Town of Marlborough
Marlborough, NH

Stormwater Infrastructure Planning and Evaluation Report

July 2023

Gale JN 718680

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EXECUTIVE SUMMARY

Gale Associates, Inc. (Gale) was engaged by the Town of Marlborough to perform a feasibility study of the existing drainage system in the Church Street, School Street, Frost Street, Pierce Avenue, and Ling Street area of downtown Marlborough, NH. The project area (refer to Figure 1) was identified in the Town of Marlborough Wastewater Collection and Stormwater System Asset Management Plan (AMP), dated August 2020, as a critical area that required further study and improvement.

During the industrial revolution, the Town of Marlborough grew rapidly to support local industry. To facilitate development in the downtown area, streams were channelized and covered. Several sections of this system are subsurface culverts comprised of wood floors, stone and granite walls, and granite slab roofs. Many of these culverts have been in place for over 100 years. On several occasions, the culverts have collapsed, clogged, or otherwise become compromised, causing sink holes and flooding of adjacent properties. More recently, several sections have failed completely. Many of the culverts are located on private property and/or may have historical significance.

Figure 1 - Project limits.

Failing stormwater infrastructure can cause or contribute to the failure of adjacent sewer system structures, which can lead to E. coli contamination of Minnewawa Brook. This study includes evaluating the existing infrastructure and developing design alternatives to address the drainage capacity, chronic flooding, and contamination issues. Addressing these issues

will address downstream river and wetland resource area degradation from silt, sediment, and E. coli contamination.

The goal of the project is to provide an understanding of the condition, capacity, and ownership of existing drainage infrastructure in the study area; to provide a preliminary design to limit upstream runoff from entering the system; and to evaluate the design alternatives and costs to improve or replace the remaining infrastructure. The study also provides suggested next steps.

A topographic survey was performed, and a base plan was prepared to document the existing surface conditions. Using the base map, record research, and information contained in the AMP, an existing conditions hydraulic model was developed and calibrated to evaluate system performance, and to use as a baseline to develop repair alternatives. After the model was developed, several areas of the system required additional fieldwork to fill in missing or unclear information, and to measure the extent of flooding from a recent historic flood.

Using the calibrated existing conditions model, five (5) alternatives were reviewed. Impacts to historical, environmental, and private properties were evaluated, and estimates of design, construction, and soft costs were tabulated for alternatives.

Based on the results of this study, Alternative #2 will remove upstream flow from the local granite infrastructure and Alternatives #3a and #3b should be further studied to determine the most economical method to divert flow from the infrastructure on private property between the municipal parking lot and Ling Street.

EXISTING CONDITIONS

To develop an understanding of the system variables and elements that affect its performance, an existing conditions base plan was developed. A topographic survey was performed to develop a base plan (refer to Attachment 1) to document the existing surface conditions, as well as subsurface utility type, size, location, and other pertinent data within the project limits. The base plan references the same structure/node numbers referenced in the AMP in parenthesis on structures list on the plans. After base plan development, Closed-Circuit Television (CCTV) inspections performed as part of the AMP conditions were reviewed for condition and conduit size estimation. During this process, areas of the system were identified that required additional fieldwork to fill in missing or unclear information. On May 12, 2022, Gale engineers performed additional field survey and measurements to supplement the base plan.

Record research was performed to identify deeds, easements, rights-of-way, agreements, plans, and studies, to determine rights and/or ownership of existing features. The research was performed using the Cheshire County Registry of Deeds online search tool. Legal ownership of infrastructure on private property (if any) would be described in the current deeds or referenced plans. The results of the record research did not reveal references to ownership of the existing stormwater infrastructure. A list of properties researched is included in Attachment 2. Site development/drainage plans are not typically recorded at the Registry of Deeds and none of the researched record plans included the infrastructure. The

location of the infrastructure was historically known through experience with system failures and repairs. As such, system information was typically only conveyed through person-to-person communication. Individual property owners typically have no knowledge of system elements on their property until problems develop.

EARLY ENVIRONMENTAL/HISTORIC COORDINATION

Gale checked for threatened or endangered species within the project limits by filing a data check request with the NH Natural Heritage Bureau (NHNHB). The data check returned no recorded occurrences for sensitive species near the project area (refer to Attachment 5). To determine if there are any sensitive historic resources, Gale performed a check of historical resources using the NH Division of Historical Resources (NHDHR) Enhanced Mapping and Management Information Tool (EMMIT) and submitted a Request for Project Review (RPR) with NHDHR (refer to Attachment 6). Based on the NHDHR Response, the "Banks of the Minnewawa Brook are considered archeologically sensitive." As such, NHDHR has requested photographs of the proposed bypass discharge location and a topographical description. These will be provided to NHDHR during the design and permitting phase of the Upper Watershed/Upper System Bypass (Alternative #2).

A review of NH Department of Environmental Services (NHDES) OneStop data included municipal wells located adjacent to the project limits (School Street – Well #1) and adjacent to Minnewawa Brook (Fitch Court – Wells #3 and #4). There are isolated areas within the limits of the project that may be jurisdictional wetland resource areas. The study area is adjacent to the floodplain and bank of Minnewawa Brook, which is an impaired river resource area (impaired for fish consumption – mercury, and marginally or potentially impaired for other uses). Based on site reconnaissance, project impacts may be outside of the threshold of the bank resource area. Permanent impacts to these areas are not expected. Temporary construction period impacts should be mitigated through proper worksite erosion and sedimentation control measures. As alternatives are advanced to design, impacts to jurisdictional resource areas should be more closely evaluated and discussed with the NHDES Wetlands Bureau to determine the pertinent permitting requirements for the work proposed.

A review of the NH Aquatic Restoration Mapper has returned no data within the project area. However, Minnewawa Brook has several crossings adjacent to the project area with ratings of fair to good structural condition, partial to full geomorphic compatibility, and full passage for aquatic organisms. It should be noted that the project area is not conducive to aquatic fish habitat and is too far upstream and across multiple barriers to be considered for fish passage. The study area includes subsurface pipes and culverts, and the system connects to the NH Department of Transportation (NHDOT) system with a 5-foot drop manhole. Additionally, the NHDOT system outfall to Minnewawa Brook is over 2,000 feet downstream from the project area.

On February 9, 2023, Gale conducted a virtual meeting with the NHDOT District 4 Office. NHDOT stated that improvements to the Main Street drainage system are not planned as part of their 10-year capital plan. After reviewing the alternatives, NHDOT stated that they support Alternative #2 - Conceptual Bypass Plan and, as such, would not oppose the project. NHDOT indicated that an Excavation Permit would be required for work within the State Right-of-Way

and, as the project design is developed, they would provide input for the development of a construction phasing and traffic management plan. Alternatives #3a and #3b were briefly discussed. Because #3b would require replacement of a portion of the NHDOT system, further coordination would be required. NHDOT stated that they would provide design review and comments for any of the alternatives as the design is developed.

As a result of the research and coordination, the following permits are anticipated:

- NHDES Shoreland Permit for work on the bank of Minnewawa Brook, a listed protected waterbody.
- Potential NHDES Wetland Permit for work in potential wetland resource areas.
- NHDOT Excavation Permit for work within the NHDOT Right-of-Way.

NHDES Alteration of Terrain Permit likely does not apply because the area of disturbance is below the 100,000 S.F. threshold. As the project is advanced through future phases, the applicability of the AOT permit should be reevaluated.

Permitting under the United States Army Corps. of Engineers (USACOE) Section 404 New Hampshire Programmatic Permit (PGP) will be required for work within waters of the US. The New Hampshire permit expired on August 18, 2022. Pending a new PGP, work will likely fall under the self-verification threshold of General Permits GP2, GP6, and GP9, or equivalent General Permits under the new USACOE New Hampshire PGP.

Depending on the amount of disturbance during construction, a United Sates Environmental Protection Agency (US EPA) Notice of Intent may be required for a work area that exceeds one (1) acre. The construction phase work will most likely be covered under the US EPA New Hampshire Programmatic General Permit (PGP) for construction period impacts.

PUBLIC COORDINATION

Gale conducted a public information session on Tuesday, June 6, 2023, at the Marlborough Elementary School to present the results of the study. Several residents from the study area were in attendance (refer to sign in sheet in Attachment 7). The presentation was generally well received. Several residents that have been impacted by flooding were interested in next steps and asked when the project alternatives could be implemented. The Town explained that the funding process is ongoing and may take 3 – 5 years to complete future phases of the project to be ready for construction. At the end of the meeting, attendees were provided with contact information to provide comments after the meeting. As of June 30, 2023, no questions have been received.

HYDRAULIC MODEL

Downtown Marlborough has historically experienced severe flooding in several areas because of surcharge from the existing drainage system. Additionally, the apparent increase in system overflow and flooding impacts are likely the result of stormwater infrastructure failures, which

reduced system capacity and contributed to additional failures. Flooding and failures have resulted in sinkholes forming near several homes in the area and, in some cases, have caused property damage. To assess the drainage issues, the system was modeled, and problem areas identified.

Gale used the Environmental Protection Agency (EPA)'s Stormwater Management Model (SWMM) program to model the existing drainage system, based on assumptions made from the existing conditions research and reconnaissance. To build the stormwater model, watershed attributes, record storm data, and conveyance infrastructure characteristics were obtained or assumed. To obtain existing drainage basin characteristics, the study area was viewed using the United States Geological Survey (USGS) Streamstats web application. Using the web application, seven drainage areas (subcatchments) and their attributes were delineated (refer to Attachment 4).

Storms are modeled using either specific storm data, or a representation of the expected rainfall in the area that is based on historic events for specific recurrence intervals (2, 10, 25, 50 and 100-year synthetic rainfall distribution storms). Local drainage systems are typically designed to accommodate a 10-year recurrence interval storm. Because of significant potential for private property damage, a higher intensity historic storm was selected as the design storm. On July 17-18, 2021, a storm event caused severe flooding in the downtown Marlborough area. A Severe Storm and Flooding Federal Disaster Declaration was subsequently issued for this storm (4622-DR-NH). When compared to the 100-year rainfall, the July 2021 event was more intense, which resulted in a higher peak discharge. Using the July storm will provide a more conservative design and provide additional storm resiliency for potential increases in peak flows from climate change. Hourly rainfall data was obtained from the Keene Dillant-Hopkins Airport in Keene, NH, using the National Centers for Environmental Information (NCEI) GIS Mapping Tool on the National Oceanic and Atmospheric Administration (NOAA) website.

The existing drainage system model was developed using the topographical survey information and field measurements (refer to Attachment #1). Video footage of pipe inspections was used to confirm pipe characteristics, including size, slope, condition, and manning's roughness coefficient. After pipe lengths, locations, and elevations were entered into the SWMM model, assumptions were made relative to all pipes, based on the field data, to reflect existing conditions.

The existing conditions model results were calibrated by comparing the model flood elevation to the surveyed elevation of the high-water mark for the modeled storm. The July 17-18, 2021, storm event duration was approximately twelve (12) hours. During the storm, approximately 3.94 inches of rain was measured and resulted in severe flooding at the residential homes located at 139, 141, and 143 Main Street. To model the flooding in this area, a storage area was assigned to the nodes nearest the affected homes. The historic flood-high water line on the back of 141 Main Street was located during the survey (Elev.=699.43). Using the topographical survey data, the area where the flooding occurred was entered into HydroCAD software to size the ponded area. A storage vs. elevation graph was obtained and used to check the elevation of the ponded water at any given volume of storage. The flood volume was found to be approximately 18,400 cubic feet of stormwater during the July 18,

2021 storm event. Using the stage-storage graph (refer to Figure 2 – Storage vs. Elevation Graph below), the model stage elevation closely compared to the surveyed high-water mark. Based on this, it is Gale's opinion that the existing model reflects the existing conditions.

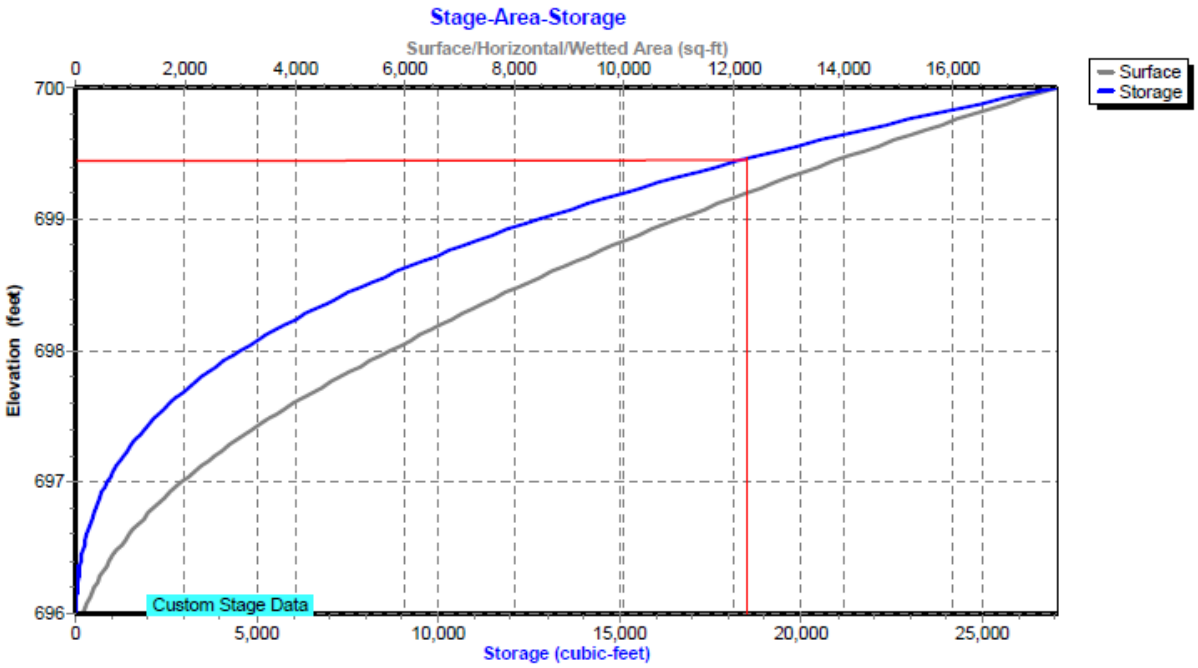


Figure 2 - Storage vs. Elevation Graph.

ALTERNATIVES DEVELOPMENT

During project development, it was important to develop a holistic approach to address the issues and improve water quality discharge from the project area. Based on the results of the existing system hydraulic model and the goal of the project, five (5) alternatives were investigated:

1. Do Nothing.
2. Upper Watershed/Upper System Bypass.
3. Lower System Bypass to Main Street.
    a. Pierce Avenue/Ling Street Conduit
    b. Fire Station Conduit
4. Combination of Alternatives/Complete System Replacement.
5. Upper Watershed/Upper System Connection to the NHDOT System at Church Street.

The "do nothing" alternative (Alternative #1) would not accomplish the project goals of reducing water pollution, and system failures and flooding would be expected to continue. Under this alternative, continued damage to private property can be expected and the Town will be required to continue to address damage to public infrastructure, as well as potential

collateral damage to water and sewer systems. In Gale's opinion, the "do nothing" alternative should not be selected.

The upper watershed/upper system bypass (Alternative #2) would remove flow from the upper granite infrastructure and route it directly to Minnewawa Brook. This alternative includes an upper watershed bypass conduit, connection of inlets along School Street and Bassett Court, and rerouting of flow from the granite infrastructure located on private property at 33 School Street.

The lower system bypass to Main Street (Alternative #3) would remove flow from the lower granite infrastructure on private property and route it to the NHDOT system. This can be accomplished in one of two ways:

3a. Install a new pipe from the municipal parking lot, down Knight Lane and Ling Street, and connect it to the NHDOT system on Main Street.

3b. Install a new pipe from the municipal parking lot, along the paved area to the north of the Fire Station, and connect it to the NHDOT system on Main Street.

Alternative #4 would include a combination of Alternative #2 and either #3a or #3b. This would substantially replace or divert stormwater flow from the known upper and lower granite infrastructure on private property.

Alternative #5 would remove flow from the upper granite infrastructure and route it directly to the NHDOT drainage system on Main Street. This alternative includes an upper watershed bypass conduit, connection of inlets along School Street and Bassett Court, and rerouting of flow from the granite infrastructure located on private property at 33 School Street.

ALTERNATIVE #2 – UPPER WATERSHED/UPPER SYSTEM BYPASS

As a result of the watershed study performed by Gale, the upper watershed area was identified as a main contributor to the system failures and flooding. Flow in the system originates upstream from the inlet located at 2 School Street (refer to Figure 3). During the study scoping process, Gale was informed that the existing NHDOT drainage system does not have the capacity to accommodate flow from the bypass conduit, so the bypass was designed to connect directly to Minnewawa Brook. The bypass conduit originates at the existing inlet located at 2 School Street (node 0240), along Church Street, across Main Street, and into Minnewawa Brook. The proposed outfall at Minnewawa Brook will replace an existing NHDOT outfall in the same location.

Figure 3 - System inlet at 2 School Street.

Figure 4 - In-line catch basin at 5 School Street.

Adjacent to the proposed bypass system at the corner of Church and School Streets, there are two separate laterals that convey runoff directly into the existing granite infrastructure through private property located at 5 and 7 School Street. One of the laterals connects directly to an in-line catch basin (Node 0237), located in front of 5 School Street (refer to Figure 4), before conveying the stormwater through the 5 School Street property and into the existing granite drainage system in an unknown location. The in-line catch basin consists of small slabs of granite and rock and is mostly collapsed, making it difficult for the stormwater runoff to properly drain into the existing system. The other lateral collects stormwater runoff from Bassett Court via a catch basin (Node 0236), down Bassett Court, across School Street, through private property at 7 School Street, and directly into the existing granite drainage system at an unknown location.

Alternative #2 also includes intercepting both laterals and connecting them to the bypass system at the corner of Church and School Streets via 18" reinforced concrete pipe (RCP) (refer to Figure 6). This would remove known stormwater connections from the existing granite infrastructure that is located on private property from the entrance of the system (Node 0240) to the corner of Pierce Avenue and Frost Street (Node 0235). Proposed drain manhole elevations were assumed based on the existing conditions survey (please see Attachment 3 - Alternative #2 Layout and Materials Plan).

Figure 5 - Existing NHDOT outfall from Main Street.

Streamstats was used to estimate relevant attributes of the drainage area that directs runoff into the proposed bypass conduit, which were entered into the SWMM model. A modified SWMM model was developed for the proposed bypass conduit design. The bypass entrance has a flared end inlet, with a grate at the existing granite culvert entrance location. The grate over the flared end is proposed to inhibit access and keep debris from entering the conduit. Stormwater is conveyed through a 42" RCP, down Church Street to Main Street. The RCP connects to a 4' wide by 3' high precast concrete box culvert across Main Street and directly into Minnewawa Brook. The bypass conduit was modeled to convey runoff from the July 18th storm event. The simulation indicates that the conduit reaches the peak at approximately 77% capacity in the box culvert section (refer to Attachment 3).

