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. All required method quality control elements including instrument calibration were performed in accordance with method requirements and determined to be acceptable unless otherwise noted.

The column labeled Lab/Tech in the accompanying report denotes the laboratory facility where the testing was performed and the technician who conducted the assay. A "W" designates the Williston, VT lab under NELAC certification ELAP 11263; "R" designates the Lebanon, NH facility under certification NH 2037 and "N" the Plattsburgh, NY lab under certification ELAP 11892. "Sub" indicates the testing was performed by a subcontracted laboratory. The accreditation status of the subcontracted lab is referenced in the corres ponding NELAC and Qual fields. The Williston, VT facility is also ISO/IEC 17025:2017 accredited for Total Coliform and E coli by SM9223B.

The NELAC column also denotes the accredit ation status of each laboratory for each reported parameter. "A" indicates the referenced laboratory is NELAC accredited for the parameter reported. "N" indicates the laboratory is not accredited. "U" indicates that NELAC does not offer accreditation fo r that parameter in that specific matrix. Test results denoted with an "A" meet all National Environmental Laboratory Accreditation Program requirements except where denoted by pertinent data qualifiers. Test results are representative of the samples as t hey were received at the laboratory

Endyne, Inc. warrants, to the best of its knowledge and belief, the accuracy of the analytical test results contained in this report, but makes no other warranty, expressed or implied, especially no warranties of merchantability or fitness for a particular purpose.

Reviewed by:

Harry B. Locker, Ph.D.
Laboratory Director

Laboratory Report DATE REPORTED: 05/08/2023

CLIENT: PMNRCD
PROJECT: Castleton

WORK ORDER: **2305-11537**
DATE RECEIVED: 05/03/2023

001 Site: Bridge Right Side — Date Sampled: 5/2/23 Time: 12:04

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.12	mg/L	SM20 4500 P-F	5/5/23 14:33	R VGR	A	

002 Site: Bridge Left Side — Date Sampled: 5/2/23 Time: 12:04

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.12	mg/L	SM20 4500 P-F	5/5/23 14:43	R VGR	A	

003 Site: Under Bridge Pond Hill — Date Sampled: 5/2/23 Time: 12:08

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.044	mg/L	SM20 4500 P-F	5/5/23 14:44	R VGR	A	

004 Site: Cressy — Date Sampled: 5/2/23 Time: 12:16

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.039	mg/L	SM20 4500 P-F	5/5/23 14:46	R VGR	A	

005 Site: Church — Date Sampled: 5/2/23 Time: 12:18

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.052	mg/L	SM20 4500 P-F	5/5/23 14:48	R VGR	A	

006 Site: North Rd — Date Sampled: 5/2/23 Time: 12:21

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.076	mg/L	SM20 4500 P-F	5/5/23 14:50	R VGR	A	

007 Site: Culvert — Date Sampled: 5/2/23 Time: 12:30

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.090	mg/L	SM20 4500 P-F	5/5/23 14:52	R VGR	A	

008 Site: Elm St — Date Sampled: 5/2/23 Time: 12:36

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.52	mg/L	SM20 4500 P-F	5/5/23 14:54	R VGR	A	

009 Site: 5/T Mem — Date Sampled: 5/2/23 Time: 12:39

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.091	mg/L	SM20 4500 P-F	5/5/23 14:55	R VGR	A	

010 Site: R Hold — Date Sampled: 5/2/23 Time: 12:42

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.12	mg/L	SM20 4500 P-F	5/5/23 14:57	R VGR	A	

Laboratory Report DATE REPORTED: 05/08/2023

CLIENT: PMNRCD
PROJECT: Castleton

WORK ORDER: **2305-11537**
DATE RECEIVED: 05/03/2023

011 Site: Unknown Date Sampled: 5/2/23 Time: 12:50

Parameter	Result	Units	Method	Analysis Date/Time	Lab/Tech	NELAC	Qual.
Phosphorus, Total	0.22	mg/L	SM20 4500 P-F	5/5/23 14:59	R VGR	A	

Do Not use this form for WSID Samples or
Residential Drinking Water Samples

ENDYNE Inc.
Environmental Laboratories

160 James Brown Dr
Williston Vermont 05495
Ph 802-879-4333

Chain-of-Custody-Record

*Required Fields

PO#_____ *EMAIL PMNRCD@gmail.com

*Project Name:	*Company Name: PMNRCD PMNRCD@gmail.com	*Sampler Name: Heath
Castleton	*Phone # 802-558-3515	*Phone #
*State of Origin (VT) NY NH Other	*Mailing Address: P.O. Box 209 Poultney, VT 05764	*Billing Address:

*Sample Location (Please Print Clearly)	*Matrix	GRAB	COMP	*Date/Time Sampled	# of Containers	Sample Preservation	*Analysis Required: Enter Number from Choices Below	Field Results/Remarks
Bridge Right side				5/2 12:04	1	None	7	
Bridge Left side				5/2 12:04	1		7	
under bridge - Pond Hill				5/2 12:08	1		7	
Cressy				5/2 12:16	1		7	
Church				5/2 12:18	1		7	
North Rd.				5/2 12:21	1		7	
Culvert				5/2 12:30	1		7	
Elm St.				5/2 12:36	1		7	
S/T Mem				5/2 12:39	1		7	
R hold				5/2 12:42	1		7	
Unknown				5/2 12:50	1		7	

2305-11537

PMNRCD
Castleton

*Relinquished By:	Date/Time	Received By:	Date/Time	Received By:	Date/Time
	5/3 12:41			Eileen Looney	5/3/23@1240

