Municipal Roads General Permit (MRGP)
Open Drainage Roads Road Erosion Inventory (REI) Supplement

2024 Field Season Survey123 Form

Use: For the assessment of Vermont DEC Municipal Roads General Permit standards for Open Drainage Roads. For additional MRGP information see the VT DEC MRGP website (link below).For Closed Drainage Roads, use the Closed Drainage inventory and supplement. For hybrid paved roads, such as paved with ditches and catch basins, use this inventory template.

http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program

For additional information regarding the ESRI Field Maps and Survey123 applications visit the link below:

http://vtanr.maps.arcgis.com/home/item.html?id=fe11c5ffd0d04eeca968115d84dacf90

Inventory Timing: Avoid conducting field inventory assessments during snow covered conditions through the end of mud season, as these conditions may skew assessment results.

Assessor Notes: All hydrologically-connected municipal road segments depicted on the ANR Natural Resources Atlas (https://anrmaps.vermont.gov/websites/anra5/) at the time the REI is conducted shall be field visited, walked and evaluated using the DEC REI template. **"Drive-by" segment assessments are <u>not</u> acceptable.** Additionally, the applicant may propose to add or remove road segments from its REI based on an evaluation of hydrologic connectivity.

Field Form Questions (* indicates required fields):

1. **Name***

2. **Organization***

3. **Date of Assessment**

4. **Municipality***

5. **Purpose for assessment***

Reassessment	Work Completed	Storm Damage	DEC Staff Assessment

Primary funding for work completed*

Grant-In-Aid Program	Better Roads Grant	Town Funding	Other

6. **Segment ID** (auto populated)

7. **Segment length** (auto populated)

8. **Road Name**

9. Is the road segment hydrologically-connected?*

Yes	No	Segment is not a town highway

Evaluation Criteria:

- Municipal road within 100' of a water of the State or wetland;
- Municipal road bisects (crosses) a water of the State or wetland or a defined channel;
- The municipal road segment is uphill from, and drains to, a municipal road that bisects a water of the State or wetland, or defined channel and should be included in the REI to accurately capture the extent of the stormwater watershed. The ANR Atlas connected roads layer is a GIS-based proximity analysis and often will underestimate these types of connected segments. Please be sure to add these segments in the field if you find them, especially if adjacent to ANR Atlas connected mapped segments.
- If a road segment appears on the ANR Atlas and none of the above conditions are observed in the field, persons conducting inventories may propose to re-classify a segment as not connected. Alternately, if none of the above conditions are observed in the field, but the segment is likely to discharge to waters or wetlands, a permittee shall propose to add this segment to the inventory following a field evaluation.

10. Is there evidence of sedimentation into a water resource from the segment?*

Yes	No

Assessor Notes: This question was designed to prioritize non-compliant segments with the greatest impact to water quality for implementation. Answering "yes" will automatically make the segment status 'Does Not Meet' and 'Very High' Priority.

Evaluation Criteria:

- There is clear causality between the road erosion and the discharge of sediment to a water of the State. There may be erosion without sedimentation to a water resource.
- Sedimentation appears as visible turbidity (cloudiness) in the water or accumulation of sediment in a water of the State.
- Sedimentation is the result of non-compliance with an MRGP standard, especially turnouts, culverts, and drainage ditches.
- There is a significant sediment source, likely associated with gully erosion or a long stretch of rill erosion.

11. Road Type*

Paved road with catch basin	Paved road with open ditches	Gravel road	Class 4 road

