APPENDIX A

Rutland Population Information and Projections

VERMONT

State of Vermont

Vermont Population Projections – 2010 - 2030

August, 2013

Produced by:
Ken Jones, Ph.D., Economic Research Analyst
Vermont Agency of Commerce and Community Development
and
Lilly Schwarz, Community Based Learning Intern
Montpelier High School

This project was developed with the assistance and oversight of a committee of State Agency representatives. The Committee reviewed the methodology and results leading to the final figures presented in this report.

Population Projection Review Committee

Glenn Bailey, Vermont Agency of Education
Mathew Barewicz, Vermont Department of Labor
Sarah Lindberg, Vermont Department of Financial Regulation
Michael Moser, University of Vermont, Center for Rural
Studies Michael Nyland-Funke, Vermont Department of Health

Vermont Population Projections – 2010 - 2030

How are Population Projections developed?

Vermont's population projections are based on an age cohort model (defined age groupings such as: 35-39 year-olds) using US Census data as the basis for calculations. Mortality, birth rate and migration rate data from 1990-2010 are factors used to develop the projections.

In general, an age cohort projection model starts with the population total for a particular age group at a given point in time. The Census bureau reports most age cohorts in 5 year groups and thus, five year groups are used in this model. At the end of a ten year period, the population for an age cohort is equal to the beginning population total minus the mortality and plus or minus the migration during the ten year period. For example,

> In year 2000, according to the US census, Vermont's 25-29 age cohort population was 34,182. Ten years later, in year 2010, Vermont's 35-39 age cohort population was 36,358 - according to Census reporting. Between 2000 and 2010, about 50 people in that age cohort died (0.15% mortality rate over the ten year period).
>
> By taking into account the population increase and mortality rate for the the age cohort, the migration rate can be calculated.
> Migration = 36,358 – 34,182 + 50
> = 2226 or 6.51% of the 2000 five year age cohort

"Projecting" into the future, would suggest that the 2020 population of 35-39 year olds will equal the 2010 population of 25-29 year olds (35,441) minus mortality (again, about .15%) plus the 6.51% net migration rate. 2020 projected population of 35-39 year olds = 37,700

Migration

The migration rate for the 2010 to 2020 and 2020 to 2030 decades could be similar to the migration rate for the 2000 to 2010 period or the 1990 to 2000 period. These different migration assumptions are the basis for the two sets of projections presented in this report – Scenario A and Scenario B. In Vermont, there is a relationship between the national economy and the direction and magnitude of migration. During the 1990s (Scenario A), the national economy was generally healthier than during the 2000s (Scenario B) and Vermont saw greater rates of net in-migration. As a result, Scenario A using 1990s migration rates generally, show higher populations than Scenario B using the migration rates of the 2000s.

Mortality

The mortality rates for age cohorts greater than 50 years old continue to decrease. For the population projections, we use mortality rates that continue the decline. For younger populations, the mortality rate is leveling off and the mortality rates used for the projection do not have the same proportional decreases that other age cohorts exhibit.

Births

The number of children born during the projection period requires the use of age specific birth rates. The Vermont Department of Health publishes county and age-specific birth rates each year in its Vital Statistics publication. In Vermont, each county is witnessing decreases in the birth rates for teenage women. Birth rates for women in their 20s and early 30s are relatively more stable, while the birth rates for women in older age cohorts continue to increase. As with the mortality rates, these Vermont population projections assume a continuation in the trend in birth rates seen for the past twenty years to provide birth rates for each age cohort into the next twenty years. Unlike mortality, the birth rates in Vermont vary significantly for each county. Therefore, the county projections use county-specific birth rates for each age cohort.

In order to complete the projections for children born during the projection period, there are three steps. The first step is to complete the population projections for females in each county using statewide mortality rates and county and age specific migration rates based on 1990s and 2000s Census data. The second step is to apply the age and county specific birth rates to each projected female age cohort resulting in the number of births during the time period. The final step is to review the migration rates for young children during the 1990s and 2000s and apply those migration rates to the number of births projected from Steps One and Two.

Normalizing the county and town projections

For all age cohorts, a state projection is completed in addition to one for each county. Because the statistical validity of a projection is greater with larger numbers, the state projection serves as a base against which the county projections are normalized. In other words, for any age cohort, the state projected total is compared against the total of each county cohort. Any differences are normalized by reducing or increasing county figures proportionally to the population size of that cohort in each county. For example, the age 40-44 state population is projected to be 35,561 when assuming the migration pattern of the 2000s. The sum of the county projections for that cohort is 35,570. For consistency, the county population numbers for that cohort are decreased proportionally to result in a county total equal to the state projected figure.

Town and City projections

The county projections are the basis for determining town and city level projections. As with the county migration rates, the changes in the population for each town that took place in 2000-2010 and 1990 – 2000 combined with the projected changes in county numbers result in an equation to project town populations. Specifically,

> 2020 Town projected figure = Town population in 2010 + (50% of the rate of town population change from 2000-2010) + (25% of the rate of town population change from 1990 – 2000) + (25% of the rate of county population change from 2000-2010)
>
> 2030 Town projected figure = Town population in 2020 + (35% the rate of town population change from 2000-2010)+(15% of the rate of town population change from 1990 – 2000) + (50% of the rate of county population change from 2000-2010)
>
> Similar to normalizing county age cohort figures to correspond to the state projections, town populations are either increased or decreased to assure that the sum of the town populations in a county equal the county population.

Caveats when considering the Vermont Population Projections

Projections, not predictions

Projections assume that conditions that occurred in the past will continue into the future. For these projections, there are assumptions about mortality rates (continuing a downward trajectory for the next 20 years), birth rates and two sets of assumptions about migration rates. Events may alter the conditions that led to population changes in the past 20 years and those events will affect the changes in population. Examples of changes that are not predicted for these estimates:

- Changes in the birth rate from social changes different than what has occurred in the past 20 years
- Changes in health care practices or epidemics that could affect mortality rates
- Changing economic conditions that result in shifts in national (internal) migration
- Changes in national immigration policies

Census populations, not the actual number of inhabitants at a given time

Many individuals, particularly those that are retired and those attending colleges and universities have more than one home. The Census Bureau does not have a requirement that individuals determine their residency with a particular set of standards and does not allow any individual to split their residence to multiple towns or states. The residence as of April 1, in the

year the Census is conducted is a standard upon which many people determine their census filing “home”.

In Vermont, individuals that reside in other states such as “snow bird” destinations in the southern United States may not file their Census return from Vermont and yet may be registered to vote in Vermont, hold a Vermont driver’s license, pay taxes or even live the majority of the year in Vermont. Because the Census does not capture the true nature of these residents, the projections may give a misleading estimate on how many individuals reside in a particular community during different times of the year.

Statistical limitations

When working with relatively small population sizes, data can be susceptible to fluctuations that may not represent trends, but rather individual, non-replicable events. The margin of error for any statistical calculation increases as the size of the population decreases These small numbers are evident in some of the small county age cohort projections as well as small town populations.

Vermont 2010 Census Count Projections by Town, 2020, 2030 - Scenario A

Town	2010 Census	2020	%change from 2010	2030	%change from 2010
Rutland County					
BENSON	1,056	1,115	5.6%	1,118	5.9%
BRANDON	3,966	3,883	-2.1%	3,720	-6.2%
CASTLETON	4,717	4,887	3.6%	4,862	3.1%
CHITTENDEN	1,258	1,310	4.1%	1,306	3.8%
CLARENDON	2,571	2,433	-5.4%	2,272	-11.6%
DANBY	1,311	1,336	1.9%	1,311	0.0%
FAIR HAVEN	2,734	2,629	-3.8%	2,481	-9.3%
HUBBARDTON	706	732	3.7%	723	2.4%
IRA	432	424	-1.9%	406	-6.0%
MENDON	1,059	1,060	0.1%	1,030	-2.7%
MIDDLETOWN SPRINGS	745	740	-0.7%	712	-4.4%
MOUNT HOLLY	1,237	1,265	2.3%	1,244	0.6%
MOUNT TABOR	255	282	10.6%	295	15.7%
PAWLET	1,477	1,530	3.6%	1,520	2.9%
PITTSFIELD	546	630	15.4%	677	24.0%
PITTSFORD	2,991	2,950	-1.4%	2,829	-5.4%
POULTNEY	3,432	3,340	-2.7%	3,176	-7.5%
PROCTOR	1,741	1,640	-5.8%	1,528	-12.2%
RUTLAND CITY	16,495	15,757	-4.5%	14,825	-10.1%
RUTLAND TOWN	4,054	4,094	1.0%	3,995	-1.5%
KILLINGTON	811	797	-1.7%	754	-7.0%
SHREWSBURY	1,056	1,022	-3.2%	969	-8.2%
SUDBURY	560	562	0.4%	545	-2.7%
TINMOUTH	613	670	9.3%	689	12.4%
WALLINGFORD	2,079	1,993	-4.1%	1,875	-9.8%
WELLS	1,150	1,224	6.4%	1,235	7.4%
WEST HAVEN	264	256	-3.0%	243	-8.0%
WEST RUTLAND	2,326	2,230	-4.1%	2,099	-9.8%
County Total	61,642	60,791	-1.4%	58,439	-5.2%

Vermont 2010 Census Count Projections by Town, 2020, 2030 - Scenario B

Town	2010 Census	2020	%change from 2010	2030	%change from 2010
Rutland County					
BENSON	1,056	1,073	1.6%	1,038	-1.7%
BRANDON	3,966	3,737	-5.8%	3,448	-13.1%
CASTLETON	4,717	4,704	-0.3%	4,512	-4.3%
CHITTENDEN	1,258	1,261	0.2%	1,212	-3.7%
CLARENDON	2,571	2,340	-9.0%	2,104	-18.2%
DANBY	1,311	1,286	-1.9%	1,216	-7.2%
FAIR HAVEN	2,734	2,529	-7.5%	2,298	-15.9%
HUBBARDTON	706	704	-0.3%	671	-5.0%
IRA	432	409	-5.3%	377	-12.7%
MENDON	1,059	1,020	-3.7%	955	-9.8%
MIDDLETOWN SPRINGS	745	712	-4.4%	659	-11.5%
MOUNT HOLLY	1,237	1,218	-1.5%	1,154	-6.7%
MOUNT TABOR	255	272	6.7%	274	7.5%
PAWLET	1,477	1,473	-0.3%	1,411	-4.5%
PITTSFIELD	546	607	11.2%	630	15.4%
PITTSFORD	2,991	2,838	-5.1%	2,623	-12.3%
POULTNEY	3,432	3,213	-6.4%	2,943	-14.2%
PROCTOR	1,741	1,578	-9.4%	1,415	-18.7%
RUTLAND CITY	16,495	15,157	-8.1%	13,734	-16.7%
RUTLAND TOWN	4,054	3,940	-2.8%	3,705	-8.6%
KILLINGTON	811	767	-5.4%	699	-13.8%
SHREWSBURY	1,056	983	-6.9%	898	-15.0%
SUDBURY	560	541	-3.4%	505	-9.8%
TINMOUTH	613	645	5.2%	640	4.4%
WALLINGFORD	2,079	1,917	-7.8%	1,737	-16.5%
WELLS	1,150	1,178	2.4%	1,147	-0.3%
WEST HAVEN	264	247	-6.4%	225	-14.8%
WEST RUTLAND	2,326	2,145	-7.8%	1,945	-16.4%
County Total	61,642	58,494	-5.1%	54,175	-12.1%

United States Census Bureau

QuickFacts

United States; Rutland city, Vermont; Rutland County, Vermont

QuickFacts provides statistics for all states and counties, and for cities and towns with a ***population of 5,000 or more***.

Table

All Topics	United States	Rutland city, Vermont	Rutland County, Vermont
Population estimates, July 1, 2019, (V2019)	**328,239,523**	**15,074**	**58,191**
PEOPLE			
Population			
Population estimates, July 1, 2019, (V2019)	**328,239,523**	**15,074**	**58,191**
Population estimates base, April 1, 2010, (V2019)	308,758,105	16,469	61,660
Population, percent change - April 1, 2010 (estimates base) to July 1, 2019, (V2019)	6.3%	-8.5%	-5.6%
Population, Census, April 1, 2020	331,449,281	15,807	60,572
Population, Census, April 1, 2010	308,745,538	16,495	61,642
Age and Sex			
Persons under 5 years, percent	▲ 6.0%	▲ 4.6%	▲ 4.4%
Persons under 18 years, percent	▲ 22.3%	▲ 16.0%	▲ 17.6%
Persons 65 years and over, percent	▲ 16.5%	▲ 21.4%	▲ 22.7%
Female persons, percent	▲ 50.8%	▲ 50.8%	▲ 50.5%
Race and Hispanic Origin			
White alone, percent	▲ 76.3%	▲ 95.4%	▲ 96.4%
Black or African American alone, percent (a)	▲ 13.4%	▲ 1.7%	▲ 0.7%
American Indian and Alaska Native alone, percent (a)	▲ 1.3%	▲ 0.0%	▲ 0.3%
Asian alone, percent (a)	▲ 5.9%	▲ 1.7%	▲ 1.0%
Native Hawaiian and Other Pacific Islander alone, percent (a)	▲ 0.2%	▲ 0.0%	▲ Z
Two or More Races, percent	▲ 2.8%	▲ 1.1%	▲ 1.5%
Hispanic or Latino, percent (b)	▲ 18.5%	▲ 1.8%	▲ 1.6%
White alone, not Hispanic or Latino, percent	▲ 60.1%	▲ 93.7%	▲ 95.1%
Population Characteristics			
Veterans, 2015-2019	18,230,322	943	3,510
Foreign born persons, percent, 2015-2019	13.6%	2.8%	2.7%
Housing			
Housing units, July 1, 2019, (V2019)	139,684,244	X	34,637
Owner-occupied housing unit rate, 2015-2019	64.0%	55.0%	71.4%
Median value of owner-occupied housing units, 2015-2019	$217,500	$153,300	$177,400
Median selected monthly owner costs -with a mortgage, 2015-2019	$1,595	$1,431	$1,427
Median selected monthly owner costs -without a mortgage, 2015-2019	$500	$654	$617
Median gross rent, 2015-2019	$1,062	$780	$826
Building permits, 2020	1,471,141	X	46
Families & Living Arrangements			
Households, 2015-2019	120,756,048	7,074	25,338
Persons per household, 2015-2019	2.62	2.07	2.24
Living in same house 1 year ago, percent of persons age 1 year+, 2015-2019	85.8%	89.9%	91.9%
Language other than English spoken at home, percent of persons age 5 years+, 2015-2019	21.6%	6.1%	4.5%
Computer and Internet Use			
Households with a computer, percent, 2015-2019	90.3%	86.9%	88.4%
Households with a broadband Internet subscription, percent, 2015-2019	82.7%	77.3%	80.1%
Education			
High school graduate or higher, percent of persons age 25 years+, 2015-2019	88.0%	91.0%	92.6%
Bachelor's degree or higher, percent of persons age 25 years+, 2015-2019	32.1%	28.4%	30.8%
Health			
With a disability, under age 65 years, percent, 2015-2019	8.6%	13.7%	11.5%
Persons without health insurance, under age 65 years, percent	▲ 10.2%	▲ 5.7%	▲ 5.5%

Economy			
In civilian labor force, total, percent of population age 16 years+, 2015-2019	63.0%	62.0%	61.9%
In civilian labor force, female, percent of population age 16 years+, 2015-2019	58.3%	58.6%	59.8%
Total accommodation and food services sales, 2012 ($1,000) (c)	708,138,598	54,305	130,073
Total health care and social assistance receipts/revenue, 2012 ($1,000) (c)	2,040,441,203	386,313	440,425
Total manufacturers shipments, 2012 ($1,000) (c)	5,696,729,632	D	613,112
Total retail sales, 2012 ($1,000) (c)	4,219,821,871	420,413	1,082,777
Total retail sales per capita, 2012 (c)	$13,443	$25,924	$17,789
Transportation			
Mean travel time to work (minutes), workers age 16 years+, 2015-2019	26.9	18.3	22.6
Income & Poverty			
Median household income (in 2019 dollars), 2015-2019	$62,843	$48,212	$56,139
Per capita income in past 12 months (in 2019 dollars), 2015-2019	$34,103	$30,235	$31,391
Persons in poverty, percent	⚠ 11.4%	⚠ 12.6%	⚠ 10.8%

BUSINESSES

Businesses			
Total employer establishments, 2019	7,959,103	X	2,030
Total employment, 2019	132,989,428	X	24,022
Total annual payroll, 2019 ($1,000)	7,428,553,593	X	1,022,041
Total employment, percent change, 2018-2019	1.6%	X	-0.3%
Total nonemployer establishments, 2018	26,485,532	X	4,946
All firms, 2012	27,626,360	1,855	6,735
Men-owned firms, 2012	14,844,597	978	3,587
Women-owned firms, 2012	9,878,397	498	2,068
Minority-owned firms, 2012	7,952,386	50	154
Nonminority-owned firms, 2012	18,987,918	1,622	6,272
Veteran-owned firms, 2012	2,521,682	235	663
Nonveteran-owned firms, 2012	24,070,685	1,395	5,658

GEOGRAPHY

Geography			
Population per square mile, 2010	87.4	2,182.8	66.3
Land area in square miles, 2010	3,531,905.43	7.56	929.82
FIPS Code	1	5061225	50021

About datasets used in this table

Value Notes

⚠ Estimates are not comparable to other geographic levels due to methodology differences that may exist between different data sources.

Some estimates presented here come from sample data, and thus have sampling errors that may render some apparent differences between geographies statistically indistinguishable. Click the Quick Info ⓘ icon to the left of eac row in TABLE view to learn about sampling error.

The vintage year (e.g., V2019) refers to the final year of the series (2010 thru 2019). *Different vintage years of estimates are not comparable.*

Fact Notes

- **(a)** Includes persons reporting only one race
- **(c)** Economic Census - Puerto Rico data are not comparable to U.S. Economic Census data
- **(b)** Hispanics may be of any race, so also are included in applicable race categories

Value Flags

- **-** Either no or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest or upper interval of an open ended distribution.
- **F** Fewer than 25 firms
- **D** Suppressed to avoid disclosure of confidential information
- **N** Data for this geographic area cannot be displayed because the number of sample cases is too small.
- **FN** Footnote on this item in place of data
- **X** Not applicable
- **S** Suppressed; does not meet publication standards
- **NA** Not available
- **Z** Value greater than zero but less than half unit of measure shown

QuickFacts data are derived from: Population Estimates, American Community Survey, Census of Population and Housing, Current Population Survey, Small Area Health Insurance Estimates, Small Area Income and Poverty Estimates, State and County Housing Unit Estimates, County Business Patterns, Nonemployer Statistics, Economic Census, Survey of Business Owners, Building Permits.

APPENDIX B

Community Engagement

CITY OF RUTLAND, VERMONT
Board of Aldermen
Monday, August 2, 2021
Public Hearing Minutes

Members present; President Whitcomb; Aldermen Gorruso, *Gillam, Davis, Neary *Doenges and Clifford. Alderman Gillam arrived at 6:32 PM, Alderman Doenges arrived at 6:37 PM. Aldermen Franco, Savage, Talbott and DePoy arrived just before the closing of the public hearing. Also present, Mayor Allaire, Jim Rotondo, Ted Gillen, Bob Protovanski and Shane Mullen.

6:30 PM Public Hearing; Long Term Control Plan (LTCP)

President Whitcomb called the meeting to order at 6:30 PM and noted the meeting was to review the Long Term Control Plan and asked Commissioner Rotondo to start his presentation.

Commissioner Rotondo noted the hearing was to provide information on the LTCP and review projects to date as well as take questions from the Board of Aldermen (BOA) or the public. After brief introduction, Commissioner Rotondo turned the presentation over to Shane Mullen, PE, project manager with Weston & Sampson.

Mr. Mullen briefed the Board on;
What is a CSO (Combined Sewer Overflow)
Rutland's Sewer System
Historical CSO Work
CSO LTCP Approach
Sewer System Limitations
Existing CSO Flows
Data Collection & Analysis
CSO Abatement Alternatives
Priority and Economic Ranking &
Workplan Items Remaining

Within each category Mr. Mullen gave brief details. The presentation lasted about 15 minutes and then there was brief Q & A with several members of the Board of Aldermen.

At 6:54 PM a motion was made and seconded (Davis, Gorruso) to close the public hearing. **Motion passed.**

Respectfully submitted,

Henry A Heck
Rutland City Clerk

City of Rutland

Department of Public Works

Long Term Control Plan (LTCP)

Public Meeting
60% Progress Update & Public Comments

August 2, 2021

Origin of LTCP Requirement

- In accordance with the 1272 Order issued May 8, 2018 by the Vermont Agency of Natural Resources (ANR) to ensure all remaining Combined Sewer Overflows (CSOs) in the City of Rutland are brought into compliance, the City is required to complete a Long Term Control Plan (LTCP) for CSO abatement by May 8, 2020.
- The City was subsequently granted an extension to this deadline to October 30, 2021.

Background

Process Chosen to Develop the LTCP:

- 1st Step: Develop a Hydrologic and Hydraulic (H&H) Model of the City's Combined Sewer System
- 2nd Step: Use the model to compare potential alternatives in order to identify the most cost effective & beneficial projects

Weston & Sampson was hired on July 20, 2016 to develop the H&H Model. The model was completed in 2019.

Weston & Sampson was hired to develop the LTCP on December 17, 2019.

Goal of Today's Meeting

- To present work done to date regarding the development of the Long Term Control Plan (LTCP) – currently 60% complete
- To provide an opportunity for both the Board and Public to ask questions and make comments

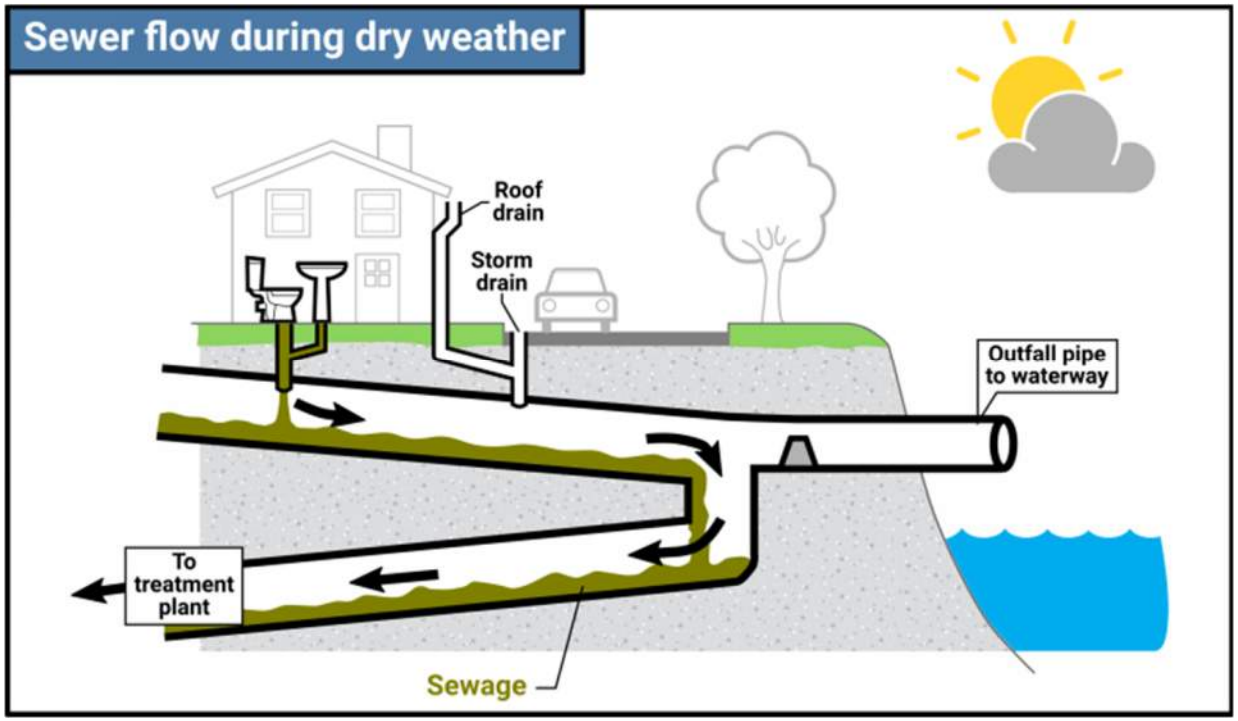
Presenter

- Shane Mullen, PE, Project Manager, Weston & Sampson

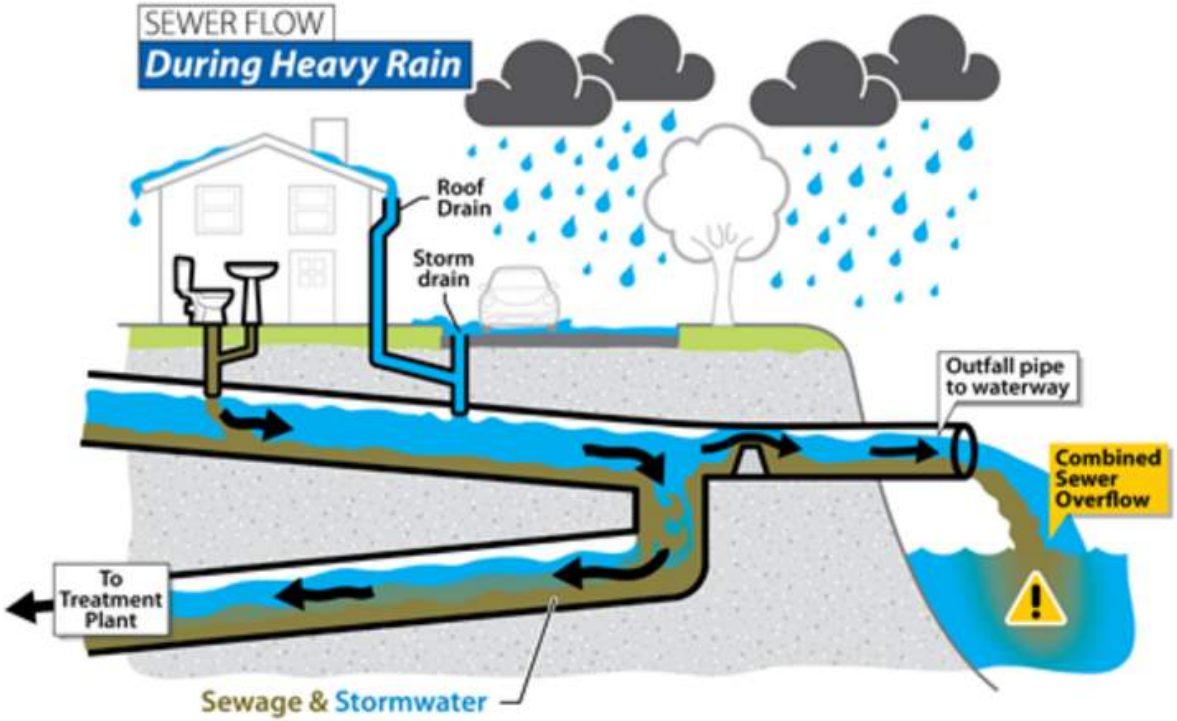
Possibly Joining by Phone

- Jeff Fehrs, PE, Supervisior, VTDEC Water Investment Division
- Hugo Martinez Cazon, PE, Design Engineer, VTDEC Water Investment Division
- Lynnette Claudon, PE, Chief Design Engineer, VTDEC Water investment Division

What is a CSO?


Sewer flow during dry weather
Roof drain
Storm drain
Outfall pipe to waterway
To treatment plant
Sewage

What is a CSO?


SEWER FLOW
During Heavy Rain
Roof Drain
Storm drain
Outfall pipe to waterway
Combined Sewer Overflow
To Treatment Plant
Sewage & Stormwater

Rutland's Sewer System

- Wastewater treatment facility (WWTF)
  - 8 MGD municipal wastewater treatment
  - 29 MGD combined sewage treatment
- 22 MGD River Street pump station
- 4 CSO outfalls
- Over 450,000 linear feet of sewer & over 1,500 MHs
- Serves the City of Rutland, Rutland Town & Killington Resort

Historical CSO Work

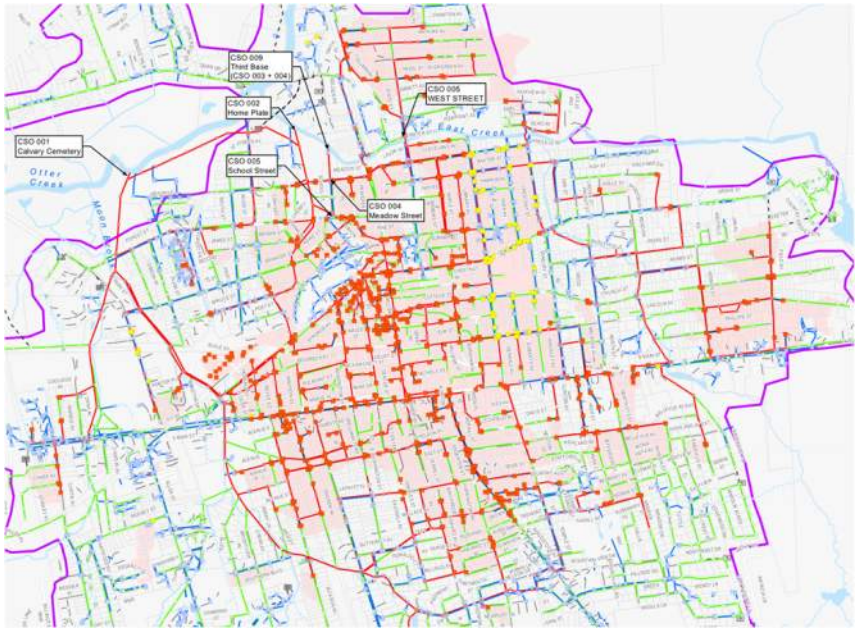
- $17.5 MM spent from 1988 - 2018
- Eliminated three CSO discharge locations
- Increase treatment capacity at WWTF
- Separate combined sewers



CSO LTCP Approach

- Goal: Eliminate CSO discharges from 5-year, 1-hour and 5-year, 24-hour storm events
- Create a model to aid in analysis
- Water quality monitoring for health of receiving waters
- Prioritize based on cost-effective analysis

Sewer System Limitations



- Minimal existing storage in system
- Pump station pumps 22 MGD
- WWTF treats 29 MGD
- Combined sewershed area is large

Existing CSO Flows

Existing Conditions Model		
Location	5-Year, 1 Hour Storm (1.2") (MG)	5-Year, 24-Hour Storm (3.1") (MG)
CSO 001 - Calvary	0.58	4.91
CSO 002 - Home Plate	0.10	0.15
CSO 003 - School Street	1.13	5.48
CSO 004 - Meadow Street	0.14	1.1

<u>Inflow sources</u>

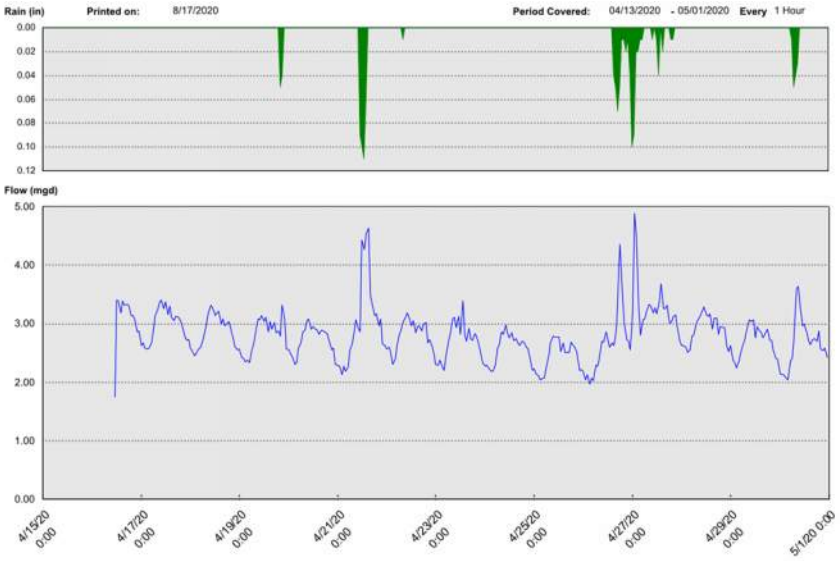
- Roof leaders, CBs, direct inflow
- Rainfall-driven infiltration
- Sump pumps

<u>Infiltration sources</u>

- Cracks in pipe

Data Collection & Analysis

- CSO discharge events
- Rainfall
- Sewer flow monitoring
- H&H modeling
- Water quality sampling

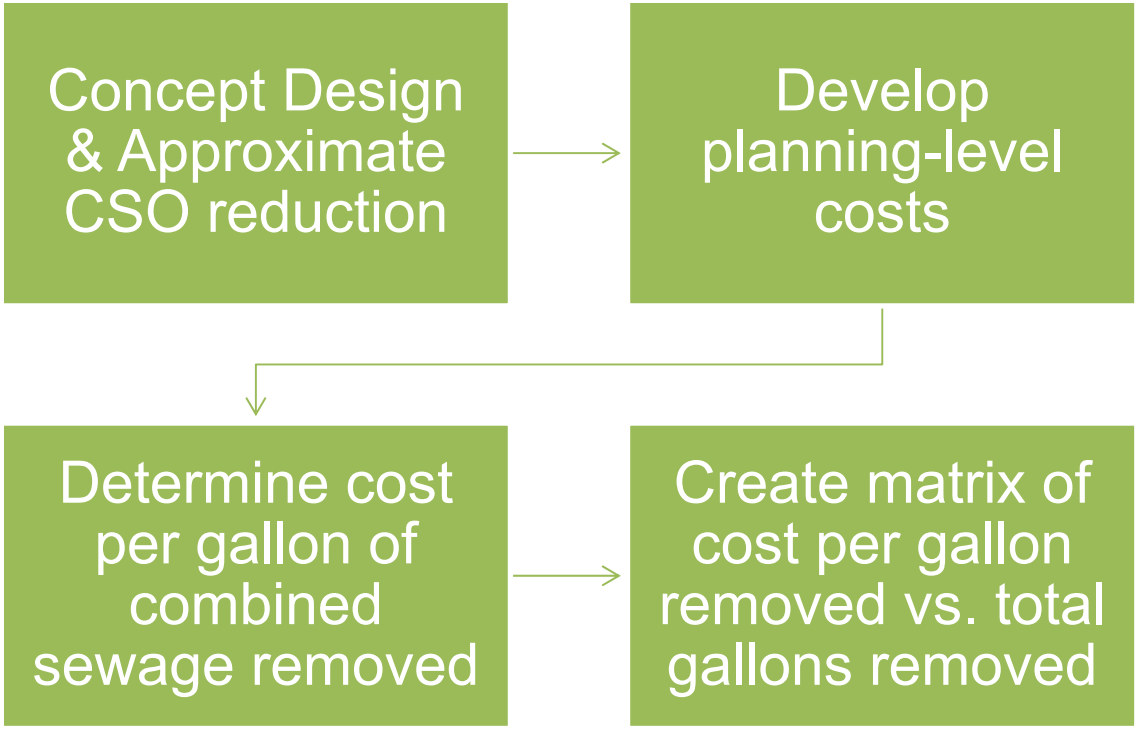


CSO Abatement Alternatives

- Increase combined sewage treatment capacity
- Increase storage capacity
- Green Stormwater Infrastructure
- Separation of combined sewershed



Priority & Economic Ranking



Workplan Items Remaining



City data collection program



Further develop CSO abatement alternatives



Develop opinions of cost for improvements



Ranking list of improvements



Second public engagement meeting



Review findings with VT DEC



Issue preliminary engineering report

thank you

westonandsampson.com

City of Rutland

Department of Public Works

Long Term Control Plan (LTCP)

Public Meeting
90% Progress Update & Public Comments

January 11, 2022

Goal of Today's Meeting

- To present work done to date regarding the development of the Long Term Control Plan (LTCP) – currently 90% complete
- To identify and describe a potential *Short List of Projects* that may be recommended to be included in the next 5-Year Plan that the City will agree to perform (DEC will issue a new 1272 Order at the completion of the LTCP)
- To provide an opportunity for both the Board and Public to ask questions and make comments

Presenter

- Shane Mullen, PE, Project Manager, Weston & Sampson

Joining by Phone

- Lynnette Claudon, PE, Chief Design Engineer, VTDEC Water investment Division

CSO LTCP Approach

- Goal: Eliminate CSO discharges from 5-year, 1-hour and 5-year, 24-hour storm events
- Create a model to aid in analysis
- Water quality impacts
- Prioritize projects based on cost-effective analysis

Work Performed & Deliverables

- Preliminary environmental resource assessment of all projects
- 2020 flow metering: 12 weeks monitoring 10 locations + collection of rain gage data
- H&H model calibration against flow metering data
- H&H model development of second quartile storm
- Water & combined sewer quality sampling & analysis
- Tabulation of historical CSO discharges for past 5 years

Work Performed & Deliverables

- 30% concept design for 21 distinct projects
  - Hydrologic modeling of proposed storm sewer systems
  - Design of stormwater treatment and peak flow mitigation
  - Evaluation of GSI measures
- Opinions of cost for all projects
- Project ranking & prioritization
- Development of 5-year project plan (ongoing)

