Agenda
Executive Committee
Wednesday, October 4, 2017 – 5:45 p.m.
Small Conference Room, CCRPC Offices
110 West Canal Street, Suite 202, Winooski, VT

1. Changes to the Agenda, Members’ Items

2. Approval of September 6, 2017 Executive Committee Meeting Minutes* (Action)

3. Act 250 & Sec 248 Applications
   a. Roosevelt Highway Solar Project, Colchester * (Action)
   b. Creekside Village - Dousevicz, Essex, #4C1305 * (Action)

4. FY19 Municipal Dues Recommendation* (Action)

5. ECOS Plan Update
   a. CEDS update*
   b. MTP update*

6. Municipal Road General Permit Draft Comments* (Action)

7. Legislative Breakfast topics (Discussion)

8. Chair/Executive Director Report
   a. Clean Water update
   b. Regional Dispatch update
   c. FY2017 Audit

9. Agenda Review – October 18th Meeting* (Discussion)

10. Other Business (Discussion)

11. Executive Session – if needed (Action)

12. Adjournment (Action)

*Attachments

NEXT MEETING – Executive Committee – Wed. November 1st, 2017; 5:45 p.m.

In accordance with provisions of the Americans with Disabilities Act (ADA) of 1990, the CCRPC will ensure public meeting sites are accessible to all people. Requests for free interpretive or translation services, assistive devices, or other requested accommodations, should be made to Emma Vaughn, CCRPC Title VI Coordinator, at 802-846-4490 x *21 or evaughn@ccrpcvt.org, no later than 3 business days prior to the meeting for which services are requested.
The meeting was called to order at 5:45 p.m. by the Chair, Chris Roy.

1. Changes to the agenda; Members’ Items. There were none.

2. Approval of August 2, 2017 Executive Committee Meeting Minutes. BARBARA ELLIOTT MADE A MOTION, SECONDED BY BRIAN BIGELOW, TO APPROVE THE MINUTES OF AUGUST 2, 2017 WITH CORRECTIONS IF ANY. MOTION CARRIED WITH ANDY MONTROLL ABSTAINING.

3. Act 250 & Sec. 248 Applications.
   a. Potential Solar Array project for Colchester – “Preferred Site.” Regina explained that net metering projects in Vermont are capped at 150kW, unless they are located on a preferred site. Vermont’s net metering rules allow for net metering projects to be up to 500kW if they are located on certain sites (described in her memo) or a specific location identified in a joint letter of support from the municipal legislative body and the municipal and regional planning commission. The main applicant is the Town of Colchester and some of the material has been reviewed by the Selectboard. This is on an open space parcel, part of a PUD, which is owned by the town. Colchester selectboard and planning commission drafted a letter to the Public Utilities Commission (PUC) saying that the current Colchester Town Plan does not provide guidance on solar siting and therefore the Planning Commission does not have the basis to evaluate compliance or non-compliance; however the Colchester Selectboard has endorsed the project and will solicit community input on the siting of this proposed solar facility in a comprehensive manner more so than envisioned by a preferred site process. The Town is asking CCRPC if we would consider writing a similar letter in support of this project. Staff has reviewed the project in light of our draft Energy Plan; and under our current practice of development review and didn’t find any issues. This is in the rural planning area and we have in the past found solar projects to be okay in rural areas. We do not need action tonight. Colchester’s solar consultant prepared a draft letter for CCRPC consideration, acknowledging that we also don’t have a plan or process or procedure in place to identify something as a preferred site yet, but that we find the site to be appropriate. Regina said staff is fine with this as an approach, but wanted to check with Executive Committee. Chris Roy questioned the 150kW system which is okay on a preferred site. However, the letter is not consistent with powerpoint printout that says the project is 208kW. Regina will check on this. This is a municipal net metering project and he feels it’ll have public input on it. John Zicconi questioned whether this is indeed a good
site or just site that would provide a project that lowers their energy rate. Regina feels that Colchester really wants to go with this type of project and has spent a lot of time researching appropriate sites. Discussion continued about whether “preferred site,” since it doesn’t have criteria or procedure yet, is as simple as when someone looks at it can say “yes that’s it.” Andy Montroll asked if we have any criteria to judge these on yet. We don’t yet. We have our general development review policy, but nothing in place to identify something as a preferred site for solar. Regina said she understands there will be a public process and the town is okay with it, and in the normal Act 250 review we put a good deal of weight into what the municipality supports. John Zicconi said when we have dual sign-off with town and RPC he assumes that’s there for checks and balances. Lengthy discussion continued. Do we feel we have something that we’re comfortable with before we sign it? John Zicconi questioned whether they should do the local public process before they go to the Public Utilities Commission, or should that go first. Regina said she understands there will be a couple of meetings in Colchester in September, so we won’t have final discussion until October for our action. After a brief discussion, Barbara Elliott suggested changing the second from the last paragraph in the letter to PUC to read that CCRPC is not against it, rather than is in support of it. Members agreed. Regina will check with Colchester to see if that type of language would get them what they need to move this project forward.

b. Cobble Hill Trailer Sales, Milton (4C1144-5). Regina noted that Lot #1 is Cobble Hill Trailer sales and the boundary line will be expanded and become Mountain Transit. The Executive Committee is being asked to ratify the letter sent to the DEC #4. JOHN ZICCONI MADE A MOTION, SECONDED BY BRIAN BIGELOW, TO RATIFY THE LETTER SENT TO DEC #4. MOTION CARRIED UNANIMOUSLY.

4. ECOS Plan Update.

a. Energy Element – draft policy statements. Members reviewed the second page of 3.2.2. The Energy Subcommittee came up with a way to eliminate “should” and “shall”. We need to say that there are places that we don’t want to see this, but there are places that we would like to see renewable energy projects. There are still some questions about how this will play out in the long term. Staff is checking in the Executive Committee to get their opinion on the tone of this. Chris Roy said he really likes it because there is an area of clear restrictions where we can say “no” and then everything else has a continuum of suggested things that we’re looking for. He feels it was a good approach. John Zicconi agreed and gives high praise for getting out of the “should” and “shall”. Staff will still refine this. The very clear constraint vs. suitability was Emily’s idea. Chris Roy is looking forward to the final draft to review at the board meeting.

b. MTP – draft financial plan. Eleni presented revised material from what was in the packet. We have three elements we have to address: 1) funding reasonably expected to be available; 2) level of funding needed to operate and maintain the existing system; and 3) the difference between 1 and 2 and how this will be allocated to projects/strategies. First we determined the amount of federal funds Vermont received from 2010-2016 ($211,609,103). Then we reviewed the portion of all federal funds (except earmarks) that came to Chittenden County. Between FY1999 and FY2016 the average was 19.4%. VTrans has agreed to use that number although they reminded us that there are several big projects in the pipeline. Now that we know how much money we have, we need to decide how we divide that among the various categories, which we redefined. For planning purposes we’ll define 70% to go to maintenance and 30% for new/expansion projects with the possibility that we’ll go as high as 45% for new projects. Discussion ensued. It was noted that the percentages are over the period to 2050 and individual
years will fluctuate. Eleni said if the Executive Committee is comfortable with that ratio, staff will work out the details and bring more information next month.

c. **CEDS Update.** Regina noted that we’re updating Community Economic Development Strategy (CEDS) because it’s on the same five-year cycle as the ECOS plan. We’re meeting with GBIC and others and will bring something in October and then go to municipalities to either the economic development committees or planning commissions.

5. **Credit Card Account Officer’s Certificate.** Forest Cohen presented a form that we need to fill out for the credit cards we have. We’re looking for a motion to authorize Chris to sign it. (This was just brought to our attention recently although we’ve had the cards for several years since the merger.)

BARBARA ELLIOTT MADE A MOTION TO AUTHORIZE THE CHAIR, CHRIS ROY, TO SIGN THE FORM.

BRIAN BIGELOW SECONDED AND THE MOTION CARRIED UNANIMOUSLY.

6. **Draft FY17 Financials.** Forest reviewed his memo in the packet, along with the financial statements. The bottom line is that we have $166,000 of income, unaudited. We did a good job of billing out our projects but fell short and only spent 95% of our expenses. We know when we earn this much it will affect our indirect rate two years down the road. Next year (FY18) will be a penalty year so we will have a lesser amount and have predicted a deficit. Our balance sheet is very strong with plenty of cash in the bank and no debt. Charlie said we made money in FY16 so that’s why we’re recovering less income in FY18. We also made money in FY17 so FY 19 will be another deficit year. We have been trying to be conservative. Charlie noted we talked to the Finance Committee and discussed that we could potentially review the rate at mid-year and perhaps adjust it then to reduce the income. Discussion ensued about having a three-year adjustment. Charlie said the RPCs have differing processes. After the merger we started with a high indirect rate and have been dealing ever since. Lengthy discussion continued. Charlie said VTrans is trying to be accommodating and are working with us. After further discussion, it was noted that there are pros and cons and perhaps we shouldn’t adjust the indirect rate at the mid-year. Talked about how it might work better if phased over two years.

7. **Executive Director’s Report.**

a. **Building Homes Together Campaign- revised numbers.** Regina noted that we have revised numbers for FY16 and presented a revised chart showing the number and type of housing units built or demolished in 2016. There were 834 new homes (rather than the near 1,000 we reported earlier). The plan is to have a press conference on September 27th to report these numbers and the Governor will also talk about the housing bond passed by the Legislature earlier this year. Regina noted that two years ago 400, 2015-600 and 2016–834. Regina said this chart is based on certificates of occupancy, so they are actually built; and it is based on the calendar year.

b. **Clean Water Program Update.** Charlie noted we’ve started work on these and we have four applications totaling $70,000 which we are reviewing. We are also working on basin planning that we’ve been subcontracted to do. Our application is due next Friday. The state Clean Water Fund Board met yesterday and have not responded to our comments. Capital bond money – they received more revenue than what had been anticipated, so there might be more capital money going in there. The Grants-in-Aid Program has shown that most towns are getting things done. Sec. Moore was taxed with looking at long-term funding. One question is are we going to do a statewide parcel fee and it seems it’s years away because of what has to be done to put this in place and how to bill each property owner and not just those who pay taxes. There may be more information for the October Board meeting.
8. **Agenda Review – September 20th meeting.** Members reviewed the proposed agenda.

9. **Other Business.**
   a. Charlie noted there is a Union Municipal District Agreement and a draft funding MOU for the regional dispatch project. These were reviewed by municipal managers and attorneys. It then will go the Attorney General in September and then to selectboards to ask to get it on town meeting ballots. Brief discussion.
   b. John Zicconi asked is South Burlington has come to us with the airport ownership issue. Charlie said no. Brief discussion.

10. **Executive Session.** None needed.

11. **Adjournment.** JOHN ZICCONI MADE A MOTION TO ADJOURN AT 7 P.M. ANDY MONTROLL SECONDED AND THE MOTION CARRIED UNANIMOUSLY.

Respectfully submitted,

Bernadette Ferenc
October 5, 2017

Judith Whitney, Clerk of the Commission  
Vermont Public Utility Commission  
112 State Street  
Montpelier, VT 05620-2701

Re: Chittenden County Regional Planning Commission – Letter of Support

Dear Ms. Whitney,

The Chittenden County Regional Planning Commission (“CCRPC”) is in receipt of a plan by the Town of Colchester (the “Town”) to develop a 150 kW solar project to be located on approximately 1.25 acres of an approximately 21.61 acre parcel located at 0 Roosevelt Highway, Colchester, Vermont (the “Project”). The parcel is an existing planned unit development and is owned by the Town.

The current Chittenden County ECOS Plan does not provide guidance on solar siting and therefore the CCRPC does not have the basis to evaluate compliance or non-compliance. However, the Project is in compliance with Chittenden County’s goal of reducing energy consumption and reliance on non-renewable energy, and the CCRPC supports the Town’s efforts to meet this County goal through this Project. The CCRPC has identified no specific issues or concerns on this site of a previously developed PUD. Thank you for your time and attention.

Sincerely,

Charlie Baker  
Executive Director
September 26, 2017

Warren Foster
Act 250 Acting District Coordinator
111 West Street
Essex Junction, VT 05452

RE: Creekside Village Development; Essex; Application #4C1305 – DRAFT

Dear Mr. Foster:

The Chittenden County Regional Planning Commission’s Staff and Executive Committee have reviewed this Act 250 application for a project described as construction of Creekside Village Development consisting of 17 single family homes, 14 carriage homes, and 1 existing single family home to remain. The Project is located at 15 Upper Main Street in Essex, VT. The project was approved by the Town of Essex Planning Commission on May 25, 2017. We offer the following comments:

The project is located within the Metro Planning Area as defined in the Chittenden County Regional Plan, entitled the 2013 Chittenden County ECOS Plan. We find this project to be consistent with the Planning Areas for the following reasons:

1. The Metro Planning Area is identified in the Plan as an area planned for growth, and therefore this project helps implement Strategy #2 of the Plan which calls for 80% of new development in the areas planned for growth.
2. The project will be served by municipal water and sewer service, and is accessible via GMT transit routes.
3. The density and uses are consistent with the local regulations.

Therefore, we find this project to be in conformance with the Planning Areas of the 2013 Chittenden County Regional Plan.

We also find that this project meets the requirements of Criterion 9(L), as it is located within an existing center that includes the characteristics defined in 10 VSA §6001(16), it is purely residential, and it makes efficient use of land, roads, energy, utilities and other infrastructure.

Due to the detailed level of development review in most Chittenden County municipalities and the environmental permit reviews at the Department of Environmental Conservation, CCRPC will give specific attention in its Act 250 reviews to the type of use and the Planning Areas section of the 2013 Chittenden County ECOS Plan. While there are many other topics covered in the 2013 Chittenden County ECOS Plan, there has been significant analysis at the Regional level regarding transportation impacts. The CCRPC will also focus its attention on transportation, where appropriate, in accordance with the Metropolitan Transportation Plan, which is within the 2013 Chittenden County ECOS Plan. We have no comments on transportation at this time.

These comments are based on information currently available; we may have additional comments as the process continues. Please feel free to contact me should you have any questions.

Sincerely,

Charlie Baker
Executive Director

Cc: CCRPC Board
    Certificate of Service
Chittenden County Regional Planning Commission
October 4, 2017
Agenda Item 4: Municipal Dues for FY19

FY2019 Municipal Dues

Background:
Each year the CCRPC assesses municipal dues that are primarily used to match federal transportation dollars for municipal and regional projects in Chittenden County.

The municipal dues assessment amounts are distributed among the member municipalities based on the Equalized Education Grand List (EEGL). Even with no increase in total dues, the dues for each municipality are adjusted each year consistent with their proportion of the EEGL. The most recent EEGL issued by the State of Vermont for Chittenden County is used in the FY19 tables. A copy of the January 1, 2017 Chittenden County EEGL is included in your packet.

*Table 1* shows a proposed 0% increase over FY18 dues for FY19. It is likely that the total dues assessed in FY18, $244,770, would be adequate for FY19.

The CCRPC had kept municipal dues level for fiscal years 2012 through 2014 following the merger. The dues were increased by 1.8% in FY15 based on the change in the Employment Cost Index (ECI) for State and Local Government employee Compensation, which is published by the U.S. Bureau of Labor Statistics (BLS). The Commission decided to level fund the dues again for FY16, FY17, and FY18.

The increase in ECI for state and local government workers during the 12-month period ending June 2017 was 2.6%. Excerpted pages from the U.S. BLS News Release regarding ECI, released on July 28, 2017, are included in your packet for reference. *Table 2* shows the FY19 dues with a proposed 2.6% increase over the FY18 dues. The overall dollar amount of a 2.6% increase is $6,364, for a total assessment of $251,134.

Recommendations:
Staff recommends that the Executive Committee decide whether to keep the municipal dues level for FY19 or to propose an increase. The Executive Committee will recommend Municipal Dues for FY19, based on this decision, to the Full Commission.

For more information contact:
Forest Cohen
fcohen@ccrpcvt.org, 846-449 ext. 19
## Equalized Education Grand List
### Effective January 1, 2017

#### Chittenden

<table>
<thead>
<tr>
<th>Town Name</th>
<th>Total Taxable Parcel Count</th>
<th>Education Grand List</th>
<th>Education CLA</th>
<th>COD</th>
<th>Total Equalized Education Grand List</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolton</td>
<td>752</td>
<td>1,245,335</td>
<td>99.07</td>
<td>3.80</td>
<td>1,256,970</td>
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<tr>
<td>Buels Gore</td>
<td>26</td>
<td>29,226</td>
<td>94.13</td>
<td>7.98</td>
<td>31,050</td>
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<tr>
<td>* Burlington</td>
<td>10,410</td>
<td>36,564,045</td>
<td>82.42</td>
<td>10.97</td>
<td>44,365,230</td>
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<td>Charlotte</td>
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<td>9,172,036</td>
<td>99.00</td>
<td>5.09</td>
<td>9,265,070</td>
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<td>Colchester</td>
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<td>20,777,414</td>
<td>94.33</td>
<td>8.46</td>
<td>22,026,060</td>
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<tr>
<td>Essex Jct.</td>
<td>3,403</td>
<td>10,859,353</td>
<td>97.50</td>
<td>5.49</td>
<td>11,138,290</td>
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<tr>
<td>Essex Town</td>
<td>4,333</td>
<td>14,417,686</td>
<td>97.45</td>
<td>5.49</td>
<td>14,795,180</td>
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<td>Hinesburg</td>
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<td>90.02</td>
<td>11.07</td>
<td>5,887,620</td>
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<td>Huntington</td>
<td>899</td>
<td>2,144,580</td>
<td>99.84</td>
<td>3.97</td>
<td>2,148,000</td>
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<td>6,622,983</td>
<td>104.19</td>
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<td>6,356,590</td>
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<td>* Milton</td>
<td>4,381</td>
<td>11,395,039</td>
<td>99.36</td>
<td>7.61</td>
<td>11,468,680</td>
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<tr>
<td>Richmond</td>
<td>1,678</td>
<td>4,537,391</td>
<td>96.95</td>
<td>10.25</td>
<td>4,680,120</td>
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<td>Shelburne</td>
<td>2,896</td>
<td>15,027,674</td>
<td>95.67</td>
<td>8.79</td>
<td>15,707,070</td>
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<td>* South Burlington</td>
<td>7,501</td>
<td>29,101,126</td>
<td>95.98</td>
<td>6.66</td>
<td>30,318,410</td>
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<td>St. George</td>
<td>339</td>
<td>710,257</td>
<td>95.83</td>
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<td>Underhill</td>
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<td>3,878,517</td>
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<td>Westford</td>
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<td>2,391,997</td>
<td>100.52</td>
<td>10.17</td>
<td>2,379,700</td>
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<td>Williston</td>
<td>4,089</td>
<td>18,952,964</td>
<td>99.24</td>
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<td>* Winooski</td>
<td>1,776</td>
<td>5,577,706</td>
<td>92.20</td>
<td>8.55</td>
<td>6,049,870</td>
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**County Totals**

<table>
<thead>
<tr>
<th></th>
<th>Total Taxable Parcel Count</th>
<th>Education Grand List</th>
<th>Education CLA</th>
<th>COD</th>
<th>Total Equalized Education Grand List</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>57,269</td>
<td>198,705,530</td>
<td>211,576,580</td>
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<td></td>
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</table>

* Municipality has active TIF district. For more information, refer to introduction preceding this report.
Each town is assessed dues using their percentage of the Equalized Education Grand List. Their amount is determined by taking the total dues and multiplying it by the municipality’s percentage of the total Grand List.

Equalized Education Grand List can be accessed at the Vermont Department of Taxes http://www.state.vt.us/tax/publications.shtml
Employer costs for health benefits increased 1.2 percent for the 12-month period ending in June 2017. (For further information, see www.bls.gov/web/eci/echealth.pdf.)

Among occupational groups, compensation cost increases for private industry workers for the 12-month period ending in June 2017 ranged from 1.7 percent for sales and office occupations to 2.9 percent for service occupations. (See table 5.)

Among industry supersectors, compensation cost increases for private industry workers for the 12-month period ending in June 2017 ranged from 1.8 percent for professional and business services to 3.9 percent for leisure and hospitality. (See table 5.)

**State and Local Government Workers**

Compensation costs for state and local government workers increased 2.6 percent for the 12-month period ending in June 2017. In June 2016, the increase was 2.3 percent. Wages and salaries increased 2.1 percent for the 12-month period ending in June 2017, higher than the June 2016 increase of 1.7 percent. Benefit costs increased 3.2 percent for the 12-month period ending in June 2017. The prior year’s increase was 3.4 percent. (See chart 5 and tables A, 7, 11, and 12.)
Table A. Major series of the Employment Cost Index  
(Percent change)

<table>
<thead>
<tr>
<th>Category</th>
<th>3-month, seasonally adjusted</th>
<th>12-month, not seasonally adjusted</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIVILIAN WORKERS(^1)</td>
<td></td>
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</tr>
<tr>
<td>Compensation(^2)</td>
<td>0.8</td>
<td>0.5</td>
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<tr>
<td>Wages and salaries</td>
<td>0.8</td>
<td>0.5</td>
</tr>
<tr>
<td>Benefits</td>
<td>0.7</td>
<td>0.6</td>
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<tr>
<td>PRIVATE INDUSTRY</td>
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<tr>
<td>Compensation(^2)</td>
<td>0.8</td>
<td>0.5</td>
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<tr>
<td>Wages and salaries</td>
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<td>0.5</td>
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<tr>
<td>Benefits</td>
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<td>0.6</td>
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<tr>
<td>STATE AND LOCAL GOVERNMENT</td>
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<tr>
<td>Compensation(^2)</td>
<td>0.6</td>
<td>0.5</td>
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<tr>
<td>Wages and salaries</td>
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<td>0.4</td>
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<tr>
<td>Benefits</td>
<td>0.8</td>
<td>0.7</td>
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</table>

\(^1\) Includes private industry and state and local government.  
\(^2\) Includes wages and salaries and benefits.

The Employment Cost Index for September 2017 is scheduled for release on Tuesday, October 31, 2017, at 8:30 a.m. (EDT).

Information in this release will be made available to sensory impaired individuals upon request—Voice phone: (202) 691-5200; Federal Relay Service: (800) 877-8339.

BLS news releases, including the ECI, are available through an email subscription service at www.bls.gov/bls/list.htm.
## FY18 to FY19 Municipal Assessments

### TABLE 2

<table>
<thead>
<tr>
<th>Municipality</th>
<th>EEG List</th>
<th>EEG List</th>
<th>1/16 - 1/17</th>
<th>1/16 - 1/17</th>
<th>CCRPC FY18 Assessment</th>
<th>CCRPC FY19 Assessment</th>
<th>FY18 - FY19</th>
<th>FY18 - FY19</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>January 2016</td>
<td>% of County</td>
<td>January 2017</td>
<td>% of County</td>
<td>$ Change</td>
<td>% Change</td>
<td>$ Change</td>
<td>% Change</td>
</tr>
<tr>
<td>Bolton</td>
<td>1,289,810</td>
<td>0.63%</td>
<td>1,256,970</td>
<td>0.59%</td>
<td>$(32,840)</td>
<td>-5.51%</td>
<td>$1,534</td>
<td>$35</td>
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<td>Buels Gore</td>
<td>29,390</td>
<td>0.01%</td>
<td>31,050</td>
<td>0.01%</td>
<td>$1,660</td>
<td>2.68%</td>
<td>$37</td>
<td>$2</td>
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<td>Burlington</td>
<td>42,433,560</td>
<td>20.62%</td>
<td>44,365,230</td>
<td>20.97%</td>
<td>$1,931,670</td>
<td>1.66%</td>
<td>$50,475</td>
<td>$2,185</td>
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<td>Charlotte</td>
<td>9,356,940</td>
<td>4.55%</td>
<td>9,265,070</td>
<td>4.38%</td>
<td>$(91,870)</td>
<td>-3.84%</td>
<td>$11,130</td>
<td>$133</td>
</tr>
<tr>
<td>Colchester</td>
<td>21,093,970</td>
<td>10.25%</td>
<td>22,026,060</td>
<td>10.41%</td>
<td>$932,090</td>
<td>1.53%</td>
<td>$25,092</td>
<td>$1,053</td>
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<td>Essex Jct.</td>
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<td>11,138,290</td>
<td>5.26%</td>
<td>$172,450</td>
<td>1.23%</td>
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<td>14,795,180</td>
<td>6.99%</td>
<td>$552,930</td>
<td>1.02%</td>
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<td>Hinesburg</td>
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<td>2.81%</td>
<td>5,887,620</td>
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<td>$102,900</td>
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<td>$392,120</td>
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<td>$585,900</td>
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<td>0.55%</td>
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<td>15,707,070</td>
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<td>Underhill</td>
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<td>3,863,200</td>
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<td>Westford</td>
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<td>Williston</td>
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<td>19,098,270</td>
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<td>Winooski</td>
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<td>6,049,870</td>
<td>2.86%</td>
<td>$10,370</td>
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<tr>
<td>TOTAL</td>
<td>$205,772,980</td>
<td>100.00%</td>
<td>$211,576,580</td>
<td>100.00%</td>
<td>$5,803,600</td>
<td>2.74%</td>
<td>$244,770</td>
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Each town is assessed dues using their percentage of the Equalized Education Grand List. Their amount is determined by taking the total dues and multiplying it by the municipality's percentage of the total Grand List.

