



Cornish Temporary Road Advisory Committee

Report to the Select Board
January 2025

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Executive Summary

The Temporary Road Advisory Committee (TRAC) was created by the Select Board in the summer of 2024. There were 5 members, including: Ginger Bulkeley (Chair), Scott Sweet (Vice Chair), Tim Schad (Secretary), Jim Fitch, and Kevin Noble. The Select board set a deadline of Dec. 30, 2024 for TRAC to deliver their findings.

The committee met about 12 times between Aug 13, 2024, and December 2024. Additionally, sub-groups met with the selectmen twice, and also conducted ‘field trips’ to look at roads and culverts. We were joined on occasion by the road agent, several townspeople with road maintenance expertise and by a selectman. Minutes of all TRAC meetings are posted on the town website.

The selectmen provided TRAC with a charter document, outlining what they wanted the committee to accomplish (see Appendix A). TRAC was initially charged with providing the selectmen with information regarding maintenance procedures and improvements to the town roads, and recommendations for plans for 2, 5, 10 and 20 year road maintenance.

TRAC identified the information needed to produce road plans, including:

- Number of miles of gravel road, and number of miles of paved roads
- Date of last paving for paved roads
- Current condition of each paved and gravel road, by section where appropriate
- Number of culverts, location, type, age, condition
- Date of last inspection &/or maintenance for each culvert
- List and map of current road/culvert areas of needing priority attention (“hot spots”)

- Current plans for Fall '24 road maintenance by town crew and subcontractors
- List of current road crew employees with their skillsets and training needs
- List of open positions in road crew
- List of needed skill sets not available in current road crew
- List of possible subcontractors to augment town manpower and skill set

It became clear that much of this information was not known or at least could not be located. Using a combination of NHDOT maps and committee members driving the roads, we eventually determined the miles of paved and gravel roads. None of the culvert or road condition information was available to the committee. We spent considerable time researching ways to locate and assess all culverts including obtaining estimates from the Upper Valley Lake Sunapee Regional Planning Commission (See Appendix B) to assess our culverts. Limited information was available regarding the road crew management, staff and skill sets, while some information on subcontractor resource was available.

The committee reached the conclusion that, given the short time-frame and lack of available information, we could not produce long-term road maintenance plans. Getting a full written assessment of the current condition of all roads and culverts should be an immediate priority for the select board and road agent, and is a pre-requisite for building road maintenance plans.

Our roads are a very large and valuable asset to our town, requiring significant investment. Having long-term plans for their maintenance and improvement is both appropriate and necessary. With accurate plans, we can become proactive in our efforts to protect and preserve those road sections that are in good shape, while also improving those that are sub-par.

The Temporary Road Advisory Committee offers the following collection of information in the hopes that it will help the select board and road agent in their efforts to care for our roads. This report includes recommendations on road maintenance techniques materials and suppliers, methods and tools for evaluating and tracking road conditions, additional resources for information and training, and suggestions for the overall management of the Highway Department.

Respectfully submitted,

Ginger Bulkeley

Scott Sweet

Tim Schad

Jim Fitch

Kevin Noble

Gravel Roads

A. Existing Conditions

More than two-thirds of our roads, about 37 miles, are gravel (aka dirt or unpaved). We received several observations and reports from various town residents and committee members. The condition of a gravel road can be significantly impacted by the weather and can vary substantially from year to year. A road might be relatively unaffected during one mud season while becoming nearly impassable the next.

We were unable to obtain any significant specific information about the condition of existing gravel roads which would allow a more detailed report. Time constraints did not allow us to conduct our own assessment.

B. Overview

Gravel roads, although much less expensive to construct than paved roads, require a much higher level of regular, periodic maintenance. They are subject to potholes, rutting, “washboarding”, and loss of crown. They typically need regrading fairly frequently, depending on conditions and the level of traffic.

Gravel roads are especially sensitive to the condition of the soil beneath and around them. For this reason, the approach for maintenance, repair or reconstruction of any given section of a gravel road may be very different from what is required just 200 feet further down the same road.