12. Percent Slope (auto populated with LiDAR GIS slope)

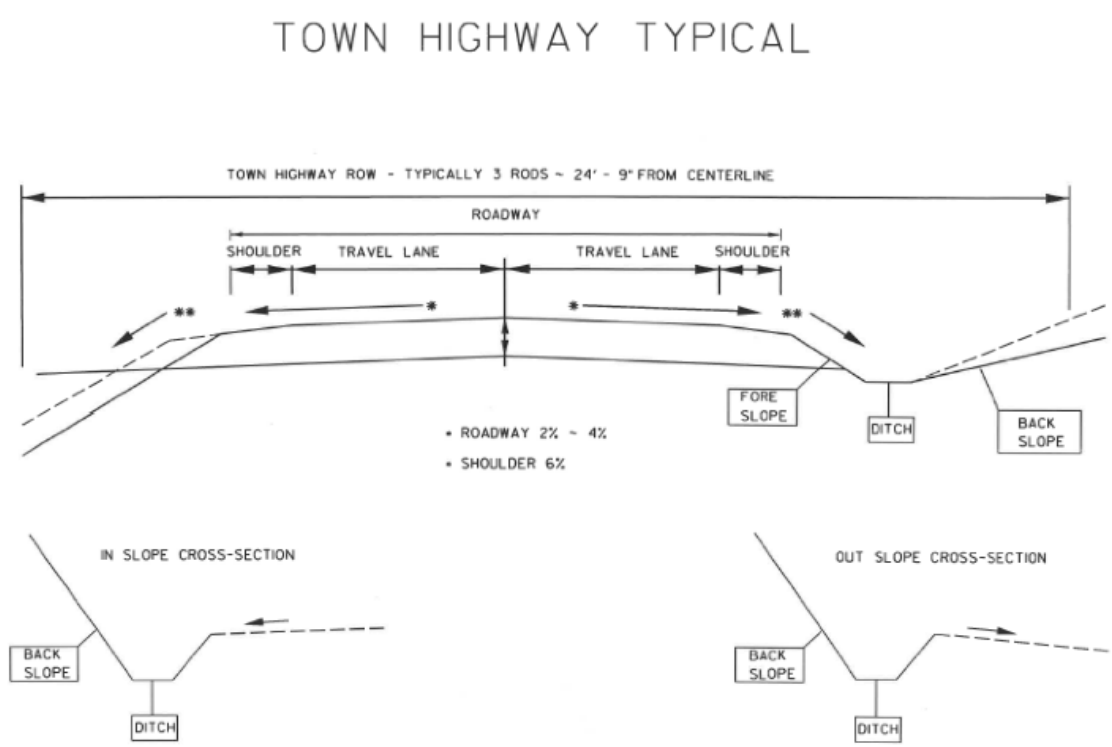
Assessor Notes: Option to re-calculate road segment slopes in the field with clinometer/ inclinometer, digital level, or equivalent (cell phone slope app is not appropriate). Be sure to set your digital level to the correct units setting - in percent slope and not degrees. Take 3 measurements of areas that are typical of the segment, take an average of those 3 measurements. If there is a very steep section of the segment longer than 65' in length, and likely over 8% slope, be sure to measure that slope as one of your 3 measurements, even if the rest of the segment is a lower gradient.

13. Capture Photo

14. Segment Location

15. Assessment Notes

MRGP Standards and Road Erosion Evaluation



Erosion Types (for all REI questions)

Gully Erosion Depth 12"+	Rill Erosion Depth 1" to <12"	Sheet Flow/None Depth < 1"

16. Roadway Crown/Travel Lane* (not applicable for paved roads)

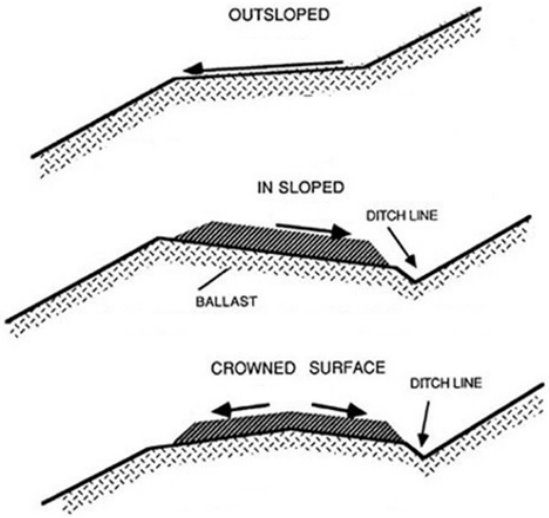
A-1. Is 90% of the segment in-sloped, out-sloped, or properly crowned?* (2% or greater crown slope)

Yes	No

A-2. Erosion Type Present* (within the travel lane)

Gully	Rill	Sheet Flow/ None

Assessor Notes: Measure crown with digital level between the road center and edge of travel lane. 10% of the 100-meter road segment is 10-meters, or 33 feet.



Out-sloped, in-sloped, and crowned diagram

17. Grader Berm/Windrow* (not applicable for paved roads)

B-1. Is 90% of the segment (both sides of the road) without grader berm/windrow?*

Yes	No

B-2. Erosion Type Present*

Gully	Rill	Sheet Flow/ None

Assessor Notes: MRGP language - *"Shoulder berms shall be removed to allow precipitation to shed from the travel lane into the road drainage system. Roadway runoff shall flow in a distributed manner to the drainage ditch or filter area and there shall be no shoulder berms or evidence of a 'secondary ditch'. Shoulder berms may remain in place if the road crown is in-sloped or out-sloped to the opposite side of the road from berm side of road."*

10% of the 200-meter road shoulder (100-meters on each side) is 20-meters or 66 feet.