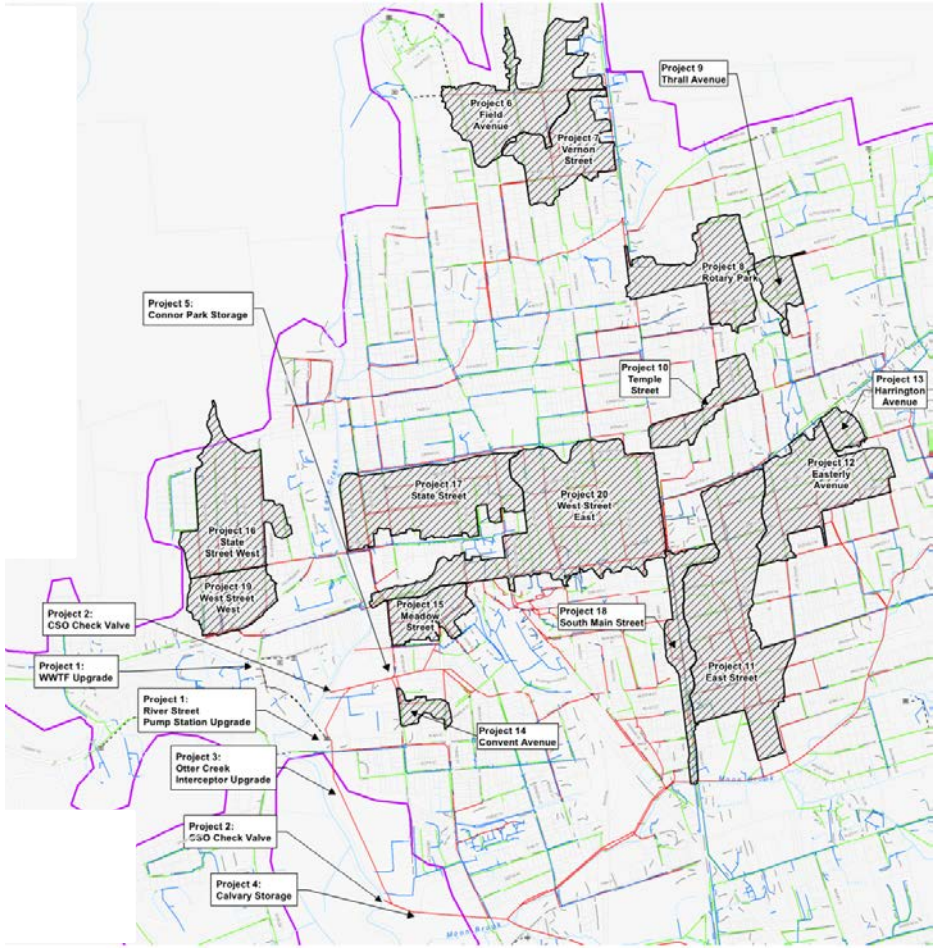
CSO Abatement Alternatives

1. Increase combined sewage treatment capacity

2. Increase storage capacity

3. Separation of combined sewersheds (with Green Stormwater Infrastructure)




Project 9
Thrall Avenue
Project 6
Field
Avenue
Project 7
Vernon
Street
Project 8
Rotary Park
Project 5:
Connor Park Storage
Project 10
Temple
Street
Project 13
Harrington
Avenue
Project 12
Easterly
Avenue
Project 17
State Street
Project 20
West Street
East
Project 16
State
Street West
Project 19
West Street
West
Project 15
Meadow
Street
Project 18
South Main Street
Project 2:
CSO Check Valve
Project 1:
WWTF Upgrade
Project 11
East Street
Project 1:
River Street
Pump Station Upgrade
Project 14
Convent Avenue
Project 3:
Otter Creek
Interceptor Upgrade
Project 2:
CSO Check Valve
Project 4:
Calvary Storage

Ranking Considerations

- Cost-efficient projects ($/gal removed)
- Projects that build on existing infrastructure
- Projects that occur on City-owned land
- Existing designs available (shovel-ready)

CSO Abatement Project Ranking

Project No.	Rank	Project Name	Project Type	Step 2 Engineering	Step 3 Engineering	Construction Cost	Total Cost	Gallons Removed	$/Gal
2	1	CSO Check Valves	Capacity	$ 17,000	$ 31,000	$ 297,000	$ 345,000	*See Note 1*	N/A
1.2	2	WWTF Upgrade	Capacity	$ 66,000	$ 121,000	$ 1,353,000	$ 1,540,000	1,622,000	$ 1.21
1.1	3	River St. Pump Station Upgrade	Capacity	$ 26,000	$ 48,000	$ 350,000	$ 424,000	*See Note 2*	N/A
18	4	South Main Street	Separation	$ 20,000	$ 38,000	$ 372,000	$ 430,000	171,162	$ 2.51
5.2	5	Connor Park Storage Phase 2	Storage				$ 3,900,000	1,100,000	$ 3.55
3	6	Otter Creek Interceptor Upgrade	Capacity	$ 283,000	$ 518,000	$ 6,899,000	$ 7,700,000	1,714,000	$ 4.49
20	7	West Street East	Separation				$ 12,930,000	2,500,762	$ 5.17
5.1	8	Connor Park Storage Phase 1	Storage	$ 232,000	$ 425,000	$ 5,543,000	$ 6,200,000	1,100,000	$ 5.64
10	9	Temple Street	Separation				$ 2,270,000	401,758	$ 5.65
8	10	Rotary Park	Separation				$ 4,590,000	640,429	$ 7.17
12	11	Easterly Avenue	Separation				$ 3,460,000	422,522	$ 8.19
9	12	Thrall Ave	Separation				$ 920,000	89,680	$ 10.26
11	13	East Street	Separation				$ 9,350,000	781,636	$ 11.96
7	14	Vernon Street	Separation	$ 45,000	$ 167,000	$ 3,033,000	$ 3,245,000	250,398	$ 12.96
16	15	State Street West	Separation				$ 4,910,000	376,446	$ 13.04
6	16	Field Ave	Separation				$ 6,830,000	360,903	$ 18.92
17	17	State Street East	Separation				$ 11,130,000	442,783	$ 25.14
4	18	Calvary Storage	Storage	$ 142,000	$ 261,000	$ 3,297,000	$ 3,700,000	129,000	$ 28.68
13	19	Harrington Avenue	Separation				$ 1,700,000	54,223	$ 31.35
15	20	Meadow Street	Separation				$ 4,160,000	130,635	$ 31.84
19	21	West Street West	Separation				$ 4,610,000	38,000	$ 121.32
14	22	Convent Avenue	Separation				$ 1,460,000	*See Note 3*	N/A

Short List of Potential CSO Projects Considered for next 5-Year Plan

1. CSO Check Valves
2. River Street Pump Station Upgrade
3. WWTF Upgrade
4. Connor Park Storage – Phase 1
5. Vernon Street Separation
6. South Main Street Separation
7. Calvary Storage
8. Otter Creek Interceptor

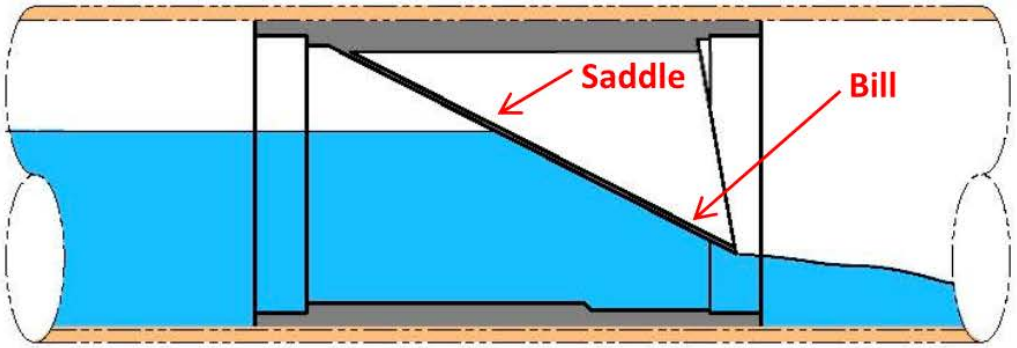
CSO Check Valves

- Install on Calvary & Home Plate CSO outfalls
- Prevents inflow when stream levels are high
- Lower cost than other options
- Installed on City-controlled property

CSO Check Valves









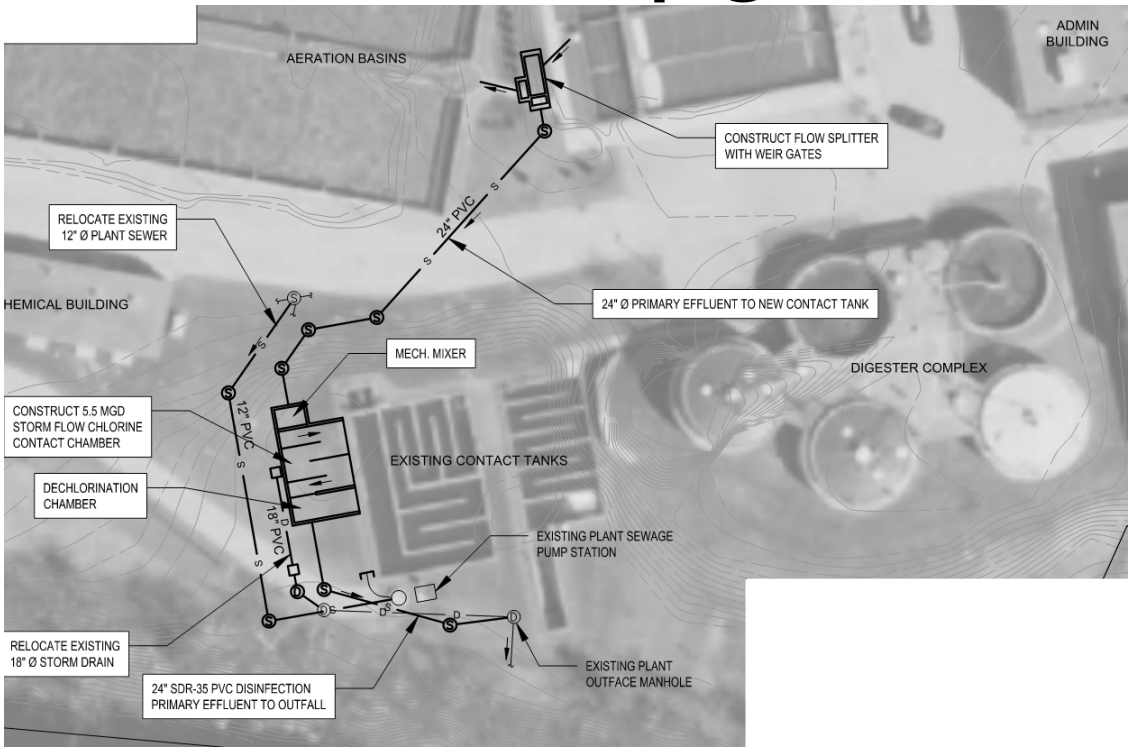
River Street Pump Station

- Increase pumping capacity to 28 MGD through control system modification
- Install bypass pumping connection
- Process piping modifications

WWTF Upgrade

- Increase treatment capacity by 5.5 MGD (to 28 MGD total)
- Installation of piping from primary settling to disinfection/dechlorination
- Ancillary site work (relocated storm drains, etc.)

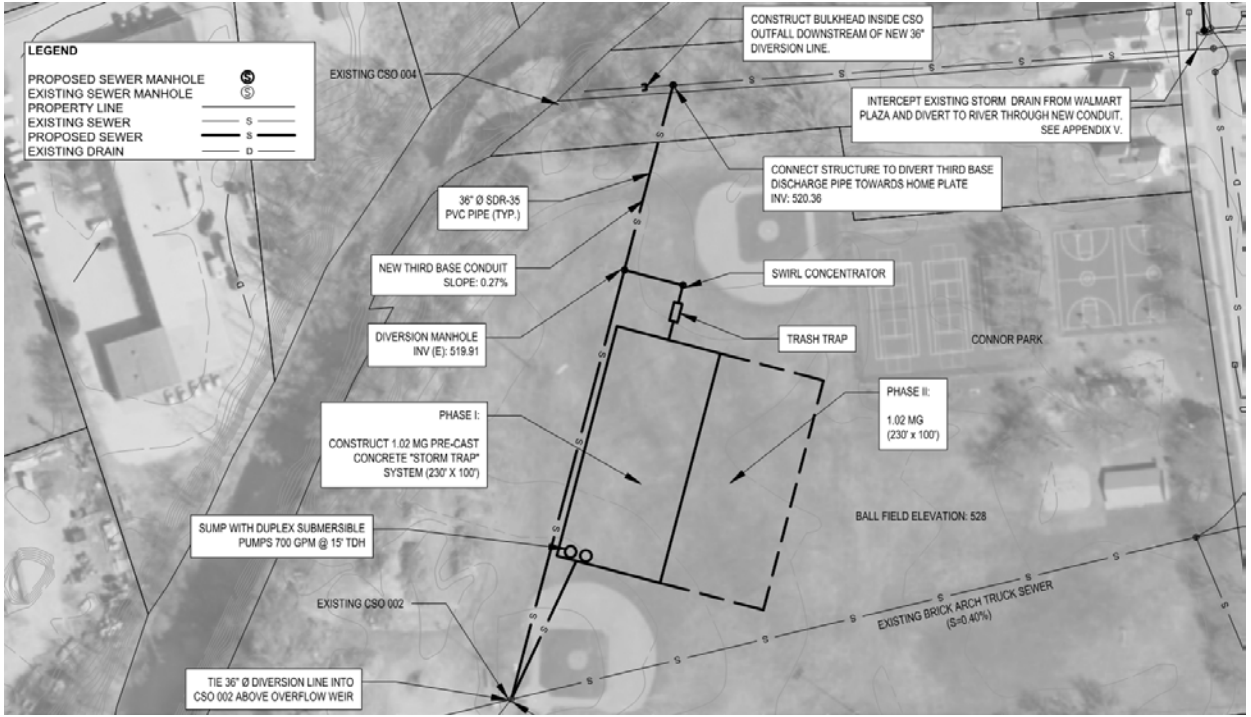
WWTF Upgrade



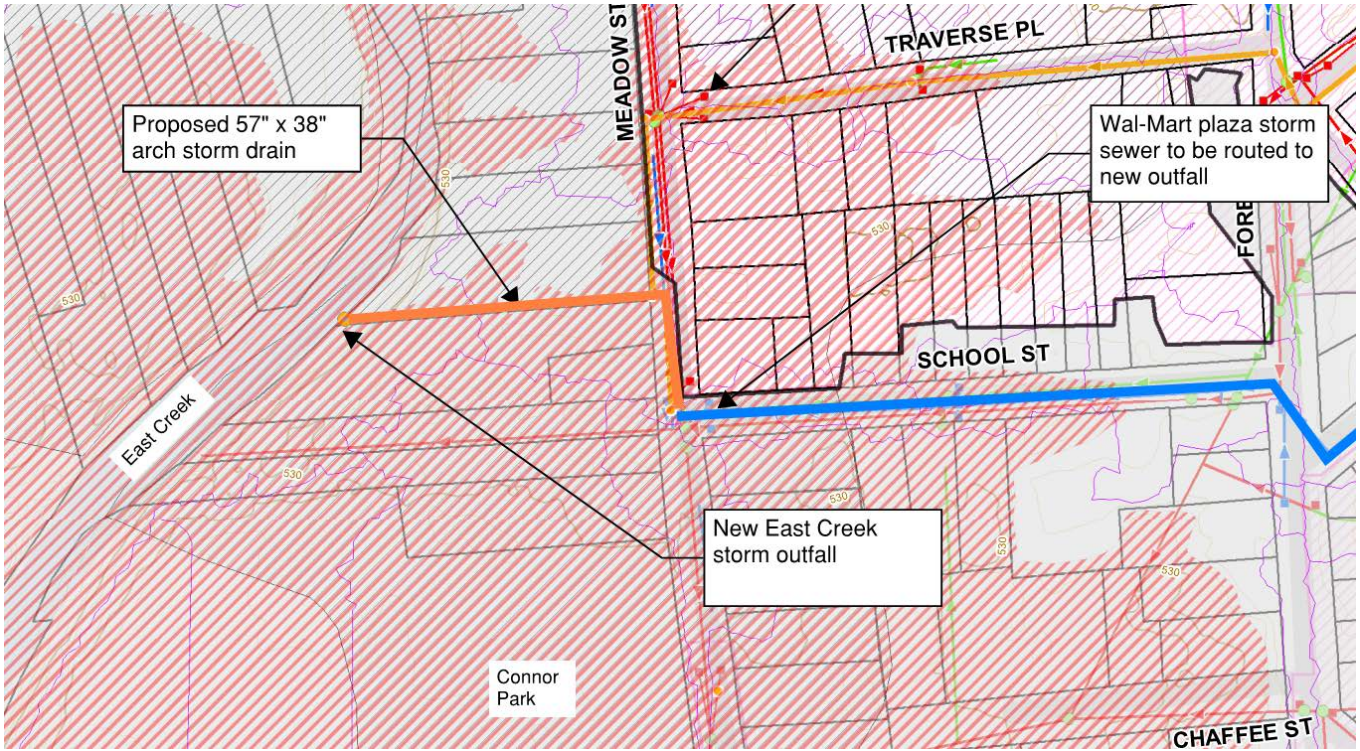
Connor Park Storage

- Two-phase approach
- 1.02 million gallons of storage per phase
- Trash & grit removal pre-treatment
- Pumped discharge to maximize vertical storage
- Decommission Third Base outfall
- Re-route existing Wal-Mart shopping plaza storm sewer to new outfall

Connor Park - Storage



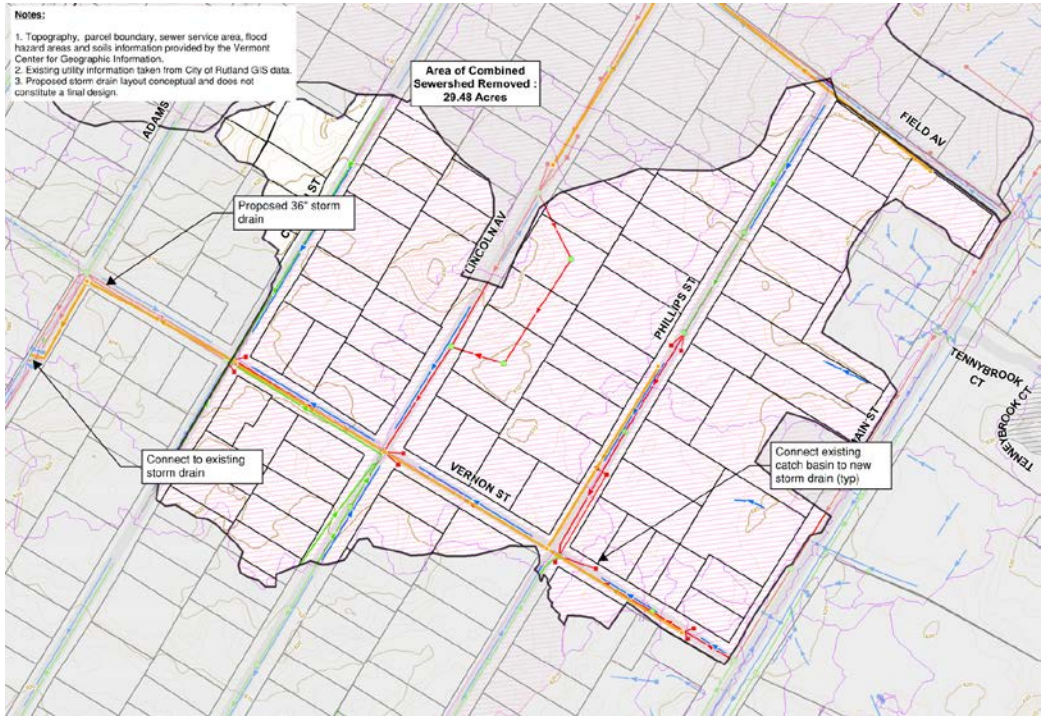
Connor Park – New Outfall



Vernon Street Separation

- 30 acres in Meadow Street sewershed
- Existing stormwater treatment & outfall in place
- Design work complete

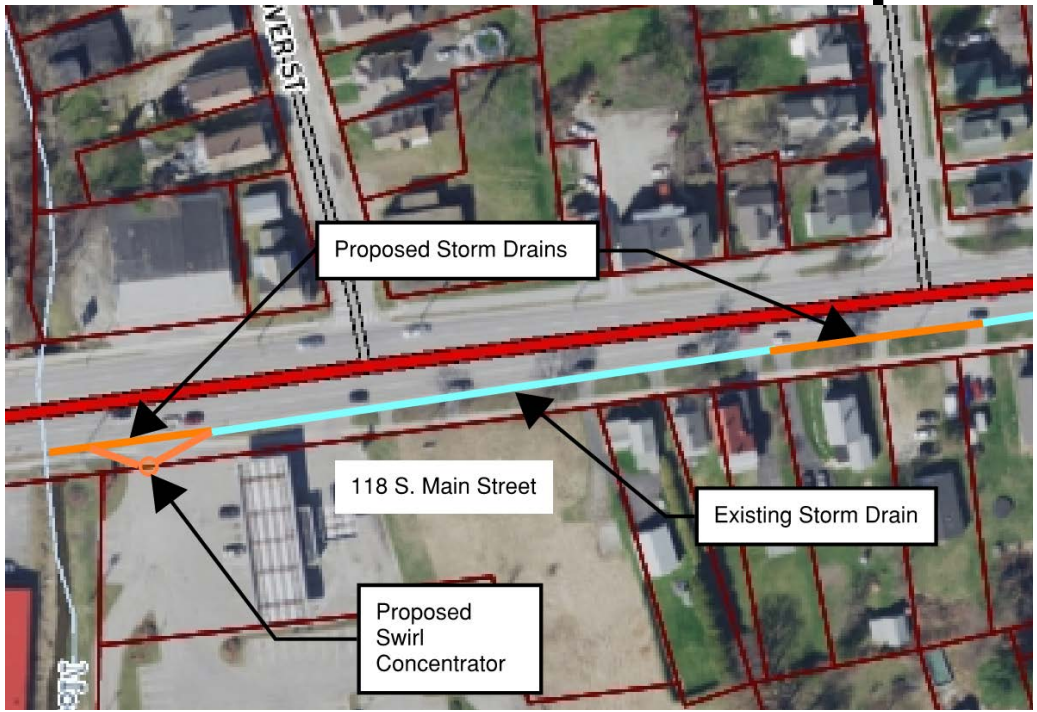
Vernon Street Separation



South Main Street Separation

- Previous separation project, incomplete
- Project consists of short runs of new storm drain, swirl concentrator, and new outfall on Moon Brook
- Right-of-Way access required

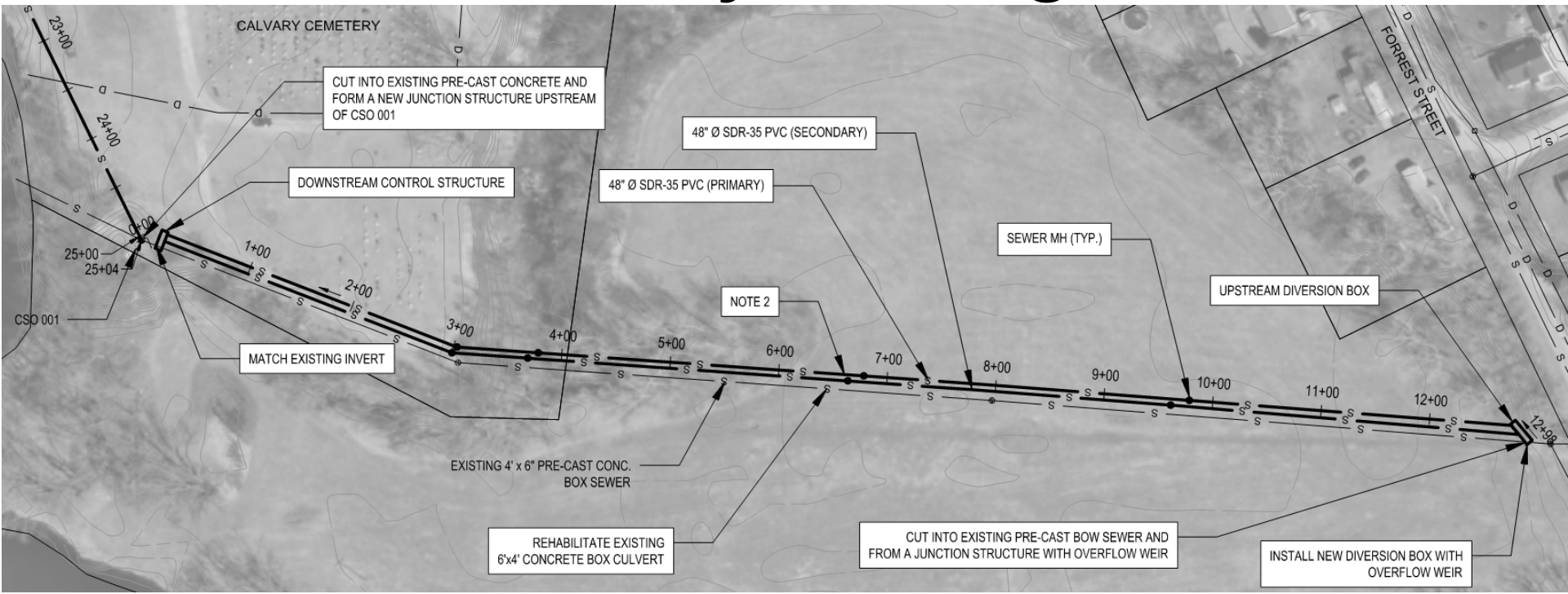
South Main Street Separation



Calvary Storage

- Storage of 129,000 gallons of combined sewage
- Construct new dry-weather sewer
- Rehabilitate existing 4’ x 6’ box sewer for storage
- Provide additional access and means for flushing accumulated solids

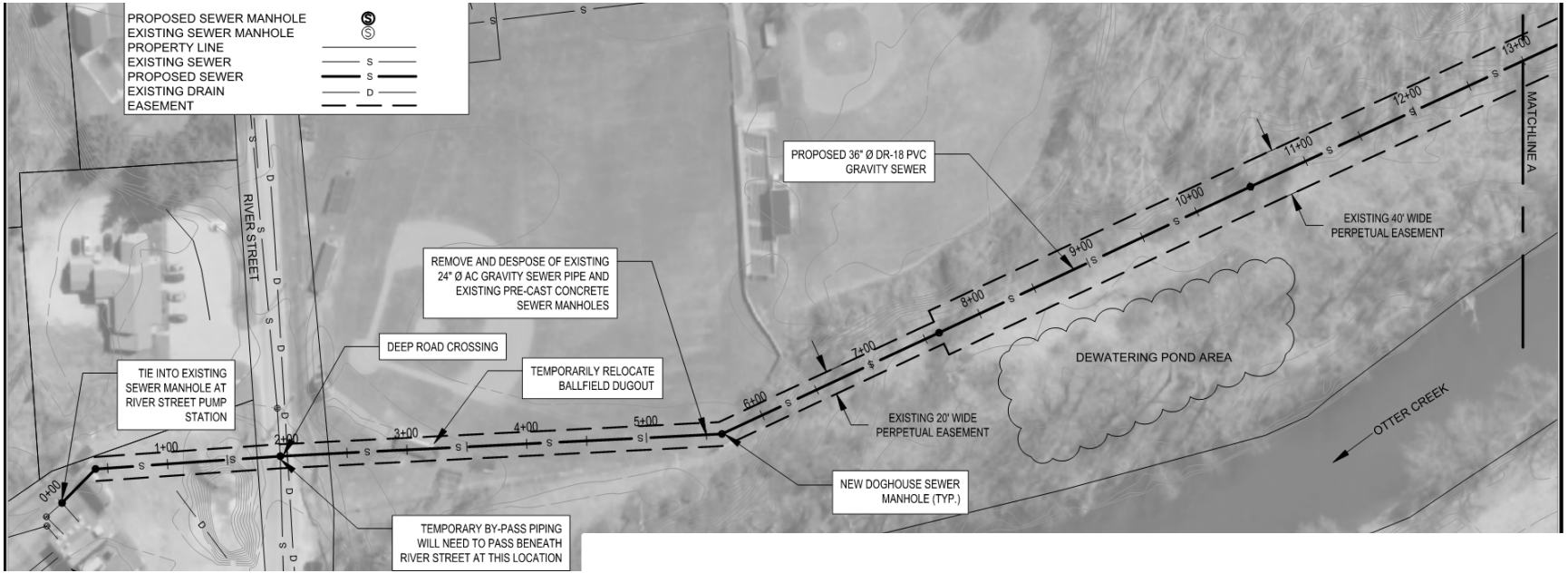
Calvary Storage



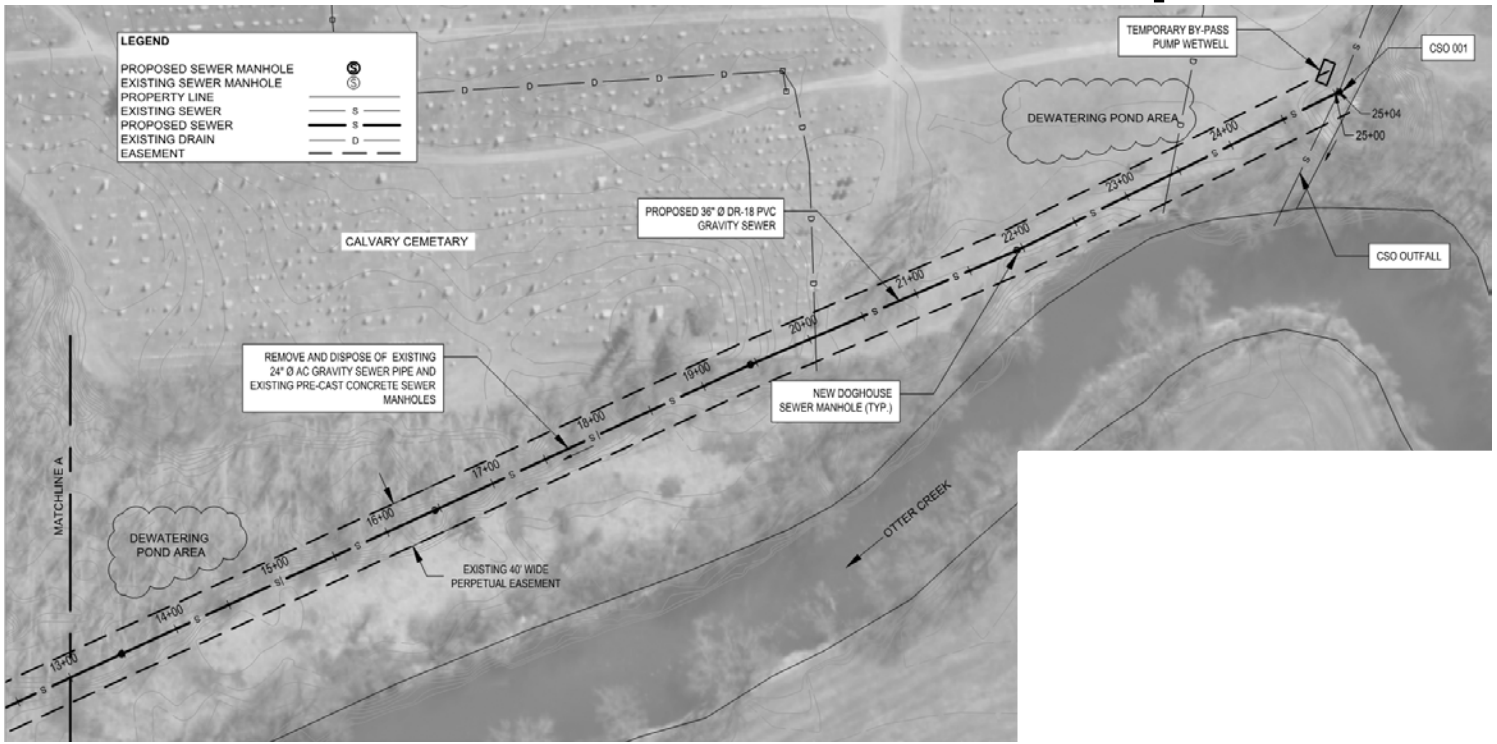
Otter Creek Interceptor

- Provides 1.7 MG of storage
- Increase size of final leg of sewer from Calvary Cemetery CSO to RSPS from 24” to 36”
- Maximizes amount of flow handled by RSPS
- Must be done after RSPS & WWTF projects
- Deep excavation, additional easements required

Otter Creek Interceptor



Otter Creek Interceptor



Action Items Needed to Complete LTCP Report

- Identify Projects to be Included in 5-Year Plan
  - This list will become part of the 1272 order (legal obligation to complete)
  - High cost-effectiveness & priority
- Future Projects (6th year and beyond)
  - Involve additional regulatory, legal and/or land acquisition considerations
  - Lower cost-effectiveness

5-Year Project List/Implementation Plan

Project Name	Year 1 FY23	Year 2 FY24	Year 3 FY25	Year 4 FY26	Year 5 FY27
CSO Check Valves					
Vernon St. Separation					
River St. Pump Station Upgrade					
WWTF Improvements					
South Main St. Separation					
Connor Park Storage					
Calvary Storage					
Otter Creek Interceptor					
Total					

DPW will investigate potential CSO grants and subsidies and then create a recommended 5-Year Project List/Implementation Plan for consideration and approval by the BOA. This list will become part of the 1272 order (legal obligation to complete).

The Plan may be composed of both Design and Construction Projects.

Tentative Schedule – Project Completion

- 1/21/22: Weston & Sampson submits final updated project costs to DPW
- 1/22/22 – 1/30/22: DPW investigates potential CSO Grants & Subsidies & prepares Recommended *5-Year Project List/Implementation Plan*
- 1/31/22: DPW completes & submits Recommended *5-Year Project List/Implementation Plan* to BOA DPW Committee for their consideration
- 2/9/22: Conduct BOA DPW Committee meeting to discuss and approve recommended plan
- 2/22/22: BOA Meeting – Full Board to consider/approve DPW Committee recommended plan
- 3/15/22: Weston & Sampson to submit final LTCP to City of Rutland

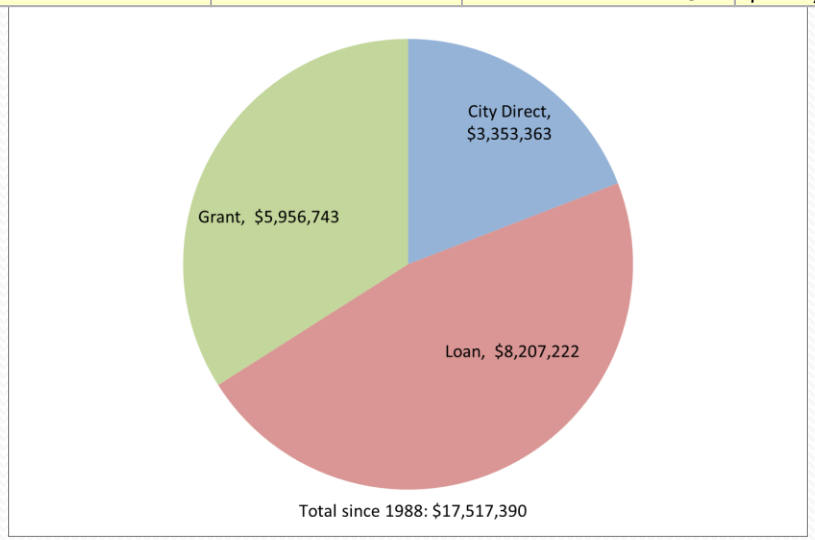
Any Questions?