Effective drainage is critical for gravel roads (see the section on Drainage). Good drainage helps control the tendency of gravel roads to become mud roads over time. As water works down through the crushed stone surface, it mixes with the soil underneath to create mud, and this mud works its way up through the stone. The mixture of mud and crushed stone does not make for a good functional road surface, especially in mud season. Periodically adding another layer of gravel improves things in the short term, but the problem still continues. This is especially true of roads built on hydric soils, which may never dry out (for instance, adjacent to a wetland area).

A properly constructed gravel road needs a good, multi layer base, of properly size-graded crushed stone. The base is often laid over a geotextile road fabric which can stop the tendency of mud to migrate upward through the gravel. Some details for this are given in Appendix D.

C. Recommendations

Without specific condition information, we are unable to offer specific recommendations. However, we would strongly encourage each member of the Highway Department to read “A Ditch In Time” by Russ Lanoie, from Conway, NH. The author has compiled a good deal of practical and helpful recommendations for gravel roads. This is available without charge at <https://ruralhometech.com/a-ditch-in-time/>

Paved Roads

A. Existing Conditions

We were unable to obtain any significant specific information about the condition of existing paved roads which would allow a more detailed report. Two of our committee members drove the entire length of our paved roads and made the condition assessment in the table below.

B. Overview

Appendix D contains some information on suggested road construction techniques.

C. Recommendations

We have summarized our recommendations in the following table:

Road Name	Length in miles	Width	Last Paved	Condition	5 Year Plan
Dingleton Hill					
Segment A	1.8	18	2016	Very Good	Crack Seal 2026
Segment B	1.2	18	2018	Excellent	
Mill Village/Root Hill	0.3	16	40 years plus	Fair	Overlay 2027
Jackson					
Segment A	1.2	18	2024	Excellent	
Segment B	1.1	18	40 years plus	Fair	Overlay 2025
East					

Segment A	0.3	18	2024	Excellent	
Segment B	1	18	40 years plus	Fair to Poor	Overlay 2025
Center					
Segment A	0.25	18	2022	Reclaim	Base 2026
Segment B	3.25	18	40 years plus	Fair to Poor	Overlay 2027
Segment C	0.4	16	2006	Fair	Overlay 2027
Cornish Stage	1	18	2015	Good	Crack Seal 2026
School	0.5	16	2012	Good	Crack Seal 2026
Lang Road	0.2	18	1990	Good	Overlay 2028
Platt Road	1.35	16	2004?	Fair	Overlay 2028
Total paved miles	14.6				

Drainage, Ditches and Culverts

A. Existing Conditions

We did receive some undated partial documentation for the culverts along eight roads (see the Section on Mapping). These limited data show that the roads may have between 8 and 27 culverts per mile, with an average of 15. If we apply that average to 53 miles of roads, that means we may have almost 800 culverts.

Spot observations revealed substandard drainage conditions for many roadways. Road crown and slope, especially for gravel roads, is insufficient in many cases. Ditches are often in desperate need of maintenance. A significant number of culverts are blocked, and many need cleaning or replacement.

B. Overview

Proper drainage is a very important component of building and maintaining long-lived roads.

Drainage of the road surface is critical for gravel roads. If the road surface is not properly sloped, and the accumulated water is not allowed to drain away promptly, the road surface can be quickly damaged by washouts. Generally, a gravel road needs a crown, or in some cases, a side to side slope of 2% to 4%. This becomes more important when the road is significantly sloped in the direction of travel, since washouts can easily form parallel to the direction of travel.

Drainage of a paved road is important as well, for safety in rainstorms and also for longevity, but for a different reason. During the winter, water can flow into cracks, and cause significant damage when it freezes. A crack sealing program can help with this.

In almost every case water draining from the road surface is carried away by a ditch. The water needs to readily flow into the ditch, and the ditch needs to be pitched to a point of drainage.

The path from the road surface to the ditch needs to be maintained. Often traction sand applied in winter can build up and create an obstruction. The ditch itself will require periodic maintenance to remove accumulated sand as well.