1. pH	6. TKN	11. Total Solids	16. Sulfate	21. F.O.G	26. 8270 B/N only 827B-W	31. PP13 Metals PP13-W	Lab Use Only
2. Chloride	7. TP	12. TSS	17. *E. coli*	22. 8015 GRO	27. 8270 Acid only 827A-W	32. Total RCRA 8 Metals RCRA8-W	Delivery: Client
3. Ammonia N	8. TDP	13. TDS	18. COD	23. 8015 DRO	28. 8270 PAH Only 827P	33. Corrosivity	Temp C: 2.2
4. Nitrate N	9. BOD	14. Turbidity	19. VOC 8021B VT21-W Low Level or High Level	24. Full 8260 NH60-W Low Level or High Level	29. 8081 Pest 881-W	34. Ignitability	Delivered on Ice Y N
5. Nitrite N	10. Alkalinity	15. Conductivity	20. 8260 Halocarbons HAL60-W	25. Full 8270 827-W	30. 8082 PCB 882-W	35. Reactivity	PO# 275.00
36. Metals Total or Diss. Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sn Tl U V Zn (circle)							CC 8653
37. TCLP (circle) Metals, Volatiles, Semi-volatiles, Pesticides, Hericides				38. PFAS (circle) Drinking Water Non-potable Solid			

5/2/23 sample date
Castleton VT by Heath

Sample order

1	12:04 pm	bridge Right side
2	12:04 pm	bridge left side
3	12:08	under bridge - pond hill brk
4	12:16	Cressy
5	12:18	Church
6	12:21	North Rd.
7	12:30	CULVERT
8	12:36	Elm St.
9	12:39	S/T mem
10	12:42	Rhold
11	12:50	

VILLAGE SCHOOL STORMWATER MITIGATION PROJECT

CASTLETON · VERMONT

47 MECHANIC STREET

JANUARY 9, 2026

SHEET INDEX

LOCATION MAP

SCALE: 1" = 200'

PREPARED BY

FUSS & O'NEILL

205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

PREPARED FOR

TOWN OF CASTLETON
263 VT ROUTE 30N
BOMOSEEN, VERMONT 05732

PREPARED FOR

POULTNEY METTOWEE NRCD
PO BOX 209
POULTNEY, VT 05764

Poultney Mettowee Natural Resources Conservation District

PROJ. No.: 20220286.B10
DATE: 01/09/2026

GI-001

CIVIL GENERAL NOTES

GENERAL

1. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SHOWN ON THE DRAWINGS TO SCALE OR TO THEIR ACTUAL DIMENSION OR LOCATION. COORDINATE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
2. DO NOT RELY SOLELY ON ELECTRONIC VERSIONS OF DRAWINGS, SPECIFICATIONS, AND DATA FILES THAT ARE PROVIDED BY THE ENGINEER. FIELD VERIFY LOCATION OF PROJECT FEATURES.
3. PERFORM NECESSARY CONSTRUCTION NOTIFICATIONS, APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK AS REQUIRED BY THE CONTRACT DOCUMENTS.
3. TOPOGRAPHIC AND PLANIMETRIC INFORMATION IS BASED ON A FIELD SURVEY PERFORMED BY HOLT GILMORE SURVEY ASSOCIATES IN OCTOBER OF 2024. LIDAR SUPPLEMENT WAS PROVIDED BY FUSS & O'NEILL BASED ON PUBLICLY AVAILABLE LIDAR DATA.
4. UTILITIES SHOWN DO NOT PURPORT TO CONSTITUTE OR REPRESENT ALL UTILITIES LOCATED UPON OR ADJACENT TO THE SURVEYED PREMISES. EXISTING UTILITY LOCATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL FIELD VERIFY ALL UTILITY CONFLICTS. ALL DISCREPANCIES SHALL BE REPORTED TO THE CONTRACTING OFFICER.
4. GEOTECHNICAL DATA WAS OBTAINED BY FUSS & O'NEILL UTILIZING A DOUBLE RING INFILTROMETER.

WORK RESTRICTIONS

1. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, FIRE HYDRANTS, AND UTILITIES WITHOUT APPROPRIATE PERMITS.
2. WORK IS RESTRICTED TO THE HOURS OF TO THE HOURS 7:00 AM TO 7:00 PM MONDAY THROUGH SATURDAY.

REGULATORY REQUIREMENTS

1. WITHIN LOCAL RIGHTS–OF–WAY, PERFORM THE WORK IN ACCORDANCE WITH LOCAL MUNICIPAL STANDARDS.
2. WITHIN STATE RIGHTS–OF–WAY, PERFORM THE WORK IN ACCORDANCE WITH THE LATEST EDITION OF THE DEPARTMENT OF TRANSPORTATION'S STANDARD SPECIFICATIONS AND ISSUED REVISIONS/SUPPLEMENTS.
3. PROVIDE TRAFFIC SIGNAGE AND PAVEMENT MARKINGS IN CONFORMANCE WITH THE LATEST EDITION OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
4. BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. PERFORM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
5. DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.

EROSION AND SEDIMENT CONTROL

1. INSTALL EROSION CONTROL MEASURES PRIOR TO STARTING ANY WORK ON THE SITE. SHOWN ON THE EROSION AND SEDIMENT CONTROL DRAWINGS.
2. IMPLEMENT ALL NECESSARY MEASURES REQUIRED TO CONTROL STORMWATER RUNOFF, DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE. PERFORM CORRECTIVE ACTION AS NEEDED FOR EROSION CLEANUP AND REPAIRS TO OFF SITE AREAS, IF ANY, AT NO COST TO OWNER.
3. INSPECT AND MAINTAIN EROSION CONTROL MEASURES AT A MINIMUM WEEKLY AND AFTER EACH STORM EVEN REPLACE ANY DAMAGED PRODUCT GOODS. DISPOSE OF SEDIMENT IN AN UPLAND AREA. DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
4. PERFORM CONSTRUCTION SEQUENCING IN SUCH A MANNER TO CONTROL EROSION AND TO MINIMIZE THE TIME THAT EARTH MATERIALS ARE EXPOSED BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED.
5. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL MEASURES. CLEAN SEDIMENT AND DEBRIS FROM TEMPORARY MEASURES AND FROM PERMANENT STORM DRAIN AND SANITARY SEWER SYSTEMS.