Equalized Education Grand List can be accessed at the Vermont Department of Taxes
http://www.state.vt.us/tax/publications.shtml
Chittenden County Regional Planning Commission – Executive Committee
October 4, 2017
Agenda Item 5A: Comprehensive Economic Development Strategy (CEDS) Update

Issues:

Staff will provide an update and seek feedback on recent changes to the ECOS Plan’s CEDS.

(1) Edits and Reorganization: Staff have worked with the Long Range Planning Committee and GBIC to edit and reorganize the CEDS to comply with the latest requirements from the US Economic Development Administration. A SWOT analysis and a discussion of economic resilience are new requirements. The current draft incorporates feedback from both the LRPC and GBIC staff.

(2) A project list is now longer required, but the LRPC and GBIC agree that it makes sense to include one. Charlie will meet with which all municipalities to determine which of their planned infrastructure projects should be included. Staff will meet with Champlain Water District, Chittenden Solid Waste District, the airport, and UVM Medical Center to determine which projects should be included on the CEDS project list.

(3) The SWOT analysis included in the draft is a new component. Items were drawn from the 2012 analysis completed for the ECOS Plan and from recent work.

(4) The Economic Resilience section is also a new component, which was adapted from the State of Vermont CEDS section on economic resilience.

(5) The strategies and actions have been edited to reflect new projects and initiatives and to show work that has been completed since 2013. Since the strategies and actions appear in Chapter 3 of the ECOS plan instead of in the CEDS chapter, their location is indicated.

(6) The introductory text to the CEDS chapter and all data and indicators have been updated as well.

Staff Recommendation: No action needed at this time.

For more information contact: Emily Nosse-Leirer and Regina Mahony
846-4490 x *15 & *28 or enosse-leirer@ccrpcvt.org & rmahony@ccrpcvt.org
4.2 Comprehensive Economic Development Strategy (CEDS) – DRAFT 9/28/2017

SUMMARY BACKGROUND

Over the past several decades, Chittenden County has enjoyed a competitive advantage relative to the balance of the state. The findings of the 2012 Economic Base and Competitive Assessment reports, available as appendices and summarized here, show that the County’s share of population, Gross Domestic Product, jobs and income, among other economic indicators, has increased.

Despite the advantages the region has enjoyed in many areas, however, there are some disquieting trends that need to be acknowledged. If recent trends continue, there will be additional loss of jobs in high-wage industries and slow growth in lower-wage industries. Job growth has been slow over the past decade and this is likely to continue into the future. However, the Chittenden County region has a highly desirable quality of life by many measures and there will continue to be growth pressures. Our challenge is how to manage and shape these larger external growth pressures to improve our job opportunities and incomes while also improving our quality of life.

Understanding Economic Development

- Economic development is about building a community’s capacity for shared and sustainable improvements in the economic well-being of residents.
- Economic development is about access to good jobs that can support an adequate standard of living for all residents of a region or community. Economic development is also about continuous and sustainable improvements in the internal functioning of the economy, where its structural underpinnings are made stronger without sacrificing long-term quality of life.
- Economic development provides the means and the continuous process to strengthen the foundation of our communities, and to make them more resilient and able to withstand shocks.

We need economic development:

- To constantly renew and strengthen the “living economy.”
- To address on-going infrastructure needs of key dollar-importing regional businesses.
- To supply the financial resources in order to create and sustain healthy communities.
The Circle of Prosperity
When a state has and maintains a talented workforce it attracts a diverse industrial base of dollar importing businesses that create high wage jobs. From the economic drivers dollars flow into the private sector to provide taxes, public revenues, capital, resources, and employment opportunities. These private sector actions fund the public sector’s operations through taxes and governmental fees of which both the public and private sectors invest in creating and maintaining a clean environment, good schools, access to higher education and housing, and enhances the state’s quality of life, thereby creating healthy communities. The “Circle of Prosperity” illustrates this interrelationship. First articulated in Vermont back in 1997 by the Vermont Business Roundtable, the “Circle of Prosperity” emphasizes the fact that economic development and healthy communities are a system, involving the collective and sometimes coordinated actions of many individuals, businesses, and institutions.¹

Key Issues/Trends/Insights
This section is a combination of updated information originally included in Chapter 2 and 3 of the 2013 ECOS Plan and information from the CEDS chapter of the 2013 ECOS Plan.

SWOT ANALYSIS

This section analyzes the Region's strengths, weaknesses, opportunities and threats (SWOT). The issues below were originally identified in the ECOS Analysis Report titled Final Draft Chittenden County, VT Competitive Assessment. That report is an appendix to this plan and contains more detail on each issue. Supporting data on each issue and related actions are included elsewhere in this chapter. It should be noted that one issue can have positive and negative implications for the region, and therefore may be listed multiple times in the SWOT analysis. For example, Vermont's Clean Water Act creates new regulations that will increase costs for municipalities and developers, but the increased funding dedicated to these issues will also create jobs.
**Strengths: A region’s relative competitive advantages (e.g. industry supply chains and clusters, extensive port, rail and broadband assets, specialized workforce skills, higher education levels, collaboration among stakeholders), often internal in nature.**

- High concentration of a young and educated population
- Diversified base economic sectors
- High labor quality
- High concentration of institutions of higher education
- More diverse population than the rest of Vermont
- High quality airport
- University of Vermont Medical Center
- High quality of public K-12 education
- Vermont and Burlington “brand”
- Strong creative economy
- Access to high quality infrastructure (natural gas, interstate, telecommunications)
- Concentration of high net worth individuals
- Access to recreational, entertainment, and cultural opportunities
- Highly networked non-profit and service provider sector

**Weaknesses: A region’s relative competitive disadvantages (e.g. a risk-averse or change-resistance regional culture), often internal in nature.**

- Rising income inequality
- Housing affordability
- Labor constraints and skill shortages
- Uneven quality of public K-12 schools throughout the county
- Lack of connection between educational outcomes and employer needs
- Lack of career fairs and career planning
- Lack of affordable child care
- Limited developable site inventory
- Lack of diversity compared to the rest of the US
- Land transportation and commuter mass transit infrastructure
- Wages not keeping pace with high cost of living
- Slow population growth
**Opportunities: Chances or occasions for regional improvement or progress (e.g. expansion of a biosciences research lab in the region), often external in nature.**

- Increased involvement of University of Vermont in economic development
- Nurturing entrepreneurial environment and support systems
- Structured employer engagement in K-16 education curricula and State training programs
- Coordinating and increasing efficacy of state and local permitting processes
- Creating more dynamic economic development programs and services
- Increased policy focus and investment in renewable energy and clean water
- Ensuring adequate transportation infrastructure, including parking in downtown Burlington
- Leveraging and expanding regional assets to promote telecommuting and remote workforce
- Expanding access to career, vocational and technical education in K-12 and to adult Vermonters
- Engaging a highly skilled and trainable retirement age population
- Engaging and support a growing New American population

**Threats: Chances or occasions for negative impacts on the region or regional decline (e.g. several companies in the region considering moving out of state), often external in nature.**

- Permitting costs, delays, and appeals in the construction process
- Cost of complying with the Lake Champlain Total Maximum Daily Load
- Increasing rate of population aging
- Declining workforce age population
- Declining K-12 population
- Labor/skills needs negatively impacting employers’ growth, investment, and location decisions
- Aging transportation, water and wastewater infrastructure and limited maintenance funds
- Rising rates of chronic disease and dangerous behaviors, such as addiction, substance abuse, and obesity
- Significant population of economically disconnected Vermonters
- Lack of affordable rental and owner-occupied housing
**Economic Base Analysis**

This sub-section provides an analysis of the current economic base of Chittenden County and the trends that have been shaping the County’s economy up to this point in time. It considers those aspects of a regional economy most typically included in the preparation of a Comprehensive Economic Development Strategy (CEDS) or similar economic development strategic plans.

In reviewing the findings presented in the Economic Base Analysis report ([http://ecosproject.com/analysis](http://ecosproject.com/analysis)), it is apparent that Chittenden County enjoys a competitive advantage relative to the balance of the state. Further, the County is an essential part of the Vermont economy as evidenced by:

- Chittenden County contains 26 percent of the State’s population
- Median household income is $67,997 versus $56,990 for the State
- The County poverty rate is 12.3 percent for individuals, compared to 10.2 percent statewide
- Between 2010 and 2015, the State’s population grew .01%, while Chittenden County’s population grew 3%.
- Home to 27 percent of the State’s private businesses. Between 2010-2016, the number of private businesses increased by 3.7% in Vermont, and by 13.8% in Chittenden County.
- Accounted for 45 percent of total manufacturers’ shipments in 2007 [Looking for updated data]
- Thirty percent of the State’s retail sales occurred in the County (2012)
- GDP per capita in 2015 was $53,759 in the Burlington-South Burlington MSA vs. $43,495 for the State
- Provides 28.6 percent of sales tax revenue in Vermont in 2015 (a drop from 32% in 2012)
- Provides 36 percent of state income tax revenues in 2015 (an increase from 35% in 2012)

Over the past several decades the County’s share of population, GDP, jobs and income, among other factors, has increased. While this is certainly good news for the economic development community in the Burlington region, the analysis also points out some areas of concern, described below:

- Chittenden County is a mix of urban, suburban and rural areas, with a rural character that is important to many residents. Similarly, the economy includes the largest for-profit employer in the state (the major Global Foundries complex); the largest retail area in Vermont with five communities ranking in the top six in the state based on preliminary 2011 retail sales tax reports (Williston – #1; Colchester – #2, South Burlington – #3; Burlington– #4; and Essex - #6 (source: Vermont Department of Taxes)); and significant agricultural, recreational and open space areas. This mix of uses results in a character cherished by its residents and appealing to prospective residents. The challenge is to plan and manage future growth, including economic development, so that it sustains and enhances this community character.
• After declining from 2000-2010, employment in the private sector increased by 9.5% between 2010 and 2016. Public sector employment grew by 6.2% during the same time period.
• The largest employers in Chittenden County are the University of Vermont Medical Center and the University of Vermont rather than private sector businesses. These institutions are net dollar importers and are highly stable.
• The annual rate of population growth in both Chittenden County as well as the State has slowed over the past several years. While regional population growth is still stronger than statewide growth, this may suggest that the advantage the region has enjoyed from its population gains is shrinking.
• Chittenden County has the highest percentage of New Americans in the state, and the percentage is growing—1/3 of all new county residents in the last decade were born outside of the US. This group makes up 6.1% of the county’s spending power and is strongly represented in key sectors like manufacturing and health care.
• Services-providing industries have become a larger portion of the economy since 2010. In 2010, private goods-producing industries were 19.7% of the economy, and private services-providing industries were 65.9% of the economy. In 2015, the industries made up 15.2% and 69.3% of the economy respectively.
• The growth in the MSA’s gross domestic product over the past five years has come entirely from the services sectors. The MSA’s GDP increased 5.4% from 2010-2015; the GDP of private goods producing industries dropped 18.6% while the GDP of private services-providing industries increased by 10.9%.
• The number of Chittenden County jobs in high-wage industries has declined by more than 5,000 since the year 2000; much of this has been from cutbacks at IBM (now Global Foundries). Employment in mid-wage and low-wage industries has increased slightly. The loss of jobs in high wage industries is not unique to this region—it is part of a larger trend that has been seen nationwide.
• The construction industry has recovered since the recession, and the numbers of newly permitted projects, both housing and commercial/industrial, have reached pre-recession levels.
• Growth in total nominal wages has risen off its sharp decline in 2009, and average wages were 11.4% higher in 2016 than they were in 2010. However, manufacturing, one of the sectors with the highest average wages in Chittenden County, has seen wages decrease by 2% since 2009.
• After decreasing from 2008-2010, the number of private businesses in Chittenden increased by 820 establishments from 2010-2016.
• Since 2010, the retail sector has expanded. GDP per capita in the retail sector increased 3.8% between 2010 and 2016. However, over that same time period, employment in retail sectors decreased by 0.9%.
• Growth in traded-sector industries (those industries that sell their products and services outside the region and bring new money back in, thus supporting the local, or non-traded, industries) has been limited.
• The information technology and analytical instruments cluster remains the most important element of traded sector employment. Durable goods manufacturing, which includes electronics manufacturing, remains 7% of the region’s GDP.

• However, following the loss of more than 4,000 jobs at Global Foundries (formerly IBM) over the past decade, the long-term security of these jobs may be in question.

Household Financial Security [Data in this section drawn from Housing Analysis Report]

• In 2015, 25% of Chittenden County residents were living at less than 200% of the federal poverty level and many receive state and federal assistance to meet basic needs. Additionally, income inequality increased in Chittenden County between 2010-2015.

• Vermont’s Basic Needs Budget determines the hourly rate a worker would need to make to pay for their “basic needs,” ranging from food and housing to childcare and insurance. This rate is known as the “livable wage,” and it is calculated differently depending on household size/makeup and rural or urban location. For full time workers, the Vermont minimum wage is only 74% of the average living wage. However, this varies significantly by household composition and location. For example, the Vermont minimum wage is only 43% of the living wage for two working parents with two children in an urban area, and only 25% of the living wage for a single parent with two children in an urban area.

• Although this plan celebrates Chittenden County’s high income and education levels, income inequality increased in Chittenden County between 2010-2015. This follows a national trend that has been occurring since the 1980’s. While Vermont and Chittenden County have significantly lower levels of income inequality than the country as a whole, this trend is still concerning.

• Lower income Vermonters report higher rates of depression and chronic conditions, such as obesity, asthma, heart disease, stroke and diabetes. Lack of financial resources can also cause food insecurity. For example, in Chittenden County, 29% of students are eligible for free or reduced priced school meals. Food insecurity is also linked to obesity, as “unhealthy,” high calorie foods tend to be cheaper in terms of “calories per dollar” compared to “healthy” food like fresh produce.

• Household financial security influences a family’s ability to access enough food to fully meet basic needs at all times. Lack of financial resources can cause food insecurity.
  - 15,401 Chittenden County residents participate in 3SquaresVT (formerly known as Food Stamps).
  - 6.6% increase in 3SquaresVT participation since 2010.
  - 1 in 7 children in Chittenden County are food insecure.
  - 26% of grade school and high school students are eligible for free or reduced-price meals (Hunger Free VT – www.hungerfreevt.org). [Working with Hunger Free VT to get updated data]

• The County’s ability to grow its economy in the future will be closely tied to its ability to provide available labor. A broad-based strategy of skills upgrading, new methods of recruiting and alternative working arrangements will be necessary.

• More focus is needed on education and workforce development to train employees for the opportunities in the technologies needed for manufacturing, professional services and health care. See more under the “Education” topic.
For a more detailed discussion of housing costs in Chittenden County, please see Section 2.5.2.

**Working Lands & Land Based Industries** [Data for this section drawn from Natural Systems Analysis Report; Farm to Plate Annual Reporting; Informing Land Use Planning and Forestland Conservation Through Subdivision and Parcelization Trend Information – Vermont Natural Resources Council, September 2010; The Action Plan of the VT Working Landscape Partnership.]

- Working lands and resource extraction industries are critical components of a self-reliant and diverse economy, making a region less vulnerable to market crises. Local food and fuel production is preferred since the transportation to import these products consumes tremendous amounts of energy and generates pollution. In addition, when food is imported from far-away places, nutrient value is reduced during the transport time.

- Working lands and resource extraction industries are economically viable within the constraints of our natural landscape. Sustainably managed farmland and forest land means less developed land, fewer impervious surfaces, and thus a greater presence of the natural ecosystem’s features and functions. Conversely, high quality food and productive forests are dependent upon clean water and clean, nutrient-rich soils. It is imperative that we maintain high quality water and soils for healthy and viable food and forest product industries.

- A major challenge to forest and farm businesses is the value of the land in these industries versus the value of the land for development. Often when these industries are no longer economically viable, the land is sold and developed, resulting in forest fragmentation and increased parceling of land. The number of parcels has gone up, while their size has gone down, diminishing their economic viability and the ecological services they provide. This situation has far-reaching potential consequences for the future of Vermont’s local economies, including tourism.

- Markets for forest products are necessary to ensure that landowners can afford to hold and manage their forest land.

- In recent decades, farm enterprises in the County have been employing new forms of business ownership, engaging in non-farm employment, limiting the size of farm operations to control the growth of farm production expenses, producing different types of farm products, producing more farm-related products, and engaging in more direct sales to consumers.

- **Renewable energy generation, especially solar panels and biodigesters, provide opportunities for farmers to bring in extra income by producing electricity. Both net metering (using the energy produced on-site) and leasing the land to a developer may be valuable economic opportunities. For more information on CCRPC’s goals for renewable energy generation and facility siting policies, see Strategy 3.2.2.**

Despite the advantages the region has enjoyed in many areas, there are some disquieting trends that need to be acknowledged. Jobs in goods-producing sectors are dropping in economic output in comparison to service-providing sectors in the region. The rate of population growth has declined and that is likely to continue into the future, and the workforce continues to age. Though unemployment is currently very low, the workforce population is also decreasing. This may mean that businesses cannot grow due to a lack of skilled workers. These and other problems are exceedingly difficult to address on a local level, but this does not
mean that one should throw up one’s arms in despair. Local efforts, coupled with strong pressure on state and federal elected officials, could work to mitigate some of these disadvantages.

While reversing these trends is unlikely, awareness of them can facilitate local planning. It is unlikely that these issues can be successfully addressed locally since many of the policies affecting these changes emanate at the federal level. The larger issue here is a long-term structural change impacting Vermont. Local planning is necessary, but not nearly sufficient, given the magnitude of ongoing changes.

**Competitive Assessment**

This sub-section provides an assessment of the competiveness of Chittenden County, Vermont as an economic development product. In the economic development marketplace, the product being sold is usually a place, and the characteristics of that place determine its competitiveness. In this instance, the place being assessed is Chittenden County, Vermont and its constituent communities, in particular, the central City of Burlington. Chittenden County is comprised of many communities that have varying degrees of interest in differing forms of economic development. Taken as a whole, this provides the basis for a diverse and sustainable economy and quality of place in the future.

In reviewing the findings presented in the Competitive Assessment report ([http://ecosproject.com/analysis](http://ecosproject.com/analysis)), the following highlights were noted:

- Chittenden County is a mix of urban, suburban and rural areas, with an essential rural character that polling has consistently shown is important to many residents. Protection of this character must be reflected in economic development efforts if public sector economic development efforts are to be broadly supported.

- The County has a high quality of life, making it attractive to businesses and workers. The notable exception is the affordability of housing, which was rated the lowest quality of life factor in the 2012 Employers Survey. This issue persists as the most commonly observed weakness of the area in interviews of employers. While there are many reasons an employee in Chittenden County may choose to live outside the region, it is important to increase quality housing stock available to all income levels, to increase quality of life for current residents and to attract those who wish to live near their jobs.

- Based upon the results of the Employers Survey, recreational opportunities, safety from crime, and cultural opportunities all scored Very Good or higher, while the quality of the K – 12 educational system scored just below Very Good.

- Educational levels among residents 25 years old and older exceed state and national norms. (See Section 2.5 Education for more detail.) However, due to our aging demographics and available workforce, we need more individuals with postsecondary training and experiences.

- Roughly 40% of graduating high school seniors go on to no further education (industry recognized credentials, certificates, or two and four year degrees) once they leave school. This often means they have limited ability to engage meaningfully in the workforce, and disproportionately suffer from negative social, economic, and health outcomes.
The County represents 26% of the state’s population, and is relatively young, with household incomes and educational attainment exceeding state and national norms.

Between 2012 and 2016, Chittenden County’s employment base has remained concentrated within five private industry sectors: healthcare and social assistance; retail trade; manufacturing; accommodation and food service; and professional, scientific and technical services. However, the proportion of jobs in these sectors has dropped from 71% of total employment in the County in 2012 to 54% in 2016.

The number of subsectors with high location quotients (goods production, construction, manufacturing, education and health services and other services) shows a diversified employment base that offers opportunities for continued economic diversification and a broad base on which the County’s economy can flourish.

The County’s ability to grow its economy in the future will be closely tied to its ability to provide available skilled labor, particularly once the currently unemployed are absorbed back into the ranks of the employed as much as their skills will allow. A broad-based strategy of skills upgrading, training, new methods of recruiting and alternative working arrangements will be necessary. An integrated workforce delivery system plan will need to be considered and implemented.

Unemployment in Chittenden County is low. In January 2016, unemployment in Chittenden County was 2.9%, compared to the US average of 4.9%. However, Vermont’s percentage of “underutilized” workers is 8.2%, much higher than the unemployment rate. Workers who are unemployed, involuntarily part time, or marginally attached fall into this category. Although Vermont’s rate of underutilized workers is lower than the national average (10% in 2015), many Vermonters are still searching for a job that fits their skills and economic needs.

The best recruiting experiences reported by county employers are typically from workers in the Northeast, the upper Midwest and areas with similar climate and outdoor recreational opportunities, such as the Northwest and Colorado. Recruiting people from large technology centers such as Boston, Austin and California is difficult.

Employers report very good to excellent workforce quality, with good work ethic and productivity, and low turnover and absenteeism.

The County’s higher education infrastructure is excellent, although almost 30% of employers participating in the Employer Survey indicated that they have training needs that are not being met by local resources. While some of these needs are for skills that are unique to specific companies, several employers surveyed for this assessment reported similar training needs for skilled manufacturing occupations particularly in the machine trades. Interviewed manufacturers emphasized the strong need for local training programs in machining and other skilled occupations to support their growth and sustainability.

With the notable exception of affordability of housing, most every kind of quality of life factor sought by most people is readily available in the County.

S.135 directs the Commissioner of Labor and the State Workforce Development Board (SWDB) chair to convene a working group to assess current workforce education and training and develop a comprehensive strategy that meets the needs of employers and employees. This study and workforce development system review includes expanded Career and Technical Education programming, and a more integrated approach across agencies to develop a career pathways system to help link students to careers and workplaces in which they will best work. The working group’s report is due by November 15, 2017.
▪ The County’s perceived regulatory environment rates as less than Good (where Good = 3 on the five point scale used in the Employer Survey conducted as part of this assessment), with local property taxes and the local construction permitting process (regulations and procedures) both topics of complaint.

▪ Most permitted industrial parks are approaching full build out, and consequently the supply of industrial land remains low. This will continue to inhibit industrial growth in the County.

▪ Commercial land sales have increased since the recession and high sales activity is projected to continue. However, the market for office space is currently somewhat oversupplied, and construction will likely slow.

▪ Chittenden County is well-served with a highway network that facilitates multi-directional travel and is well-planned for roadway and related improvements. Those plans must be implemented, often at substantial cost and sometimes (particularly for larger projects) with delays from state-mandated permitting. A potential impending decline in the adequacy of the County’s roadway system caused by increasing traffic congestion, necessary roadway maintenance, and need for new road construction, coupled with the opportunity and need for future economic development, has resulted in the identification of a number of issues and situations that require immediate and careful consideration.

▪ The County is generally well-served with utilities and telecommunications services necessary to support economic development. The weakest part of the County’s utilities and telecommunications system is the quality and costs of telecommunications, in particular cell phone service. A major state-wide initiative to improve telecommunications services is underway. Though almost all Chittenden County households are served by broadband internet, faster internet is an important utility for many of the region’s key sectors, including those who work at home.

▪ Interviews and surveys show there are lingering misconceptions about the mission of GBIC.

▪ Continued and increased attention must be paid to providing services to existing businesses and entrepreneurs in Chittenden County. Organizations such as the Vermont Center for Emerging Technologies, BTV Ignite and the South End Arts and Business Association are key to the region. Encouraging the creation and growth of small, “home-grown” businesses is key to diversifying the economy instead of having relying solely on large employers like Global Foundries (formerly IBM) for all technology jobs.

▪ Three of the County’s public high schools have low performance indicators, and employer interviews indicate that the limited proficiency of students remains a concern as they move into the workforce. Equal education that meets or exceeds state standards, especially for financially disadvantaged students and those for whom English is not their primary language, is key to the economy.