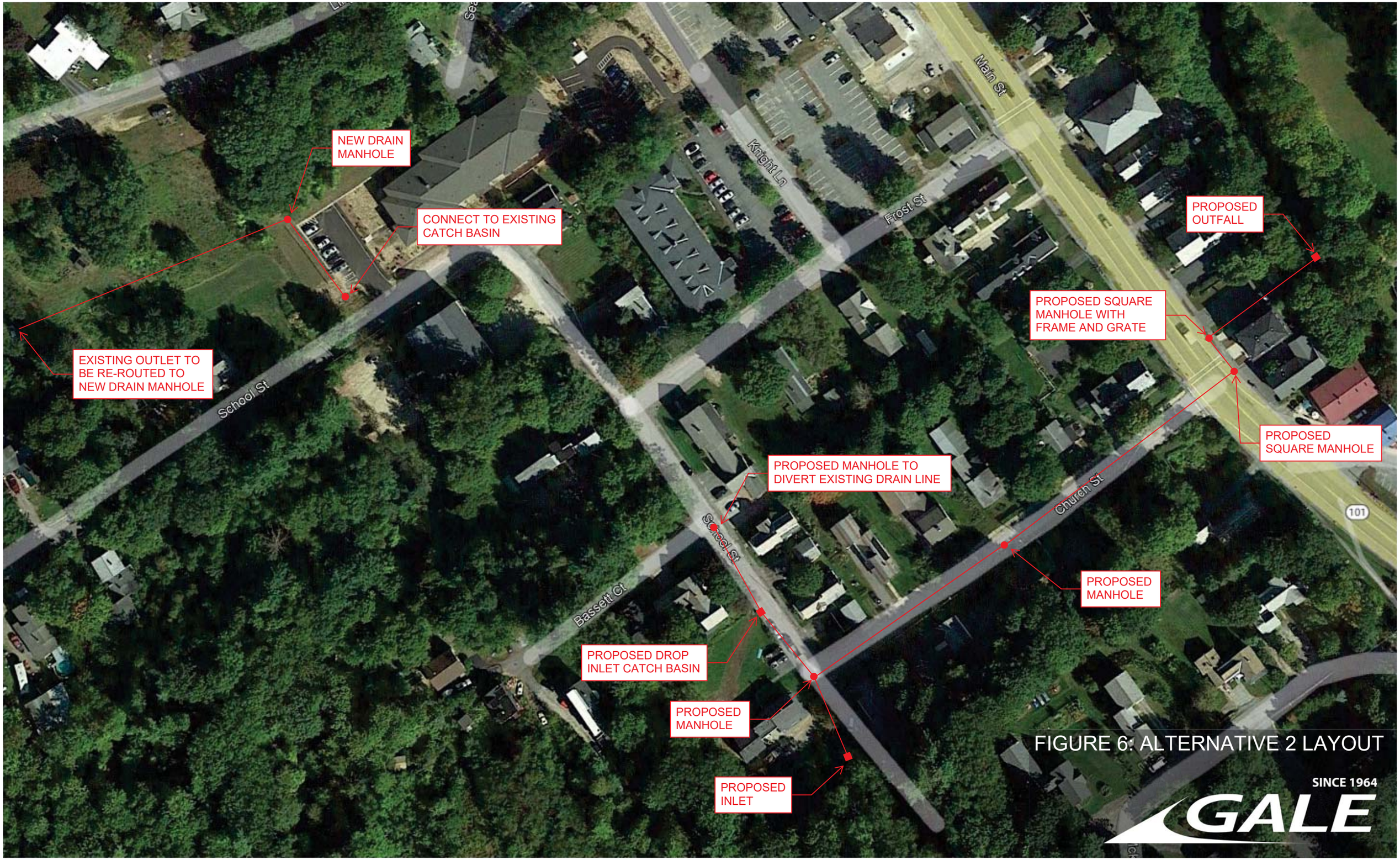


FIGURE 6: ALTERNATIVE 2 LAYOUT

SINCE 1964
GALE

33 School Street

Based on information provided by the Town of Marlborough Department of Public Works, an alternative was considered to address ongoing drainage issues at 33 School Street. Repeated sinkholes have been reported in the vicinity of the existing granite infrastructure on the property. This work includes the installation of a HDPE pipe, starting at the inlet to the drainage system and connecting to the drain manhole at the eastern corner of the property (refer to Figure 7). The existing 6" HDPE pipe that connects to the existing drain manhole appears to be a retaining wall subdrain. If possible, the subdrain will remain in place.

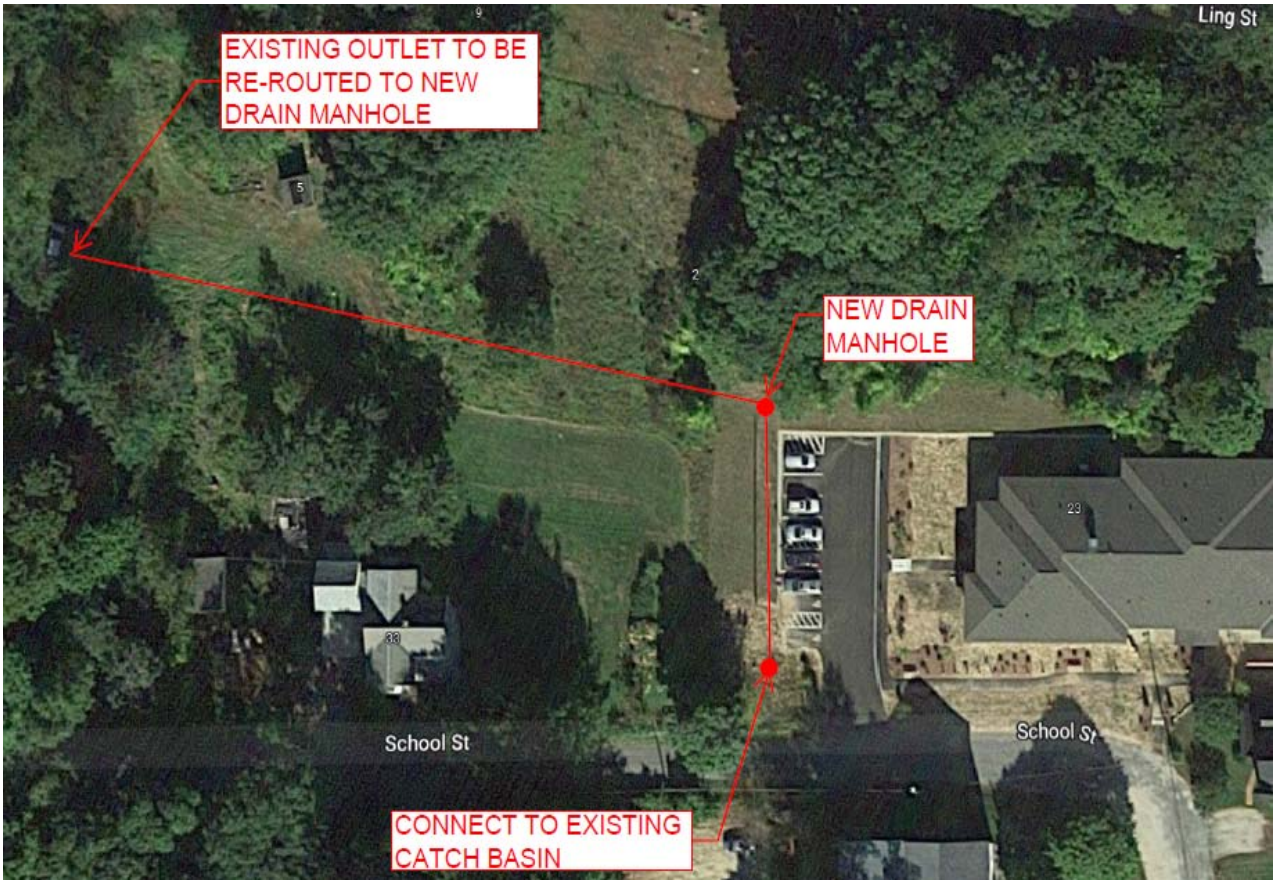


Figure 7 - Alternative #2 - 33 School Street layout.

The installation of Alternative #2 is anticipated to have temporary impacts associated with construction, such as noise and traffic impacts, and may potentially require work within wetland resource areas. With appropriate environmental controls, construction period erosion and sedimentation can be addressed. Alternative #2 will, at a minimum, require two permanent drainage easements on private property: one at 2 School Street for the inlet and one at 170 Main Street for the culvert outfall. It should be noted that the NHDOT has an existing pipe and outfall at this property and, as such, likely has a prescriptive easement. The NHDOT reported they did not have any documentation of an existing easement at this location.

ALTERNATIVE #3 – LOWER SYSTEM BYPASS TO MAIN STREET

The lower system bypass to Main Street would remove flow from the lower granite infrastructure on private property and route it to the NHDOT system. This alternative would be achievable using one of two possible routes, either #3a or #3b:

3a. Pierce Ave/Ling Street Conduit.
3b. Fire Station Conduit.

Either of these options would achieve the same result, to divert the upstream stormwater runoff entering existing infrastructure located on residential private property at 141 and 143 Main Street, and 4 Ling Street. The cost and impacts associated with each alternative can be used to assess which alternative will meet the needs of the Town.

Alternative #3a – Pierce Avenue/Knight Lane Culvert Replacement

Alternative #3a will redirect stormwater runoff from entering the existing infrastructure located on residential private property at 141 and 143 Main Street, and 4 Ling Street. This alternative consists of the installation of manholes and conduit to convey stormwater from the existing system in the municipal parking lot adjacent to the Marlborough Fire Department (Node 0204) to the existing outlet on Main Street (Node 0168), avoiding private property and keeping the system within the public right of way. This alternative will redirect stormwater runoff from entering the drainage system on private property, where severe flooding has previously occurred. A new 30" RCP will connect to the manhole located at the entrance of the municipal parking lot (Node 0205) and run northwest on Knight Lane, then northeast on Ling Street, to a new drain manhole in the approximate location of the existing granite culvert (refer to Figure 8). The existing 27" x 33" (2.25' x 2.75') granite culvert will be removed and replaced with a new 30" RCP to the existing outlet location (Node 0168). The existing drainage system infrastructure will remain between the drain manhole at the corner of Pierce Avenue and Frost Street (Node 0235) and the catch basin in the entrance of the municipal parking lot at the Marlborough Fire Department (Node 0205). The catch basin in the municipal parking lot (Node 0199) will require re-routing, as well as the abandonment/plugging of outlets in drainage structures on Knight Lane (Nodes 0204 and 0205), to allow the system to function as proposed (refer to Attachment 3).

Alternative #3a was modeled in SWMM to evaluate the hydraulic performance relative to the existing system. Under this alternative, the system does not surcharge during the July 18th storm event. It should be noted that this alternative will require the installation of conduit and drainage structures approximately fourteen feet (14') below the existing ground surface in some locations in Ling Street, near the retaining wall. As a result, additional precautions may be necessary during construction, such as shoring of trenches, to avoid compromising the structural integrity of the retaining wall.

The installation of Alternative #3a is anticipated to have temporary impacts associated with construction, such as noise and traffic impacts. With appropriate environmental controls, construction period erosion and sedimentation can be addressed. While temporary easements may be required for system construction and existing infrastructure removal or

abandonment, no permanent easements are anticipated for this alternative.

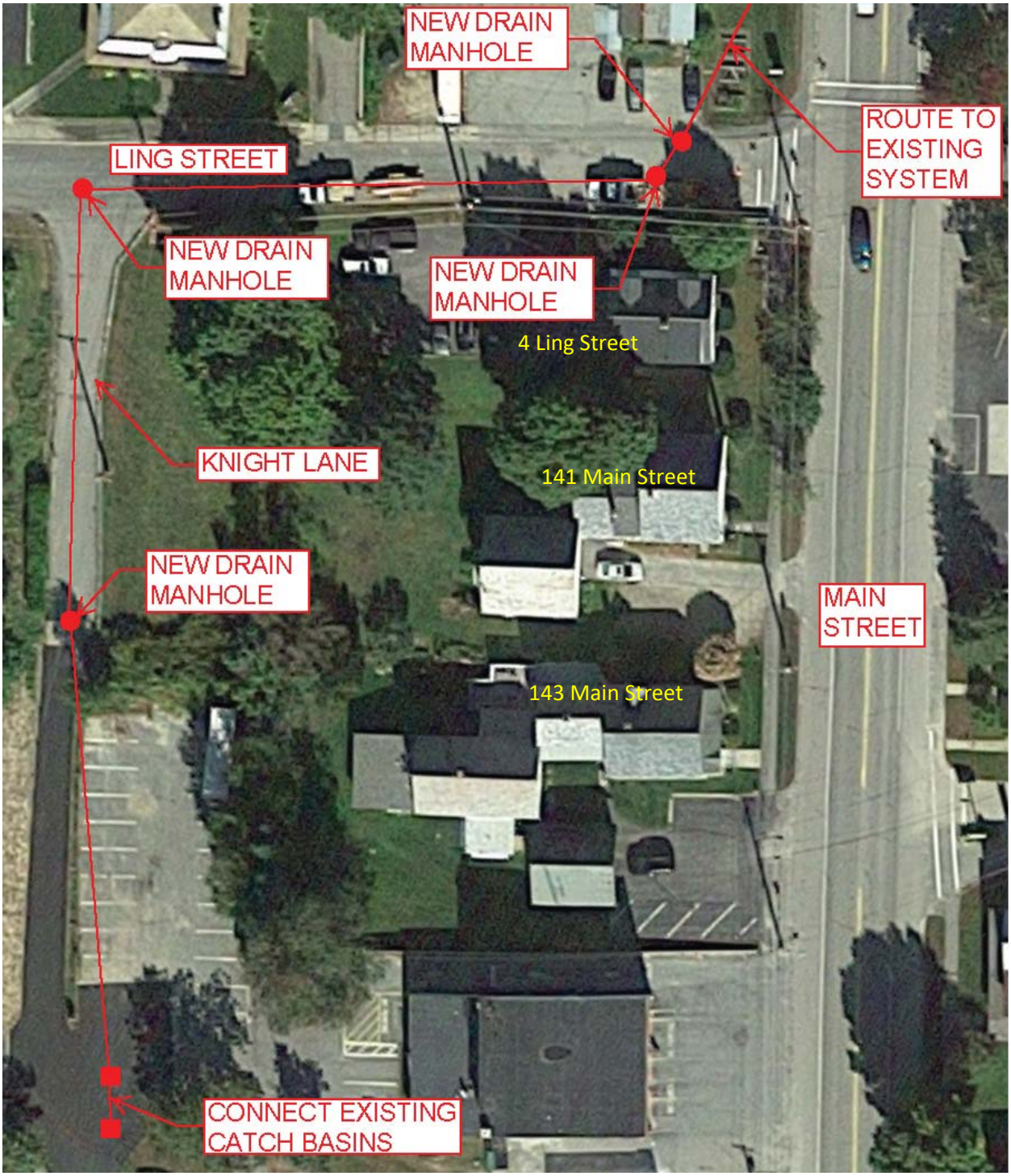


Figure 8 - Alternative #3a layout.

Alternative #3b – Fire Station Bypass

Alternative #3b includes rerouting the existing drainage system to Main Street before it connects to the existing granite culvert on private property. The connection would be routed via the driveway along the north side of the Marlborough Fire Department Building. The existing catch basin located on Knight Lane (Node 0198) that connects to the existing granite culvert behind 141 Main Street will need to be rerouted to the existing catch basin in the municipal parking lot (Node 0205) (refer to Figure 9).

This alternative was modeled in SWMM to evaluate the performance relative to the existing system. The connection would consist of new 30" RCP. The existing catch basin on Knight Lane (Node 0198) will connect via a 12" RCP to the existing catch basin (Node 0205). Proposed pipes have sufficient capacity to handle the July 18th storm event. The existing NHDOT drainage pipes downstream of the proposed connection to the NHDOT system are 15" and 24" pipes. To accommodate the increased flow, the existing pipes will need to be removed and replaced with a new 30" RCP.

The installation of Alternative #3b is anticipated to have temporary impacts associated with construction, such as noise and traffic impacts. With appropriate environmental controls, construction period erosion and sedimentation can be addressed. While temporary easements may be required for system construction and existing infrastructure removal or abandonment, no permanent easements are anticipated for this alternative.

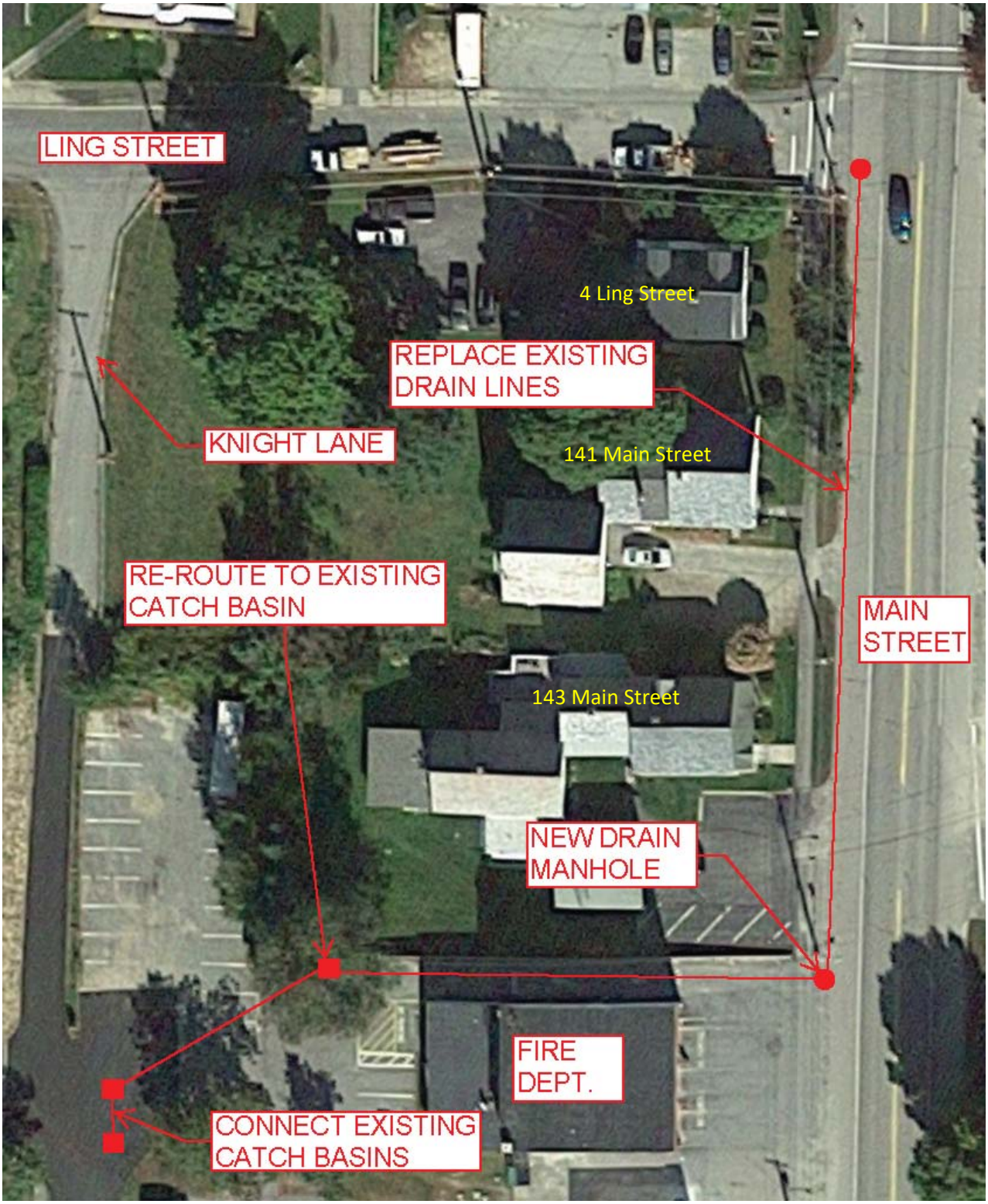


Figure 9 - Alternative #3b layout.