CONSTRUCTION LAYOUT

1. PROVIDE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED SITE IMPROVEMENTS. FIELD VERIFY EXISTING PAVEMENT AND GROUND ELEVATIONS AT THE INTERFACE WITH EXPECTED PAVEMENTS AND DRAINAGE STRUCTURES BEFORE START OF CONSTRUCTION.
2. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, FIELD VERIFY PROPOSED UTILITY ROUTES AND IDENTIFY ANY INTERFERENCES OR OBSTRUCTIONS WITH EXISTING UTILITIES OR PUBLIC RIGHTS–OF–WAY.
3. IMMEDIATELY INFORM THE ENGINEER IN WRITING IF EXISTING UTILITY CONDITIONS CONFLICT OR DIFFER FROM THAT INDICATED AND IF THE WORK CANNOT BE COMPLETED AS INDICATED.
4. DIMENSIONS ARE FROM FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS NOTED OTHERWISE.
5. BOUNDS OR MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL LICENSED SURVEYOR IN THE STATE OF VERMONT.

EARTHWORK

1. NOTIFY UTILITY LOCATOR SERVICE AT LEAST 72 HOURS BEFORE STARTING EXCAVATION.
   VT: "DIG SAFE" AT 1–800–922–4455.
2. STOP WORK IN THE VICINITY OF SUSPECTED CONTAMINATED SOIL, GROUNDWATER OR OTHER MEDIA. IMMEDIATELY NOTIFY THE OWNER SO THAT APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN. RESUME WORK IN THE IMMEDIATE VICINITY ONLY UPON DIRECTION BY THE OWNER.

UTILITIES

1. TERMINATE EXISTING UTILITIES IN CONFORMANCE WITH LOCAL, STATE AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. COORDINATE UTILITY SERVICE DISCONNECTS WITH UTILITY REPRESENTATIVES.
2. THE TYPE, SIZE AND LOCATION OF DEPICTED UNDERGROUND UTILITIES ARE APPROXIMATE REPRESENTATIONS OF INFORMATION OBTAINED FROM FIELD LOCATIONS OF VISIBLE FEATURES, EXISTING MAPS AND PLANS OF RECORD, UTILITY MAPPING, AND OTHER SOURCES OF INFORMATION OBTAINED BY THE ENGINEER. ASSUME NO GUARANTEE AS TO THE COMPLETENESS, SERVICEABILITY, EXISTENCE, OR ACCURACY OF UNDERGROUND FACILITIES. FIELD VERIFY THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES.
3. PAY ALL FEES AND COSTS ASSOCIATED WITH UTILITY MODIFICATIONS AND CONNECTIONS, REGARDLESS OF THE ENTITY THAT PERFORMS THE WORK.
4. COORDINATE THE WORK AND WORK SCHEDULE WITH UTILITY COMPANIES. PROVIDE ADEQUATE NOTICE TO UTILITIES TO PREVENT DELAYS IN CONSTRUCTION.
5. INTERIOR DIAMETERS OF STORM DRAIN AND SANITARY SEWER STRUCTURES SHALL BE DETERMINED BY THE PRECAST MANUFACTURER, BASED ON THE INDICATED PIPE SYSTEM LAYOUT AND LOCAL MUNICIPAL STANDARDS.

   MINIMUM INTERIOR DIAMETERS:
   0 TO 20 FEET DEEP; 4 FEET.
   20 FEET OR GREATER; 5 FEET.

6. RIM ELEVATIONS FOR MANHOLES, VALVE COVERS, GATE AND PULL BOXES, AND OTHER STRUCTURES ARE APPROXIMATE. SET OR RESET RIM ELEVATIONS AS FOLLOWS:

   IN PAVEMENTS AND CONCRETE SURFACES: FLUSH
   IN SURFACES ALONG ACCESSIBLE ROUTES: FLUSH
   IN LANDSCAPE, SEEDED, AND OTHER EARTH SURFACE AREAS:
   1 INCH ABOVE SURROUNDING AREA; TAPER EARTH TO RIM ELEVATION.

PAVEMENT

1. AT A MINIMUM, CONSTRUCT ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).

SITE RESTORATION

5. PROVIDE 6 INCHES OF TOPSOIL AND SEED TO AREAS DISTURBED DURING CONSTRUCTION AND NOT DESIGNATED TO BE RESTORED WITH IMPERVIOUS SURFACES (BUILDINGS, PAVEMENTS, WALKS, ETC.) UNLESS OTHERWISE NOTED.
6. RESTORE AREAS DISTURBED BY CONSTRUCTION OPERATIONS TO THEIR ORIGINAL CONDITION OR BETTER, AT NO ADDITIONAL COST TO OWNER.

EXISTING LEGEND

100 / 98	CONTOURS MAJOR & MINOR
	BASKETBALL COURT
	UTILITY POLE
WG	WATER GATE VALVE
	HYDRANT
	CATCH BASIN
S	SANITARY MANHOLE
D	STORM MANHOLE
	BOUNDARY MONUMENT
	LANDSCAPING
TP–1	TEST PIT
S	SANITARY SEWER LINE
T	TELEPHONE LINE
W	WATER MAIN
	PROPERTY LINE
X X X X	WIRE FENCE
	STOCKADE FENCE

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
1				

SEAL

SCALE: HORZ.: NOT TO SCALE
VERT.:
DATUM: HORZ.: -
VERT.: -

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
WHITE RIVER JUNCTION, VT 05001
802.698.0370
www.fando.com

TOWN OF CASTLETON
GENERAL NOTES
47 MECHANIC STREET
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

GN-001

File: J:\DWG\P2022\0286\B10\Civil\Plan\20220286_B10_SRV.dwg Layout: GN-001 Plotted: 2026-01-13 1:25 PM Saved: 2026-01-13 1:18 PM User: Jake.Fowler
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

TEST PIT: TP-1
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 58 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN SILTY LOAM; ORGANIC MATERIAL.
6"-30" : SANDY LOAM; BROWN; MOIST; MODERATE STRUCTURE; FEW ROOTS.
30"-58": LOAMY SAND; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-2
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 60 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-5": TOPSOIL; DARK BROWN; LOAM; ORGANIC MATERIAL PRESENT.
5"-26": SANDY LOAM; BROWN; MOIST; MODERATE STRUCTURE; FEW ROOTS.
26"-60": SAND WITH GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-3
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 72 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN; SILTY LOAM; ORGANIC MATERIAL PRESENT.
6"-34": SANDY LOAM; BROWN; MOIST; WEAK STRUCTURE; NO ROOTS.
34"-72": COARSE SAND WITH GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