▪ Funding the water quality projects necessitated by the Lake Champlain TMDL will present a challenge for Chittenden County municipalities by straining municipal budgets. Additionally, complying with increased stormwater management requirements will increase the cost of development.
Strategic Industry Sector Analysis
This sub-section provides a summary of the identification of target clusters and industry sectors that will likely be significant economic drivers for Chittenden County. The full Strategic Industry Sector Analysis report can be found at [http://ecosproject.com/analysis](http://ecosproject.com/analysis). Based on the Economic Base Analysis and Competitive Assessment, the following 12-14 initial target clusters and industries for attraction and development efforts were identified and submitted to GBIC for consideration:

- Information Technology
- Value Added/Sustainable Agriculture
- Digital Media
- E-Commerce
- Clean Tech/Green Technology
- Tourism
- Retail
- Non-profit Organizations
- Health Care
- Business and Administrative Services
- Value-Added Manufacturing
- Higher Education
- **Outdoor Recreation**
- **Food systems**

From this initial selection, five primary targets, one of which is a combination of three of the initial recommendations, were selected as value-adding industries with high location quotients and are profiled in the Strategic Industry Sector Analysis report referenced above:

1. Information Technology, Communications, and Media
   - Information Technology
   - E-Commerce
   - Digital Media
2. High Value-Added Manufacturing
3. Higher Education
4. Clean Tech/Green Tech
5. Health Care and Wellness
ECONOMIC RESILIENCE

As identified in the Weaknesses and Threats section of the SWOT analysis, Chittenden County faces a number of economic challenges. The Chittenden County Multi-Jurisdictional All Hazards Mitigation Plan identifies two hazards facing the county’s economy:

1. Economic Recession: While employment and property values have recovered strongly since the 2008 recession, Chittenden County could be affected by another national recession.
2. Major Employer Loss: The loss of a major employer, either through severe job cutbacks or outright closure, has the potential to dramatically increase unemployment and reduce property values due to out-migration of terminated employees or facilities closure.

An area’s ability to withstand, prevent, or quickly recover from major disruptions (i.e., ‘shocks’) to its underlying economic base, identify vulnerabilities and withstand or recover from disruptions. These disruptions are not equally felt throughout Chittenden County. Depending on the character of the hazard, employees in certain industries, residents of certain areas or people with lower incomes or a more limited social safety net will be impacted more than others. Increasing economic resilience means that all Chittenden County residents, institutions and businesses will be better equipped to handle economic shocks.

The State of Vermont CEDS states that any economic development activity that meets one or more of the following criteria increases economic resilience.

1. Embraces complexity
2. Plans for change
3. Expands opportunities
4. Develops diverse relationships
5. Designs for learning
6. Builds local and regional self-reliance

Building resilience is an issue that requires more than traditional economic development activities alone. The table below shows the different strategies and actions throughout the ECOS Plan that increase the region’s economic resilience.

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<table>
<thead>
<tr>
<th>A RESILIENT ECONOMY:</th>
<th>THE ECOS PLAN’S STRATEGIES INCLUDE:</th>
<th>ACTIONS TO IMPLEMENT THESE STRATEGIES INCLUDE:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Embraces complexity</strong> (Does it encourage flexibility, economic diversity, and awareness of uncertainty?)</td>
<td>Improving and strengthening the economic systems of our region to increase opportunities for Vermont employers and employees (3.2.1)</td>
<td>3.2.1.8: Economic Development Coordination - Work with the State of Vermont to implement the State CEDS</td>
</tr>
<tr>
<td><strong>Plans for change</strong> (Does it reflect systems thinking and foresight? Does it consider multiple scales? Does it build adaptive capacities?)</td>
<td>Directing growth in a way that benefits all sectors of the economy and enables economic diversity—trying to make development for homes, retail and industrial uses easier in the areas planned for their growth, and simultaneously decreasing the destruction of working lands (Strategies 3.2.1, 3.2.2 and 3.2.4)</td>
<td>3.2.1.4: Innovation and Entrepreneurial Development - Create an economic system of resources that is easily navigable at all stages of the innovation and entrepreneurial continuum.</td>
</tr>
<tr>
<td><strong>Expands opportunities</strong> (Does it enrich human, social, cultural, economic, and ecological wellbeing? Does it build diverse and accessible forms of livelihood and local wealth?)</td>
<td>Implementing strategies about education and equity, and seeking to improve the water quality of the region’s lakes, rivers and streams, and to increase investment in and reduce fragmentation of the working landscaping (3.2.3 and 3.2.4)</td>
<td>3.2.4.2: Protect farmland and forestland and support existing and new operations</td>
</tr>
<tr>
<td><strong>Develops diverse relationships</strong> (Does it forge trusted partnerships and rich feedback loops amongst a flexible network of people and resources?)</td>
<td>Partnering with health and social welfare groups to increase the health and safety of every community member (Strategy 3.2.5)</td>
<td>3.2.5.7: Social Connectedness - Increase opportunities for residents to come together, interact and network</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.5.1: Basic Needs - Provide the basic needs of all people</td>
</tr>
<tr>
<td>Designs for learning (Does it facilitate continuous learning, adaptation, knowledge sharing, and innovation?)</td>
<td>Supporting educational efforts for all ages to ensure that children have equal opportunity for good educations, that teenagers are prepared for future careers, and that adults have the skills they need to thrive at work (Strategy 3.2.6).</td>
<td>3.2.6.2: Elementary Readiness and Comprehensive Student Needs</td>
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<tr>
<td>Builds local and regional self-reliance (Does it empower communities?)</td>
<td>Making equity a focus of planning through government partnerships data analysis, project prioritization and public participation (Strategies 3.2.7 and 3.2.8).</td>
<td>3.2.7.1: Community Development Finance Tools - Expand and improve implementation of financial tools available to municipalities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.7.7: County coordination and alignment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.7.8: Multi-jurisdictional services</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.8.3: Increase opportunities and remove barriers for civic engagement for all, including underrepresented populations</td>
</tr>
</tbody>
</table>
4.2.3 STRATEGIC DIRECTION/ACTION PLAN

A Project List is no longer required, but one will be included. It will hopefully include identifying funding sources besides EDA grants. See the attached draft project list.

Goals

Broad Goal: Build the region’s capacity for shared and sustainable improvements in the economic wellbeing of the community through support of both local and globally competitive initiatives.

Economy Goal: Retain and support existing employers and job growth, grow target sector employers and entrepreneurs, and work to attract a greater diversity of employers and employees.

Household Financial Security Goal: Improve the financial security of households.

Working Lands Goal: Support the growth and vitality of working farms and managed forests; and sustainably manage sand and gravel extraction operations.

Strategies – [Note: These strategies are currently found in Chapter 3 of the ECOS Plan, most from strategy 3.2.1. However, other issues are addressed in detail elsewhere in the ECOS Plan. If no edits are proposed, those actions are not included here. For example, actions related to housing affordability can be found in Section 3.2.2.3.]

3.2.1 IMPROVE AND STRENGTHEN THE ECONOMIC SYSTEMS OF OUR REGION TO INCREASE OPPORTUNITIES FOR VERMONT EMPLOYERS AND EMPLOYEES.

Economic development is about building a community’s capacity for shared and sustainable improvements in the economic well-being of residents. Providing access to good jobs that can support an adequate standard of living for all residents of a region or community; continuous and sustainable improvements in the internal functioning of the economy, where its structural underpinnings are made stronger without sacrificing long-term quality of life; and providing the means and the continuous processes to strengthen the foundation of our communities.

Actions

1. **High wage employers** – The primary goal of any economic development strategy is retaining and growing the already existing high wage jobs within the economy. The region should maintain economic diversity by deepen existing sectors, and increase diversity by identifying and supporting businesses in sectors with high location quotients. Providing support and connecting available resources is critical to ensuring that this economic base remains vital and is able to grow. The high wage sectors in which Chittenden County expects to drive our economy are: Information Technology, Communications, and Media (including Information Technology, E-Commerce, and Digital
Media); High Value-Added Manufacturing; Higher Education; Clean Tech/Green Tech; and, Health Care and Wellness (see the Target Sector Analysis – will be located here www.ecosproject.com/analysis shortly.).

a. Build relationships with these employers. For example, the recent Region’s Tech Jams highlighted some of the region’s many successful tech companies. Success here connects to the action on innovation and entrepreneurial development and includes: developing and attracting a tech workforce, access to financing, marketing VT and the region as a home for tech jobs and tech companies, supportive infrastructure such as broadband access, incubator space, and networking.

b. Facilitate access to employment and infrastructure development resources made available by the State. Currently these include programs such as the Vermont Employment Growth Incentive, Vermont Training Program, etc.

c. Market the quality of life and the Vermont and Burlington “brand”—Chamber action

2. Industrial Site Locations – With only a few years supply of existing buildings or permitted sites left for high wage industrial or manufacturing businesses in the region, additional sites need to be identified and carefully planned to ensure a smooth permitting process to be ready for employers’ needs for expansion or relocation in Chittenden County. The most likely employment sectors with this need are high wage, technology-based and other types of manufacturing. The best opportunities for these sites are on vacant portions of land owned by current major employers, within close proximity to or already connected to existing infrastructure services for long term efficiency.

a. CCRPC and GBIC will work with ACCD to have business/industrial parks recognized as benefit locations in state designation programs. (Funded by GBIC and CCRPC. No direct additional employment is expected, but this would help to create future opportunities.)

b. Efforts should be made by CCRPC to educate businesses and developers about “Smart Growth”—development practices that achieve a higher level of density, greater compatibility within traditional development patterns, use less land, and provide for all modes of transportation.

c. GBIC should prepare a “longevity analysis” to project when additional fully-serviced land should be added to the regional inventory.

3. Workforce Education and Skills Development – Promote public/private partnerships for education that connect the skills development infrastructure of our institutions of higher education, vocational programs, and technical schools with the direct needs of the Vermont workforce. If education takes place with connections to our economic needs, students and retrained workers will have their skill sets match with the employment market.

a. See Strategy 3.2.6 for more actions related to education.
a. Maintain, improve and market the assets that attract and retain young professionals, such as the “Vermont brand,” social and professional opportunities, and affordable and attractive housing

4. Innovation and Entrepreneurial Development – Coordinate and promote the providers, programs, and services already available in the State to create an economic system of resources that is easily navigable at all stages of the innovation and entrepreneurial continuum. This must aggregate and address services such as finding capital, mentorship, prototyping, commercialization, etc.
   a. Encourage home-based small businesses in villages throughout the Region as allowed by municipal zoning, and ensure that sufficient telecommunications infrastructure, especially high-speed internet, is available to make these businesses possible.
   b. Research Dayton, OH’s work which capitalizes on the entrepreneurial spirit of recent immigrants as a cornerstone of their economic development policy and actions, and incorporate strategies as appropriate.

5. Creative Economy and the Arts – Arts and the creative economy are what drives a large and diverse amount of economic activity in our region (e.g. local foods, design, technology, media, craftsmanship/fabrication, arts, emergent media, music, dance, festivals, education, and recreation). This portion of the economy is fundamentally unique in that it is a significant contributor to the culture in our region. Support creative economy and arts programs and efforts. Create collaborations between arts, culture and recreation groups and the Chamber of Commerce and local businesses to promote the use of local artists in regular business needs (i.e. advertising, branding, communications, etc.) and to share vacant or underutilized commercial spaces with artists for gallery and/or studio space.

6. Working Lands - Support value-added foods, farms and forest products through the work of Farm to Plate by Vermont Sustainable Jobs Fund and Working Lands Enterprise Board. See Strategy 4 for more details.

6.7. Tourism – Continue good efforts in tourism including VT Convention Bureau, Lake Champlain Regional Chamber of Commerce, and Lake Champlain Byway. Support the work of the Vermont Outdoor Recreation Economic Collaborative, a task force created by Governor Phil Scott in 2017, to strengthen and expand Vermont’s outdoor recreation economy.

7-8. Economic Development Coordination – CCRPC and GBIC should work with the State of Vermont to implement the 2014 Vermont Comprehensive Economic Development Strategy (Vermont 2020). Both the State of Vermont and Northwest Regional Planning Commission have begun economic development planning efforts to develop CEDS for the State and Northwest region—There has not previously been a Statewide CEDS. A Statewide CEDS process is beginning in 2013 and this Plan will help inform that effort. Any recommendations that come out of that process will be
considered in future ECOS Plan amendments or revisions as appropriate. CCRPC staff is actively participating on behalf of CCRPC and GBIC in both efforts as part of their advisory committees. GBIC and CCRPC will coordinate and assist those efforts to improve the effectiveness of efforts in Chittenden County and for the State.

8.9. Public Infrastructure – Adequate funding for public infrastructure is necessary to maintain and expand existing systems. See the Metropolitan Transportation Plan for more details.

9.10. Housing Affordability – Affordable rental and owner-occupied housing is a key component of economic development. See Strategy 3.2.2.3 for more details.

10.11. 5. State/Local Permitting Coordination & Improvement (Currently in the ECOS Plan as Action 3.2.2.5)

a. Support changes to the local and state permitting process to make the two more coordinated and effective. Participate in the Agency of Commerce and Community Development’s (ACCD) process to improve the State’s designation programs designed to encourage development in appropriately planned places and discourage development outside of those areas. This program could be improved with regulatory and/or fiscal incentives. These could include expedited permitting processes for projects in areas that are: a) designated for growth; and, b) where a community has a robust plan, regulations and staff capacity; and reduction of redundancies such as delegation of permitting for certain local and state reviews (such as exemption from Act 250). In conjunction with delegation it may be appropriate to develop more stringent standards and thresholds for development review in rural areas.

b. Collaborate with stakeholders to ensure local and state regulations, bylaws and plans encourage transparency, predictability and timely review of sustainable and environmentally sound development applications.

c. Develop a transportation assessment process that supports existing and planned land use densities and patterns in Center, Metro, Suburban, Village, and Enterprise Planning Areas to allow for more congestion and greater mode choice than allowed by current standards. The CCRPC will collaborate with the Vermont Agency of Transportation (VTrans), the Natural Resources Board, and other state and local stakeholders to develop a process that evaluates the transportation impact from a multi-modal perspective rather than just a traffic flow standpoint.

- Policies and planning studies that are adopted as part of this ECOS Plan and subsequent amendments will guide CCRPC’s position in permit proceedings.

d. Participate in the Commission on Act 250
EVALUATION FRAMEWORK

The Key Indicators below are reported on the ECOS Scorecard: https://app.resultsscorecard.com/Scorecard/Embed/8502

Proposed New Indicators:

➢ Wages in Chittenden County by target industry sectors

![Wages by Sector Over Time](image)

➢ Percent of employment and location quotient of target industry sectors in Chittenden County – Will add

➢ Economic Diversity – Will add
Current Indicators:

➢ Population Age Trends

Figure 2. Change in Age Cohorts, 2005-2014

Source: American Community Survey 1-year estimates, Table S0101

➢ Chittenden County job growth

Total (Covered) Employment - Chittenden County

Data Source: Vermont Department of Labor, Economic & Labor Market Information


➢ Total number of businesses in Chittenden County:
➢ The unemployment rate in Chittenden County

Data Source: Vermont Department of Labor, Economic & Labor Market Information (Not Seasonally Adjusted)

➢ Education rates in Chittenden County

Data Source: American Community Survey, 1 year estimates (S1501)

➢ Percent of Adults (25+) with Bachelor's Degree or Higher in Chittenden County

Data Source: American Community Survey, 1 year estimates
➢ Chittenden County household income

Data Source: American Community Survey, 1-year estimate

➢ Household income by race

Data Source: American Community Survey, 1-Year Estimates, Table B19013B

Percentage of Families whose Income in the Last 12 Months is Below Poverty Level

➢ Average Combined Housing + Transportation Costs

Data Source: Percentage of families whose income in the last 12 months is below poverty level, U.S. Bureau of the Census, ACS 1-year estimates
Working Lands & Land Based Industries

- Use Value Appraisal (UVA) Enrollment
  - The number of farms versus acreage of farmland.

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**ECOS** Housing + Transportation Costs for Median Income Family

Data Source: [http://www.locationaffordability.info/ai.aspx](http://www.locationaffordability.info/ai.aspx)

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**ECOS** Economy: Number of Forested Acres enrolled in the Current Use Program

Data Source: Vermont Department of Taxes

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**ECOS** Economy: Number of Agricultural Acres enrolled in the Current Use Program

Data Source: Department of Taxes
Color Key:
- Projects proposed for removal (as well as programs that are already removed) so we can instead focus on major infrastructure/utilities.
- Projects proposed for removal because they are on the MTP project list
- Questionable infrastructure projects - keep these or remove?
- Cost estimate or date from old CEDS list that needs to be updated