APPENDIX C

CSO Abatement Project History

City of Rutland CSO Planning and Work Since 1988

Year	Project	Contractor	Funding Source	Cost	City Direct	Loan	Grant
1988	CSO Planning Study	Dusfrene-Henry	CWSRF Planning Advance	$ 175,033	$ 10,612	$ 164,421	
1989	Storm sewer separation - Shedd Place	DPW	City of Rutland	$ 13,390	$ 13,390		
1990	Storm sewer separation - Eastview Court/Hillcrest Road	DPW	City of Rutland	$ 22,767	$ 22,767		
1990	Storm sewer separation - Robinwood Lane	DPW	City of Rutland	$ 7,136	$ 7,136		
1992	Storm sewer separation - State Street	Daniels Construction	FhWA - Vtrans	unknown			
1993	CSO Phase I Completed - New force main, CSO Headworks	Belden	CWSRF	$ 1,223,615	$ 433,085	$ 611,807	$ 178,722
1995	Storm sewer separation - North Main Street	Don Weston Excavating	Town of Rutland	unknown			
1997	Storm sewer separation - School, Forest, and Union Streets	DPW	City of Rutland	$ 386,368	$ 386,368		
1998	Storm sewer separation - Spruce St Ext.	Casella Construction	City of Rutland	$ 274,749	$ 274,749		
2006	CSO Phase IIA Design/Construction	Penta Corporation	Bond/CWSRF/Grant	$ 5,606,106	$ 1,401,206	$ 2,801,226	$ 1,403,613
2006	I&I Smoke testing project	Green Mountain Pipeline	LCIF?	$ 3,000			$ 3,000
2006	Storm sewer separation - GE Roof Drains	GE	GE	unknown			
2008	Storm sewer separation - West Street/Crescent Street	M&M Excavating	ARRA Grant/CWSRF Loan	$ 1,234,640	$ 312,014	$ 462,500	$ 460,126
2009/2012	Storm sewer separation - Stratton Road	DPW	City of Rutland	$ 48,014	$ 48,014		
2010	Storm sewer separation - Allen Street	DPW	City of Rutland	$ 40,000	$ 40,000		
2013	Storm sewer separation - River Street	DPW	City of Rutland	$ 29,033	$ 29,033		
2014	Storm sewer separation - Main Street	Casella Construction	FhWA - Vtrans	$ 2,888,418	$ 288,842		$ 2,599,576
2015	Northwest Neighborhood Sewer Separation Project completed	Kingsbury Construiction	Bond, CWSRF	$ 5,170,670		$ 3,886,016	$ 1,284,654
2016	Storm sewer separation - Adams Street (swirl separator)	DPW	ERP	$ 47,000	$ 33,948		$ 13,052
2016	Storm sewer separation - NNSSP Phase IA Design	Otter Creek Engineering	CWSRF	$ 20,252		$ 20,252	
2017	West Street bypass pump	DPW/Belden	City of Rutland	$ 33,000	$ 33,000		
2017	CSO monitoring program	Ayyeka	City of Rutland	$ 19,199	$ 19,199		
2017	Storm sewer separation - Vernon Street Design	Dubois & King	ERP	$ 14,000			$ 14,000
2018	Hydraulic and Hydrologic Study Completed	Weston & Sampson/DPW	CWSRF Planning Advance	$ 261,000		$ 261,000	
			TOTAL	**$ 17,517,390**	**$ 3,353,363**	**$ 8,207,222**	**$ 5,956,743**



APPENDIX D

CSO Activations

CSO 001: Cavalry Cemetary
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
2/25/2017	2:17	151,900	1.11	3.5
4/4/2017	1:20	15,000	1.12	0.47
5/1/2017	1:30	56,000	1.75	5.01
5/22/2017	1:00	56,000	0.66	1.37
5/25/2017	0:35	24,500	1.89	3.74
6/19/2017	2:17	97,300		
7/1/2017	2:03	86,100		
7/7/2017	0:30	21,000	1.25	2.05
7/8/2017	0:33	24,500		
7/13/2017	1:52	78,400	1.6	1.79
7/27/2017	0:20	14,000	0.43	2.01
8/9/2017	0:29	20,300		
8/19/2017	0:33	18,000		
8/22/2017	1:15	46,900		
9/3/2017	0:10	10,000		
10/9/2017	0:35	11,500		
10/24/2017	1:00	38,500		
10/26/2017	0:45	21,000		
10/30/2017	2:24	105,000		
1/12/2018	5:40	84,000		
1/23/2018	3:00	125,300		
2/21/2018	5:26	212,852		
5/4/2018	7:00	600,000	0.73	4.65
6/23/2018	2:03	90,000	0.48	0.75
7/6/2018	0:55	298,206	0.61	1.08
7/23/2018	3:25	3,000,000	3.41	3.24
7/26/2018	0:30	60,000	0.84	0.37
8/4/2018	5:20	1,521,047	2.27	1.5
8/7/2018	3:05	691,006	0.9	1.68
8/17/2018	1:01	189,089		
8/18/2018	3:50	386,249	1.01	1.26
9/6/2018	1:25	96,681	0.837	4.07
9/11/2018	1:21	86,588	0.488	0.47
9/26/2018	2:52	235,136	0.753	2.71
10/7/2018	3:03	26,695	0.243	1.03
10/11/2018	1:30	81,832	0.211	0.33
10/11/2018	1:27	97,710	0.598	0.75
11/2/2018	1:05	4,400	0.622	0.61
11/3/2018	3:55	458,922	1.017	0.56
11/6/2018	4:23	422,236	0.667	0.51
12/2/2018	1:10	272,000	0.612	0.42

CSO 001: Cavalry Cemetary
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
12/21/2018	2:02	300,000	0.54	0.47
12/28/2018	4:46	566,653	0.603	0.19
1/24/2019	0:40	2,686,426	2.402	0.98
2/5/2019	3:40	358,027	0.082	0.06
2/8/2019	10:35	611,283	0.18	0.096
4/15/2019	1:02	1,153,318	1.563	1.68
4/20/2019	1:06	67,113	0.393	0.372
4/20/2019	2:00	84,200	0.6	0.516
4/27/2019	3:49	917,490	0.52	0.144
5/3/2019	2:05	180,415	0.389	0.564
5/10/2019	1:01	117,145	0.472	0.42
5/19/2019	7:25	866,047	0.908	2.292
5/20/2019	2:40	369,132	0.199	0.516
6/11/2019	0:10	30,423		
6/20/2019	7:30	745,451		
7/6/2019	0:50	109,657	0.55	1.644
2/27/2020	7:30	363,607	0.601	0.33
3/13/2020	6:10	492,519	0.88	0.33
4/9/2020	7:30	608,940	0.89	0.33
4/13/2020	1:25	117,815	0.87	0.47
5/11/2020	1:10	30,477	0.47	0.037
5/15/2020	0:40	21,696	0.425	1.83
6/29/2020	1:25	93,711	0.88	5.28
8/4/2020	0:40	11,730	0.79	1.36
8/21/2020	1:25	58,728	0.65	0.8
8/29/2020	0:44	41,046	0.602	2.25
9/30/2020	4:55	374,979	1.4	0.66
11/15/2020	1:00	120,404	0.681	0.56
11/23/2020	0:45	64,473	0.542	0.51
11/30/2020	0:45	264,409	0.72	1.17

CSO 002: Home Plate
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
2/25/2017	2:17	151,900	1.11	3.5
4/4/2017	1:20	56,000	1.12	0.47
5/1/2017	1:30	56,000	1.75	5.01
5/22/2017	1:00	31,500	0.66	1.37
5/25/2017	0:35	24,500	1.89	3.74
6/19/2017	2:17	97,300		
7/1/2017	2:03	86,100		
7/7/2017	0:30	21,000	1.25	2.05
7/8/2017	0:33	24,500		
7/13/2017	1:52	78,400	1.6	1.79
7/27/2017	0:20	14,000	0.43	2.01
8/9/2017	0:29	20,300		
8/19/2017	0:33	10,000		
8/22/2017	1:15	38,500		
10/24/2017	1:00	18,000		
1/12/2018	5:40	52,500		
1/23/2018	3:00	92,200		
5/4/2018	7:00	939,850	0.73	4.65
6/13/2018	0:55	549,745	1.41	3.25
6/23/2018	2:03	120,858	0.48	0.75
7/6/2018	0:55	313,258	0.61	1.08
7/23/2018	3:25	3,119,279	3.41	3.24
7/26/2018	0:30	62,710	0.84	0.37
8/4/2018	5:20	686,036	2.27	1.5
8/7/2018	3:05	647,847	0.9	1.68
8/18/2018	3:50	328,106	1.01	1.26
9/6/2018	1:25	224,985	0.84	4.07
9/11/2018	1:21	38,330	0.49	0.47
9/26/2018	2:52	368,091	0.75	2.71
10/7/2018	3:03	70,323	0.24	1.03
10/11/2018	1:27	26,969	0.6	0.75
11/3/2018	3:55	696,269	1.02	0.56
11/6/2018	4:23	300,265	0.67	0.51
12/21/2018	2:02	93,912	0.54	0.47
1/24/2019	0:30	3,141,119	2.402	0.98
4/15/2019	7:18	4,122,998	1.56	1.68
4/20/2019	0:45	139,971	0.6	0.516
5/3/2019	0:05	3,068	0.389	0.564
5/19/2019	0:30	189,844	0.908	2.29
5/20/2019	0:15	43,099	0.199	0.516
6/11/2019	0:25	65,383		

CSO 002: Home Plate
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
6/20/2019	2:25	948,984		3.05
7/6/2019	0:35	121,853	0.55	1.64
2/27/2020	0:15	13,621	0.6	0.33
4/9/2020	0:17	58,884	0.89	0.33
4/13/2020	1:15	114,225	0.87	0.47
5/11/2020	0:10	5,906	0.47	0.037
5/15/2020	0:10	11,270	0.43	1.83
6/29/2020	0:55	457,633	0.8	5.28
8/4/2020	0:10	13,550	0.79	1.36
8/21/2020	0:45	245,729	0.65	0.8
8/29/2020	0:15	61,010	0.6	2.25
9/30/2020	3:25	573,489	1.4	0.66
11/15/2020	0:55	61,179	0.68	0.56
11/30/2020	1:05	129,250	0.72	1.17

CSO 003: School Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
2/25/2017	2:17	151,900	1.11	3.5
4/4/2017	1:20	56,000	1.12	0.47
5/1/2017	1:30	56,000	1.75	5.01
5/22/2017	1:00	31,500	0.66	1.37
5/25/2017	0:35	24,500	1.89	3.74
6/19/2017	2:17	97,300		
7/1/2017	2:03	86,100		
7/7/2017	0:30	21,000	1.25	2.05
7/8/2017	0:33	24,500		
7/13/2017	1:52	78,400	1.6	1.79
7/27/2017	0:20	14,000		
8/9/2017	0:29	20,300		
8/19/2017	0:33	19,800		
8/22/2017	1:15	52,500		
10/9/2017	0:35	1,000		
10/24/2017	1:00	38,500		
10/30/2017	2:24	16,100		
1/12/2018	5:40	31,500		
1/23/2018	3:00	18,200		
5/4/2018	7:00	257,000	0.73	4.65
5/22/2018	0:10	1,728	0.33	0.14
5/26/2018	0:09	3,530	0.11	0.33
6/13/2018	0:55	669,152	1.41	3.25
6/18/2018	0:22	41,816	0.27	1.08
6/23/2018	2:03	475,557	0.48	0.75
6/27/2018	0:15	41,643	0.31	1.2
6/28/2018	0:41	64,009	0.91	0.56
7/6/2018	0:55	294,900	0.61	1.08
7/23/2018	3:25	3,368,463	3.41	3.24
7/25/2018	2:26	70,043	0.88	0.75
7/26/2018	0:30	99,060	0.84	0.37
8/4/2018	5:20	955,581	2.27	1.5
8/7/2018	3:05	998,558	0.9	1.68
8/17/2018	1:01	96,172		
8/18/2018	3:50	613,266	1.01	1.26
9/6/2018	1:25	380,416	0.84	4.07
9/11/2018	1:21	41,684	0.49	0.47
9/26/2018	2:52	565,450	0.75	2.71
10/11/2018	1:27	102,122	0.69	0.75
11/2/2018	1:05	9,300	0.62	0.61

CSO 003: School Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
11/3/2018	3:55	285,154	1.02	0.56
11/6/2018	4:23	220,043	0.67	0.51
12/2/2018	1:10	10,974	0.61	0.42
12/21/2018	2:06	61,902	0.31	0.14
12/28/2018	4:46	63,248	0.6	0.19
1/24/2019	6:55	69,148	2.402	0.98
4/9/2019	0:45	482		
4/15/2019	7:38	3,624,484	1.56	1.68
4/20/2019	0:10	141,255	0.6	0.52
5/3/2019	0:15	5,101	0.39	0.56
5/10/2019	0:40	1,432	0.47	0.42
5/19/2019	2:00	89,947	0.91	2.29
5/20/2019	0:40	19,567	0.19	0.516
5/23/2019	0:15	1,679	0.12	0.56
6/11/2019	0:35	34,875		
6/20/2019	2:10	251,875		
7/6/2019	0:39	53,997	0.55	1.64
7/30/2019	0:05	6,797	0.29	0.71
8/7/2019	0:05	1,288	0.05	0.27
8/16/2019	0:05	1,093	0.13	0.66
4/9/2020	0:20	3,901	0.89	0.33
4/13/2020	1:10	10,089	0.87	0.47
5/1/2020	0:16	3,174	0.3	0.33
5/11/2020	0:30	2,817	0.47	0.037
5/15/2020	0:20	31,072	0.425	1.83
6/11/2020	0:21	17,388	0.433	0.8
6/23/2020	0:30	13,652	0.3	1.08
6/29/2020	0:45	156,353	0.88	5.28
7/14/2020	0:10	13,094	0.25	0.94
7/22/2020	0:05	5,609	0.332	0.89
7/23/2020	0:02	1,237	0.332	0.89
8/4/2020	0:25	19,962	0.79	1.36
8/18/2020	0:15	12,266	0.42	1.24
8/21/2020	0:45	73,165	0.65	0.8
9/30/2020	3:50	76,115	1.4	0.66
10/10/2020	0:21	8,067	0.21	0.77
11/15/2020	0:40	19,434	0.681	0.56
11/23/2020	0:10	4,706	0.542	0.51
11/30/2020	0:50	34,105	0.72	1.17

CSO 004: Meadow Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
1/7/2017	0:15	7,500		
8/19/2017	0:33	10,000		
8/22/2017	1:15	37,800		
10/9/2017	0:35	27,000		
10/24/2017	1:00	36,000		
10/26/2017	0:45	31,500		
10/30/2017	2:24	46,200		
1/12/2018	5:40	84,000		
1/23/2018	3:00	106,400		
2/16/2018	0:35	3,586		
2/21/2018	5:26	99,312		
5/4/2018	7:00	520,000	0.73	4.65
6/13/2018	0:55	345,495	1.41	3.25
6/23/2018	2:03	50,000	0.48	0.75
6/27/2018	0:15	9,025	0.31	1.2
6/28/2018	0:41	163,424	0.91	0.56
7/10/2018	0:10	94,180	0.34	1.17
11/3/2018	3:55	8,215	1.02	0.56
1/1/2019	0:35	12,818	1.155	0.23
1/24/2019	3:00	1,371,362	2.402	0.98
2/5/2019	2:05	12,962	0.082	0.06
4/9/2019	0:35	7,272	1.563	1.68
4/15/2019	7:06	682,413	0.393	0.372
4/20/2019	8:02	37,110	0.6	0.516
4/20/2019	2:31	105,105	0.52	0.144
4/27/2019	2:05	22,449	0.179	0.276
5/2/2019	0:25	2,843	0.389	0.564
5/3/2019	1:50	40,173	0.472	0.42
5/10/2019	1:35	32,460	0.521666667	0.28
5/13/2019	0:40	9,137	0.908	2.292
5/19/2019	2:30	120,414	0.199	0.516
5/20/2019	0:40	17,412	0.107	0.516
5/23/2019	0:15	5,642	0.347	0.324
5/28/2019	4:01	19,972		
6/11/2019	1:25	80,236		3.05
6/20/2019	4:55	529,345	0.555	1.644
7/6/2019	1:00	68,714	0.067	0.276
7/25/2019	0:05	1,715	0.287	0.708
7/30/2019	1:35	44,539	0.051	0.276
8/7/2019	0:10	3,798	0.129	0.66
5/1/2020	0:30	12,163	0.3	0.33

CSO 004: Meadow Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
5/11/2020	1:35	44,388	0.47	0.037
5/15/2020	1:10	52,708	0.425	1.83
6/11/2020	0:53	40,375	0.433	0.8
6/29/2020	1:25	235,588	0.88	5.28
7/22/2020	0:19	10,183	0.33	0.89
8/4/2020	1:45	39,254	0.79	1.36
8/18/2020	0:10	3,641	0.42	1.24
8/21/2020	1:10	105,957	0.65	0.8
8/29/2020	1:00	65,117	0.602	2.25
9/30/2020	0:47	173,672	1.4	0.66
11/15/2020	1:20	41,246	0.681	0.56
11/23/2020	0:55	8,559	0.542	0.51
11/30/2020	1:35	49,328	0.72	1.17

CSO 005: West Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
2/25/2017	2:17	35,200	1.11	3.50
4/4/2017	1:20	22,400	1.12	0.47
5/1/2017	1:30	91,000	1.75	5.01
5/22/2017	1:00	24,000	0.66	1.37
5/25/2017	0:35	33,600	1.89	3.74
6/19/2017	2:17	150,400		
6/20/2017	0:16	25,600		
6/26/2017	0:12	19,200		
6/30/2017	0:08	12,800		
7/1/2017	2:03	62,400		
7/7/2017	0:30	36,000	1.25	2.05
7/8/2017	0:33	17,000		
7/13/2017	1:52	59,200	1.60	1.79
7/27/2017	0:20	12,800	0.43	2.01
8/9/2017	0:29	25,600		
8/19/2017	0:33	44,800		
8/22/2017	1:15	88,000		
10/9/2017	0:35	45,500		
10/24/2017	1:00	32,000		
10/26/2017	0:45	45,000		
1/12/2018	5:40	204,000		
5/4/2018	7:00	24,500	0.73	4.65
6/13/2018	0:55	29,396	1.41	3.25
6/18/2018	0:22	220	0.27	1.08
6/23/2018	2:03	8,000	0.48	0.75
7/6/2018	0:55	13,236	0.61	1.08
7/10/2018	0:10	1,530	0.34	1.17
7/23/2018	3:25	198,719	3.41	3.24
7/26/2018	0:30	857	0.84	0.37
8/4/2018	5:20	32,317	2.27	1.50
8/7/2018	3:05	32,317	0.90	1.68
8/14/2018	0:20	2,673	0.77	0.37
8/18/2018	3:50	37,505	1.01	1.26
9/6/2018	1:25	18,557	0.84	4.07
9/11/2018	1:21	3,120	0.49	0.47
9/26/2018	2:52	31,656	0.75	2.71
10/7/2018	3:03	619	0.24	1.03
10/11/2018	1:27	4,939	0.60	0.75
1/24/2019	8:00	149,921	2.40	0.98
4/15/2019	7:26	333,236	1.56	1.68
4/20/2019	0:05	316	0.39	0.37

CSO 005: West Street
Overflow Event Log (2017-2020)

Date	Total Duration (hours)	Total Volume (gallons)	Total 24 Hour Rainfall (in.)	Max Rainfall Intensity (in./hour)
4/20/2019	0:20	4,175	0.60	0.52
5/3/2019	0:05	238	0.39	0.56
5/19/2019	2:05	22,433	0.91	2.29
5/20/2019	0:15	7,249	0.20	0.51
6/11/2019	0:25	12,240		
6/20/2019	2:05	63,500		
7/6/2019	0:30	18,024	0.55	1.64
7/25/2019	0:10	7,531	0.07	0.27
7/30/2019	0:15	6,837	0.29	0.71
8/7/2019	0:05	619	0.05	0.28
5/15/2020	0:06	2,624	0.43	1.83
6/29/2020	0:40	39,630	0.88	5.28
7/14/2020	0:16	16,992	0.25	0.94
7/22/2020	0:10	3,330	0.33	0.89
8/4/2020	0:10	6,837	0.79	1.36
8/18/2020	0:05	93	0.42	1.24
8/21/2020	0:35	35,298	0.65	0.80
8/29/2020	0:20	20,812	0.60	2.25
9/30/2020	1:50	1,264	1.40	0.66
11/30/2020	0:15	2,694	0.72	1.17

APPENDIX E

Water Quality Data

Water Quality Sampling Data

The City of Rutland has collected composite samples to determine the water quality of the combined sewage in the collection system as well as the water quality in the two receiving waters upstream of all CSO discharge points. The data tables on the following pages summarize the laboratory analytical results for each sampling location.

The following sample locations were used for this analysis:

- Sample Location 1 - Otter Creek, upstream of CSO 001
  (Represents receiving water quality)
- Sample Location 2 - Located in MH A25-1, adjacent to Forest Street upstream of CSO 001
  (Represents combined sewage quality – Southern Area – Residential/Industrial)
- Sample Location 3 - Located in MH R1-3A, in Connor Park upstream of CSO 002
  (Represents combined sewage quality – Northern Area – Commercial/residential)
- Sample Location 4 - East Creek adjacent to the West Street bridge, upstream of CSOs 002, 004 and 009
  (Represents receiving water quality)

CSO LONG TERM CONTROL PLAN
WATER QUALITY SAMPLING

SAMPLE TESTING REQUIREMENTS

Samples must be tested for the following:

1. Indicator bacteria (E. Coli)
2. Total Suspended Solids (TSS)
3. Biochemical Oxygen Demand (BOD)
4. Dissolved Oxygen (DO)
5. pH
6. Settleable Solids
7. FOG
8. Total Phosphorus
9. Total Nitrogen
10. EPA Toxic Metals
    a. Arsenic
    b. Barium
    c. Cadmuim
    d. Chromium
    e. Lead
    f. Mercury
    g. Selenium
    h. Silver
    i. Zinc
    j. Copper

Certain tests will be conducted in-house and Endyne will conduct the remainder. The final Endyne currier pick-up is at 9AM on Thursdays in West Rutland. Therefore, all sampling must take place between **Monday and Wednesday** and samples must be delivered to the City Lab no later than **1pm on Wednesday**.

SAMPLING PROCEDURE

Parameters:

- A total volume of **6 liters** is required in order to conduct the necessary tests.
- Each auto sampler has a capacity of **12 liters** (Qty 24 - 500mL sample bottles).
- A typical overflow event lasts approximately **2 hours**.

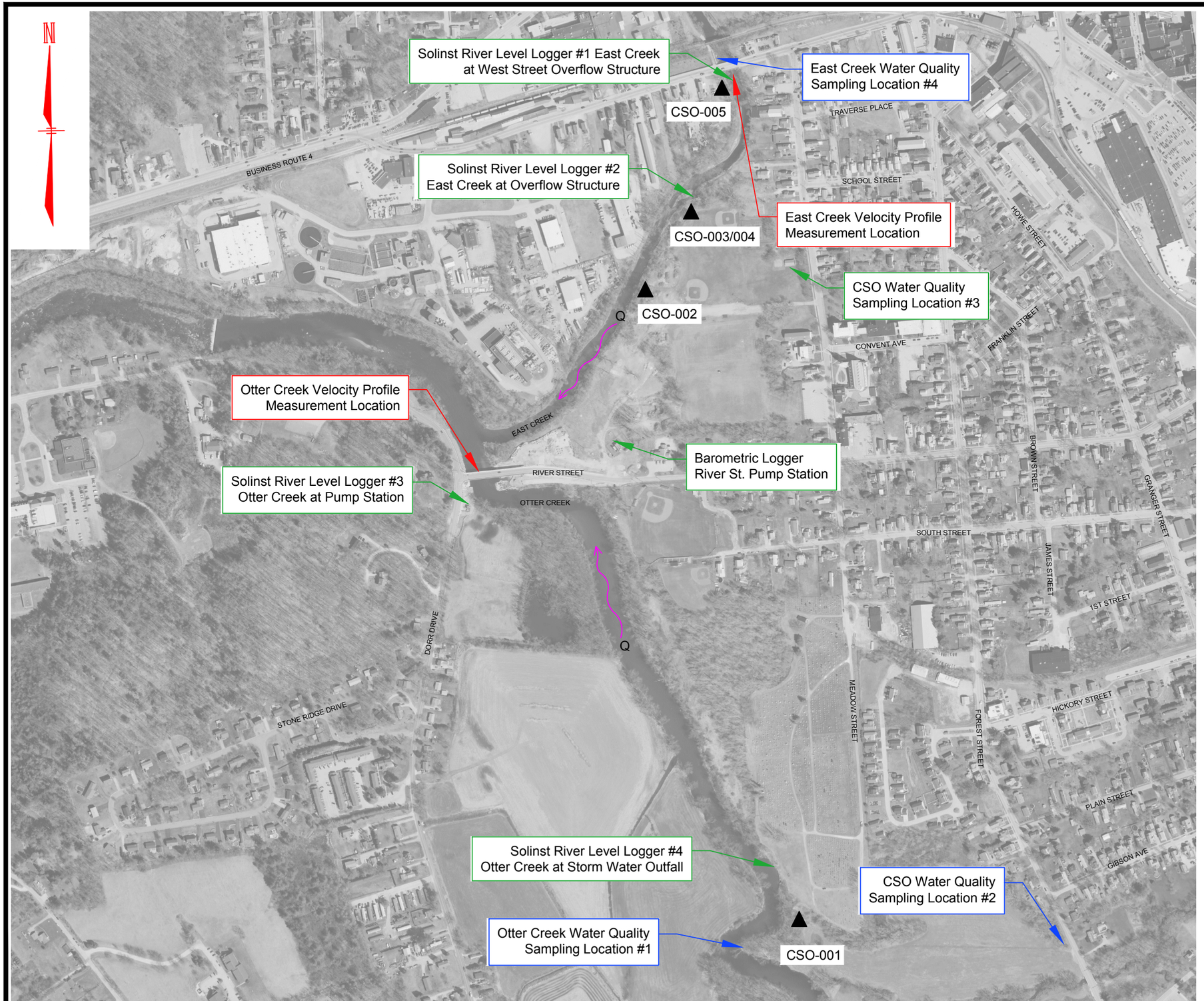
In order to capture a large enough sample, given the parameters, the procedure will be as follows:

- Utilize time-based composite sampling
- Set auto samplers to retrieve one **500 mL sample** every **15 minutes**, for **6 hours**. This provides the City with a 6 hour window to capture the typical 2 hour overflow event.
- Retrieve the samplers, identify the time/duration of the storm event, and utilize the **12 – 500ml** samples that closely correspond with the resulting overflow and increase in creek levels.
- The 12-500mL samples will generate one 6 liter composite sample, of which will be utilized for all of the required tests.

SAMPLING LOCATIONS

The following *sampling location numbers* shall correspond with the Rutland City Laboratory *sample numbers.* The four auto samplers and bottle carriers will be labeled accordingly.

- Sampling Location #1 - Otter Creek Interceptor at Billings Meadow
  Manhole A25-1 (Lew's monitoring manhole at Forest Street pull off)
- Sampling Location #2 - East Creek Interceptor at Meadow Street Park
  Manhole R1-3A (Lew's monitoring manhole)
- Sampling Location #3 - Otter Creek, south of CSO #001 (Calvary)
  On the eastern river bank adjacent to Billings Meadow
- Sampling Location #4 - East Creek, north of CSO #005 (West Street)
  On the western river bank, north of West Street, adjacent to the bike path



LEGEND:

- FLOW MEASUREMENTS (RIVER)
- WATER QUALITY SAMPLING LOCATION
- RIVER LEVEL GAUGING LOCATIONS
- ▲ OVERFLOW REGULATOR

NOTES:

1. WATER QUALITY SAMPLING LOCATION #1 REPRESENTS OTTER CREEK WATER QUALITY UPSTREAM OF THE CSOs.
2. WATER QUALITY SAMPLING LOCATION #2 REPRESENTS WATER QUALITY DURING A STORM EVENT IN THE SOUTHERN PORTION OF THE COLLECTION SYSTEM.
3. WATER QUALITY SAMPLING LOCATION #4 REPRESENTS EAST CREEK WATER QUALITY UPSTREAM OF THE CSOS.
4. WATER QUALITY SAMPLING LOCATION #3 REPRESENTS WATER QUALITY DURING A STORM EVENT IN THE NORTHERN PORTION OF THE COLLECTION SYSTEM.

0′ 500′ 1000′

GRAPHIC SCALE

FIGURE E-1

CITY OF RUTLAND, VERMONT
CSO LONG TERM CONTROL PLAN

WATER QUALITY SAMPLING
AND RIVER LEVEL GAUGING LOCATIONS

DESIGNED BY: EMG	CHECKED BY: MAS	DATE: FEBRUARY 2022

Weston & Sampson℠

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Table E-1

City of Rutland - CSO Sampling / Test Result Data

CSO Event Date: __5.26.2021__

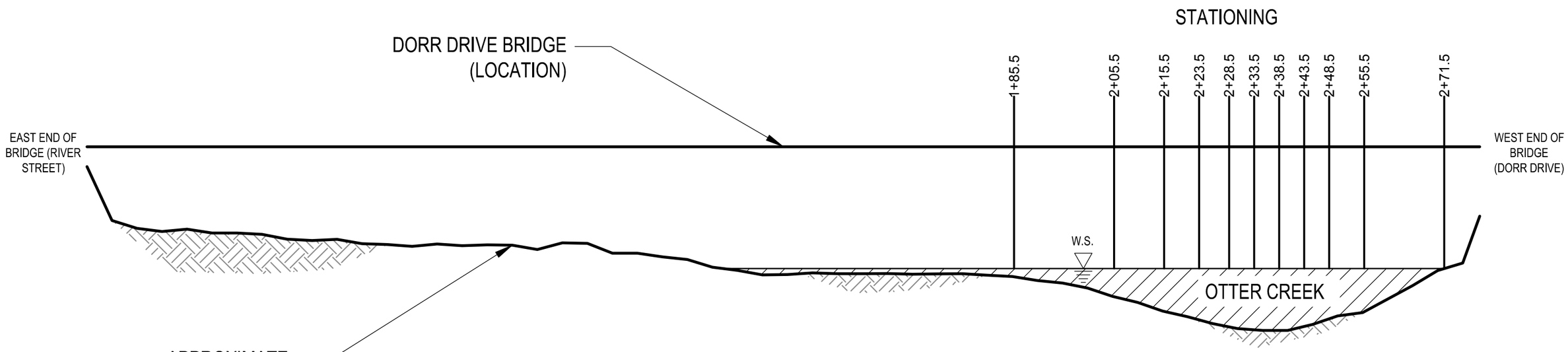
Sample Parameter	Sample Location # 1	Sample Location # 2	Sample Location # 3	Sample Location # 4
Indicator Bacteria (E.Coli)	14 CFUs / 100ml	84,000 CFUs / 100ml	131,000 CFUs / 100ml	279 CFUs / 100ml
Total Suspended Solids (TSS)	2.2 mg/L	742 mg/L	2,658 mg/L	2.4 mg/L
Biochem. Oxy. Demand (BOD)	< 3 mg/ L	220 mg/ L	760 mg/ L	8 mg/ L
Dissolved Oxygen	7.78 mg/L @ 17.8 Deg. C	1.37 mg/L @ 17.4 Deg. C	5.37 mg/L @ 19.0 Deg. C	8.55 mg/L @ 20.6 Deg. C
pH	7.36 @ 17.8 Deg. C	7.25 @ 18.0 Deg. C	7.20 @ 19.3 Deg. C	7.85 @ 20.5 Deg. C
Settleable Solids	0.1 ml / L	24 ml / L	Not Enough Sample	0.1 ml / L
Fats, Oils, Grease	< 2.0 mg/L	19.8 mg/L	Not Enough Sample	< 2.0 mg/L
Total Phosphorus	0.028 mg/L	2.8 mg/L	9.6 mg/L	0.035 mg/L
Total Nitrogen	0.56 mg/L	21.1 mg/L	Not Enough Sample	0.66 mg/L
Toxic Metals				
Arsenic	< 0.0010 mg/L	< 0.0010 mg/L	< 0.0080 mg/L	< 0.0010 mg/L
Barium	0.060 mg/L	< 0.020 mg/L	0.39 mg/L	< 0.020 mg/L
Cadmium	< 0.0005 mg/L	< 0.0005 mg/L	0.0007 mg/L	< 0.0005 mg/L
Chromium	< 0.005 mg/L	0.0053 mg/L	0.0438 mg/L	< 0.005 mg/L
Lead	< 0.0010 mg/L	0.0078 mg/L	0.0811 mg/L	< 0.0010 mg/L
Mercury	< 0.0002 mg/L	< 0.0002 mg/L	0.0005 mg/L	< 0.0002 mg/L
Selenium	< 0.0020 mg/L	< 0.0020 mg/L	< 0.0020 mg/L	< 0.0020 mg/L
Silver	< 0.010 mg/L	< 0.010 mg/L	< 0.010 mg/L	< 0.010 mg/L

Table E-2

City of Rutland - CSO Sampling / Test Result Data

CSO Event Date: __6.21.2021__

Sample Parameter	Sample Location # 1	Sample Location # 2	Sample Location # 3	Sample Location # 4
Indicator Bacteria (E.Coli)	564 CFUs / 100ml	4,320,000 CFUs / 100ml	10,910,000 CFUs / 100ml	986 CFUs / 100ml
Total Suspended Solids (TSS)	4.0 mg/L	4,657 mg/L	1,510 mg/L	31.0 mg/L
Biochem. Oxy. Demand (BOD)	< 3.0 mg/L	320 mg/L	100 mg/L	3 mg/L
COD	< 20 mg/L	860 mg/L	280 mg/L	< 20 mg/L
Dissolved Oxygen	8.24 mg/L	1.30 mg/L	4.72 mg/L	7.98 mg/L
pH	8.72	7.52	7.39	7.77
Settleable Solids	0.2 ml / L	19 ml / L	7 ml / L	0.2 ml / L
Fats, Oils, Grease	3 mg/L	20.1 mg/L	9.0 mg/L	2 mg/L
Total Phosphorus	0.017 mg/L	4.6 mg/L	1.7 mg/L	0.054 mg/L
Total Nitrogen	0.66 mg/L	32.1 mg/L	12.1 mg/L	0.76 mg/L
Toxic Metals				
Arsenic	< 0.0010 mg/L	0.0079 mg/L	0.0039 mg/L	< 0.0010 mg/L
Barium	0.020 mg/L	0.27 mg/L	0.17 mg/L	0.020 mg/L
Cadmium	< 0.0005 mg/L	< 0.0005 mg/L	< 0.0005 mg/L	< 0.0005 mg/L
Chromium	< 0.005 mg/L	0.0413 mg/L	0.017 mg/L	< 0.005 mg/L
Lead	< 0.0010 mg/L	0.131 mg/L	0.0989 mg/L	0.0010 mg/L
Mercury	< 0.0002 mg/L	0.0004 mg/L	< 0.0002 mg/L	< 0.0002 mg/L
Selenium	< 0.0020 mg/L	< 0.0020 mg/L	< 0.0020 mg/L	< 0.0020 mg/L
Silver	< 0.010 mg/L	< 0.010 mg/L	< 0.010 mg/L	< 0.010 mg/L



NOTES:
1. CROSS SECTION OF OTTER CREEK FACING SOUTH (UPSTREAM)
2. REFER TO DATA TABLES FOR DEPTHS AND VELOCITIES ON SPECIFIC DATES.
3. FIGURE DEPICTS MONITORING STATIONS FOR READINGS.

20 10 0 20 40
SCALE: 1"=20'

NO	DATE	BY	DESCRIPTION
-	-	-	-

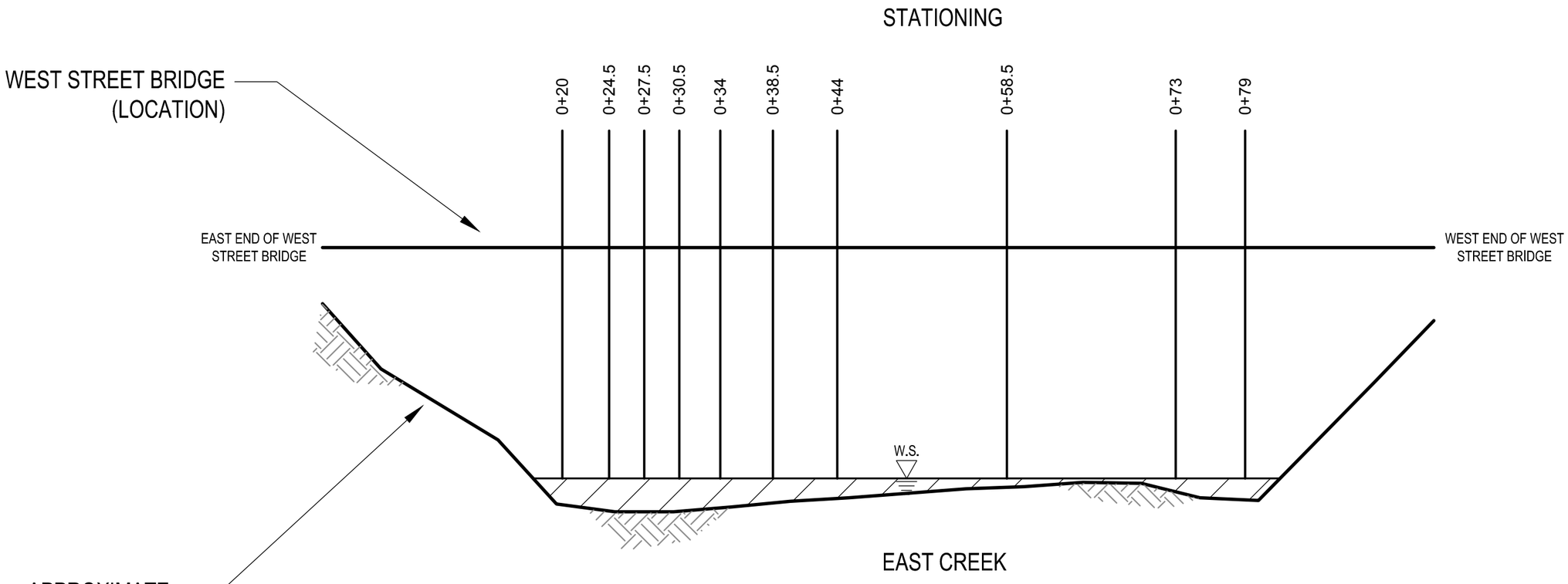
DRAWN BY: SMM | CHK'D BY: SMM | 11/10/20

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CSO LONG TERM CONTROL PLAN
RUTLAND, VERMONT

FIGURE E-2
OTTER CREEK CROSS-SECTION

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NOTES:
1. CROSS SECTION OF EAST CREEK FACING SOUTH (DOWNSTREAM)
2. REFER TO DATA TABLES FOR DEPTHS AND VELOCITIES ON SPECIFIC DATES.
3. FIGURE DEPICTS MONITORING STATIONS FOR READINGS.

10 5 0 10 20
SCALE: 1"=10'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: SMM	CHK'D BY: SMM	11/10/20

Weston & Sampson

CSO LONG TERM CONTROL PLAN
RUTLAND, VERMONT

FIGURE E-3
EAST CREEK CROSS-SECTION

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TABLE E-3

City of Rutland, Vermont

Stream Velocity Measurement - Stationing

WSE # ENG20-0228

Velocity meter to be posititioned at 0.6 times the depth of water at each station

Date of Measurement: 11.24.2020

East Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
0+20.0	1.54	0.93	1.18
0+24.5	2.17	1.30	2.62
0+27.5	2.67	1.60	0.57
0+30.5	2.08	1.25	2.20
0+34.0	2.25	1.35	3.08
0+38.5	1.58	0.95	3.08
0+44.0	1.17	0.70	1.94
0+58.5	0.33	0.20	0.72
0+73.0	0.25	0.15	0.20
0+79.0	0.96	0.58	0.43

Otter Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
2+05.5			
2+15.5			
2+23.5			
2+28.5			
2+33.5			
2+38.5			
2+43.5			
2+48.5			
2+55.5			
2+71.5			

Notes:

1 - stationing developed based on survey information provided by the City of Rutland

2 - station locations identified represent the midpoint of cross-sections that are no more than 10% of total stream cross sectional area

3 - velocity meter position based on the "six tenths depth method" in Discharge Measurements at Gaging Station, USGS T&M 3-A8

TABLE E-4

City of Rutland, Vermont

Stream Velocity Measurement - Stationing

WSE # ENG20-0228

Velocity meter to be posititioned at 0.6 times the depth of water at each station

Date of Measurement: 5.03.2021

East Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
0+20.0	1.58	0.95	1.44
0+24.5	2.92	1.75	0.02
0+27.5	2.92	1.75	0.98
0+30.5	2.25	1.35	3.97
0+34.0	2.79	1.68	4.46
0+38.5	1.67	1.00	3.67
0+44.0	1.13	0.68	3.35
0+58.5	0.50	0.30	1.41
0+73.0	0.50	0.30	0.52
0+79.0	1.00	0.60	0.46

Otter Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
1+85.5	4.00	2.40	0.95
2+05.5	8.33	5.00	1.31
2+15.5	12.33	7.40	0.98
2+23.5	13.50	8.10	1.38
2+28.5	15.42	9.25	1.41
2+33.5	15.83	9.50	1.48
2+38.5	15.83	9.50	1.28
2+43.5	16.67	10.00	1.41
2+48.5	14.00	8.40	1.38
2+55.5	9.71	5.83	1.57
2+71.5	2.17	1.30	0.98

Notes:

1 - stationing developed based on survey information provided by the City of Rutland

2 - station locations identified represent the midpoint of cross-sections that are no more than 10% of total stream cross sectional area

3 - velocity meter position based on the "six tenths depth method" in Discharge Measurements at Gaging Station, USGS T&M 3-A8

TABLE E-5

City of Rutland, Vermont

Stream Velocity Measurement - Stationing

WSE # ENG20-0228

Velocity meter to be posititioned at 0.6 times the depth of water at each station

Date of Measurement: 12.2.2020

East Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
0+20.0	0.00	0.00	0.00
0+24.5	0.00	0.00	0.00
0+27.5	0.00	0.00	0.00
0+30.5	0.00	0.00	0.00
0+34.0	0.00	0.00	0.00
0+38.5	0.00	0.00	0.00
0+44.0	0.00	0.00	0.00
0+58.5	0.00	0.00	0.00
0+73.0	0.00	0.00	0.00
0+79.0	0.00	0.00	0.00

Otter Creek			
Station	Total Depth (ft)	Depth of Velocity Meter (ft)	Velocity (ft/s)
1+85.5	3.17	1.90	0.46
2+05.5	7.50	4.50	0.98
2+15.5	10.83	6.50	1.08
2+23.5	12.50	7.50	0.98
2+28.5	13.33	8.00	0.92
2+33.5	14.58	8.75	1.03
2+38.5	15.00	9.00	1.07
2+43.5	13.92	8.35	0.82
2+48.5	13.17	7.90	0.90
2+55.5	8.75	5.25	0.95
2+71.5	1.50	0.90	0.54

Notes:

1 - stationing developed based on survey information provided by the City of Rutland

2 - station locations identified represent the midpoint of cross-sections that are no more than 10% of total stream cross sectional area

3 - velocity meter position based on the "six tenths depth method" in Discharge Measurements at Gaging Station, USGS T&M 3-A8

Levelogger Field Measurement

Levelogger 5 Ranges

Each model of Levelogger is rated for a specific submergence depth (Table 1). The choice of model largely depends on the accuracy of the water level required and the submergence depth. The selection, however, should be based on the maximum anticipated water level fluctuation.

