

Gravel Road Committee INTERIM Report

December 8, 2022

EXECUTIVE SUMMARY:

The gravel road committee priority recommendations are funding the re-construction of first 1000 feet of Zinn Road and a 1000-foot section of North Hinsdale Road for 2023. The Town will need to budget \$36,000 for out-sourced material and excavation, plus 70 man-truck days from highway personnel to accomplish the first 1200 feet. The remaining 800 feet of North Hinsdale Road would be completed for \$72,000 to outsource materials, excavation and hauling of materials to and from the site. This totals \$108,000.

Alternatively, the town could do one project each year. This moves other road section re-construction further into the future. The risks associated with these delays include: emergency vehicles, fire trucks and fuel trucks delayed or unable to reach homes.

The road section priority list is included in Appendix - A. Zinn Road is priority-A and North Hinsdale Road is Priority-B, both are dead-end roads.

Problem Statement:

During winter, the gravel roads may freeze to a depth of approximately 36 inches. When the temperatures are above 32-degrees the surface of the roads thaw. Moisture from melting snow and rain collect and are often trapped in/on the road surface, because the gravel below the surface is still frozen. As vehicles drive on the road, mud and ruts develop. This mud gets deeper the longer the thaw cycle continues. Some sections of our gravel roads become impassible for emergency

and fuel vehicles. Once the road completely thaws the moisture will drain thru the road and the road can be safely travelled.

This committee was formed to address this gravel road mud season issue and recommend a prioritized list of roads that need attention. The Select Board and Road Agent can budget and with the Town of Chesterfield's support resolve these problem sections.

Scope of the Problem:

Chesterfield has 90 miles of roads to maintain. Gravel roads make-up 31 miles of these roads. There are 38 different gravel roads. There are roughly 3 miles of roads that are difficult to impossible to travel during mud season for residents, school buses, emergency vehicles and fuel trucks providing service to our citizens. These sections of gravel road are from 150 to 2500 feet in length. Chesterfield has significant problems on seven roads or 18%. Mud-season historically has lasted two to three weeks at the end of winter. Recently, mud-season has been expanded due to mid-winter thaws as NH winters have warmed, which is expected to continue.

Our concern about our roads is not new. The Town has managed the maintenance of our roads well and handled emergencies as warranted. Past practice for gravel roads has been one of "crisis management". For example, when a culvert washes out or fails a new one is installed. When mud holes emerge, stone is deposited. When a road is washed away, new ditches are built and repairs made. Years ago, the Town experimented with drainage fabric and new road surface materials. The Town has managed this critical infrastructure issue as best it could afford. However, the problems of mud-season basically remain unresolved and are expected to worsen.

Our goal is to establish a new practice in the form of a systematic multi-year plan. This plan is to ensure safe and passable gravel roads year-round. The key factors in establishing priorities include availability of alternative access (dead-end roads), the number of homes on the road, volume of traffic, school bus routes, accessibility of emergency vehicles and fuel supply trucks. This also includes the overall Goals of the Town of Chesterfield Hazard Mitigation Plan as shown here:

1. To improve upon the protection of the general population, the citizens of the Town of Chesterfield and guests, from all natural, technological and human-caused hazards.
2. To reduce the potential impact of natural, technological and human caused hazards on the Town of Chesterfield's emergency response services, critical facilities and infrastructure.
3. To improve the Town of Chesterfield's Emergency Preparedness and Disaster Response and Recovery Capability.
4. To identify, introduce and implement cost-effective hazard mitigation measures so as to accomplish the Town's goals and objectives

The committee has visited all key gravel road areas listed below. Since this committee was formed during the Summer of 2022, we were unable to visit the sites during mud season which we believe would be beneficial. Bruce Adler, the Chesterfield Road Agent, has worked these roads for many years and showed us the worst areas. We used his experience and committee members knowledge, where appropriate, to determine the areas to address and their priority. We have developed a prioritized list of roads that require attention (Appendix-A). We are trying to determine the proper re-construction, so the roads meet the needs of our citizens through-out the year.

Committee Input Requested by Select Board:

Our committee is chartered to provide input to the Road Agent and the select-board but not to provide cost benefit analysis for potential warrant articles.