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Infrastructure Type</th>
<th>Project Summary</th>
<th>Estimated Cost</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington/South Burlington</td>
<td>Airport</td>
<td>Airport Improvements - South End Development Engineering Design - General Aviation/Corporate Taxiway &amp; Apron.</td>
<td>$9,780,000</td>
<td>2013-2016</td>
</tr>
<tr>
<td>Burlington/South Burlington</td>
<td>Airport</td>
<td>Airport Improvements - South End Development PHASE 6 - Taxiway G Extention, Taxiway B rehabilitation.</td>
<td>$80,000,000</td>
<td>2014</td>
</tr>
<tr>
<td>Burlington</td>
<td>Airport</td>
<td>Vermont Aviation Center (CEDO)- Working with VTC, Heritage Aviation and the Airport to establish a facility housing the Burlington Aviation Tech Program, Vermont Flight Academy and allowing room for VTC to expand their future aviation program offerings.</td>
<td>$5,250,000</td>
<td>2019</td>
</tr>
<tr>
<td>Burlington, South Burlington</td>
<td>Airport</td>
<td>Airport Improvements - South End Development PHASE 5 - Construction of New Cargo Area.</td>
<td>$5,000,000</td>
<td>2018-2019</td>
</tr>
<tr>
<td>Burlington, South Burlington</td>
<td>Airport</td>
<td>Airport Improvements - South End Development PHASE 7 - General Aviation/Corporate Taxiway &amp; Apron.</td>
<td>$5,000,000</td>
<td>2020</td>
</tr>
<tr>
<td>Burlington</td>
<td>All</td>
<td>General utility upgrades in waterfront district - Water, sewer, lighting, electrical, conduit, telecommunications upgrades to prepare sites for development and enhanced public space.</td>
<td>$6,500,000</td>
<td>2014</td>
</tr>
<tr>
<td>Burlington</td>
<td>Broadband</td>
<td>Burlington High School Renovations - to meet 21st century learning needs, such as electrical outlets and capacity, wireless infrastructure, smart boards and projectors.</td>
<td>$6,500,000</td>
<td>2016</td>
</tr>
<tr>
<td>Colchester</td>
<td>Broadband</td>
<td>Community Broadband Wireless Technology Access</td>
<td>$25,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Brownfield</td>
<td>Redevelopment of 453 Pine (CEDO) - Redevelop Brownfield at 453 Pine St to allow growth in the South End. Possible inclusion of solar array.</td>
<td>$6-12,000,000</td>
<td>2013</td>
</tr>
<tr>
<td>South Burlington</td>
<td>City Hall</td>
<td>New City Hall - Expanded facility to meet community needs for municipal services and municipal meeting space.</td>
<td>$8,900,000</td>
<td>2018</td>
</tr>
<tr>
<td>CVE, Essex Junction</td>
<td>Culture</td>
<td>Champlain Valley Exposition (CVE) music pavilion/grandstand – Renovation &amp; expansion</td>
<td>$8,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Hinesburg</td>
<td>Electric</td>
<td>Extension of 3-phase power - to South Hinesburg along VT116 by Green Mountain Power. Job creation possibly substantial, service extension to existing industrial district with ample build out potential.</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Chittenden County</td>
<td>Emergency Services</td>
<td>New regional dispatch facility and technology capital costs.</td>
<td>$1,140,000</td>
<td>2018</td>
</tr>
<tr>
<td>Burlington</td>
<td>Ferry - Waterfront</td>
<td>Redevelopment of King Street Dock Site / Ferry Yard Relocation (CEDO) - Relocation of maintenance yard, and redevelopment of King Street dock site and ferry terminal – mixed use development.</td>
<td>$60-65,000,000</td>
<td>2014</td>
</tr>
<tr>
<td>Burlington</td>
<td>Food Systems</td>
<td>Intervale Heated Greenhouse (CEDO) – Build greenhouses on intervale land heated by excess heat from the McNeil Plant.</td>
<td>$65,000,000</td>
<td>2015</td>
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<tr>
<td>Municipality</td>
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<td>Timeframe</td>
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<tr>
<td>Burlington</td>
<td>Food Systems</td>
<td>Burlington Food Enterprise Center (CEDO) - Finalize Environmental remediation of the site (CAP) and possibly sell property to Intervale Center for future redevelopment.</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>CVE, Essex Junction</td>
<td>Food Systems</td>
<td>Champlain Valley Exhibition Agricultural Center - create an agricultural center</td>
<td>$8,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Heating</td>
<td>District Heating Plan (CEDO) - Plan to recapture &quot;waste heat&quot; from the McNeil power plant and distribute it to the Old North End of Burlington, a densely populated area within the City.</td>
<td>$21,000,000</td>
<td></td>
</tr>
<tr>
<td>St. George</td>
<td>Heating</td>
<td>Extension of Natural Gas service in Hinesburg up Richmond Road.</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>CVE, Essex Junction</td>
<td>Highway Garage</td>
<td>Highway Garage planning, design and construction - Expand existing space to accommodate all vehicles and repair activities.</td>
<td>$103,000</td>
<td>After 2018</td>
</tr>
<tr>
<td>Hinesburg</td>
<td>Highway Garage</td>
<td>planning, design and construction</td>
<td>TBD</td>
<td>2016</td>
</tr>
<tr>
<td>Essex</td>
<td>Historic</td>
<td>Historic Structure repairs, construction - Fort Ethan Allen Water Tower requires funds for preservation of structure.</td>
<td>$1,000,000</td>
<td>2016 and beyond</td>
</tr>
<tr>
<td>Colchester</td>
<td>Library</td>
<td>Burnham Memorial Library Expansion - The current public community library has outgrown its space and is limited to what it can and should potentially offer to the public. Serving 60,000+ patrons.</td>
<td>$5,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Essex</td>
<td>Library</td>
<td>Library Expansion and Renovation, Planning, design and construction - expand existing space to meet current needs.</td>
<td>$100,000</td>
<td>2016</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Library</td>
<td>Library and recreation facility serving community.</td>
<td></td>
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<tr>
<td>University of Vermont Medical Center</td>
<td>Medical Facility</td>
<td>UVM Medical Center Inpatient Facility - Development of a new inpatient facility to serve the population of Northwest Vermont. Design completed, in permit process.</td>
<td>$187,000,000</td>
<td>2016</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parking</td>
<td>Downtown parking garage on the campus of Edmonds School for the use of School, Champlain College and the community (BSD). Underground facility with turf surface above to extend green area for School. Consider parking revenue as one source of funding.</td>
<td>$5-10,000,000</td>
<td>2015</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Parking</td>
<td>City Center Parking Decks - Construct 500 spaces to provide necessary infrastructure to facilitate business and residential development.</td>
<td>6300000</td>
<td>2018</td>
</tr>
<tr>
<td>Westford</td>
<td>Parking</td>
<td>Formalize on street parking in front of brick meeting house - upgrade, pave and stripe parking.</td>
<td>$15,000</td>
<td>2020</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parks</td>
<td>Leddy Arena Parking Lot Renovation (Parks) - Existing parking lot deteriorating and in need of major reconstruction.</td>
<td>$1,500,000</td>
<td>2016</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parks</td>
<td>Boat House Public Restroom Renovation (Parks) - Significant leaking has deteriorated existing facilities. Need for renovation.</td>
<td>$15,000</td>
<td>In-progress</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parks</td>
<td>Waterfront Electrical Distribution Design (Parks) - Improvements needed to better support waterfront events.</td>
<td>TBD</td>
<td>TBD</td>
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<tr>
<td>Burlington</td>
<td>Parks</td>
<td>Miller Community Recreation Center Roof Renovation (Parks) - Facility currently experiences serious, extensive leaking throughout building. Repair/replace existing roof, remove chimney.</td>
<td>$7-10,000,000</td>
<td>2013</td>
</tr>
<tr>
<td>Municipality</td>
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<tr>
<td>Burlington</td>
<td>Parks</td>
<td>City Hall Park (BCA/Parks) — Imagine City Hall Park master planning process completed; park slated for major reconstruction. Stimulate downtown business growth.</td>
<td>$575,000</td>
<td>In-progress</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parks — Waterfront</td>
<td>Marina Expansion and Long-term Improvements (Parks) — In conjunction with Plan BTV, the Parks Master Plan, and an assessment of the existing Boathouse, opportunities to improve/renovate/replace the Boathouse, increase transient boater slips, and improve land side amenities should be considered.</td>
<td>$2-3,000,000</td>
<td>2014</td>
</tr>
<tr>
<td>Burlington</td>
<td>Parks — Waterfront</td>
<td>Continue reconstruction of and enhancement of 7.5 mile bike path</td>
<td>$17,000,0000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Colchester</td>
<td>Recreation</td>
<td>Multi-Generational Community Recreation Center — Land secured; funding needed to build.</td>
<td>$500,000</td>
<td>In Progress</td>
</tr>
<tr>
<td>Burlington</td>
<td>Redevelopment</td>
<td>Town Center Mall redevelopment — associated public infrastructure and parking</td>
<td>$200,000,000</td>
<td>2017</td>
</tr>
<tr>
<td>Burlington</td>
<td>Redevelopment</td>
<td>Gateway Block Redevelopment (CEDO) — Redevelopment of the Gateway Block at Main and North Winooski. Properties include Memorial Auditorium, Municipal surface lot, motel and firehouse.</td>
<td>$10,000,000</td>
<td>2014</td>
</tr>
<tr>
<td>Burlington</td>
<td>Redevelopment</td>
<td>Moran Plant/Waterfront Redevelopment (CEDO) — To redevelop one of the last parcels/vacant buildings on the shores of Lake Champlain in downtown Burlington. The Moran plant has been vacant for decades and the city is now working to develop a private/public partnership to renovate the facility.</td>
<td>$330,000</td>
<td>2013</td>
</tr>
<tr>
<td>Burlington</td>
<td>Redevelopment</td>
<td>YMCA — Redevelopment of current site.</td>
<td>$95,000</td>
<td>2013</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Redevelopment</td>
<td>City Center Development — Assure there is an adequate inventory of “develop-able” sites with the necessary infrastructure to promote retention and expansion of existing firms and the recruitment of new startup operations in strategic business clusters in the region and workforce housing.</td>
<td>$7,200,000</td>
<td>TBD</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Redevelopment</td>
<td>Market Street — Assure there is an adequate inventory of “develop-able” sites with the necessary infrastructure to promote retention and expansion of existing firms and the recruitment of new startup operations in strategic business clusters in the region and workforce housing.</td>
<td>$12,000,000</td>
<td>2017</td>
</tr>
<tr>
<td>Burlington</td>
<td>Road</td>
<td>North Beach Emergency Access Road Improvement (Parks) — Renovation of roadway to better accommodate emergency vehicle access to North Beach Campground.</td>
<td>$300,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Roadway</td>
<td>Railyard Enterprise District (CEDO) — Develop and build out new street grid including bike/ped/mixed use/greenspace and connections to the lake and bike path.</td>
<td>$10-30,000,000</td>
<td>2012</td>
</tr>
<tr>
<td>Burlington</td>
<td>Roadway</td>
<td>Realignment of Birchcliff Pkwy and Sears Lane - Realigning the roads to facilitate better, safer traffic connections.</td>
<td>$2,500,000</td>
<td>2016</td>
</tr>
<tr>
<td>Williston</td>
<td>Roadway</td>
<td>Taft Corner Grid Streets - construct local streets in Taft Corner area to improve circulation</td>
<td>$3,900,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Milton</td>
<td>Roadway</td>
<td>Milton Hourglass Intersection - this project invests in an area planned for growth and would address a high-accident intersection at US7, Middle and Railroad Street by creating an hourglass-shaped intersection scoped by the RPC.</td>
<td>$1,300,000</td>
<td>2017</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Municipality</th>
<th>Infrastructure Type</th>
<th>Project Summary</th>
<th>Estimated Cost</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burlington</td>
<td>Roadway - Complete Streets</td>
<td>Pine Street Corridor Redevelopment (CEDO) - Ongoing work with businesses along Pine St. (Sondik, Noyes, Champ. Choc., Dealer and others). Individual Projects may be funded by private businesses. Complete street improvements would be publicly funded.</td>
<td>$10,000,000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Westford</td>
<td>Salt Shed</td>
<td>Town Salt &amp; Salted Sand Shed – protect water resources from salt contamination.</td>
<td>$250,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Winooski</td>
<td>School</td>
<td>Winooski School District Renovations and Upgrades</td>
<td>$591,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Westford</td>
<td>Sidewalk/Path</td>
<td>Create a path from the common to the school along the Browns River.</td>
<td>$10,000</td>
<td>In Process</td>
</tr>
<tr>
<td>Westford</td>
<td>Sidewalks</td>
<td>Pedestrian infrastructure - construct sidewalks connecting public facilities (common, library, town office, post office, school, meeting house, etc.)</td>
<td>$250,000</td>
<td>2017</td>
</tr>
<tr>
<td>Essex Town</td>
<td>Stormwater</td>
<td>Stormwater projects – planning, design and construction to meet MS4 permit and Flow Restoration Plans</td>
<td>$50,000,000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Stormwater improvements</td>
<td>Continue to comply with State Standards. Prepare for the implementation of the MS-4 Permits.</td>
<td>$2,835,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Streetscape</td>
<td>Cherry Street Streetscape - Phase 1 - Creating walkable environment and links between the waterfront and Church Street Marketplace.</td>
<td>$1,500,000</td>
<td>2015</td>
</tr>
<tr>
<td>Burlington</td>
<td>Streetscape</td>
<td>Cherry Street Streetscape - Phase 2 - Creating links from Battery Street at foot of Cherry Street down to Lake Street.</td>
<td>$23,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Streetscape</td>
<td>Side Streets Project (CEDO) - Expand amenities of Church Street Market Place to more of the downtown district. Add connectivity to waterfront from CSMP. Stimulate downtown business growth.</td>
<td>$28,000,000</td>
<td>2013-25</td>
</tr>
<tr>
<td>Milton</td>
<td>Streetscape</td>
<td>Milton 4D Streetscape Improvements: Defining Downtown from the Diner to the Dam - this project invests in lighting, street trees, sidewalk improvements, and wayfinding/placemaking signage along US Route 7 in the Town Core.</td>
<td>$2,300,000</td>
<td>2016 &amp; ongoing</td>
</tr>
<tr>
<td>Burlington</td>
<td>Transit</td>
<td>Gilbane Smart Growth Center, Phase III (CEDO) - South End Transit Center - This is an ongoing discussion on how best to utilize the site.</td>
<td>$13,000,000</td>
<td>Ongoing</td>
</tr>
<tr>
<td>University of Vermont</td>
<td>University-Facility</td>
<td>UVM STEM Building – Development of a University building designed to meet the specific needs of classes to teach Science, Technology, Engineering, and Mathematics related courses. Under construction.</td>
<td>$106,000,000</td>
<td>In Progress</td>
</tr>
<tr>
<td>CSWD, Burlington, Hinesburg</td>
<td>Waste Disposal</td>
<td>Relocate Burlington, Colchester and Hinesburg Drop-Off Centers - Build New Drop-Off Centers.</td>
<td>$1,300,000</td>
<td>2016 &amp; ongoing</td>
</tr>
<tr>
<td>CSWD, Burlington, Hinesburg</td>
<td>Waste Disposal</td>
<td>Construct new relocated Burlington and Hinesburg Drop-Off Centers - Construct new Drop-Off Centers.</td>
<td>$1,000,000</td>
<td>2016 &amp; ongoing</td>
</tr>
<tr>
<td>CSWD</td>
<td>Waste Disposal</td>
<td>Design &amp; Construction for HHW Facility Upgrades</td>
<td>$185,000</td>
<td>2016</td>
</tr>
<tr>
<td>CSWD</td>
<td>Waste Disposal</td>
<td>Design, Permitting &amp; Construction of Regional Landfill - New Regional Landfill in Williston, design presently on hold indefinitely</td>
<td>$50,400,000</td>
<td>On hold</td>
</tr>
<tr>
<td>CSWD</td>
<td>Waste Disposal</td>
<td>Construction of Special Waste Management System - Special Waste &amp; C&amp;D Facility.</td>
<td>$1,000,000</td>
<td>TBD</td>
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<tr>
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<td>Timeframe</td>
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<tr>
<td>Burlington</td>
<td>Wastewater</td>
<td>Burlington North Wastewater Treatment Plant - increased capacity needed to meet TMDL phosphorous reduction requirements (currently at 59% of of the proposed TMDL phosphorous load). North Plant began optimizing in August 2015, thus 2015 load for those plants is reduced from previous years.</td>
<td>$4,300,000</td>
<td>near-term</td>
</tr>
<tr>
<td>Burlington</td>
<td>Wastewater</td>
<td>Burlington Riverside Wastewater Treatment Plant - increased capacity needed to meet TMDL phosphorous reduction requirements (currently at 90% of the proposed TMDL phosphorous load).</td>
<td>$4,300,000</td>
<td>near-term</td>
</tr>
<tr>
<td>Burlington</td>
<td>Wastewater</td>
<td>Burlington Main Wastewater Treatment Plant - increased capacity needed to meet TMDL phosphorous reduction requirements (currently at 110% of proposed TMDL phosphorous load). Main Plant began implementing additional chemically based phosphorus removal in June 2015.</td>
<td>$29,400,000</td>
<td>near-term</td>
</tr>
<tr>
<td>Burlington</td>
<td>Wastewater</td>
<td>Data are not available for Burlington Electric’s wastewater treatment plant.</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Colchester</td>
<td>Wastewater</td>
<td>Recent studies concluded that Goodsell Point and East Lakeshore Drive, realistically, could only be served by a centralized sewer system. With the most logical treatment option being the North Plant in the City of Burlington, the sewer line would extend from Goodsell Point, East Lakeshore Drive, West Lakeshore Drive, Prim Road, Heineberg Drive, and then into Burlington. Capacity will be needed from the North Plant. This project may be affected by any work needed to meet TMDL for the Burlington North Wastewater Treatment Plant. This project was listed on the 2017 Pollution Control Priority and Planning List distributed by the Clean Water State Revolving Fund.</td>
<td>$1,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Colchester</td>
<td>Wastewater</td>
<td>Sewer infrastructure may be needed around Exit 17. The project would utilize the Milton Wastewater Treatment Plant. This project may be affected by any work needed to meet TMDL for the Milton Wastewater Treatment Plant.</td>
<td>$1,200,000</td>
<td>long-term</td>
</tr>
<tr>
<td>Essex &amp; Essex Junction</td>
<td>Wastewater</td>
<td>Additional capacity needed over the long term to meet TMDL phosphorous reduction requirements. Essex Junction Wastewater Treatment Plant is currently at 25% of its phosphorous load after a $15 million refurbishment. Over the long term, $1,200,000 may need to be invested to maintain the TMDL.</td>
<td>$250,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Essex</td>
<td>Wastewater</td>
<td>Construction of new municipal sewers is needed on Pinecrest Drive, Blair and portions of Pioneer and Ira Allen. Essex may be affected by any work needed to meet TMDL for the Essex Junction Wastewater Treatment Plant.</td>
<td>$360,000</td>
<td>After 6/2018</td>
</tr>
<tr>
<td>Shelburne</td>
<td>Wastewater</td>
<td>Additional capacity needed in the future to meet the new 2016 TMDL phosphorous reduction goals. Shelburne Wastewater Treatment Plant #1 is currently at 60% of its phosphorous load and Shelburne #2 is at 50%. Improving these plants was listed on the 2017 Pollution Control Priority and Planning List distributed by the Clean Water State Revolving Fund.</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>South Burlington</td>
<td>Wastewater</td>
<td>Additional wastewater treatment capacity needed in the future to meet the TMDL phosphorous reduction. The Bartlett Bay Wastewater Treatment Plant upgrade is currently at 80% of its phosphorous load.</td>
<td>$88,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Municipality</td>
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<td>Project Summary</td>
<td>Estimated Cost</td>
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<tr>
<td>Winooski</td>
<td>Wastewater</td>
<td>Additional capacity needed in the future to meet the TMDL phosphorous reduction. The Winooski Wastewater Treatment Plant is currently at 130% of its phosphorous load. Winooski WWTF headworks and phosphorus removal was listed on the 2017 Pollution Control Priority and Planning List distributed by the Clean Water State Revolving Fund.</td>
<td>$7,052,897; $525,000 for Headworks and P removal</td>
<td>near-term</td>
</tr>
<tr>
<td>Hinesburg</td>
<td>Wastewater</td>
<td>The Hinesburg Wastewater Treatment Plant is currently at 71% of its phosphorous load, but future upgrades may be needed. This project was listed on the 2017 Pollution Control Priority and Planning List distributed by the Clean Water State Revolving Fund.</td>
<td>$3,250,000 - $7,800,000</td>
<td>long-term</td>
</tr>
<tr>
<td>Richmond</td>
<td>Wastewater</td>
<td>Possible upgrades may be needed to meet the TMDL in the long term</td>
<td>$1,620,150</td>
<td>long-term</td>
</tr>
<tr>
<td>Williston</td>
<td>Wastewater</td>
<td>Addition to an existing gravity sewer line on Route 2A.</td>
<td>$140,000</td>
<td>Done?</td>
</tr>
<tr>
<td>Huntington</td>
<td>Wastewater - New</td>
<td>Stone Environmental completed a village wastewater system feasibility study in 2012. There are no current plans to implement this plan.</td>
<td>$10,461,000</td>
<td>long-term</td>
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<tr>
<td>St. George</td>
<td>Wastewater - New</td>
<td>The town completed a feasibility study on expanding the town center’s community septic system, but have no immediate plans to implement it. A developer is currently working with the DRB to complete a development in the town center, which will be served by the community septic system. All costs for septic hookup will be borne by the developer. In 2015, funding for a treatment building and pumping facility improvements was bypassed by the Drinking Water State Revolving Fund Capitalization Grant.</td>
<td>TBD</td>
<td>long-term</td>
</tr>
<tr>
<td>Westford</td>
<td>Wastewater - New</td>
<td>The town is currently investigating a large scale community wastewater system. Study and planning are funded by a Municipal Planning Grant. Cost includes engineering and construction. Land acquisition is expected in 2017. This project was listed on the 2017 Pollution Control Priority and Planning List distributed by the Clean Water State Revolving Fund.</td>
<td>$2,090,000</td>
<td>2019</td>
</tr>
<tr>
<td>Colchester</td>
<td>Water</td>
<td>Colchester Fire District #3 also requires additional water storage capacity and an expanded distribution system to provide necessary fire storage capacity for the growth center.</td>
<td>$10,000,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Essex</td>
<td>Water</td>
<td>Additional water system capacity is needed. New waterlines with increased pipe sizes have been studied for Susie Wilson Road to provide adequate fire flows and pressures.</td>
<td>$200,000</td>
<td>In progress</td>
</tr>
<tr>
<td>Essex</td>
<td>Water</td>
<td>Sandhill Road Waterline Improvements planning, design and construction. Increase waterline with 8 inch pipe to replace section of 3 inch piping and add pressure reducing valves.</td>
<td>$700,000</td>
<td>After 6/2018</td>
</tr>
<tr>
<td>Williston</td>
<td>Water</td>
<td>In the process of replacing the water storage tank on Tower Lane.</td>
<td>$1,150,000</td>
<td>2020</td>
</tr>
<tr>
<td>Champlain Water District</td>
<td>Water</td>
<td>Twin Filtered Water Tank &amp; Wet Well - New redundant 1.0 MG filtered water tank and wet well expansion</td>
<td>$3,800,000</td>
<td>2017 to 2018</td>
</tr>
<tr>
<td>Champlain Water District</td>
<td>Water</td>
<td>Close-in Transmission Main Cross-tie - 1,300° of new 24” transmission main along Farrell Street to tie HS1 and HS2 together close to the plant</td>
<td>$500,000</td>
<td>2017 to 2018</td>
</tr>
<tr>
<td>Champlain Water District</td>
<td>Water</td>
<td>Williston High Service Storage Tank - New 0.6 MG tank in Williston High Service area</td>
<td>$1,700,000</td>
<td>2017 to 2018</td>
</tr>
<tr>
<td>Champlain Water District</td>
<td>Water</td>
<td>Interior piping upgrades for existing Well #7 meter vault</td>
<td>$150,000</td>
<td>2017 to 2018</td>
</tr>
<tr>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Replacement of the existing Milton meter vault</td>
<td>$175,000</td>
<td>2017 to 2018</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>New communications tower at Williston South Tank to replace antenna at Williston East Tank</td>
<td>$125,000</td>
<td>2017 to 2018</td>
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<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Exit 16 Double Diamond Transmission Main - Replacement of 1,300’ of 16” main as part of VTrans interchange project</td>
<td>$600,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Filter Effluent Pump System Upgrade - Upgrade of existing filter effluent pumps, piping, and controls</td>
<td>$300,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Allen Road Meter Vault Improvements - Replacement of the existing Allen Road meter vault</td>
<td>$100,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Spear Street PRV Replacement - Replacement of the existing Spear Street PRV vault</td>
<td>$150,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Essex West PS and Transmission Main - New pump station and transmission main at Essex West tank for interconnection with the Town of Essex</td>
<td>$750,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Treatment Plant Emergency Generators - Three new emergency generators for backup power at the plant and raw water pump station</td>
<td>$1,000,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Second Emergency Backup PRV Feed from HS to MS - New PRV vault to feed water from High Service to Main Service</td>
<td>$50,000</td>
<td>2018 to 2021</td>
</tr>
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<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Old Filtered Water Tank Rehabilitation - Rehabilitation of the existing filtered water tank</td>
<td>$200,000</td>
<td>2018 to 2021</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Permnaganate Process Upgrade - Upgrade of the permanganate feed system at the plant</td>
<td>$30,000</td>
<td>2018 to 2021</td>
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<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>North Intake Sample / Chemical Feed Upgrade - Upgrade of the North Intake sample and chemical feed lines</td>
<td>$200,000</td>
<td>2018 to 2021</td>
</tr>
<tr>
<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Main Service Pump #3 and Discharge Header - Upgrade of Main Service Pump #3 and the Main Service discharge header</td>
<td>$150,000</td>
<td>2018 to 2021</td>
</tr>
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<td>District</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Parallel Lake Water Transmission Main - Plant End - Completion of a parallel transmission main from the Lake Water Pump Station to the plant</td>
<td>$250,000</td>
<td>2018 to 2021</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Treatment Plant HVAC Improvements - Upgrade of the plant HVAC system</td>
<td>$150,000</td>
<td>2018 to 2021</td>
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<tr>
<td>Champlain Water</td>
<td>Water</td>
<td>Essex South Tank Flow Control Valve &amp; Passive Mixing System - Installation of a flow control valve and passive mixing system at the Essex South tank</td>
<td>$80,000</td>
<td>2018 to 2021</td>
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</tr>
<tr>
<td>Hinesburg</td>
<td>Water</td>
<td>Another water source is still needed for projected demand in the village center. The town hopes to build two new wells and a nanofiltration system.</td>
<td>$1,175,000</td>
<td></td>
</tr>
<tr>
<td>Municipality</td>
<td>Infrastructure Type</td>
<td>Project Summary</td>
<td>Estimated Cost</td>
<td>Timeframe</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Champlain Water District</td>
<td>Water</td>
<td>A project is being planned to install a new 1 million gallon Filtered Water Tank and wet well expansion project at the CWD treatment facility in South Burlington. The project will provide redundancy of two critical elements at the plant: filtered water storage and filtered water effluent wet well volume. The total project cost includes both the new tank and the wet well expansion. CWD is planning to begin design this summer, conduct a bond vote on November 1, 2016, and construction in 2017. $2,000,000 of the project will be funded by a Drinking Water State Revolving Fund Capitalization Grant.</td>
<td>$3,000,000</td>
<td>2017</td>
</tr>
<tr>
<td>Jericho-Underhill Water District</td>
<td>Water</td>
<td>The system needs a new Maple Ridge pump station and distribution system, as well as other minor improvements, beginning in 2018. This project was determined to be Non Fundable on the 2015 Drinking Water State Revolving Fund Capitalization Grant Revised Comprehensive Project Priority List.</td>
<td>$250,000</td>
<td>2018</td>
</tr>
<tr>
<td>Huntington</td>
<td>Water - New</td>
<td>Publicly regulated water systems serve Huntington Woods/Roberts Park and the BPMS elementary school. Additional capacity may be needed.</td>
<td>$8,164,000</td>
<td>long-term</td>
</tr>
<tr>
<td>Richmond</td>
<td>Water and Wastewater</td>
<td>System improvement needed. Water and sewer lines on Pleasant Street and Bridge Street need to be improved. $957,550 loan obtained in 2015 from the Drinking Water State Revolving Fund Capitalization Grant.</td>
<td>$2,100,000 for system improvement; $10,170,000 for extension</td>
<td>2017</td>
</tr>
<tr>
<td>Richmond</td>
<td>Water and Wastewater</td>
<td>Scoping study completed in 2015 re: extending water and sewer into the West Main Street area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Charlotte</td>
<td>Water and Wastewater - New</td>
<td>The town is investigating sites for potential community sewage disposal and drinking water supply in the Village and Commercial districts.</td>
<td>TBD</td>
<td>long-term</td>
</tr>
<tr>
<td>Municipality</td>
<td>Infrastructure Type</td>
<td>Project Summary</td>
<td>Estimated Cost</td>
<td>Timeframe</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------</td>
<td>-----------------</td>
<td>----------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Burlington</td>
<td>Water, wastewater or both?</td>
<td>This is an asset management project. City-wide gravity pipe assessment and rehabilitation is needed.</td>
<td>$5,020,000</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Waterfront</td>
<td>Breakwater planning and construction—Breakwater to protect harbor from north and south winds</td>
<td>$4,300,000</td>
<td>2015</td>
</tr>
<tr>
<td>Burlington</td>
<td>Fire station consolidation (CEDO)—This is an ongoing conversation related to Gateway Block Redevelopment.</td>
<td></td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Region</td>
<td>Transportation</td>
<td>Incorporate the Metropolitan Transportation Plan project list by reference</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Richmond</td>
<td>Redevelopment</td>
<td>Creamery Site</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Burlington</td>
<td>Redevelopment</td>
<td>Burlington Town Center</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Region</td>
<td>Stormwater/Water Quality</td>
<td>Incorporate the State of Vermont Watershed Project Database by reference</td>
<td>TBD</td>
<td>TBD</td>
</tr>
</tbody>
</table>

**Color Key:**
- **strikethrough**: Projects proposed for removal (as well as programs that are already removed) so we can instead focus on major infrastructure/utilities.
- **Projects proposed for removal because they are on the MTP project list**
- **Questionable infrastructure projects - keep these or remove?**
- **Cost estimate or date from old CEDS list that needs to be updated**
- **New projects**
CCRPC Executive Committee  
October 4, 2017  

Agenda Item 7.  

CCRPC comments on draft Municipal Roads General Permit  (Action Item)  

**Background:**  
On Monday, September 11th, Vermont DEC formally issued its draft MRGP. See info at: [http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program](http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program). The public is invited to provide written comment on the draft MRGP through the close of business (4:30pm) on October 27, 2017. Written comments on the draft MRGP should be emailed to Jim Ryan at jim.ryan@vermont.gov or mailed to:  
Jim Ryan DEC Stormwater Program 1 National Life Drive, Main 2 Montpelier, VT 05620-3522  

CCRPC staff as well as Jim Ryan of DEC have provided prior presentations to both the TAC and the CWAC. Both these Committees will review and provide comments on the draft letter at their October 3rd meeting.  

Attached are draft formal comments prepared by staff along with a short memo showing how are previous comments from March were addressed. A separate PDF collates the draft Permit along with referenced attachments.  

**Action:**  
The Executive Committee should review and provide any desired edits to the draft comment letter. Staff will compile and incorporate these comments along with those of the CWAC and TAC and then ask the CCRPC Board to finalize the letter and its formal transmittal to Jim Ryan at its October 18th meeting.  

**Staff contact:**  
Dan Albrecht, dalbrecht@ccrpcvt.org, 861-0133  
Chris Dubin, cdubin@ccrpcvt.org 861-0121
Thank you for the opportunity to comment on the draft Municipal Roads General Permit. Please consider these comments of our Board of Directors approved at their monthly meeting on October 18th.

**General comment** – The MRGP references numerous documents/forms which are to be used by municipalities to work towards and/or demonstrate compliance with this permit including, for example:

- DEC Road Erosion Inventory Template
- MRGP Implementation Table
- RSWMP Implementation Table
- Implementation Table
- MRGP Planning Report
- Culvert sizing based on in-field and mapping techniques
- Catch Basin Inventory and Outlet Erosion Evaluation

The draft permit directs the reader to obtain these various documents by accessing them on the recommended web links. However, in some cases, the referenced documents are embedded within larger PDFs or within additional links whose names are not intuitive to the casual user.

**Recommendation 1** CCRPC recommends that DEC create a separate webpage or Permit Appendix which clearly lists and numbers each of the various documents (e.g. MRGP, Attachment A-DEC Road Erosion Inventory Template; Attachment B-Example RSWMP Implementation Table, etc) that are to be used to comply with this MRGP as well as provide examples where appropriate.