Vegetation in and around ditches is a mixed blessing. The vegetation can help filter out mud and debris from the road drainage and also stabilizes the sides of the ditch. Ideally, vegetation is best controlled by mowing. Aggressive cleaning of a ditch should be avoided when possible. Exposed earth can quickly erode as a result of a major rainstorm or heavy spring meltwater flows.

C. Culverts

A culvert is simply a pipe (or another type of conduit) for conveying drainage water. Most of the Town-maintained culverts are under roads, while culverts under driveway are the responsibility of the property owner (see RSA 236:13, VI). Regardless of ownership, culverts need to be inspected and maintained. They can become blocked or partially filled with traction sand and other debris. If they can't function properly, a great deal of damage can occur during a severe storm.

The Town should be inspecting all culverts periodically, including privately owned and maintained culverts under driveways. Culverts that are known to be critical and/or troublesome should be inspected more frequently. A few should be quickly checked when a major rainstorm is predicted.

Culverts need to be properly sized. An oversized culvert can fill with sediment easily, and an undersized culvert invites damage due to overflow during severe storms.

Properly sizing a culvert requires careful thought: it is both art and science. If a culvert simply drains water that runs off a road, the sizing process is quite simple. Appendix D presents a simple method of sizing, and Appendix E has a more detailed method. However, many of our Town culverts also carry runoff water from adjacent land areas, some of which can be quite large. The

size, topography and surface condition of the drainage area all need to be carefully considered when sizing a culvert. Online tools such as StreamStats (<https://streamstats.usgs.gov/ss/>) can be used to determine the needed capacity. In these cases, the services of a licensed engineer may be necessary.

In particular, the Town needs to be aware of any significant change to the condition of the drainage area. For instance, if a heavily wooded parcel is cleared for development, or logged, the amount of runoff may dramatically increase.

Wetlands and Stream Crossings

We have roads that abut wetlands. NHDES has a data mapper website that shows wetlands (<https://nh-department-of-environmental-services-open-data-nhdes.hub.arcgis.com/>) Work on culverts in wetlands, and culverts that are stream crossings, falls under DES regulations (Env-Wt 900) and typically requires special treatment, notification and/or approval.

Many of these regulations are focused on perennial or intermittent streams that are expected to support the passage of aquatic organisms. See the NH Aquatic Restoration Mapper (<http://nhdes.maps.arcgis.com/apps/webappviewer/index.html?id=21173c9556be4c52bc20ea706e1c9f5>) for more information. It appears that most streams in Cornish are have been modelled as “Predicted Coldwater Fishery”.

D. Recommendations

- Any effective plan for long term maintenance and capital budget forecast must start with an accurate inventory and condition assessment. See the recommendations under Mapping.
- As a priority item, the most critical culverts should be identified town wide. These should be regularly checked, and in particular, before any anticipated major rainstorm. Culverts and ditches can become quickly blocked or obstructed with serious results.
- During a major rainstorm, those critical culverts should be regularly checked. Heavy storm water flows can easily propel debris into culvert inlets. The first couple of heavy rains in late winter or early spring can move a lot of traction sand into ditches and culverts.
- All culverts should be examined at least once per year.
- All private culverts (under driveways) should be checked as well, and property owners advised of the need for cleaning or repairs. The Highway Department should develop a protocol for this. In certain cases if a private culvert is not remediated in a timely manner, Select Board action may be required.
- Ditches should be examined in the spring, and appropriate maintenance scheduled. This should be almost automatic as the culverts are checked.

- As the inventory is underway, the Highway department should develop and update a plan for culvert repair and replacement, including long term replacement. This plan, along with an estimated budget, should be reviewed with the Select Board periodically.
- Replacement culverts should generally be polypropylene (gray) double wall pipe. Culverts should be set with proper backfill material (generally ¾" crushed stone or screened sand) in lifts, appropriately and carefully compacted. Once the sand cushion is placed and compacted over the pipe, the re-use of the excavated soil is placed at the subgrade of the road gravel layer as to lessen any possible frost heaves. Culverts should be set with a minimum slope of 1% if possible (that is about 3-1/2 inches over the length of a 30 foot long culvert).
- The Highway Department should always have at least one person on staff who is a state Certified Culvert Maintainer, and the Town should be filing the required reports promptly.
- Culverts larger than 48" require NHDOT/NHDES permits and professional engineering.