Current Knowledge:

The Town of Chesterfield has, on at least three occasions, removed existing gravel from sections of Castle (approximately 1/2 mile), Poocham (approximately 3000 feet) and Gulf (approximately 300 feet) Roads. The re-construction included "Gravel Support Fabric" as a first layer, then 1" minus gravel then 1/2" minus gravel plus improvements to the drainage ditches. This Poocham road re-construction was successful at a cost of approximately \$92,000 in 2004.

During the Town Meeting (February, 2022) \$80,000 was added to the budget for gravel road improvement. A 2750-foot section of Atherton Hill Road was identified to be re-constructed.

It was suggested that the Inter Ax™ Geogrid material should be used, because it was considered the best gravel road support material. This section of Atherton Hill Road was modified by removing up to 24-inches of the gravel surface in an effort to match driveway heights. The re-construction was (bottom up):

- Layer #1 - Inter Ax™ Geogrid (center of road)
- Layer #2 - 1" minus gravel six-inches
- Layer #3 - 1/2" minus gravel eight-inches

The incremental cost of this project was \$70,000. The use of our road crew personnel, five people for five weeks was already budgeted. Additional resources (trucks and drivers) from Hinsdale and

Westmoreland equaling 15-man days were also required (favors to be re-paid). This estimated incremental cost was \$30 per foot.

Bruce Adler's concern after the Atherton Hill Road project, "this 2750-foot project "stretched" our town's capacity to properly maintain all roads."

Bruce Adler feels just using the town's resources; the road crew is capable of doing two ~600-foot sections of gravel road re-construction without jeopardizing the other road needs in Chesterfield each year. The 1200 feet could be done at a cost of approximately \$30 per foot, totaling \$36,000 above the already budgeted Highway Department Personnel Budget. (Warrant Article required). Additional (outsourcing) trucks and drivers would expand the Chesterfield Road Agent's capability. A truck and driver cost about \$1,000 per day. It would cost approximately \$35,000 (\$1000 times 140 truck days/4) for trucks and drivers to do an additional 600 feet of gravel improvement plus materials and excavating \$18,000 (\$30 per foot times 600 feet) or an incremental \$53,000 for each 600 feet to modify the road or \$90 per foot. Re-construction of 1800 feet per year would be an incremental cost of \$89,000, if the re-construction matched Atherton Hill Road.

Areas of Concern/Alternatives:

Discussion with Marlborough and Nelson Road Agents has shown mixed results with the Inter Ax™ Geogrid methodology used on Atherton Hill Road. The Marlborough and Nelson Road Agents' conclusion were the roads, after modification, survived mud-season better than before, but some years were not much better. The Nelson Road Agent used a re-construction as follows (bottom up):

- Layer #1 - Inter Ax™ Geogrid (center of road).

- Layer #2 - Six-inch layer 1.5" stone.
- Layer #3 - 8-inch of gravel.

He claims the roads are excellent after modification during mud season and have lasted over ten years.

EJP's Technical Salesman, Inter Ax™ Geogrid supplier, recommended for the worst road sections of Mud-season (bottom up):

- Layer #1 - a textile (center of road) Prevent migration of Stone and gravel.
- Layer #2 - six-inches 1.5" stone
- Layer #3 - Inter Ax™ Geogrid (center of road)
- Layer#4 - 8-inches of 1/2" minus gravel

The committee is trying to find an independent consultant to assess the road conditions and to determine a re-construction recommendation for each section of gravel road to be upgraded.

Asphalt is not considered an alternative, because the road foundation must be sound or the road will likely develop considerable cracking and crumbling. The road sections in several years could revert to mud season conditions with the crumbled asphalt being churned into the dirt.

Pending Further Input:

- The committee would like to see the results of the 2022 Atherton Hill Road project as we go through the 2023 mud season before offering any further recommendations.
- Input from University of New Hampshire Technology Center or another knowledgeable source for best practices of gravel road

construction and re-construction methods for mud-season problems.

NOTE:

This is an interim report submitted to the Chesterfield Road Agent and the Select Board by the Gravel Road Committee. It is expected that a further report will be published by this Committee during mid-2023.

Acknowledged by:


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