Model	Submergence Depth	Accuracy
Barologger	Air only	± 0.05 kPa
M5	5 m (16.4 ft.)	± 0.3 cm (0.010 ft.)
M10	10 m (32.8 ft.)	± 0.5 cm (0.016 ft.)
M20	20 m (65.6 ft.)	± 1 cm (0.032 ft.)
M30	30 m (98.4 ft.)	± 1.5 cm (0.064 ft.)
M100	100 m (328.1 ft.)	± 5 cm (0.164 ft.)
M200	200 m (656.2 ft.)	± 10 cm (0.328 ft.)

Table 1 – Levelogger 5 Ranges

Measurement Fundamentals

Leveloggers **(L)** measure the total pressure acting on a transducer at their zero point/sensor. The total pressure is caused by the column of water lying above the Levelogger pressure sensor AND the barometric (atmospheric) pressure acting on the water surface. To compensate for barometric pressure fluctuations and get true height of water column measurements **(H)**, a Barologger **(B)** is required, i.e.:

Levelogger Reading (L) – Barologger Reading (B)
=
Height of Water Column (H)

Verifying Readings

The best recommendation is to compare barometrically compensated Levelogger data **(H)** with a manually measured depth to water level value **(d)** (using a Water Level Meter).

Tip: To adjust all readings in your Levelogger file to depth to water below a well casing **(d)**, record a manual water level measurement using a water level meter. This reading should correspond in date and time with an actual Levelogger recording. Use this as a reference datum in the Manual Data Adjustment option in the Levelogger Software Data Wizard.

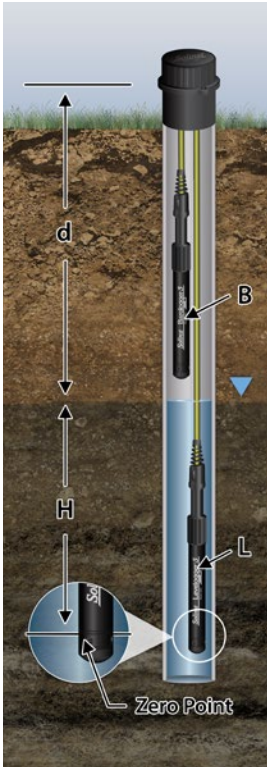
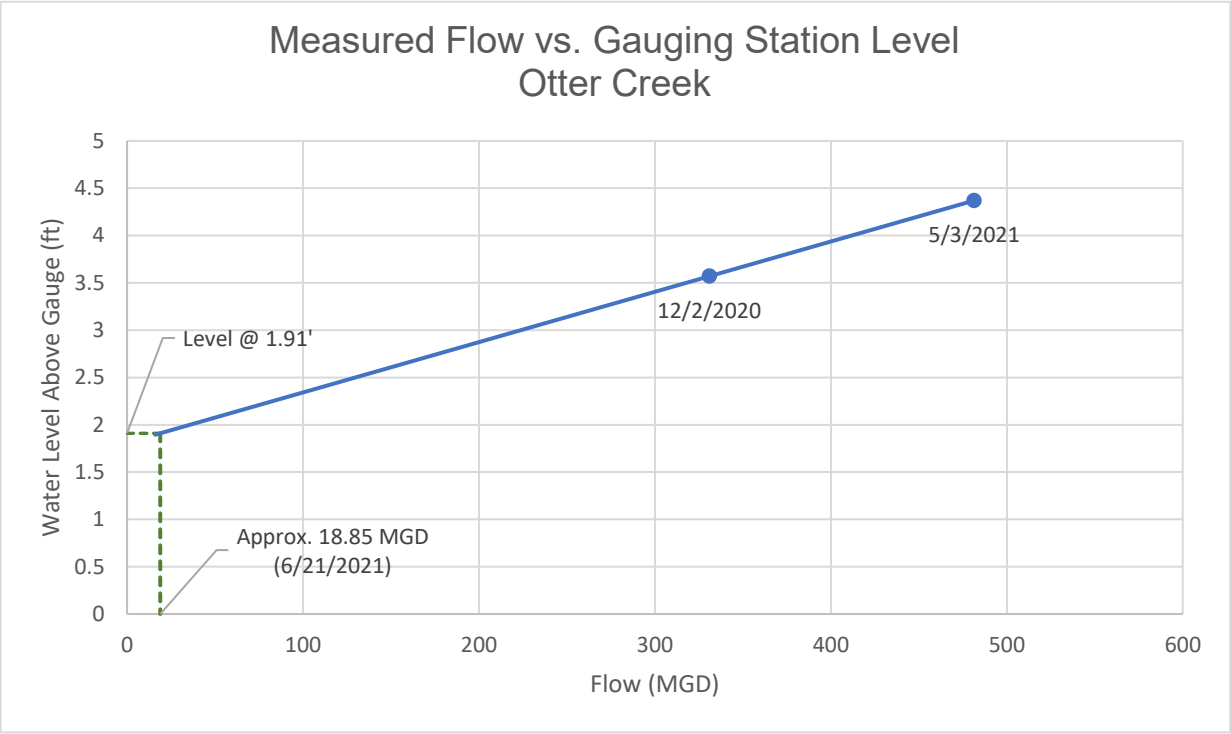


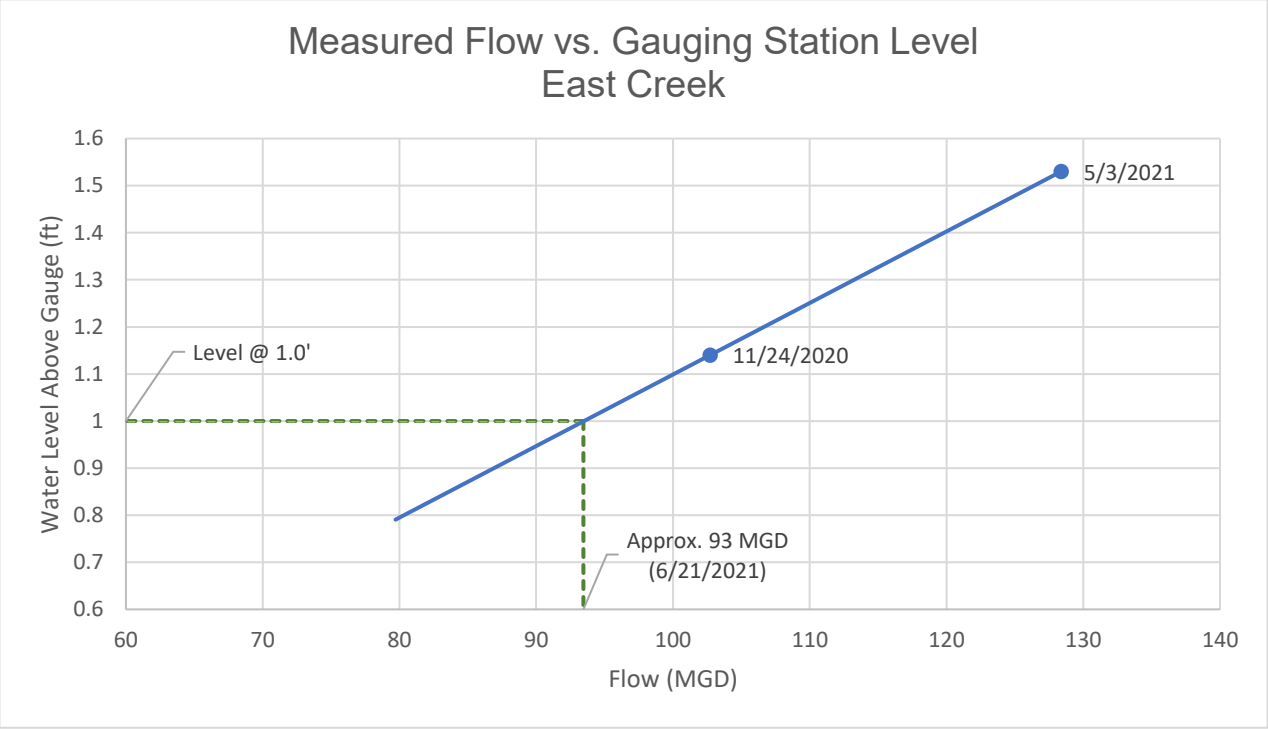
Figure E-5
CSO Long Term Contol Plan
Rutland, Vermont



Notes:

1. Level logger No. 3 was stolen. No data available.
2. Graph based on data from level logger No. 4, which was the only other gauging station on the Otter Creek, upstream of the location where velocity profiles were taken.
3. Velocity profiles were taken at this location on December 2, 2020 and May 3, 2021.
4. Refer to Figure E-1 for other gauging station locations.

Figure E-6
CSO Long Term Contol Plan
Rutland, Vermont



Notes:

1. Level logger No. 1 was used for this graph as it was located closest to where velocity profiles were taken for the East Creek.
2. Velocity profiles were taken at this location on November 24, 2020 and May 3, 2021.
4. Refer to Figure E-1 for other gauging station locations.

TABLE E-6

WET WEATHER COMBINED SEWER OVERFLOWS Reviewed by DEC Wastewater staff

	Start Date	End Date	Start/End Times	Municipality	Location	Waterbody	Nature of Incident	Estimated Volume (gallons)	Wastewater Treatment Facility	Contact Person	Submission Number	ID
View	2021-06-21	2021-06-21	06:30 pm to 09:04 pm	City of Rutland	CSO # 1 - Calvary Cemetery	Otter Creek	Authorized Wet Weather CSO Overflow	234,111 gallons	Rutland	James Rotondo, Interim Commissioner of Public Works	HP9-NNQC-FCYE1	5998
View	2021-06-21	2021-06-21	06:14 pm to 07:49 pm	City of Rutland	CSO # 2 - Home Plate, Ball Field	East Creek	Authorized Wet Weather CSO Overflow	387,787 gallons	Rutland	James Rotondo, Interim Commissioner of Public Works	HP9-NP01-DDRSC	5999
View	2021-06-21	2021-06-21	06:13 pm to 08:28 pm	City of Rutland	CSO # 3 - School Street & CSO # 4 - Meadow Street - Combined - Third Base, Ball	East Creek	Authorized Wet Weather CSO Overflow	250,704 gallons	Rutland	James Rotondo, Interim Commissioner of Public Works	HP9-NP4Y-S3BW3	6000
View	2021-06-21	2021-06-21	06:08 pm to 07:03 pm	City of Rutland	CSO # 5 - West Street Siphon	East Creek	Authorized Wet Weather CSO Overflow	38,332 gallons	Rutland	James Rotondo, Interim Commissioner of Public Works	HP9-NPAP-AE8XM	6002

Rutland, VT - CSO Long Term Control Plan

CSO Event Loading Calculation

CSO Event: June 21, 2021 - 6:00 PM to 9:00 PM

Sample Parameter	Otter Creek (upstream of regulators)	Otter Creek Interceptor	East Creek Interceptor	East Creek (upstream of regulators)	Otter Creek Background Loadings (lb/day)	Otter Creek Interceptor Loadings (total lb/this event)	Otter Creek Interceptor Loadings (total lb/this event)	East Creek Background Loadings (lb/day)	Otter Creek Loading Increase (%)	East Creek Loading Increase (%)	
Indicator Bacteria (E.Coli)	564 CFUs / 100ml	4,320,000 CFUs / 100ml	10,910,000 CFUs / 100ml	986 CFUs / 100ml					821.6	7993.7	(5)
TSS (mg/L)	4	4,657	1,510	31	7,272	9,093	8,524	24,044	125.0	35.4	
BOD (mg/L)	3	320	100	3	5,454	625	564	2,327	11.5	24.3	
COD (mg/L)	20	860	280	20	36,362	1,679	1,581	15,512	4.6	10.2	
DO (mg/L)	8.24	1.3	4.72	7.98	14,981	3	27	6,189	0.0	0.4	
pH (su)	8.72	7.52	7.39	7.77							
Settleable Solids (mg/L)	200	19,000	7,000	200	363,624	37,097	39,513	155,124	10.2	25.5	
FOG (mg/L)	3	20.1	9	2	5,454	39	51	1,551	0.7	3.3	
Total P (mg/L)	0.017	4.6	1.7	0.054	31	9	10	42	29.1	22.9	
Total N (mg/L)	0.66	32.1	12.1	0.76	1,200	63	68	589	5.2	11.6	
Toxic Metals:											
Arsenic (mg/L)	0.001	0.0079	0.0039	0.001	1.82	0.02	0.02	0.78	0.8	2.8	
Barium (mg/L)	0.02	0.27	0.17	0.02	36.36	0.53	0.96	15.51	1.4	6.2	
Cadmium (mg/L)	0.0005	0.0005	0.0005	0.0005	0.91	0.00	0.00	0.39	0.1	0.7	
Chromium (mg/L)	0.005	0.0413	0.017	0.005	9.09	0.08	0.10	3.88	0.9	2.5	
Lead (mg/L)	0.001	0.131	0.0989	0.001	1.82	0.26	0.56	0.78	14.1	72.0	
Mercury (mg/L)	0.0002	0.0004	0.0002	0.0002	0.36	0.00	0.00	0.16	0.2	0.7	
Selenium (mgL)	0.002	0.002	0.002	0.002	3.64	0.00	0.01	1.55	0.1	0.7	
Silver (mg/L)	0.01	0.01	0.01	0.01	18.18	0.02	0.06	7.76	0.1	0.7	

Reported Overflows	Total Gallons Reported	Surface Water Affected	Otter Creek Discharge Event Total Gal.	East Creek Discharge Event Total Gal.
CSO OO1	234,111	Otter Creek	234,111	676,823
CSO OO2	387,787	East Creek		
CSO OO3 & 004	250,704	East Creek		
CSO OO5	38,332	East Creek		

Approximated Flows	MGD
Otter Creek (1)	218
East Creek	93

Notes: 1 - Otter Creek Flow based on average measured stream flows during the overflow event at the USGS City Center gauging station (USGS No. 04282000).
Since gauging station is downstream of Otter/East Creek confluence, East Creek flow was subtracted to determine Otter Creek flow upstream of confluence.
2 - Background Loadings for both streams were measured on the actual date of the overflow event. These were time-based composites.
3 - Combined Sewage Loadings for both interceptors were measured on the actual date of the overflow event. These were time -ased composites.
4 - pH of the combined sewage and surface waters (upstream of the CSO discharge locations) was not appreciably different.
5 - Used dilution calculation to determine % increase in number of colonies (CFUs/100 ml) downstream of the overflows.

APPENDIX F

City Wastewater Financial Data

City of Rutland

Water & Sewer Rate Studies

FY2022

December, 2020

CITY OF RUTLAND

Department of Public Works

RUTLAND, VERMONT

FY2022 WATER AND SEWER RATE STUDY

Transmittal Letter.....1

City/Town Metered Water Use History.....3

Effect of Proposed Rates.....4

Water Revenue/Expense Chart.....5

Wastewater Treatment Revenue/Expense Chart.....6

Wastewater Collection Revenue/Expense Chart.....7

Water Fund Rate Study.....8

Sewer Fund Wastewater Treatment Rate Study.....20

Sewer Fund Wastewater Collection Rate Study.....32

CITY OF RUTLAND
Department of Public Works
RUTLAND, VERMONT

City Hall – 52 Washington St. – Rutland, VT 05701
Mailing Address: P. O. Box 969 – Rutland, VT 05702
Phone: 802-773-1813 Fax: 802-775-3947

Jeff Wennberg
Commissioner

Jim Rotondo, P.E.
City Engineer

December 2, 2020

TO: Rutland City Board of Aldermen
FROM: Jeff Wennberg, Commissioner of Public Works

Water and Sewer Rate Study for FY2022

Major work on almost every aspect of your water and sewer infrastructure moved forward in FY2020 despite the COVID-19 pandemic and the financial challenges it caused. Wastewater improvement bonds approved in March, 2019, funded the next phase of the northwest neighborhood sewer separation project (to reduce combined sewer overflows), the renovation of anaerobic digesters at the treatment plant, and the replacement of a failing sewer main. The Advanced Metering Infrastructure (AMI) upgrade to our water metering and billing systems continued despite the collapse of our initial vendor, Fathom. All of these projects will have significant impacts on water and sewer rates in FY2022.

The Water Fund is in good shape. Last year we increased set-asides for capital investments in treatment and distribution thanks to a windfall from retiring the refunding bond debt. This year we have reduced the appropriation for capital reserves significantly to allow a water rate reduction of 11.6%. In addition, the new AMI metering system is saving us over $110,000 in expenses compared to the current year. This is all needed to offset a major increase in the sewer fund.

The Sewer Fund is a different story. While operating budgets are essentially level funded, the bond principal and interest payments for the wastewater projects (Force Main, NNSSP 1A, Digesters) will hit sewer rates in FY22. In addition we have to replace the Vactor sewer flusher truck ($400,000) through a 7-year lease-purchase. These two items require a 5.7% increase in WWT and a 27.9% increase in WWC.

Overall, the Water Fund savings nearly offset the Sewer Fund increases. The proposed overall Water-Sewer bill for the average 1,200 cubic foot per quarter home would increase $2.79 per quarter or less than 1.8% (table on page 4).

AMI Meter Upgrade Project

In mid-November 2019, the City was informed that our Advanced Metering Infrastructure contractor, Fathom, was dissolving. This forced this department to quickly replace all of the functions performed by Fathom and complete the installation of millions of dollars of new hardware and get it operational. This required negotiating new contracts with multiple vendors and making all of that technology work together. Notwithstanding the global pandemic, this is essentially done. As of the end of 2020, we have replaced or upgraded over 6,000 meters. The remaining 200 or so are mostly within the Alpine Pipeline system or larger meters at commercial businesses.

Over 90% of our meters are communicating through the AMI network. This enables these customers to access all the capabilities we have sought to provide from the project's inception. It also provides enormous benefits to our utility billing and customer support in the Business Office. For example, before AMI it took about 6 weeks to read all 6,300 meters in our system. As of November 2020, we were able to read about 5,800 meters in a few minutes and the balance in less than 4 days. When finished, we will be able to read all the meters in about 2 days.

Over 40% of all of our customers have registered on the WaterSmart Portal, giving them access to their near-real-time water use information. In the last 3 months of 2020, 958 customers have been alerted that they

probably have a water leak, and customer feedback has been universally positive in response to the leak alerts.

Water

Water Treatment Plant expenditures will be lower in FY22 in large part due to the reduced demand for water and the resulting savings on chemicals. We have substantial chemical storage capacity at the plant, and the reduced demand now allows us to purchase fluoride and zinc orthophosphate every other year. FY22 is a year in which we need to purchase neither, saving over $50,000 compared to FY21. This is of course a temporary savings, as these chemicals will need to be budgeted again in FY23.

Water Distribution is essentially level-funded, with the increase a result of increased costs for health insurance and related payroll expenses. As mentioned above, Water Meters shows a savings of about $100,000, entirely the result of lowered operating costs associated with the AMI metering project.

Appropriations for capital reserves are also being trimmed from $400,000 to $100,000. The Water Fund has a healthy fund balance, even after the losses suffered as a result of the economic toll taken by the COVID-19 pandemic.

COVID-19

The Charts on Page 3 show annual metered water use from FY10 through FY22 (projected). In the COVID year of FY20, Rutland City water use dropped by 3.6 million cubic feet or about 27 million gallons compared to the prior year. The loss was even greater in Rutland Town – 28.5 million gallons. Nearly all of the water and sewer utility customers in Rutland Town are commercial customers, and when factories, hotels, restaurants and retail stores are closed water and sewer demand stops.

These losses could be only partially offset by spending cuts over half-way through the year, so all water and sewer accounts ended the year in deficit. Fund balances, built up over prior years, absorbed these losses. Fortunately, water demand had improved by the beginning of FY21.

Wastewater Treatment

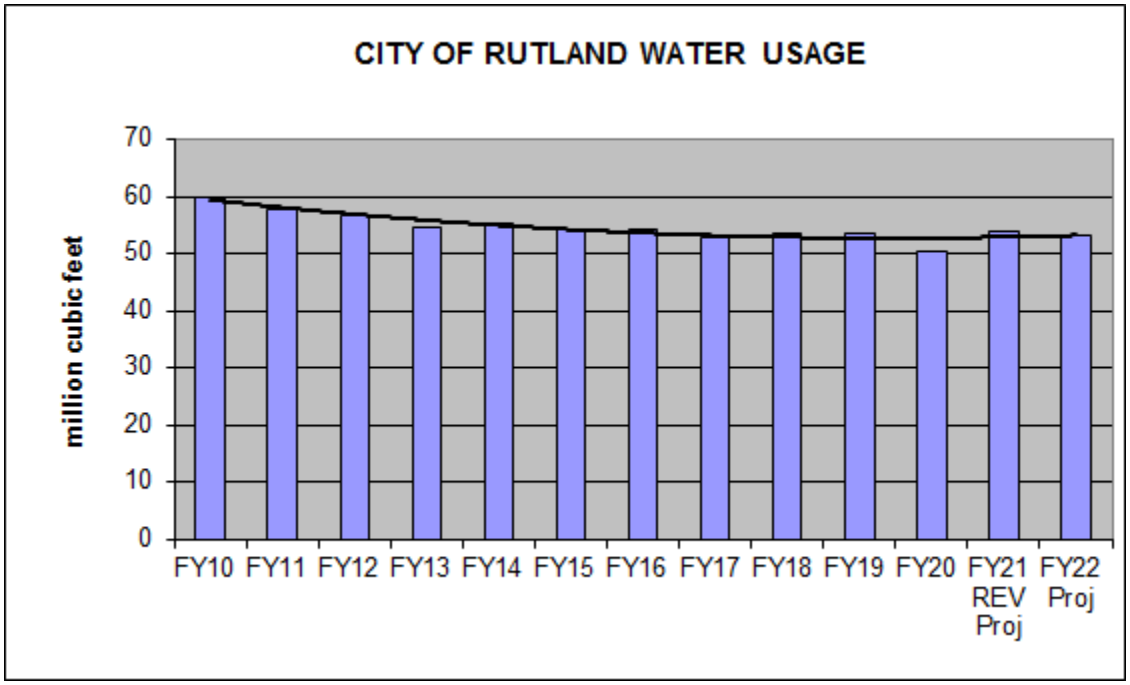
Proposed operating expenditures in Wastewater Treatment are down from FY21 due to sludge disposal and fuel oil savings from the expected completion of the Digester Rehabilitation bond project. However, that bond and the one for the replacement force main, approved in March 2019, will be added to debt expenses in FY22. Overall, Wastewater Treatment expenses are up slightly over FY21. As a result of this, coupled with a small projected decrease in demand due to COVID-19, we project the need for a rate increase of 5.7% to keep the fund in balance.

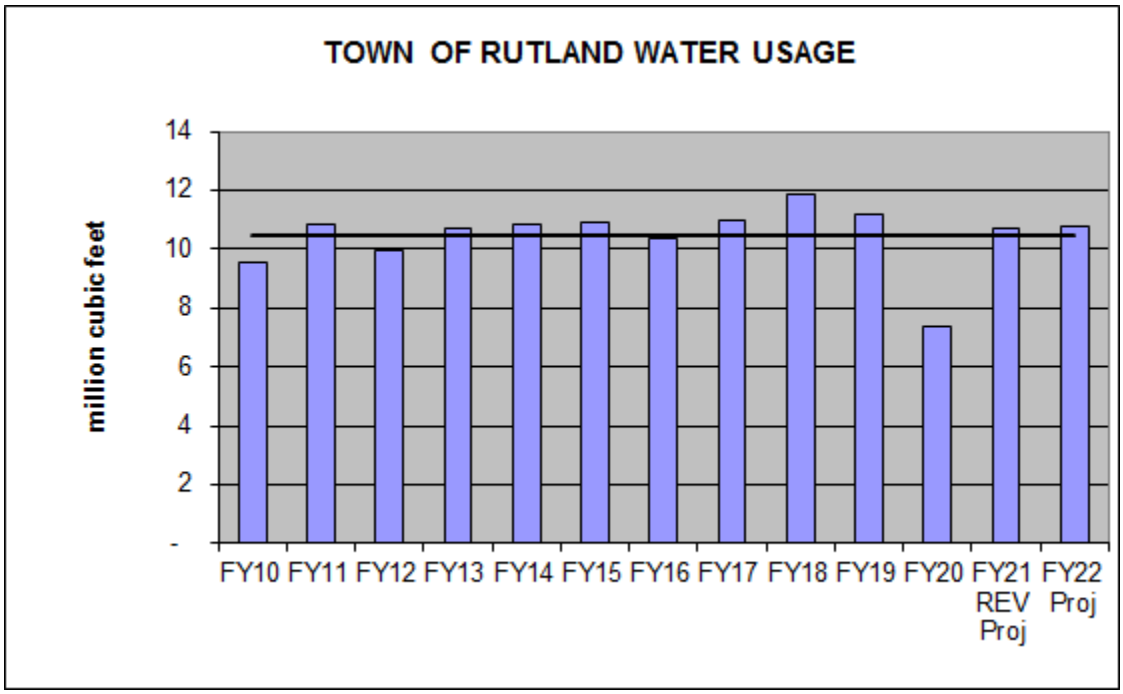
Wastewater Collection

Wastewater Collection expenses are up over $200,000 from FY21. This is largely due to 1) debt principal and interest payments for the recently completed new phase of the Northwest Neighborhood Sewer Separation Project; and, 2) the need to lease a replacement for the 15 year old sewer flusher Vactor truck. Because this is a very small budget to begin with, this requires a 28% rate increase. The chart on page 7 shows the relative impact of the new debt service on the wastewater collections budget.

Rates

The table on Page 4 shows the overall impact of the recommended rate changes on a typical 1,200 cubic foot per quarter (two-person) household, and one twice that size. The typical two-person family would see an overall 1.79% increase in combined water-sewer costs, or $2.79 per quarter. The four-person family would see an increase of $5.59 per quarter.


CITY OF RUTLAND WATER USAGE
million cubic feet
70
60
50
40
30
20
10
0
FY10 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20 FY21 REV Proj FY22 Proj


TOWN OF RUTLAND WATER USAGE
million cubic feet
14
12
10
8
6
4
2
-
FY10 FY11 FY12 FY13 FY14 FY15 FY16 FY17 FY18 FY19 FY20 FY21 REV Proj FY22 Proj

COMBINED PROPOSED RATE CHANGES EFFECT ON TYPICAL CITY HOUSEHOLDS
Fiscal Year 2021-2022

1200 ft^3 per quarter

Existing	**FY 2021**		City Rate	Quarterly Billing		Monthly	
	Water		$3.359	$40.31		$13.44	
1200 cft per quarter =	Sewer Treatment		$4.406	$52.87		$17.62	
100 gallons per day	Sewer Maintenance		$1.344	$16.13		$5.38	
	Water Service Fee			$29.05		$9.68	
	Sewer Service Fee			$17.55		$5.85	
				$155.91		$51.97	
Proposed	**FY 2022**	Increase	City Rate	Quarterly Billing	**Qtrly Increase**	Monthly	Mo. Increase
	Water	-11.64%	$2.968	$35.61	**-$4.69**	$11.87	-$1.56
1200 cft per quarter =	Sewer Treatment	5.66%	$4.655	$55.86	**$2.99**	$18.62	$1.00
100 gallons per day	Sewer Maintenance	27.88%	$1.719	$20.63	**$4.50**	$6.88	$1.50
	Water Service Fee	0.00%		$29.05	**$0.00**	$9.68	$0.00
	Sewer Service Fee	0.00%		$17.55	**$0.00**	$5.85	$0.00
				$158.70	**$2.79**	$52.90	$0.93

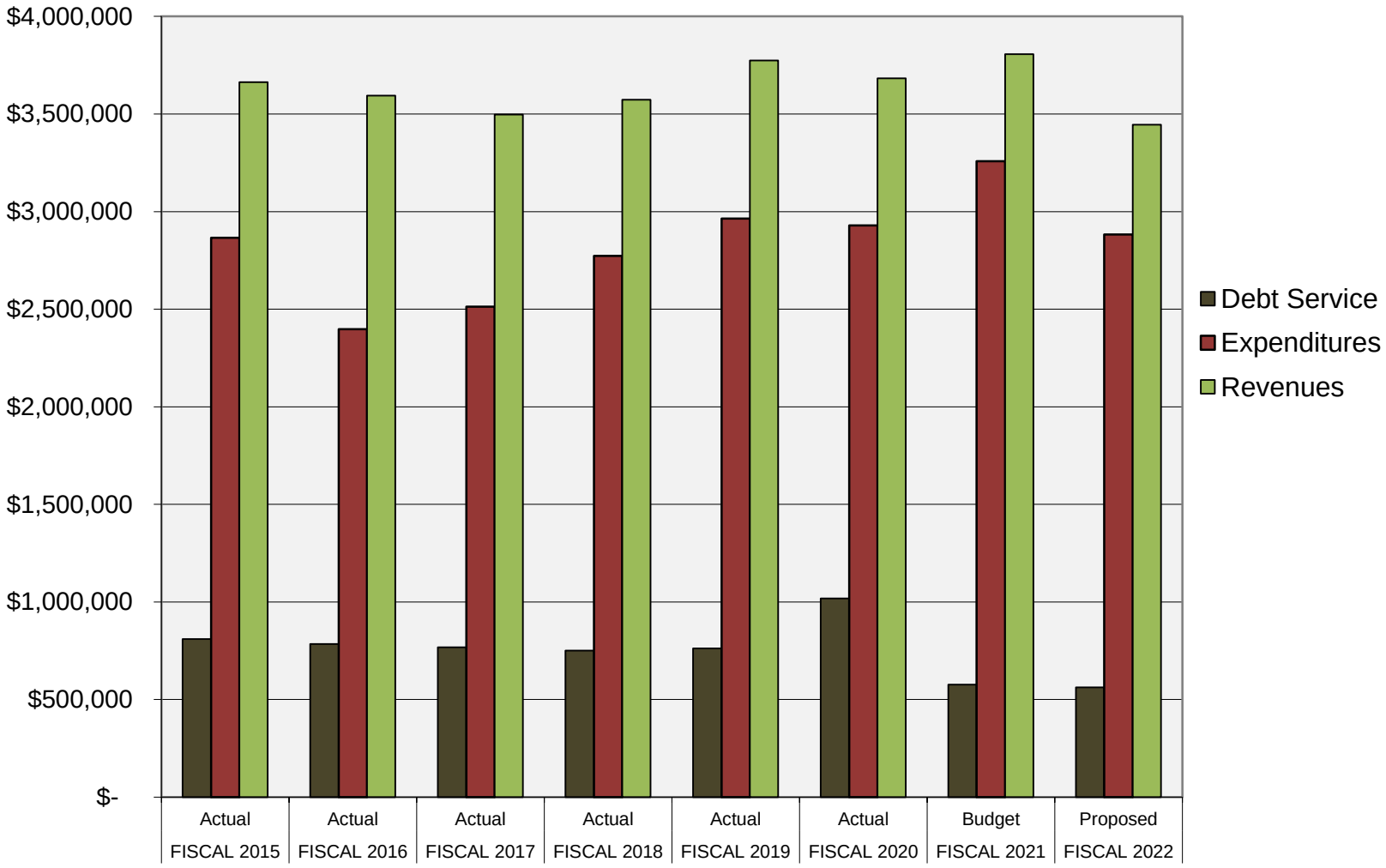
2400 ft^3 per quarter

Existing	**FY 2021**	Increase	City Rate	Quarterly Billing		Monthly	
	Water	0.00%	$3.359	$80.62		$26.87	
2400 cft per quarter =	Sewer Treatment	0.00%	$4.406	$105.74		$35.25	
199 gallons per day	Sewer Maintenance	0.00%	$1.344	$32.26		$10.75	
	Water Service Fee			$29.05		$9.68	
	Sewer Service Fee			$17.55		$5.85	
				$265.22		$88.41	
Proposed	**FY 2022**	Increase	City Rate	Quarterly Billing	**Qtrly Increase**	Monthly	Mo. Increase
	Water	-11.64%	$2.968	$71.23	**-$9.39**	$23.74	-$3.13
2400 cft per quarter =	Sewer Treatment	5.66%	$4.655	$111.73	**$5.98**	$37.24	$1.99
199 gallons per day	Sewer Maintenance	27.88%	$1.719	$41.25	**$8.99**	$13.75	$3.00
	Water Service Fee	0.00%		$29.05	**$0.00**	$9.68	$0.00
	Sewer Service Fee	0.00%		$17.55	**$0.00**	$5.85	$0.00
				$270.81	**$5.59**	$90.27	$1.86

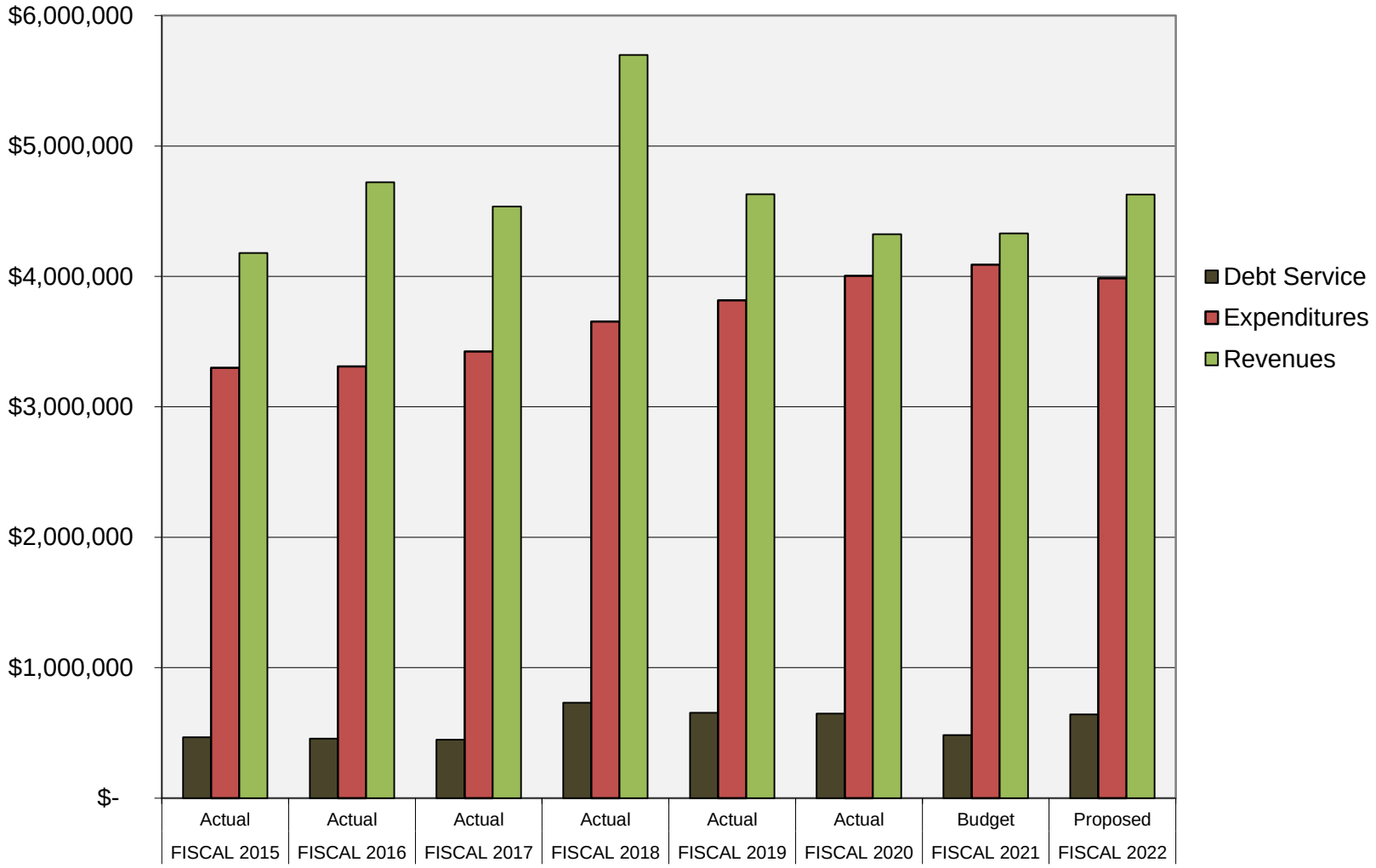
The gross percent increase for 1200 ft^3 per quarter: 1.79%