**Specific comments:**

2.1 Duty to Apply

**Recommendation 2** There is a reference to MS4 and “Part 7” in the 3rd sentence. It appears that this should refer to “Part 6.”

3.1. Submittal of Initial Notice of Intent and Application Fee

**Recommendation 3** A $2,000 flat annual fee is too heavy of a burden for smaller towns. The total amount of fees should be tied to the cost to administer the permit and not generate excess
revenue. Fees could be a lower flat fee, be tiered, or be variable depending on the number of connected road segments or road-related impervious cover. There should be some incentive, such as a reduced fee, for towns to complete their road erosion projects in less than the 20-year timeframe.

4.1 Comprehensive Plan for All Stormwater Discharges

A.1 Road Erosion Inventory for all municipal hydrologically-connected road segments

Slope Data – Because required BMPs vary for different slope ranges, 0<5, 5<8, 8+, 10+ the use of accurate slope data is critical. As Chittenden County has recent 2014, 1ft. contour LIDAR data, the CCRPC with DEC concurrence, has used this data (rather than that in the ANR Atlas) to derive slope values in order to perform road erosion inventories in 2016 and 2017.

Recommendation 4 CCRPC recommends that the permit should clearly allow the use of alternative data sources when more accurate data exists.

a. “For paved roads with catch basins: the catch basin outfall pipe is within 500 feet of a water of the state or wetland.”

Within 500 feet seems overly expansive and inconsistent with use of 100 ft. as a cutoff point as noted in 4.1.A.1.b.1 and with use of “uphill” as noted in 4.1.A.1.b.3.

Recommendation 5 CCRPC recommends modifying to reduce distance to “within 100 feet and uphill of a water of the state or wetland.”

The REI will include a road erosion “score” for each hydrologically-connected road segment. All road segments will be scored as “Fully Meets,” “Partially Meets,” or “Does Not Meet” the standards listed in Part 6 of this permit. A detailed procedure for scoring road segments is provided in the Inventory. Road segments that score “Partially Meets” or “Does Not Meet” shall be upgraded to meet standards according to the municipality’s implementation schedule. Road segments that score “Fully Meets” do not require upgrades, but shall be maintained to ensure that they continue to meet standards. The Inventory scores and explanation of those scores shall be entered into the RSWMP Implementation Table.

We appreciate the inclusive process by which DEC developed the Road Erosion Inventory methodology especially the involvement of CCRPC and other Regional Planning Commissions. Overall, the Inventory Template is useful to assessing the various attributes of a given road segment with regards to its ability to handle stormwater. However, we have the following recommendations which, if followed, would more appropriately target remedial actions/upgrades to improve water quality.

The inventory assesses the degree to which various standards ----Crown, Berm/Windrow, Drainage, Conveyances/Turnouts, Driveway Culverts, Drainage Culvert and Rill/Gully Erosion--- are being implemented on a given segment. Depending upon how many of these standards are considered to
have scored as Partially Meets or Does Not Meet determines the Overall Segment Score. We are concerned however that all these Standards are weighted equally regardless of their relative impacts to water quality.

In July 2017, the firm of Fitzgerald Environmental completed development of a refined and field-calibrated Road Erosion Prioritization Methodology (see attached memo dated July 14, 2017) based upon 2016 inventory data collected by CCRPC. Most critically, the methodology weights the relative importance of these standards vis-à-vis sediment and pollutant source and transport mechanisms. The methodology concludes that the most critical variables and those that should be weighted the highest when predicting impacts to water quality are:

- Slope
- Adequacy of Road Drainage
- Total Number of Poor Conveyances
- Gully Erosion Locations
- Stream and Road Conflicts
- Total Conveyances
- Stream Culverts

Conversely, the performance of the following variables was less critical:

- Roadway Crown
- Berm
- Total Road Drainage Culverts less than 18” in Diameter
- Total Road Drainage Culverts lacking Header(s)
- Total Driveway Culverts less than 15” in Diameter

Therefore, we recommended that the REI Scoring Methodology be refined to incorporate this analysis so that the RSWMP Implementation is focused on improving water quality rather than focusing on meeting road maintenance and construction standards. Therefore, we recommend:

**Recommendation 6** Adjust any or all of the following standards from the Segment Scoring process [Roadway Crown, Berm, Road Drainage Culverts less than 18” in Diameter; Road Drainage Culverts lacking Header(s) and Driveway Culverts less than 15” in Diameter] so that they are not weighted equally with more “water-quality-determinant” standards. For example, scores of Partially Meets for these standards should not count as much towards the cumulative total [“One or two Partially Meets individual scores = Partially Meets segments score.”] that labels a segment as Partially Meets.

**Recommendation 7** Create one set of Partially Meets / Does Not Meet criteria for segments with slopes less than 5% and one for segments of 5% or more as Slope is probably the single most important variable.

**Recommendation 8** Require segments that Do Not Meet criteria for Adequacy of Road Drainage; a high number of Poor Conveyances; Gully Erosion Locations and Stream and Road Conflicts to be addressed in the first five years of the Permit to meet all standards.
Recommendation 9  Similarly, as Stream Crossings provide the most likely avenue by which sediment and flow can be conveyed into waters, require any segments with such crossings to be addressed in the first five years of the Permit to meet all standards.

Part 6. Road Stormwater Management Standards

This section is the heart of the permit. We appreciate the work that DEC has put into it. We have a few suggestions for improvement.

6.2 Required Standards for Gravel and Paved Roads with Ditches

Recommendation 10  With regards to “new construction” and “significant road upgrades,” please clarify that the MRGP standards only apply to such work if the segment is a hydrologically-connected gravel and/or paved municipal road segment with drainage ditches

6.2 B. Road Drainage Standards

........................................

2. For roads with slopes 5% or greater but less than 8%:
   a. ......
   b. ......
   c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume. There shall be at least two cross culverts or turnouts per segment disconnecting road stormwater out of the road drainage network into vegetated areas, or spaced every 164’.

Recommendation 11  Please clarify item “c” above. Topography and field conditions may preclude spacing these cross-culverts/turnouts apart. Suggest revising to state “It is recommended that these be spaced at least 163’ apart.

4. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substitute for the Above Road Drainage Standards.

In more sparsely populated areas or areas of high elevation, existing municipal roads often lack ditches. Municipalities have had to prioritize the use of limited funds and grants and therefore focus most effort on more heavily traveled roads. To address the lack of ditches, road foremen often make several “grader cuts” along the edge of a road so as to act as a “conveyance” to direct water into adjacent vegetated areas or woods.

Recommendation 12  Please clarify under what conditions existing or new “grader cut” conveyances may be used.

Section 6.2.C Stable Conveyances – Drainage Outlets to Waters & Turnouts
Recommendation 13. CCRPC recommends that the permit make clear that in addressing outfalls, the Road Erosion Inventory is only required to address what is visible within the ROW, within any applicable easements or within the area allowed to be inventoried by the applicable property owner. The permit should make it clear that municipalities are not required to bring up to standards any outfall that is outside of the municipal ROW, outside of any applicable easement and not allowed by any applicable landowner.

6.3 Standards if Rill or Gully Erosion is Present on Gravel and Paved Roads with Ditches

This section is highly detailed. We appreciate the clear direction given. We have a few comments as follows.

Recommendation 14. The permit should make clear that these standards do not apply to new construction on non-hydrologically-connected segments?

Both rill erosion and gully erosion are defined with regards to depth as 1”-12” and 12” or more respectively. However, no difference is made in recommended standards depending upon the length or severity regardless of the fact that gully erosion of 5 ft. in length is a much more significant issue than rill erosion of 5 ft.

Recommendation 15. CCRPC recommends that the DEC establish a length measurement within the definition for both rill erosion and gully erosion, and establish standards appropriate for the length and severity of each issue.

Rill or gully erosion is mostly caused by inadequate road crowns, the presence of berms, slope and other factors. However, adherence to these standards mostly trigger improvements that are totally unrelated to said problem of rill or gully erosion. Furthermore, those discrete areas of improvement may not have any erosion issues at all.

Recommendation 16. CCRPC recommends improvements to road crowns, grading and/or berm removal in this section rather than improvements to culverts; or please explain the rationale for this section as written.

6.4 Standards for Connected Class 4 Roads

Currently municipalities are not required to maintain Class 4 roads in accordance with 19 V.S.A. § 310 and case law. We are, however, supportive of doing road erosion inventories of Class 4 roads. Additionally, we are also concerned that requiring maintenance on Class 4 roads, even if it is confined to major erosion problems, could lead to causing more erosion just to get to the site with the right equipment.

Recommendation 17. No permit requirements on municipalities should be established on Class 4 roads unless and until statute is clarified to specifically require this responsibility.

Putting legal issues aside, language in the draft permit and Inventory Template is problematic in that the presence of any gully erosion automatically classifies that Class IV segment as “Does Not Meet
Recommendation 18  CCRPC recommends that this standard be changed to say, for example, “any gully erosion equals Partially Meets, gully erosion exceeding 10 ft. in length equals Does Not Meet.”

Recommendation 19  CCRPC recommends it be made clear that improvements to Class IV roads to meet the MRGP standards shall be considered the last priority.

Part 10: Definitions

Recommendation 20  Please define “new road construction” and “significant road upgrades.” Clear metrics such as total linear feet, depth of reconstruction, etc. should be used and examples given. Additionally, it may be helpful to define what does NOT constitute either of these two key terms as they are used as triggers throughout the permit.

Recommendation 21  Please define “redevelopment” as used in Section 6.2, A.1.b.

Recommendation 22  Please clearly define and/or reduce the number of terms for “ditch,” “swale” and “gully”

Recommendation 23  Please define “stream crossing” culverts in relation to whether it applies only to perennial streams and/or intermittent streams.
Date: September 28, 2017  
To: CWAC and TAC  
From: Dan Albrecht, CCRPC Senior Planner

The following shows how our original comments in March were addressed as we crafted the proposed October comments.

2. **Inventories** - Please clarify if ALL connected roads (including ones that meet the MRGP road standards and have no erosion issues) need to be inventoried every 5 years: We removed this comment. DEC clarified this, yes, every 5 years.

3. **Triggers** - For each of the triggers for improvement identified in the permit, there needs to be clear definitions on the thresholds for “Fully Meets”, “Partially Meets”, and “Does Not Meet.” We removed this comment. DEC clarified this in Road Erosion Inventory Template.

4. **Class 4 Roads** – Currently municipalities are not required to maintain Class 4 roads in accordance with 19 V.S.A. § 310 and case law. No permit requirements on municipalities should be established on Class 4 roads unless and until statute is clarified to specifically require this responsibility. We are, however, supportive of doing road erosion inventories of Class 4 roads. Additionally, we are also concerned that requiring maintenance on Class 4 roads, even if it is confined to major erosion problems, could lead to causing more erosion just to get to the site with the right equipment. We continued with this general theme and added additional recommendations.

5. **Stone-lined Ditching** - We are concerned that the stone line ditching standards in the draft MRGP creates a discrepancy with the Orange Book standards (i.e. 5% v. 8%). The standard should be consistent across programs to ensure municipalities remain eligible for funding programs including FEMA Disaster Recover funds. We feel strongly that municipalities should not have to try to follow two different sets of standards for connected roads and non-connected roads to avoid these conflicts. We removed this comment. It appears to be addressed via MRGP BMP requirements for “less than 5%”, 5%-8% and greater than 8%.”

6. **Outfalls outside of the ROW** – Often these grass-lined ditches will need to be stabilized well outside of the ROW. The permit should not include requirements on municipalities outside the ROW or easements. The erosion assessments should be clear that they are limited to what is visible from the edge of the ROW or allowed by easement or permission of the property owner. We clarified this comment which is addressed re, Section 6.2.C

7. **Culvert Requirements** - Please clearly define the different culverts and associated standards (driveway, conveyance, drainage, stream crossing, etc.). These comments addressed in Section 10.

8. **Ditch Definitions** – Please clearly define and/or reduce the number of terms for ditch, swale, and gully. This comment addressed in Section 10.
9. **Reporting Cycle** – Change the reporting cycle to once per year instead of twice per year to reduce the administrative burden on the State and municipalities by 50%. There will be minimal work occurring between October to April to report. We would prefer an April reporting date so that municipalities can report what got accomplished the previous construction season and report what has been approved in the budget for the upcoming construction season. We removed this comment. DEC Consolidated it into one report in February.

10. **Annual Fee** – A $2,000 flat annual fee is too heavy of a burden for smaller towns. The total amount of fees should be tied to the cost to administer the permit and not generate excess revenue. Fees could be a lower flat fee, be tiered, or be variable depending on the number of connected road segments or road-related impervious cover. There should be some incentive, such as a reduced fee, for towns to complete their road erosion projects in less than the 20-year timeframe. We restated this comment, re: Section 3.1. above.

11. **MS4 Fees** – We understand and would like it confirmed that no additional fee charged to MS4 permittees when the MRGP requirements are added to the MS4 permits. We removed this comment. DEC makes it clear in Part 2.1 Duty to Apply.

12. **Historic Projects** – Although it may not seem to be directly connected to the MRGP permit going forward, it is our understanding that the State can document and take credit for phosphorous reduction to meet the Lake Champlain TMDL going back to more than 10 or maybe even 15 years ago. We understand that date is 2002 for the stormwater permits vs. two years prior to the permit issuance for the MRGP. It would seem to us that it would be very beneficial to the State to ask for documentation of these prior projects that were done solely by municipalities, with it being optional for the municipalities to provide this information. We removed this comment, not appropriate venue and yes, DEC is working on this.

13. **Slope Data** – Recent higher resolution LiDAR (elevation) data is a more accurate source for slope data. There is a chance that fewer roads may be deemed “connected” because of this more accurate data. While this data may not be available statewide yet, we’d like to use it in Chittenden County. Can we re-examine the slope data and provide information back to the State to update your data? We continued this point in discussion about Part 4.1.
STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
VERMONT POLLUTANT DISCHARGE ELIMINATION SYSTEM (VPDES)
GENERAL PERMIT 3-9040
FOR STORMWATER DISCHARGES FROM MUNICIPAL ROADS

DRAFT

Effective Month, Day, 2017
# TABLE OF CONTENTS

## PART 1: BACKGROUND AND AUTHORITY

1.1 Purpose

1.2 Authority

## PART 2: COVERAGE UNDER THIS PERMIT

2.1 Duty to Apply

2.2 Permit Coverage

2.3 Limitations on Coverage

## PART 3: APPLICATION REQUIREMENTS

3.1 Submittal of Initial Notice of Intent and Application Fee

3.2 Deadlines

3.3 Determination of Complete Application and Request for Additional Information

3.4 Public Notice and Public Comments

3.5 Notice of Agency Decision

3.6 Authorization to Discharge

3.7 Amendments

## PART 4: ROAD STORMWATER MANAGEMENT PLAN

4.1 Comprehensive Plan for All Stormwater Discharges

4.2 Reviewing and Updating Road Stormwater Management Plans

## PART 5: RECORDKEEPING AND REPORTING

5.1 Recordkeeping

5.2 Reporting

## PART 6: ROAD STORMWATER MANAGEMENT STANDARDS

6.1 General Standards

6.2 Required Standards for Gravel and Paved Roads with Ditches

6.3 Standards if Rill or Gully Erosion is Present on Gravel and Paved Roads with Ditches

6.4 Standards for Paved Roads with Catch Basins

6.5 Standards for Connected Class 4 Roads

## PART 7: DISCHARGES UNDER THIS PERMIT

Discharges to High Quality Waters; Anti-degradation

## PART 8: STANDARD PERMIT CONDITIONS

## PART 9: APPEALS

## PART 10: DEFINITIONS
PART 1: BACKGROUND AND AUTHORITY

1.1 Purpose

This general permit, also referred to as the MRGP, is issued pursuant to 10 V.S.A. § 1264, which requires the Secretary to issue a general permit for discharges of regulated stormwater from municipal roads. This permit is intended to achieve significant reductions in stormwater-related erosion from municipal roads, both paved and unpaved. Under this permit, municipalities shall implement a customized, multi-year stormwater management plan to stabilize their road drainage system and prevent erosion and the transport of sediment. Plans shall include the required steps for road drainage systems to meet maintenance standards, and identify additional corrective measure to reduce erosion as necessary.

1.2 Authority

This general permit is issued in accordance with the following state and federal laws and rules: the Vermont Water Pollution Control statute, 10 V.S.A. Chapter 47, including §§ 1258, 1259, and1264; the federal Clean Water Act (CWA), as amended, 33 U.S.C.A. § 1251 et seq., including 33 U.S.C.A. § 1342(p); and regulations of the United States Environmental Protection Agency (EPA) including but not limited to 40 CFR Part 122.

PART 2: COVERAGE UNDER THIS PERMIT

2.1 Duty to Apply

Any incorporated city, town, or village with operational control over municipal roads is subject to the requirements of this permit. The exception to this is municipalities that are authorized under the Municipal Separate Storm Sewer System (MS4) General Permit. The MS4 General Permit will include the road stormwater management standards listed in Part 7 of this general permit, and those municipalities authorized under the MS4 will address discharges of regulated stormwater from municipal roads pursuant to the terms of their MS4 authorizations.

This permit is issued by the State of Vermont as the delegated authority to administer the federal National Pollutant Discharge Elimination System (NPDES), and complies with all state-specific permitting requirements under 10 V.S.A. § 1264.

2.2 Permit Coverage

This general permit covers discharges of regulated stormwater from municipal roads, which include:

A. Town highways, class 1-4, and their rights-of-way.

B. Municipal stormwater infrastructure associated with town highways, within and outside of the municipal right-of-way.
For the purposes of this permit, “municipal stormwater infrastructure” refers to all stormwater conveyances and treatment and control systems, controlled by the municipality, that receive stormwater discharges from municipal roads.

2.3 Limitations on Coverage.

Any discharges not expressly authorized in this permit cannot become authorized or shielded from liability under CWA section 402(k) by disclosure to EPA, state, or local authorities after issuance of this permit via any means, including the Notice of Intent (NOI) to be covered by the permit, the Road Stormwater Management Plan (RSWMP), or during an inspection.

Coverage under this general permit does not obviate the need to seek authorization under a general or individual stormwater permit for the discharge of regulated stormwater associated with the construction, expansion, and redevelopment of impervious surface.

PART 3: APPLICATION REQUIREMENTS

To apply for authorization under this general permit, a NOI and Road Stormwater Management Plan (RSWMP) must be submitted in accordance with the deadlines in Subpart 3.2 of this permit. After the Secretary has determined that an NOI is administratively complete, the Secretary shall provide public notice of the NOI on the Environmental Notice Bulletin (ENB) in accordance with Part 3.4 of this permit.

3.1 Submittal of Initial Notice of Intent and Application Fee

A. An application for coverage under this general permit shall consist of a completed NOI form. The NOI forms required to apply for coverage under this general permit are available on the Stormwater Program’s website, at: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program. If an electronic NOI submittal system is available, the municipality shall submit all application materials, including applicable fees, through the electronic NOI system.

B. The municipality shall pay the applicable administrative processing and application review fee at the time that it submits its NOI. The applicable fees are included under 3 V.S.A. § 2822 and a fee schedule is available on the Stormwater Program’s website.

3.2 Deadlines

A. Initial application – The NOI form must be filed with the Agency by July 31, 2018.

B. The Initial RSWMP must be filed with the Agency by December 1, 2020.

3.3 Determination of Complete Application and Request for Additional Information

The Secretary reserves the right to return an application that is incomplete or inaccurate or does not meet the requirements of this permit. The Secretary may require the municipality to submit
additional information that the Secretary considers necessary to make a decision on the eligibility for, or the issuance or denial of, an authorization to discharge pursuant to this permit. The Secretary may deny an authorization to discharge pursuant to this permit if the additional information requested is not provided to the Secretary within 60 days of the Secretary’s request or if any additional information submitted is inadequate for the Secretary to make a decision on the eligibility for, or the issuance or denial of, an authorization to discharge pursuant to this permit.

3.4 Public Notice and Public Comments

A. For the initial permit application, as well as for major amendments, as defined in Section 3.7, the Secretary shall provide public notice of the administratively complete NOI on the ENB. The Secretary shall provide notice of the draft authorization through the ENB, and shall post the draft authorization to the bulletin. The Secretary shall provide a public comment period of at least 14 days on the draft authorization. The Secretary shall provide an opportunity for written comments regarding the NOI's compliance with the terms and conditions of this permit.

B. Any interested person may file comments with the Secretary during the 14-day notice period. Should the Secretary extend or reopen the public comment period, the Secretary will notify those persons who filed comments or a letter of interest.

C. The period for public comment may be extended at the sole discretion of the Secretary.

D. Interested Persons List – The Secretary shall maintain an interested persons list for those individuals or groups that wish to receive copies of notices of all general permit applications within the State or within a certain geographic area. Interested persons will provide an email address to the Secretary to receive a copy of any requested public notices.

3.5 Notice of Agency Decision

The Secretary shall provide notice of the final decision through the ENB and shall post the decision to the bulletin. The Secretary shall provide a response to comments.

3.6 Authorization to Discharge

A. A municipality shall only be authorized to discharge under the terms and conditions of this permit upon receipt of a written authorization to discharge from the Secretary.

B. The complete NOI, including all attachments, shall be incorporated by reference and included in the terms of an authorization under this general permit, and the municipality shall comply with all terms and conditions of this general permit and its authorization issued hereunder. Failure to comply with the NOI and all attachments shall be deemed a violation of this permit and may be subject to enforcement action.
3.7 Amendments

A request for an amendment of authorization under this general permit shall consist of a completed NOI, and if applicable, the RSWMP.

A. Requests for amendments of coverage shall be subject to the following processes:

1. Any major amendment to an authorization that necessitates technical review, including the submittal of the RSWMP, shall be subject to the public notice procedure listed in Subpart 3.4.

2. For any minor amendment to an authorization that requires a change in permit condition or requirement but does not require technical review, the Secretary shall provide notice of the amendment through the ENB and shall post the draft amended authorization to the bulletin. The Secretary shall provide a public comment period of at least 14 days on the draft amendment. The Secretary shall provide notice of the final decision through the ENB and shall post the final authorization and a response to comments to the bulletin.

3. An administrative amendment that corrects typographical errors, changes the name or mailing address of a permittee, or makes other similar changes to a permit that do not require technical review or the changing of conditions or requirements, shall not be subject to public notice and comment.

B. The municipality shall pay the administrative processing fee at the time that it submits an NOI for an amendment.

PART 4: ROAD STORMWATER MANAGEMENT PLAN

4.1 Comprehensive Plan for All Stormwater Discharges

A. A municipality shall complete and submit for Agency approval a Road Stormwater Management Plan (RSWMP) for all municipal roads, which include municipally-owned and controlled town highways, rights-of-ways, and municipal stormwater infrastructure associated with town highways. Municipalities shall complete the RSWMP by completing the following items:

1. Road Erosion Inventory for all municipal hydrologically-connected road segments. Each municipality shall complete a Road Erosion Inventory (REI) of all hydrologically-connected road segments. The REI is intended to verify which municipal road segments are hydrologically connected, and identify which of those segments meet the operational standards required under this permit.

The REI shall include all hydrologically-connected municipal road segments that appear on the ANR Atlas at the time that the REI is conducted. All hydrologically-connected road segments depicted on the ANR Atlas shall be field visited and evaluated using the
DEC Road Erosion Inventory Template. Additionally, the applicant may propose to add or remove road segments from its REI based on an evaluation of the following criteria:

a. For paved roads with catch basins: the catch basin outfall pipe is within 500 feet of a water of the state or wetland.

b. For all other municipal roads:
   1. The municipal road is within 100 feet of a water of the state or wetland;
   2. The municipal road bisects any water of the state or wetland, or a defined channel;
   3. The municipal road segment is uphill from, and drains to, a municipal road that bisects a water of the state or wetland, and should be included in the REI to accurately capture the extent of the stormwater watershed.

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.

The addition or removal of any road segments not appearing on the ANR Atlas must be documented as part of the REI, and justification for the removal or addition shall be included in the MRGP Implementation Table.

The Secretary may determine at any time that a road segment not identified on the ANR Atlas is hydrologically connected, based on the criteria listed above, as well as other site-specific factors that indicate the likelihood of a discharge, including slope, soil type, proximity to receiving waters, etc. When the Secretary determines that an unmapped road segment is hydrologically connected and informs the municipality of its determination, the permittee shall include the segment in its Implementation Table as part of the next annual report.

