Chosen Valley Testing, Inc.

Geotechnical Engineering and Testing, 245 E. Roselawn, St. Paul, Minnesota

Trailblazer
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August 19, 2026

cc Scott Vos, President
Vos Construction
scott@vosconstruction.com

Re: Geotechnical Recommendations for Trailblazer Pavement Distress
Trailblazer
207 West 11th Street
Glencoe, MN
CVT Project Number:

As authorized, we are providing this letter documenting recommendations requested to expedite planning for repairs to pavements at the above site. The facility is understood the have been built around 2011. As directed, our recommendations are based on a review of a number of documents from construction of the facility including the plans and specifications, the geotechnical report used for construction of the project (included in the specifications), field observations by our project engineer and verbal information from the client during a site visit on August 13, 2026. Compaction tests or other geotechnical records from the construction were not provided. Soil borings were not performed due to time constraints.

Distress

Since construction, repairs have been made around MH/CB G due to settlement and voids around the structure. Based on aerial photos, it appears that an initial repair was made between 2012 and 2016 and is evidenced by a surrounding square concrete pavement. A 2020 photo seems to indicate a rectangular repair – extending the concrete surface to the north. The settlement and voids reappeared sometime later and were visible at the time of our site visit. We are not aware of settlement of the manhole itself nor with the piping connected to the manhole.

Shallower, localized settlement of the asphalt without noticeable voids is evident in close proximity to nearby MH/CB F, situated along the north edge of the site, though not to the extent that voids were evident below the pavement. Similar settlement was observed at MH/CB C at the northeast corner of the facility, along with vertical shifting of concrete. We are not aware of any prior repairs to these structures, and none are evident in the aerial photos observed. The 2026 aerial photo taken in February shows snow piles along the east edge of the property and wrapping around the corners - and likely extending into the storm pond just past the east edge of the pavement.

A non-conformity is also present in the pavement on the north side of the facility, running through the curb at the northeast corner of the "T" at the west end of building, across the asphalt and continuing

through the curb to the north. The non-conformity consists of a long crack through the curb and asphalt along with a side-to-side elevation shift of the asphalt. The pavement on the west side of the crack is somewhat higher than the east. The crack is evident in a 2016 aerial photograph.

Soil Information

The background information provided included a geotechnical report prepared by Northern Technologies, Inc. and dated April 9, 2009. The report indicates the site was dominated by soft to medium glacial clays, which were covered by topsoil. The thickness of the topsoil was indicated to be less than 1 foot at most locations explored by was about 5 feet at Boring B-4, situated near the southwest building corner. Based on those borings, pre-existing site contours, and elevations on the plans, all of the affected catch basin/manholes structures would have been expected to bear on the natural glacial soils. Since much of the site was indicated to be "cut" to grade and topsoil depths were mostly shallow, minimal depths of fill would have been needed below most pavements after topsoil stripping -- except portions of the southwest part of the site where the topsoil was much thicker. In that direction, topsoil stripping likely extended several feet below the pavement section.

Recommendations for Catch Basin/Manhole Structures

Analysis: Based on the data, the most likely cause of the settlement is likely due to settlement of clay fill used around the affected structures and to some extent above the pipes. Clay fill is much more susceptible to settlement in this fashion than clean sand or gravel fill. Clay placed below its optimum moisture content is particularly susceptible and is much more permeable than wet clay fill even when very firmly compacted. That being said, even with ample moisture, it is much more difficult to get compaction on clay when filling against vertical structures and around pipes – so settlement is much more common around these structures. If such clay fill is protected from moisture after placement (such as by overlying buildings or a pavement), it can be stable for many years. Despite protective pavement coverings, pipe bedding materials can be a conduit for water infiltrating from other sources along the pipe alignments and surface settlement can also cause drainage changes and infiltration.

Recommendations – Structure G: Again, this structure is presumed to be bearing on natural clays but is presumed to surrounded by clay fill which has been settling. The natural clays are not susceptible to this and are likely suitable. We recommend removing the clay fill from beneath the affected area. For planning purposes, we recommend assuming that the clay fill extends to the bottom of the existing manhole structure – which appears to be on the order of 7 feet below the existing surface - and extend that removal horizontally for a radius of at least 10 feet from center of the structure.

The trench sidewalls must meet OSHA minimum requirements. Due to the unknown conditions of the materials, we recommend assuming Type C soil conditions. The upper 5 feet of the trench (frost zone) should ideally be backsloped even flatter, at a gradient of a 3 horizontal to 1 vertical, to minimize impacts on traffic due to differential frost action.