TEST PIT: TP-4
EXCAVATION METHOD: BACKHOE
TOTAL DEPTH: 70 INCHES
OBSERVER: B. BERTSCH, J. FOWLER
DATE: 11/27/2024

SOIL PROFILE:
0"-6": TOPSOIL; DARK BROWN; SILTY LOAM; ORGANIC MATERIAL PRESENT.
6"-30": SANDY LOAM; BROWN; MOIST; WEAK GRANULAR STRUCTURE; NO ROOTS.
30"-70": COARSE SAND AND GRAVEL; LIGHT BROWN; DENSE; NO MOTTLING OBSERVED; NO EVIDENCE OF SHWT.

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER
-				

SEAL

SCALE: HORZ.: 1" = 40'
VERT.: -
DATUM: HORZ.: -
VERT.: -
0 20' 40' 80'
GRAPHIC SCALE

FUSS & O'NEILL
205 BILLINGS FARMS RD, SUITE 6B
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TOWN OF CASTLETON
EXISTING CONDITIONS PLAN
47 MECHANIC STREET
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CS-100

File: J:\DWG\P2022\0286\B10\Civil\Plan\20220286_B10_SRV.dwg Layout: CS-100 Plotted: 2026-01-13 1:25 PM Saved: 2026-01-13 1:18 PM User: Jake.Fowler
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MS VIEW: LAYER STATE:

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SEAL

SCALE: HORZ.: 1" = 40' VERT.: -
DATUM: HORZ.: - VERT.: -
0 20' 40' 80' GRAPHIC SCALE

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WHITE RIVER JUNCTION, VT 05001
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www.fando.com

TOWN OF CASTLETON
PROPOSED SITE PLAN
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CS-101

File: J:\DWG\P2022\0286\B10\Civil\Plan\20220286_B10_STP.dwg Layout: CS-101 Plotted: 2026-01-13 1:25 PM Saved: 2026-01-13 1:24 PM User: Jake.Fowler
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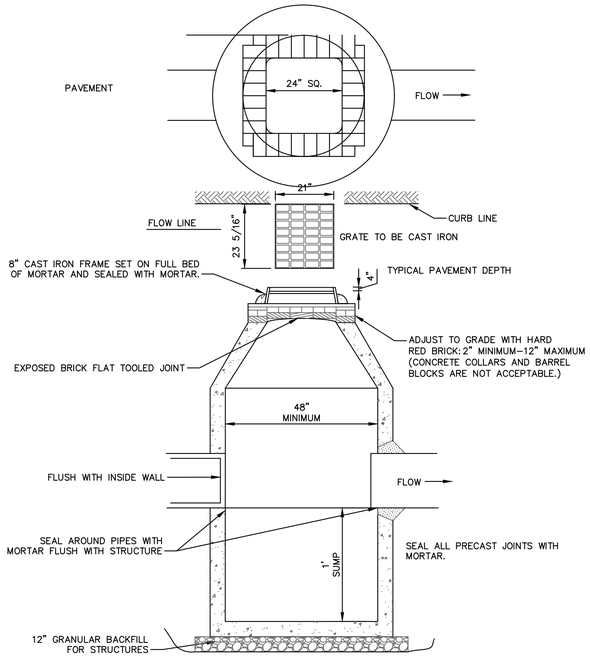
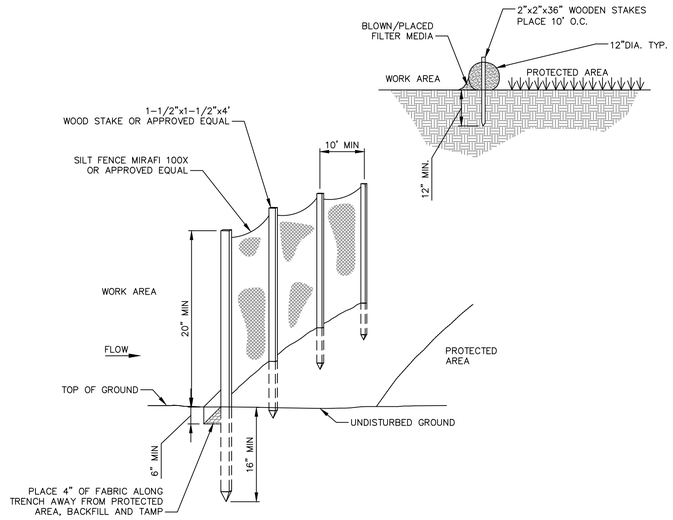
MS VIEW: LAYER STATE:



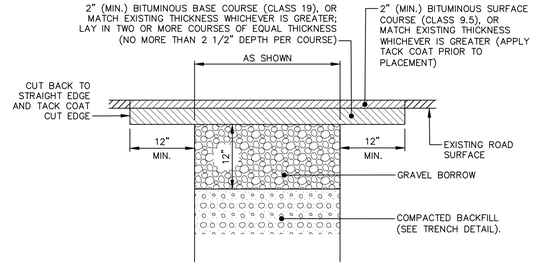
CATCH BASIN DETAIL

SCALE: N.T.S.



SILT FENCE OR SILT SOCK BARRIER

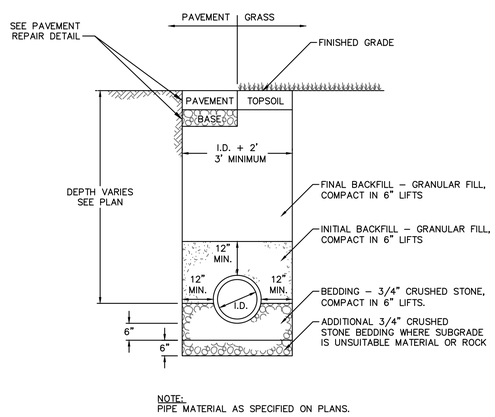
SCALE: N.T.S.