Options for Digital Mapping

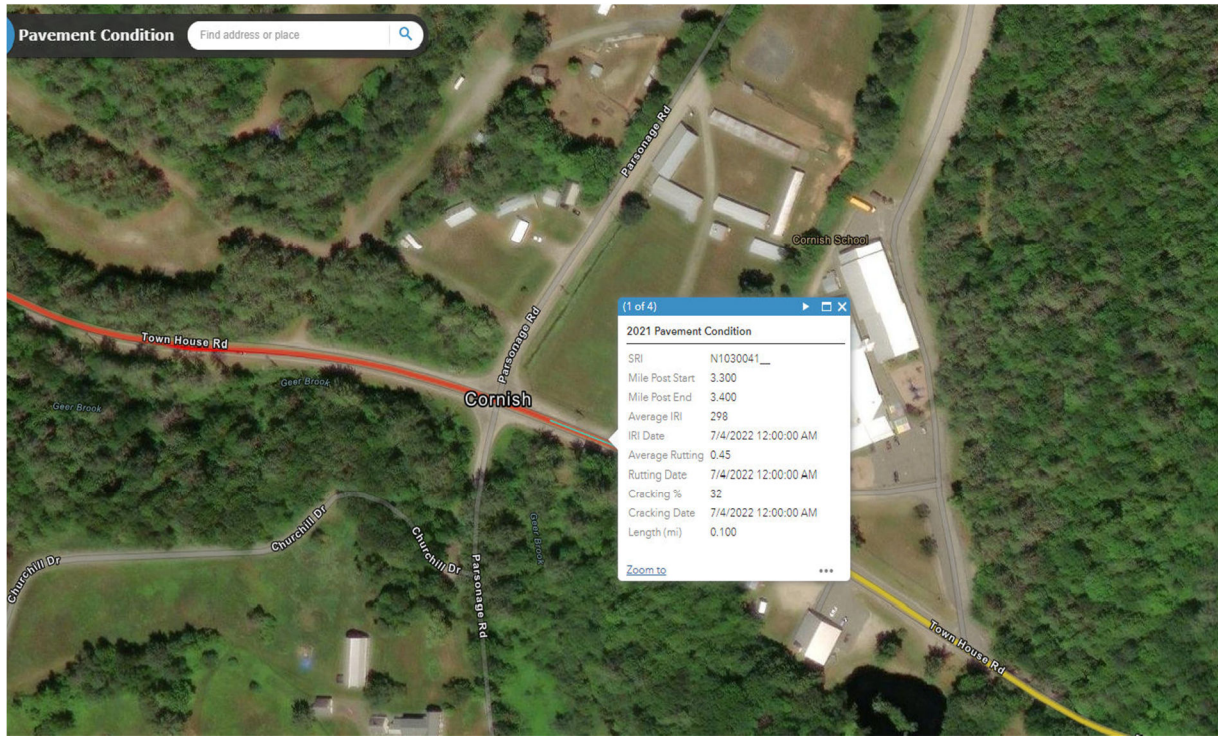
Part of our charge is to “identify methodology to inventory: infrastructure, infrastructure needs, and infrastructure maintenance”. To do this we evaluated methods to inventory and map our roads and culverts, including web/cloud based digital platforms.

We were not able to obtain any significant or concise documentation or inventory of Town owned roads and culverts. NHDOT records show that we own 53.7 miles of road, which includes 17.3 miles of paved road. We did compile a list of roads from NHDOT data, which we believe to be better than 95% accurate (See Appendix H).

A. NHDOT

UNH and NHDOT have been collaborating on some impressive digital mapping projects which can be viewed on the web. NHDOT has a GIS pavement condition viewer, which is here: <https://www.arcgis.com/apps/webappviewer/index.html?id=e8e562e1fba341dcad153df89d6ce4b0>. Detailed data is only included for state roads, of course. However, NHDOT has mapped all of our Tier V&VI (class V&VI) roads. This website provides access to an extensive database which includes Tier V roads but they do not include any data on their condition.