The excavated soils should be replaced with clean aggregate having a maximum size of 1 ½ inches. We recommend placing a filter fabric between the aggregate fill and the soils being left in place, to prevent finer soils from rinsing into the void space and causing settlement. Details for these materials are indicated on the original project plans.

Compaction testing on the aggregate materials is not practical or necessary. It is considered adequate to tamp that material into place with the backside of the bucket of the backhoe until no yield is observed.

Recommendations- Structures C and F with Alternates: The same procedures described with regard to

structure G could also be applied to these other structures. As they are both at the edges of the parking lot, the radius dimension provided should only be necessary below the pavements and curbs. That being said, OSHA side slopes must be maintained out into the surrounding green areas.

Although the distress in areas C and F is perceived as having same root causes, the actual settlement is much less and neither of those areas is understood to have had prior corrective work. For that reason, alternative procedures appear worth considering.

- **Structure F Alternate**: Settlement is not perceived to be ongoing at this location. Under the circumstances, we would suggest obtaining an alternative cost consisting of removing the existing pavement for a radius of 5 feet from structure F, releveling the subgrade with well compacted and properly moisture conditioned class 5 aggregate base, and then replacing the pavement. If deeper issues are revealed during the initial removal process, we would see this option being expanded to the more complete removal option.

- **Structure C Alternate**: Settlement is also not perceived to be ongoing at this location. However, the Area C distress appears to include a frost heave element. We assume this is from surface water collecting below the pavement and might also be related to snow removal operations. The "full" treatment option is expected to address both scenarios by providing aggregate materials which drain but which are also non-frost susceptible. Because of the much more limited distress, we suggest considering an option whereby the upper 1 foot of subgrade materials within 10 feet of the corner are replaced with the clean 1 ½-inch minus aggregate wrapped in filter fabric. Presuming the underlying materials are the onsite clays, the bottom of this excavation should be provided with a suitable drainage outlet – to prevent accumulating water from collecting, freezing and heaving. If that is not possible, we recommend implementing the full procedure previously referenced.

Recommendations – Pavement Non-Conformity: The nature of the non-conformity is not known but is believed mostly likely be due to an undiscovered, pre-existing utility line (such as a field tile) or possibly simply an abrupt change in subgrade materials during construction – resulting in differential frost action. With the present information, we recommend removing the existing subgrade soils to a depth of at least 3 feet below the top of the pavement at the center of the crack. Bottom of the excavation should then be sloped upward at a slope of 10 feet horizontal to 1 foot vertical, until it meets the bottom of the aggregate base on either side. According to the plan, the total thickness of the paving materials is about 20 inches, so this depth should be about 16 inches below the aggregate base.

The excavation should be filled with compacted aggregate base. A dirtier, lower permeability aggregate base material would be preferred in this application, to limit the ability for water to collect below the pavement. For planning purposes, we would suggest obtaining costs for Class 5 materials, while allowing alternate materials to be suggested with gradations that are closer to Class 1 (along with supporting gradations). The resulting fill should be properly moisturized and compacted to meet 100% of the soil's standard Proctor density.

Additional Comments/Recommendations

Based on the aerial photographs, it appears that the settlement around structure G may be following the backfill around the connecting pipe heading northeast from the manhole and correction might have to be extended in the direction. The actual shape and extent of all excavations will ideally be modified as needed depending on the conditions exposed. Ideally, CVT will be retained to observe the work and evaluate if changes to the excavation limits or corrections procedures provided are needed.

It is assumed that pavements removed will be replaced with materials consistent with those removed, and to the standards cited in the original construction documents. Due to the finite nature of the replacements, it may be more practical and cost effective to use concrete pavement in some areas. The existing plans appear to indicate a minimum concrete section of 7 inches which would presumably be underlain by Class 5 aggregate base of about 13 inches, to match the bottom elevation of the existing aggregate under the asphalt.

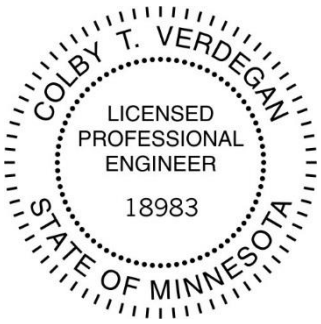
Level of Care

The services provided for this project have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area, under similar budget and time constraints. This is our professional responsibility. No other warranty, expressed or implied, is made.

Remarks

We appreciate the opportunity to provide our services to you. If you have any questions, or need additional services, please call us at 507-281-0968.

Sincerely,
Chosen Valley Testing, Inc.



I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly licensed engineer under the laws of the State of Minnesota.

Colby T. Verdegan, PE
Geotechnical Engineer
Registration Number 18983
Date: August 20, 2026