NOTE:
UNSUITABLE MATERIAL WITHIN SUBGRADE SHALL BE REMOVED AND REPLACED WITH GRAVEL BORROW.

PAVEMENT REPAIR DETAIL

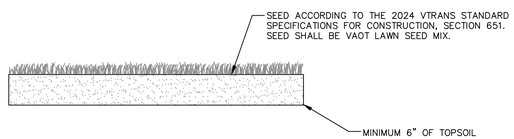
SCALE: N.T.S.



NOTE:
PIPE MATERIAL AS SPECIFIED ON PLANS.

DRAINAGE TRENCH DETAIL

SCALE: N.T.S.



LOAM AND SEED

SCALE: N.T.S.

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SEAL

SCALE: HORZ.: NOT TO SCALE VERT.:
DATUM: HORZ.: - VERT.: -

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TOWN OF CASTLETON
SITE DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-500

File: J:\DWG\P2022\20286\B10\Civil\Plan\20220286_B10_STP.dwg Layout: CD-500 Plotted: 2026-01-13 1:25 PM Saved: 2026-01-13 1:24 PM User: Jake.Fowler
PC3: AUTOCAD PDF (GENERAL DOCUMENTATION).PC3 STB/CTB: FO.STB
LAYER STATE:
MS VIEW:

PROJECT SUMMARY

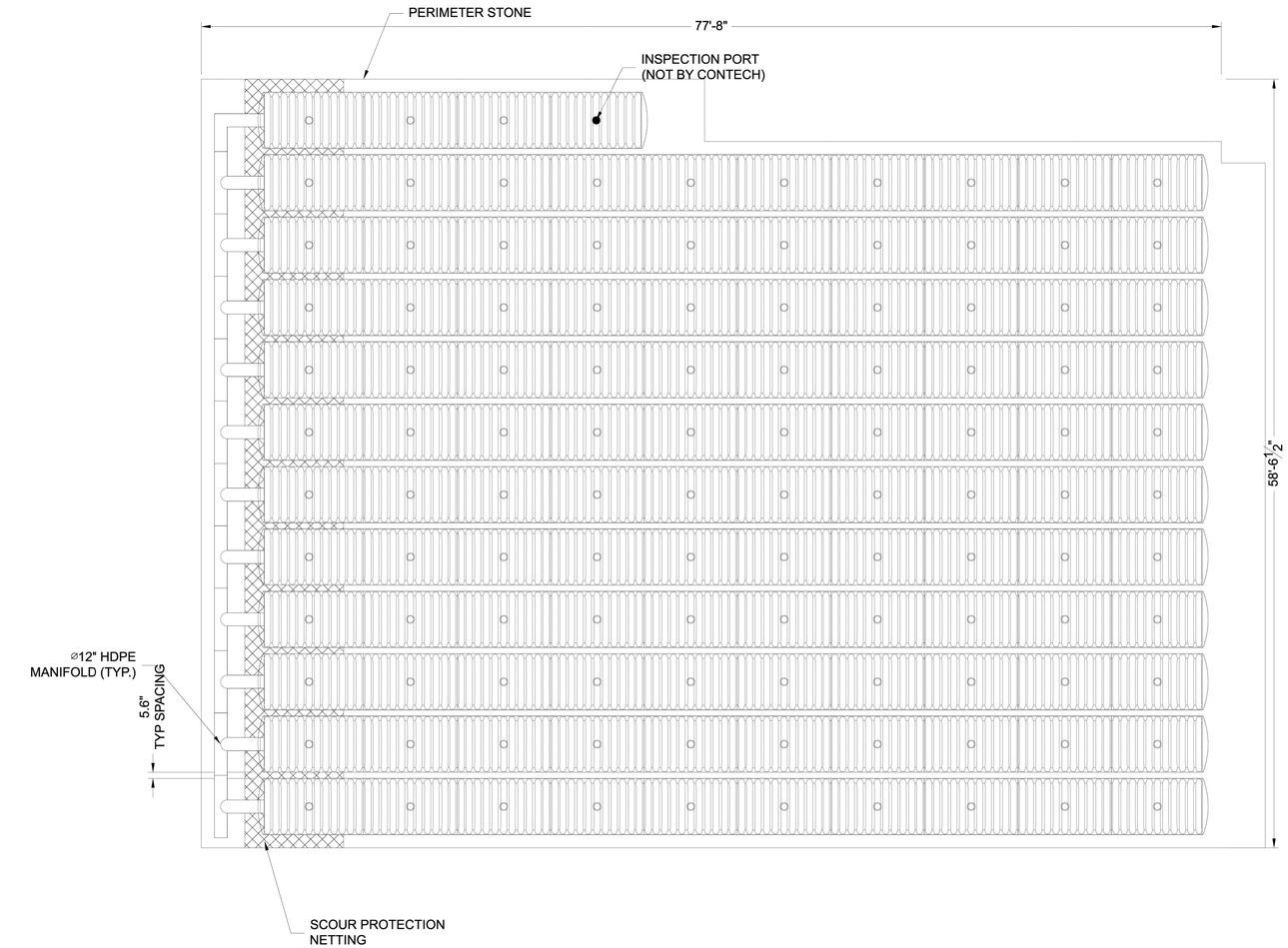
DESIGN PARAMETERS
- PRETREATMENT METHOD = None
- STORAGE VOLUME REQUIRED = 9365ft³
- INVERT DEPTH = 4.5ft
- MANIFOLD DIAMETER = 12in.
- SPACING BETWEEN CHAMBERS = 5.6in.
- SIDE PERIMETER STONE WIDTH = 12in.
- END PERIMETER STONE WIDTH = 12in.
- TOP PERIMETER STONE WIDTH = 6in.
- BOTTOM PERIMETER STONE WIDTH = 6in.
- STONE POROSITY = 40%