The gross percent increase for 2400 ft^3 per quarter: 2.11%

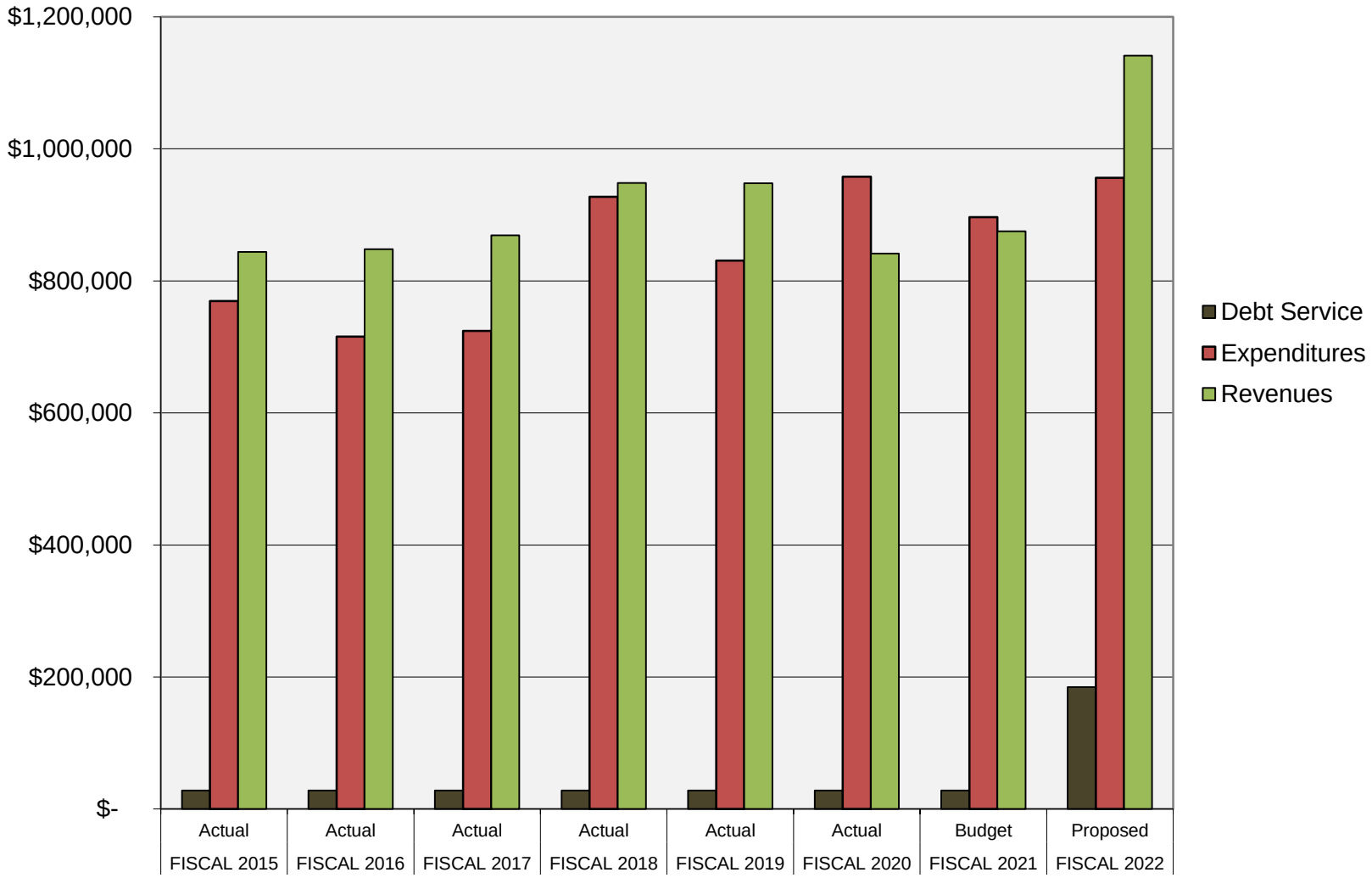
Water Revenues and Expenses



Wastewater Treatment Revenues and Expenses



Wastewater Collection Revenues and Expenses



WATER FUND

SUMMARY OF WATER RATE STUDY - FISCAL 2022

WATER RATES	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
Rates per 100 cft (748 gallons):								
Rutland City Water Rates	$ 3.397	$ 3.397	$ 3.397	$ 3.261	$ 3.359	$ 3.359	$ 3.359	$ 2.968
Rutland Town Water Rates	$ 4.528	$ 4.528	$ 4.528	$ 4.348	$ 4.477	$ 4.478	$ 4.478	$ 3.956
Rates per sq ft of Sprinklered area:								
Rutland City Stand by Water	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435
Rutland Town Stand by Water	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148
Service Fee (Quarterly)	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050
RATE CHANGE	**4.80%**	**0.00%**	**0.00%**	**-4.00%**	**3.00%**	**0.00%**	**0.00%**	**-11.64%**
REVENUES								
Billed at Rates	$ 3,506,475	$ 3,478,912	$ 3,436,382	$ 3,428,974	$ 3,540,489	$ 3,329,709	$ 3,449,190	$ 3,165,923
Non Rates	$ 157,036	$ 114,966	$ 61,260	$ 143,889	$ 155,095	$ 58,289	$ 58,562	$ 66,544
Transfer from Sewer - SAS Meters	$ -	$ -	$ -	$ -	$ 78,565	$ 294,474	$ 299,324	$ 212,793
Year End Adjustment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenues	**$ 3,663,510**	**$ 3,593,878**	**$ 3,497,642**	**$ 3,572,863**	**$ 3,774,149**	**$ 3,682,473**	**$ 3,807,075**	**$ 3,445,261**
EXPENDITURES								
Operational Budget	$ 1,647,333	$ 1,409,915	$ 1,485,918	$ 1,723,377	$ 1,823,598	$ 1,787,437	$ 1,937,504	$ 1,833,213
Capital Planning	$ 595,430	$ 327,500	$ 347,500	$ 340,000	$ 375,000	$ 375,000	$ 570,000	$ 270,000
Transfers to DPW	$ 456,544	$ 461,278	$ 479,206	$ 496,236	$ 538,701	$ 541,699	$ 523,715	$ 542,010
Transfers to General Fund	$ 166,526	$ 198,761	$ 199,569	$ 213,476	$ 227,382	$ 224,636	$ 227,446	$ 237,576
Prior Year Adjustments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Principal & Interest	$ 810,070	$ 784,372	$ 767,308	$ 750,535	$ 762,211	$ 1,017,619	$ 575,658	$ 562,462
Total Expenditures	**$ 3,675,904**	**$ 3,181,826**	**$ 3,279,501**	**$ 3,523,624**	**$ 3,726,892**	**$ 3,946,390**	**$ 3,834,322**	**$ 3,445,261**
Net of Revenue vs. Expenditures	**$ (12,394)**	**$ 412,052**	**$ 218,141**	**$ 49,239**	**$ 47,257**	**$ (263,918)**	**$ (27,247)**	**$ -**
PERCENT OF TOTAL EXPENDITURES								
Operational Budget	44.8%	44.3%	45.3%	48.9%	48.9%	45.3%	50.5%	53.2%
Capital Planning	16.2%	10.3%	10.6%	9.6%	10.1%	9.5%	14.9%	7.8%
Transfers to DPW	12.4%	14.5%	14.6%	14.1%	14.5%	13.7%	13.7%	15.7%
Transfers to General Fund	4.5%	6.2%	6.1%	6.1%	6.1%	5.7%	5.9%	6.9%
Debt Principal & Interest	22.0%	24.7%	23.4%	21.3%	20.5%	25.8%	15.0%	16.3%

WATER SUMMARY

WATER - RATE REVENUE BY USER CLASS

RATE REVENUE	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
RUTLAND CITY								
METERED USAGE	$ 1,850,652	$ 1,850,250	$ 1,784,112	$ 1,761,627	$ 1,849,272	$ 2,085,078	$ 1,811,936	$ 1,583,427
SERVICE FEE	$ 651,882	$ 650,023	$ 649,819	$ 650,197	$ 676,574	$ 806,161	$ 655,833	$ 655,833
Total Metered	**$ 2,502,534**	**$ 2,500,272**	**$ 2,433,932**	**$ 2,411,824**	**$ 2,525,846**	**$ 2,891,238**	**$ 2,467,769**	**$ 2,239,260**
City Flat Rate	**$ 38,571**	**$ 36,465**	**$ 38,298**	**$ 28,565**	**$ 27,700**	**$ -**	**$ 38,001**	**$ 38,000**
Stand by Water	**$ 155,053**	**$ 154,158**	**$ 155,763**	**$ 159,255**	**$ 161,016**	**$ -**	**$ 160,000**	**$ 160,000**
Total Rutland City	**$ 2,696,158**	**$ 2,690,895**	**$ 2,627,992**	**$ 2,599,644**	**$ 2,714,562**	**$ 2,891,238**	**$ 2,665,770**	**$ 2,437,260**
RUTLAND TOWN								
METERED USAGE	$ 493,028	$ 470,844	$ 492,607	$ 519,637	$ 523,784	$ 405,446	$ 479,737	$ 424,980
SERVICE FEE	$ 25,622	$ 25,506	$ 25,738	$ 25,796	$ 19,039	$ 33,024	$ 20,684	$ 20,684
Total Metered	**$ 518,650**	**$ 496,350**	**$ 518,346**	**$ 545,433**	**$ 542,823**	**$ 438,471**	**$ 500,420**	**$ 445,663**
Stand by Water	**$ 291,666**	**$ 291,666**	**$ 290,045**	**$ 283,896**	**$ 283,104**	**$ -**	**$ 283,000**	**$ 283,000**
Total Rutland Town	**$ 810,316**	**$ 788,017**	**$ 808,390**	**$ 829,330**	**$ 825,927**	**$ 438,471**	**$ 783,420**	**$ 728,663**
TOTAL REVENUE BY RATES	**$ 3,506,475**	**$ 3,478,912**	**$ 3,436,382**	**$ 3,428,974**	**$ 3,540,489**	**$ 3,329,709**	**$ 3,449,190**	**$ 3,165,923**

PERCENT OF RATE REVENUE

RUTLAND CITY	76.9%	77.3%	76.5%	75.8%	76.7%	86.8%	77.3%	77.0%
RUTLAND TOWN	23.1%	22.7%	23.5%	24.2%	23.3%	13.2%	22.7%	23.0%

WATER RATE REVENUE

WATER - NON RATE REVENUE

NON RATE REVENUE	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
600-6-30-00								
319.002 Interest On DLQ	$ 17,989	$ 18,991	$ 19,849	$ 16,338	$ 16,162	$ 30,458	$ 24,242	$ 30,458
319.003 5% Past Due [1.5% FY2020]	$ 20,984	$ 21,047	$ 19,964	$ 16,884	$ 15,402	$ 6,386	$ 4,620	$ 6,386
321.001 Water Permits	$ 2,110	$ 2,030	$ 1,880	$ 1,900	$ 2,015	$ 900	$ 2,000	$ 2,000
334.000 State Grants	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
340.000 Charges for Services	$ 2,540	$ 1,620	$ -	$ 788	$ -	$ -	$ 1,000	$ 1,000
344.006 Water Repairs	$ 31,951	$ 22,776	$ 588	$ 16,359	$ 5,569	$ 9,760	$ 16,000	$ 16,000
344.007 Water Testing	$ 10,783	$ 14,560	$ 15,500	$ 14,140	$ 8,950	$ -	$ -	$ -
344.008 Monitoring Well*	$ 1,000	$ 500	$ 500	$ 21,538	$ 500	$ 500	$ 500	$ 500
344.009 Hydrant Maint. Services	$ 5,150	$ 5,200	$ 5,150	$ 5,150	$ 5,250	$ 4,850	$ 5,200	$ 5,200
362.009 Misc Rents	$ 1,200	$ 900	$ 3,600	$ 3,300	$ 3,900	$ 3,600	$ 2,000	$ 2,000
390.002 Previous Year Reimburse	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
390.001 Other Revenue - Misc	$ 3,163	$ 27,343	$ 10,600	$ 11,658	$ 25,649	$ 1,835	$ 3,000	$ 3,000
392.000 Sale Capital Asset	$ -	$ -	$ (16,372)	$ -	$ -	$ -	$ -	$ -
392.001 Timber Sales	$ 60,166	$ -	$ -	$ 35,835	$ 71,699	$ -	$ -	$ -
392.002 Compensation For Loss								
TOTAL NON-RATE REVENUES	**$ 157,036**	**$ 114,966**	**$ 61,260**	**$ 143,889**	**$ 155,095**	**$ 58,289**	**$ 58,562**	**$ 66,544**

* Monitor well revenue more appropriate to be included in General Fund

WATER - USAGE AND CUSTOMER BASE

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
METERED USAGE (100 cuft)								
RUTLAND CITY	544,408	544,715	529,380	536,294	534,907	504,544	539,427	533,523
RUTLAND TOWN	108,873	103,985	109,736	118,565	111,809	73,600	107,143	107,422
TOTAL ANNUAL USAGE Usage is in 100's of Cubic Feet	**653,281**	**648,700**	**639,116**	**654,858**	**646,716**	**578,144**	**646,570**	**640,945**
ANNUAL USAGE CHANGE	**-1.4%**	**-0.7%**	**-1.5%**	**2.5%**	**-1.2%**	**-10.6%**	**11.8%**	**-0.9%**
Change in Use Since FY 2008	**-14.0%**	**-14.6%**	**-15.8%**	**-13.8%**	**-14.8%**	**-23.9%**	**-14.9%**	**-15.6%**
CUSTOMER BASE								
RUTLAND CITY	5,630	5,630	5,600	5,615	5,604	5,639	5,644	5,644
FLAT RATE (NO METER)	45	45	53	42	42	42	153	153
RUTLAND TOWN	223	223	229	229	231	231	178	178
TOTAL BILLED ACCOUNTS	**5,898**	**5,898**	**5,882**	**5,886**	**5,877**	**5,912**	**5,975**	**5,975**

WATER USAGE AND CUSTOMERS

WATER TREATMENT - OPERATIONAL BUDGET

WATER TREATMENT	FISCAL 2015	FISCAL 2016	FISCAL 2017	FISCAL 2018	FISCAL 2019	FISCAL 2020	FISCAL 2021	FISCAL 2022
600-7-32-00	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
600-7-32-00-110.000 Salaries	$ 125,178	$ 130,621	$ 133,659	$ 140,388	$ 140,149	$ 142,231	$ 140,483	$ 143,164
600-7-32-00-114.000 Comp Cashed	$ 1,298	$ 407	$ 1,534	$ 377	$ -	$ -	$ -	$ -
600-7-32-00-120.000 Seasonal Employee	$ 5,555	$ 3,914	$ 8,461	$ 9,224	$ 9,595	$ 6,444	$ 11,000	$ 11,000
600-7-32-00-120.001 Temp Emp - Storm Recov	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-32-00-130.000 Overtime	$ 25,339	$ 23,117	$ 24,683	$ 24,431	$ 28,381	$ 29,129	$ 25,000	$ 25,000
600-7-32-00-210.000 Health Insurance	$ 24,264	$ 26,842	$ 26,893	$ 22,698	$ 18,865	$ 13,914	$ 23,784	$ 29,482
600-7-32-00-210.001 Dental Insurance	$ 853	$ 855	$ 799	$ 570	$ 588	$ 598	$ 595	$ 571
600-7-32-00-210.002 Vision Insurance	$ 128	$ 299	$ 294	$ 206	$ 195	$ 201	$ 212	$ 228
600-7-32-00-210.003 Life Insurance	$ 155	$ 151	$ 151	$ 197	$ 202	$ 202	$ 202	$ 202
600-7-32-00-210.005 HRA	$ 2,221	$ 3,055	$ 1,637	$ 1,917	$ 672	$ 452	$ 4,500	$ 5,063
600-7-32-00-210.006 Healthy Dollars Admin Fees	$ 215	$ 215	$ 190	$ 111	$ 108	$ 148	$ 108	$ 108
600-7-32-00-220.000 FICA/MEDI	$ 12,234	$ 12,104	$ 12,818	$ 13,087	$ 13,318	$ 13,052	$ 13,501	$ 13,706
600-7-32-00-230.000 VMERS Contributions	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-32-00-230.001 City Employer Pension	$ 10,250	$ 11,230	$ 11,638	$ 13,883	$ 14,982	$ 15,567	$ 16,156	$ 16,750
600-7-32-00-250.000 Unemployment Comp	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-32-00-260.000 Workers' Comp	$ 8,233	$ 9,264	$ 7,970	$ 9,977	$ 10,774	$ 11,499	$ 12,810	$ 14,098
600-7-32-00-320.000 Professional Services	$ 7,270	$ 7,805	$ 8,987	$ 5,938	$ 7,829	$ 7,586	$ 8,000	$ 8,000
600-7-32-00-340.000 Technical Services	$ 15,525	$ 11,567	$ 7,875	$ 11,682	$ 9,165	$ 9,763	$ 12,500	$ 12,500
600-7-32-00-421.000 Trash Removal	$ -	$ -	$ -	$ -	$ -	$ -	$ 100	$ 100
600-7-32-00-430.003 Repair & Maint - Bldgs	$ 4,411	$ 2,572	$ 8,610	$ 4,949	$ 7,269	$ 3,810	$ 8,000	$ 8,000
600-7-32-00-430.004 Repair & Maint - Plant	$ 2,785	$ 7,312	$ 4,595	$ 8,000	$ 7,383	$ 2,198	$ 10,000	$ 10,000
600-7-32-00-430.006 Repair & Maint - Equip	$ 16,370	$ 16,674	$ 17,559	$ 44,349	$ 28,089	$ 17,131	$ 25,000	$ 25,000
600-7-32-00-430.011 Grounds Maintenance	$ 3,605	$ 3,866	$ 8,533	$ 12,250	$ 5,411	$ 974	$ 7,000	$ 7,000
600-7-32-00-430.014 Grounds Maint - Watershed	$ 14,746	$ 14,922	$ 13,778	$ 22,035	$ 15,386	$ 17,932	$ 25,000	$ 25,000
600-7-32-00-442.002 Equipment Lease	$ -	$ -	$ 1,500	$ -	$ -	$ 1,275	$ 1,500	$ 1,500
600-7-32-00-520.000 Liability Insurance	$ 139,354	$ 149,376	$ 155,070	$ 146,627	$ 133,719	$ 118,455	$ 120,500	$ 120,500
600-7-32-00-530.000 Telephone	$ 1,483	$ 1,329	$ 1,214	$ 1,033	$ 1,196	$ 1,328	$ 1,500	$ 1,500
600-7-32-00-530.001 Cell Phones/Pagers	$ 443	$ 264	$ 255	$ 178	$ 191	$ 130	$ 200	$ 200
600-7-32-00-530.002 Internet Service	$ -	$ 2,822	$ 3,280	$ 2,149	$ 1,524	$ 1,581	$ 1,800	$ 1,800
600-7-32-00-532.000 Training/Prof Development	$ 602	$ 1,148	$ 577	$ 1,317	$ 1,336	$ 1,233	$ 1,500	$ 1,500
600-7-32-00-540.000 Advertising	$ -	$ -	$ -	$ 57	$ -	$ 26	$ 300	$ 300
600-7-32-00-550.000 Printing	$ -	$ -	$ -	$ 1,127	$ -	$ -	$ 3,000	$ 3,000
600-7-32-00-610.000 Office Supplies	$ -	$ -	$ -	$ 53	$ -	$ -	$ -	$ -
600-7-32-00-610.003 Work Uniforms	$ 417	$ 415	$ 494	$ 415	$ 417	$ 804	$ 500	$ 500
600-7-32-00-610.009 Safety Supplies	$ 648	$ 265	$ 1,095	$ 536	$ 274	$ -	$ 700	$ 700
600-7-32-00-610.017 Lab Supplies	$ 10,452	$ 5,263	$ 7,494	$ 15,188	$ 9,261	$ 10,859	$ 10,000	$ 9,500
600-7-32-00-610.019 Chemicals	$ 56,318	$ 67,383	$ 49,330	$ 43,193	$ 54,608	$ 51,821	$ 65,500	$ 15,000
600-7-32-00-610.044 Tools	$ 605	$ 913	$ 212	$ 540	$ 547	$ 315	$ 800	$ 800
600-7-32-00-610.045 Building Supplies	$ 1,199	$ 338	$ -	$ 3,623	$ 1,815	$ 1,920	$ 2,000	$ 2,000
600-7-32-00-622.000 Electricity - Buildings	$ 11,925	$ 11,611	$ 14,629	$ 14,124	$ 15,618	$ 17,991	$ 15,825	$ 15,000
600-7-32-00-623.000 Propane	$ 24,175	$ 17,627	$ 24,141	$ 26,588	$ 29,146	$ 32,864	$ 20,097	$ 24,640
600-7-32-00-624.000 Fuel Oil	$ 3,557	$ 1,313	$ 793	$ 1,177	$ 2,598	$ 3,335	$ 2,450	$ 2,000
600-7-32-00-740.000 Machinery & Equipment	$ -	$ -	$ 1,368	$ -	$ -	$ -	$ -	$ -
600-7-32-00-740.001 Computers & Hardware	$ -	$ -	$ 1,563	$ 229	$ 1,182	$ 1,622	$ 1,000	$ 1,000
600-7-32-00-742.000 Vehicles	$ 51,520	$ -	$ (47)	$ 24,167	$ -	$ -	$ -	$ -
600-7-32-00-800.001 State Fees	$ 39,404	$ 39,498	$ 43,727	$ 50,151	$ 52,831	$ 28,439	$ 56,700	$ 56,700
600-7-32-00-800.002 Real Estate Tax	$ 57,735	$ 58,672	$ 60,326	$ 57,300	$ 59,144	$ 62,016	$ 56,500	$ 68,000
600-7-32-00-810.000 Depreciation Expense	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL WATER TREATMENT	**$ 680,476**	**$ 645,026**	**$ 667,683**	**$ 736,044**	**$ 683,768**	**$ 628,845**	**$ 706,321**	**$ 681,111**

WATER TREATMENT OPERATING

WATER DISTRIBUTION - OPERATIONAL BUDGET

WATER DISTRIBUTION	FISCAL 2015	FISCAL 2016	FISCAL 2017	FISCAL 2018	FISCAL 2019	FISCAL 2020	FISCAL 2021	FISCAL 2022
600-7-34-00	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
600-7-34-00-110.000 Salaries	$ 249,861	$ 207,053	$ 196,685	$ 226,143	$ 257,144	$ 245,079	$ 257,581	$ 265,173
600-7-34-00-114.000 Comp Cashed	$ 17,285	$ 14,947	$ 8,034	$ 7,175	$ -	$ -	$ -	$ -
600-7-34-00-120.000 Seasonal Employee	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-130.000 Overtime	$ 33,941	$ 21,437	$ 30,077	$ 39,421	$ 26,835	$ 27,693	$ 10,000	$ 10,000
600-7-34-00-210.000 Health Insurance	$ 91,652	$ 90,285	$ 112,300	$ 72,594	$ 82,530	$ 85,658	$ 90,997	$ 97,680
600-7-34-00-210.001 Dental Insurance	$ 4,204	$ 4,244	$ 3,819	$ 2,932	$ 2,043	$ 2,295	$ 2,322	$ 2,229
600-7-34-00-210.002 Vision Insurance	$ 1,214	$ 1,320	$ 1,573	$ 1,114	$ 639	$ 606	$ 719	$ 773
600-7-34-00-210.003 Life Insurance	$ 489	$ 486	$ 532	$ 651	$ 542	$ 531	$ 544	$ 544
600-7-34-00-210.005 HRA	$ 11,124	$ 16,546	$ 7,495	$ 7,266	$ 15,873	$ 7,165	$ 10,500	$ 11,813
600-7-34-00-210.006 Healthy Dollars Admin Fees	$ 646	$ 754	$ 935	$ 689	$ 538	$ 475	$ 432	$ 432
600-7-34-00-220.000 FICA/MEDI	$ 21,166	$ 19,198	$ 18,149	$ 20,937	$ 21,218	$ 21,438	$ 20,470	$ 21,051
600-7-34-00-230.000 VMERS Contributions	$ 3,218	$ 3,884	$ 9,145	$ 11,536	$ 12,462	$ 12,946	$ 12,183	$ 13,270
600-7-34-00-230.001 City Employer Pension	$ 17,400	$ 19,439	$ 20,089	$ 6,432	$ 6,935	$ 7,237	$ 7,547	$ 7,856
600-7-34-00-250.000 Unemployment Comp	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-260.000 Workers' Comp	$ 13,817	$ 15,524	$ 13,639	$ 15,915	$ 16,524	$ 17,794	$ 20,707	$ 23,072
600-7-34-00-320.000 Professional Services	$ 6,454	$ 229	$ 464	$ 712	$ 11,021	$ 95	$ -	$ -
600-7-34-00-421.000 Trash Removal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-421.002 Disposal Fees	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-430.002 Repair & Maint - Vehicles	$ -	$ -	$ 90	$ -	$ 5,146	$ 631	$ -	$ -
600-7-34-00-430.003 Repair & Maint-Bldgs	$ 2,470	$ 5,533	$ 8,455	$ 8,298	$ 1,921	$ 6,681	$ 2,500	$ 2,500
600-7-34-00-430.006 Repair & Maint - Equip	$ 1,969	$ 1,752	$ 2,459	$ 2,439	$ 2,442	$ 3,894	$ 4,000	$ 4,000
600-7-34-00-430.011 Grounds Maintenance	$ 663	$ 1,282	$ 1,662	$ 1,896	$ 1,099	$ 1,612	$ 1,000	$ 1,000
600-7-34-00-442.000 Equipment Rental	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,500	$ 2,500
600-7-34-00-442.002 Equipment Lease	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-520.000 Liability Insurance	$ -	$ 1,248	$ 2,015	$ 113	$ 138	$ -	$ 500	$ 500
600-7-34-00-530.000 Telephone	$ 792	$ 1,463	$ 1,777	$ 952	$ 1,011	$ 1,144	$ 1,000	$ 1,000
600-7-34-00-530.001 Cell Phones/Pagers	$ 727	$ 685	$ 566	$ 46	$ -	$ -	$ -	$ -
600-7-34-00-530.002 Internet Service	$ 916	$ 1,026	$ 997	$ 892	$ 1,052	$ 1,089	$ -	$ 1,200
600-7-34-00-532.000 Training/Prof Development	$ -	$ 1,463	$ 1,608	$ 260	$ 616	$ 240	$ -	$ 500
600-7-34-00-540.000 Advertising	$ -	$ -	$ -	$ 99	$ -	$ -	$ -	$ -
600-7-34-00-580.000 Travel	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-610.003 Work Uniforms	$ 1,086	$ 1,337	$ 2,158	$ 1,318	$ 908	$ 1,214	$ 1,548	$ 1,548
600-7-34-00-610.009 Safety Supplies	$ 4,139	$ 3,120	$ 5,880	$ 2,793	$ 2,109	$ 1,188	$ 3,000	$ 3,000
600-7-34-00-610.026 Top Soil & Seed	$ 1,278	$ 175	$ 259	$ 1,620	$ 81	$ 390	$ 2,000	$ 2,000
600-7-34-00-610.027 Gravel Stone & Sand	$ 10,565	$ 7,323	$ 6,604	$ 13,655	$ 20,436	$ 12,506	$ 15,000	$ 15,000
600-7-34-00-610.032 Pipe & Fittings	$ 59,197	$ 56,081	$ 31,665	$ 68,390	$ 56,220	$ 36,903	$ 75,000	$ 75,000
600-7-34-00-610.034 Hydrants	$ 22,411	$ 29,369	$ 16,742	$ 13,128	$ 24,006	$ 16,597	$ 31,500	$ 31,500
600-7-34-00-610.041 Concrete & Precast	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-34-00-610.044 Tools	$ 5,303	$ 6,353	$ 5,873	$ 7,102	$ 5,083	$ 5,184	$ 3,000	$ 3,000
600-7-34-00-622.000 Electricity - Buildings	$ 3,113	$ 2,617	$ 2,840	$ 2,768	$ 2,915	$ 3,370	$ 3,165	$ 3,000
600-7-34-00-624.000 Fuel Oil	$ 6,498	$ 2,048	$ 4,129	$ 2,750	$ 7,441	$ 2,150	$ 4,900	$ 4,000
600-7-34-00-740.000 Machinery & Equipment	$ -	$ 2,984	$ -	$ 4,486	$ 1,200	$ 502	$ -	$ -
600-7-34-00-740.001 Computers and Hardware	$ -	$ -	$ -	$ 410	$ 120	$ -	$ -	$ -
600-7-34-00-742.000 Vehicles	$ -	$ -	$ -	$ 36,885	$ 58	$ -	$ -	$ -
600-7-34-00-810.000 Depreciation Expense	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
TOTAL WATER DISTRIBUTION	**$ 593,598**	**$ 541,207**	**$ 518,714**	**$ 583,816**	**$ 588,308**	**$ 524,307**	**$ 584,614**	**$ 605,140**

WATER METER - OPERATIONAL BUDGET

WATER METER	FISCAL 2015	FISCAL 2016	FISCAL 2017	FISCAL 2018	FISCAL 2019	FISCAL 2020	FISCAL 2021	FISCAL 2022
600-7-36-00	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
600-7-36-00-110.000 Salaries	$ 150,244	$ 95,231	$ 156,539	$ 157,004	$ 157,268	$ 175,336	$ 175,631	$ 180,091
600-7-36-00-114.000 Comp Cashed	$ -	$ 285	$ -	$ 148	$ -	$ -	$ -	$ -
600-7-36-00-120.001 Temp Emp - Fathom	$ -	$ -	$ -	$ -	$ 68,713	$ 55,179	$ -	$ -
600-7-36-00-130.000 Overtime	$ 562	$ 886	$ 967	$ 1,202	$ 12,673	$ 11,560	$ 400	$ 400
600-7-36-00-210.000 Health Insurance	$ 64,911	$ 63,457	$ 69,664	$ 65,179	$ 64,122	$ 73,263	$ 76,486	$ 83,574
600-7-36-00-210.001 Dental Insurance	$ 2,344	$ 2,021	$ 1,992	$ 2,143	$ 2,106	$ 1,882	$ 2,039	$ 1,685
600-7-36-00-210.002 Vision Insurance	$ 658	$ 801	$ 856	$ 847	$ 664	$ 765	$ 734	$ 789
600-7-36-00-210.003 Life Insurance	$ 242	$ 237	$ 237	$ 301	$ 329	$ 271	$ 316	$ 316
600-7-36-00-210.005 HRA	$ 12,165	$ 5,051	$ 12,140	$ 9,052	$ 9,900	$ 8,097	$ 9,000	$ 10,125
600-7-36-00-210.006 Healthy Dollars Admin Fees	$ 323	$ 323	$ 323	$ 332	$ 323	$ 382	$ 324	$ 324
600-7-36-00-220.000 FICA/MEDI	$ 9,926	$ 10,076	$ 10,761	$ 11,045	$ 17,187	$ 17,139	$ 13,466	$ 13,808
600-7-36-00-230.000 VMERS Contributions	$ -	$ -	$ -	$ -	$ -	$ 1,403	$ -	$ 3,636
600-7-36-00-230.001 City Employer Pension	$ 13,455	$ 14,877	$ 15,322	$ 16,576	$ 19,530	$ 18,695	$ 19,891	$ 13,953
600-7-36-00-250.000 Unemployment Comp	$ -	$ -	$ -	$ -	$ -	$ 8,833	$ -	$ -
600-7-36-00-260.000 Workers' Comp	$ 8,300	$ 9,391	$ 7,685	$ 10,299	$ 11,880	$ 12,630	$ 13,881	$ 15,412
600-7-36-00-320.000 Professional Services	$ -	$ 250	$ -	$ 789	$ 6,155	$ 17,817	$ -	$ -
600-7-36-00-320.001 Prof Svs - Fathom	$ -	$ -	$ -	$ -	$ -	$ 19,322	$ -	$ 10,000
600-7-36-00-422.004 Software Lease - Fathom	$ -	$ -	$ -	$ -	$ 101,232	$ 184,366	$ 326,351	$ 153,300
600-7-36-00-430.006 Repair & Maint - Equip	$ -	$ -	$ -	$ 156	$ -	$ 32	$ -	$ -
600-7-36-00-430.010 Repair & Maint - Computer	$ -	$ -	$ -	$ -	$ -	$ -	$ 200	$ 200
600-7-36-00-442.004 Software Lease	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-36-00-520.000 Liability Insurance	$ -	$ -	$ -	$ 243	$ 171	$ 1,000	$ -	$ -
600-7-36-00-530.000 Telephone	$ 1,398	$ 1,422	$ 1,280	$ 1,540	$ 1,540	$ 1,540	$ -	$ 1,500
600-7-36-00-530.001 Cell Phones/Pagers	$ 626	$ 628	$ 617	$ 741	$ 647	$ 831	$ 600	$ 600
600-7-36-00-531.000 Postage	$ 11,534	$ 10,739	$ 8,944	$ 8,954	$ 4,511	$ 4,389	$ -	$ 10,000
600-7-36-00-532.000 Training/Prof Development	$ -	$ -	$ -	$ 236	$ -	$ -	$ 500	$ 500
600-7-36-00-540.000 Advertising	$ 129	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-36-00-550.000 Utility Bills Materials	$ 5,067	$ 6,897	$ 9,572	$ 6,468	$ 4,372	$ 11,262	$ -	$ 10,000
600-7-36-00-560.000 Dues & Subscriptions	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-36-00-580.000 Travel	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-36-00-610.003 Work Uniforms	$ 413	$ 324	$ 100	$ 401	$ 371	$ 487	$ 500	$ 500
600-7-36-00-610.009 Safety Supplies	$ 6	$ 122	$ 1,214	$ -	$ 379	$ 371	$ 500	$ 500
600-7-36-00-610.011 Water Meter Parts	$ 90,546	$ -	$ -	$ 108,265	$ 66,746	$ 5,991	$ 5,000	$ 15,000
600-7-36-00-610.044 Tools	$ 412	$ 664	$ 563	$ 609	$ 675	$ 227	$ 250	$ 250
600-7-36-00-622.000 Electricity						$ 104	$ -	$ -
600-7-36-00-740.000 Machinery & Equipment	$ -	$ -	$ -	$ -	$ 29	$ 1,110	$ 500	$ 500
600-7-36-00-740.001 Computers & Hardware	$ -	$ -	$ 167	$ 988	$ -	$ -	$ -	$ -
600-7-36-00-742.000 Vehicles	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
600-7-36-00-743.000 Furniture & Fixtures	$ -	$ -	$ 578	$ -	$ -	$ -	$ -	$ -
600-7-36-00-888.000 Misc - Fathom	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 20,000
TOTAL WATER METER	**$ 373,259**	**$ 223,682**	**$ 299,520**	**$ 403,517**	**$ 551,523**	**$ 634,284**	**$ 646,569**	**$ 546,962**

TOTAL WATER DIVISIONS OPERATIONAL BUDGET

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
TOTAL WATER DEPT. BUDGET	**$ 1,647,333**	**$ 1,409,915**	**$ 1,485,918**	**$ 1,723,377**	**$ 1,823,598**	**$ 1,787,437**	**$ 1,937,504**	**$ 1,833,213**

WATER METER OPERATING AND TOTALS

WATER - TRANSFERS TO GENERAL FUND

TRANSFERS TO GENERAL FUND	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
600-7-99-00								
892.001 Transfer Out -Treasurer	$ 193,077	$ 177,990	$ 177,939	$ 190,270	$ 190,096	$ 188,316	$ 189,183	$ 199,376
892.003 Transfer Out - Attorney	$ 19,389	$ 20,771	$ 21,630	$ 23,206	$ 37,286	$ 36,320	$ 38,263	$ 38,200
892.005 Transfer Out - General Bldg	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
adjustment at board action	$ (45,940)							
TOTAL TO GENERAL FUND	**$ 166,526**	**$ 198,761**	**$ 199,569**	**$ 213,476**	**$ 227,382**	**$ 224,636**	**$ 227,446**	**$ 237,576**

WATER FUND TRANSFERS ARE:
30%
12.5%

WATER - TRANSFERS TO DPW

TRANSFERS TO DPW	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
600-7-99-00								
892.002 Transfer Out -AdmDPW	$ 307,427	$ 314,864	$ 341,641	$ 359,135	$ 392,818	$ 390,520	$ 372,300	$ 390,373
892.004 Transfer Out - Equipment Maint.	$ 149,117	$ 146,414	$ 137,565	$ 137,101	$ 145,883	$ 151,179	$ 151,415	$ 151,637
600-7-99-00-892.006 Trnsfer Out - Sewer Fund (AMI)					$ -			
TOTAL TO DPW	**$ 456,544**	**$ 461,278**	**$ 479,206**	**$ 496,236**	**$ 538,701**	**$ 541,699**	**$ 523,715**	**$ 542,010**

WATER FUND TRANSFERS ARE:
33%
25%

WATER - DEBT

BALANCE ON WATER FUND DEBT	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
REFUNDING WATER BOND	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Refinanced 2003 - Payoff FY 14								
WATER BOND	$ 855,000	$ 760,000	$ 665,000	$ 570,000	$ 475,000	$ 380,000	$ 285,000	$ 190,000
Issued 2002/Payoff Fiscal 2024								
SRF LOAN - ROOF REPAIR	$ 1,655,064	$ 1,589,169	$ 1,521,278	$ 1,451,390	$ 1,379,386	$ 1,305,221	$ 1,228,831	$ 1,150,150
Was $5.7 M reduced by $3.8M settlement								
CURRENT EXPENSE NOTE								
Water 75% share	$ 2,700,000	$ 2,250,000	$ 1,800,000	$ 1,350,000	$ 900,000	$ 450,000	$ -	$ -
Deficit Note & Roof Litigation Costs								
Volvo Excavator Lease -Payoff FY 2017	$ 117,252	$ 89,208	$ 60,334	$ 30,607	$ -	$ -	$ -	$ -
Tandem Dump Truck Lease					$ 130,000	$ 99,000	$ 84,285	$ 57,355
2016 Water Mains Bond					$ 723,866	$ 699,737	$ 609,737	$ 567,686
$1,201,393.29 reduced by $477,527.52								
AMI Meter Program - payoff 2033						$ 3,072,437	$ 2,916,586	$ 2,754,829
South End Water Main - payoff 2049							$ 2,050,000	$ 990,833
South End Water Main - principal forgivness							$ (1,025,000)	
NNSSP 1A Water Bond								$ 592,242
NNSSP 1A Water Bond - principal forgiveness								$ (278,341)
TOTAL WATER FUND DEBT	**$ 5,327,316**	**$ 4,688,377**	**$ 4,046,612**	**$ 3,401,997**	**$ 3,608,252**	**$ 6,006,395**	**$ 5,124,439**	**$ 6,024,754**
PRINCIPAL PAYMENTS								
REFUNDING WATER BOND	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
WATER BOND	$ 95,000	$ 95,000	$ 95,000	$ 95,000	$ 95,000	$ 95,000	$ 95,000	$ 95,000
SRF LOAN - ROOF REPAIR	$ 65,895	$ 67,871	$ 69,907	$ 72,005	$ 74,165	$ 76,390	$ 78,681	$ 81,042
Current Expense Note 50%								
Current Expense Note 75%	$ 450,000	$ 450,000	$ 450,000	$ 450,000	$ 450,000	$ 450,000	$ -	$ -
Volvo Excavator Lease	$ 28,044	$ 28,874	$ 29,728	$ 30,607	$ -	$ -	$ -	$ -
Tandem Dump Truck Lease					$ 31,000	$ 31,000	$ 26,930	$ 26,929
2016 Water Mains Bond - payoff 2048					$ 24,129	$ 24,129	$ 21,025	$ 21,025
AMI Meter Program - payoff 2033						$ 155,851	$ 161,757	$ 167,878
South End Water Improvements - payoff 2049							$ 34,167	$ 34,167
NNSSP 1A Water Bond								$ 8,969
TOTAL PRINCIPAL PAYMENTS	**$ 638,939**	**$ 641,745**	**$ 644,635**	**$ 647,612**	**$ 674,294**	**$ 832,370**	**$ 417,560**	**$ 435,009**
INTEREST PAYMENTS								
REFUNDING WATER BOND	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
WATER BOND	$ 37,535	$ 30,268	$ 25,749	$ 21,350	$ 16,785	$ 12,339	$ 8,155	$ (15,058)
SRF Loan - Roof repair 1%	$ 16,551	$ 15,892	$ 15,213	$ 14,514	$ 13,794	$ 13,030		
SRF Loan Admin Fee2%	$ 33,102	$ 31,783	$ 30,426	$ 29,028	$ 27,588	$ 26,060	$ 36,805	$ 34,504
Current Expense Note 50%								
Current Expense Note 75%	$ 80,475	$ 62,045	$ 49,500	$ 37,125	$ 24,750	$ 12,375	$ -	$ -
Volvo Excavator Lease	$ 3,468	$ 2,639	$ 1,785	$ 906	$ -	$ -	$ -	$ -
Tandem Dump Truck Lease					$ 5,000	$ 5,000	$ 2,599	$ 3,599
AMI Meter Program - payoff 2033						$ 116,445	$ 110,539	$ 104,408
South End Water Improvements - payoff 2049								$ -
NNSSP 1A Water Bond								$ -
TOTAL INTEREST PAYMENTS	**$ 171,131**	**$ 142,627**	**$ 122,673**	**$ 102,923**	**$ 87,917**	**$ 185,249**	**$ 158,098**	**$ 127,453**
TOTAL PAYMENTS FOR PRINCIPAL AND INTEREST	**$ 810,070**	**$ 784,372**	**$ 767,308**	**$ 750,535**	**$ 762,211**	**$ 1,017,619**	**$ 575,658**	**$ 562,462**