Grader Berm

Secondary Ditch

18. Road Drainage Standards*

C-1. Is 90% of the segment (both sides of the road) allowed to shed water in a distributed manner, when shoulder is lower than road, to a forested or vegetated filter area or ditch that is;

Distributed flow: If no back slope exists or the toe of back slope is outside right-of-way (more than 25' from the road center).

Drainage ditch standards: If distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:

- For roads with slopes of 0% - <5%: Grass-lined ditch
- For roads with slopes of 5% - <8%:
  - Stone-lined ditch with minimum 6" to 8" minus stone, or
  - Grass-lined ditch with stone check dams, or
  - Grass-lined ditch with disconnection practices such as cross culverts and/or turnouts. There shall be at least two disconnection practices per segment, or spaced every 160'.
- For roads with slopes ≥ 8%: Stone-lined ditch with minimum 6" to 8" minus stone.

Yes	No

C-2. Erosion Type Present*

Gully	Rill	Sheet Flow/ None

Assessor Notes: MRGP language - "*If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above Road Drainage Standards.*"

10% of the 200-meter road shoulder (100-meters on each side) is 20-meters or 66 feet.

High Shoulder

Distributed Flow, Low Shoulder

19. Conveyance Areas/Turn-outs*

D-1. Do drainage ditch outlets and conveyance areas shed water in a distributed manner? If not, stabilize bank slopes with stone when slopes are 5% or greater.*

All practices in place	Practice absent in one or more areas	None present

D-2. Erosion Type Present*

Gully	Rill	Sheet Flow/ None

Assessor Notes:

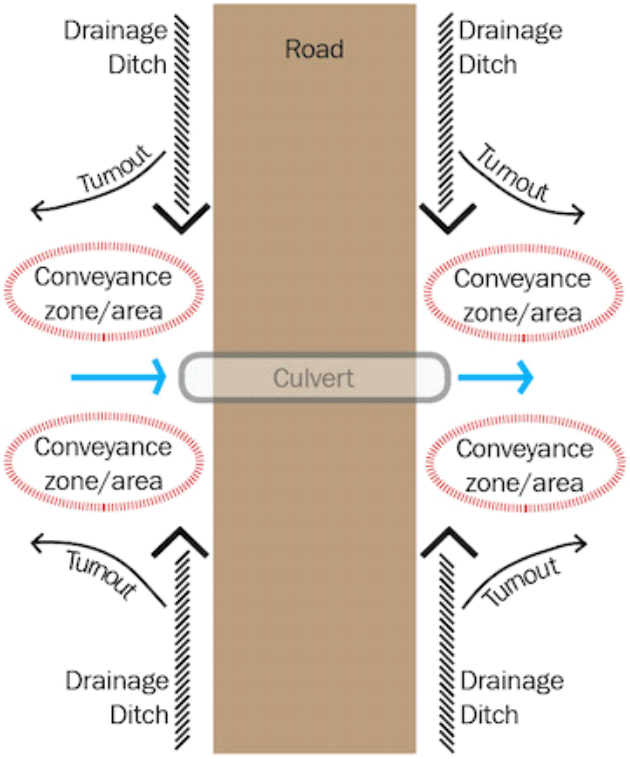
First determine if turnout/conveyance area is hydro-bisect or hydro-parallel

- Hydro-bisect: Road bisects a water resource (i.e., perennial or intermittent stream crossing). See diagram below. Evaluate each of the 4 possible areas where road runoff can enter the water resource to determine if each area meets this standard.
- Hydro-parallel: Road is parallel to a water resource. Evaluate each turnout.

Measure bank slope if distributed flow is not in place. Measure the bank where the ditch outlet/ turnout is located (not road slope). Measure with digital level.

Practice question will be met if:

- There is distributed flow (not concentrated) or
- Conveyances with slopes of 0% - <5% are stabilized with grass or
- Conveyances with slopes ≥5% are stabilized with stone.