The REI will include a road erosion “score” for each hydrologically-connected road segment. All road segments will be scored as “Fully Meets,” “Partially Meets,” or “Does Not Meet” the standards listed in Part 6 of this permit. A detailed procedure for scoring road segments is provided in the Inventory. Road segments that score “Partially Meets” or “Does Not Meet” shall be upgraded to meet standards according to the municipality’s implementation schedule. Road segments that score “Fully Meets” do not require upgrades, but shall be maintained to ensure that they continue to meet standards. The Inventory scores and explanation of those scores shall be entered into the RSWMP Implementation Table.

Municipalities shall complete their first REI by December 1, 2020, and complete a new REI every five years thereafter. The Inventory template is available on the Stormwater Program’s website: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program
2. **Implementation Table.** Municipalities shall use the REI scoring information and RSWMP Implementation Table to prioritize road segments for upgrades to meet the MRGP standards listed in Part 6 of this general permit. The Implementation Table shall be the municipality’s working document to track planned road stormwater improvements and implementation. Municipalities shall complete the table for each road segment prioritized for improvements and upgrades within the upcoming calendar year, including the specific steps for achieving compliance. Road segments identified for upgrades during future years shall be included in the list but do not need to include specific steps for achieving compliance.

3. **Very High Priority Road Segments.** Hydrologically connected road segments scoring “Does Not Meet” on the REI, on slopes greater than 10 %, are considered Very High Priority Road Segments. Very high priority segments shall be upgraded to meet the MRGP standards listed in Part 6 of this General Permit by December 31, 2025.

B. Upon approval by the Secretary, the RSWMP shall be a part of the municipality’s authorization. Any failure of the municipality to comply with the plan shall constitute a violation of this permit.

C. **Schedule of Compliance.** The municipality shall bring all hydrologically-connected road segments up to the MRGP standards as soon as possible but no later than January 1, 2037. The municipality shall include in its RSWMP Implementation Table the number of non-compliant road segments the municipality will bring up to standards each year, in order to achieve compliance by January 1, 2037. The minimum number of road segments that must be brought up to MRGP standards annually until compliance is achieved shall be determined by dividing the total number of non-compliant segments by the years remaining in the MRGP implementation schedule.

D. **Planning Report.** Prior to submitting the Road Stormwater Management Plan (RSWMP), the municipality shall complete and submit a planning report, on a form provided by the Secretary, that details the progress the municipality has made on completing the Road Erosion Inventory and development of the Implementation Table.

The following development and implementation schedule shall apply.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 31, 2018</td>
<td>Applications (NOI) due</td>
</tr>
<tr>
<td>February 1, 2019</td>
<td>1st MRGP planning report due</td>
</tr>
<tr>
<td>February 1, 2020</td>
<td>2nd MRGP planning report due</td>
</tr>
<tr>
<td>December 1, 2020</td>
<td>Road Stormwater Management Plan (RSWMP) due; includes REI results and Implementation Table</td>
</tr>
<tr>
<td>February 1, 2022 and every February 1 thereafter</td>
<td>RSWMP status update due (see Part 4.2, below)</td>
</tr>
</tbody>
</table>
4.2 Reviewing and Updating Road Stormwater Management Plans

A. Municipalities shall update the Implementation Table on an annual basis. Elements of the Implementation Table to be updated include:

1. Planned road segments to be upgraded in the upcoming year.
2. Changes to MRGP compliance status (Fully, Partially, and Does Not Meet) for completed road segments, and the dates upgrades were completed.
3. Re-prioritization schedule of segments to be upgraded.
4. Identification of any new hydrologically-connected road segments.

B. Municipalities shall complete a new Road Erosion Inventory once every five years.

PART 5: RECORDKEEPING AND REPORTING

5.1 Recordkeeping

A. Municipalities must retain records of all inventory information, copies of all reports required by this permit, a copy of this general permit, and records of all data used to complete the application (NOI) for this permit, for a period of at least three years from the date of the report or application, or for the term of this permit, whichever is longer. This period may be extended by request of the Secretary at any time.

B. A municipality must submit its records to the Secretary only when specifically asked to do so. It must retain a copy of the RSWMP required by this permit at a location accessible to the Secretary. A municipality must make its records, including the notice of intent (NOI), the Road Erosion Inventory and the copy of the RSWMP, available to the public if requested to do so in writing.

5.2 Reporting

Municipalities shall submit annual reports to the Department of Environmental Conservation, Watershed Management Division, Stormwater Management Program by February 1st each year, and upon receipt, the Department shall post each annual report on its website.

A. For reports due February 1, 2019 and February 1, 2020, municipalities shall complete the MRGP Planning Report found on the Stormwater Program’s website, at:
http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program

B. For reports due February 1, 2022 and after, municipalities shall submit the updated Implementation Table, in accordance with Part 4.2.
PART 6: ROAD STORMWATER MANAGEMENT STANDARDS

The following standards are required to be met for all “hydrologically-connected” municipal road segments within the road ROW, and municipal stormwater infrastructure associated with town highways. The standards listed below constitute the Best Management Practices (BMPs) that must be implemented pursuant to this permit. Road segments not meeting these standards must implement the BMPs listed below in order to meet the required standards.

Municipalities shall implement these standards to the greatest extent feasible. The implementation of a standard is considered feasible to the extent that it does not require the acquisition of additional state or federal permits, the condemnation of private property, adverse impacts to historic stone walls, historic structures, or historic trees, impacts to buried utilities, excessive blasting of ledge, or adverse impacts to other significant or sensitive cultural and environmental resources. Municipalities shall document in the RSWMP, for approval by the Secretary, each instance where these feasibility affects implementation of the standards.

6.1 General Standards

The following standards shall apply to all hydrologically connected municipal road segments. These standards are considered the minimum required BMPs, and apply to all construction projects and repair and maintenance activities, unless there exists an applicable stabilization schedule otherwise specified in a stormwater construction permit issued pursuant to 10 V.S.A. § 1264. It is the municipality’s responsibility to maintain all practices after installation.

6.2 Required Standards for Gravel and Paved Roads with Ditches

The following are the required standards for all hydrologically-connected gravel and paved municipal road segments with drainage ditches, whether or not erosion is present. These standards also apply to all new road construction and significant road upgrades. For new construction or upgrades, all bare or unvegetated areas shall be re-vegetated and/or stone lined within five days of disturbance of soils, or sooner if precipitation is forecast. There are separate standards for paved roads with catch basins (see Part 6.4) and for Class 4 roads (see Part 6.5).

A. Roadway/Travel Lane Standards

1. Roadway Crown

   a. Gravel roads shall be crowned, in or out-sloped:

      Minimum: ¼” per foot

      Recommended: ¼” – ½” per foot or 2% - 4%.

   b. Paved/ditched roads shall be crowned during new construction, redevelopment, or repaving where repaving involves removal of the existing paving.

      Minimum: 1/8” per foot or 1%

      Recommended: 1% - 2%.
2. Grader Berm/Windrows

Grader 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 grader berms or evidence of a “secondary ditch”.

B. Road Drainage Standards

Roadway runoff shall flow in a distributed manner to grass or a forested area by lowering road shoulders. Road shoulders shall be lower than travel lane elevation. If distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:

1. For roads with slopes between 0% and 5%: At minimum, grass-lined ditch, no bare soil. Alternatively, ditches may be stabilized using any of the practices identified in sub-paragraph 2(a)-(c) when possible.

   Recommended shape: trapezoidal or parabolic cross section with mild side slopes; two foot horizontal per one foot vertical or flatter.

2. For roads with slopes 5% or greater but less than 8%:
   a. Stone-lined ditch: minimum 6”-8” minus stone or the equivalent for new construction,
   b. Grass-lined ditch with stone check dams, or
   c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume. There shall be at least two cross culverts or turnouts per segment disconnecting road stormwater out of the road drainage network into vegetated areas, or spaced every 164’.

   See Appendix B for check dam installation specifications.

3. For roads with slopes of 8% or greater: Stone-lined ditch.
   a. For slopes greater than 8% but less than 10%: minimum 6”-8” minus stone or the equivalent for new construction.
   b. For slopes greater than 10%: minimum 12” minus stone or the equivalent.

4. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the Above Road Drainage Standards.

C. Stable Conveyances – Drainage Outlets to Waters & Turnouts

Roadway drainage shall be disconnected from waterbodies whenever possible and shall flow in a distributed manner to a grass or forested filter area. If this is not possible, drainage outlets and conveyance areas must be stabilized as follows:

1. Turn-outs - all drainage ditches shall be turned out to avoid direct outlet to surface waters, whenever possible.

2. There must be adequate outlet protection at the end of the turnout, based upon slope ranges below:
a. For conveyances with slopes of 0% or greater but less than 5%: stabilize with grass at minimum. Alternatively, stabilize using the practices identified in subparts (b)-(c) when possible.

b. For conveyances with slopes 5% or greater: stabilize with stone.

c. For slopes greater than 5% but less than 10%: Minimum 6”-8” minus stone or the equivalent for new construction.

d. For slopes greater than 10%: Minimum: 12” minus stone or the equivalent for new construction.

6.3 Standards if Rill or Gully Erosion is Present on Gravel and Paved Roads with Ditches

Required standards if rill or gully erosion is present. These standards also apply to new construction. There are separate standards for paved roads with catch basins (see Part 6.3) and for Class 4 roads (see Part 6.4).

A. Municipal Drainage Culverts/Cross Culverts/Conveyance Culverts

1. Culvert end treatment or headwall required for areas with slopes 5% or greater, if erosion is due to absence of these structures. End treatment or headwall is required for new construction.

2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction.

3. Upgrade to 18” culvert (minimum), if erosion is due to inadequate size or absence of structure. In some instances, intermittent streams enter the municipal road drainage network. In these cases, the Secretary recommends culvert sizing based on in-field and mapping techniques described in the Intermittent Stream Crossing Sizing Guidance, found on the Stormwater Program’s website, at: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program.

4. Drainage culverts conveying perennial waters are subject to coverage under the DEC Stream Alteration General Permit.

5. A French Drain or French Mattress sub-surface drainage practice may be substituted for a cross culvert.

B. Driveway Culverts within the municipal ROW

1. Culvert end treatment or headwall required for areas with slopes of 5% or greater, if erosion is due to absence of these structures. End treatment or headwall is required for new construction.

2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction.
3. Upgrade to minimum 15” culvert, 18” recommended, if erosion is due to inadequate size or absence of structure. In some instances, intermittent streams may enter the municipal road drainage network. In these cases, the Secretary recommends culvert sizing based on in-field and mapping techniques described on the Stormwater Program’s website: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program.

4. Driveway culverts conveying perennial waters are subject to coverage under the DEC Stream Alteration General Permit.

6.4 Standards for Paved Roads with Catch Basins

A. For catch basin outlets from paved roads, complete the Catch Basin Inventory and Outlet Erosion Evaluation to identify areas of rill and gully erosion. The Catch Basin Inventory and Outlet Erosion Evaluation can be found on the Stormwater Program’s website, at: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program

B. Catch Basin Outlet Stabilization

All catch basin outlets shall be stabilized to eliminate all rill and gully erosion. Municipalities shall stabilize all catch basin outlets per the following schedule:

1. Category 1 Municipalities (see Appendix A):
   Implement catch basin outlet stabilization on at least the minimum number of eroded outlets per year, each year from 2021-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.

2. Category 2 Municipalities (see Appendix A):
   Implement catch basin outlet stabilization on at least the minimum number of eroded outlets per year, each year from 2024-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.

6.5 Standards for Connected Class 4 Roads

Stabilize any areas of gully erosion identified in the Road Erosion Inventory with the practices described above or equivalent practices. Disconnection practices such as broad-based dips and water bars may replace cross culverts and turnouts.
PART 7: DISCHARGES UNDER THIS PERMIT

Discharges to High Quality Waters; Anti-degradation

This permit is adopted in conformance with the Anti-Degradation Policy of the Vermont Water Quality Standards and the Department of Environmental Conservation’s Interim Anti-Degradation Implementation Procedure (October 2010).

The BMPs required under this permit are established consistent with 40 C.F.R. 122.44(k) of the Code of Federal Regulations and 10 V.S.A. § 1264(c)(6), were developed based on a review of leading national stormwater standards, and were informed by best available information regarding the effectiveness of the BMPs. Additionally, the BMPs required under this permit were informed by stakeholder input and subject to public review and comment regarding their effectiveness.

The BMPs required under this permit will be reviewed in cycles not to exceed five years, in conformance with the Department’s established plan, to ensure that the required practices provide the highest level of stormwater treatment. Where warranted based on this review, the Department will revise this permit to add, remove, or modify practices to ensure ongoing compliance with the anti-degradation requirements of the Vermont Water Quality Standards.

In the vast majority of cases, application of the BMPs required under this permit will maintain and protect the higher quality of the State’s high quality waters, will prevent limited reductions in the existing higher quality of those waters, and will minimize risk to the existing and designated uses of those waters.

Therefore, compliance with this permit affords a rebuttable presumption of compliance with the Anti-Degradation Policy. The overall presumption of compliance with anti-degradation requirements for projects and sites in conformance with this permit may be rebutted on a case-by-case basis if warranted by credible and relevant project- or site-specific information available to the Agency during the review of an application for a proposed discharge.

PART 8: STANDARD PERMIT CONDITIONS

8.1 Operation and Maintenance

The permittee shall at all times properly operate, inspect, and maintain all stormwater collection, treatment, and control systems and BMPs which are used to achieve compliance with this permit. Any stormwater system deficiencies noted during inspections shall be corrected. Solids, sediments, and other pollutants collected and removed in the course of treatment or control of stormwater runoff shall be disposed of in a manner to prevent any pollutant from entering waters or wetlands.

8.2 Duty to Comply

The permittee shall comply with all terms and conditions of this permit and the permittee’s authorization to discharge issued hereunder. Any permit noncompliance shall constitute a
violation of 10 V.S.A. Chapter 47, the CWA, to the full extent it applies, and related rules and regulations and may be cause for an enforcement action; revocation and reissuance, modification, or termination of the permittee’s authorization to discharge under this permit; or denial of a permit renewal application. Violations of the terms and conditions of this permit are subject to civil and criminal penalties pursuant to 10 V.S.A. §§ 1274 and 1275 and administrative enforcement pursuant to 10 V.S.A. § 1272 and Chapters 201 and 211.

8.3 Duty to Reapply

Within 90 days of reissuance of this general permit, all permittees shall submit complete NOIs and updated RSWMPs in order to obtain authorization to discharge. If the discharge does not meet the eligibility requirements for coverage under this permit, then the permittee shall apply for coverage under an individual permit within 90 days of the reissuance of this general permit.

When the permittee has made timely and sufficient application for the renewal of its authorization or a new permit with reference to any activity of a continuing nature, the existing authorization shall not expire until the application has been finally determined by the Secretary, and, in case the application is denied or the terms of the new permit limited, until the last day for seeking review of the Secretary’s decision or a later date fixed by order of the reviewing court.

8.4 Continuation of the Expired General Permit

If this permit is not reissued or replaced prior to its expiration date, it will be administratively continued and remain in full force and effect until the permit is reissued or replaced or until the Secretary makes a formal decision not to reissue this permit.

8.5 Requiring an Individual Permit

The Secretary may require any municipality that files an application for coverage or who is already covered under this permit to apply for an individual permit. Any municipality may petition the Secretary to take action under this paragraph. Cases in which an individual permit may be required include:

A. The permittee is not in compliance with the terms and conditions of this permit;

B. The discharge is a significant contributor of pollution, as determined by the following factors:
   1. The location of the discharge;
   2. The size of the discharge;
   3. The impact of the discharge on the receiving water;
   4. Whether an individual permit is necessary to implement an applicable TMDL or Water Quality Remediation Plan; or
   5. Other relevant factors


8.6 Right of Entry

The permittee shall allow the Secretary or his/her authorized representatives, at reasonable times and upon presentation of credentials, to:

A. Enter upon and inspect the permittee’s property where discharges, and the stormwater collection, treatment, and control system, and BMPs are located, or where records must be kept under the conditions of this permit;

B. Have access to and copy, at reasonable times, any records required to be kept pursuant to this permit;

C. Inspect at reasonable time any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

D. Sample or monitor at reasonable times, for the purposes of ensuring permit compliance or as otherwise authorized by the CWA or state law, any substances or parameters, including BMP performance, at any location.

8.7 Duty to Provide Information

The permittee shall furnish to the Secretary, within a reasonable time, any information which the Secretary may request to determine whether cause exists for modifying, revoking and reissuing, or termination of this permit or to determine compliance with this permit, including information regarding any change to the permittee’s approved RSWMP. The permittee shall also furnish to the Secretary, upon request, copies of records required to be kept pursuant to this permit.

If the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Secretary, it shall promptly submit such facts or information.

8.8 Operating Fees

Pursuant to 3 V.S.A. § 2822, stormwater discharges authorized by this permit are subject to operating fees. A municipality shall submit all operating fees in accordance with procedures provided by the Secretary. Failure to pay operating fees shall constitute a violation of this permit.

8.9 Rights & Privileges

This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations. This permit does not obviate the necessity of obtaining such federal, state, or local permits or approvals as may be required by law.
8.10 Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

8.11 Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

8.12 Anticipated Noncompliance

The permittee shall give advance notice to the Secretary of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

8.13 Compliance With Other Laws

Nothing in this general permit shall be construed to preclude the institution of legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject to under other laws. This permit does not obviate the necessity to comply with other federal, state, and local laws and regulations nor does it obviate the necessity of obtaining other applicable federal, state, and local permits and approvals as may be required by law.

8.14 Permit Actions & Revocation

The Secretary may, after notice and opportunity for public hearing under 3 V.S.A. § 814, revoke or suspend, in whole or in part, authorization to discharge under this permit for cause, including:

A. Violation of any terms or conditions of the permit;

B. Obtaining authorization under the permit by misrepresentation or failure to disclose fully all relevant facts;

C. A change in any condition that requires either a temporary or permanent reduction or elimination of the permitted discharge;

D. Correction of violations of the Vermont Water Quality Standards.

The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

8.15 Enforcement

The permittee shall comply with all terms and conditions of this permit. Any violation of this permit or relevant state law may result in the institution of legal proceedings pursuant to 10 V.S.A. §§ 1274 and 1275 and 10 V.S.A. Chapters 201 and 211. Such legal proceedings may
include the issuance of orders, the levying of penalties, and imprisonment. Legal proceedings may also be instituted if a person knowingly makes any false statement, representation, or certification in any application, record, report, plan, or other document, or who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method, in connection with this permit and any authorization to discharge issued under this permit. In addition, the Secretary may issue orders pursuant to 10 V.S.A. § 1272 and may take any and all other enforcement actions, without limitation, provided by law.

8.16 Signatory Requirements

A. All permit applications, including NOI, shall be signed as follows:

   For a municipality: By either a principal executive officer or ranking elected official.

B. All reports required by this permit, and other information requested by the Secretary shall be signed by a person described in paragraph (A) of this section, or by a duly authorized representative of that person. A person is a duly authorized representative only if:

1. The authorization is made in writing by a person described in paragraph (A) of this section and submitted to the Secretary; and

2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity, or an individual or position having overall responsibility for environmental matters for the municipality.

Any person signing a document under paragraph (1) or (2) of this section shall make the following certification:

“I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.”

8.17 Severability

Invalidation of a portion of this permit does not necessarily render the whole permit invalid. The Secretary’s intent is that the permit is to remain in effect to the extent possible; in the event that any part of this permit is invalidated, the Secretary will advise as to the effect of such invalidation.

8.18 Effect of Permit

Authorizations issued pursuant to this permit shall be valid for a period of time not to exceed five years from the date of the authorization being signed.
PART 9: APPEALS

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant’s attorney. In addition, the appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address for the Environmental Division is: 32 Cherry St.; 2nd Floor, Suite 303; Burlington, VT 05401 (Tel. # 802-828-1660).

PART 10: DEFINITIONS

1. **Agency:** the Vermont Agency of Natural Resources

2. **Armored Shoulder:** a structure that reinforces existing road shoulder integrity and embankment area stability by reducing Stormwater-related overbank erosion. To construct an armored shoulder, road surface material and base material are excavated and removed and replaced with 12” minus stone 1-3’ in depth and top-dressed with processed road surface material.

3. **Best Management Practices (BMPs):** a schedule of activities, prohibitions or practices, maintenance procedures, green infrastructure, and other management practices to prevent or reduce water pollution.

4. **Bioretention Area:** a vegetated surface depression, often referred to as a “rain garden,” with amended soils used to capture, slow, infiltrate, and treat runoff from impervious surfaces, including rooftops, roads, parking lots and driveways. The goal of this practice is to infiltrate stormwater runoff. Properly designed and installed bioretention area provide volume control, and groundwater recharge.

5. **Broad-based Dip:** a drainage structure, similar to but wider than a waterbar, used on Class 4 roads where grades are less than or equal to 8 percent. These structures divert the surface water runoff into a filter area.


7. **Conveyance culvert:** a municipal culvert with a defined channel at the outlet. Conveyance culverts generally drain a larger watershed area than municipal drainage
culverts and have the ability to convey road stormwater to adjacent waters. Conveyance culverts conveying perennial waters are subject to the DEC Stream Alteration Permit.

8. **Culvert Headwall**: stone structures that protect culverts from damage during grading, plowing and ditch cleaning, increase hydraulic efficiency, and prevent erosion around the culvert inlet and outlet. These structures may also be referred to as “headers” or “end treatments.”

9. **Discharge**: the placing, depositing or emission of any wastes, directly or indirectly, into an injection well or into the waters of the State.

10. **Driveway culvert**: a culvert under a driveway within municipal right-of-way.

11. **EPA**: the United States Environmental Protection Agency.

12. **French Drain / Under Drain**: a drainage practice installed under a road or road ditch to collect and transport subsurface waters. These buried perforated conduits are wrapped in geotextile fabric, which allows water to enter the conduit while keeping sediment out.

13. **French Mattress**: a structure under a road consisting of clean coarse rock wrapped in geotextile fabric through which water can pass freely. These structures are used in extremely wet areas, to support the road bed while allowing unrestricted water movement.

14. **Gully erosion**: a severe level of erosion. Gully erosion is equal to or greater than 12” in depth. (figure below)

15. **Hydrologically-connected road segments**: a road segment, equal to 100 meters in length, where the Secretary has determined that road and drainage characteristics indicate a likelihood of discharges to surface waters or wetlands. This definition includes those road segments identified as hydrologically connected on the ANR Atlas. The Secretary has developed a hydrologically-connected road segment layer using GIS analysis of roadway distance to receiving waters.

16. **Impervious surface**: those man-made surfaces, including paved and unpaved roads, parking areas, roofs, driveways and walkways, from which precipitation runs off rather than infiltrates.

17. **Level Spreader**: a parallel or oval-shaped infiltration structure used to intercept and discharge water flow over a wide linear area. The construction of a level spreader involves the excavation and removal of soil and backfilling excavated area to the original grade with 3”-6” stone.

18. **Municipality**: a city, town, or village. See 10 V.S.A. § 1264(g)(D).
19. **Municipal drainage/cross culvert**: culverts that convey road stormwater from one side of the road to another with no defined channel acting as a conveyance at the outlet. Outlets fan or sheet flow into grassed or forested areas and are not direct conveyances to waters.

20. **Municipal roads**: all town highways, classes 1-4, as defined under 19 V.S.A. Chapter 3, and their rights-of-way, as well as municipal stormwater infrastructure associated with town highways.

21. **NOI**: An acronym meaning Notice of Intent to be authorized by this permit. The NOI is the mechanism used to register for coverage under a general permit.

22. **Pollutant**: dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. This term does not mean (A) "sewage from vessels" within the meaning of section 1322 of the CWA; or (B) water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil or gas production and disposed of in a well, if the well used either to facilitate production or for disposal purposes is approved by authority of the State in which the well is located, and if such State determines that such injection or disposal will not result in the degradation of ground or surface water resources.

23. **Rill erosion**: a moderate level of erosion. Rill erosion is erosion rivulets greater than 1” but less than 12” in depth.

24. **Secretary**: the Secretary of the Vermont Agency of Natural Resources or the Secretary’s duly authorized representative.

25. **Sedimentation**: the deposition or accumulation of sediment. Sedimentation is often a symptom of erosion, and while rill and gully erosion are often concave in cross section, sedimentation is convex.

26. **Stone/Rock Apron**: a fan-shaped culvert outlet stabilization structure, designed to reduce water velocity, constructed of 12” minus stone. This structure should not be installed at perennial stream culvert outlets.

27. **Stormwater or stormwater runoff**: precipitation and snowmelt that does not infiltrate into the soil, including material dissolved or suspended in it, but does not include discharges from undisturbed natural terrain or wastes from combined sewer overflows.

28. **Turn-out**: the extension of a drainage ditch that redirects or ‘turns away’ water into a vegetated buffer and disperses runoff before entering a water resource.
29. **Total Maximum Daily Loads (TMDLs):** the calculations and plan for meeting water quality standards approved by EPA and prepared pursuant to 33 U.S.C. § 1313(d) and federal regulations adopted under that law.