WATER FUND - CAPITAL PLANNING

Water System Capital Fund 602-730-00	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
Within the Water System Capital Fund, the monies are earmarked as follows:								
Water Treatment								
Beginning Balance	$ 802,173	$ 894,523	$ 849,472	$ 816,159	$ 732,402	$ 603,813	$ 644,235	$ 659,235
Appropriation*	$ 317,930	$ 50,000	$ 50,000	$ 50,000	$ 55,000	$ 55,000	$ 150,000	$ 150,000
Interest Income	$ 1,433	$ 2,134	$ 7,789	$ 10,219	$ 21,199	$ 16,697	$ -	$ 13,000
Expenditure	$ (227,013)	$ (97,184)	$ (91,103)	$ (143,976)	$ (204,788)	$ (31,275)	$ (135,000)	$ (120,000)
Ending Balance	**$ 894,523**	**$ 849,472**	**$ 816,159**	**$ 732,402**	**$ 603,813**	**$ 644,235**	**$ 659,235**	**$ 702,235**
Distribution System								
Beginning Balance	$ (136,439)	$ 130,058	$ 160,858	$ 326,427	$ 528,503	$ 828,503	$ 828,503	$ 928,503
Appropriation*	$ 250,000	$ 250,000	$ 270,000	$ 270,000	$ 300,000	$ 300,000	$ 400,000	$ 100,000
Interest/Misc Income	$ 16,497	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Expenditure	$ -	$ (219,200)	$ (104,431)	$ (67,924)	$ -	$ (74,000)	$ (300,000)	$ (200,000)
Ending Balance	**$ 130,058**	**$ 160,858**	**$ 326,427**	**$ 528,503**	**$ 828,503**	**$ 1,054,503**	**$ 928,503**	**$ 828,503**
607-3-00-00 WATER Vehicle and Equipment								
Beginning Balance	$ 20,000	$ 36,610	$ 76,610	$ 36,940	$ 56,947	$ 17,511	$ 9,571	$ (20,429)
Appropriation - Water	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000	$ 20,000
Appropriation - Others	$ 20,000	$ 20,000	$ 20,000	$ -	$ -	$ -	$ -	$ -
Interest Income	$ -	$ -	$ -	$ 7	$ 20	$ 5	$ -	$ -
Expenditure - Water	$ -	$ -	$ (33,099)	$ -	$ (59,456)	$ (27,946)	$ (50,000)	$ -
Expenditure - Others	$ (23,390)	$ -	$ -		$ -	$ -	$ -	$ -
Ending Balance	**$ 36,610**	**$ 76,610**	**$ 83,511**	**$ 56,947**	**$ 17,511**	**$ 9,571**	**$ (20,429)**	**$ (429)**
Pierpoint Building Purchase								
Beginning Balance	$ 22,500	$ 30,000	$ 37,500	$ -				
Appropriation*	$ 7,500	$ 7,500	$ 7,500	$ -				
Interest Income	$ -	$ -	$ -	$ -				
Expenditure	$ -	$ -	$ (45,000)	$ -				
Ending Balance	**$ 30,000**	**$ 37,500**	**$ -**	**$ -**				

[2] Treatment capital planning expenditures in FY22 include: sand replacement $55,000; wood chipper replacement $65,000; Distribution $200,000 is for water main replacements/repairs

WATER SYSTEM CAPITAL FUND Annual Funding	**$ 595,430**	**$ 327,500**	**$ 347,500**	**$ 340,000**	**$ 375,000**	**$ 375,000**	**$ 570,000**	**$ 270,000**

WATER SYSTEM CAPITAL FUND FUNDING BALANCE	$ 1,091,191	$ 1,124,440	$ 1,226,097	$ 1,317,852	$ 1,449,827	$ 1,708,308	$ 1,567,308	$ 1,530,308

SEWER FUND
WASTEWATER TREATMENT

SUMMARY OF WASTEWATER TREATMENT FACILITY (WWTF) RATE STUDY - FISCAL 2022

Rates per 100 cubic feet (748 gallons)	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
WASTEWATER TREATMENT RATES								
Rutland City	$ 4.079	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655
Rutland Town	$ 4.079	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655
Rutland Town Business Rate	$ 16.314	$ 16.314	$ 17.450	$ 17.624	$ 17.624	$ 17.624	$ 17.624	$ 18.621
Alpine Killington/Mendon	$ 4.079	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655
Alpine Rutland Town	$ 4.079	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655
REDC	$ 4.079	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655
REDC Business Rate	$ 8.157	$ 8.157	$ 8.725	$ 8.812	$ 8.812	$ 8.812	$ 8.812	$ 9.311
Sewer Only - Water Service Fee	$ 29.05	$ 29.050	$ 31.073	$ 31.384	$ 31.384	$ 31.384	$ 31.384	$ 33.160
Sewer Service Fee	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 18.543
RATE CHANGE	**5.4%**	**0.0%**	**7.0%**	**1.0%**	**0.0%**	**0.0%**	**0.0%**	**5.7%**
REVENUES	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
Billed at Rates	$ 3,475,057	$ 3,512,956	$ 3,552,087	$ 3,608,959	$ 3,628,695	$ 3,311,524	$ 3,422,113	$ 3,600,629
Non Rates	$ 705,360	$ 1,208,302	$ 984,288	$ 2,088,731	$ 923,306	$ 1,012,166	$ 907,805	$ 1,027,805
NNSSP VT Appropriation				$ -	$ 78,565	$ -	$ -	$ -
Year End Adjustment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenues	**$ 4,180,417**	**$ 4,721,258**	**$ 4,536,375**	**$ 5,697,689**	**$ 4,630,566**	**$ 4,323,690**	**$ 4,329,918**	**$ 4,628,434**
EXPENDITURES								
Operational Budget	$ 2,518,588	$ 2,529,817	$ 2,618,043	$ 2,811,723	$ 2,810,648	$ 2,817,795	$ 2,942,847	$ 2,902,718
CSO Phase 2A Bond Capital Fund	$ 203,710	$ 213,036	$ 222,669	$ 230,955	$ 287,834	$ 292,207	$ 261,146	$ 241,422
Transfers to General Fund	$ 212,466	$ 198,761	$ 199,569	$ 213,476	$ 227,382	$ 224,635	$ 227,446	$ 237,576
Payment in Lieu of Taxes (PILOT)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfers to DPW	$ 365,235	$ 369,022	$ 383,365	$ 396,989	$ 489,777	$ 668,939	$ 658,431	$ 603,842
Prior Year Adjustments	$ -	$ -	$ -	$ -	$ -	$ -	$ 1	$ -
Debt Principal & Interest	$ 465,795	$ 456,244	$ 448,618	$ 731,429	$ 655,369	$ 647,620	$ 484,025	$ 642,876
Total Expenditures	**$ 3,765,794**	**$ 3,766,880**	**$ 3,872,263**	**$ 4,384,572**	**$ 4,471,010**	**$ 4,651,195**	**$ 4,573,895**	**$ 4,628,434**
Net of Revenue vs Expenditures	**$ 414,623**	**$ 954,378**	**$ 664,112**	**$ 1,313,117**	**$ 159,556**	**$ (327,505)**	**$ (243,977)**	**$ -**
Percent of Total Expenditures								
Operational Budget	66.9%	67.2%	67.6%	64.1%	62.9%	60.6%	64.3%	62.7%
CSO Phase 2A Bond Capital Fund	5.4%	5.7%	5.8%	5.3%	6.4%	6.3%	5.7%	5.2%
Transfers to General Fund	5.6%	5.3%	5.2%	4.9%	5.1%	4.8%	5.0%	5.1%
Payment in Lieu of Taxes (PILOT)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Transfers to DPW	9.7%	9.8%	9.9%	9.1%	11.0%	14.4%	14.4%	13.0%
Debt Principal & Interest	12.4%	12.1%	11.6%	16.7%	14.7%	13.9%	10.6%	13.9%

WWTF SUMMARY

WASTEWATER TREATMENT - RATES REVENUE BY USER CLASS

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
RUTLAND CITY								
METERED USAGE*	$ 2,603,297	$ 2,641,341	$ 2,695,562	$ 2,746,022	$ 2,846,992	$ 2,675,658	$ 2,655,222	$ 2,805,478
CITY FLAT RATE	$ 46,563	$ 44,266	$ 46,593	$ 36,876	$ 32,591	$ 51,392	$ 49,999	$ 50,000
Total Rutland City	**$ 2,649,860**	**$ 2,685,607**	**$ 2,742,155**	**$ 2,782,897**	**$ 2,879,583**	**$ 2,727,050**	**$ 2,705,221**	**$ 2,855,478**
RUTLAND TOWN								
METERED USAGE*	$ 420,454	$ 409,700	$ 421,861	$ 462,901	$ 440,773	$ 306,160	$ 422,547	$ 445,763
BUSINESS RATE	$ 183,551	$ 185,173	$ 153,514	$ 106,634	$ 94,842	$ 82,968	$ 90,175	$ 85,287
Total Rutland Town	**$ 604,005**	**$ 594,873**	**$ 575,375**	**$ 569,534**	**$ 535,615**	**$ 389,128**	**$ 512,722**	**$ 531,050**
ALPINE PIPELINE KILLINGTON & MENDON								
METERED USAGE*	$ 144,461	$ 146,480	$ 137,702	$ 151,854	$ 137,609	$ 100,262	$ 111,658	$ 117,977
RUTLAND TOWN								
METERED USAGE*	$ 21,248	$ 25,929	$ 26,176	$ 39,264	$ 26,784	$ 28,904	$ 30,381	$ 32,005
Total Alpine	**$ 165,709**	**$ 172,409**	**$ 163,878**	**$ 191,119**	**$ 164,393**	**$ 129,167**	**$ 142,040**	**$ 149,982**
REDC								
METERED USAGE*	$ 11,185	$ 12,691	$ 16,189	$ 14,539	$ 8,595	$ 13,060	$ 11,710	$ 12,373
BUSINESS RATE	$ 17,544	$ 20,535	$ 27,532	$ 24,231	$ 13,509	$ 26,119	$ 23,420	$ 24,746
Total REDC	**$ 28,729**	**$ 33,225**	**$ 43,721**	**$ 38,769**	**$ 22,104**	**$ 39,179**	**$ 35,131**	**$ 37,119**
WATER SERVICE FEE	**$ 26,755**	**$ 26,842**	**$ 26,958**	**$ 26,639**	**$ 27,000**	**$ 27,000**	**$ 27,000**	**$ 27,000**
TOTAL REVENUE FROM RATES	**$ 3,475,057**	**$ 3,512,956**	**$ 3,552,087**	**$ 3,608,959**	**$ 3,628,695**	**$ 3,311,524**	**$ 3,422,113**	**$ 3,600,629**

* Includes sewer service fee starting in FY14

WASTEWATER TREATMENT - NON RATE REVENUE

NON-RATE REVENUE	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
610-6-30-01								
319.002 Interest On DLQ Accts	$ 23,675	$ 24,230	$ 25,571	$ 22,721	$ 22,530	$ 39,953	$ 33,795	$ 33,795
319.003 5% Past Due Penalty	$ 24,497	$ 26,964	$ 31,826	$ 26,827	$ 19,701	$ 8,515	$ 5,910	$ 5,910
344.001 Alpine Ad Valorem	$ 123,499	$ 122,301	$ 122,251	$ 136,658	$ 122,101	$ 122,101	$ 125,000	$ 125,000
344.002 Septage Disposal Fees	$ 75,757	$ 149,252	$ 310,861	$ 348,537	$ 407,801	$ 466,619	$ 400,000	$ 500,000
344.003 Industrial Sewage Surcharge	$ 52,976	$ 116,315	$ 44,898	$ 27,701	$ 53,665	$ 77,424	$ 50,000	$ 70,000
344.004 Alpine Option	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
344.005 Sludge Disposal Fees	$ 210,238	$ 196,041	$ 214,410	$ 186,620	$ 244,485	$ 258,120	$ 250,000	$ 260,000
344.007 Water Testing Services	$ -	$ -	$ -	$ 11,833	$ 9,135	$ 630	$ -	$ -
344.008 Town Ad Valorum	$ 77,160	$ 69,418	$ 67,086	$ 15,588	$ 21,316	$ 5,998	$ 20,000	$ 6,000
362.000 Power Load Shedding	$ 1,324	$ 1,006	$ 861	$ -	$ -	$ 4,110	$ -	$ -
362.001 Pole & Conduit Lease	$ 100	$ 100	$ 100	$ 100	$ 100	$ 100	$ 100	$ 100
390.001 Miscellaneous Revenue	$ 1,576	$ 1,776	$ 37,317	$ 3,843	$ 1,552	$ 2,558	$ 2,000	$ 2,000
344.010 Alpine Pump Station Maint.	$ 18,655	$ 23,608	$ 15,441	$ 21,961	$ 20,920	$ 26,038	$ 21,000	$ 25,000
610-6-80-00-380.000 Gain - Asset Disp.	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-6-98-00-391.000 Transfers In	$ 95,903	$ 477,293	$ 113,667	$ 1,286,342	$ -	$ -	$ -	$ -
TOTAL NON RATE REVENUE	**$ 705,360**	**$ 1,208,302**	**$ 984,288**	**$ 2,088,731**	**$ 923,306**	**$ 1,012,166**	**$ 907,805**	**$ 1,027,805**

TOTAL WASTEWATER TREATMENT REVENUE	**$ 4,180,417**	**$ 4,721,258**	**$ 4,536,375**	**$ 5,697,689**	**$ 4,552,001**	**$ 4,323,690**	**$ 4,329,918**	**$ 4,628,434**

PERCENT OF REVENUE	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
RUTLAND CITY	76.3%	76.4%	77.2%	77.1%	79.4%	82.4%	79.1%	79.3%
RUTLAND TOWN	17.4%	16.9%	16.2%	15.8%	14.8%	11.8%	15.0%	14.7%
ALPINE	4.8%	4.9%	4.6%	5.3%	4.5%	3.9%	4.2%	4.2%
REDC	0.8%	0.9%	1.2%	1.1%	0.6%	1.2%	1.0%	1.0%
WATER SERVICE FEE	0.8%	0.8%	0.8%	0.7%	0.7%	0.8%	0.8%	0.7%

WWTF NON RATE REVENUE AND TOTALS

WASTEWATER TREATMENT - USAGE AND CUSTOMER BASE

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
METERED USAGE								
RUTLAND CITY	541,216	541,099	525,751	532,743	531,548	501,940	512,713	512,713
RUTLAND TOWN	98,151	94,127	93,386	102,565	101,690	65,468	93,114	93,114
TOWN Business Rate	11,250	11,139	8,776	6,050	5,653	4,580	5,117	5,117
ALPINE Killington & Mendon	31,917	31,857	28,216	34,326	27,429	22,139	25,342	25,342
ALPINE Rutland Town	5,209	6,231	5,983	8,906	8,152	6,000	6,513	6,513
REDC	2,148	2,479	3,147	2,750	1,986	2,884	2,658	2,658
Total Annual Usage	**689,891**	**686,932**	**665,260**	**687,340**	**676,458**	**603,011**	**645,457**	**645,457**
Usage is in 100's of Cubic Feet								
ANNUAL USAGE CHANGE	**-2.8%**	**-0.4%**	**-3.2%**	**-0.4%**	**-1.5%**	**-9.4%**	**-6.1%**	**-6.0%**
Change in Use since FY 2007	**-14.0%**	**-14.4%**	**-17.1%**	**-14.3%**	**-15.7%**	**-24.8%**	**-19.5%**	**-19.5%**
CUSTOMER BASE								
RUTLAND CITY	5,588	5,588	5,571	5,562	5,578	5,578	5,644	5,644
FLAT RATE /NO METER	47	47	40	53	51	51	153	153
RUTLAND TOWN	250	250	253	121	134	134	175	175
TOWN Business Rate	34	34	26	16	10	10	3	3
ALPINE Killington & Mendon	196	196	202	201	209	209	275	275
ALPINE Rutland Town	63	63	61	61	61	61	61	61
REDC	12	12	13	13	13	13	13	13
Total Billed Accounts	**6,190**	**6,190**	**6,166**	**6,027**	**6,056**	**6,056**	**6,324**	**6,324**

Note: Rutland Town Business Rate not seperated by code until 2009

WWTF USAGE AND CUSTOMERS

WASTEWATER TREATMENT - OPERATIONAL BUDGET

WASTEWATER TREATMENT	FISCAL 2015	FISCAL 2016	FISCAL 2017	FISCAL 2018	FISCAL 2019	FISCAL 2020	FISCAL 2021	FISCAL 2022
610-7-33-00	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
610-7-33-00-110.000 Salaries	$ 639,074	$ 672,008	$ 662,353	$ 674,461	$ 654,964	$ 711,223	$ 689,525	$ 707,391
610-7-33-00-114.000 Comp Cashed	$ 24,441	$ 26,371	$ 26,005	$ 12,179	$ -	$ -	$ -	$ -
610-7-32-00-120.000 Seasonal Employee	$ -	$ -	$ 3,205	$ 4,881	$ 6,213	$ 6,100	$ 6,100	$ 6,100
610-7-33-00-130.000 Overtime	$ 80,432	$ 84,243	$ 84,027	$ 104,447	$ 100,012	$ 75,000	$ 75,000	$ 75,000
610-7-33-00-210.000 Health Insurance	$ 159,612	$ 147,505	$ 156,775	$ 156,296	$ 150,313	$ 166,098	$ 177,215	$ 197,978
610-7-33-00-210.001 Dental Insurance	$ 6,369	$ 6,884	$ 6,165	$ 5,671	$ 5,860	$ 6,112	$ 6,585	$ 6,050
610-7-33-00-210.002 Vision Insurance	$ 2,125	$ 2,308	$ 2,332	$ 2,064	$ 1,894	$ 1,984	$ 2,167	$ 2,323
610-7-33-00-210.003 Life Insurance	$ 925	$ 877	$ 835	$ 1,190	$ 1,273	$ 1,198	$ 1,304	$ 1,203
610-7-33-00-210.005 HRA	$ 15,933	$ 10,269	$ 6,294	$ 7,346	$ 9,254	$ 20,625	$ 24,000	$ 23,625
610-7-33-00-210.006 Healthy Dollars Admin Fee	$ 969	$ 969	$ 904	$ 876	$ 1,008	$ 960	$ 972	$ 972
610-7-33-00-220.000 FICA/MEDI	$ 57,155	$ 60,117	$ 60,285	$ 59,688	$ 60,794	$ 56,251	$ 56,251	$ 56,251
610-7-33-00-230.000 VMERS Contributions	$ -	$ -	$ 726	$ 2,422	$ 6,026	$ 2,233	$ 5,091	$ 5,493
610-7-33-00-230.001 City Employer Pension	$ 54,190	$ 62,582	$ 62,848	$ 67,909	$ 73,219	$ 73,077	$ 69,538	$ 72,483
610-7-33-00-260.000 Workers' Comp	$ 39,006	$ 43,670	$ 37,488	$ 48,103	$ 51,430	$ 46,809	$ 57,280	$ 63,550
610-7-33-00-320.000 Professional Services	$ (2,043)	$ 12,643	$ 20,712	$ 38,173	$ 20,221	$ 27,000	$ 27,000	$ 27,000
610-7-33-00-340.000 Technical Services	$ 12,304	$ 25,278	$ 16,082	$ 20,911	$ 16,221	$ 20,000	$ 20,000	$ 20,000
610-7-33-00-421.000 Trash Removal	$ 109	$ 332	$ 324	$ 263	$ 326	$ 4,100	$ 4,100	$ 100
610-7-33-00-421.001 Sludge Removal	$ 474,342	$ 442,360	$ 499,643	$ 533,669	$ 615,401	$ 475,000	$ 570,000	$ 510,000
610-7-33-00-430.003 Repair & Maint - Bldgs	$ 71,990	$ 87,819	$ 111,157	$ 146,500	$ 94,527	$ 100,000	$ 100,000	$ 100,000
610-7-33-00-430.004 Repair & Maint - Plant	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-33-00-430.006 Repair & Maint - Equip	$ 44,986	$ 47,102	$ 51,639	$ 53,631	$ 56,077	$ 70,000	$ 70,000	$ 70,000
610-7-33-00-442.003 Copier Lease	$ -	$ -	$ 65	$ 1,062	$ 1,082	$ -	$ -	$ -
610-7-33-00-442.004 Software Lease	$ -	$ -	$ -	$ -	$ 1,924	$ -	$ -	$ -
610-7-33-00-520.000 Liability Insurance	$ 190,082	$ 203,721	$ 211,472	$ 199,372	$ 183,397	$ 215,000	$ 215,000	$ 215,000
610-7-33-00-530.000 Telephone	$ 1,730	$ 1,422	$ 1,638	$ 1,528	$ 1,993	$ 1,800	$ 1,800	$ 1,800
610-7-33-00-530.001 Cell Phones	$ 895	$ 977	$ 1,451	$ 1,158	$ 1,217	$ 1,890	$ 1,890	$ 1,890
610-7-33-00-530.002 Internet Service	$ 1,495	$ 1,676	$ 1,689	$ 1,689	$ 1,582	$ 1,700	$ 1,700	$ 1,700
610-7-33-00-530.004 CSO Monitoring	$ 575	$ 730	$ 695	$ 4,682	$ 2,983	$ 5,000	$ 5,000	$ 5,000
610-7-33-00-532.000 Training/Prof Dev	$ 2,040	$ 3,177	$ 2,621	$ 2,120	$ 2,010	$ 3,000	$ 3,000	$ 3,000
610-7-33-00-580.001 Auto Allowance	$ 600	$ 650	$ 600	$ 450	$ 350	$ 600	$ 600	$ 600
610-7-33-00-610.000 Office Supplies	$ -	$ 151	$ 817	$ -	$ 100	$ 600	$ 600	$ 600
610-7-33-00-610.003 Work Uniforms	$ 2,468	$ 3,486	$ 2,520	$ 2,528	$ 2,742	$ 2,520	$ 3,000	$ 3,000
610-7-33-00-610.009 Safety Supplies	$ 507	$ 1,922	$ 4,591	$ 1,487	$ 2,221	$ 2,500	$ 2,500	$ 2,500
610-7-33-00-610.017 Lab Supplies	$ 20,456	$ 22,001	$ 24,014	$ 28,157	$ 30,395	$ 20,000	$ 20,000	$ 20,000
610-7-33-00-610.020 Polymer	$ 19,258	$ 13,177	$ 15,885	$ 23,228	$ 18,198	$ 17,670	$ 18,024	$ 18,024
610-7-33-00-610.021 Sodium Aluminate	$ 93,466	$ 60,242	$ 52,094	$ 47,082	$ 68,740	$ 84,000	$ 85,680	$ 85,680
610-7-33-00-610.022 Sodium Hypochlorite	$ 23,672	$ 14,416	$ 21,723	$ 27,545	$ 34,773	$ 41,019	$ 41,839	$ 41,839
610-7-33-00-610.023 Sodium Bisulfite	$ 24,680	$ 17,502	$ 33,700	$ 33,139	$ 36,958	$ 45,437	$ 46,346	$ 46,346
610-7-33-00-610.045 Building Supplies	$ 6,844	$ 11,791	$ 6,949	$ 8,822	$ 8,357	$ 10,000	$ 10,000	$ 10,000
610-7-33-00-622.000 Electricity - Buildings	$ 288,781	$ 294,332	$ 292,664	$ 302,847	$ 290,297	$ 275,000	$ 305,950	$ 305,950
610-7-33-00-623.000 Propane	$ -	$ 1,452	$ -	$ 261	$ 12	$ 500	$ 200	$ 200
610-7-33-00-624.000 Fuel Oil	$ 78,806	$ 52,247	$ 43,662	$ 58,569	$ 76,733	$ 94,205	$ 85,167	$ 60,000
610-7-33-00-740.000 Machinery & Equipment	$ 15,652	$ 35,242	$ 37,700	$ 70,174	$ 52,257	$ 60,000	$ 60,000	$ 60,000
610-7-33-00-740.001 Computers & Hardware	$ 490	$ 1,323	$ 2,592	$ 922	$ 110	$ 650	$ 650	$ 650
610-7-33-00-800.001 State Fees	$ 12,500	$ 12,500	$ 13,013	$ 12,895	$ 100	$ 13,500	$ 13,500	$ 13,500
TOTAL WASTEWATER TREATMENT	**$ 2,466,916**	**$ 2,487,471**	**$ 2,581,953**	**$ 2,770,396**	**$ 2,743,563**	**$ 2,760,363**	**$ 2,884,575**	**$ 2,842,798**

WWTF OPERATIONAL BUDGET

WASTEWATER PUMP STATIONS - OPERATIONAL BUDGET

PUMP STATIONS	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
610-7-31-10 River Street PS	$ 14,534	$ 15,329	$ 20,098	$ 19,818	$ 28,476	$ 23,930	$ 23,930	$ 23,930
610-7-31-11 Country Club PS	$ 1,220	$ 1,950	$ 1,366	$ 2,594	$ 4,121	$ 2,360	$ 1,961	$ 2,404
610-7-31-12 Dorr Dr PS	$ 8,249	$ 6,054	$ 7,604	$ 5,020	$ 8,668	$ 5,499	$ 21,282	$ 20,560
610-7-31-13 Clement Rd PS	$ 8,438	$ 2,626	$ 2,093	$ 5,985	$ 3,121	$ 3,734	$ 3,621	$ 3,750
610-7-31-14 Belden Rd PS	$ 2,010	$ 11,926	$ 1,549	$ 1,614	$ 1,785	$ 2,072	$ 2,377	$ 2,798
610-7-31-15 Northeast Dr PS	$ 14,540	$ 2,028	$ 1,618	$ 2,483	$ 18,764	$ 17,010	$ 2,005	$ 2,453
610-7-31-16 Laverne Dr PS	$ 1,129	$ 1,440	$ 1,330	$ 1,786	$ 1,197	$ 1,517	$ 1,756	$ 2,210
610-7-31-17 Marolin St PS	$ 1,551	$ 994	$ 434	$ 2,029	$ 952	$ 1,310	$ 1,341	$ 1,816
Total Pump Stations Budgets	**$ 51,672**	**$ 42,345**	**$ 36,090**	**$ 41,327**	**$ 67,085**	**$ 57,432**	**$ 58,273**	**$ 59,920**

TOTAL WASTEWATER TREATMENT OPERATIONAL BUDGETS

TOTAL WASTEWATER TREATMENT	**$ 2,518,588**	**$ 2,529,817**	**$ 2,618,043**	**$ 2,811,723**	**$ 2,810,648**	**$ 2,817,795**	**$ 2,942,847**	**$ 2,902,718**

WWTF PUMP STATIONS BUDGET AND TOTALS

WASTEWATER TREATMENT - TRANSFERS TO GENERAL FUND

TRANSFERS TO GENERAL FUND 610-7-80-00	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
892.001 Transfer Out -Treasurer	$ 193,077	$ 177,990	$ 177,939	$ 190,270	$ 190,096	$ 188,316	$ 189,183	$ 199,376
892.003 Transfer Out - Attorney	$ 19,389	$ 20,771	$ 21,630	$ 23,206	$ 37,286	$ 36,320	$ 38,263	$ 38,200
892.005 Transfer Out - General Buildings	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
	$ 212,466	$ 198,761	$ 199,569	$ 213,476	$ 227,382	$ 224,635	$ 227,446	$ 237,576
Sewer Fund Share	**$ 212,466**	**$ 198,761**	**$ 199,569**	**$ 213,476**	**$ 227,382**	**$ 224,635**	**$ 227,446**	**$ 237,576**
892.006 Wastewater Treatment PILOT	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
TOTAL TO GENERAL FUND	**$ 212,466**	**$ 198,761**	**$ 199,569**	**$ 213,476**	**$ 227,382**	**$ 224,635**	**$ 227,446**	**$ 237,576**
Wastewater Treatment % Share	100%	100%	100%	100%	100%	100%	100%	100%

WASTEWATER TREATMENT - TRANSFERS TO DPW

TRANSFERS TO DPW 610-7-80-00	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
892.002 Transfer Out - AdmDPW	$ 307,427	$ 314,864	$ 341,641	$ 359,135	$ 392,818	$ 390,520	$ 372,300	$ 390,373
892.004 Transfer Out -Equipment Maint.	$ 149,117	$ 146,414	$ 137,565	$ 137,101	$ 145,883	$ 151,179	$ 151,415	$ 151,637
892.005 Transfer Out - SAS Meters to Water	$ -	$ -	$ -	$ -	$ 73,520	$ 294,474	$ 299,324	$ 212,793
Total Sewer Fund to DPW	$ 456,544	$ 461,278	$ 479,206	$ 496,236	$ 612,222	$ 836,173	$ 823,038	$ 754,803
Wastewater Treatment Share	**$ 365,235**	**$ 369,022**	**$ 383,365**	**$ 396,989**	**$ 489,777**	**$ 668,939**	**$ 658,431**	**$ 603,842**
Wastewater Treatment % Share	80%	80%	80%	80%	80%	80%	80%	80%

80/20 split with Sewer Collection starting in 2011 for better cost allocation

WWTF TRANSFERS

WASTEWATER TREATMENT - DEBT

BALANCE ON WASTEWATER TREATMENT DEBT	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
CSO Bond	$ 2,080,000	$ 1,920,000	$ 1,760,000	$ 1,600,000	$ 1,440,000	$ 1,280,000	$ 1,120,000	$ 960,000
CSO Phase 2A BOND	$ 1,040,000	$ 960,000	$ 880,000	$ 800,000	$ 720,000	$ 640,000	$ 560,000	$ 480,000
CSO Overflow Bond (paid FY 2013)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
NNSSP CSO 1272 Compliance				$ 3,630,430	$ 3,481,014	$ 3,328,609	$ 3,173,156	$ 3,014,594
Current Expense Note								
Sewer 25% share	$ 900,000	$ 750,000	$ 600,000	$ 450,000	$ 300,000	$ 150,000	$ -	$ -
H&H Study (RF1-193-1)								$ 251,022
Digester Rehab (RF1-235) net of 50% grant								$ 1,909,765
Force Main (RF1-236) estimate								$ 1,993,619
TOTAL WWTF DEBT	**$ 4,020,000**	**$ 3,630,000**	**$ 3,240,000**	**$ 6,480,430**	**$ 5,941,014**	**$ 5,398,609**	**$ 4,853,156**	**$ 8,609,000**
PRINCIPAL PAYMENTS								
CSO Bond	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000	$ 160,000
CSO Phase 2A BOND	$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000	$ 80,000
NNSSP CSO 1272 Compliance				$ 149,416	$ 152,405	$ 155,453	$ 158,562	$ 161,733
CURRENT EXPENSE NOTE								
Sewer 25% share	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ 150,000	$ -	$ -
H&H Study (RF1-193-1)								$ -
Digester Rehab (RF1-235) net of 50% grant								$ 56,031
Force Main (RF1-236) estimate								$ 58,988
TOTAL PRINCIPAL PAYMENTS	**$ 390,000**	**$ 390,000**	**$ 390,000**	**$ 539,416**	**$ 542,405**	**$ 545,453**	**$ 398,562**	**$ 516,751**
INTEREST PAYMENTS								
CSO Bond	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
CSO Phase 2A BOND	$ 48,970	$ 45,562	$ 42,118	$ 30,638	$ 35,094	$ 31,470	$ 22,000	$ 18,218
Current Expense Note								
Sewer 25% share	$ 26,825	$ 20,682	$ 16,500	$ 12,375	$ 8,250	$ 4,125	$ -	$ -
H&H Study (RF1-193-1)								$ -
Digester Rehab (RF1-235) net of 50% grant								$ 22,281
Force Main (RF1-236) estimate								$ 25,334
TOTAL INTEREST PAYMENTS	**$ 75,795**	**$ 66,244**	**$ 58,618**	**$ 43,013**	**$ 43,344**	**$ 35,595**	**$ 22,000**	**$ 65,833**
OTHER FEES								
NNSSP CSO 1272 Compliance				$ 149,000	$ 69,620	$ 66,572	$ 63,463	$ 60,292
TOTAL OTHER FEES	**$ -**	**$ -**	**$ -**	**$ 149,000**	**$ 69,620**	**$ 66,572**	**$ 63,463**	**$ 60,292**
TOTAL PAYMENTS FOR PRINCIPAL, INTEREST & OTHER	**$ 465,795**	**$ 456,244**	**$ 448,618**	**$ 731,429**	**$ 655,369**	**$ 647,620**	**$ 484,025**	**$ 642,876**

WWTF DEBT

WASTEWATER TREATMENT - SEWER FUND CAPITAL PLANNING

Annual Appropriation to Wastewater Treatment Capital Fund	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
CSO Phase 2A Bond Capital Fund	5%	5%	5%	5%	6%	6%	6%	5%
(*5%*) 6% of revenues*	*$ 199,062*	*$ 203,036*	*$ 213,819*	*$ 220,955*	$ 277,834	$ 259,421	$ 251,146	$ 231,422
TOTAL WWTF CAPITAL FUNDING	**$ 199,062**	**$ 203,036**	**$ 213,819**	**$ 220,955**	**$ 277,834**	**$ 259,421**	**$ 251,146**	**$ 231,422**

Activities & Balances in Wastewater Treatment Capital Fund	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
616-3-00-00 CSO II								
Beginning Balance**	$ 702,942	$ 271,270	$ 241,374	$ 338,347	$ 318,124	$ 548,050	$ 640,069	$ 576,215
Appropriation	$ 193,710	$ 203,036	$ 212,669	$ 220,955	$ 277,834	$ 282,207	$ 251,146	$ 231,422
Interest Income	$ 1,127	$ 655	$ 391	$ 2,391	$ 5,190	$ 5,651	$ -	$ 5,000
Misc Income	$ 11,500	$ 1,400	$ 4,891	$ 78,600	$ 6,419	$ 3,750	$ -	$ 4,000
Expenditure	$ (638,009)	$ (234,987)	$ (124,205)	$ (322,169)	$ (59,516)	$ (199,589)	$ (315,000)	$ (200,000)
Ending Balance	**$ 271,270**	**$ 241,374**	**$ 335,120**	**$ 318,124**	**$ 548,050**	**$ 640,069**	**$ 576,215**	**$ 616,636**
617-3-00-00 Vehicle and Equipment								
Beginning Balance	$ 20,000	$ 36,610	$ 76,610	$ 46,650	$ 66,659	$ 79,441	$ 28,779	$ 8,779
Appropriation - WWTP	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Appropriation - WWC (*others*)	*$ 30,000*	*$ 30,000*	*$ 30,000*	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Interest Income	$ -	$ -	$ -	$ 9	$ 36	$ 19	$ -	$ -
Expenditure - WWTP	$ (23,390)	$ -	$ -	$ -	$ (7,254)	$ (70,681)	$ -	$ -
Expenditure - WWC (*others*)	$ -	$ -	*$ (33,099)*	$ -	$ -	$ -	$ (40,000)	$ -
Ending Balance	**$ 36,610**	**$ 76,610**	**$ 83,511**	**$ 66,659**	**$ 79,441**	**$ 28,779**	**$ 8,779**	**$ 28,779**

[1] The FY22 projects are River Street suction pipe replacement 50K; Belt Filter Press rehab 50k; Dewatering Bld roof replacement 60k; Gas detector replacement 40k

WASTEWATER TREATMENT CAPITAL PLAN ANNUAL FUNDING	**$ 203,710**	**$ 213,036**	**$ 222,669**	**$ 230,955**	**$ 287,834**	**$ 292,207**	**$ 261,146**	**$ 241,422**
WASTEWATER TREATMENT CAPITAL PLAN FUNDING BALANCE	**$ 307,880**	**$ 317,984**	**$ 418,631**	**$ 384,782**	**$ 627,491**	**$ 668,848**	**$ 584,994**	**$ 645,415**

***CSO II Bond funding required City of Rutland to establish a capital fund of 5% of Wastewater Treatment Revenues for WWTF maintenance, improvements or repairs. See Board of Aldermen Resolution dated April 5, 2004. FY19 proposed increase to 6%.**

**** Balance of CSO Project - Related Funds placed in Fund**

WWTF CAPITAL

SEWER FUND
WASTEWATER COLLECTION

SUMMARY OF WASTEWATER COLLECTION (WWC) RATE STUDY - FISCAL 2022

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
SEWER COLLECTION RATES								
Rates per 100 cubic feet (748 gallons)								
Rutland City	$ 1.195	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719
Rutland Town	$ 1.195	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719
Alpine Killington/Mendon	$ 1.195	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719
Alpine Rutland Town	$ 1.195	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719
RATE CHANGE	**6.33%**	**0.00%**	**4.62%**	**7.50%**	**0.00%**	**0.00%**	**0.00%**	**27.88%**
REVENUES	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
Billed at Rates	$ 843,305	$ 847,441	$ 867,659	$ 945,630	$ 946,999	$ 839,486	$ 874,031	$ 1,140,188
Non Rate	$ 450	$ 697	$ 1,524	$ 2,737	$ 933	$ 2,080	$ 950	$ 950
Total Revenues	**$ 843,755**	**$ 848,138**	**$ 869,183**	**$ 948,367**	**$ 947,932**	**$ 841,566**	**$ 874,981**	**$ 1,141,138**
EXPENDITURES								
Operational Budget	$ 601,560	$ 548,289	$ 553,538	$ 753,335	$ 647,822	$ 774,381	$ 716,751	$ 730,343
Capital Planning	$ 76,679	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000
Transfers to DPW	$ 91,309	$ 92,256	$ 95,841	$ 99,247	$ 107,740	$ 108,340	$ 104,743	$ 150,961
Transfers to General Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ 1	$ -
Debt Principle & Interest	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 184,835
Total Expenditures	**$ 797,760**	**$ 743,757**	**$ 752,591**	**$ 955,794**	**$ 858,775**	**$ 985,932**	**$ 924,707**	**$ 1,141,138**
Net of Revenue vs Expenditures	**$ 45,995**	**$ 104,381**	**$ 116,591**	**$ (7,427)**	**$ 89,157**	**$ (144,366)**	**$ (49,726)**	**$ -**