ALTERNATIVE #4 – COMBINATION OF ALTERNATIVES/COMPLETE SYSTEM REPLACEMENT

Alternative #4 includes a combination of Alternative #2 and either Alternative #3a or Alternative #3b. Alternative #4 would include Alternative #2 (bypass conduit that originates at the existing inlet located at 2 School Street, along Church Street, across Main Street, and into Minnewawa Brook, as well as intercepting both laterals and connecting them to the bypass system at the corner of Church and School Streets via 18" RCP), and Alternative #3 (rerouting the existing lower drainage system to Main Street before it connects to the existing granite culvert on private property). Refer to the individual descriptions for details of Alternatives #2 and #3.

ALTERNATIVE #5 – UPPER WATERSHED BYPASS TO NHDOT SYSTEM ON MAIN STREET

Alternative #5 would remove flow from the upper granite infrastructure and route it directly to the NHDOT drainage system on Main Street. This alternative includes an upper watershed bypass conduit, connection of inlets along School Street and Bassett Court, and rerouting of flow from the granite infrastructure located on private property at 33 School Street. During the study scoping process, Gale was informed that the existing NHDOT drainage system does not have the capacity to accommodate flow from the bypass conduit, so implementation of this alternative was not considered further due to impacts associated with implementation and the availability of other alternatives with less impacts.

GRANITE INFRASTRUCTURE DISPOSITION

Implementation of the bypass and alternatives will divert flow from sections of the failing infrastructure located on private property. Several options are available for decommissioning, including abandon in place, open cut and backfill, and the installation of flowable fill. Depending on the location of the infrastructure, multiple methods may be necessary. In locations where the infrastructure is near, under, or part of a building, flowable fill or concrete are appropriate; while in areas of landscaping, abandon in place or cut and fill would be more economical. Since there may be unknown or hidden connections to the system from private property (sump pumps, floor drains, etc.), sections that will be backfilled should be subject to a waiting period, and/or discussions with homeowners about any known connections. Because the infrastructure was potentially used to dispose of sanitary waste in the past, the potential exists for active historic sanitary sewer connections.

A review of the available property deeds did not show any specific indication of ownership of the infrastructure. As a next step, the Town may consider consulting with counsel to potentially develop decommissioning options to present to the affected property owners. The options should include an action deadline, at which time the abandoned infrastructure becomes the responsibility of the property owner. Because the granite infrastructure was likely installed as part of the Town's industrial revolution, continued coordination with NHDHR is required to assess if the infrastructure has any archeological/historical significance.

PROJECTED COSTS

Gale prepared an Engineer's Opinion of Probable Project Costs (EOPPC) associated with design and construction for each alternative (2022 costs). Unit costs were obtained from bid price averages, recent construction contracts, and engineering judgement based on the type, size, and complexity of the anticipated work. Soft costs are estimated at 15% of construction, and include services such as borings, engineering design, and construction administration. Stormwater controls, including structural treatment options, are estimated at 10% of construction and include rain garden, subsurface infiltration system, tree box filters and biofiltration swales, pervious paving sections, and other stormwater treatment options. Costs associated with permits, easements, legal fees, survey, operation, and maintenance costs are not included. A 25% contingency was applied to the construction cost:

Option	Option Description	Construction	Soft Costs (est. @ 15%)	Stormwater Improvements (est. @ 10%)	Total Cost
Alternative #1	Do Nothing	$ 0	$ 0	$ 0	$ 0
Alternative #2	Upper watershed bypass	$ 809,975	$ 121,500	$ 81,000	$ 1,012,475
Alternative #3	#3a – Ling St. Bypass	$ 288,510	$43,275	$ 28,850	$ 360,635
	#3b – Fire Sta. Bypass	$ 265,475	$39,825	$ 26,550	$ 331,850
Alternative #4	Alt #2 and Alt #3a	$ 1,098,485	$ 164,775	$109,850	$ 1,373,110
	Alt #2 and Alt #3b	$ 1,075,450	$ 161,320	$107,545	$ 1,344,315

Alternates are structured so that they are independent of each other, and therefore can be advanced in either a single or multi-phase approach. Alternatives #2 and #3 (either #3a or #3b) can be developed separately to allow the Town to better structure the work to fit available funding. Alternative #4 can be advanced to perform the work included in Alternate #2 and either #3a or #3b in a single phase.

SUMMARY

Alternative #2 will remove a significant amount of flow from the failing infrastructure, which is anticipated to reduce the frequency of failures during high runoff events. Either Alternative #3a or #3b will address the same section of failing infrastructure and have comparable costs. Alternative #4, which is a combination of Alternative #2 and either Alternative #3a or Alternative #3b, will address the failing granite infrastructure on private property and, as a result, selection will depend on other factors, such as coordination with the NHDOT and right-of-way construction constraints. Based on the modeling results, the alternatives were ranked according to cost/benefit.

Implementing either Alternative #3a or #3b will result in the potential replacement of a section of failing infrastructure. Alternative #3a will require pipes to be installed approximately 14 feet below existing grade at some points in the system. Further evaluation is warranted to determine the costs associated with deep excavation. Alternative #3b connects to the existing NHDOT drainage system on Main Street via the driveway on the northern edge of the Fire Department Building. This alternative will also require minor re-routing of drain manholes and catch basins in the municipal parking lot area. The existing

NHDOT system on Main Street will require the replacement of several sections of pipe for this alternative. The NHDOT system is approximately located under the southwest gutter line on Main Street, so the construction is not expected to require a complete roadway closure.

Alternative #2 is anticipated to remove approximately two-thirds of the existing system flow and would potentially replace two sections of failing granite infrastructure located on private property (upper granite infrastructure and 33 School Street). In Gale's opinion, this alternative will result in the most significant improvement to flooding impacts. Alternatives #3a and #3b are two different options to achieve the same goal of removing flow from the existing infrastructure on private property between the municipal parking lot and Ling Street. Alternative #4 combines Alternatives #2 and #3, and results in replacement or abandonment of known granite infrastructure on private property.

The study has provided several alternatives for addressing the Town of Marlborough's granite infrastructure issues in the project area. In Gale's opinion, suggested next steps are to advance the preliminary design for Alternative #2 to full design and construction document phase, and study Alternatives #3a and #3b further to determine the most economical method to divert flow from the infrastructure on private property between the municipal parking lot and Ling Street. Alternates are structured so that they can be advanced in either a single or multi-phase approach. Alternatives #2 and #3 (either #3a or #3b) can be developed separately to allow the Town to better structure the work to fit available funding. Alternative #4 can be advanced to perform the work included in Alternates #2 and either #3a or #3b in a single phase. As the selected alternatives are advanced through the design process, continued coordination with NHDHR, NHDOT, and other state and federal permitting agencies, as applicable, will be required to incorporate comments from these agencies. In Gale's opinion, the Town should develop decommissioning options for the various sections of infrastructure.

Maintenance of future drainage infrastructure will be incorporated into the Town's existing Stormwater Maintenance Plan and will include routine cleaning of inlets and catch basins, and observation of outfalls for erosion. These drainage appurtenances already exist in the system and will continue to need to be maintained after construction.

Future project elements that can potentially reduce flow, address pollution, and increase climate resiliency include green infrastructure stormwater design for the municipal parking lot and potentially the inlet to Alternative #2 (including rain garden, subsurface infiltration system, tree box filters and biofiltration swales, pervious paving sections, etc.), and the installation of offline catch basins, water quality inlets, or biofiltration systems in the public right of way.

ATTACHMENT 1

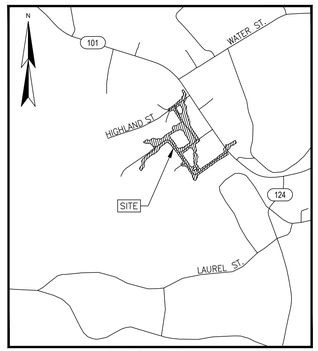
Existing Conditions Plans

LEGEND

	APPROXIMATE GIS LOT LINE
100	MAJOR CONTOUR LINE
98	MINOR CONTOUR LINE
	STONE WALL
	RETAINING WALL
O	CHAIN LINK FENCE
	STOCKADE FENCE
V	PICKET FENCE
X	WIRE FENCE
	HANDRAIL
OHW	OVERHEAD WIRE
D	DRAIN LINE
S	SEWER LINE
	TREE LINE
	SHRUB LINE
	EDGE OF WATER
	CONCRETE
	LANDSCAPED AREA
	CRUSHED STONE
X 100.0	SPOT GRADE
	BOUND FOUND (BND. FND.)
	DRILL HOLE FOUND (D.H.F.)
	UTILITY POLE
	UTILITY POLE & GUY WIRE
	UTILITY POLE W/LIGHT
	LIGHT POST
D	DRAIN MANHOLE
	CATCH BASIN
S	SEWER MANHOLE
CO	CLEANOUT
	FIRE HYDRANT
	WATER GATE VALVE
	WATER SHUTOFF VALVE
	PAD MOUNTED TRANSFORMER
	GAS METER
M	MANHOLE (PAVED OVER)
	SQUARE POST
	POST
	BOLLARD
	FLAG POLE
	MAIL BOX
	CONIFEROUS TREE 10" DIA. OR GREATER
	CONIFEROUS TREE LESS THAN 10" DIA.
	DECIDUOUS TREE 10" DIA. OR GREATER
	DECIDUOUS TREE LESS THAN 10" DIA.
	CONIFEROUS SHRUB
	DECIDUOUS BUSH
	TREE STUMP
	MONITORING WELL LOCATION
TYP.	TYPICAL
APPRX.	APPROXIMATE
BND. FND.	BOUND FOUND
CONC.	CONCRETE
GRAN.	GRANITE
HDWL	HEADWALL
RET. WALL	RETAINING WALL
R.S.S.	RAILROAD SPIKE FOUND
D.H.	DRILL HOLE
NHHB	NEW HAMPSHIRE HIGHWAY BOUND
FF	FINISHED FLOOR ELEVATION
TH	THRESHOLD ELEVATION
EP	EDGE OF PAVEMENT
EG	EDGE OF GRAVEL
VGC	VERTICAL GRANITE CURB
SBB	SLOPED BITUMINOUS BERM
TMB	TIMBER EDGE
SWL	SINGLE WHITE LINE
DYL	DOUBLE YELLOW LINE
DIP	DUCTILE IRON PIPE
RCP	REINFORCED CONCRETE PIPE
VCP	VITREOUS CLAY PIPE
PVC	POLYVINYL CHLORIDE PIPE
HDPE	HIGH DENSITY POLYETHYLENE PIPE
NPV	NO PIPE VISIBLE
SED.	SEDIMENT
UNK	UNKNOWN
(X)	INVERT I.D. CONNECTION UNKNOWN
"DE"	DEAD END
"NP"	NO PARKING SIGN
"PP"	PRIVATE PARKING
"R"	RESERVED PARKING SIGN
"TP"	TENANT PARKING
"V"	VISITORS

1. REFERENCE: STORMWATER ASSESSMENT
   MARLBOROUGH, NEW HAMPSHIRE
   D.S. PROJECT NO. 6988
2. FIELD SURVEY PERFORMED BY A.D.K. & P.C.L. (DOUCET SURVEY) DURING APRIL, 2022 USING A TRIMBLE S6 TOTAL STATION WITH A TRIMBLE TSC3 DATA COLLECTOR AND A SOKKIA B21 AUTO LEVEL. TRAVERSE ADJUSTMENT BASED ON LEAST SQUARE ANALYSIS.
3. HORIZONTAL DATUM BASED ON NAD83(2011) NEW HAMPSHIRE STATE PLANE COORDINATE ZONE (2800) DERIVED FROM REDUNDANT GPS OBSERVATIONS UTILIZING THE KEYNET GPS VRS NETWORK.
4. VERTICAL DATUM IS BASED ON NAVD88 AS ESTABLISHED BY DIFFERENTIAL LEVELS RUN TO SURVEY CONTROL POINTS FROM NHDOT GEODETIC CONTROL DISK #287-0200. PUBLISHED NAVD88 ELEVATION ON THAT DISK IS 726.00 FEET.
5. PROPER FIELD PROCEDURES WERE FOLLOWED IN ORDER TO GENERATE CONTOURS AT 2' INTERVALS. ANY MODIFICATION OF THIS INTERVAL WILL DIMINISH THE INTEGRITY OF THE DATA, AND DOUCET SURVEY WILL NOT BE RESPONSIBLE FOR ANY SUCH ALTERATION PERFORMED BY THE USER.
6. THE ACCURACY OF MEASURED UTILITY INVERTS AND PIPE SIZES/TYPES IS SUBJECT TO NUMEROUS FIELD CONDITIONS, INCLUDING; THE ABILITY TO MAKE VISUAL OBSERVATIONS, DIRECT ACCESS TO THE VARIOUS ELEMENTS, MANHOLE CONFIGURATION, ETC.
7. UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON OBSERVED PHYSICAL EVIDENCE AND PAINT MARKS FOUND ON-SITE.
8. ALL UNDERGROUND UTILITIES (ELECTRIC, GAS, TEL. WATER, SEWER DRAIN SERVICES) ARE SHOWN IN SCHEMATIC FASHION, THEIR LOCATIONS ARE NOT PRECISE OR NECESSARILY ACCURATE. NO WORK WHATSOEVER SHALL BE UNDERTAKEN USING THIS PLAN TO LOCATE THE ABOVE SERVICES. CONSULT WITH THE PROPER AUTHORITIES CONCERNED WITH THE SUBJECT SERVICE LOCATIONS FOR INFORMATION REGARDING SUCH. CALL DIG-SAFE AT 1-888-DIG-SAFE.

MAP KEY



LOCATION MAP (n.t.s.)

40 0 40 80

SCALE: 1 INCH = 40 FT.

TOPOGRAPHIC PLAN

FOR

GALE ASSOCIATES

OF

CHURCH STREET, SCHOOL STREET,
FROST STREET, PIERCE ROAD,
KNIGHT LANE & LING STREET
MARLBOROUGH, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	A.D.K.	DATE:	APRIL, 2022
CHECKED BY:	S.V.M.	DRAWING NO.	6988A
JOB NO.	6988	SHEET	1 OF 4

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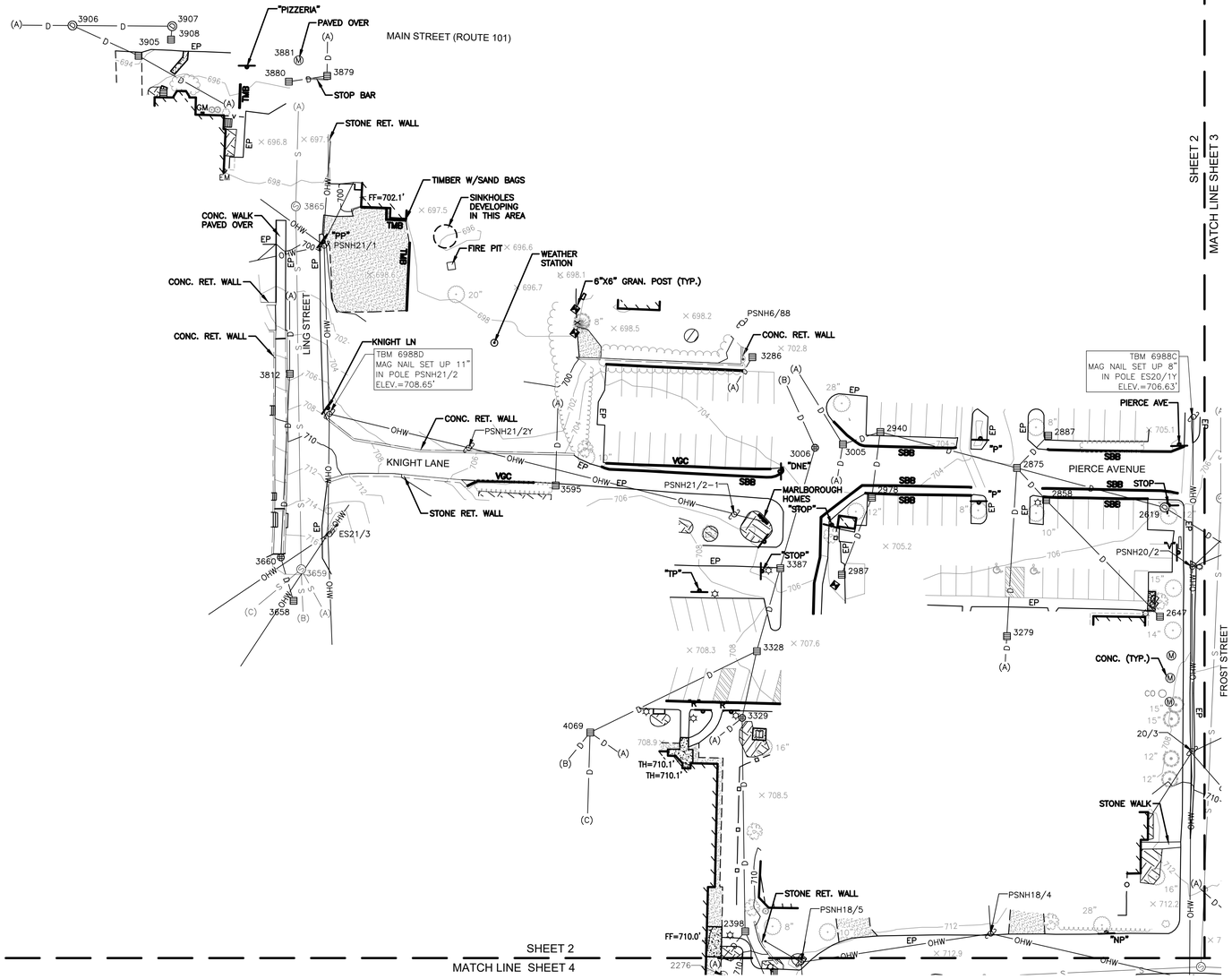
DRAINAGE STRUCTURES		
CB 2398	CB 3279 (0230)	DMH 3906 (0167)
RIM ELEV.=708.6'	RIM ELEV.=705.2'	RIM ELEV.=693.4'
(A) 8" HDPE INV.=702.5'	(A) 12" DIP INV.=702'	(3905) 30" RCP INV.=687.4'
(2217) 36" HDPE INV.=701.3'	(2875) 15" CMP INV.=702'	(3907) 30" RCP INV.=686.6'
(3329) 36" HDPE INV.=701.2'	SED. ELEV.=701.2'	(A) 30" RCP INV.=686.2'
SED. ELEV.=701.2'	REFUSAL ELEV.=701.1'	SUMP ELEV.=686'
REFUSAL ELEV.=700.9'		
	CB 3286 (0199)	DMH 3907 (0169)
DMH 2619 (0235)	RIM ELEV.=702.3'	RIM ELEV.=694.3'
RIM ELEV.=705.9'	(A) 15" CMP INV.=698.8'	NO INVERTS MEASURED
(A) 24"x24" BOX CULV. INV.=702.1'	SED. ELEV.=696.2'	OUT OF SCOPE
(2875) 30" CMP INV.=699.3'	REFUSAL ELEV.=695.3'	
SUMP ELEV.=700.3'		CB 3908 (0171)
	CB 3328 (0206)	RIM ELEV.=693.9'
CB 2647 (0234)	RIM ELEV.=707.7'	NO INVERTS MEASURED
RIM ELEV.=705.8'	(4069) 12" HDPE INV.=699.3'	OUT OF SCOPE
(2858) 12" CMP INV.=701.6'	(3329) 36" CMP INV.=698.5'	
HARD PACK SED. ELEV.=700.9'	(3387) 36" CMP INV.=698.4'	CB 4069 (0207)
	SED. ELEV.=699.O'	RIM ELEV.=707.8'
CB 2858 (0233)	REFUSAL ELEV.=698.7'	(A) 8" HDPE INV.=703.6'
RIM ELEV.=704.8'		(B) 6" HDPE INV.=703.5'
(2647) 12" CMP INV.=700.5'	CBR 3329 (0215)	(C) 12" HDPE INV.=703.5'
(2647) 15" CMP INV.=700.0'	RIM ELEV.=708'	(3328) 12" HDPE INV.=703.5'
HARD PACK SED. ELEV.=700.4'	(A) 10" HDPE INV.=702.7'	SED. ELEV.=703.3'
	(2398) 36" HDPE INV.=699.7'	REFUSAL ELEV.=701.5'
CB 2875 (0232)	(3328) 36" HDPE INV.=699.3'	
RIM ELEV.=704'	SUMP ELEV.=699.2'	
(2858) 15" CMP INV.=700.4'		
(2887) 15" CMP INV.=700.3'	CB 3387 (0200)	
(3279) 15" CMP INV.=699.8'	RIM ELEV.=705.3'	
(2619) 30" CMP INV.=699.4'	(3328) 36" CMP INV.=698.2'	
(2940) 30" CMP INV.=699.4'	(3006) 36" CMP INV.=698.0'	
HARD PACK SED. ELEV.=699.5'	SED. ELEV.=697.7'	
	REFUSAL ELEV.=695.9'	
CB 2887 (0231)		
RIM ELEV.=704'	CB 3595 (0198)	
(2875) 15" CMP INV.=700.7'	RIM ELEV.=704.6'	
SED. ELEV.=698.6'	(A) 10" CMP INV.=701.1'	
REFUSAL ELEV.=698.5'	HARD PACK SED. ELEV.=700.8'	
CB 2940 (0203)	CB 3658 (1076)	
RIM ELEV.=703'	RIM ELEV.=719.2'	
(2978) 12" CMP INV.=699.3'	(3660) 10" RCP INV.=716.1'	
(2875) 30" CMP INV.=698.5'	SED. ELEV.=716.4'	
(3005) 30" CMP INV.=698.3'		
SUMP ELEV.=698.3'	CBR 3660 (1075)	
	RIM ELEV.=717.3'	
CB 2978 (0202)	(3658) 10" RCP INV.=715.0'	
RIM ELEV.=704'	(3812) 10" VCP INV.=714.4'	
(2987) 12" CMP INV.=699.9'	HARD PACK SED. ELEV.=714.4'	
(2940) 12" CMP INV.=699.7'		
SED. ELEV.=699.3'	CB 3812 (0174)	
REFUSAL ELEV.=697.9'	RIM ELEV.=705.5'	
	10" VCP INV.=702.9'	
CB 2987 (0201)		
RIM ELEV.=704.9'	CB 3879 (0173)	
(2978) 12" CMP INV.=701.9'	RIM ELEV.=695.6'	
HARD PACK SED. ELEV.=700.7'	(3880) 15" RCP INV.=690.3'	
	(A) 15" RCP INV.=690.3'	
CB 3005 (0204)	HARD PACK SED. ELEV.=690.0'	
RIM ELEV.=703.1'		
(A) OPENING IN WALL APPRX. INV.=698.6'	CB 3880 (0172)	
(2940) 30" CMP INV.=698.6'	RIM ELEV.=695.6'	
(B) 36"x18" BOX CULV. INV.=698.1'	(3879) 15" RCP INV.=691.1'	
HARD PACK SED. ELEV.=698.5'	HARD PACK SED. ELEV.=690.9'	
CBR 3006 (0205)	CB 3905 (0168)	
RIM ELEV.=703.2'	RIM ELEV.=693.7'	
(3387) 36" CMP INV.=698.1'	(A) 24"x24" BOX CULV. INV.=690.4'	
(A) 44"x30" CMP INV.=698.0'	(3906) 30" CMP INV.=690.2'	
SUMP ELEV.=698.0'	C.C. ELEV.=690.3'	