30. **Water Quality Standards:** the Vermont Water Quality Standards define the water quality goals of a water body, or portion thereof, by designating the use or uses of the water, by setting criteria necessary to protect the designated uses, and by establishing anti-degradation requirements to protect existing uses and high quality waters. Vermont has adopted water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the CWA (See CWA sections 101(a)2 and 303(c)).

31. **Waters:** includes all rivers, stream, creek, brooks, reservoirs, ponds, lakes, springs, and all bodies of surface waters, artificial or natural, which are contained within, flow through or border upon the State or any portion of it.

32. **Waterbar:** a type of berm or open culvert drainage structure constructed across the width of a Class 4 road that diverts the surface water runoff from ditches and road into a filter area.

33. **Wetlands:** those areas of the State that are inundated by surface or groundwater with a frequency sufficient to support significant vegetation or aquatic life that depend on saturated or seasonally saturated soil conditions for growth and reproduction. Such areas include marshes, swamps, sloughs, potholes, fens, river and lake overflows, mud flats, bogs, and ponds, but excluding such areas as grow food or crops in connection with farming activities.

**PART 11: EFFECTIVE DATE AND TERM OF GENERAL PERMIT**

This permit shall become effective upon signing and shall expire five years from the date of signing.

Signed at Montpelier, Vermont his ___ day of Month, 2017.

Emily Boedecker, Commissioner
Department of Environmental Conservation

By___________________________
Peter LaFlamme, Director
Watershed Management Division
Appendix A – Category 1 & 2 Municipalities, and Municipalities authorized under the MS4

Category 1 municipalities

Municipalities with more than 8.5 miles of paved roads with catch basins

Barre City
Barre Town
Bennington
Brattleboro
Hartford
Middlebury
Montpelier
Newport City
Rockingham
Rutland City
Springfield
St Johnsbury

Category 2 municipalities

Municipalities with less than 8.5 miles of paved roads with catch basins

All other municipalities

Municipalities Authorized Under the MS4

City of Burlington
Town of Colchester
Town of Essex
Village of Essex Junction
Town of Milton
Town of Rutland
City of St. Albans
Town of St. Albans
Town of Shelburne
City of South Burlington
Town of Williston
City of Winooski
Appendix B – Stone Check Dam Specification

- Height: No greater than 2 feet. Center of dam should be 9 inches lower than the side elevation.
- Side slopes: 2:1 or flatter.
- Stone size: Use a mixture of 2 to 9 inch stone.
- Width: Dams should span the width of the channel and extend up the sides of the banks.
- Spacing: Space the dams so that the bottom (toe) of the upstream dam is at the elevation of the top (crest) of the downstream dam. This spacing is equal to the height of the check dam divided by the channel slope.

\[
\text{Spacing (in feet) } = \frac{\text{Height of check dam (in feet)}}{\text{Slope in channel (ft/ft)}}
\]

- Maintenance: Remove sediment accumulated behind the dam as needed to allow channel to drain through the stone check dam and prevent large flows from carrying sediment over the dam. If significant erosion occurs between check dams, a liner of stone should be installed.
ROAD STORMWATER MANAGEMENT STANDARDS

The following standards are required for all “hydrologically-connected” municipal road segments within the road ROW and municipal stormwater infrastructure. If the implementation of one of the following standards will trigger the need for an additional state permit for a specific location, the Secretary may waive the requirement at that location. Additionally, extremely challenging sites and conditions may preclude the implementation of the MRGP Standards in certain situations. Some examples include: historic stone walls, historic trees, excessive ledge, buried utilities, and other significant and sensitive areas, and/or unique cultural and environmental resources. Municipalities shall document the reasons why an MRGP standard cannot be met for each location where a waiver is requested. Waivers will not be granted until review and approval by the Secretary. Fiscal reasons are not a basis for non-compliance or basis for a request of a waiver.

When planning for and implementing road stormwater management practices, follow the three primary principles: 1st disconnection; 2nd infiltration; and 3rd stable conveyances.

Required Standards for Gravel and Paved Roads with Ditches

This part includes the required standards for all hydrologically-connected gravel and paved municipal roads with drainage ditches, whether or not erosion is present. These standards also apply to all new road construction and significant road upgrades. For new construction or upgrades, all bare or unvegetated areas shall be re-vegetated and/or stone lined within five days of disturbance of soils, or sooner if precipitation is forecast. There are separate standards for paved roads with catch basins (see Part 6.3) and for Class 4 roads (see Part 6.4).

A. Roadway/Travel Lane Standards

1. Roadway Crown
   a. Gravel roads shall be crowned, in or out-sloped;
      Minimum: ¼”/foot
      Recommended: ¼” – ½”/foot or 2% - 4%.
   b. Paved/ditched roads shall be crowned during new construction, removal of old pavement or addition of new pavement;
      Minimum: 1/8”/foot or 1%
      Recommended: 1% - 2%.

2. Grader Berm/windrows
   Grader berms shall be removed to allow precipitation to shed from the travel lane into the road drainage. Roadway runoff shall flow in a distributed manner to the drainage ditch or filter area and there shall be no grader berms or evidence of a “secondary ditch”.

DRAFT Vermont DEC Municipal Road General Permit Standards
B. Road Drainage Standards

Roadway runoff shall flow in a distributed manner to grass or a forested area by lowering road shoulders. Road shoulder shall be lower than travel lane elevation. If distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:

1. For roads with slopes of 0% - <5% - At a minimum, grass-lined ditch, no bare soil. Alternatively, ditches may be stabilized using any of the practices identified in sub-paragraph 2(a)-(c) when possible.

   Recommended shape: trapezoidal or parabolic cross section with mild side slopes; 2H:1V or flatter.

2. For roads with slopes of 5% - <8%:
   a. Stone-lined ditch; Minimum: 6-8” minus stone or the equivalent for new construction, or
   b. Grass-lined ditch with stone check dams, or
   c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume, at least two cross culverts or turnouts per segment disconnecting road stormwater out of the road drainage network into vegetated areas, or spaced every 164’

   See Appendix B for check dam installation specifications.

3. For roads with slopes ≥ 8%; Stone-lined ditch.

   For slopes ≥8% - 10%, Minimum: 6-8” minus stone or the equivalent for new construction.

   For slopes >10%, Minimum: 12” minus stone or the equivalent for new construction.

4. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above Road Drainage Standards.

C. Stable Conveyances – Drainage Outlets to Waters & Turnouts

Roadway drainage shall be disconnected from waterbodies whenever possible and shall flow in a distributed manner to a grass or forested filter area. If this is not possible, drainage outlets and conveyance areas must be stabilized as follows:

1. Turn-outs - all drainage ditches shall be turned out to avoid direct outlet to surface waters, whenever possible.

2. There must be adequate outlet protection at the end of the turnout, based upon slope ranges below:
   a. For conveyances with slopes of 0% - <5%, stabilize with grass. Alternatively, turnouts may be stabilized using any of the practices identified in sub-paragraph 2(a)-(c) of the Road Drainage Standards when possible.
   b. For conveyances with slopes ≥5%, stabilize with stone.

   For slopes ≥5% - 10%, Minimum: 6-8” minus stone or the equivalent for new construction.
For slopes of >10%, Minimum: 12” minus stone or the equivalent for new construction.

**Standards if Rill or Gully Erosion is Present on Gravel and Paved Roads with Ditches**

Required standards if rill or gully erosion or sedimentation is present. These standards also apply to new construction.

D. Municipal Drainage Culverts/Cross Culverts/Conveyance Culverts

1. Culvert end treatment and/or headwall required for areas with slopes ≥ 5%, if erosion is due to absence of these structures. End treatment and/or headwall is required for new construction.

2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction.

3. Upgrade to 18” culvert (minimum), if erosion is due to inadequate size or absence of structure. In some instances, intermittent streams may become part of the municipal road drainage network. In these cases, the Secretary recommends culvert sizing based on in-field and mapping techniques described in: [http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program](http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program)

4. A French Drain or French Mattress sub-surface drainage practice may be substituted for a cross culvert.

E. Driveway Culverts within the municipal ROW

1. Culvert end treatment and/or headwall required for areas with slopes ≥ 5%, if erosion is due to absence of these structures. End treatment and/or headwall is required for new construction.

2. Stabilize outlet such that there will be no scour erosion, if erosion is due to absence or inadequacy of outlet stabilization. Stone aprons or plunge pools required for new construction.

3. Upgrade to 15” culvert (minimum), 18” recommended, if erosion is due to inadequate size or absence of structure. In some instances, intermittent streams may become part of the municipal road drainage network. In these cases, the Secretary recommends culvert sizing based on in-field and mapping techniques described in: [http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program](http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program)
Standards for Paved Roads with Catch Basins

A. For catch basin outlets from paved roads, complete the Catch Basin Inventory and Outlet Erosion Evaluation to identify areas of rill and gully erosion. The Catch Basin Inventory and Outlet Erosion Evaluation can be found on the Stormwater Program’s website, at: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program

B. Catch Basin Outlet Stabilization

All catch basin outlets shall be stabilized to eliminate all rill and gully erosion. Municipalities shall stabilize all catch basin outlets per the following schedule:

1. Category 1 Towns (see Appendix A)

   Implement catch basin outlet stabilization on at least the minimum number of eroded outlets per year, each year from 2021-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.

2. Category 2 Towns (see Appendix A)

   Implement catch basin outlet stabilization on at lease the minimum number of eroded outlets per year, each year from 2024-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.

6.4 Standards for Connected Class 4 Roads

Stabilize any areas of gully erosion identified in the Road Erosion Inventory on hydrologically-connected road segments with the practices described above or equivalent. Disconnection practices such as broad-based dips and water bars may replace cross culverts and turnouts.
Appendix A. Category 1 and 2 towns for the MRGP Paved Roads with catch basins standards

**Category 1 municipalities**

Municipalities with more than 8.5 miles of paved roads with catch basins

Barre City
Barre Town
Bennington
Brattleboro
Hartford
Middlebury
Montpelier
Newport City
Rockingham
Rutland City
Springfield
St Johnsbury

**Category 2 municipalities**

Municipalities with less than 8.5 miles of paved roads with catch basins

All other municipalities
Introduction: The following Road Erosion Inventory and Evaluation Interim Guidance Form was developed to assist municipalities with the forthcoming Vermont Department of Environmental Conservation’s Municipal Roads General Permit (MRGP). The form is based on the draft practice standards that are being developed as part of the MRGP. Vermont municipalities will have to adhere to the MRGP requirements starting in July 2018. These requirements include conducting road erosion inventories of all hydrologically-connected roads. The primary goal of the road erosion inventory is to establish baseline conditions of road segments and evaluate progress of implementation efforts. Inventories will be used to determine if connected road segments meet MRGP standards. For those road segments not meeting MRGP standards, towns will be required to develop Implementation Plans and Schedules and implement those plan practices.

Steps for completing the Municipal Road Inventory:

1. Review GIS road segment connectivity maps, made available for each municipality by DEC at anr.vermont.gov/maps/nr-atlas. The GIS road segment connectivity is determined by road segment proximity to waters of the state (wetlands, lakes, ponds, perennial and intermittent streams), both bisecting and lateral distance.

2. Record each Road Segment Identification Number and segment slope from the Hydrologically-Connected Road layer, road name, and Town Highway Number. Additional road segments not included in the GIS road segment connectivity map may be found to be connected in the field and evaluated with this form.

3. For each hydrologically-connected road segment complete the corresponding Road Inventory and Evaluation Form or corresponding App. Apps must answer all the questions included in these forms.
   a. Paved Roads with Open Ditches and Gravel/Open (Ditched) Non-Class 4 Roads: Form A
   b. Class 4 Roads: Form B
   c. Paved Roads with Curbing Drainage and Catch Basins: Use a separate evaluation and reporting mechanism. Catch basin outlet erosion inventories and other considerations will be included.

MRGP Overall Segment Scoring:

- Any standards that score Does Not Meet individual practice scores= Does Not Meet segment score (except for crown)
- One or twoPartially Meets* individual scores= Partially Meets segment score
- Three or more Partially Meets individual practice scores= Does Not Meet segment score
- Fully Meet for all individual practice scores= Fully Meets segment score

*Note: both Partially Meet and Does Not Meet scores indicate road segment does not meet MRGP standards and will require the implementation of road best management practices (BMPs) in order to meet MRGP standards.

<table>
<thead>
<tr>
<th>Segment Slope</th>
<th>Fully Meets</th>
<th>Partially Meets</th>
<th>Does Not Meet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Crown</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Berm/windrow</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Drainage ditch/shoulder</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Conveyance area/turn out</td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>5. Drive culvert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Drainage culvert</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall Segment Score</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Name: GRAVEL/OPEN (DITCHED) PAVED ROADS WITH OPEN DITCHES

**Road Segment Name, Town Highway Number & Segment ID Number:**  
**ANR Atlas Slope:**  
**Field Determined Slope:**  
**Road Type:** □ Paved  
□ Gravel

#### 1. ROADWAY CROWN/TRAVEL LANE: (N/A for Paved) What percentage of the segment is properly crowned (¼” to ½” per foot), in-sloped, or out-sloped? Note if erosion is present due to poor road surface material.

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 163’)</th>
<th>50% - 89% (164’ – 294’)</th>
<th>90% - 100% (295’ – 328’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

#### 2. GRADER BERM/WINDROW: What percentage of the segment (both sides of road, 200m, 656’) is the grader berm/windrow removed? (N/A for paved roads)

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 327’)</th>
<th>50% - 89% (328’ – 589’)</th>
<th>90% - 100% (590’ – 656’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

#### 3. ROAD DRAINAGE: What percentage of the segment (both sides of road, 200m, 656’) is the allowed to shed in a distributed manner to a vegetated or forested filter area (shoulder lower than travel lane) or drainage ditch stabilized appropriately for the slope range below?

- <5% slope: stabilized with vegetation, stone-lined, or check dams
- ≥5% to <8% slope: stabilized with stone-lined ditch or combination of grass lined ditch with check dams or grass-lined ditch if installed with disconnection practices such as turnouts and cross culverts
- ≥8% slope: stone-lined ditch required

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 327’)</th>
<th>50% - 89% (328’ – 589’)</th>
<th>90% - 100% (590’ – 656’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

#### 4. CONVEYANCE AREA/TURNOUT: Do drainage outlets/conveyance areas meet the standard of being turned out, shed in a distributed manner down the bank (shedding water), and/or stabilized with vegetation (<5% slope) or stone (>5% slope)?

- □ One or more areas does not meet standard.
- □ All areas meet standard.

#### 5 & 6. DRIVEWAY & DRAINAGE CULVERTS

**A. Type of culvert?**  
**B. Is erosion present?**

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 327’)</th>
<th>50% - 89% (328’ – 589’)</th>
<th>90% - 100% (590’ – 656’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

#### C. Where in the culvert cross section is erosion present and is it rill or gully erosion?

**SEE CULVERT CROSS SECTION DIAGRAM**

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 327’)</th>
<th>50% - 89% (328’ – 589’)</th>
<th>90% - 100% (590’ – 656’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

#### (Optional) IS OTHER RILL OR GULLY EROSION PRESENT?

- □ River-road embankment erosion
- □ Outside the Right of Way: i.e. agriculture, logging erosion, or private road/drive erosion
- □ Other:

<table>
<thead>
<tr>
<th>Erosion Type</th>
<th>0% - 49% (0’ - 327’)</th>
<th>50% - 89% (328’ – 589’)</th>
<th>90% - 100% (590’ – 656’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Does Not Meet</td>
<td>□ Partially Meets</td>
<td>□ Fully Meets</td>
<td>□ Rill</td>
</tr>
</tbody>
</table>

**Check if Present in Segment and Note Linear Feet (LF):**

- □ Historic stone walls, LF: ___________
- □ Historic large trees, LF: ___________
- □ Buried utilities, LF: ___________
- □ Wetland, LF: ___________

### Notes:

- □ Rill
- □ Gully

### Overall Segment Score

- □ Fully Meets
- □ Partially Meets
- □ Does Not Meet

---

Updated June 2017
# Road Inventory and Evaluation Form B

## CLASS 4 ROADS

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>ROAD SEGMENT NAME, Town Highway Number &amp; Segment ID number:</th>
<th>SLOPE:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Linear feet (L)</th>
<th>Width (W)</th>
<th>Depth (D)</th>
<th>Total Cubic Yards (LWD/27)</th>
<th>Location of erosion within road cross section</th>
<th>Notes and likely cause of erosion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel lane</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Embankment/shoulder</td>
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<td></td>
<td></td>
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<tr>
<td>Drainage ditch</td>
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</tr>
<tr>
<td>Ditch outlet/conveyance zone/turnout</td>
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<tr>
<td>Drainage culvert or water bar (presence/absence or size/quantity)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drainage culvert outlet</td>
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<tr>
<td>Drainage culvert headwall</td>
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<tr>
<td>Stream and road conflict</td>
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<tr>
<td>Other area:</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Segment Score</th>
<th>□ Any Gully Erosion = Does Not Meet</th>
<th>□ No Gully Erosion = Fully Meets</th>
</tr>
</thead>
</table>

1 road segment = 100 meters = 328 feet
Both sides of road = 200 meters = 656 feet
Sheet Flow <1” erosion depth
Rill 1”-11” erosion depth
Gully 12”+ erosion depth
Municipal Roads General Permit- Road Erosion Inventory (REI) Supplement
(see MRGP website for additional info: http://dec.vermont.gov/watershed/stormwater/permit-information-applications-fees/municipal-roads-program)

Use: for the assessment of Vermont DEC Municipal Roads General Permit standards for paved and gravel roads with drainage ditches (Not Class 4). For paved roads with catch basins, use the Paved Roads with Catch Basins inventory template (link above). For hybrid paved roads, such as paved with ditches and catch basins, use this inventory template.

MRGP REI Coverage: The MRGP standards and REI evaluation areas include:

A. Town highways, class 1-4, and their rights-of-way.

B. Municipal stormwater infrastructure associated with town highways, within and outside of the municipal right-of-way.

“Municipal stormwater infrastructure” refers to all stormwater conveyances and treatment and control systems, controlled by the municipality, that receive stormwater discharges from municipal roads.

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

Field determination of road hydrologic connectivity:

Evaluate all hydrologically-connected road segments that appear on the ANR Natural Resources Atlas at the time of that the REI is conducted. All hydrologically-connected municipal road segments depicted on the ANR Atlas shall be field visited and evaluated using the DEC REI template. Additionally, the applicant may propose to add or remove road segments from its REI based on an evaluation of the following criteria:

- Municipal road within 100’ to a water of the state or wetland;
- Municipal road that bisects 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.
- 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.
- The addition or removal of any road segments not appearing on the ANR Atlas must be documented as part of the REI, and justification for the removal or addition shall be included in the MRGP Implementation Table.
• The Secretary may determine at any time that a road segment not identified on the ANR Atlas is hydrologically connected, based on the criteria listed above, as well as other site-specific factors that indicate the likelihood of a discharge, including slope, soil type, proximity to receiving waters, etc. When the Secretary determines that an unmapped road segment is hydrologically connected and informs the municipality of its determination, the permittee shall include the segment in its Implementation Table as part of the next annual report.

**Erosion Types:**

**Rill Erosion** = depth of 1” to <12”

**Gully erosion** = depth of 12”+
# Road Erosion Inventory Parameters

## 1. Roadway Crown

<table>
<thead>
<tr>
<th>Applicability</th>
<th>Standard</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravel Roads</td>
<td>Crowned, in-sloped or out-sloped</td>
<td>Minimum: 1/4”/ft. Recommended: ¼”-1/2”/ft. or 2-4% and steeper for steep road grades</td>
</tr>
<tr>
<td>Paved/Ditched Roads</td>
<td>Crowned, in-sloped or out-sloped; Only applies during new construction or new pavement and removal of old pavement</td>
<td>Minimum: 1/8”/ft. or 1% slope Recommended: 1-2% slope</td>
</tr>
</tbody>
</table>

Out-sloped, in-sloped, and crowned diagram:

![Diagram of road crown types](image)

Measuring **road crown** (can also use digital level)
2. Grader Berm and plow berm
Grader and plow berms shall be removed to allow precipitation to shed from the travel lane into the road drainage. Roadway runoff shall flow in a distributed manner to the drainage ditch or filter area and there shall be no grader berms or evidence of a “secondary ditch”.

Grader berm

Secondary ditch

3. Road Drainage Standards- Measure road segment slopes in the field with clinometer/inclinometer, digital level, or equivalent (cell phone slope app is not appropriate).

Distributed flow- roadway runoff shall flow in a distributed manner to grass or a forested area by lowering road shoulders (examples below). Road shoulder shall be lower than travel lane elevation from edge of travel lane to end of right-of-way. No back slope exists or toe of back slope is outside right-of-way.

Drainage ditch standards- if distributed flow is not possible, roadway runoff may enter a drainage ditch, stabilized as follows:
   a. For roads with slopes of 0% - <5% - Grass-lined ditch
   b. For roads with slopes of 5% - <8%:
       a. Stone-lined ditch, or
b. Grass-lined ditch with stone check dams, or

c. Grass-lined ditch if installed with disconnection practices such as cross culverts and/or turnouts to reduce road stormwater runoff volume, at least two cross culverts or turnouts per segment disconnecting road Stormwater out of the road drainage network into vegetated areas, or spaced every 164’.

c. For roads with slopes ≥ 8%; Stone-lined ditch required. If there is a road slope within the segment 8% or greater, longer than 65’ in length, stone is required for that length 8% or greater to Fully Meet this MRGP standard, even if the average road segment slope is less than 8%.

d. If appropriate, bioretention areas, level spreaders, armored shoulders, and sub-surface drainage practices may be substituted for the above Road Drainage Standards.

Example of high road shoulder

Example of distributed flow, low shoulder

4. Conveyance Areas - Turn-outs and outlets of drainage ditches to water resources

Roadway drainage shall be disconnected from waterbodies whenever possible and shall flow in a distributed manner to a grass or forested filter area (see Distributed Flow above), and turned out to avoid direct outlet to surface waters whenever possible. If this is not possible, drainage outlets and conveyance areas must be stabilized as follows:

a. For conveyances with slopes of 0% - <5%, stabilize with grass.

b. For conveyances with slopes ≥5%, stabilize with stone.
5. and 6. Driveway and Drainage/Intermittent stream culverts- Driveway culverts located within the municipal right-of-way and drainage culverts and all other non-perennial stream crossings within the right-of-way.

Intermittent streams are streams that do not flow for portions of the year. Intermittent streams and their related infrastructure associated with municipal roads are covered under this permit. Examples of MRGP standards to address culvert erosion include: culvert size upgrading, culvert headwalls, and culvert outlet stabilization. Perennial streams and related BMPs are not covered by this permit. The differences between perennial and intermittent streams are described below.*

If rill or gully present near or around a drive, drainage, or intermittent stream culvert, document what type of erosion and where the erosion is located (see diagram). Erosion may also be present because the structure is needed but currently lacking. If culvert is completely plugged/blocked score as Does Not Meet. Score partially plugged (greater than 50% plugged but not fully plugged) culverts as Partially Meets.

Driveway culvert erosion example  Drainage culvert erosion example
*Perennial versus intermittent streams*

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

1. 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).

2. Presence of one or more geomorphic characteristics typically associated with perennial streams including:
   a. Bed forms; i.e. riffles, pools, runs, gravel bars, other depositional features, bed armor layer
   b. Bank erosion and/or bed scour
   c. Indications of waterborne debris and sediment transport
   d. Defined bed and banks in a valley setting

3. Watershed size greater than 0.25 square miles, although some perennial streams may be located in smaller watersheds. (See DEC map layers)

4. Presence of aquatic organisms (fish and macroinvertebrates) requiring uninterrupted flow for survival
5. Base flows are primarily supported by groundwater recharge as indicated by bank seeps, springs or other indicators

6.Disconnected surface flow within a singular channel; e.g. limited sub-surface flow

Any work to replace, retrofit or otherwise alter the streambank 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.

Road Erosion Inventory- Segment Scoring

(Note: Partially Meets score for individual practice or segment score still does not meet MRGP standards, same with Does Not Meet score. BMP implementation will be required for both of these scored segments. For a road segment to meet MRPG standards, individual and segment score= Fully Meets).