A typical screenshot follows below:



More detailed information is also available. This is from another GIS viewer:

<https://www.arcgis.com/apps/webappviewer/index.html?id=1d83377ccf4d4236bb11f3de2b82eab5> (Note: the “attribute table” has been turned on):

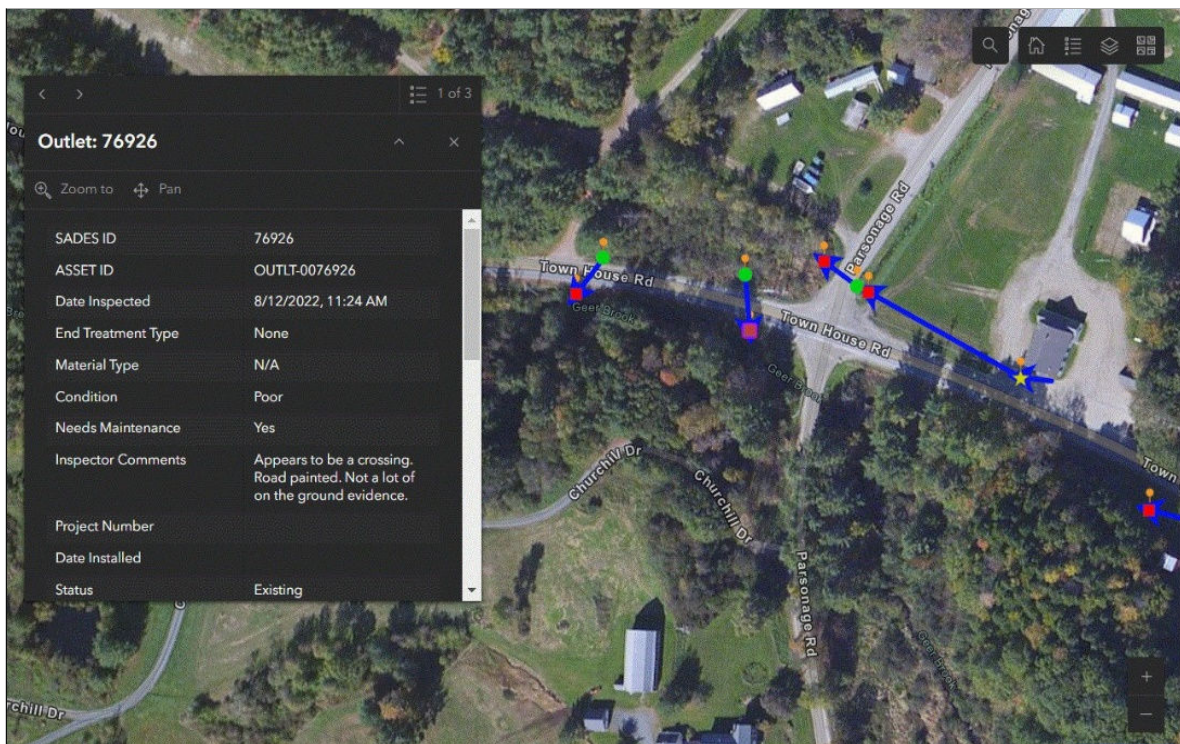
UNIQUE_ID	SRI	MP_START	MP_END	IS_CIRCLE	STREET	TOWN_ID	TOWN_NAME	SECT_LENGTH	SRI_TYPE	FUNCT_SYSTEI	FUNCT_SYSTEI	URBAN_ID	URBAN_NAME	POPULATION_L	IS_NHS	NHS	NHS_DESCR	IS_FED_AIE
32,235	L1030065_	1.71	2.32	NO	East Rd	103	CORNISH	0.60	Local	7	Local	0			NO	0		NO
23,191	L1030065_	2.32	2.93	NO	East Rd	103	CORNISH	0.62	Local	7	Local	0			NO	0		NO

A very small portion of the database is shown above. Note that map shows that Sunrise Hill connects to Center Road, and it also shows all of Deming road. These are not errors: the map shows Class VI roads.