SEWER STRUCTURES
SMH 3659
RIM ELEV.=717.8'
(A) 8" PVC INV.=710.4'
(B) 8" PVC INV.=710.3'
(C) 8" PVC INV.=710.1'
(3865) 8" PVC INV.=709.8'
SMH 3865
RIM ELEV.=698.6'
(3659) 8" PVC TOP INV.=692.5'
(3659) 8" PVC BOTT. INV.=688.3'
(A) 8" PVC INV.=688.2'



40 0 40 80
SCALE: 1 INCH = 40 FT.

TOPOGRAPHIC PLAN

FOR

GALE ASSOCIATES

OF

CHURCH STREET, SCHOOL STREET, FROST STREET, PIERCE ROAD, KNIGHT LANE & LING STREET

MARLBOROUGH, NEW HAMPSHIRE

NO.	DATE	DESCRIPTION	BY

DRAWN BY:	A.D.K.	DATE:	APRIL, 2022
CHECKED BY:	S.V.M.	DRAWING NO.	6988A
JOB NO.	6988	SHEET 2 OF	4

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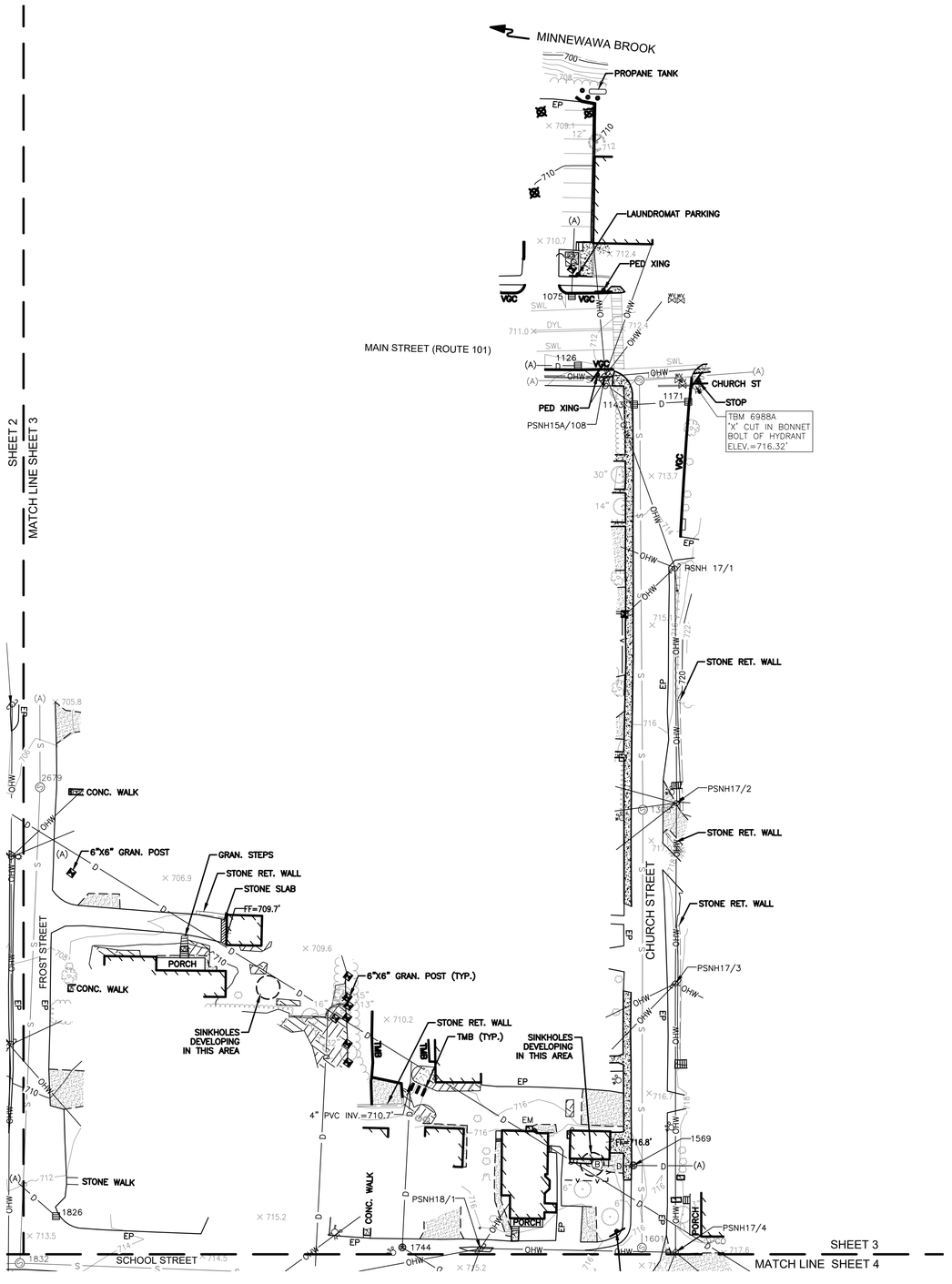
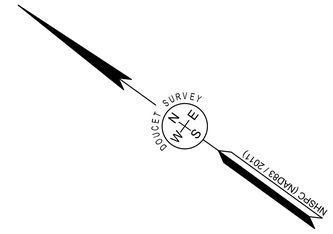
DRAINAGE STRUCTURES	SEWER STRUCTURES
CB 1075 (0246)	SMH 1121
RIM ELEV.=710.8'	RIM ELEV.=712.9'
(A) 15" RCP INV.=707.7'	(1308) 8" PVC TOP INV.=706.1'
HARD PACK SED. ELEV.=707.2'	(1308) 8" PVC BOTT. INV.=698'
	(A) 8" VCP INV.=697.9'
CB 1126 (0243)	(B) 10" PVC INV.=697.8'
RIM ELEV.=711.6'	
(1143)15" RCP INV.=707.0'	SMH 1308
(A) 15" RCP INV.=706.7'	RIM ELEV.=716.5'
HARD PACK SED. ELEV.=703.4'	(1601) 8" PVC INV.=708.7'
	(1121) 8" PVC INV.=708.6'
CB 1143 (0244)	
RIM ELEV.=712.8'	SMH 1601
(1171) 15" RCP INV.=707.9'	RIM ELEV.=716.4'
(1126) 15" RCP INV.=707.8'	(1308) 8" PVC INV.=709.7'
SUMP ELEV.=704.4'	
	SMH 2679
CB 1171 (0245)	RIM ELEV.=706.3'
RIM ELEV.=713.0'	(1832) 8" PVC INV.=699.9'
(1143) 15" RCP INV.=708.4'	(A) 8" PVC INV.=699.8'
SUMP ELEV.=708.1'	
CBR 1569 (0239)	
RIM ELEV.=715.7'	
(A) 10" CMP INV.=713.2'	
(B) 8" VCP INV.=713.2'	
HARD PACK SED. ELEV.=713'	
CBR 1744 (0237)	
RIM ELEV.=714.6'	
PARTIALLY COLLAPSED, NPV	
HARD PACK SED. ELEV.=709.5'	
CB 1826 (0228)	
RIM ELEV.=712.7'	
(A) 10" CMP INV.=709.3'	
HARD PACK SED. ELEV.=708.9'	





40 0 40 80
SCALE: 1 INCH = 40 FT.

TOPOGRAPHIC PLAN
FOR
GALE ASSOCIATES
OF
CHURCH STREET, SCHOOL STREET,
FROST STREET, PIERCE ROAD,
KNIGHT LANE & LING STREET
MARLBOROUGH, NEW HAMPSHIRE

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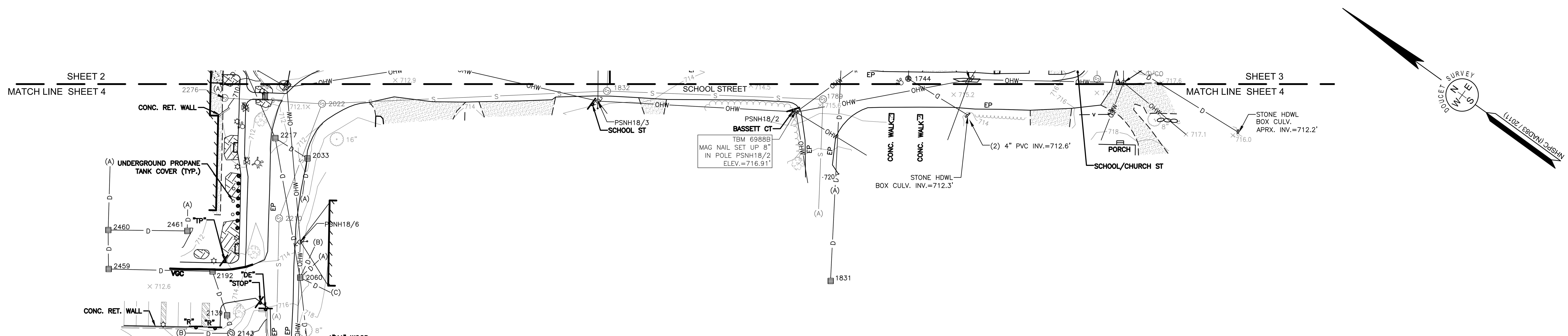

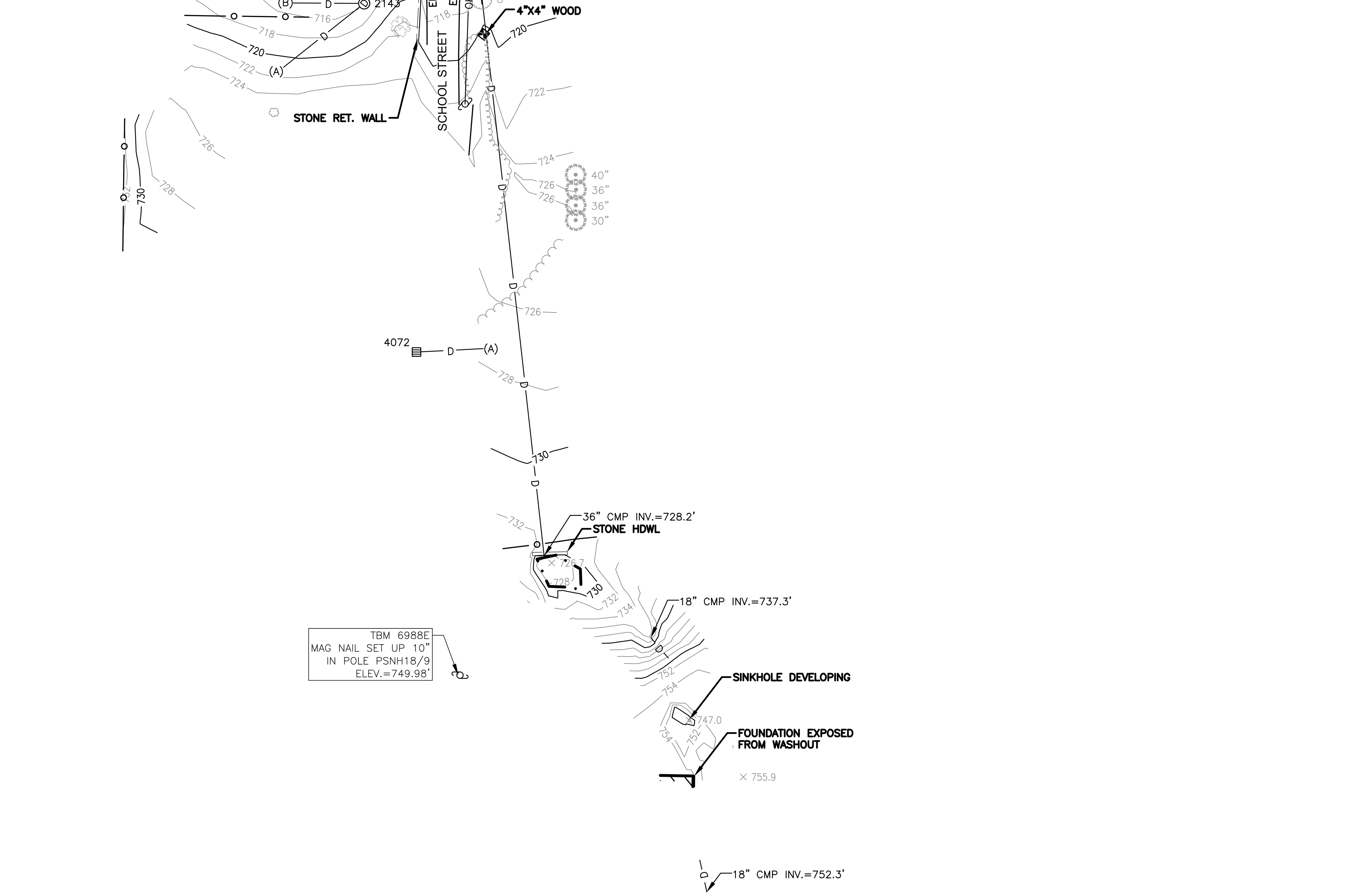

DRAINAGE STRUCTURES

CB 1831 (0236)
RIM ELEV.=728.7'
(A) 8" RCP INV.=725.1'
HARD PACK SED. ELEV.=725.2'

CB 2033 (0217)
RIM ELEV.=711.5'
(A) 10" VCP REMAINS INV.=708.5'
(2217) 12" CMP INV.=708.5'
HARD PACK SED. ELEV.=708.2'

CB 2060 (0218)
RIM ELEV.=714.2'
(A) 4" PVC INV.=711.3'
(B) 4" PVC INV.=709.8'
(C) 4" PVC INV.=709.6'
(STONE HDWL) 36" CMP INV.=709.4'
(2217) 36" CMP INV.=709.3'
SUMP ELEV.=709.4'

CB 2139 (0213)
RIM ELEV.=713.1'
(2143) 12" HDPE INV.=709.2'
(2192) 12" HDPE INV.=709.1'
SED. ELEV.=709.3'
REFUSAL ELEV.=706.3'

DMH 2143 (0214)
RIM ELEV.=716.3'
(A) 12" HDPE INV.=712.9'
(B) 6" HDPE INV.=711.3'
(2139) 12" HDPE INV.=709.8'
SUMP ELEV.=709.2'

CB 2192 (0212)
RIM ELEV.=713.0'
(2139) 12" HDPE INV.=709'
(2459) 12" HDPE INV.=709.1'
SED. ELEV.=709.0'
REFUSAL ELEV.=707.1'

CB 2217 (0216)
RIM ELEV.=711.6'
(2060) 36" CMP INV.=707'
(2033) 12" HDPE INV.=707.4'
(2398) 36" HDPE INV.=701.9'
SUMP ELEV.=700.4'

CB 2459 (0209)
RIM ELEV.=711.8'
(A) 6" HDPE INV.=707.1'
(2192) 12" HDPE INV.=706.7'
(2460) 12" HDPE INV.=705.9'
SED. ELEV.=705.4'
REFUSAL ELEV.=704.2'

CB 2460 (0210)
RIM ELEV.=708.0'
(2461) 12" HDPE INV.=704.7'
(2459) 12" HDPE INV.=704.7'
(A) 12" HDPE INV.=704.7'
SED. ELEV.=704.7'
REFUSAL ELEV.=702.8'

CB 2461 (0211)
RIM ELEV.=709.4'
(A) 8" HDPE INV.=705.1'
(2460) 12" HDPE INV.=705.2'
SED. ELEV.=704.5'
REFUSAL ELEV.=703.1'

CB 4072 (0219)
RIM ELEV.=730.5'
(A) 15" CMP INV.=728.6'
HARD PACK SED. ELEV.=729.0'

SEWER STRUCTURES

SMH 1789
RIM ELEV.=715.4'
(A) 8" PVC INV.=708.3'
(1832) 8" PVC INV.=707.6'

SMH 1832
RIM ELEV.=713.8'
(1789) 8" PVC TOP INV.=707.1'
(1789) 8" PVC BOTT. INV.=703.9'
(2022) 8" PVC INV.=703.9'
(2679) 8" PVC INV.=703.8'

SMH 2022
RIM ELEV.=712.2'
(2276) 6" PVC INV.=705.6'
(2210) 8" PVC INV.=705.6'
(1832) 8" PVC INV.=705.5'

SMH 2210
RIM ELEV.=713'
(A) 8" PVC INV.=707'
(2022) 8" PVC INV.=706.9'

SMH 2276
CO PIT, NO INVERT MEASURED
RIM ELEV.=709'

40 0 40 80
SCALE: 1 INCH = 40 FT.

