

EXECUTIVE SUMMARY

Ravi Engineering and Land Surveying, P.C. (RE&LS) was retained by the Genesee Transportation Council (GTC), in partnership with and on behalf of Orleans County, to conduct a sign and guide rail inventory program. The County owns and maintains approximately 200 miles of roadway and has limited data on the location and type of signage and guiderail in regards to meeting current standards. This limited data makes it difficult for the County to prioritize their spending and maintain their facilities. Currently if the County does not have a program in place to ensure that the signs meet the minimum requirements of the MUTCD they could lose federal funding for projects. Without a current inventory of guide rail types and prioritizing any repairs and/or replacements they may not be using the available funds efficiently or applying for additional funding and grants that may be available.

The purpose of this program was to define the locations of the signs and guiderail and to create a prioritization for both to bring them up to the current standards as defined in the Manual on Uniform Traffic Control Devices (MUTCD) and NYSDOT. This information will also be given to the County in a format integrating with their existing GIS programs that will allow the crews in the field to keep up with any upgrades, replacements, or changes that they make by using hand held devices. This will ensure that the program keeps up to date and proper tracking of materials used and costs can be tracked efficiently.

Approach

A project kick off meeting was held with GTC, Orleans County, and RE&LS to define the requirements and expectations of this program. The sign and guide rail inventory has been created utilizing physical condition, compliance with current design and safety standards, recommendation of remedial actions, including a schedule to replace or upgrade signage and guide rail to meet current standards. This meeting also established criteria to determine if there are areas where guiderail may be needed such as roadway curvature and super elevation, roadside clear zone and drop off, fixed objects, water bodies, and accident history.

Initially traffic accidents were to be included in the assessment process but the county has confirmed that no traffic incidents were on file related to signage or guiderail. There were 2 roads that the County had identified as having high traffic incidents, Gains Basin Road/Albion Eagle Harbor Road and Gains Basin Road/County House Road. Both of these intersections have had additional signage added to warn drivers of these intersections. The new signage is very noticeable and in good shape and no additional signage was seen as being needed at these locations.

Prior to field evaluation standards were developed and documented for use when conducting the inventory. These standards were provided to each field crew for their use when assessing and evaluating both guiderail and signage. This enabled consistency when ranking and prioritizing locations. Coordination with the County's Engineer, who is responsible for the GIS/Cartegraph program, has been conducted to understand the capabilities and logistics of setting up a guiderail and signage inventory on the County's existing network system. It is assumed that the Cartegraph program will be available on laptop computers or tablets to use in the field by County forces when entering/verifying future data.

The survey crews were supplied with survey grade GPS systems, Leica VIVA GNSS and Topcon HiPer V, both accurate to within 1 inch for locating signs and guiderail and other features. On initial visit a surveyor located all of the sign and guide rail locations utilizing GPS and photos were taken of each feature. The field inspection followed documenting the specifics listed below;

Signs

- All warning, regulatory and guide signage were identified using the MUTCD including supplements #1 & 2 and the NYS Supplement dated March 16, 2011.
- All roads were driven with a ball bank indicator at posted speed or advisory speed to determine if additional signage was required and existing signs are posted correctly. The ball bank readings were compared to the MUTCD section 2C.08 for determination of any additional need or changes to existing signage.
- Retroreflectivity was determined by driving all the County roads at night and using calibration signs, and comparison panels as approved by the FHWA Sign Retroreflectivity Maintenance Methods. The vehicle used was a 2013 Chevy Equinox driven with low beams.
- Replacement/Upgrading/New sign prioritization schedule will be based upon whether the sign meets existing MUTCD standards and need, with the order of importance being Warning signs (including School signs), Regulatory signs, and Guide signs.
- References used for signage evaluation;
 - National Manual on Uniform Traffic Control Devices (MUTCD) 2009 edition including Supplements #1 and #2
 - NYS Supplement to MUTCD 2011
 - FHWA Methods for maintaining Sign Retroreflectivity
 - Standard Highway Signs 2012 Supplement
 - FHWA 2014 Traffic Sign Retroreflective Sheeting Identification Guide
 - FHWA Nighttime Visibility – Implementation Tools Sign Retroreflectivity
 - NYSDOT Standard Sheet Section 645 - Signs

Guide Rail

- All roads were driven and stops were made at each existing guide rail location for an in-depth inspection. A determination was made while traveling the roads where future guide rail might be necessary.
- Condition ratings were assigned to guide rail post, end sections and barriers. The average height and length of the rail was also documented.
- Field inspection information was used to quantify guide rail condition and guide rail was reviewed for code compliance and point of need.
- References used for Guide rail evaluation;
 - NYSDOT Highway Design Manual
 - NYSDOT Standard Sheets
 - AASHTO Roadside Design Guide, 4th Edition, 2011
 - NYSDOT Guide rail Inspection and Inventory Reference Manual, June 2015.

Prioritization methodologies based upon mutually agreeable criteria was established. All of the new data for guide railing and signage was incorporated into the existing Cartegraph database with all the required fields as previously determined.

For each database created, asset replacements were prioritized and integrated within the database. Any other key information which may materially benefit project decision- making as necessary has been provided.

Findings

There were 1856 signs located and evaluated and the following was found; 154 signs should be replaced immediately due to nighttime retroreflectivity, 36 signs are marginal on retroreflectivity and should be replaced as soon as possible, 10 signs do not meet the new graphic standard and should be replaced immediately, 5 signs were missing between the original survey and the field evaluation, 2 additional signs were needed, and 35 street name signs do not meet the minimum size requirement. Overall the signs in the County have been maintained very well with the majority of the retroreflectivity problems being on 4 roads, Salt Works, West Barre, West Shelby, and Eagle Harbor Roads.

The majority of street name signs should be upgraded as funding allows to account for the larger size required by the MUTCD and also the standard design of the signs regarding mixed case lettering and the white border. The minimum size of the street signs should be 8" for a single line sign but on signs at major routes it would be advised to use 12" for the sign height.

As signs have been replaced the County has been placing a date sticker on each of the signs so the actual lifetime of a particular group of signs can be determined. We were unable to determine how much fading the sign has during nighttime since the use of the control panels and control signs only show the minimum required retroreflectivity. The typical warrantee on the sign material is around 10 years.

The County has 40,687 linear feet of guiderail and of that only 4 locations at this time are candidates for replacement due to condition of the exiting rail. There are some additional repair/maintenance that can be performed on sections of existing rail that will keep them functioning and up to standards. There is one location on Oak Orchard River road that is a candidate for removal of the railing system completely, but this area should have a survey and engineering study done prior to removal. There are 32 locations that do not have guiderail but have obstructions and markers and should be looked at to determine if rail is warranted or if the obstructions can be removed. These findings are detailed more in depth in appendix B.

Conclusion

Nighttime visibility of signs is a major safety issue for the travelling public especially where there are changes in the roadway alignment. If the County replaces the signs that do not meet the minimum retroreflectivity and keep up with their current program of replacing the sign on a road as major work and/or preventative maintenance is completed the signs will stay up to current MUTCD standards. By having all the signs up to current standards it will be easier to comply with any new standards that come out in the future and not risk losing any funding for projects.

For the guiderail this report will allow for the County to replace the areas of guiderail that are not up to current standards. There are locations defined where only repairs are need to the existing rail and doing these repairs will keep the existing systems functional for years to come. With the additional areas of unique situations defined the County can set up a program to allocate funding or have the basis for grants to possibly remove or mitigate roadside hazards.