SYSTEM DETAILS
- TOTAL ELBOW MANIFOLDS = 1
- TOTAL TEE MANIFOLDS = 11
- TOTAL START CHAMBERS = 12
- TOTAL MID CHAMBERS = 90
- TOTAL END CHAMBERS = 12
- TOTAL NUMBER OF CHAMBERS = 114
- NUMBER OF ROWS = 12
- CHAMBERS PER ROW = 10
- CHAMBER STORAGE VOLUME = 5404.8ft³
- MANIFOLD STORAGE VOLUME = 70ft³
- BACKFILL STORAGE VOLUME = 3933.38ft³
- TOTAL STORAGE PROVIDED = 9408.19ft³

SYSTEM DIMENSIONS AND OTHER MATERIALS
- RECTANGULAR FOOTPRINT = 77.66x58.53ft
- TOTAL EXCAVATION = 841.78y³
- STONE BACKFILL = 364.2y³
- REMAINING BACKFILL TO PAVEMENT = 248.32y³
- WOVEN GEOTEXTILE QTY = 0y²
- NON-WOVEN GEOTEXTILE QTY = 505.07y²
- SCOUR PROTECTION FITTING = 58.53x7.5ft
- APPROXIMATE TRUCKLOADS = 1

GENERAL NOTES

1. ALL ELEVATIONS, DIMENSIONS AND LOCATIONS OF RISERS AND INLETS SHALL BE VERIFIED BY THE ENGINEER OF RECORD.
2. PRIOR TO INSTALLATION OF THE CHAMBERMAXX SYSTEM A PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED. THOSE REQUIRED TO ATTEND ARE THE SUPPLIER OF THE SYSTEM, THE GENERAL CONTRACTOR, SUB-CONTRACTORS AND THE ENGINEER.
3. CHAMBERMAXX CHAMBERS ARE MANUFACTURED FROM POLYPROPYLENE PLASTIC.
4. CHAMBERMAXX SYSTEM TO MEET AASHTO HS20/HS25 LIVE LOADING, PER AASHTO LRFD SECTION 12.
5. ACCESS COVERS TO MEET AASHTO HS20/HS25 LIVE LOADING.
6. MINIMUM COVER IS 18-INCHES TO BOTTOM OF FLEXIBLE PAVEMENT OR TO TOP OF RIGID PAVEMENT. FOR COVER HEIGHTS GREATER THAN 96-INCHES CONTACT YOUR LOCAL REPRESENTATIVE.
7. ALL PARTS PROVIDED BY CONTECH UNLESS OTHERWISE NOTED.
8. FOR INFORMATION ON PRE-TREATMENT SYSTEMS, REFERENCE CONTECH PRE-TREATMENT SYSTEM STANDARD DETAILS OR CONTACT YOUR LOCAL REPRESENTATIVE.
9. CHAMBERMAXX BY CONTECH ENGINEERED SOLUTIONS (800) 925-5240



ASSEMBLY
SCALE: 1"=10'

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800-328-2047 320-852-7500 320-852-7067 FAX

CHAMBERMaxx® PATENT PENDING

CONTECH
DYODS
DRAWING

DYO96832 Parks & Rec Building

CHAMBERMAXX

Castleton, VT

CHAMBERMAXX

PROJECT No.:	SEQ. No.:	DATE:
70762	96832	01/12/2026
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D1 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

No.	DATE	DESCRIPTION	DESIGNER	REVIEWER

SEAL

SCALE: HORZ.: NOT TO SCALE VERT.:
DATUM: HORZ.: - VERT.: -

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TOWN OF CASTLETON
CONTECH DETAILS
47 MECHANIC ST
CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-501

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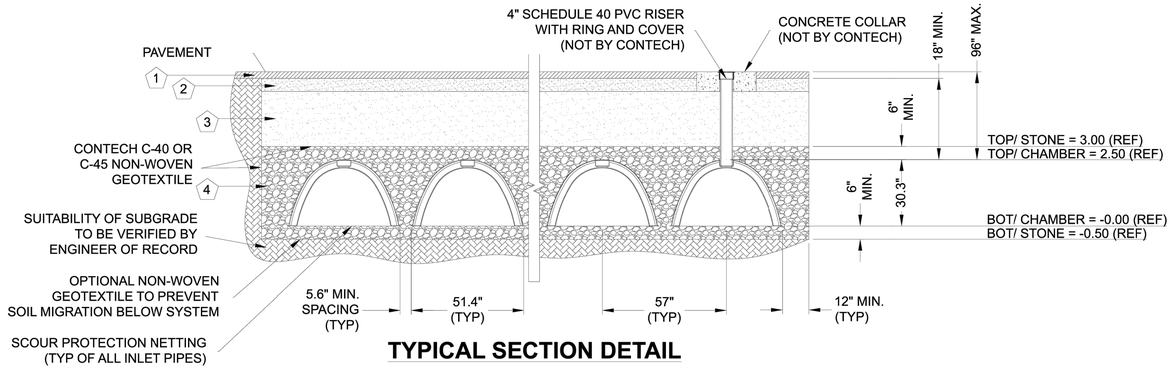
LAYER STATE:
MS VIEW:

INSTALLATION NOTES

1.CHAMBERMAXX INSTALLATION GUIDE TO BE REVIEWED BY CONTRACTOR PRIOR TO INSTALLATION.
2.PRIOR TO PLACING BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, UNSUITABLE MATERIAL SHALL BE REMOVED AND BROUGHT BACK TO GRADE WITH FILL MATERIAL AS APPROVED BY THE ENGINEER OF RECORD. ONCE THE FOUNDATION PREPARATION IS COMPLETE, THE BEDDING MATERIAL CAN BE PLACED.
3.THE SCOUR PROTECTION NETTING TO EXTEND 1'-0" BEYOND OUTSIDE EDGE OF INLET CHAMBERS.
4.COVER ANY OPEN VOID SPACES GREATER THAN 3/4" ON CHAMBERS WITH A NON-WOVEN GEOTEXTILE TO PREVENT INFILTRATION OF BACKFILL MATERIAL.
5.STONE EMBEDMENT MATERIAL SHALL BE INSTALLED TO 95% STANDARD PROCTOR DENSITY AND PLACED IN 6-INCH TO 8-INCH LIFTS SUCH THAT THERE IS NO MORE THAN A TWO LIFT DIFFERENTIAL BETWEEN ANY OF THE CHAMBERS AT ANY TIME. GRANULAR BACKFILL MATERIAL SHALL BE COMPACTED TO 90% SPD. BACKFILLING SHALL BE ADVANCED ALONG THE LENGTH OF THE CHAMBER ROWS AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING AND DISPLACEMENT OF THE CHAMBERS. THE MINIMUM CHAMBER SPACING MUST BE MAINTAINED.
6.REFER TO CHAMBERMAXX INSTALLATION GUIDE FOR TEMPORARY CONSTRUCTION LOADING GUIDELINES.
7.IT IS ALWAYS THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.
8.GENERAL INSTALLATION METHODS AND MATERIALS TO BE IN ACCORDANCE WITH ASTM D2321.



TYPICAL SECTION DETAIL

NOT TO SCALE

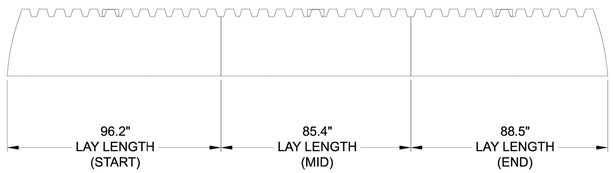
KEY
1. FLEXIBLE PAVEMENT.
2. GRANULAR ROAD BASE.
3. ANY SUITABLE NATIVE OR GENERAL BACKFILL, SEE ENGINEER PLANS.
4. THE BACKFILL MATERIAL SHALL BE FREE-DRAINING ANGULAR WASHED STONE 3/4" - 2" PARTICLE SIZE. MATERIAL SHALL BE PLACED IN 8"-10" MAXIMUM LIFTS. MATERIAL SHALL BE WORKED INTO THE CHAMBER SPACING BY MEANS OF SHOVEL-SLICING, RODDING, AIR-TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS. COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE PROJECT ENGINEER OR THEIR REPRESENTATIVE IS SATISFIED WITH THE LEVEL OF COMPACTION. INADEQUATE COMPACTION CAN LEAD TO EXCESSIVE DEFLECTIONS WITHIN THE SYSTEM AND SETTLEMENT OF THE SOILS OVER THE SYSTEM. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO-LIFT DIFFERENTIAL BETWEEN THE SIDES OF ANY CHAMBER IN THE SYSTEM AT ALL TIMES DURING THE BACKFILL PROCESS. BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON ANY PIPES IN THE SYSTEM.

EQUIPMENT USED TO PLACE AND COMPACT THE BACKFILL SHALL BE OF A SIZE AND TYPE SO AS NOT TO DISTORT, DAMAGE, OR DISPLACE THE CHAMBERS. ATTENTION MUST BE GIVEN TO PROVIDING ADEQUATE MINIMUM COVER FOR SUCH EQUIPMENT, AND MAINTAIN BALANCED LOADING ON ALL CHAMBERS IN THE SYSTEM, DURING ALL SUCH OPERATIONS.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS. CONTACT YOUR LOCAL CONTECH REPRESENTATIVE FOR DETAILS.

CHAMBERMAXX DESIGN DETAILS

FEATURE	START CHAMBER	MIDDLE CHAMBER	END CHAMBER
OVERALL CHAMBER HEIGHT - IN	30.3	30.3	30.3
OVERALL CHAMBER WIDTH - IN	51.4	51.4	51.4
ACTUAL LENGTH - IN	98.4	91.0	92.0
INSTALLED LAY LENGTHS - IN	96.2	85.4	88.5
CHAMBER STORAGE VOLUME - CF	50.2	47.2	46.2
CHAMBER STORAGE PER LINEAR FOOT - CF/LF	6.3	6.6	6.3
*MIN. INSTALLED CHAMBER VOLUME - CF	78.1	75.1	74.1
*MIN. INSTALLED CHAMBER VOLUME PER LINEAR FOOT - CF/LF	9.7	10.6	10.0
CHAMBER WEIGHT - LB	83	73	76
*6" OF STONE ABOVE AND BELOW CHAMBER, 5.6" CHAMBER SPACING AND 40% POROSITY			



TYPICAL ELEVATION VIEW

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CHAMBERMAXX
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90% PLANS - NOT FOR CONSTRUCTION

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CASTLETON VERMONT

PROJ. No.: 20220286.B10
DATE: 01/09/2026

CD-502

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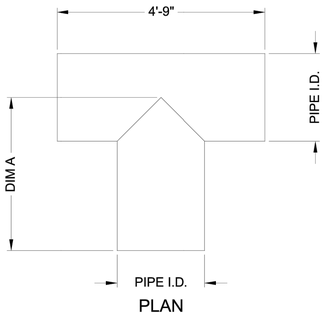
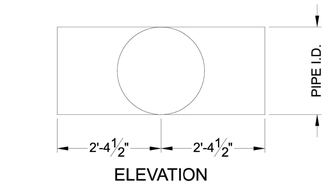
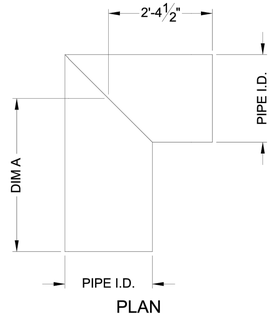


PLAN



ELEVATION

TEE



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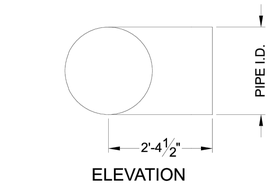
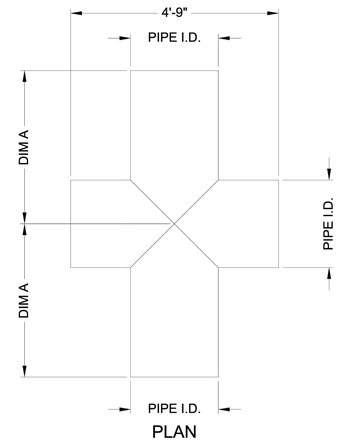