PERCENT OF TOTAL EXPENDITURES								
Operational Budget	75.4%	73.7%	73.6%	78.8%	75.4%	78.5%	77.5%	64.0%
Capital Planning	9.6%	10.1%	10.0%	7.8%	8.7%	7.6%	8.1%	6.6%
Transfers to DPW	11.4%	12.4%	12.7%	10.4%	12.5%	11.0%	11.3%	13.2%
Transfers to General Fund	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Debt Principle & Interest	3.5%	3.8%	3.7%	3.0%	3.3%	2.9%	3.1%	16.2%

WWC SUMMARY

WASTEWATER COLLECTION - RATES REVENUE BY USER CLASS

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
RUTLAND CITY								
METERED USAGE	$ 647,097	$ 653,872	$ 669,105	$ 716,006	$ 736,700	$ 693,539	$ 689,173	$ 912,120
CITY FLAT RATE	$ 26,755	$ 26,842	$ 26,958	$ 26,639	$ 25,041	$ 10,279	$ 10,000	$ 10,000
Total Rutland City	**$ 673,852**	**$ 680,714**	**$ 696,063**	**$ 742,645**	**$ 761,741**	**$ 703,819**	**$ 699,173**	**$ 922,120**
RUTLAND TOWN								
METERED USAGE	$ 125,031	$ 120,669	$ 128,517	$ 149,097	$ 142,174	$ 96,787	$ 132,039	$ 160,711
BUSINESS RATE								
Total Rutland Town	**$ 125,031**	**$ 120,669**	**$ 128,517**	**$ 149,097**	**$ 142,174**	**$ 96,787**	**$ 132,039**	**$ 160,711**
ALPINE PIPELINE								
KILLINGTON & MENDON								
METERED USAGE	$ 38,197	$ 38,512	$ 35,710	$ 41,910	$ 36,864	$ 30,590	$ 34,064	$ 46,218
RUTLAND TOWN								
METERED USAGE	$ 6,225	$ 7,545	$ 7,368	$ 11,977	$ 6,220	$ 8,290	$ 8,755	$ 11,139
Total Alpine	**$ 44,422**	**$ 46,057**	**$ 43,079**	**$ 53,887**	**$ 43,084**	**$ 38,880**	**$ 42,819**	**$ 57,358**
TOTAL REVENUE FROM RATES	**$ 843,305**	**$ 847,441**	**$ 867,659**	**$ 945,630**	**$ 946,999**	**$ 839,486**	**$ 874,031**	**$ 1,140,188**

WASTEWATER COLLECTION - NON RATE REVENUE

610-6-30-01								
321.002 Sewer Permits	$ 450	$ 600	$ 600	$ 2,400	$ 660	$ 2,080	$ 700	700
344.006 Sewer Repair Services	$ -	$ 97	$ 924	$ 337	$ 273	$ -	$ 250	250

Allocation Fees were waived by Board of Aldermen in Fiscal 2011

TOTAL NON RATE REVENUE	**$ 450**	**$ 697**	**$ 1,524**	**$ 2,737**	**$ 933**	**$ 2,080**	**$ 950**	**$ 950**

TOTAL REVENUE	**$ 843,755**	**$ 848,138**	**$ 869,183**	**$ 948,367**	**$ 947,932**	**$ 841,566**	**$ 874,981**	**$ 1,141,138**

WWC TOTAL REVENUE

WASTEWATER COLLECTION - USAGE AND CUSTOMER BASE

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
METERED USAGE								
RUTLAND CITY	541,216	541,099	525,751	532,743	531,548	501,940	512,713	530,651
RUTLAND TOWN	109,401	105,266	102,163	108,615	107,343	70,048	98,231	93,498
ALPINE Killington & Mendon	31,917	31,857	28,216	34,326	27,429	22,139	25,342	26,889
ALPINE Rutland Town	5,209	6,231	5,983	8,906	8,152	6,000	6,513	6,481
Total Annual Usage	**687,743**	**684,453**	**662,113**	**684,590**	**674,472**	**600,128**	**642,799**	**657,518**
Usage is in 100's of Cubic Feet								
ANNUAL USAGE CHANGE	**-1.9%**	**0.0%**	**-2.8%**	**1.3%**	**-0.2%**	**-5.6%**	**2.1%**	**5.7%**
Change in Use since FY 2008	**-2.8%**	**-0.5%**	**-3.3%**	**3.4%**	**-1.5%**	**-11.0%**	**7.1%**	**2.3%**
CUSTOMER BASE								
RUTLAND CITY	5,588	5,588	5,571	5,562	5,578	5,578	5,644	5,644
FLAT RATE /NO METER	47	47	40	53	51	51	153	153
RUTLAND TOWN	284	284	279	137	144	144	178	178
ALPINE Killington & Mendon	196	196	202	201	209	209	275	275
ALPINE Rutland Town	63	63	61	61	61	61	61	61
Total Billed Accounts	**6,178**	**6,178**	**6,153**	**6,014**	**6,043**	**6,043**	**6,311**	**6,311**
PERCENT OF REVENUE								
RUTLAND CITY	79.9%	80.3%	80.2%	78.5%	80.4%	83.8%	80.0%	80.9%
RUTLAND TOWN	15.5%	14.8%	14.2%	15.5%	14.8%	14.2%	14.8%	14.2%
ALPINE	5.3%	5.4%	5.0%	5.7%	4.5%	4.6%	4.9%	5.0%

WWC USAGE AND CUSTOMERS

WASTEWATER COLLECTION - OPERATIONAL BUDGET

SEWER COLLECTION 610-7-30-00	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
610-7-31-00-110.000 Salaries	$ 313,104	$ 268,600	$ 255,675	$ 302,742	$ 322,241	$ 316,713	$ 331,847	$ 340,957
610-7-31-00-114.000 Comp Cashed	$ 2,039	$ 1,972	$ 8,743	$ 3,640	$ 263	$ -	$ -	$ -
610-7-31-00-120.000 Seasonal Employee	$ 4,268	$ 4,780	$ 5,847	$ 4,188	$ 4,617	$ 6,500	$ 6,500	$ 6,500
610-7-31-00-130.000 Overtime	$ 3,050	$ 2,194	$ 10,691	$ 5,895	$ 11,803	$ 4,000	$ 4,000	$ 4,000
610-7-31-00-210.000 Health Insurance	$ 74,375	$ 63,936	$ 65,573	$ 86,319	$ 102,130	$ 80,559	$ 99,223	$ 123,638
610-7-31-00-210.001 Dental Insurance	$ 2,097	$ 2,281	$ 2,201	$ 2,508	$ 4,714	$ 2,890	$ 4,078	$ 3,915
610-7-31-00-210.002 Vision Insurance	$ 746	$ 801	$ 932	$ 1,030	$ 1,284	$ 1,058	$ 1,142	$ 1,228
610-7-31-00-210.003 Life Insurance	$ 331	$ 353	$ 290	$ 562	$ 689	$ 649	$ 685	$ 685
610-7-31-00-210.005 HRA	$ 18,808	$ 14,370	$ 14,343	$ 17,000	$ 18,134	$ 16,875	$ 13,500	$ 15,188
610-7-31-00-210.006 Healthy Dollars Admin Fees	$ 431	$ 431	$ 431	$ 535	$ 753	$ 600	$ 540	$ 540
610-7-31-00-220.000 FICA/MEDI	$ 23,782	$ 23,866	$ 23,722	$ 24,879	$ 25,207	$ 25,032	$ 26,190	$ 26,886
610-7-31-00-230.000 VMERS Contributions	$ -	$ -	$ 3,229	$ 4,527	$ 5,227	$ 4,590	$ 5,491	$ 5,910
610-7-31-00-230.001 City Employer Pension	$ 27,001	$ 29,914	$ 29,849	$ 23,220	$ 25,398	$ 25,597	$ 27,331	$ 28,517
610-7-31-00-250.000 Unemployment Comp	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-260.000 Workers' Comp	$ 16,969	$ 18,830	$ 16,218	$ 19,802	$ 21,543	$ 20,058	$ 26,504	$ 29,478
610-7-31-00-320.000 Professional Services	$ 8,793	$ 24,479	$ 11,297	$ 13,439	$ 11,952	$ 15,000	$ 15,000	$ 15,000
610-7-31-00-340.000 Technical Services	$ -	$ -	$ -	$ -	$ 463	$ -	$ -	$ -
610-7-31-00-421.000 Trash Removal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-421.002 Disposal Fees	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-430.003 Repair & Maint - Bldgs	$ 1,888	$ 4,187	$ 5,576	$ 7,565	$ 6,704	$ 1,000	$ 1,000	$ 1,000
610-7-31-00-430.006 Repair & Maint-Equip	$ 690	$ 4,598	$ 3,849	$ 3,085	$ 2,211	$ 5,000	$ 5,000	$ 5,000
610-7-31-00-441.000 Real Estate Lease	$ 5,700	$ 5,225	$ 5,225	$ 5,700	$ 5,700	$ 5,700	$ 5,700	$ 5,700
610-7-31-00-442.000 Rental Of Equipment	$ 585	$ -	$ 2,539	$ 6,578	$ 301	$ -	$ -	$ -
610-7-31-00-442.001 Vehicle Lease	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-450.000 Construction Services	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-520.000 Liability Insurance	$ 5,383	$ -	$ 1,000	$ 2,870	$ 4,525	$ 5,000	$ 5,000	$ 5,000
610-7-31-00-530.000 Telephone	$ 1,522	$ 1,463	$ 770	$ 1,924	$ -	$ 1,500	$ 1,500	$ 1,500
610-7-31-00-530.001 Cell Phones/Pagers	$ 250	$ 251	$ 251	$ 365	$ 48	$ -	$ -	$ -
610-7-31-00-531.000 Postage	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-532.000 Training/Prof Development	$ -	$ 830	$ 366	$ 236	$ -	$ 300	$ 300	$ 300
610-7-31-00-610.003 Work Uniforms	$ 1,371	$ 1,239	$ 1,764	$ 1,244	$ 1,105	$ 1,260	$ 1,500	$ 1,500
610-7-31-00-610.009 Safety Supplies	$ 2,035	$ 1,678	$ 4,443	$ 3,278	$ 2,902	$ 3,000	$ 3,000	$ 3,000
610-7-31-00-610.026 Top Soil & Seed	$ 3,183	$ 4,063	$ 1,362	$ 3,504	$ 384	$ 3,000	$ 3,000	$ 3,000
610-7-31-00-610.027 Gravel Stone & Sand	$ 8,983	$ 8,836	$ 5,499	$ 12,479	$ 2,278	$ 12,500	$ 12,500	$ 12,500
610-7-31-00-610.030 Cold Patch	$ -	$ -	$ (1,208)	$ -	$ -	$ -	$ -	$ -
610-7-31-00-610.033 PVC Pipe & Fittings	$ 18,204	$ 32,601	$ 19,591	$ 11,938	$ 33,897	$ 25,000	$ 25,000	$ 25,000
610-7-31-00-610.035 Sewer Rods	$ -	$ 3,072	$ -	$ -	$ 24	$ -	$ -	$ -
610-7-31-00-610.037 CB Frames & Grates	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-610.038 Catch Basin Restoration	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
610-7-31-00-610.039 Manhole Frames & Covers	$ 11,942	$ 3,016	$ 11,614	$ 12,206	$ 8,397	$ 8,000	$ 8,000	$ 20,000
610-7-31-00-610.040 Manhole Restoration	$ -	$ 2,391	$ 12,550	$ -	$ -	$ 2,500	$ 2,500	$ 2,500
610-7-31-00-610.041 Concrete & Precast	$ 14,712	$ (1,490)	$ 22,008	$ 8,422	$ 15,426	$ 29,500	$ 29,500	$ 29,500
610-7-31-00-610.044 Tools	$ 2,494	$ 6,412	$ 2,290	$ 6,435	$ 1,859	$ 2,000	$ 2,000	$ 2,000
610-7-31-00-623.000 Propane	$ 4,676	$ 2,874	$ 4,892	$ 5,872	$ 4,960	$ 5,000	$ 5,220	$ 6,400
610-7-31-00-624.000 Fuel Oil	$ -	$ -	$ 115	$ -	$ -	$ -	$ -	$ -
610-7-31-00-740.000 Machinery & Equipment	$ 2,820	$ 10,236	$ -	$ 5,130	$ 685	$ 4,000	$ 4,000	$ 4,000
610-7-31-00-742.000 Vehicles	$ 19,327	$ -	$ -	$ 144,217	$ -	$ 140,000	$ 40,000	$ -
610-7-31-00-810.000 Depreciation Expense	$ -	$ 678,103	$ -	$ -	$ -	$ -	$ -	$ -
WW COLLECTION OPERATING BUDGET	**$ 601,560**	**$ 548,289**	**$ 553,538**	**$ 753,335**	**$ 647,822**	**$ 774,381**	**$ 716,751**	**$ 730,343**

WWC OPERATING BUDGET

WASTEWATER COLLECTION - TRANSFERS TO DPW

TRANSFERS TO DPW 600-7-99-00	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
892.002 Transfer Out - AdmDPW	$ 307,427	$ 314,864	$ 341,641	$ 359,135	$ 392,818	$ 390,520	$ 372,300	$ 390,373
892.004 Transfer Out -Equipment Maint.	$ 149,117	$ 146,414	$ 137,565	$ 137,101	$ 145,883	$ 151,179	$ 151,415	$ 151,637
892.005 Transfer Out - SAS Meters to Water	$ -	$ -	$ -	$ -	$ -	$ 294,474	$ 299,324	$ 212,793
Total Sewer Fund to DPW	$ 456,544	$ 461,278	$ 479,206	$ 496,236	$ 538,701	$ 541,699	$ 523,715	$ 754,803
Sewer Collection Share	**$ 91,309**	**$ 92,256**	**$ 95,841**	**$ 99,247**	**$ 107,740**	**$ 108,340**	**$ 104,743**	**$ 150,961**
Sewer Collection % Share	20%	20%	20%	20%	20%	20%	20%	20%

80/20 split with Wastewater Treatment since 2011

WASTEWATER COLLECTION - DEBT

	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
ARRA (Stimulus)								
Crescent & West St Projects FY 11	$ 424,148	$ 404,395	$ 384,247	$ 363,696	$ 342,734	$ 320,165	$ 298,356	$ 276,111
NWNSS Phase 1A (RF1-238)								$ 2,353,358
TOTAL BALANCE ON DEBT	**$ 424,148**	**$ 404,395**	**$ 384,247**	**$ 363,696**	**$ 342,734**	**$ 320,165**	**$ 298,356**	**$ 2,629,469**
PRINCIPAL PAYMENTS								
ARRA (Stimulus)								
Crescent & West St Projects FY 11	$ 19,753	$ 20,148	$ 20,551	$ 20,962	$ 21,381	$ 21,809	$ 22,245	$ 22,890
NWNSS Phase 1A (RF1-238)								$ 65,635
Vactor Lease								$ 53,028
TOTAL PRINCIPAL PAYMENTS	**$19,753**	**$20,148**	**$20,551**	**$20,962**	**$21,381**	**$21,809**	**$22,245**	**$141,553**
INTEREST PAYMENTS								
ARRA (Stimulus) 0% Interest								
Crescent & West St Projects FY 11	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
NWNSS Phase 1A (RF1-238)								$ 28,240
Vactor Lease								$ 9,520
TOTAL INTEREST PAYMENTS	$ -	$ -	$ -	$ -	$ -	$ -	$ -	**$ 37,760**
OTHER FEES								
ARRA (Stimulus) 2% Admin Fee	$ 8,459	$ 8,064	$ 7,661	$ 7,250	$ 6,831	$ 6,403	$ 5,967	$ 5,522
Crescent & West St Projects FY 11								
TOTAL OTHER FEES	**$ 8,459**	**$ 8,064**	**$ 7,661**	**$ 7,250**	**$ 6,831**	**$ 6,403**	**$ 5,967**	**$ 5,522**
TOTAL DEBT PAYMENTS	**$ 28,212**	**$ 28,212**	**$ 28,212**	**$ 28,212**	**$ 28,212**	**$ 28,212**	**$ 28,212**	**$ 184,835**

WASTEWATER COLLECTION - CAPITAL PLANNING

Sewer Capital Improvements Fund	FISCAL 2015 Actual	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Budget	FISCAL 2022 Proposed
615-3-00-00 Sewer Capital Improvements								
Beginning Balance	$ 203,319	$ 271,678	$ 125,433	$ 195,323	$ 249,441	$ 346,471	$ 427,526	$ 434,726
Appropriation	$ 66,679	$ 65,000	$ 65,000	$ 65,000	$ 65,000	$ 65,000	$ 65,000	$ 65,000
Sewer Allocation Fees	$ 1,568	$ 2,560	$ 6,764	$ 1,680	$ 28,132	$ 12,552	$ 2,000	$ 10,000
Interest Income	$ 111	$ 195	$ 225	$ 1,002	$ 3,898	$ 3,503	$ 200	$ 3,000
Expenditure	$ -	$ (214,000)	$ -	$ (13,564)	$ -	$ -	$ (60,000)	$ (60,000)
Ending Balance	$ 271,678	$ 125,433	$ 197,422	$ 249,441	$ 346,471	$ 427,526	$ 434,726	$ 452,726
617-3-00-00 Vehicles and Equipment								
Beginning Balance	$ 20,000	$ 36,610	$ 76,610	$ 46,650	$ 66,659	$ 79,441	$ 28,779	$ 8,779
Appropriation - WWC	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Appropriation - WWT (others)	*$ 30,000*	*$ 30,000*	*$ 30,000*	$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000
Interest Income	$ -	$ -	$ -	$ 9	$ 36	$ 19	$ -	$ -
Expenditure - WWC	$ -	$ -	$ -	$ -	$ -	$ -	$ (40,000)	$ -
Expenditure -WWT (others)	*$ (23,390)*	*$ -*	*$ (33,099)*	$ -	$ (7,254)	$ (70,681)	$ -	$ -
Ending Balance	**$ 36,610**	**$ 76,610**	**$ 83,511**	**$ 66,659**	**$ 79,441**	**$ 28,779**	**$ 8,779**	**$ 28,779**

[1] The project for FY22 is the lining of additional trunk sewers ($60,000).

SEWER COLLECTION CAPITAL PLAN Annual Funding	**$ 76,679**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**	**$ 75,000**
SEWER COLLECTION CAPITAL PLAN FUNDING BALANCE	**$ 308,288**	**$ 202,043**	**$ 280,933**	**$ 316,100**	**$ 425,912**	**$ 456,305**	**$ 443,505**	**$ 481,505**

WWC CAPITAL

129th ANNUAL REPORT



CITY OF RUTLAND, VERMONT



Fiscal Year July 1, 2020 – June 30, 2021

SEWER FUND DEBT REPAYMENT SCHEDULE AS OF 6/30/2021 - Principal + Interest										
	CSO RF1-052	CSO 2015	CSO AR1-009	RF1-166	**RF1-193**	**Digester RF235**	**Force Main RF236***	**Long T Control RF258***	**NWNSSP RF237***	Annual total
FY22	$ 160,000.00	$ 98,218.00	$ 28,212.41	$ 222,025.19	$12,032.00		$ 55,142.18	$ -	$ 93,875.52	669,505
FY23	$ 160,000.00	$ 94,519.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	863,877
FY24	$ 160,000.00	$ 91,031.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	860,389
FY25	$ 160,000.00	$ 87,435.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	880,433
FY26	$ 160,000.00	$ 83,996.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	876,994
FY27	$ 160,000.00	$ 81,924.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	874,922
FY28	$ 160,000.00	$ 80,010.00	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	873,008
FY29	$ -	$ -	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	632,998
FY30	$ -	$ -	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	632,998
FY31	$ -	$ -	$ 28,212.41	$ 222,025.19	$12,032.00	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	632,998
FY32	$ -	$ -	$ 28,212.41	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	620,966
FY33	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	592,753
FY34	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ 23,640.00	$ 93,875.52	592,753
FY35	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	569,113
FY36	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	569,113
FY37	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	569,113
FY38	$ -	$ -	$ -	$ 222,025.19	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	569,113
FY39	$ -	$ -	$ -	$ -	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	347,088
FY40	$ -	$ -	$ -	$ -	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	347,088
FY41	$ -	$ -	$ -	$ -	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	347,088
FY42	$ -	$ -	$ -	$ -	$ -	$ 198,070.45	$ 55,142.18	$ -	$ 93,875.52	347,088
FY43	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY44	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY45	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY46	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY47	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY48	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY49	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY50	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
FY51	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,142.18	$ -	$ 93,875.52	149,018
	1,120,000.00	**617,133.00**	**310,336.51**	**3,774,428.23**	**120,320.00**	**3,961,409.00**	**1,654,265.40**	**236,400.00**	**2,816,265.60**	14,610,558
	* - These are estimates, projects are not complete and repayment schedules have not been finalized.									

SUMMARY OF WATER RATE STUDY - FISCAL 2023

WATER RATES	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Actual	FISCAL 2022 Budget	FISCAL 2023 Proposed
Rates per 100 cft (748 gallons):								
Rutland City Water Rates	$ 3.397	$ 3.397	$ 3.261	$ 3.359	$ 3.359	$ 3.359	$ 2.968	$ 2.923
Rutland Town Water Rates	$ 4.528	$ 4.528	$ 4.348	$ 4.477	$ 4.478	$ 4.478	$ 3.956	$ 3.897
Rates per sq ft of Sprinklered area:								
Rutland City Stand by Water	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435	$ 0.0435
Rutland Town Stand by Water	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148	$ 0.148
Service Fee (Quarterly)	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050	$ 29.050
RATE CHANGE	**0.00%**	**0.00%**	**-4.00%**	**3.00%**	**0.00%**	**0.00%**	**-11.64%**	**-1.50%**
REVENUES								
Billed at Rates	$ 3,478,912	$ 3,436,382	$ 3,428,974	$ 3,540,489	$ 3,329,709	$ 3,245,557	$ 3,184,318	$ 3,137,714
Non Rates	$ 114,966	$ 61,260	$ 143,889	$ 155,095	$ 58,289	$ 72,331	$ 66,544	$ 58,562
Transfer from Sewer - SAS Meters	$ -	$ -	$ -	$ 78,565	$ 294,474	$ 212,793	$ 212,793	$ 192,764
Year End Adjustment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenues	**$ 3,593,878**	**$ 3,497,642**	**$ 3,572,863**	**$ 3,774,149**	**$ 3,682,473**	**$ 3,530,682**	**$ 3,463,655**	**$ 3,389,039**
EXPENDITURES								
Operational Budget	$ 1,409,915	$ 1,485,918	$ 1,723,377	$ 1,823,598	$ 1,787,437	$ 1,623,775	$ 1,808,835	$ 1,754,208
Capital Planning	$ 327,500	$ 347,500	$ 340,000	$ 375,000	$ 375,000	$ 570,000	$ 270,000	$ 250,000
Transfers to DPW	$ 461,278	$ 479,206	$ 496,236	$ 538,701	$ 541,699	$ 523,715	$ 540,428	$ 521,530
Transfers to General Fund	$ 198,761	$ 199,569	$ 213,476	$ 227,382	$ 224,636	$ 227,446	$ 237,576	$ 248,915
Prior Year Adjustments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Principal & Interest	$ 784,372	$ 767,308	$ 750,535	$ 762,211	$ 1,017,619	$ 541,491	$ 593,109	$ 564,385
Total Expenditures	**$ 3,181,826**	**$ 3,279,501**	**$ 3,523,624**	**$ 3,726,892**	**$ 3,946,390**	**$ 3,486,427**	**$ 3,449,947**	**$ 3,339,039**
Net of Revenue vs. Expenditures	**$ 412,052**	**$ 218,141**	**$ 49,239**	**$ 47,257**	**$ (263,918)**	**$ 44,255**	**$ 13,708**	**$ 50,000**
PERCENT OF TOTAL EXPENDITURES								
Operational Budget	44.3%	45.3%	48.9%	48.9%	45.3%	46.6%	52.4%	52.5%
Capital Planning	10.3%	10.6%	9.6%	10.1%	9.5%	16.3%	7.8%	7.5%
Transfers to DPW	14.5%	14.6%	14.1%	14.5%	13.7%	15.0%	15.7%	15.6%
Transfers to General Fund	6.2%	6.1%	6.1%	6.1%	5.7%	6.5%	6.9%	7.5%
Debt Principal & Interest	24.7%	23.4%	21.3%	20.5%	25.8%	15.5%	17.2%	16.9%

WATER SUMMARY

SUMMARY OF WASTEWATER TREATMENT FACILITY (WWTF) RATE STUDY - FISCAL 2023

Rates per 100 cubic feet (748 gallons)	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Actual	FISCAL 2022 Budget	FISCAL 2023 Proposed
WASTEWATER TREATMENT RATES								
Rutland City	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655	$ 4.655
Rutland Town	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655	$ 4.655
Rutland Town Business Rate	$ 16.314	$ 17.450	$ 17.624	$ 17.624	$ 17.624	$ 17.624	$ 18.621	$ 18.621
Alpine Killington/Mendon	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655	$ 4.655
Alpine Rutland Town	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655	$ 4.655
REDC	$ 4.079	$ 4.363	$ 4.406	$ 4.406	$ 4.406	$ 4.406	$ 4.655	$ 4.655
REDC Business Rate	$ 8.157	$ 8.725	$ 8.812	$ 8.812	$ 8.812	$ 8.812	$ 9.311	$ 9.311
Sewer Only - Water Service Fee	$ 29.050	$ 31.073	$ 31.384	$ 31.384	$ 31.384	$ 31.384	$ 29.050	$ 29.050
Sewer Service Fee	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550	$ 17.550
RATE CHANGE	**0.0%**	**7.0%**	**1.0%**	**0.0%**	**0.0%**	**0.0%**	**5.7%**	**0.0%**

REVENUES	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
Billed at Rates	$ 3,512,956	$ 3,552,087	$ 3,608,959	$ 3,626,736	$ 3,284,524	$ 3,328,706	$ 3,588,197	$ 3,672,299
Non Rates	$ 1,208,302	$ 984,288	$ 2,088,731	$ 923,306	$ 1,012,166	$ 1,217,085	$ 916,568	$ 1,050,196
NNSSP VT Appropriation			$ -	$ 78,565	$ -	$ -	$ -	$ -
Year End Adjustment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Revenues	**$ 4,721,258**	**$ 4,536,375**	**$ 5,697,689**	**$ 4,628,607**	**$ 4,296,690**	**$ 4,545,791**	**$ 4,504,765**	**$ 4,722,495**
EXPENDITURES								
Operational Budget	$ 2,529,817	$ 2,618,043	$ 2,811,723	$ 2,810,648	$ 2,817,795	$ 2,936,887	$ 2,900,636	$ 2,942,737
CSO Phase 2A Bond Capital Fund	$ 213,036	$ 222,669	$ 230,955	$ 287,716	$ 292,207	$ 294,466	$ 261,146	$ 236,125
Transfers to General Fund	$ 198,761	$ 199,569	$ 213,476	$ 227,382	$ 224,635	$ 227,446	$ 237,576	$ 248,915
Payment in Lieu of Taxes (PILOT)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Transfers to DPW	$ 369,022	$ 383,365	$ 396,989	$ 489,777	$ 668,939	$ 658,431	$ 602,577	$ 571,435
Prior Year Adjustments	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Principal & Interest	$ 456,244	$ 448,618	$ 731,429	$ 655,369	$ 647,620	$ 484,025	$ 487,196	$ 741,789
Total Expenditures	**$ 3,766,880**	**$ 3,872,263**	**$ 4,384,572**	**$ 4,470,893**	**$ 4,651,195**	**$ 4,601,255**	**$ 4,489,130**	**$ 4,741,000**
Net of Revenue vs Expenditures	**$ 954,378**	**$ 664,112**	**$ 1,313,117**	**$ 157,715**	**$ (354,505)**	**$ (55,464)**	**$ 15,635**	**$ (18,505)**

Percent of Total Expenditures								
Operational Budget	67.2%	67.6%	64.1%	62.9%	60.6%	63.8%	64.6%	62.1%
CSO Phase 2A Bond Capital Fund	5.7%	5.8%	5.3%	6.4%	6.3%	6.4%	5.8%	5.0%
Transfers to General Fund	5.3%	5.2%	4.9%	5.1%	4.8%	4.9%	5.3%	5.3%
Payment in Lieu of Taxes (PILOT)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Transfers to DPW	9.8%	9.9%	9.1%	11.0%	14.4%	14.3%	13.4%	12.1%
Debt Principal & Interest	12.1%	11.6%	16.7%	14.7%	13.9%	10.5%	10.9%	15.6%

WWTF SUMMARY

SUMMARY OF WASTEWATER COLLECTION (WWC) RATE STUDY - FISCAL 2023

	FISCAL 2016 Actual	FISCAL 2017 Actual	FISCAL 2018 Actual	FISCAL 2019 Actual	FISCAL 2020 Actual	FISCAL 2021 Actual	FISCAL 2022 Budget	FISCAL 2023 Proposed
SEWER COLLECTION RATES								
Rates per 100 cubic feet (748 gallons)								
Rutland City	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719	$ 1.823
Rutland Town	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719	$ 1.823
Alpine Killington/Mendon	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719	$ 1.823
Alpine Rutland Town	$ 1.195	$ 1.250	$ 1.344	$ 1.344	$ 1.344	$ 1.344	$ 1.719	$ 1.823
RATE CHANGE	**0.00%**	**4.62%**	**7.50%**	**0.00%**	**0.00%**	**0.00%**	**27.88%**	**6.05%**
REVENUES	Actual	Actual	Actual	Actual	Actual	Actual	Budget	Proposed
Billed at Rates	$ 847,441	$ 867,659	$ 945,630	$ 946,999	$ 839,486	$ 961,485	$ 1,114,888	$ 1,208,510
Non Rate	$ 697	$ 1,524	$ 2,737	$ 933	$ 2,080	$ (286)	$ 950	$ 950
Total Revenues	**$ 848,138**	**$ 869,183**	**$ 948,367**	**$ 947,932**	**$ 841,566**	**$ 961,199**	**$ 1,115,838**	**$ 1,209,460**
EXPENDITURES								
Operational Budget	$ 548,289	$ 553,538	$ 753,335	$ 647,822	$ 774,381	$ 714,775	$ 727,366	$ 828,191
Capital Planning	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 75,000	$ 50,000
Transfers to DPW	$ 92,256	$ 95,841	$ 99,247	$ 107,740	$ 108,340	$ 104,743	$ 108,086	$ 142,859
Transfers to General Fund	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Debt Principle & Interest	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 28,212	$ 184,835	$ 188,410
Total Expenditures	**$ 743,757**	**$ 752,591**	**$ 955,794**	**$ 858,775**	**$ 985,932**	**$ 922,730**	**$ 1,095,286**	**$ 1,209,460**
Net of Revenue vs Expenditures	**$ 104,381**	**$ 116,591**	**$ (7,427)**	**$ 89,157**	**$ (144,366)**	**$ 38,470**	**$ 20,552**	**$ -**
PERCENT OF TOTAL EXPENDITURES								
Operational Budget	73.7%	73.6%	78.8%	75.4%	78.5%	77.5%	66.4%	68.5%
Capital Planning	10.1%	10.0%	7.8%	8.7%	7.6%	8.1%	6.8%	4.1%
Transfers to DPW	12.4%	12.7%	10.4%	12.5%	11.0%	11.4%	9.9%	11.8%
Transfers to General Fund	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Debt Principle & Interest	3.8%	3.7%	3.0%	3.3%	2.9%	3.1%	16.9%	15.6%

WWC SUMMARY

APPENDIX G

1272 Order

STATE OF VERMONT
AGENCY OF NATURAL RESOURCES
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
1 NATIONAL LIFE DRIVE, MAIN 2
MONTPELIER, VT 05620-3522

1272 ORDER - Discharge Permit No. 3-1285

IN THE MATTER OF:
City of Rutland, Permit No. 3-1285
P.O. Box 969
Rutland, Vermont 05702

In accordance with the provisions of 10 V.S.A. § 1272 and the Combined Sewer Overflow Rule (Environmental Protection Rule, Chapter 34), the Secretary (Secretary) of the Vermont Agency of Natural Resources (Agency) makes the following findings of fact. The definitions in the Combined Sewer Overflow Rule shall apply to this Order.

FINDINGS OF FACT

(1) The City of Rutland (Rutland) owns and operates the Rutland Wastewater Treatment Facility (WWTF) which is a secondary treatment facility that began discharging to Otter Creek in December 1986. The collection system includes combined sewers (sanitary wastewater and stormwater).

(2) On November 6, 2002, the Agency issued Discharge Permit No. 3-1285 to the City of Rutland which contained terms and conditions governing the discharge from and the operation of the Rutland WWTF.

(3) On December 7, 2007, the Agency determined the City of Rutland's application for renewal was timely and sufficient for the purposes of 3 V.S.A. § 814. Therefore, the existing permit has been administratively continued and does not expire until the application has been finally acted upon by the Agency.

(4) During certain storm events, combined stormwater and sanitary wastewater containing untreated sewage discharges from combined sewer overflow (CSO) outfalls within the Rutland collection system to Otter Creek and East Creek. Such discharges adversely affect the quality of waters of the State and create public health concerns.

(5) The discharge of untreated sewage is in violation of the 10 V.S.A. chapter 47 and the Vermont Water Quality Standards (VWQS).

(6) To address its CSOs, Rutland submitted a multi-volume study report completed by Dufresne-Henry, Inc. to the Agency in February 1989 (volumes 1 and 2) and September 1989 (volume 3). The report identified seven CSOs and several

abatement alternatives, including the construction of CSO treatment facilities with chlorination.

(7) Phase 1 of the CSO abatement work was completed in 1992-3 which included various improvements to the combined collection system, including separation work and implementing best management practices.

(8) For Phase 2, Rutland proposed to submit to the Agency a Basis of Design for CSO abatement, which would not include construction of CSO treatment facilities as previously planned. Rutland proposed, and the Agency agreed (via a December 4, 1997 letter) to, the abatement strategy of providing secondary treatment and storage as an alternative to the option of CSO treatment facilities.

(9) In 2002, Rutland submitted a Basis of Final Design Report, CSO Control Plan Phase 2A, dated March 2002. Phase 2A would maximize flow to the wastewater treatment facility. This would include increasing the collection system conveyance capacity, increasing the River Street Pump Station pump capacity, and increasing the WWTF wet weather flow capacity.

(10) The Rutland WWTF 2002 Discharge Permit No. 3-1285 included a requirement that Rutland complete a minimum 2-year effectiveness report following completion of the Phase 2A improvements. If the discharges did not comply with the Agency's CSO Control Policy, then Phase 2B of the CSO elimination project would be implemented. Phase 2B included maximizing collection system storage. The Phase 2A improvements were completed by November 2006.

(11) Rutland submitted an interim CSO report, dated March 21, 2008. The report indicated that overflows might still be occurring during certain high flow events, however the data was not conclusive.

(12) In response to the March 21, 2008 report, Rutland proposed changes to its CSO monitoring program in order to secure more accurate data for determining compliance with the Agency's CSO Control Policy as well as for determining appropriate Phase 2B improvements, if necessary. As a result, Rutland requested additional time for completion of the CSO effectiveness report.

(13) The Secretary found that it was reasonable to provide Rutland with additional time sufficient to determine compliance with the Agency's CSO Control Policy and to determine, if necessary, what improvements were needed to comply with the CSO Control Policy.

(14) Rutland submitted a "Report on Effectiveness of CSO Phase 2A Rutland City Combined Sewer Overflow," dated September 2010. The report included the remaining four overflow sites: SIN 002 (Cemetery), SIN 003 (Homeplate), SIN 005 (West Street Siphon), and SIN 009 (Third Base) and the results indicated

that Rutland did not meet the requirements of the Agency's CSO Control Policy. As a result, additional improvements to the collection system were necessary.

(15) Rutland submitted a letter dated March 20, 2012 proposing a four-year schedule for CSO work to be completed. This schedule was specific to the Library Avenue Separation Project (CSO SIN 003 and 009).

(16) On June 27, 2012, Rutland was issued a 1272 Order to complete projects to reduce the frequency and magnitude of the overflows as described in the 2010 effectiveness report and March 20, 2012 letter to the Agency.

(17) On October 22, 2015, Rutland submitted written confirmation of the Library Avenue Separation Project's completion.

(18) On October 31, 2017, Rutland submitted the Library Avenue Separation Project (Northwest Neighborhood Sewer Separation Project) Effectiveness Report.

(19) The NNSSP Effectiveness Report stated the project has had little or no effect on the incidence of CSOs in the Rutland system but appears to have reduced their duration and total volumes.

(20) Since October 22, 2015, Rutland has reported 142 individual wet weather overflow incidents at remaining CSO overflow points.

(21) Without the implementation of the methods and procedures set forth in this Order, the combined sewer overflows of untreated sanitary sewage from Rutland's combined stormwater and sanitary wastewater collection system will continue to create or cause a discharge to waters of the State in violation of 10 V.S.A. chapter 47 and the VWQS.

ORDER

Based on the foregoing findings of fact, the Secretary issues the following Order, under 10 V.S.A. § 1272 and the Combined Sewer Overflow Rule (Environmental Protection Rule, Chapter 34), to ensure all remaining CSOs in Rutland are brought into compliance with the applicable requirements of state and federal law, including the VWQS.

(I) **Minimum Controls**: The municipality shall implement the minimum technology-based requirements below, known as the "Minimum Controls," which are designed to maximize pollutant capture and minimize impacts to water quality:

(1) Proper operation and regular maintenance programs for collection systems and CSO outfalls;

(2) Maximum use of the collection system for storage without endangering public health or property, or causing solids deposition problems;

(3) Review and modification of pretreatment requirements to assure that CSO impacts are minimized;

(4) Maximization of flow to the treatment plant for treatment consistent with an evaluation of alternative treatment options;

(5) Prohibition of CSOs during dry weather;

(6) Control of solid and floatable materials in CSOs;

(7) Establishment of pollution prevention programs to minimize contaminants in CSOs;

(8) Public notification to ensure that the public receives adequate notification of CSOs and CSO impacts, which shall, at a minimum, comply with § 34-404 of the Combined Sewer Overflow Rule (Environmental Protection Rule, Chapter 34);

(9) Monitoring to effectively characterize CSO impacts and the efficacy of CSO controls, which shall include at a minimum:

(A) The municipality shall define through monitoring, modeling, and other means, as appropriate, the sewer system, the response of the system to a range of precipitation events that encompasses the 5-year design storm, the characteristics of the overflows, and the water quality impacts that result from CSOs. To comply with the foregoing requirement, the municipality shall, at a minimum:

(i) Establish and maintain a precipitation monitoring system. The system must provide unique precipitation amounts specific to individual CSO subcatchments. Such a system does not necessarily demand a precipitation recording device for each CSO outfall. Precipitation measurements shall be to the nearest 0.01 inches, continuous at a five-minute interval over the duration of a storm event, and indexed to time and date. If establishing a physical precipitation monitoring system, the municipality shall work to minimize impacts of wind and surrounding trees and buildings that may hinder the accuracy of precipitation recording devices. If a municipality proposes to use a system other than a physical precipitation monitoring system, the municipality shall get prior approval from the Secretary.