TOPOGRAPHIC PLAN
FOR
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ATTACHMENT 2

Property Research List

Tax Map & Lot	Deed 1	Deed 2	Deed 3	Deed 4	Plan	Rights Referenced in Deed	Rights Specifically Drain/Sewer Related	Rights Document 1	Rights Document 2	Rights Document 3	Rights Document 4
12-045	879-517	-	-	-	-	-	-	-	-	-	-
12-046	3188-30	-	-	-	13-9-204	Numerous-See Deed	No	-	-	-	-
12-047	3072-943	-	-	-	-	Slope/bank/drain	Yes	1029-891	NHDOT Plan P2868	-	-
13-005	Town	-	-	-	-	-	-	-	-	-	-
13-006	2957-978	-	-	-	12-8-122	ROW Shown on Plan	No	-	-	-	-
13-007	2007-985	-	-	-	12-8-122	OHW Line Shown on Plan	No	-	-	-	-
13-008	2818-491	2798-712	2818-484	2818-479	13-9-194	Numerous-See Deed & Plan	Yes	-	-	249-84	529-260
13-011	2926-841	-	-	-	-	Numerous-See Deed	Yes	-	-	-	-
13-012	2347-322	-	-	-	55-39	Water/sewage/drain	Yes				
13-013	1788-698	-	-	-	12-5-37	Numerous-See Deed	Yes	529-389	530-117	535-585	536-387
13-014	2917-290	-	-	-		Water/sewage	Yes	-	-	-	-
13-015	No Listing	-	-	-	-	-	-	-	-	-	-
13-016	2820-545	-	-	-	50-22A	Slope	No	1059-88	-	-	-
13-018	2644-449	-	-	-	-	Aqueduct/water	No	393-975-Not Found	513-370	560-379	-
13-019	Town	-	-	-	-	-	-	-	-	-	-
13-020	1733-708	-	-	-	50-77	Drainage/Restrictive Covenant	Yes	-	-	-	-
13-021	1430-206	-	-	-	-	Water	No	393-375	513-370	560-379	
13-022	2257-830	-	-	-	-	Water	No	-	-	-	-
13-023	1105-457	-	-	-	-	-	-	-	-	-	-
13-025	Town	-	-	-	-	-	-	-	-	-	-
13-027	2992-470	-	-	-	49-36	Aqueduct/water	No	-	-	-	-
13-033	3179-1114	-	-	-	-	Covenants/spring	No	243-493	255-482	313-61	-
13-034	1922-799	-	-	-	-	Aqueduct/spring	No	248-530	248-531	255-482	255-483
13-035	3030-1218	-	-	-	-	Aqueduct	No	-	-	-	-
13-036	3030-1218					**IS THIS THE RIGHT DEED?**					
13-037	1708-139	-	-	-	-	"…rights of record"	No	-	-	-	-
13-038	2296-405	-	-	-	-	"...encumberances of record"	No	-	-	-	-
13-041	2986-771	-	-	-	-	"...matters…of record"	No	-	-	-	-
13-042	3065-556	-	-	-	-	Spring	No	320-139	367-353	-	-
13-043	3091-662	-	-	-	-	-	-	-	-	-	-
13-044	3088-211	-	-	-	-	Spring	No	-	-	-	-
13-045	2974-794	-	-	-	-	Water/"…easements…of record"	No	370-42	-	-	-
13-047	1815-826	-	-	-	-	Driveway/aqueduct	No	-	-	-	-
13-048	1431-184	-	-	-	-	Driveway/slope/ROW	No	472-378	747-51	-	-
13-049	2998-487	-	-	-	10-49	"…easements of record"	No	-	-	-	-
13-050	1509-307	-	-	-	-	-	-	-	-	-	-
13-051	3178-947	-	-	-	-	-	-	-	-	-	-
13-052	3135-199	-	-	-	-	ROW	No	-	-	-	-
13-053	1431-184	-	-	-	-	Driveway/slope/ROW	No	472-378	747-51	-	-
13-138	1124-194	1109-236	1109-235	-		Roadway	No	-	-	-	-

Rights Document 5	Rights Document 6	Rights Document 7
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-	-	-
-	-	-
-	-	-
-	-	-
646-220	646-221	646-222
-	-	-
547-483	1092-434	-
-	-	-
-	-	-
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1866-670	-	-
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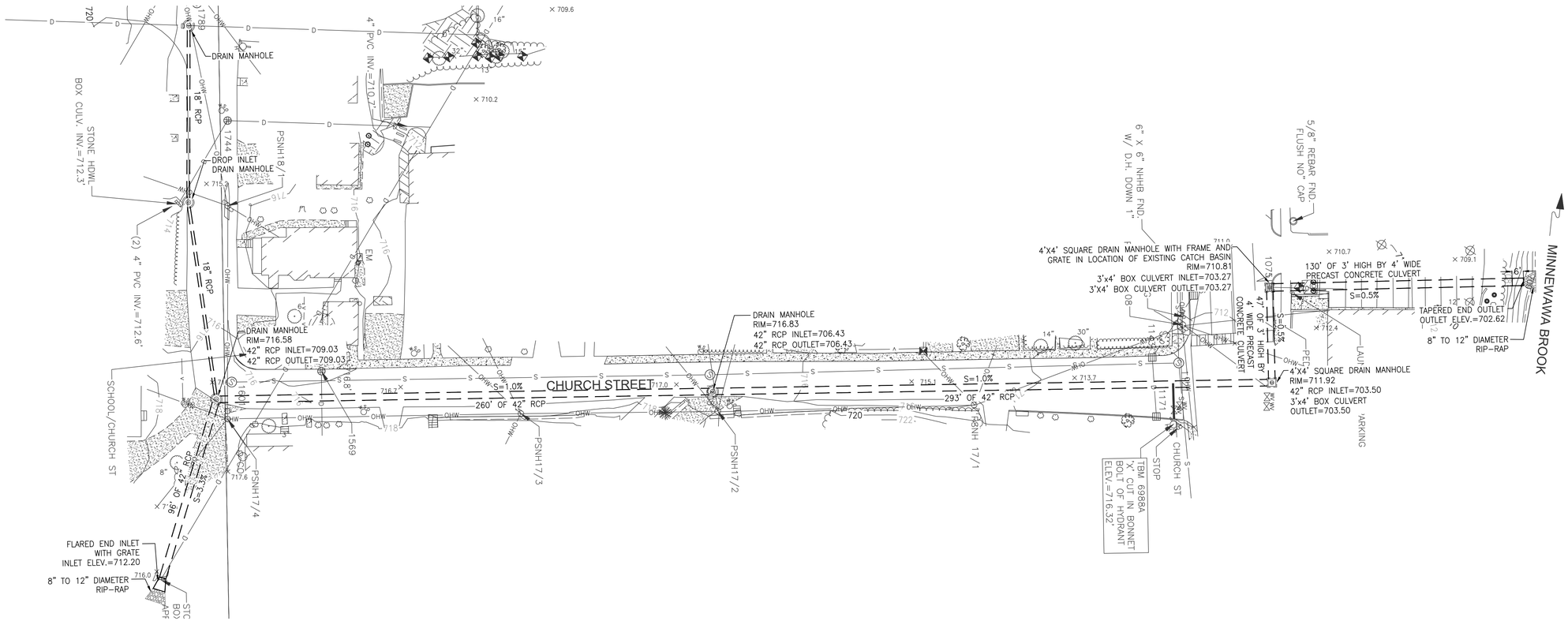
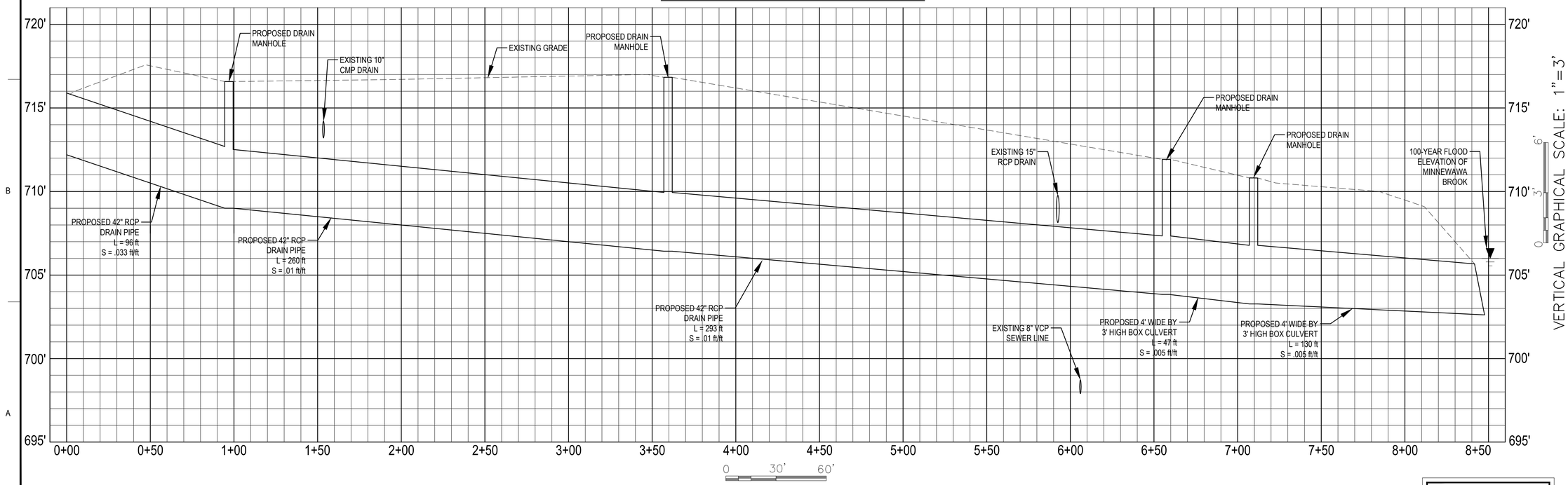
ATTACHMENT 3

Alternative Plans



DRAINAGE SYSTEM PROFILE



DRAFT

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SCHEMATIC

PROJECT
TOWN OF MARLBOROUGH STORMWATER INFRASTRUCTURE IMPROVEMENTS PROJECT
DOWNTOWN MARLBOROUGH
MARLBOROUGH, NH 03455

OWNER
TOWN OF MARLBOROUGH
P.O. BOX 487, 236 MAIN STREET
MARLBOROUGH, NH 03455

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	718680
CADD FILE	718680_C101 _RDT
DESIGNED BY	MSK
DRAWN BY	MSK
CHECKED BY	BDS
DATE	6/22/2022
DRAWING SCALE	1"=30'

GRAPHIC SCALE
0 30' 60'

SHEET TITLE

LAYOUT AND MATERIALS PLAN AND PROFILE ALTERNATIVE 2

DRAWING NO.
C101

2 OF 2

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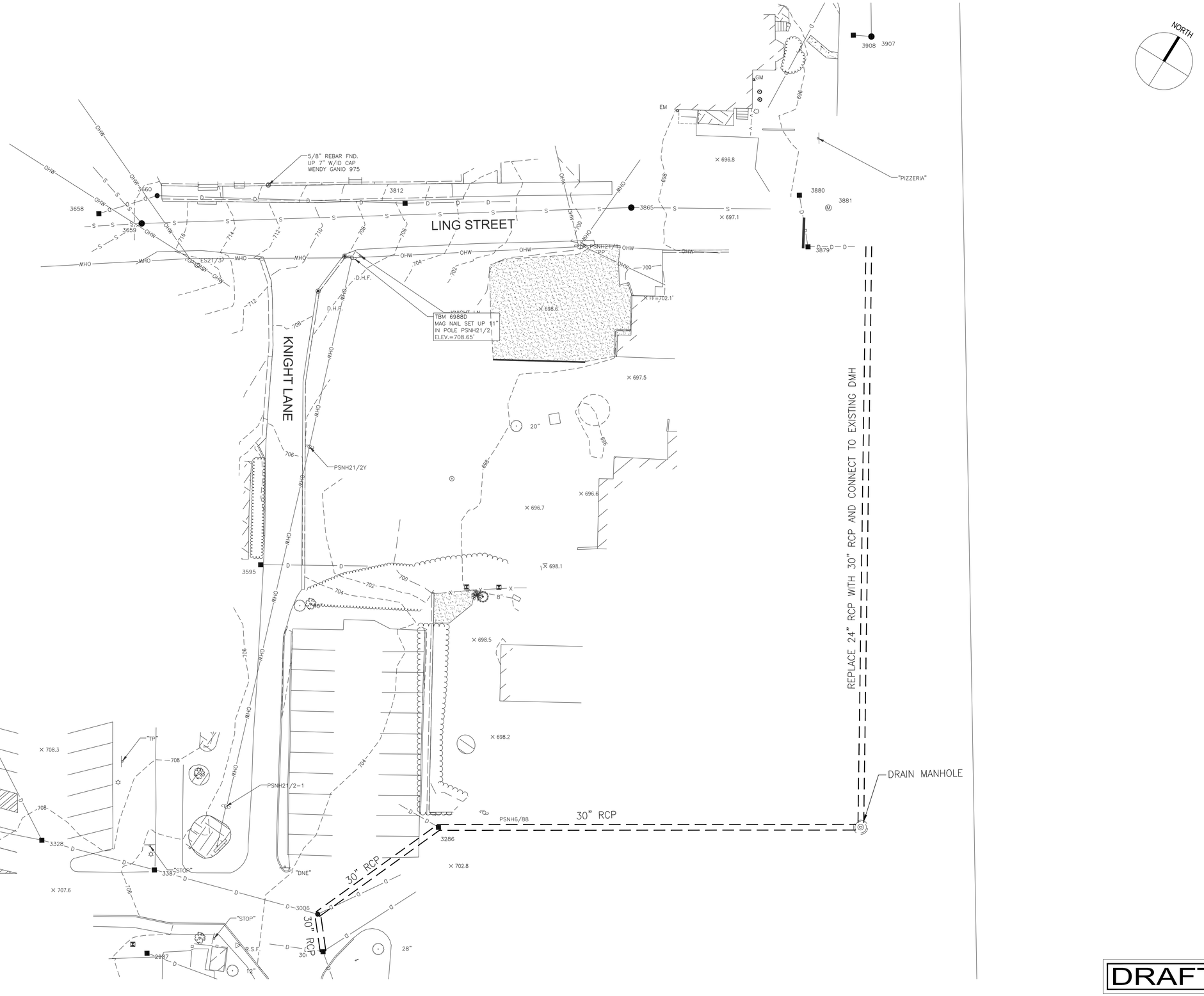

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DOWNTOWN MARLBOROUGH
MARLBOROUGH, NH 03455

OWNER
TOWN OF MARLBOROUGH
P.O. BOX 487, 236 MAIN STREET
MARLBOROUGH, NH 03455

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	718680
CADD FILE	718680_C101-ALT3
DESIGNED BY	MSK
DRAWN BY	MSK
CHECKED BY	BDS
DATE	6/22/2022
DRAWING SCALE	1"=20'

GRAPHIC SCALE

0 20' 40'

SHEET TITLE

LAYOUT AND MATERIALS PLAN ALTERNATIVE 3A

DRAWING NO.

C101

1 OF 1

DRAFT

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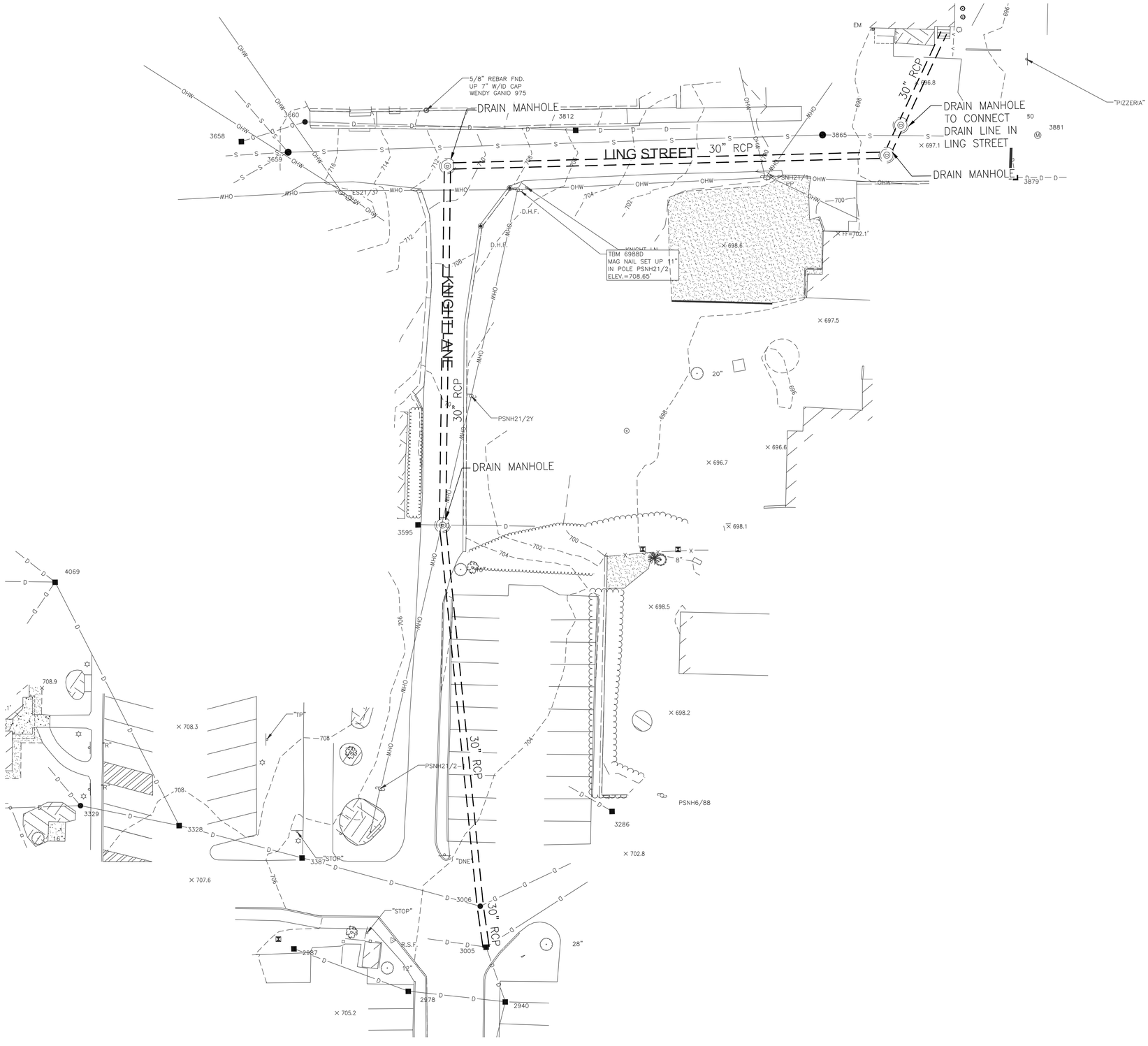

NORTH

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SCHEMATIC

PROJECT

TOWN OF MARLBOROUGH STORMWATER INFRASTRUCTURE IMPROVEMENTS PROJECT
DOWNTOWN MARLBOROUGH
MARLBOROUGH, NH 03455

OWNER

TOWN OF MARLBOROUGH
P.O. BOX 487, 236 MAIN STREET
MARLBOROUGH, NH 03455

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	718680
CADD FILE	718680_C101-ALT2
DESIGNED BY	MSK
DRAWN BY	MSK
CHECKED BY	BDS
DATE	6/22/2022
DRAWING SCALE	1"=20'

GRAPHIC SCALE

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SHEET TITLE

LAYOUT AND
MATERIALS PLAN
ALTERNATIVE 3B

DRAWING NO.

