Montana Department of Transportation
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**Memorandum**

Revised 3/7/23
MC

To: Distribution

From: Paul Ferry, P.E., Highways Engineer PF

Date: October 28, 2011

Subject: PTW Surfacing/Subgrade Treatment

A memo was distributed in September 2010 discussing the problems that may arise when construction results in the removal of the existing plant mix surface and possibly a portion of the existing base course. The memo noted that the exposed subgrade, and even the old base course material is often very wet and incapable of supporting construction equipment without the implementation of some corrective measures. We are providing the following guidance to help identify the site conditions where these situations occur, and methods to address them so they don't result in delays, costly change orders and claims during construction.

The following discussion is both a reiteration of the guidance provided in the September 2010 memo as well as some additional guidance.

**Site identification**

The following sites may have potential subsurface problems:

1) Locations where the plant mix surface is removed from the PTW and the excavation does not extend more than 2 feet into the subgrade.

2) Locations that are in close proximity to or are within known river/stream channels, floodplains, oxbows, or other areas where the ground adjacent to the roadway is frequently inundated (e.g. areas that are irrigated).

3) Locations where new grades in level terrain are lowered. These sites will generally be the same as those described in item (1). However, they may present problems even if the excavation extends more than 2 feet into the subgrade.

4) Locations where a new alignment crosses the existing alignment. The same issues with the subgrade may be encountered, but it is typically not as extensive as the locations where the new alignment and grade follow the PTW.

**Evaluation**

The evaluation consists of determining the condition of the subsurface material and assessing what corrective measures are most cost-effective. Address these sites as early in the project development process as possible.

Subsurface Investigation

1) Emphasis needs to be placed on the subsurface soils investigation data. Ensure the soils data are an accurate representation of the soils within the existing PTW, as well as all areas of new alignments and depths that will be involved during construction. If the soils investigation data leaves "gaps" in boring locations along the intended alignment (i.e., Station to Station), additional sampling/testing may need to be requested. Ensure all borings extend to, or exceed, the full depth of the cut.

2) In urban areas it may be more practical to estimate the quantities needed for treatment, because drilling in these areas can be difficult, due to impacts to buried utilities and disruption to traffic.

3) In rural areas, if time and resources are limited, provide locations (station ranges) and estimates of the quantities needed for treatment. Recognize that 2 feet of removal of poor material and replacement with special borrow may not be adequate. Consultation with the Geotechnical Section may provide a somewhat more accurate assessment of the treatment needed.

4) The Geotechnical Section should review the Falling Weight Deflectometer (FWD) data to determine variations of the subgrade modulus over time and the potential variations during different seasons. Large variations may require additional subsurface investigation if the initial investigation is not relatively recent.

5) It may be worthwhile to invite district materials lab representatives to the A&G Review.

6) When the alignment changes after the A&G Review, provide station ranges to the Geotechnical Section for areas where we may need to cut into the PTW.

Corrective Measures

1) Consider raising the grade to eliminate the removal of the existing plant mix surface. A cost analysis should be performed to compare the cost of subsurface treatment (subexcavation, special borrow, geosynthetic) with raising the grade. The impacts to R/W, the environment and utilities resulting from a grade raise must also be considered in the comparison.

2) Ensure that the areas that need treatment are identified by station in the plans, and that adequate quantities of subexcavation, special borrow and geosynthetic are provided in the plans to address the areas in question.

3) Consider using some material of lesser quality than an A-1-a material for the special borrow. The decision should be based on the availability of material and the Geotechnical Section's recommendations.

4) Consider using the existing plant mix, pulverized in place as subgrade treatment. Incorporating virgin aggregate or special borrow material may also be viable option.

5) Consider using some type of subgrade stabilization such as chemical stabilization. This type of treatment will require extensive involvement with the Geotechnical Section.

6) Increase the quantity of traffic gravel, especially if it is decided that no additional treatment of the subgrade will be provided where the existing plant mix is removed.

**General Items**

1) Consider the estimated construction time and potential letting schedule to determine if minimizing grading operations during the wetter spring season is feasible. Options to consider include providing additional contract time or requiring certain projects to be constructed over two seasons.

2) Do not remove an additional 2 feet of good material just because we are excavating into the PTW. The need to remove material and the depth of removal should be determined during the evaluation process.

3) Adjusting grades, especially lowering grades, to achieve a balanced earthwork quantity may not provide the most cost-effective design.

4) If it is determined that no subgrade treatment is necessary, document the decision in the project milestone reports.

If you have questions concerning this, please contact the Highways Engineer ~~me at 444-6244~~.

e-copies (this document is also available on the Road Design webpage):

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