ELEVATION

ELBOW



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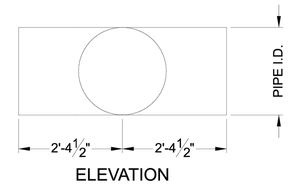
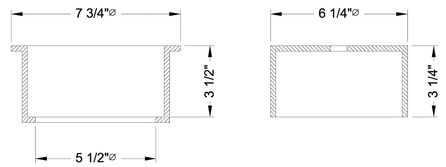


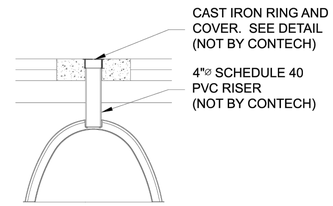
ELEVATION

CROSS-OVER



RING AND COVER DETAIL

NOT TO SCALE



INSPECTION PORT DETAIL

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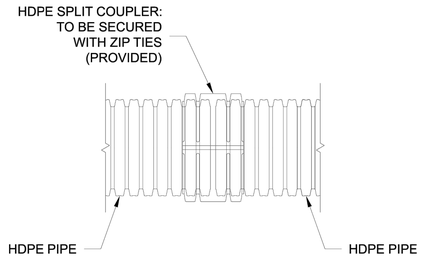

HDPE SPLIT COUPLER DETAIL

STANDARD MANIFOLD COMPONENTS - NOT TO SCALE				
	AVAILABLE DIAMETERS - INCHES			
TEE	12	15	18	24
ELBOW	12	15	18	24
DIM A	42	42	48	48

GENERAL NOTES:
1. FITTING MATERIAL TO BE MANUFACTURED FROM CORRUGATED HIGH DENSITY POLYETHYLENE, AASHTO M294 PIPE.
2. FITTINGS TO BE FABRICATED IN ACCORDANCE WITH THE REQUIREMENT OF AASHTO M294.
3. FITTINGS DESIGNED TO PROTRUDE 6" INTO THE END OF THE INLET CHAMBERS.
4. MANIFOLD TEE AND ELBOW JOINT TO BE CONNECTED UTILIZING HDPE SPLIT COUPLERS.

TYPICAL MANIFOLD DETAILS

HDPE SPLIT COUPLERS	
COUPLER SIZE	PART NUMBER
12"⌀ SPLIT COUPLER	PEF12SPCP
15"⌀ SPLIT COUPLER	PEF15SPCP
18"⌀ SPLIT COUPLER	PEF18SPCP
24"⌀ SPLIT COUPLER	PEF24SPCP

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SHEET NO.: D3 OF D4		

90% PLANS - NOT FOR CONSTRUCTION

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TOWN OF CASTLETON
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PROJ. No.: 20220286.B10
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CD-503

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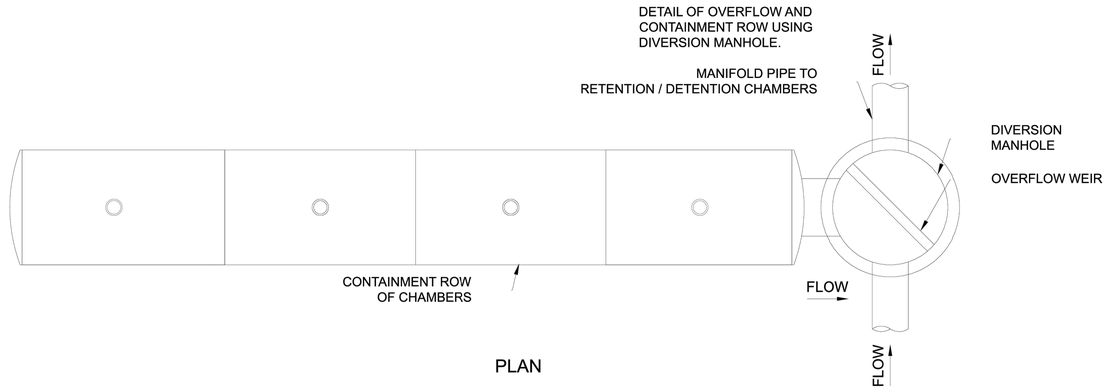

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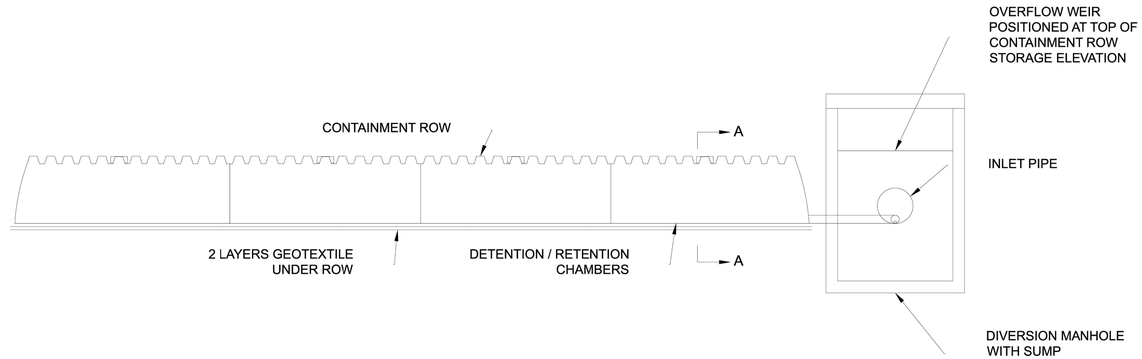

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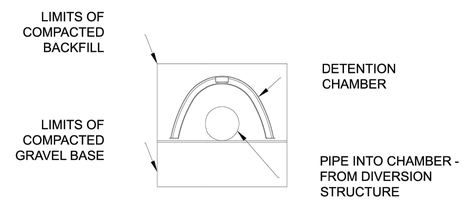

SECTION A-A

CONTAINMENT ROW DETAILS

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