Conveyance Diagram

Example of an armored turnout at a hydro bisect site

20. Non-Perennial Stream Culverts*

Are there existing driveway, drainage, or intermittent stream culverts along the road segment or absent but needed?*

Yes	No

E-1. Culvert Type*

Driveway	Drainage	Intermittent Stream

E-2. Culvert Status*

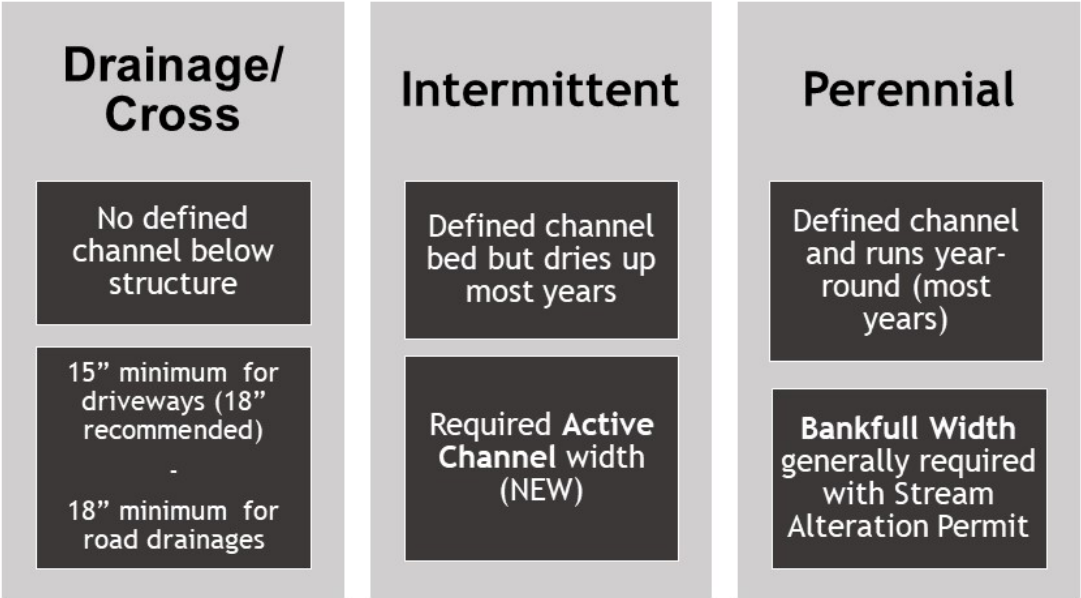
Existing	Absent

E-3. Erosion Type Present*

Gully	Rill	Sheet Flow/None

E-4. Culvert Condition*

Fully obstructed or failing	50% or more obstructed	Less than 50% obstructed



Perennial Stream Characterization:

A perennial stream may be characterized by any of the following:

- Direct observation or compelling evidence obtained that surface flow is uninterrupted (or flowing 10 months of the year flow or more, except during drought periods).
- Presence of one or more geomorphic characteristics typically associated with perennial streams including:
  - Bed forms; i.e. riffles, pools, runs, gravel bars, other depositional features, bed armor layer
  - Bank erosion and/or bed scour
  - Indications of waterborne debris and sediment transport
  - Defined bed and banks in a valley setting
- Watershed size greater than 0.25 square miles, although some perennial streams may be located in smaller watersheds. (See DEC ANR Atlas Small Streams layer)
- Presence of aquatic organisms (fish and macroinvertebrates) requiring uninterrupted flow for survival
- Base flows are primarily supported by groundwater recharge as indicated by bank seeps, springs or other indicators
- Disconnected surface flow within a singular channel; e.g. limited sub-surface flow

Any work to replace, retrofit or otherwise alter the stream bank or bed of a perennial stream may require a DEC Stream Alteration Permit. Please contact the DEC Stream Alteration Engineer before undertaking any such project.

21. Barriers to Implementation

Option to document the following that would fully or partially impede standards implementation:

- Historic stone walls (linear feet)
- Historic large trees (linear feet)
- Buried utilities (linear feet)
- Wetland (linear feet)
- Lakeshore vegetation (linear feet)
- Excessive ledge (linear feet)
- Public safety consideration (linear feet)
- Other (e.g., place listed on the Vermont Historic Register or work needed on private property)

Assessor Notes: Note that the above reasons would most likely impact the Road Drainage Standard. For example, it may be difficult to fully construct a drainage ditch or lower road shoulders if there is a historic stone wall, large historic trees or buried utilities that would fully or partially impede the implementation of such projects. Please measure linear feet as indicated.

Class 4 Roads

1. **Is gully erosion (12”+) present in the segment?***

Yes	No

2. **Gully erosion** (repeat feature for each area of gully erosion)

   A. Location* (along the road cross section)

Travel Lane	Shoulder	Ditch	Waterbar	Drainage Culvert (needed or present)	Driveway Culvert (needed or present)

   B. Length* (ft)

   C. Width* (ft)

   D. Average Depth* (ft)

   E. Notes

3. **Barriers to Implementation (see above)**