The NH Statewide Asset Data Exchange System (SADES) has a Culverts and closed Drainage Systems (CCDS) mapping program which can be accessed here: <https://www.nhgeodata.unh.edu/pages/bd4f61073c2149e0a8d1e214b742d251>

According to their website, "SADES facilitates the collection and maintenance of data related to transportation infrastructure throughout New Hampshire. Data include the location and condition of stream crossings, tidal crossings, road surfaces, pedestrian infrastructure, and culverts and closed drainage systems. A program of the UNH Technology Transfer Center, SADES provides a maintainable condition assessment process for many state and local agencies" [emphasis added]

Although data is only shown for State maintained culverts, it's pretty informative. Here's a screenshot:



NHDOT has indicated that they would be willing to add our data to their database. They update it quarterly, and anyone can access it. However, preparing the data in the required format may require some specialized skills and training. It would probably be impractical to train up our own staff to conduct a survey and digitize the data in a manner conforming to NHDOT standards.

B. UVLSRPC

We have been in contact with Tim Josephson from the Upper Valley Lake Sunapee Regional Planning Commission (UVLSRPC). They have staff who are trained by NHDOT and experienced in conducting road and culvert surveys using the format and software developed for NHDOT. They could perform the surveys, prepare the database and transmit it to NHDOT, perform QA/QC, and provide the Town with a report. A similar report, done for the Town of Lyme, is included in Appendix B. That report includes a lot of information relative to Aquatic Organism Passage; this is a concern for culverts that are stream crossings (more detail in the Drainage section).

The cost for these services is significant: we have received some preliminary budgetary estimates from them (see email, also in Appendix B). In the interest of reducing cost, we asked UVLSRPC if the Town could perform the data collection, compile it into a digital spreadsheet, and then turn it over to them to format and transmit to NHDOT. They indicated they could not do that, since the data collection requires specialized training.

C. Other Options

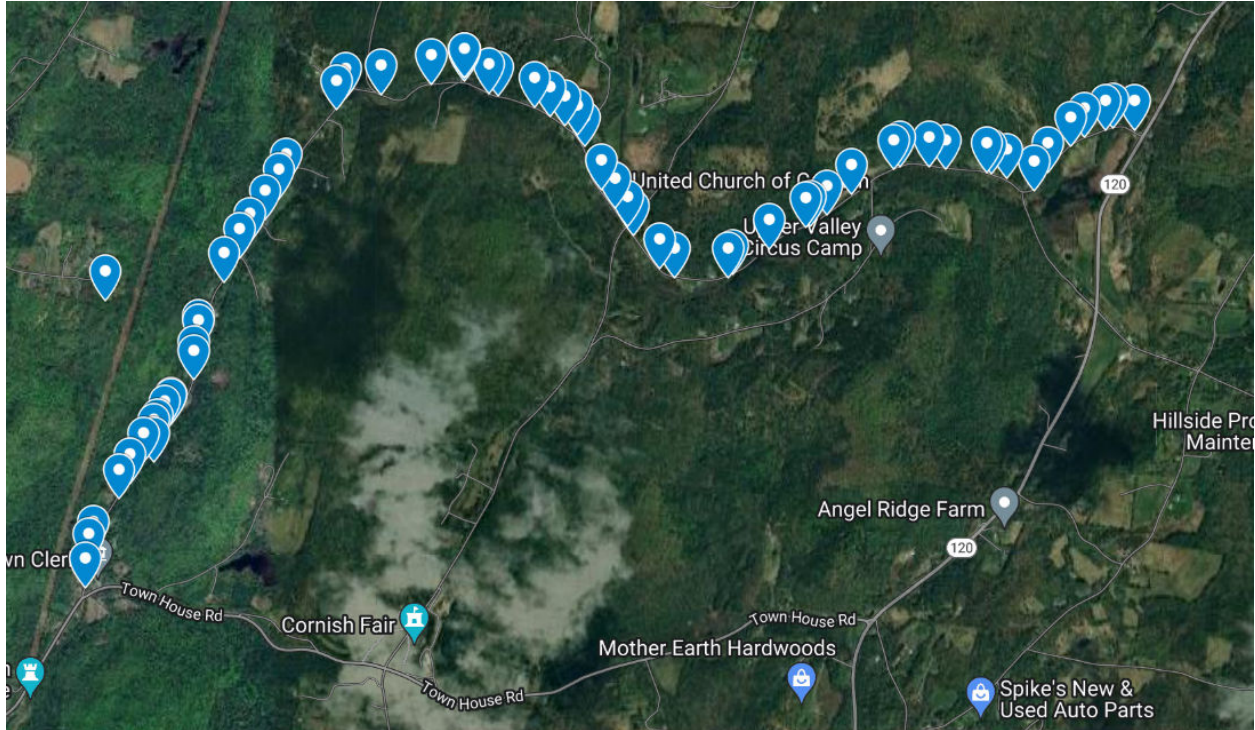
Claremont has an online GIS map (<https://claremontnh.interactivegis.com/login/>) which was developed by InteractiveGIS Inc. (see <https://interactivegis.com/>). There are likely other for-profit vendors that can do this. Town resident Jeff Baillergeon can also provide services through his firm.