C101

1 OF 1

DRAFT

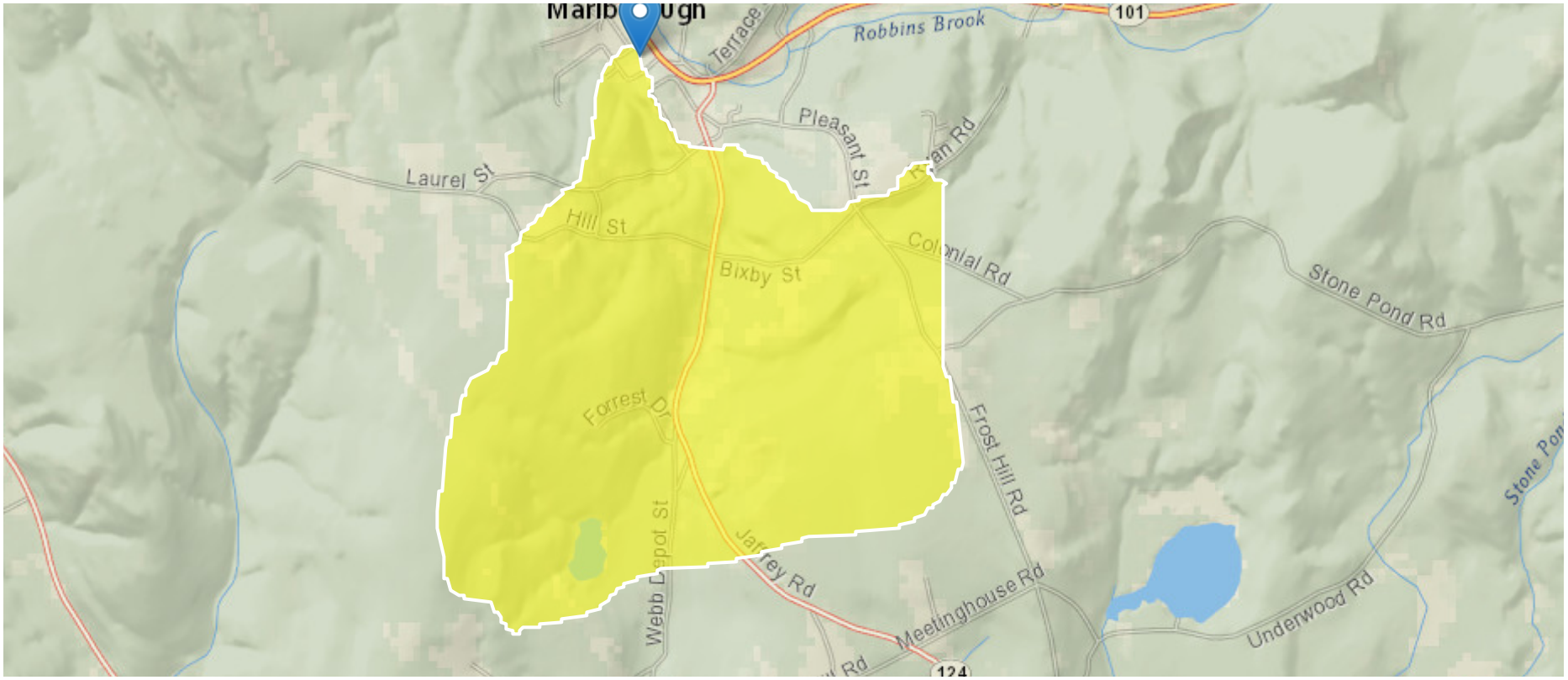
F:\718680\plots\03-Schematic Design\ALTERNATIVES\718680_C101-ALT2.dwg, 2/9/2023 12:33:59 PM, DWG To PDF.pc3

ATTACHMENT 4

Streamstats - Subcatchment Information

StreamStats Report

Region ID: NH
Workspace ID: NH20220224172325822000
Clicked Point (Latitude, Longitude): 42.90409, -72.20959
Time: 2022-02-24 12:23:43 -0500



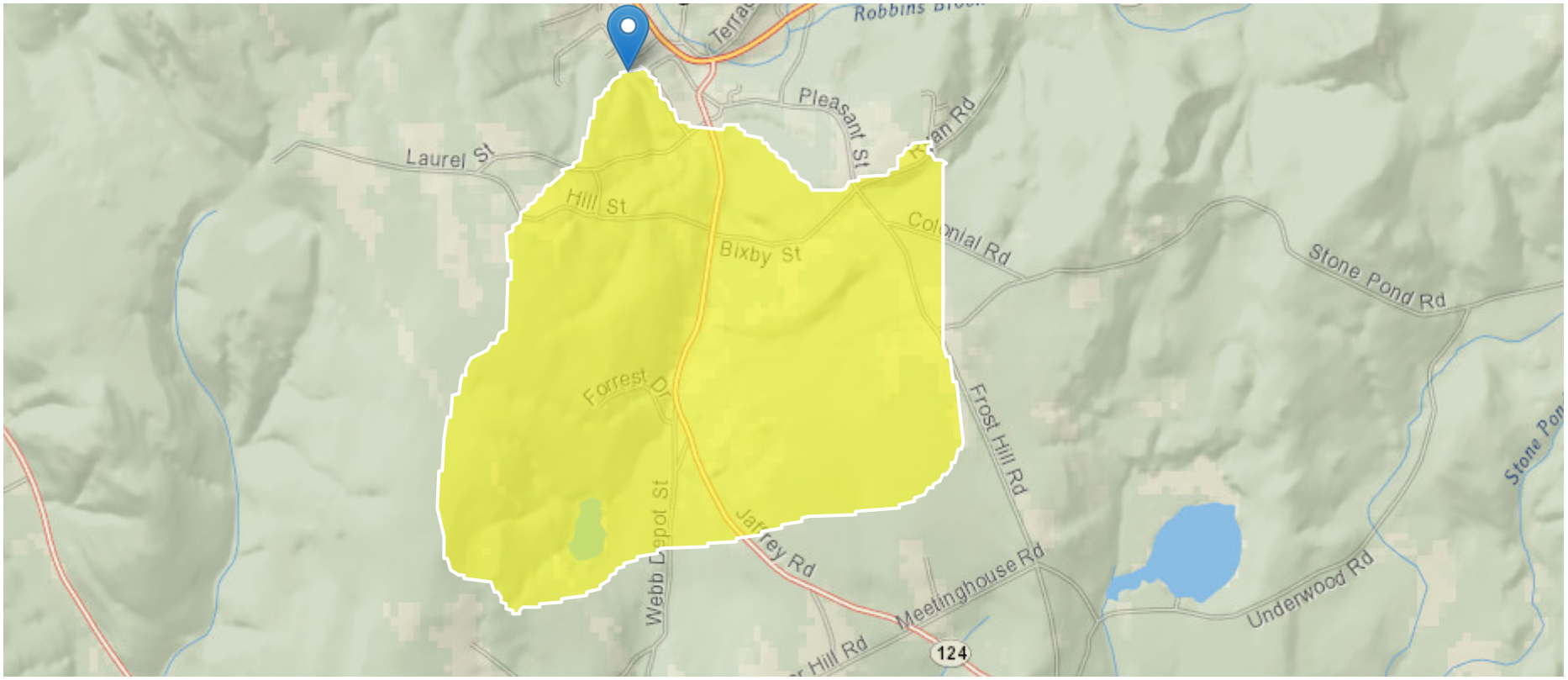
Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM30M	Mean basin slope computed from 30 m DEM	10.317	percent
CONIF	Percentaqe of land surface covered by coniferous forest	17.933	percent
DRNAREA	Area that drains to a point on a stream	1.28	square miles
ELEVMAX	Maximum basin elevation	1242.195	feet
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	12	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.86	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	28.4271	percent
WETLAND	Percentage of Wetlands	0.8408	percent

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report

Region ID: NH
Workspace ID: NH20220224173148181000
Clicked Point (Latitude, Longitude): 42.90278, -72.21030
Time: 2022-02-24 12:32:05 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
BSLDEM30M	Mean basin slope computed from 30 m DEM	10.337	percent
CONIF	Percentaqe of land surface covered by coniferous forest	18.1015	percent
DRNAREA	Area that drains to a point on a stream	1.26	square miles
ELEVMAX	Maximum basin elevation	1242.195	feet
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	11.4	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.62	percent
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	28.5667	percent
WETLAND	Percentage of Wetlands	0.8502	percent

Application Version: 4.6.2
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report

Region ID: NH
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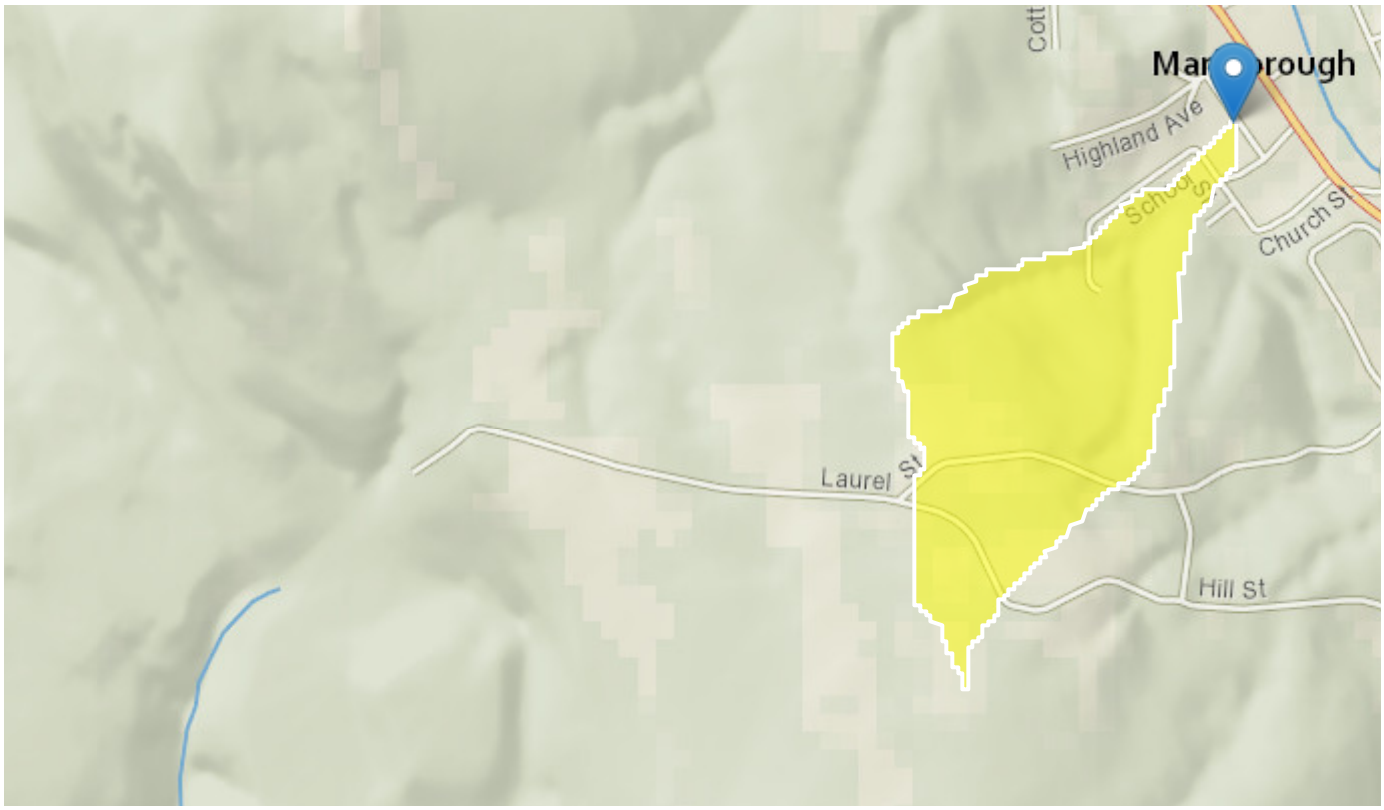

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	3.493	inches
BSLDEM30M	Mean basin slope computed from 30 m DEM	15.386	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	697	feet per mi
DRNAREA	Area that drains to a point on a stream	0.1	square miles
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	3.06	percent

Parameter Code	Parameter Description	Value	Unit
WETLAND	Percentage of Wetlands	0	percent

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.1	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.493	inches	2.79	6.23
WETLAND	Percent Wetlands	0	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	697	feet per mi	5.43	543

Peak-Flow Statistics Disclaimers [Peak Flow Statewide SIR2008 5206]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

Statistic	Value	Unit
50-percent AEP flood	7.16	ft^3/s
20-percent AEP flood	13.2	ft^3/s
10-percent AEP flood	18.7	ft^3/s
4-percent AEP flood	26.7	ft^3/s
2-percent AEP flood	33.7	ft^3/s
1-percent AEP flood	42.1	ft^3/s
0.2-percent AEP flood	64.2	ft^3/s

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

Application Version: 4.8.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report

Region ID: NH
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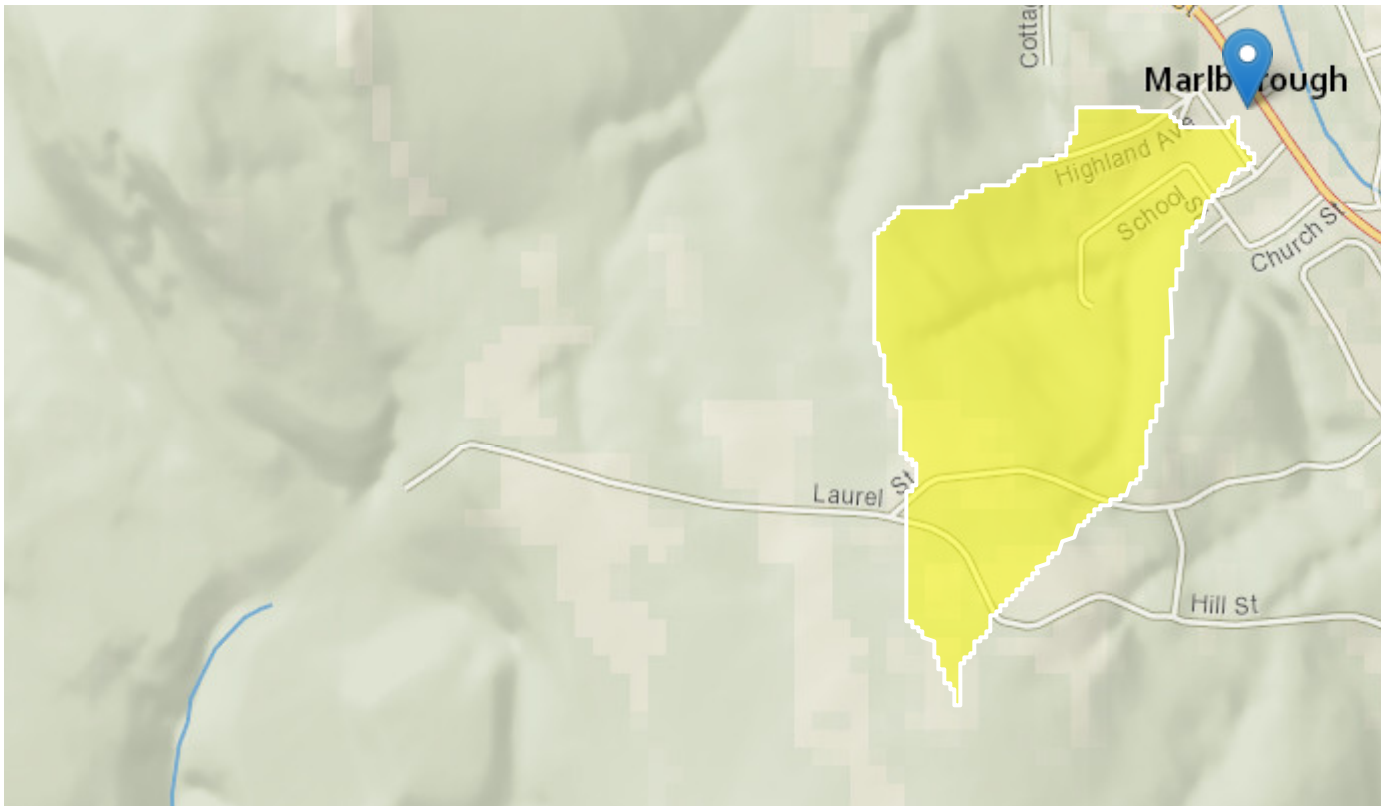

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	3.49	inches
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	681	feet per mi
DRNAREA	Area that drains to a point on a stream	0.14	square miles
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	20.7	percent

Parameter Code	Parameter Description	Value	Unit
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	6.18	percent
WETLAND	Percentage of Wetlands	0	percent

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.14	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.49	inches	2.79	6.23
WETLAND	Percent Wetlands	0	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	681	feet per mi	5.43	543

Peak-Flow Statistics Disclaimers [Peak Flow Statewide SIR2008 5206]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

Statistic	Value	Unit
50-percent AEP flood	9.82	ft^3/s
20-percent AEP flood	17.9	ft^3/s
10-percent AEP flood	25.2	ft^3/s
4-percent AEP flood	35.8	ft^3/s
2-percent AEP flood	45	ft^3/s
1-percent AEP flood	56	ft^3/s
0.2-percent AEP flood	84.6	ft^3/s

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

Application Version: 4.8.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report - Dead End of School St