Baseline Practices- Individual Practice Scores- Scores from MRGP Road Erosion Inventory Template numbers 1-3 based on % of practice in place

Fully Meets (FM)= 90-100% of practice in place within segment
Partially Meets (PM)= 50-89% of practice in place within segment
Does Not Meet (DNM)= 0-49% of practice in place within segment

1. Crown: DNM/PM/FM
2. Grader Berm: DNM/PM/FM
3. Drainage ditch/distributed flow: DNM/PM/FM
4. Conveyance area/turn out (not based on %): DNM/FM (no Partially Meets option)

Erosion Triggered Practices- Individual Practice Scores

Fully Meets (FM)= No erosion observed
Partially Meets (PM)= rill erosion observed
Does Not Meet (DNM)= gully erosion observed

5. Drive culvert- size/lacking and/or end treatment MRGP standard: DNM/PM/FM
6. Drainage/Intermittent stream culvert- size/lacking and/or end treatment and/or outlet stability: DNM/PM/FM

MRGP Overall Segment Scoring:
- Any standards that score Does Not Meet individual practice scores= Does Not Meet segment score (except for crown category)
- One or two Partially Meets individual scores= Partially Meets segment score
- Three or more Partially Meets individual practice scores= Does Not Meet segment score
- **Fully Meet** for all individual practice scores = **Fully Meets** segment score

Segment Scoring examples below

**MRGP Segment Scoring Table, Example score 1:**

<table>
<thead>
<tr>
<th>Segment slope:</th>
<th>Fully meets</th>
<th>Partially Meets</th>
<th>Does Not Meet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Crown</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Grader berm</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Road drainage</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>4. Conveyance area/turn out</td>
<td>✓</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5. Drive culvert</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Drainage culvert</td>
<td>✓</td>
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<tr>
<td><strong>Overall Segment Score</strong></td>
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**MRGP Segment Scoring Table, Example score 2:**

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</thead>
<tbody>
<tr>
<td>1. Crown</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2. Grader berm</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3. Road drainage</td>
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<td></td>
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**MRGP Segment Scoring Table, Example score 3:**

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<tr>
<td>3. Road drainage</td>
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<tr>
<td>4. Conveyance area/turn out</td>
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<td>-</td>
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<tr>
<td>5. Drive culvert</td>
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<tr>
<td><strong>Overall Segment Score</strong></td>
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**MRGP Scoring Table, Example score 4:**

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<tbody>
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<tr>
<td>2. Grader berm</td>
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</tr>
<tr>
<td>3. Road drainage</td>
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<tr>
<td>4. Conveyance area/turn out</td>
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<tr>
<td>5. Drive culvert</td>
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</tr>
<tr>
<td><strong>Overall Segment Score</strong></td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Municipal Roads General Permit – Catch Basin Inventory and Outlet Erosion Evaluation

- All towns will be required to verify paved roads with catchbasins (CB) connections by fall of 2020 as part of their road erosion inventory.
- All towns will be required to evaluate connected CB outlets for erosion by fall of 2020 as part of their road erosion inventory.
- Category 1 towns (Towns >8.5 miles of catchbasin collection system roads) shall implement catch basin outlet stabilization on at least the minimum number of eroded outlets per year, each year from 2021-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.
- Category 2 towns (all other towns) shall implement catch basin outlet stabilization on at least the minimum number of eroded outlets per year, each year from 2024-2036. The minimum number of outlets requiring upgrades annually, until compliance is achieved, will be determined by dividing the total number of eroded outlets by the years remaining in the MRGP implementation schedule.

All Towns must complete the assessment tasks A & B (1) for their collected road segments. Maps of these segments will be provided to each Town.

(A) Assessment of directly connected road segments

All towns shall take the state maps of existing collected-road system segment outfalls and verify that these segments have catch basins and/or manholes and the final outfall pipe is 500 feet or less from a water of the state. These criteria would define the collection system subject to these standards. The Agency would need to concur on adjustments to the original list or map of town road segments. A log book of these outfalls must be kept by the Town.

(B) Stormwater Outfall Inventory and Repair Plan

(1) All Towns are required to use the available state maps of existing collected road segments, locate and visit the mapped outfalls for these segments, and assess the soil erosion between the outfall and waters of the state if the outfall is less than 500 feet from the waters. All Towns will develop a written inventory with the below information collected. Note an i-phone application has been developed that is available for use by anyone for the purpose of collecting this data. A paper form is attached.

A. Outfall ID (automatically generated for each town from the ANR outfall data)  
B. Culvert diameter (inches)  
C. Is outfall perched? (Y/N)  
D. Is outfall directly into waters of the state? (Y/N)  
E. Erosion Rank  
   i. Less than 1” depth is sheet erosion, meets standard  
   ii. 1 to 11” erosion depth is rill erosion, partially meets standard  
   iii. > 11” + is gully erosion, does not meet standard  
F. Slope of Bank where outfall is located (Note: this is not the channel slope but the embankment slope)  
G. Average depth (D) of eroded gully below outfall (Note: value can be measured or estimated but method must be stated)
H. Length (L) of Eroded gully below outfall (Note: value can be measured or estimated but method must be stated)

I. Average width (W) of eroded gully below outfall (Note: value can be measured or estimated but method must be stated)

J. Cubic yards of mass of eroded material = (D x L x W)/27

K. Recommended acceptable best management practice:
   
i. Stone lining of eroded swale
   a.) Recommended 12-24” outfall diameter minimum 12” minus, 24-48” – minimum 24” minus

   ii. Stone apron at outfall
   a.) Recommended 12-24” outfall diameter minimum 12” minus, 24-48” – minimum 24” minus. For 12-24” diameter apron should be 10’ long, for 24-48” diameter apron should be 14’ long

   iii. Stone header to protect pipe in embankment
   a.) Recommended 12-24” outfall diameter minimum 12” minus, 24-48” – minimum 24” minus

L. Digital photo of erosion

M. Date of repair

N. Digital photo of repair

(2) From 2021-2025 Category 1 Towns, and from 2024-2028 Category 2 Towns, shall have stabilized the calculated required minimum number of noncompliant outfalls. Alternatively, the Town can eliminate the outfall and/or divert it to a stable conveyance. Towns will report on their Implementation Plans in the Annual MRGP reports. Annual reports will include a list of outfalls to be corrected in the coming year and a list of the outfalls previously noncompliant that are now compliant due to repairs in the previous year. Outfall assessments and outfall stabilization shall not just be within the standard highway ROW but also where the town has a deed of easement or otherwise recorded formal easement.

(3) All Category 1 Towns will first prioritize all eroded outfall gullies with >10% embankment slopes which don’t meet the standard partially or completely. Stabilization of all 10% gullies will be completed by 12/1/2025. All Category 2 Towns will first prioritize all eroded outfall gullies with >10% embankment slopes which don’t meet the standard partially or completely. Stabilization of all 10% gullies will be completed by 12/1/2028.

Foot Notes

1 If maps don’t exist use the best available information.

2 In many cases there are formal easements in place at outfalls (or are supposed to be), or there are prescriptive rights where the discharge has been in place more than 15 yrs. Towns have legal authority to stabilize drainage related erosion or add new drainage ways if needed to support the road needs but then once the work is done the town has some obligation to maintain it. Erosion caused by a pipe to another’s land without an easement is a civil issue as well (considered a nuisance and trespass). The condition of the drainage system (DIs, CBs and pipes) should be assessed visually for failures and separations that contribute to erosion. Towns are not required to complete repairs outside of their ROW but many of them will get stabilized outside the ROW while the towns are there doing the work and the landowners will be typically very glad to see it happen.

3 If stone size is hand placed and fitted stone size a 9” minus stone is recommended.
<table>
<thead>
<tr>
<th>OUTFALL ID#</th>
<th>CULVERT DIAMETER (inches)</th>
<th>Outfall Perched? (Y/N)</th>
<th>Outfall discharges directly into waters of the state? (Y/N)</th>
<th>EROSION RANK</th>
<th>SLOPE of Bank adjacent to channel (% slope)</th>
<th>AVERAGE DEPTH (D) OF EROSION AS MEASURED FROM OUTFALL PIPE INVERT (FT)</th>
<th>LENGTH (L) OF EROSION (FT)</th>
<th>AVERAGE WIDTH (W) OF EROSION (FT)</th>
<th>RECOMMENDED TREATMENT:</th>
<th>BEFORE PHOTO</th>
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<td>1-STONE LINING</td>
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<td>2-STONE APRON</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>3-STONE HEADER</td>
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</tbody>
</table>

NOTE ADDITIONAL DATA REQUIRED BUT NOT INCLUDED IN FIELD SHEET ARE CUBIC YARDS OF MATERIAL ERODED (= (D x L x W)/27), DATE OF REPAIR, DIGITAL PHOTO OF REPAIR
MEMORANDUM

To: Chittenden County Regional Planning Commission
From: Evan Fitzgerald, Roy Schiff, and Evelyn Boardman
Re: Field Verification Memorandum and Refined Prioritization Methodology
Date: July 14, 2017

Introduction

Our team has developed, refined, and calibrated through field observations a road erosion prioritization methodology using Road Erosion Inventory (REI) data collected by CCRPC during 2016 in eight (8) towns in Chittenden County: Bolton, Essex, Jericho, Huntington, Richmond, St. George, Underhill, and Williston. As part of the methods development, we reviewed, updated and corrected REI data as needed following a thorough QA/QC process in conjunction with Chris Dubin. A summary of the QA/QC process and outcomes was previously summarized in a memorandum to CCRPC dated March 8, 2017. The draft screening methods and results were summarized in a memorandum to CCRPC dated April 12, 2017.

A recap of the key project objectives, as outlined in our scope of work, is provided below.

1. Develop and apply a road erosion prioritization method within each of the municipalities to identify priority sites for mitigation work.
2. Develop conceptual erosion mitigation designs for the highest priority sites in each municipality in support of Better Roads grants. Subsequent grants and restoration projects will in turn help municipalities meet the permit conditions of the VTDEC Municipal Roads General Permit (MRGP).

Outline of Prioritization Method

During our review and QA/QC of the REI dataset, we developed a concept for categorizing REI data based on each variable’s potential impact on stormwater runoff, sedimentation, and overall water quality in adjacent waterways. We organized the data based on water quality processes that indicate sources of sedimentation and transport mechanisms. This approach is similar to other projects in the region to prioritize stormwater and water quality remediation projects (i.e., Critical Source Area analysis). This framework identifies areas with the greatest water quality impacts where there is 1) a source of pollution, and 2) a transport mechanism to move the pollution to nearby waterways, whereby road segments with both source and transport mechanisms have a higher impact rating than those lacking one.

Figure 1 outlines this concept using the REI data. Source and Transport are defined below in relation to our evaluation of road erosion:

Source: The roadway surface and/or right-of-way has areas of soil instability (i.e., rilling on gravel road surface, unstable ditches, gullies) that lead to sedimentation during runoff events.

Transport: The road segment has areas of direct discharge (i.e., conveyances) to adjacent or bisecting waterways.
Road Erosion Screening Overview
Hydrologically Connected Roads

- Adequacy of Road Drainage
- Road Slope (LiDAR)*
- Roadway Crown
- Grader Berm

- Poor Drainage Outlets
- Gully Erosion
- Stream/Road Conflicts’
- Undersized Culverts
- Culverts lacking headers

Entire Roadway

Sediment Sources

Transport

Entire Roadway

Discrete Runoff or Discharge Points

- Total conveyances
- Road Slope (LiDAR)*

- Stream Culverts
- Road Drainage Culverts
- Driveway Culverts

Notes:
* Indicates non-REI variable calculated in GIS using LiDAR
† Stream/road bank erosion not addressed in MRGP

Road Segments with High Potential for Water Quality Impact

Figure 1. Draft Prioritization Concept
Draft Screening Results and Field Validation

Our initial screening method is described in detail in a memorandum to CCRPC dated April 12, 2017. Each of REI variables included in the screen was assigned a scoring value of 1 for low, 2 for medium, and 3 for high on each hydrologically connected road segment. The final scoring ranges for each road segment depend on whether the road is paved, gravel, or Class 4, as shown in Table 1 for the Source and Transport scores. We reviewed the scoring distributions for the Source and Transport scores by road type, and applied breaks for high, medium, and low. The breaks in ranges were intended to call out the highest 10-15% of road segments as high, and about 50% as low. Final numeric scores were defined with a matrix using the scoring of high, medium, and low for Source and Transport where Source was weighted slightly higher than Transport.

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Number of REI Variables by Type</th>
<th>Lowest Possible Score (all REI variables low or 1)</th>
<th>Highest Possible Score (all REI variables high or 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Source</td>
<td>Transport</td>
<td>Source</td>
</tr>
<tr>
<td>Paved</td>
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</tr>
<tr>
<td>Class 4</td>
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<td>5</td>
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</tbody>
</table>

Initial Round of Field Validation

We completed initial field validation work in April and early May 2017 to evaluate road segments in Underhill & Richmond (hilly) and Essex & Williston (flatter). We reviewed 60 road segments representing a range of scores in the high, medium, and low categories. Our process was to review both the individual Source and Transport scores, and the combined score, and compare this with our field observations of overall water quality impact potential of the road segment.

Overall, we found that the prioritization method did a decent job of distinguishing between high and medium categories, which will likely be the most important difference for assessing initial priorities for Towns to prioritize projects for water quality improvement, and ultimately meet the MRGP standards. However, we observed the following areas for improvement in the field, which we considered in developing the next iteration of screening refinement:

Overall Scoring

- Source variables appear to drive sediment losses more than transport variables. Source should be weighted higher.
- Segments receiving high scores in the steeper towns (Underhill & Richmond) tended to look worse than segments receiving high scores in flatter towns (Essex & Williston). This is likely related to road slope, and therefore slope should receive higher weight in the screening system (Figure 2).
Variables to consider for higher weights

- Poor conveyances on segments with stream crossings almost always went straight into the stream. Poor conveyances and stream crossings should receive high weights in the screen.

Variables to consider for lower weights

- Roadway crown and grader berm variables are highly temporal, which was confirmed during field visits.
- Road drainage culverts lacking headers likely increase sediment source, but these should not be weighted as high as other Source categories. Similarly, small road drainage and driveway culverts did not appear to be large sources of sediment in the segments examined and should not be weighted as high as other source categories.

Other REI Data Observations

- The gully erosion variable tends to be related to low points in the road, where there is runoff along the shoulder and creates small eroded flow paths through the road shoulder. Where gully erosion locations were identified in the point file, the erosion tends to be of a larger magnitude (i.e. large erosion along a stream channel).

Scoring Revisions and Field Validation

After the initial round of field validation, we refined the overall scoring system before the second round of field validation. In this iteration of the screen, we pulled the slope parameter out of the Source and Transport components and included it as its own unique component to the score. Figure 3 outlines the revised screening concept using the REI data. The Slope score was the raw slope value (0-10%) if the slope was less than or equal to 10% and received a score of 10 if the slope was greater than 10%. Table 2 shows the ranges of the Slope, Source, and Transport scores with this new three-component screen.
Table 2. Ranges for Road Segment Scoring in Second Round Screening

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Number of REI Variables by Type</th>
<th>Lowest Possible Score (all REI variables low or 1)</th>
<th>Highest Possible Score (all REI variables high or 3)</th>
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<tbody>
<tr>
<td></td>
<td>Slope</td>
<td>Source</td>
<td>Transport</td>
</tr>
<tr>
<td>Paved</td>
<td>1</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Gravel</td>
<td>1</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>Class 4</td>
<td>1</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>

A composite score for each hydrologically connected road segment was calculated by weighting scaled Slope, Source, and Transport scores and summing the three components. Source and Transport were scaled from their ranges of 8 – 30 and 4 – 12 respectively to a range of 1 – 10 using the formula:

\[
\frac{\text{max}_{\text{scaled}} - \text{min}_{\text{scaled}}}{\text{max}_{\text{raw}} - \text{min}_{\text{raw}}} \times (\text{score} - \text{max}_{\text{raw}}) + \text{max}_{\text{scaled}}
\]

Or

\[
\frac{10 - 1}{\text{max}_{\text{raw}} - \text{min}_{\text{raw}}} \times (\text{score} - \text{max}_{\text{raw}}) + 10
\]

We tested different weights for the three components and compared the resulting scores to target scores we determined during the first rounds of field tours. We found the best results using a weighting scheme of 20% Slope, 20% Transport, and 60% Source. Conceptually, this agreed with our observations that Source mechanisms are the most importing factors in driving sediment losses and overall water quality impacts.
Road Erosion Screening Overview
Hydrologically Connected Roads

- Road Slope (LiDAR)*

Entire Roadway

- Adequacy of Road Drainage
  - Roadway Crown
  - Grader Berm

Entire Roadway

- Poor Drainage Outlets
- Gully Erosion
- Stream/Road Conflicts*
- Undersized Culverts
- Culverts lacking headers

Discrete (point) source

- Total conveyances

Entire Roadway

Slope (20%)

- Stream Culverts
- Road Drainage Culverts
- Driveway Culverts

Discrete Runoff or Discharge Points

Sediment Sources (60%)

Transport (20%)

Road Segments with High Potential for Water Quality Impact

Figure 3. Revised Prioritization Concept
Second Round of Field Validation
We completed the second round of field validation in June to evaluate road segments in Richmond, Huntington, and Underhill. We reviewed 30 road segments representing a range of scores. Our process was to review both the individual Slope, Source, and Transport scores, and the combined score, and compare this with our field observations of overall water quality impact potential of the road segment.

Overall, we found that the prioritization method did an excellent job of distinguishing between high, medium, and low categories. The main discrepancies between the screen and our field validation occurred in the following situations:

- In areas where road or ditch instability had been addressed by the Town after the REI survey was completed in 2016, REI variables collected prior to the work tended to overestimate sediment source and transport potential.

- In areas where a stream was near the road segment but did not cross it and in areas with ditches and channels that had considerable flow but were not considered blue-line streams, the screen tended to underestimate sediment source and transport potential (Figure 4). Once again, we observed that segments with both poor conveyances and a stream crossing or stream nearby tended to generate and deliver more sediment than segments with one of these conditions but not both.

- In areas where the REI data on which the screens were based were different from what we observed in the field the screen tended to both under- and overestimate sediment source and transport potential. This included some areas where more permanent variables (e.g. adequacy of road drainage and poor conveyances) were reported to be worse in the REI data than what we observed in the field. However, most of the discrepancies were in the more temporally variable road crown and grader berm variables.

Figure 4. Repaired pavement on Wes White Road in Richmond where a channel with flowing water is alongside the road.

Final Scoring System
Following our June 2017 field validation tours, we made minor changes to the weights of the individual variables that make up the Source and Transport components of the overall screen. After assigning REI variables included in the screen a scoring value of 1 for low, 2 for medium, and 3 for high on each hydrologically connected road segment, we weighted the scores based on the importance of each variable to sediment and pollutant source and transport mechanisms. The determinations and weights shown in Table 3 were made based on field observations, prior knowledge, and professional judgment of the permanence and magnitude of water quality impacts from problem areas. Table 4 shows the ranges possible for Slope, Source, and Transport scores before scaling, weighting, and summing to determine an overall score as described in the previous section.
Table 3. Weighting of Individual Variables used in Road Segment Scoring in Final Screening

<table>
<thead>
<tr>
<th>Component</th>
<th>Variable Description</th>
<th>Scoring Importance</th>
<th>Scoring Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope</td>
<td>Road Slope</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Adequacy of Road Drainage</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td>Source</td>
<td>Roadway Crown</td>
<td>Low</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Grader Berm</td>
<td>Low</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>Total Poor Conveyances (Road Drainage Outlets)</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Road Drainage Culvert Outlet Stability</td>
<td>Moderate</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>Gully Erosion Locations</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Stream and Road Conflicts</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td>Transport</td>
<td>Total Conveyances (Road Drainage Outlets)</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Stream Culverts</td>
<td>High</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Total Road Drainage Culverts</td>
<td>Moderate</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td>Total Driveway Culverts</td>
<td>Moderate</td>
<td>0.66</td>
</tr>
</tbody>
</table>

Table 4. Weighting of Individual Variables used in Road Segment Scoring in Final Screening

<table>
<thead>
<tr>
<th>Road Type</th>
<th>Number of REI Variables by Type</th>
<th>Lowest Possible Score (all REI variables low or 1)</th>
<th>Highest Possible Score (all REI variables high or 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Slope</td>
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Attached is a table where we recorded our observations from both rounds of field validation, and two 24” x 36” maps. One map shows revised prioritization results for the Town of Underhill, and a second map shows the locations segments visited during the field validation. Between both field validation trips, we visited approximately 90 road segments representing 5% of the hydrologically connected road segments in the REI database for the 8 Towns in the study.
REGULAR MEETING AGENDA
Wednesday, October 18, 2017 - 6:00 p.m.
CCRPC Offices; 110 W. Canal Street, Suite 202
Winooski, VT 05404

CONSENT AGENDA – DRAFT
C.1 none

DELIBERATIVE AGENDA
1. Call to Order; Changes to the Agenda
2. Public Comment Period on Items NOT on the Agenda
3. Action on Consent Agenda (MPO Business) (Action; 1 minute)
4. Approve Minutes of September 20, 2017 Meeting* (Action; 1 minute)
5. Secretary Joe Flynn, Vermont Agency of Transportation (Discussion; 30 minutes)
6. ECOS Plan Update (Discussion/Action; 40 min)
   a. MTP scenarios*
   b. CEDS status update*
7. Final Draft Rule – Municipal Road General Permit Comments * (Action; 10 minutes)
8. FY19 Municipal Dues* (Action; 5 minutes)
9. Brownfield Program update presentation (Discussion; 10 minutes)
10. Legislative Breakfast topics (Discussion; 10 minutes)
11. Chair/Executive Director’s Updates (Information; 5 minutes)
   a. Clean water initiatives update
   b. Regional Dispatch update
   c. Executive Director’s Report (to be sent separately)
12. Committee/Liaison Activities & Reports * (Information, 5 minutes)
   c. Executive Committee (draft minutes September 6, 2017 & October 4, 2017)*
      i. Act 250 Sec 248 letters*
   d. Transportation Advisory Committee (draft minutes, October 3, 2017)*
   e. CWAC & MS4 Subcommittee (draft minutes, September 5, 2017 & October 3, 2017)*
   f. Long Range Planning Committee (draft minutes, September 14, 2017)*
   g. LRPC Energy Subcommittee (draft minutes, September 19, 2017)*
13. Members’ Items, Other Business (Information, 5 minutes)
14. Adjourn

In accordance with provisions of the Americans with Disabilities Act (ADA) of 1990, the CCRPC will ensure public meeting sites are accessible to all people. Requests for free interpretive or translation services, assistive devices, or other requested accommodations, should be made to Bryan Davis, CCRPC Title VI Coordinator, at 802-846-4490 ext *17 or bdavis@ccrpctvt.org, no later than 3 business days prior to the meeting for which services are requested.
The October 18th Chittenden County RPC meeting will air on Burlington Telecom 17 and Comcast 17 on ______________________ at 8 p.m. and will be available on the web at: http://www.cctv.org/watch-tv/programs/chittenden-county-regional-planning-commission-71

Upcoming Meetings - Unless otherwise noted, all meetings are held at our offices:
- Executive Committee - Wednesday, November 1, 2017; 5:45 p.m.
- Transportation Advisory Committee - Tuesday, November 7, 2017; 9:00 a.m.
- Clean Water Advisory Committee - Tuesday, November 7, 2017; 11:00 a.m.
- CWAC MS4 Subcommittee - Tuesday, November 7; 12:15 p.m.
- Planning Advisory Committee - Wednesday, November 8, 2017; 2:30 p.m.
- Long Range Planning Committee - Thursday, November 9, 2017; 8:30 a.m.
- CCRPC Board Meeting - Wednesday, November 15, 2017; 6:00 p.m.
- Energy Sub-Committee meeting - Tuesday, November 28, 2017 at 5:00 p.m.

Tentative future Board agenda items:

<table>
<thead>
<tr>
<th>Date</th>
<th>Agenda Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>November 15, 2017</td>
<td>Review and Accept Draft FY17 Audit ECOS Plan Draft Updates: MTP, CEDS, Energy Hinesburg Town Plan (tentative)</td>
</tr>
<tr>
<td>December 12, 2017  @ Double Tree</td>
<td>Legislative Breakfast</td>
</tr>
<tr>
<td>January 17, 2018</td>
<td>National Highway System update Warn ECOS Plan Update Public Hearing FY18 Mid-Year Adjustment</td>
</tr>
<tr>
<td>February 21, 2018</td>
<td>ECOS Plan Update Public Hearing #1 St George Town Plan (tentative) Richmond Town Plan (tentative)</td>
</tr>
<tr>
<td>March 21, 2018</td>
<td>Warn ECOS Plan Update Public Hearing #2</td>
</tr>
<tr>
<td>April 18, 2018</td>
<td></td>
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<tr>
<td>May 16, 2018</td>
<td>ECOS Plan Update Public Hearing #2</td>
</tr>
<tr>
<td>June 20, 2018 – Joint Annual Meeting with GBIC</td>
<td>Election of Officers ECOS Plan Update adoption</td>
</tr>
</tbody>
</table>

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