Another option would make use of the GRANITView mapping website maintained by UNH. It is possible to create and store projects on their website without cost, and with a limited learning curve. Here's an example of data we collected on a brief survey of some culverts along Center Road:

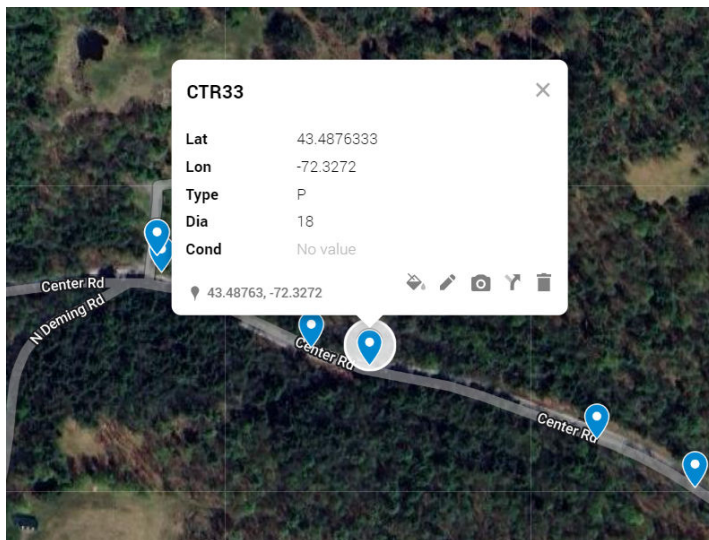


There are several shortcomings to this approach, however. While it would create a digital map with useful location information, it does not create a true database nor does it have a good method of data preservation.

Google also has an option called MyMaps. Using some data discovered and digitized by Dillon Gallagher (see Appendix G) we created a map of culverts along Center Road:



Dillon was unable to determine who made the paper records, or when they were done. Data can be associated with each point on the map like this:



While using MyMaps would not have any cost, and is relatively easy, it does have potential drawbacks. Google is well known for continuous change, and this function may become unavailable with relatively short notice. Also, there is no good method for data management or preservation. It could serve as an interim solution, however, since data can be easily exported from MyMaps. There are other similar applications available as well. While this example shows culverts, it is quite possible to use the same method to map sections of roadways and their condition.

D. Recommendations

We believe that it is essential to inventory Town roads and culverts, while respecting budget limitations. This could begin very simply with paper records in binders (there are some templates for data collection in Appendix F). Surveys and data entry could be performed by town staff and volunteers. This data could ultimately be digitized and displayed on a digital map as resources become available. Ultimately, it may be appropriate to incorporate this data into the NYDOT maps, so it makes sense to organize the data collection in a manner that would allow a smooth conversion to the NHDOT format. Although UVLSRPC has said they could not provide the services for a conversion, there may be other entities that can.

It does not appear that the Town has any method of digital record preservation at the present. While it is outside the scope of the committee, we should strongly recommend that the Town consider moving in this direction.