Region ID: NH
Workspace ID: NH20220427173148197000
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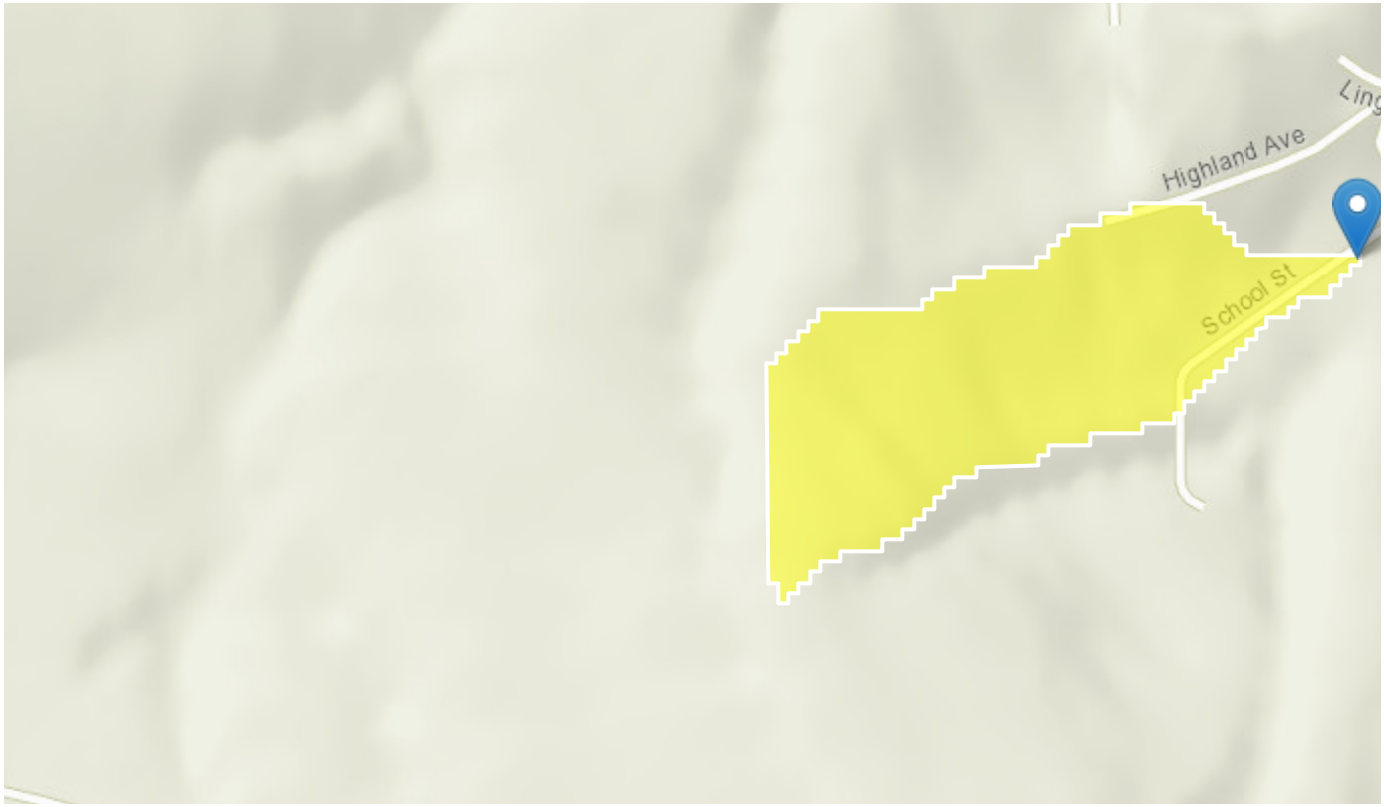
Time: 2022-04-27 13:34:48 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
APRAVPRE	Mean April Precipitation	3.481	inches
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	669	feet per mi
DRNAREA	Area that drains to a point on a stream	0.03	square miles
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	3.17	percent

Parameter Code	Parameter Description	Value	Unit
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.8	inches
TEMP	Mean Annual Temperature	44.78	degrees F
WETLAND	Percentage of Wetlands	0	percent

Peak-Flow Statistics Parameters [Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.03	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.481	inches	2.79	6.23
WETLAND	Percent Wetlands	0	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	669	feet per mi	5.43	543

Peak-Flow Statistics Disclaimers [Peak Flow Statewide SIR2008 5206]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Peak-Flow Statistics Flow Report [Peak Flow Statewide SIR2008 5206]

Statistic	Value	Unit
50-percent AEP flood	2.23	ft^3/s
20-percent AEP flood	4.24	ft^3/s
10-percent AEP flood	6.13	ft^3/s
4-percent AEP flood	8.99	ft^3/s
2-percent AEP flood	11.5	ft^3/s
1-percent AEP flood	14.6	ft^3/s
0.2-percent AEP flood	23	ft^3/s

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

Flow-Duration Statistics Parameters [Low Flow Statewide]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.03	square miles	3.26	689
PREG_06_10	Jun to Oct Gage Precipitation	17.8	inches	16.5	23.1
TEMP	Mean Annual Temperature	44.78	degrees F	36	48.7

Flow-Duration Statistics Disclaimers [Low Flow Statewide]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Flow-Duration Statistics Flow Report [Low Flow Statewide]

Statistic	Value	Unit
60 Percent Duration	0.01	ft^3/s
70 Percent Duration	0.00613	ft^3/s
80 Percent Duration	0.00275	ft^3/s
90 Percent Duration	0.00103	ft^3/s
95 Percent Duration	0.000505	ft^3/s
98 Percent Duration	0.000239	ft^3/s

Flow-Duration Statistics Citations

Flynn, R.H. and Tasker, G.D.,2002, Development of Regression Equations to Estimate Flow Durations and Low-Flow-Frequency Statistics in New Hampshire Streams: U.S.Geological Survey Scientific Investigations Report 02-4298, 66 p. (http://pubs.water.usgs.gov/wrir02-4298)

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Application Version: 4.8.1
StreamStats Services Version: 1.2.22
NSS Services Version: 2.1.2

StreamStats Report School Street 1

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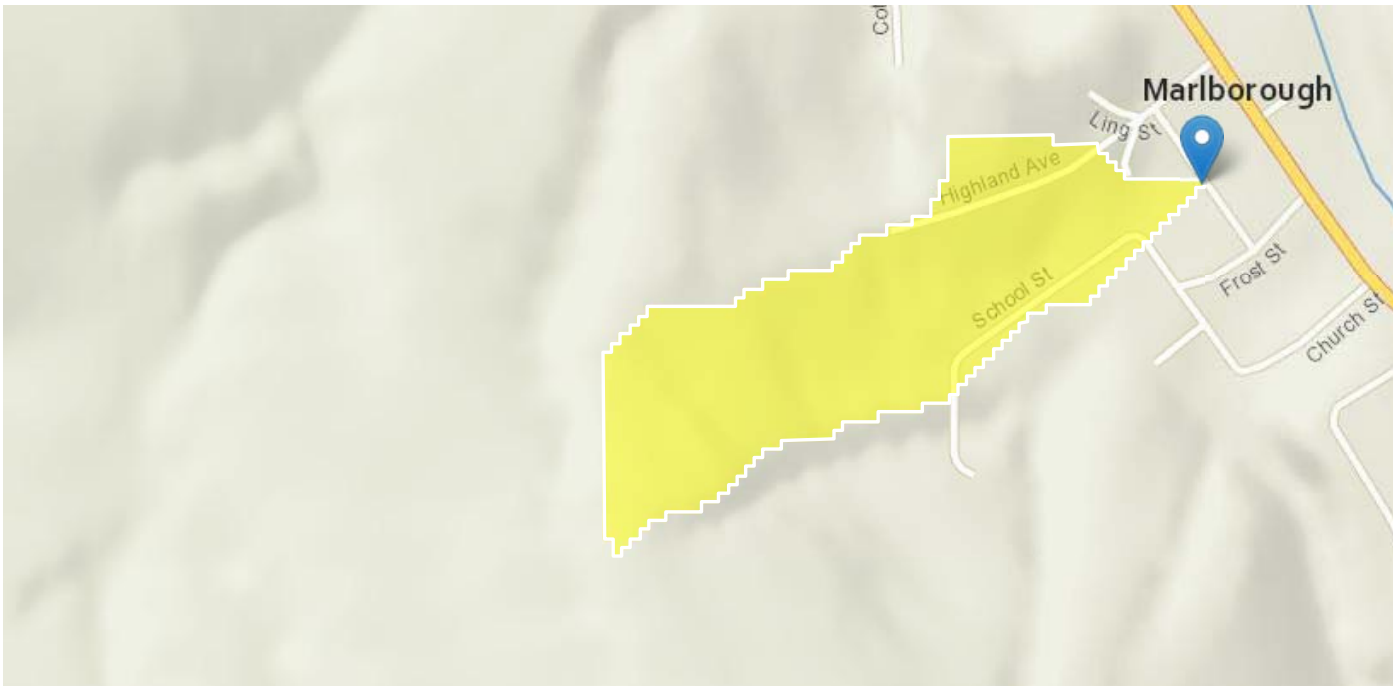


Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.04	square miles
APRAVPRE	Mean April Precipitation	3.483	inches
WETLAND	Percentage of Wetlands	0	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	589	feet per mi
PRECIPOUT	Mean annual precip at the stream outlet (based on annual PRISM precip data in inches from 1971-2000)	40.8	inches
TEMP	Mean Annual Temperature	44.78	degrees F
MINTEMP_W	Mean winter minimum air temperature over basin surface area	13.384	degrees F
CONIF	Percentaqe of land surface covered by coniferous forest	3.5853	percent

Parameter Code	Parameter Description	Value	Unit
PREG_03_05	Mean precipitation at gaging station location for March 16 to May 31 spring period	8.8	inches
SNOFALL	Mean Annual Snowfall	65.065	inches
PREG_06_10	Mean precipitation at gaging station location for June to October summer period	17.8	inches
MIXFOR	Percentage of land area covered by mixed deciduous and coniferous forest	19.2518	percent
PREBC_1112	Mean annual precipitation of basin centroid for November 1 to December 31 period	7.05	inches
PRECIPCENT	Mean Annual Precip at Basin Centroid	40.6	inches

Peak-Flow Statistics Parameters[Peak Flow Statewide SIR2008 5206]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.04	square miles	0.7	1290
APRAVPRE	Mean April Precipitation	3.483	inches	2.79	6.23
WETLAND	Percent Wetlands	0	percent	0	21.8
CSL10_85	Stream Slope 10 and 85 Method	589	feet per mi	5.43	543

Peak-Flow Statistics Disclaimers[Peak Flow Statewide SIR2008 5206]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Peak-Flow Statistics Flow Report[Peak Flow Statewide SIR2008 5206]

Statistic	Value	Unit
50_percent_AEP_flood	2.86	ft^3/s
20_percent_AEP_flood	5.4	ft^3/s
10_percent_AEP_flood	7.77	ft^3/s
4_percent_AEP_flood	11.3	ft^3/s
2_percent_AEP_flood	14.5	ft^3/s
1_percent_AEP_flood	18.3	ft^3/s
0_2_percent_AEP_flood	28.6	ft^3/s

Peak-Flow Statistics Citations

Olson, S.A.,2009, Estimation of flood discharges at selected recurrence intervals for streams in New Hampshire: U.S.Geological Survey Scientific Investigations Report 2008-5206, 57 p. (http://pubs.usgs.gov/sir/2008/5206/)

Recharge Statistics Parameters[Groundwater Recharge Statewide 2004 5019]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
PRECIPOUT	Mean Annual Precip at Gage	40.8	inches	35.83	53.11
TEMP	Mean Annual Temperature	44.78	degrees F	36.05	48.69
MINTEMP_W	Mean Winter Min Temperature	13.384	degrees F	0.8	19.88
CONIF	Percent Coniferous Forest	3.5853	percent	3.07	56.18
PREG_03_05	Mar to May Gage Precipitation	8.8	inches	6.83	11.54
SNOFALL	Mean Annual Snowfall	65.065	inches	54.46	219.07
PREG_06_10	Jun to Oct Gage Precipitation	17.8	inches	16.46	23.11
MIXFOR	Percent Mixed Forest	19.2518	percent	6.21	46.13
PREBC_1112	Nov to Dec Basin Centroid Precip	7.05	inches	6.57	15.2
PRECIPCENT	Mean Annual Precip at Basin Centroid	40.6	inches	37.44	75.91

Recharge Statistics Flow Report[Groundwater Recharge Statewide 2004 5019]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, SEp: Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	SEp
GW_Recharge_Jan_to_Mar15	5.14	in	15.5
GW_Recharge_Mar16_to_May	7.61	in	12.4
GW_Recharge_Jun_to_Oct	3.19	in	26.5
GW_Recharge_Nov_to_Dec	3.73	in	15.8
GW_Recharge_Ann	21.4	in	12.4

Recharge Statistics Citations

Flynn, R.H. and Tasker, G.D.,2004, Generalized Estimates from Streamflow Data of Annual and Seasonal Ground-Water-Recharge Rates for Drainage Basins in New Hampshire, U.S. Geological Survey Scientific Investigations Report 2004-5019, 67 p. (http://pubs.usgs.gov/sir/2004/5019/http://pubs.usgs.gov/sir/2004/5019/)

Application Version: 4.4.0

ATTACHMENT 5

NHNHB Datacheck Results Letter

New Hampshire Natural Heritage Bureau
NHB DataCheck Results Letter

To: Scott Bourcier
6 Bedford Farms Drive, Suite 101
Bedford, NH 03110

From: NH Natural Heritage Bureau

Date: 6/23/2022 (This letter is valid through 6/23/2023)

Re: Review by NH Natural Heritage Bureau of request dated 6/23/2022

Permit Types: Shoreland Standard Permit
Alteration of Terrain Permit
Wetland Standard Dredge & Fill - Major

NHB ID: NHB22-2199

Applicant: Scott Bourcier

Location: Marlborough
Tax Map: NA, Tax Lot: NA
Address: NA

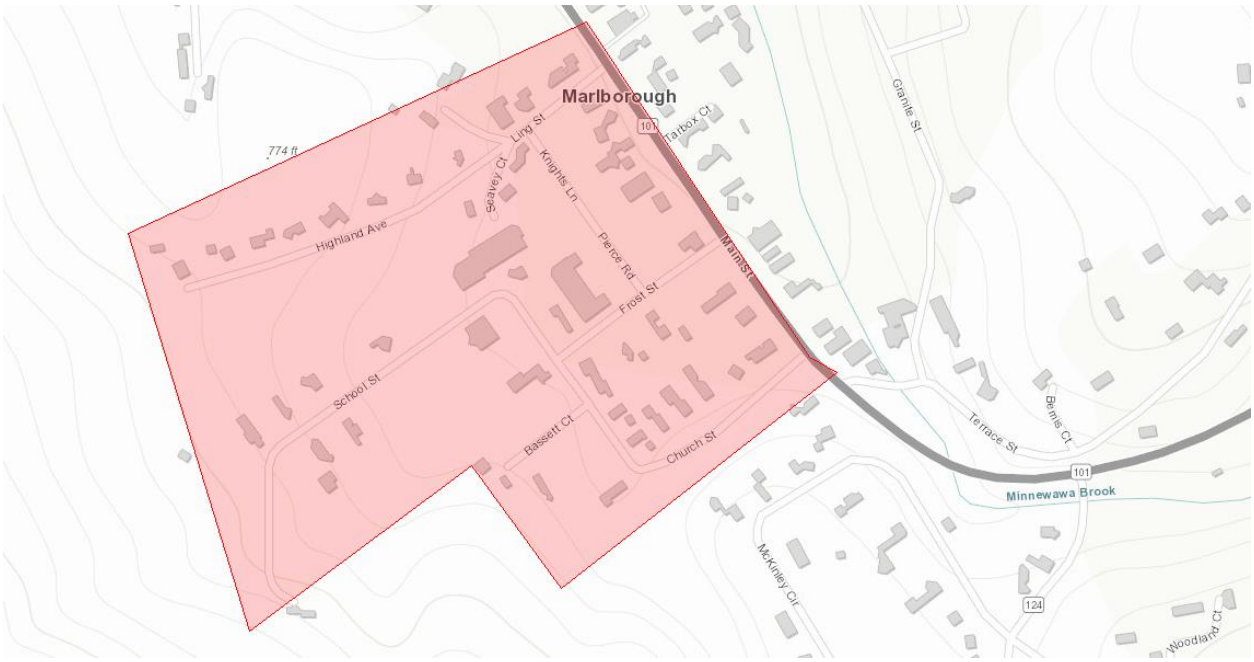
Proj. Description: Downtown drainage improvements to existing drainage infrastructure.

The NH Natural Heritage database has been checked for records of rare species and exemplary natural communities near the area mapped below. The species considered include those listed as Threatened or Endangered by either the state of New Hampshire or the federal government. We currently have no recorded occurrences for sensitive species near this project area.

A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

Based on the information submitted, no further consultation with the NH Fish and Game Department pursuant to Fis 1004 is required.

MAP OF PROJECT BOUNDARIES FOR: NHB22-2199



Department of Natural and Cultural Resources
Division of Forests and Lands
(603) 271-2214 fax: 271-6488

DNCR/NHB
172 Pembroke Rd.
Concord NH 03301

ATTACHMENT 6

Historic Resource Records Mapping – NHDHR – EMMIT/ Request for Project Review (RPR) Submission Form/ RPR Response

STORMWATER INFRASTRUCTURE
PLANNING & EVALUATION REPORT
MARLBOROUGH, NH

Reference: NHDHR Enhanced Mapping & Management Information Tool (EMMIT)

Property with Historic Records

Please mail the completed form and required material to:

New Hampshire Division of Historical Resources
State Historic Preservation Office
Attention: Review & Compliance
19 Pillsbury Street, Concord, NH 03301-3570

RECEIVED FEB 0 9 2023

DHR Use Only	
R&C #	14673
Log In Date	2/9/23
Response Date	___/___/___
Sent Date	___/___/___

Request for Project Review by the New Hampshire Division of Historical Resources

☒ This is a new submittal
☐ This is additional information relating to DHR Review & Compliance (R&C) #:

GENERAL PROJECT INFORMATION

Project Title Marlborough Downtown Stormwater Infrastructure Planning & Evaluation

Project Location Church Stree, School Street, Frost Street, Pierce Avenue, Ling Street

City/Town Marlborough, NH Tax Map NA Lot # NA

NH State Plane - Feet Geographic Coordinates: Easting 838605 Northing 147346
(See RPR Instructions and R&C FAQs for guidance.)

Lead Federal Agency and Contact *(if applicable)* NA
(Agency providing funds, licenses, or permits)
Permit Type and Permit or Job Reference # NA

State Agency and Contact *(if applicable)* Deborah Loiselle (DES Water Division – Stormwater)

Permit Type and Permit or Job Reference # CS-330189-04

APPLICANT INFORMATION

Applicant Name Town of Marlborough

Mailing Address 236 Main Street Phone Number 6038763751

City Marlborough State NH Zip 03455 Email esmith@marlboroughnh.org

CONTACT PERSON TO RECEIVE RESPONSE

Name/Company Scott Bourcier

Mailing Address 6 Bedford Farms Drive, Suite 101 Phone Number 6034711887

City Bedford State NH Zip 03110 Email smb@gainc.com

This form is updated periodically. Please download the current form at www.nh.gov/nhdhr/review. *Please refer to the Request for Project Review Instructions for direction on completing this form.* Submit one copy of this project review form for each project for which review is requested. Please include a self-addressed stamped envelope. Project submissions will not be accepted via facsimile or e-mail. This form is required. Review request form must be complete for review to begin. Incomplete forms will be sent back to the applicant without comment. Please be aware that this form may only initiate consultation. For some projects, additional information will be needed to complete the Section 106 review. All items and supporting documentation submitted with a review request, including photographs and publications, will be retained by the DHR as part of its review records. Items to be kept confidential should be clearly identified. For questions regarding the DHR review process and the DHR's role in it, please visit our website at: www.nh.gov/nhdhr/review or contact the R&C Specialist at marika.s.labash@dncr.nh.gov or 603.271.3558.

PROJECTS CANNOT BE PROCESSED WITHOUT THIS INFORMATION

Project Boundaries and Description

- ☒ Attach the Project Mapping ***using EMMIT or relevant portion of a 7.5' USGS Map.*** *(See RPR Instructions and R&C FAQs for guidance.)*
- ☒ Attach a detailed narrative description of the proposed project.
- ☒ Attach a site plan. The site plan should include the project boundaries and areas of proposed excavation.
- ☒ Attach photos of the project area (overview of project location and area adjacent to project location, and specific areas of proposed impacts and disturbances.) *(Informative photo captions are requested.)*
- ☒ A DHR records search must be conducted to identify properties within or adjacent to the project area. Provide records search results via EMMIT or in **Table 1**. *(Blank table forms are available on the DHR website.)* Please note, using EMMIT Guest View for an RPR records search does not provide the necessary information needed for DHR review.
  EMMIT or in-house records search conducted on 01/25/2023.