Highway Department Management

A. Overview

In the Town of Cornish, the Road Agent is appointed by the select board. The Select Board manages the Road Agent and the Road Agent manages the road crew. Select board terms are for 3 years, with one board member re-elected or replaced each spring. The town administrative assistant assists the select board. There are challenges and opportunities with this structure. The select board meets 4 hours per week and has many responsibilities besides roads. The administrative assistant is also part time.

When there is continuity in the road crew and road agent positions, things can go along pretty well, but when there is turnover, short-staffing or missing abilities, road maintenance and management quality suffer. In recent times it has been challenging to obtain and retain a full staff of qualified Highway Department personnel. These shortages have limited the ability of the Highway Department to maintain the roads to a satisfactory standard.

While the Temporary Road Advisory Committee did not specifically focus on the management of the road crew resources, some things did come to our attention in the course of our work, and we make the following recommendations:

B. Record Keeping

Improved record keeping must become a priority. At a minimum, the following things should be stored digitally on a suitable platforms, and be available to Selectmen, all road crew, and others as needed. Selected and appropriate portions of this information should also be made available to the public on the Highway Department webpage.

- Inventory of all roads, culverts, bridges & covered bridges
- Most recent condition assessments of all roads, culverts, bridges & covered bridges
- Current year road plan, showing work completed as year progresses
- Hot spot list of things needing immediate attention & tentative plan for addressing weekly work schedules of all road crew
- All other forms/documents in the Appendix of this report
- Job Description for Road agent, showing responsibilities and expectations vis a vis select board
- Job Description for road crew employee with required skills and outline of career opportunities
- Job application form and instructions on how to apply
- List of local subcontractors and skill sets
- List of material suppliers and current rates
- List of training resources for road crew
- List of people, equipment, and skill sets in case of road emergency (flood, excessive snow, etc.)

C. Accountability

Accountability is key to success. Expectations for job performance should be communicated from the Select Board, and staff must be held accountable for performing as described. Work schedules, status and progress reports, completion of deliverables and/or exception reporting are necessary tools and should be required. These reports can then become the basis for the necessary, accurate, long term planning that the select board is hoping to accomplish.

D. Staff development

Staff development leads to improved performance and job satisfaction which leads to employee retention. Continuing to invest in the training of the recent hires will benefit both the employees and the roads and is money well spent. The NH Roads Scholar Program establishes educational training requirements for municipal level highway practitioners, and recognizes those who have successfully completed specified UNH workshops.

E. Permanent Committee

A permanent Road Advisory Committee should be formed to channel the volunteer expertise available in town so that it can be a resource for the select board and road agent. Road maintenance is a complex and ever changing challenge and there are many professionals in town with knowledge and experience in various aspects of this industry. A permanent committee could assist with map maintenance, research, planning, budgeting, and on-line road-related content management.

The initial four months of work by the committee got us up-to-speed on many of the challenges and needs of the town regarding road maintenance and we are now in a position to put this knowledge to good use. We would like the opportunity to continue what we started and move forward with producing short and long term road maintenance plans.

Appendix: Table of Contents

In order to reduce file size, the Appendix has been provided as a separate electronic document.

A. Charge to the Committee

B. Upper Valley Lake Sunapee Regional Planning Commission

This section includes correspondence, estimates of cost, and examples of their previous work in two other towns.

C. Forms to Aid the Budgeting Process

This section contains sample forms that could be used by the Highway Department or others to prepare a multi year budget.

D. Plans, Specifications and Guidelines

This section includes road cross sections, material specifications, and culvert guidelines.

E. Culvert and Ditch Design

A brief visual presentation from the DOT of Washington State.

F. Forms for Road and Culvert Evaluation

This section includes tools for conducting a condition inventory of existing roads and culverts. We anticipate that these will need to be refined, especially if compatibility with the NHDOT GIS data structure is desired.

G. Existing Culvert Survey Data

A sample of the existing culvert inventory that was discovered by Dillon Gallagher. Date and author are not known. This was used to create the map using Google MyMaps.

H. Road Data from NHDOT

A spreadsheet derived from a download of road data from the NHDOT GIS interactive website.

I. Position Description of the Road Agent

This document became available during the final editing of this report. It appears to date from 2019 or earlier.