Architecture

Are there any buildings, structures (bridges, walls, culverts, etc.) objects, districts or landscapes within the project area? ☒ Yes ☐ No
If no, skip to Archaeology section. If yes, submit all of the following information:

Approximate age(s): Subsurface Granite Stormwater Infrastructure, age: unknown

- ☒ Photographs of ***each*** resource or streetscape located within the project area, with captions, along with a mapped photo key. (Digital photographs are accepted. All photographs must be clear, crisp and focused.)
- ☐ If the project involves rehabilitation, demolition, additions, or alterations to existing buildings or structures, provide additional photographs showing detailed project work locations. (i.e. Detail photo of windows if window replacement is proposed.)

Archaeology

Does the proposed undertaking involve ground-disturbing activity? ☒ Yes ☐ No
If yes, submit all of the following information:

- ☒ Description of current and previous land use and disturbances. – PLEASE SEE PROJECT NARRATIVE.
- ☐ Available information concerning known or suspected archaeological resources within the project area (such as cellar holes, wells, foundations, dams, etc.)

Please note that for many projects an architectural and/or archaeological survey or other additional information may be needed to complete the Section 106 process.

DHR Comment/Finding Recommendation *This Space for Division of Historical Resources Use Only*

☐ Insufficient information to initiate review. ☑ Additional information is needed in order to complete review.

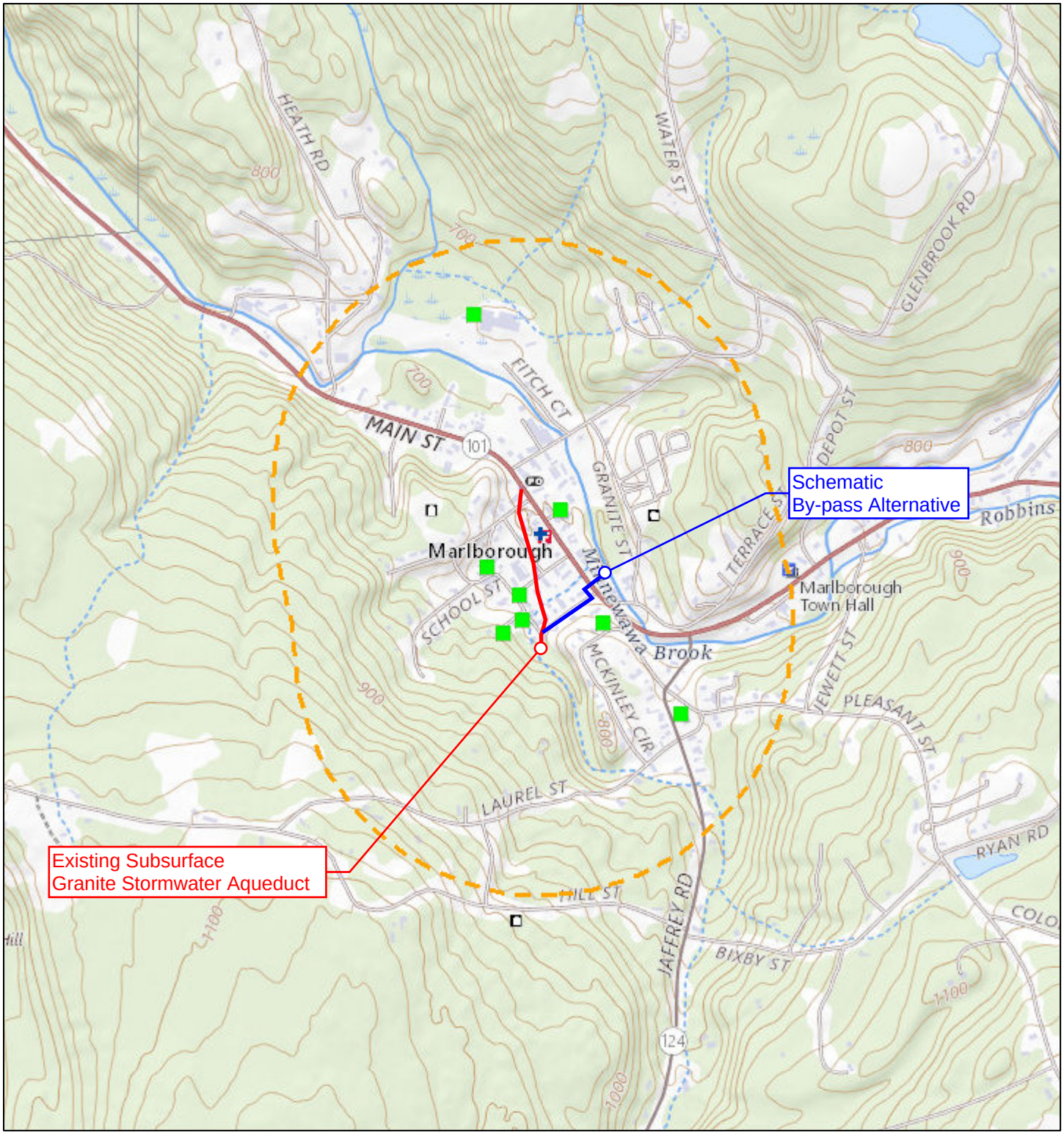
☐ No Potential to cause Effects ☐ No Historic Properties Affected ☐ No Adverse Effect ☐ Adverse Effect

Comments: BANKS OF MINNEHAWA BROOK ARE CONSIDERED ALCHAEOLOGICALLY SENSITIVE. PLEASE PROVIDE PHOTOGRAPHS OF PROPOSE BY PASS DISCHARGE AREA + TOPOGRAPHICAL DESCRIPTION.

If plans change or resources are discovered in the course of this project, you must contact the Division of Historical Resources as required by federal law and regulation.

Authorized Signature: [signature] Date: 2-14-23

Stormwater Infrastructure Marlborough, NH



January 25, 2023

1:18,056

0 0.15 0.3 0.6 mi

0 0.25 0.5 1 km

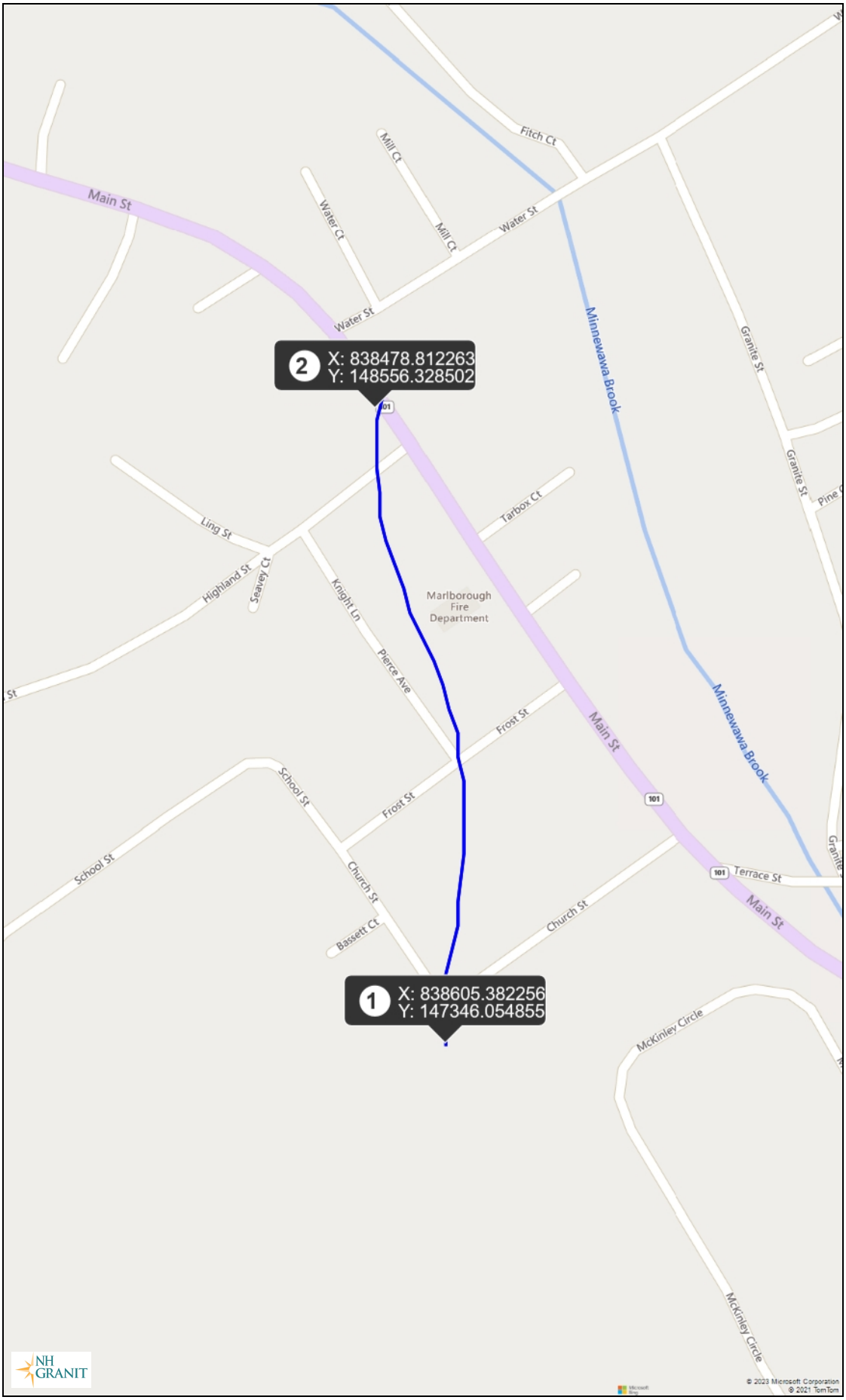
Individual Properties < 10 acres

Counties

Towns

USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census Bureau TIGER/Line data; USFS Road data; Natural Earth Data; U.S.

Map by NH GRANIT



Legend

- State
- County
- City/Town

Map Scale

1: 3,247

Map Generated: 1/20/2023

Notes

Downtown Stormwater Infrastructure
Planning & Evaluation
Marlborough, NH
*Approximate alignment of existing granite stormwater drainage infrastructure

Plan | Engineer | Construct | Maintain

Scott M. Bourcier, P.E.
Project Manager

MEMORANDUM

TO: New Hampshire Department of Historical Resource (NHDHR)

RE: NHDHR – Request for Project Review (RPR), Project Narrative
Marlborough, NH

DATE: February 1, 2023

In August 2020, the Town of Marlborough (Town) completed a town-wide asset inventory and evaluation of their drainage infrastructure. As a result of this town-wide evaluation, the Town learned more of an existing subsurface granite stormwater infrastructure located within the downtown area of Church Street, Frost Street, Pierce Avenue, and Ling Street. The existing granite infrastructure conveys up-gradient stormwater runoff through private properties that ultimately discharges to the Minnewawa Brook. During large rain events, private owners (combination of residential and commercial) have experienced flooding and sink holes due to the limited capacity and deterioration of the granite infrastructure. The residential and commercial owners are concerned with the stability of the existing granite infrastructure and safety impacts to their properties.

To address the neighborhood's concerns, the Town applied and received a Clean Water State Revolving Fund (CWSR) from the New Hampshire Department of Environmental Services (NHDES). The purpose of the fund is to evaluate the project area and develop a plan to improve the safety of the neighborhood as it relates to the existing granite infrastructure. Gale Associates (Gale) was hired by the Town to complete a study and provide opinion(s) to improve the stability and safety of the existing granite infrastructure. Three options are being developed as part of the study for the Town's consideration:

1. Do nothing – allow the existing granite infrastructure to perform as is.

2. Install a by-pass and maintain the existing granite infrastructure – the by-pass would be installed along Church Street, reducing stormwater runoff flows currently being directed existing granite infrastructure.

3. Abandon the existing granite infrastructure – the existing infrastructure would be abandoned in-place, backfilled with flowable fill, land ownership transferred to the private landowners, and stormwater flows re-routed to new infrastructure located within the Town's right-of-ways.

On behalf of the Town, Gale is filing a Request for Project Review (RPR) to the New Hampshire Division of Historical Resources (NHDHR) to receive guidance relative to the existing subsurface granite stormwater infrastructure.

The current land use of the Church Street, Frost Street, Pierce Avenue, and Ling Street neighborhood is a combination of residential single-family homes, residential apartment complexes, and small commercial/retail buildings. At this time land disturbance is anticipated to be limited to within the existing Town's right-of-ways. A schematic site plan to re-route a portion of the stormwater runoff (along Church Street, crossing Main Street, and to Minnewawa Brook) has been prepared and is included with this Request for Project Review; please see Drawing No. C101.

Photographs included within this RPR is a sample of the characteristics of the neighborhood.

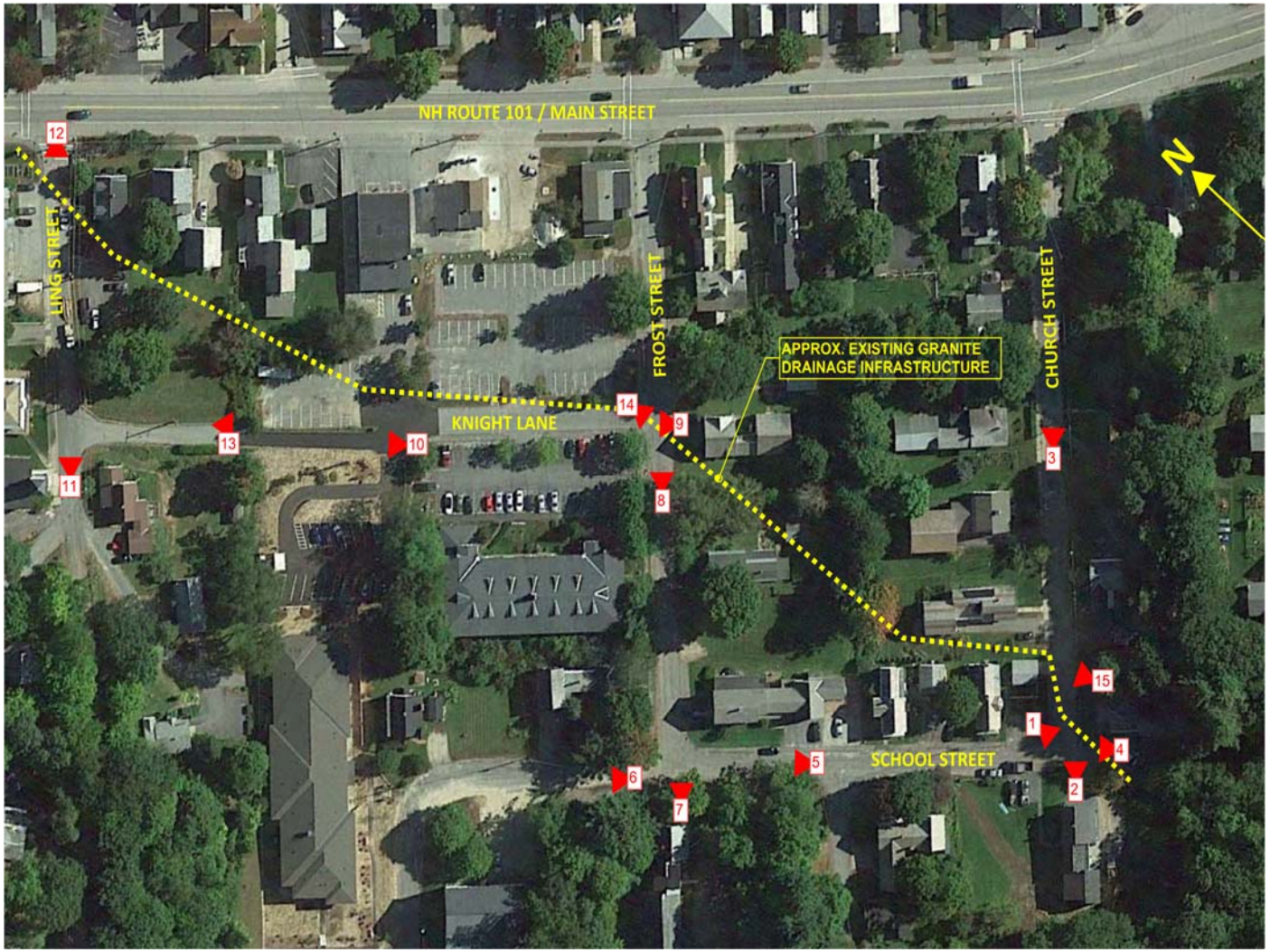
End of Memorandum

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH



SINCE 1964 GALE

Location Map

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 1

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 2

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 3

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 4

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 5

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 6

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 7

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 8

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 9

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

GALE SINCE 1964

Photograph 10

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 11

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 12

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 13

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 14

Downtown Stormwater Infrastructure Planning & Evaluation Study

NHDHR – Request for Project Review (RPR)

Downtown Neighborhood Photographs

Marlborough, NH

SINCE 1964 GALE

Photograph 15

	Inventory #	Property Name	Address	Town	SR Listing Date	NR Listing Date	DOE Date Reviewed	Eligibilities	HABS Year	HAER Year	NH Property Doc Year	Doc Id
7655	MAR0003		10 Bassett Court	Marlborough			8/3/1994	Not eligible for NR; Not evaluated as a district				
7656	MAR0004	Marlborough School	23 School Street	Marlborough			2/23/2011	Contributes to a National Register/eligible dist			2013	NHPD-0716
7657	MAR0005	Frost Free Library	28 Jaffrey Road	Marlborough	7/29/2019		5/12/2019	National Register eligible, individually; Not evaluated as a district; State Register eligible, individually				
7658	MAR0006		25 McKinley Circle	Marlborough			8/17/1994	Not eligible for NR; Not evaluated as a district				
7660	MAR0008		6 School Street	Marlborough			4/13/1994	Not eligible for NR; Not evaluated as a district				
7661	MAR0009	Recreation Center	41 Fitch Ct.	Marlborough				Not eligible for NR				
7663	MAR0011		15 Tarbox Court	Marlborough			12/22/2004	Not evaluated for individual eligibility; Contributes to a National Register/eligible dist; More information needed				
7664	MAR0012	Solon W. Stone Residence	15 Frost Street	Marlborough			9/17/1985	National Register eligible, individually	1985			HABS-0211

ATTACHMENT 7

Public Information Meeting
Sign-in Sheet

Stormwater Infrastructure Planning and Evaluation Report
Town of Marlborough, NH

GALE

Public Information Meeting
Tuesday, June 6, 2023

SIGN IN SHEET

	NAME	Address (optional)	EMAIL
1	EARL D. NELSON	SELECTMAN - MARLBOROUGH	
2	JAKE PITT	" "	
3	Gina Haight	" "	
4	Craig Cashman	Public Works Director	
5	Evan DuVerlie	20 Church St	eduverlie@gmail.com
6	Greg Lorsbach	4 Linq St	lorsbachga@gmail.com
7	Thomas Zalski	16 Frost St	Tom-jhacpa@ne.rr.com
8	Dawn Brennan	16 Frost St.	Jbrennan507@gmail.com
9	Roland Veaudry	143 Main St	
10	Dustin Franco	143 Main St.	
11	John McGarity	20 school ST	
12	Carl Russell	20 Linq St.	
13	Eric Horne	2 School St.	EHORNE@HBNLLC.com
14	Teresa Horne	2 School St.	THorne@HBNLLC.com
15	Deborah Loiselle DSL	NHDES, Stormwater Coordinator	deborah.s.loiselle@des.nh.gov
16	Ellen Smith ES	Marlborough Town Administrator	esmith@marlboroughnh.org
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19		Type text here	
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