(ii) Establish a CSO flow monitoring system. At a minimum, the municipality shall install a tell-tale block in each overflow structure and check the block after every precipitation/runoff event.

(B) The municipality shall submit to the Secretary, by no later than January 31st of each year, a report on CSO control project(s) of the previous calendar year. The Secretary will use the information from the report to monitor the progress on implementation of CSO control project(s). The municipality shall report progress on:

(i) Compliance with the Minimum Controls;

(ii) The condition and operation of the CSS;

(iii) The frequency, duration, and magnitude of the precipitation events leading to CSOs from the system in the past year and a comparison to prior years;

(iv) The frequency, duration, and magnitude of all CSOs from the system in the past year and a comparison to prior years;

(v) The overall status of the Long Term Control Plan (LTCP); and

(vi) Key CSO control accomplishments, highlighting those that reduced the frequency and magnitude of CSOs; projects under design; and construction that occurred in the previous year.

(II) **Long Term Control Plan.** The municipality shall create a Long Term Control Plan (LTCP)[1] and submit it to the Secretary **within 24 months of the date of this Order.** In developing a LTCP, the municipality shall employ a public participation process that actively involves the affected public in the decision-making to develop and select the long-term CSO controls. The affected public includes rate payers, industrial users of the sewer system, persons who reside downstream from the CSO outfalls, persons who use and enjoy the downstream waters, and any other interested persons. Additionally, in developing LTCPs, the Agency encourages municipalities to evaluate and implement green stormwater infrastructure for stormwater runoff and sewer overflow management to the greatest extent possible when developing their LTCPs. The LTCP shall, at a minimum, include:

(1) An alternatives analysis that shall evaluate the costs and performance of multiple CSO control alternatives, such as:

(A) Installing a flow metering system for each CSO outfall;

(B) Reducing stormwater flows through the separation of combined

[1] If the municipality wishes to apply for funding from the State to assist in the creation or implementation of its LTCP, the municipality shall draft all reports, including associated planning documents, according to the PER format.

stormwater and sanitary sewer lines;

(C) Adding storage tanks or retention basins to hold overflow during storm events;

(D) Expanding the treatment plant capacity;

(E) Adding screening and disinfection facilities for the overflow;

(F) Incorporating green stormwater infrastructure to reduce stormwater flow into CSSs to the greatest extent feasible and practical; and

(G) Providing for disinfection of CSOs at the outfall and discharge to an approved waste management zone.

(2) A detailed list of the selected CSO control projects necessary to bring the CSOs into compliance with the VWQS and a timeline for implementing the projects. Projects shall be prioritized based on the relative importance of adverse impacts upon water quality, including impacts on designated and existing uses. The municipality shall give the highest priority to bringing overflows to "sensitive areas" into compliance with the VWQS. "Sensitive areas" means designated Outstanding Resource Waters, designated National Marine Sanctuaries, waters with threatened or endangered species and their habitat, waters where primary contact recreation occurs, public drinking water intakes or their designated protection areas, and shellfish beds.

(3) A strategy to ensure that new sources of stormwater and wastewater to the CSS do not increase the volume, frequency, or duration of CSO events through implementation of control measures, such as making reductions in existing sources of stormwater or wastewater to the CSS, creating or increasing storage capacity within the collection system, or other measures approved by the Secretary.

(4) Measures to address and prevent any documented, recurrent instances of sewage backups or discharges of raw sewage onto the ground surface.

(5) A financing plan to design and implement the CSO control projects identified pursuant to subsection (II)(2) of this Order.

(6) A proposed schedule to bring the municipality's CSOs into compliance with the Vermont Water Quality Standards. The Agency recognizes CSO abatement and control is a costly process and anticipates plans will take an iterative approach to lessen the number and quantity of CSO events and improve their quality. As such, the schedule may include interim CSO controls as a step in the process of bringing CSOs into compliance with the VWQS. Interim CSO controls should be evaluated and designed based on

storms with a theoretical 5-year recurrence interval (also known as the 5-year design storm). The 24-hour and 1-hour extreme precipitation depths at the 5-year recurrence interval for each CSO municipality are listed in Appendix A of the Combined Sewer Overflow Rule (Environmental Protection Rule, Chapter 34).

(III) **General Conditions.**

(1) The plans and information required by this Order shall be submitted in electronic format to Shea Miller, Environmental Analyst, shea.miller@Vermont.gov.

(2) The Secretary reserves the right to amend this Order at any time as necessary to protect water quality and to comply with state and federal law.

(3) The State of Vermont and the Secretary reserve continuing jurisdiction to ensure future compliance with all statutes, rules, and regulations applicable to the facts and violations set forth above.

(4) Nothing in this Order shall be construed as having relieved, modified, or in any manner affected the municipality's on-going obligation to comply with all other federal, state, or local statutes nor does it relieve the municipality of the obligation to obtain all necessary federal, state, and local permits.

(5) This Order does not grant any exclusive rights or privileges, which would impair any rights possessed by riparian or littoral owners of the State of Vermont. It does not grant any right, title, or easement to or over any land, nor does it authorize any damage to private property or invasion of private rights or the violation of federal, state, or local laws or regulations.

(6) The Secretary, in issuing this Order, accepts no legal responsibility for any damage, direct or indirect of whatever nature and by whoever suffered, arising out of the activities described.

(7) This Order is not a resolution of any enforcement action that may be pending, contemplated, or initiated in this matter.

(8) The municipality shall allow access to Agency representatives, upon the presentation of proper credentials, to inspect the subject site and sample any discharge or receiving waters as necessary to assess compliance with this Order and applicable state laws related to water quality.

(9) Pursuant to 10 V.S.A. Chapter 220, any appeal of this Order must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of this Order. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org. The address of the Environmental Court is Vermont Superior Court,

Environmental Division, 32 Cherry Street, 2nd Floor, Suite 303, Burlington, VT 05401 (Tel # (802) 951-1740). The filing of an appeal does not stay this Order. The Notice of Appeal must specify the parties taking the appeal and the statutory provisions under which each party claims party status; must state the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project, or facility 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.

(10) This Order shall be effective upon the date of signing and shall remain in effect until such time as the activities governed under this Order are completed or until such time as the Agency rescinds this Order or issues a subsequent Order, whichever occurs first.

(11) This 1272 Order supersedes the current 1272 Order dated June 27,2012.

Emily Boedecker, Commissioner
Department of Environmental Conservation

By: Mary L. Borg Date: 5/8/18
Mary Borg, Deputy Director
Watershed Management Division

APPENDIX H

WWTF Capacity Improvements

Weston & Sampson

N

LEGEND

PROPOSED SEWER MANHOLE	Ⓢ
EXISTING SEWER MANHOLE	Ⓢ
PROPOSED DRAIN MANHOLE	Ⓓ
EXISTING DRAIN MANHOLE	Ⓓ
PROPOSED CATCH BASIN	□
PROPOSED SEWER	S
EXISTING DRAIN	D
PROPOSED DRAIN	D
PROPERTY LINE	
FLOODPLAIN BOUNDARY	

AERATION BASINS

ADMIN BUILDING

GREENS HILL LANE

CONSTRUCT FLOW SPLITTER WITH WEIR GATES

RELOCATE EXISTING 12" Ø PLANT SEWER

24" PVC

24" Ø PRIMARY EFFLUENT TO NEW CONTACT TANK

CHEMICAL BUILDING

DEWATERING BUILDING

MECH. MIXER

CONSTRUCT 5.5 MGD STORM FLOW CHLORINE CONTACT CHAMBER WITH 30 MINUTE CONTACT TIME.

DIGESTER COMPLEX

12" PVC

18" PVC

EXISTING CONTACT TANKS

DECHLORINATION CHAMBER

EXISTING PLANT SEWAGE PUMP STATION

N/F
GREEN MOUNTAIN POWER

500 YEAR FLOOD ELEVATION

RELOCATE EXISTING 18" Ø STORM DRAIN

24" SDR-35 PVC DISINFECTION PRIMARY EFFLUENT TO OUTFALL

EXISTING PLANT OUTFACE MANHOLE

NOTES:
1. SCALED ORTHOPHOTOGRAPHY TAKEN FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
2. EXISTING WWTF PIPING NOT SHOWN FOR CLARITY.
3. RELOCATION OF EXISTING CHEMICAL FEED LINES FROM THE CHEMICAL BUILDING TO THE EXISTING CONTACT TANKS NOT SHOWN FOR CLARITY, BUT CARRIED OUT IN OUR OPINION OF COST.
4. PROPOSED YARD PIPING LAYOUT IS CONCEPTUAL ONLY AND DOES NOT CONSTITUTE A FINAL DESIGN.
5. EXISTING YARD PIPING AND BUILDING LOCATIONS BASED ON RECORD DRAWINGS ENTITLED, "CSO ABATEMENT FACILITIES- PHASE 2A" BY DUFRESNE-HENRY, INC. OF NO. SPRINGFIELD, VT; DATED 2005.
6. NO CURRENT SURVEY INFORMATION AVAILABLE.

40 20 0 40 80

SCALE:1" = 40'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson℠

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

RUTLAND WWTF
HYDRAULIC
IMPROVEMENTS

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Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

WWTF Hydraulic Capacity Improvements

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 41,950	$ 42,000
	Bonds and Insurance (8%)	L.S.	1	$ 67,120	$ 67,100
	General Conditions (5%)	L.S.	1	$ 41,950	$ 42,000
				General	**$152,000**
2	**Primary Effluent Splitter Box**				
	Earthwork:				
	Excavation	C.Y.	214	$ 35	$ 7,500
	Stone Bedding	C.Y.	13	$ 25	$ 300
	Backfill/Compaction	C.Y.	126	$ 6	$ 800
	Concrete:				
	Base Slab	C.Y.	14	$ 600	$ 8,400
	Walls	C.Y.	25	$ 800	$ 20,000
	Equipment:				
	Weir Gates	Ea.	2	$ 55,000	$ 110,000
	Weir Gate Installation	Ea.	2	$ 13,750	$ 27,500
	Aluminum Grating	S.F.	240	$ 65	$ 15,600
	Aluminum Handrails	L.F.	70	$ 380	$ 26,600
				Primary Effluent Splitter Box	**$217,000**
3	**Stormflow Contact Tank**				
	Earthwork:				
	Excavation	C.Y.	1,185	$ 35	$ 41,500
	Stone Bedding	C.Y.	66	$ 25	$ 1,700
	Backfill/Compaction	C.Y.	713	$ 6	$ 4,300
	Concrete:				
	Base Slab	C.Y.	128	$ 600	$ 76,500
	Walls	C.Y.	128	$ 800	$ 102,000
	Equipment:				
	Flash Mixer	Ea.	1	$ 19,000	$ 19,000
	Ultrasonic Level Transmitter over Effluent Weir	Ea.	1	$ 2,500	$ 2,500
	Influent Weir Plate (installed)	Ea.	1	$ 5,000	$ 5,000
	Effluent Weir Plate (installed)	Ea.	1	$ 5,000	$ 5,000
	Aluminum Handrails	L.F.	192	$ 380	$ 73,000
	Power Conduit and Wiring	L.F.	220	$ 65	$ 14,300
	Signal Conduit and Wiring	L.F.	110	$ 55	$ 6,100
				Stormflow Contact Tank	**$351,000**
4	**Yard Piping**				
	24" SDR-35 PVC Primary Effluent	L.F.	165	$ 500	$ 82,500
	Cut into Existing RCP Primary Effluent Line	Ea.	1	$ 5,000	$ 5,000
	By-pass Pumping	Day	5	$ 1,500	$ 7,500
	4' dia. Pre-cast Concrete Sewer MH	Ea.	8	$ 5,500	$ 44,000
	24" PVC Transition Sleeve/Coupling	Ea.	3	$ 1,000	$ 3,000
	4' dia. Pre-cast Concrete Storm Drain	Ea.	1	$ 4,500	$ 4,500
	18" SDR-35 PVC Storm Drain	L.F.	60	$ 75	$ 4,500
	Cut and Cap Existing 18" Storm Drain	Ea.	1	$ 1,500	$ 1,500
	Core/Seal New Storm Line into Existing DMH	Ea.	1	$ 2,500	$ 2,500
	12" dia. SDR-35 PVC Plant Sewer	L.F.	180	$ 50	$ 9,000
	Core/Seal New Sewer Line into Plant Sewer PS	Ea.	1	$ 2,500	$ 2,500
	Core/Seal New Sewer Line into Existing Sewer MH	Ea.	1	$ 2,500	$ 2,500

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

WWTF Hydraulic Capacity Improvements

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
	Cut and Cap Existing 12" Plant Sewer Line	Ea.	1	$ 1,200	$ 1,200
	Relocate Chemical Feed Lines	L.S.	1	$ 12,500	$ 12,500
	Sleeved Chlorine Feed Line to New Structure	L.F.	100	$ 1	$ 100
	Sleeved Bisulfite Feed Line to New Structure	L.F.	110	$ 1	$ 100
				Yard Piping	$183,000
5	Chemical Building Modifications				
	Floor/Foundation Penetrations for Sleeves	Ea.	4	$ 2,500	$ 10,000
	New Chemical Feed Piping	L.S.	1	$ 12,000	$ 12,000
	Carrying Water Connection	L.S.	2	$ 1,500	$ 3,000
	Rotameters	Ea.	2	$ 400	$ 800
	Chemical Tank Connections (bulkhead fittings)	L.S.	2	$ 1,200	$ 2,400
	Storm Flow Hypochlorite Pump	Ea.	1	$ 10,000	$ 10,000
	Storm Flow Bisulfite Pump	Ea.	1	$ 10,000	$ 10,000
	Floor/Foundation Penetrations for Power Feed	Ea.	1	$ 2,500	$ 2,500
	Floor/Foundation Penetrations for Signal Conduit	Ea.	1	$ 2,500	$ 2,500
	Power Panel for Mixer	Ea.	1	$ 5,500	$ 5,500
	Soft Start for Mixer	Ea.	1	$ 3,000	$ 3,000
				Chemical Building Modifications	$62,000
6	Misc. Work and Clean-up				
	Grading	S.Y.	1,200	$ 2	$ 1,800
	Paving	S.Y.	255	$ 90	$ 23,000
	Restoration of Growth	MSF	11	$ 110	$ 1,200
				Misc. Work and Clean-up	$26,000
				Construction Subtotal	$991,000
				Engineering Fees	$228,000
				Project Contingencies (30%)	$366,000
				Easement Costs	$0
				Other Administrative Costs (0.5%)	$50,000
				TOTAL OPINION OF PROJECT COST	$1,640,000

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is12464.94*
2- *Subtotal amounts have been rounded to the next $1,000.*
3- *Overall anticipated project cost has been rounded to the next $10,000.*
4- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
5- *Permitting costs have not been included.*
6- *Contractor's OH&P are included in the unit prices.*
7- *Start-up and Operator Training is included in the listed equipment costs.*
8- *Project costs have been developed without benefit of final design drawings. For planning level costs, a contingency of 30% should be carried.*
9- *In order to integrate the Primary Digester Rehabilitation Project into a single WWTF Improvements Project, we have carried the anticipated construction cost of this specific work, without General Conditions, Engineering or Project Contingency. These are added to the entire combined project in this summary.*

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

River Street Pump Station Hydraulic Improvements

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 16,400	$ 16,400
	Bonds and Insurance (8%)	L.S.	1	$ 26,240	$ 26,200
	General Conditions (5%)	L.S.	1	$ 16,400	$ 16,400
				General	**$59,000**
2	**Controls**				
	Pump & Level Controls Modifications	L.S.	1	$ 20,000	$ 20,000
	Additional Wet well Level Controls for Storm Flow	L.S.	1	$ 52,000	$ 52,000
	Telemetry Reliability Upgrade	L.S.	1	$ 30,000	$ 30,000
				Controls	**$102,000**
2	**Emergency By-pass Piping**				
	Earthwork:				
	Excavation	C.Y.	25	$ 35	$ 900
	Stone Bedding	C.Y.	5	$ 25	$ 100
	Backfill/Compaction	C.Y.	22	$ 6	$ 100
	Concrete:				
	Thrust Restraint Block	C.Y.	4	$ 600	$ 2,400
	Piping:				
	20" Dia. Ductile Iron Pipe	L.F.	50	$ 120	$ 6,000
	Fittings	Ea.	4	$ 5,500	$ 22,000
	Misc. Work:				
	Dewatering	L.S.	1	$ 2,500	$ 2,500
	Erosion Control	L.S.	1	$ 1,000	$ 1,000
	Surface Restoration	L.S.	1	$ 1,500	$ 1,500
				Emergency By-pass Piping	**$37,000**
3	**Replace Wet well Suction Connections**				
	Replace Mechanical Connections	Ea.	6	$ 10,000	$ 60,000
	By-pass Pumping:				
	Freight in/out	L.S.	1	$ 18,000.00	$18,000
	On-site Set-up/Force Main Fabrication	L.S.	1	$ 15,000.00	$15,000
	Pump and Controls Rental	Wk.	6	$ 16,000.00	$96,000
				Replace Wet well Suction Connections	**$189,000**
				Construction Subtotal	**$387,000**
				Engineering Fees	$89,000
				Project Contingencies (30%)	$143,000
				Easement Costs	$0
				Other Administrative Costs (0.5%)	$19,000
				TOTAL OPINION OF PROJECT COST	**$640,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is12464.94*
2- *Subtotal amounts have been rounded to the next $1,000.*
3- *Overall anticipated project cost has been rounded to the next $10,000.*
4- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data*
5- *Permitting costs have not been included.*
6- *Contractor's OH&P are included in the unit prices.*
7- *Start-up and Operator Training is included in the listed equipment costs.*
8- *Project costs have been developed without benefit of final design drawings. For planning level costs, a contingency of 30% should be carried*
9- *In order to integrate the Primary Digester Rehabilitation Project into a single WWTF Improvements Project, we have carried the anticipated*

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

River Street Pump Station Hydraulic Improvements

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost

construction cost of this specific work, without General Conditions, Engineering or Project Contingency. These are added to the entire combined project in this summary.

APPENDIX I

Otter Creek Interceptor Capacity Improvements

Weston & Sampson

LEGEND

- PROPOSED SEWER MANHOLE
- EXISTING SEWER MANHOLE
- PROPERTY LINE
- EXISTING SEWER
- PROPOSED SEWER
- EXISTING DRAIN
- EXISTING EASEMENT
- PROPOSED EASEMENT
- FLOODPLAIN BOUNDARY

500 YEAR FLOOD ELEVATION

DEWATERING POND AREA

PROPOSED 36" Ø DR-18 PVC GRAVITY SEWER

ADDITIONAL EASEMENT AREA TO BE SECURED BEFORE CONSTRUCTION.

REMOVE AND DESPOSE OF EXISTING 24" Ø AC GRAVITY SEWER PIPE AND EXISTING PRE-CAST CONCRETE SEWER MANHOLES

DEEP ROAD CROSSING

TEMPORARILY RELOCATE BALLFIELD DUGOUT

TIE INTO EXISTING SEWER MANHOLE AT RIVER STREET PUMP STATION

RIVER STREET

0+00 1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00

MATCHLINE A

EXISTING 40' WIDE PERPETUAL EASEMENT

POTENTIALLY CONTAMINATED SOILS

EXISTING 20' WIDE PERPETUAL EASEMENT

OTTER CREEK

NEW SEWER MANHOLE (TYP.)

PROPOSED 40' WIDE PERPETUAL EASEMENT

TEMPORARY BY-PASS PIPING WILL NEED TO PASS BENEATH RIVER STREET AT THIS LOCATION

RIVER STREET PUMP STATION

NOTES:

1. SCALED ORTHOPHOTOGRAPHY TAKEN FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
2. GRAVITY SEWER EASEMENTS BASED ON DRAWINGS ENTITLED "ADDITIONS TO THE SEWERAGE SYSTEM- CITY OF RUTLAND, VERMONT" PREPARED BY FENTON G. KEYES ASSOCIATES OF BOSTON, MA; ISSUED OCTOBER 1961.
3. PERPETUAL SEWER LINE EASEMENT REDUCES IN WIDTH FROM 40' TO 20' NORTH OF STAT 7+65.
4. PROPOSED GRAVITY SEWER REPLACEMENT IS AT SAME GRADE AND ALIGNMENT AS THE EXISTING 24" AC SEWER.
5. DEWATERING PONDS AND BY-PASSING PUMPING EQUIPMENT LAYDOWN AREAS ARE APPROXIMATED FOR PRELIMINARY COSTING.
6. THE EXISTING SEWER AND PERPETUAL EASEMENT FALL WITHIN A 100' WIDE GREEN MOUNTAIN POWER EASEMENT FOR POWER TRANSMISSION LINES.THIS EASEMENT HAS NOT BEEN SHOWN FOR CLARITY.
7. TEMPORARY BY-PASS SEWER PIPE (FORCE MAIN) SHALL RUN PARALLEL TO THE EXISTING GRAVITY SEWER AND SHALL LAY AT GROUND LEVEL. BY-PASS FORCE MAIN NOT SHOWN FOR CLARITY.
8. SEWER LAYOUT IS CONCEPTUAL ONLY AND DOES NOT CONSTITUTE A FINAL DESIGN.
9. EXISTING SEWER ALIGNMENT AND MANHOLE LOCATIONS BASED ON CITY GIS DATA. NO CURRENT SURVEY INFORMATION AVAILABLE.

80 40 0 80 160

SCALE:1" = 80'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson℠

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

OTTER CREEK
INTERCEPTOR REPLACEMENT (A)

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Weston & Sampson

LEGEND

- PROPOSED SEWER MANHOLE
- EXISTING SEWER MANHOLE
- PROPERTY LINE
- EXISTING SEWER
- PROPOSED SEWER
- EXISTING DRAIN
- EASEMENT
- FLOODPLAIN BOUNDARY
- SHORING

CALVARY CEMETARY

PROPOSED 36" Ø DR-18 PVC GRAVITY SEWER

TEMPORARY SHORING

REMOVE AND DISPOSE OF EXISTING 24" Ø AC GRAVITY SEWER PIPE AND EXISTING PRE-CAST CONCRETE SEWER MANHOLES

500 YEAR FLOOD ELEVATION

MATCHLINE A

DEWATERING POND AREA

EXISTING 40' WIDE PERPETUAL EASEMENT

NEW SEWER MANHOLE (TYP.)

TEMPORARY BY-PASS PUMP WETWELL

DEWATERING POND AREA

CSO 001

CSO OUTFALL

OTTER CREEK

13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 25+04 0+00 1+00

NOTES:

1. SCALED ORTHOPHOTOGRAPHY TAKEN FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
2. GRAVITY SEWER EASEMENTS BASED ON DRAWINGS ENTITLED "ADDITIONS TO THE SEWERAGE SYSTEM- CITY OF RUTLAND, VERMONT" PREPARED BY FENTON G. KEYES ASSOCIATES OF BOSTON, MA; ISSUED OCTOBER 1961.
3. PERPETUAL SEWER LINE EASEMENT REDUCES IN WIDTH FROM 40' TO 20' NORTH OF STAT 7+65.
4. PROPOSED GRAVITY SEWER REPLACEMENT IS AT SAME GRADE AND ALIGNMENT AS THE EXISTING 24" AC SEWER.
5. DEWATERING PONDS AND BY-PASSING PUMPING EQUIPMENT LAYDOWN AREAS ARE APPROXIMATED FOR PRELIMINARY COSTING.
6. THE EXISTING SEWER AND PERPETUAL EASEMENT FALL WITHIN A 100' WIDE GREEN MOUNTAIN POWER EASEMENT FOR POWER TRANSMISSION LINES.THIS EASEMENT HAS NOT BEEN SHOWN FOR CLARITY.
7. TEMPORARY BY-PASS SEWER PIPE (FORCE MAIN) SHALL RUN PARALLEL TO THE EXISTING GRAVITY SEWER AND SHALL LAY AT GROUND LEVEL. BY-PASS FORCE MAIN NOT SHOWN FOR CLARITY.
8. SEWER LAYOUT IS CONCEPTUAL ONLY AND DOES NOT CONSTITUTE A FINAL DESIGN.
9. EXISTING SEWER ALIGNMENT AND MANHOLE LOCATIONS BASED ON CITY GIS DATA. NO CURRENT SURVEY INFORMATION AVAILABLE.

80 40 0 80 160

SCALE:1" = 80'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson℠

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

OTTER CREEK
INTERCEPTOR REPLACEMENT (B)

P:\VT\Rutland VT\2020 CSO Long-term Control Plan\CAD\rutland ltcp - site 2021 0512.dwg

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Otter Creek Interceptor Replacement

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	General				
	Mobilization/Demobilization	L.S.	1	$ 254,000.00	$254,000
	Bonds and Insurance (8%)	L.S.	1	$ 406,400.00	$407,000
	General Conditions (10%)	L.S.	1	$ 508,000.00	$508,000
				General	$1,169,000
2	By-pass Pumping (13.0 MGD)				
	Freight in/out	L.S.	1	$ 18,000.00	$18,000
	On-site Set-up/Force Main Fabrication	L.S.	1	$ 25,000.00	$25,000
	Pump and Controls Rental	Wk.	24	$ 16,000.00	$384,000
	Construct Interceptor Bulkhead	L.S.	1	$ 15,000.00	$15,000
	Pre-cast Conc. Temporary Wetwell	V.F.	20	$ 1,200.00	$24,000
	Wet-well Excavation	C.Y.	750	$ 35.00	$27,000
	Backfill/compaction	C.Y.	650	$ 25.00	$17,000
	Stone Bedding	C.Y.	20	$ 30.00	$1,000
	Cut into side of existing 6'x4' sewer	L.S.	1	$ 10,000.00	$10,000
	Drag/align Temp. Force Main	L.S.	1	$ 16,000.00	$16,000
	Demo temp. bulkhead	L.S.	1	$ 7,500.00	$8,000
	Patch Wall of 6'x4' sewer	LS.	1	$ 12,000.00	$12,000
	Abandon/Backfill temp. wetwell	C.Y.	100	$ 25.00	$3,000
	Temp. Discharge Connect. at RSPS	L.S.	1	$ 34,600.00	$35,000
	Demo. Temp. Discharge at RSPS	L.S.	1	$ 6,400.00	$7,000
				By-pass Pumping	$602,000
3	Pipe Installation				
	36" DR-18 PVC (12-20 feet deep)	LF	2,200	$ 1,000.00	$2,200,000
	36" DR-18 PVC (over 20 feet deep)	LF	400	$ 1,200.00	$480,000
	Shoring and Stabilization by Cemetery	LF	1,500	$ 175.00	$263,000
	Remove and dispose of Exist. MHs	Ea.	10	$ 1,000.00	$10,000
	Pipe Bedding	L.F.	2,600	$ 7.50	$20,000
	Dewatering	Day	110	$ 850.00	$94,000
	New Pre-cast Sewer MH	V.F.	180	$ 600.00	$108,000
	Misc. Work and Cleanup	L.S.	1	$ 20,000.00	$20,000
				Pipe Installation	$3,195,000
4	CSO 001 Tie-in				
	Excavation	C.Y.	650	$ 35.00	$23,000
	12" of Stone Bedding	C.Y.	8	$ 25.00	$1,000
	Backfill & Compaction	C.Y.	40	$ 6.00	$1,000
	Cut into side of CSO 001	L.S.	1	$ 10,000.00	$10,000
	36" PVC Transition Sleeve	Ea.	1	$ 2,200.00	$3,000
	Grading	S.Y.	300	$ 1.50	$1,000
	Misc. Work and Cleanup	L.S.	1	$ 10,000.00	$10,000

					CSO 001 Tie-in	$49,000
5	River Street Pump Station Tie-in					
	Excavation	C.Y.	650	$	35.00	$23,000
	12" of Stone Bedding	C.Y.	8	$	25.00	$1,000
	Backfill & Compaction	C.Y.	40	$	6.00	$1,000
	Tie into existing Junction MH	L.S.	1	$	7,500.00	$8,000
	36" PVC Transition Sleeve	Ea.	1	$	2,200.00	$3,000
	Grading	S.Y.	300	$	1.50	$1,000
	Misc. Work and Cleanup	L.S.	1	$	10,000.00	$10,000
					River Street Pump Station Tie-in	$47,000
6	Miscellaneous Work and Clean-up					
	Clearing and Grubbing	S.Y.	5,500		$1.00	$6,000
	Grading	S.Y.	26		$1.50	$1,000
	Paving - Wear	S.Y.	30		$90.00	$3,000
	Restoration of Growth	MSF	11		$110.00	$2,000
	Relocate/Replace Ballfield Dugout	L.S.	1		$5,000.00	$5,000
	River Street Traffic Control	Day	5		$1,000.00	$5,000
	Remove/Replace Ballfield Fence	L.F.	50		$100.00	$5,000
	Remove/Transport/Dispose of Soils	Ton	1,000		$1,000.00	$1,000,000
	Remove/Transport/Dispose of AC Pipe	Ton	100		$1,000.00	$100,000
	Temp. Dewatering Detention Pond (s)	L.S.	1		$60,000.00	$60,000
					Miscellaneous Work and Clean-up	$1,187,000
					Construction Subtotal	$6,249,000
					Engineering Fees	$1,437,000
					Project Contingencies (30%)	$2,306,000
					Archaeological Review	$65,000
					Easement Costs	$25,000
					Other Administrative Costs (0.5%)	$312,000
					TOTAL OPINION OF CONSTRUCTION COST	$10,400,000

Notes:

1- *ENR-CCI for October 2021 is 12464.94.*
2- *Subtotal amounts have been rounded to the next $1,000 increment.*
3- *Overall anticipated project cost has been rounded to the next $100,000.*
4- *Costs have been developed based on similar recent projects, and 2021 Means Construction Cost Data.*
5- *Permitting costs included with engineering.*
6- *No current soil boring data is available for the gravity sewer path. No rock excavation quantities are assumed.*
7- *Contractor's OH&P are included in the unit prices.*

APPENDIX J

Calvary Storage Conduit

LEGEND

- PROPOSED SEWER MANHOLE
- EXISTING SEWER MANHOLE
- PROPERTY LINE
- EXISTING SEWER
- PROPOSED SEWER
- EXISTING DRAIN
- EASEMENT
- FLOODPLAIN BOUNDARY

CALVARY CEMETERY

FORREST STREET

CUT INTO EXISTING PRE-CAST CONCRETE AND FORM A NEW JUNCTION STRUCTURE UPSTREAM OF CSO 001

DOWNSTREAM CONTROL STRUCTURE

48" Ø SDR-35 PVC (SECONDARY)

48" Ø SDR-35 PVC (PRIMARY)

SEWER MH (TYP.)

UPSTREAM DIVERSION BOX

NOTE 2

CSO 001

MATCH EXISTING INVERT

EXISTING 4' x 6" PRE-CAST CONC. BOX SEWER

500 YEAR FLOOD ELEVATION

REHABILITATE EXISTING 6'x4' CONCRETE BOX CULVERT

CUT INTO EXISTING PRE-CAST BOW SEWER AND FROM A JUNCTION STRUCTURE WITH OVERFLOW WEIR

INSTALL NEW DIVERSION BOX WITH OVERFLOW WEIR

NOTES:

1. SCALED ORTHOPHOTOGRAPHY TAKEN FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
2. PROPOSED STORAGE CONDUITS TO BE INSTALLED AT SAME ELEVATION AND SLOPE AS EXISTING TRUNK SEWER.

100 50 0 100 200

SCALE:1" = 100'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

CALVARY CEMETERY STORAGE

P:\VT\Rutland VT\2020 CSO Long-term Control Plan\CAD\Calvary storage- Revised concept 2022 0111.dwg

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Calvary Cemetary Storage Conduit

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	General				
	Mobilization/Demobilization	L.S.	1	$ 90,350.00	$91,000
	Bonds and Insurance (8%)	L.S.	1	$ 144,560.00	$145,000
	General Conditions (10%)	L.S.	1	$ 180,700.00	$181,000
				General	$417,000
2	By-pass Pumping (13.0 MGD)				
	Freight in/out	L.S.	1	$ 18,000.00	$18,000
	On-site Set-up/Force Main Fabrication	L.S.	1	$ 25,000.00	$25,000
	Pump and Controls Rental	Wk.	4	$ 16,000.00	$64,000
	Construct Interceptor Bulkhead	L.S.	1	$ 15,000.00	$15,000
	Pre-cast Conc. Temporary Wetwell	V.F.	20	$ 1,200.00	$24,000
	Wet-well Excavation	C.Y.	750	$ 35.00	$27,000
	Backfill/compaction	C.Y.	650	$ 25.00	$17,000
	Stone Bedding	C.Y.	20	$ 30.00	$1,000
	Cut into side of existing 6'x4' sewer	L.S.	1	$ 10,000.00	$10,000
	Drag/align Temp. Force Main	L.S.	1	$ 16,000.00	$16,000
	Demo temp. bulkhead	L.S.	1	$ 7,500.00	$8,000
	Patch Wall of 6'x4' sewer	LS.	1	$ 12,000.00	$12,000
	Abandon/Backfill temp. wetwell	C.Y.	100	$ 25.00	$3,000
				By-pass Pumping	$240,000
3	Pipe Installation				
	Rehab 6' x 4' Concrete Box Sewer	LF	1,300	$ 500.00	$650,000
	48" SDR-35 Primary Conduit	LF	1,300	$ 210.00	$273,000
	48" SDR-35 Secondary Conduit	L.F.	1,300	$ 210.00	$273,000
	6' Diameter Sewer Manholes	Ea.	8	$ 6,000.00	$48,000
	Dewatering	Day	110	$ 850.00	$94,000
	Access riser, frame & cover	Ea.	2	$ 11,000.00	$22,000
	Topsoil, seed & mulch	S.F.	35,000	$ 0.80	$28,000
	Misc. Work and Cleanup	L.S.	1	$ 50,000.00	$50,000
				Pipe Installation	$1,438,000
4	Upstream Control Structure				
	Excavation	C.Y.	120	$ 35.00	$5,000
	12" of Stone Bedding	C.Y.	10	$ 25.00	$1,000
	Backfill & Compaction	C.Y.	60	$ 6.00	$1,000
	Fabricated Steel Access Plates	Ea.	3	$ 2,400.00	$8,000
	Removable Weir Gates (aluminum)	Ea.	3	$ 5,000.00	$15,000
	Cut into side of box culvert	L.S.	1	$ 10,000.00	$10,000
	Structure Slab	C.Y.	12	$ 600.00	$8,000
	Structure Walls	C.Y.	10	$ 800.00	$8,000
	Structure Top Slab	C.Y.	4	$ 1,100.00	$5,000
	Grading	S.Y.	300	$ 1.50	$1,000

Misc. Work and Cleanup	L.S.	1	$	10,000.00	$10,000
				Upstream Control Structure	$72,000

5	Downstream Control Structure					
	Excavation	C.Y.	120	$	35.00	$5,000
	12" of Stone Bedding	C.Y.	10	$	25.00	$1,000
	Backfill & Compaction	C.Y.	60	$	6.00	$1,000
	Fabricated Steel Access Plates	Ea.	3	$	2,400.00	$8,000
	Cut into side of box culvert	L.S.	1	$	10,000.00	$10,000
	Structure Slab	C.Y.	12	$	600.00	$8,000
	Structure Walls	C.Y.	10	$	800.00	$8,000
	Structure Top Slab	C.Y.	4	$	1,100.00	$5,000
	Grading	S.Y.	300	$	1.50	$1,000
	Misc. Work and Cleanup	L.S.	1	$	10,000.00	$10,000
					Downstream Control Structure	$57,000
					Construction Subtotal	$2,224,000
					Engineering Fees	$512,000
					Project Contingencies (30%)	$821,000
					Easement Costs	$10,000
					Other Administrative Costs (0.5%)	$111,000
					TOTAL OPINION OF CONSTRUCTION COST	$3,700,000

Notes:

1- ENR-CCI for October 2021 is 12464.94.

2- Subtotal amounts have been rounded to the next $1,000 increment.

3- Overall anticipated project cost has been rounded to the next $100,000.

4- Costs have been developed based on similar recent projects, and 2021 Means Construction Cost Data.

5- Permitting costs included with engineering.

6- No current soil boring data is available for the gravity sewer path. No rock excavation quantities are assumed.

7- Contractor's OH&P are included in the unit prices.

8- Easement costs based on 1.75 times the prorated assessed value of the property.

APPENDIX K

Home Plate Storage

LEGEND

- PROPOSED SEWER MANHOLE
- EXISTING SEWER MANHOLE
- PROPERTY LINE
- EXISTING SEWER
- PROPOSED SEWER
- EXISTING DRAIN
- FLOODPLAIN BOUNDARY

PROPOSED 57" x 32" ARCH STORM DRAIN

PROPOSED STORM DRAIN MANHOLE

CONSTRUCT BULKHEAD INSIDE CSO OUTFALL DOWNSTREAM OF NEW 36" DIVERSION LINE.

EAST CREEK

CONNECT STRUCTURE TO DIVERT THIRD BASE DISCHARGE PIPE TOWARDS HOME PLATE
INV: 520.36

SCHOOL STREET

EXISTING CSO 004 TO BE DECOMISSIONED

36" Ø SDR-35 PVC PIPE (TYP.)

DIVERSION MANHOLE
INV (E): 519.91

INTERCEPT EXISTING STORM DRAIN FROM WALMART PLAZA AND DIVERT TO RIVER THROUGH NEW CONDUIT. SEE APPENDIX V.

NEW THIRD BASE CONDUIT
SLOPE: 0.27%

VENTING BELOW GRADE TO EDGE OF FIELD

TRASH TRAP

CONNOR PARK

MEADOW STREET

PHASE I:

CONSTRUCT 1.02 MG PRE-CAST CONCRETE "STORM TRAP" SYSTEM (230' X 100')

PHASE II:

1.02 MG
(230' x 100')

BALL FIELD ELEVATION: 528

500 YEAR FLOOD ELEVATION

EXISTING BRICK ARCH TRUCK SEWER
(S=0.40%)

SUMP WITH DUPLEX SUBMERSIBLE PUMPS 700 GPM @ 15' TDH

EXISTING CSO 002

INV: 518.91

TIE 36" Ø DIVERSION LINE INTO CSO 002 ABOVE OVERFLOW WEIR

ACCESS RISER AND COVER. COVER WITH 12" SOIL. TYP OF 37 EACH STORMTRAP

NOTES:

1. SCALED ORTHOPHOTOGRAPHY TAKEN FROM VERMONT CENTER FOR GEOGRAPHIC INFORMATION.
2. PROPOSED FEATURES SHOWN IN BOLD LINE WEIGHT.
3. PROPOSED STORAGE LAYOUT IS CONCEPTUAL ONLY AND DOES NOT CONSTITUTE A FINAL DESIGN.
4. NO CURRENT SURVEY INFORMATION IS AVAILABLE.

150 75 0 150 300

SCALE:1" = 150'

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson℠

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

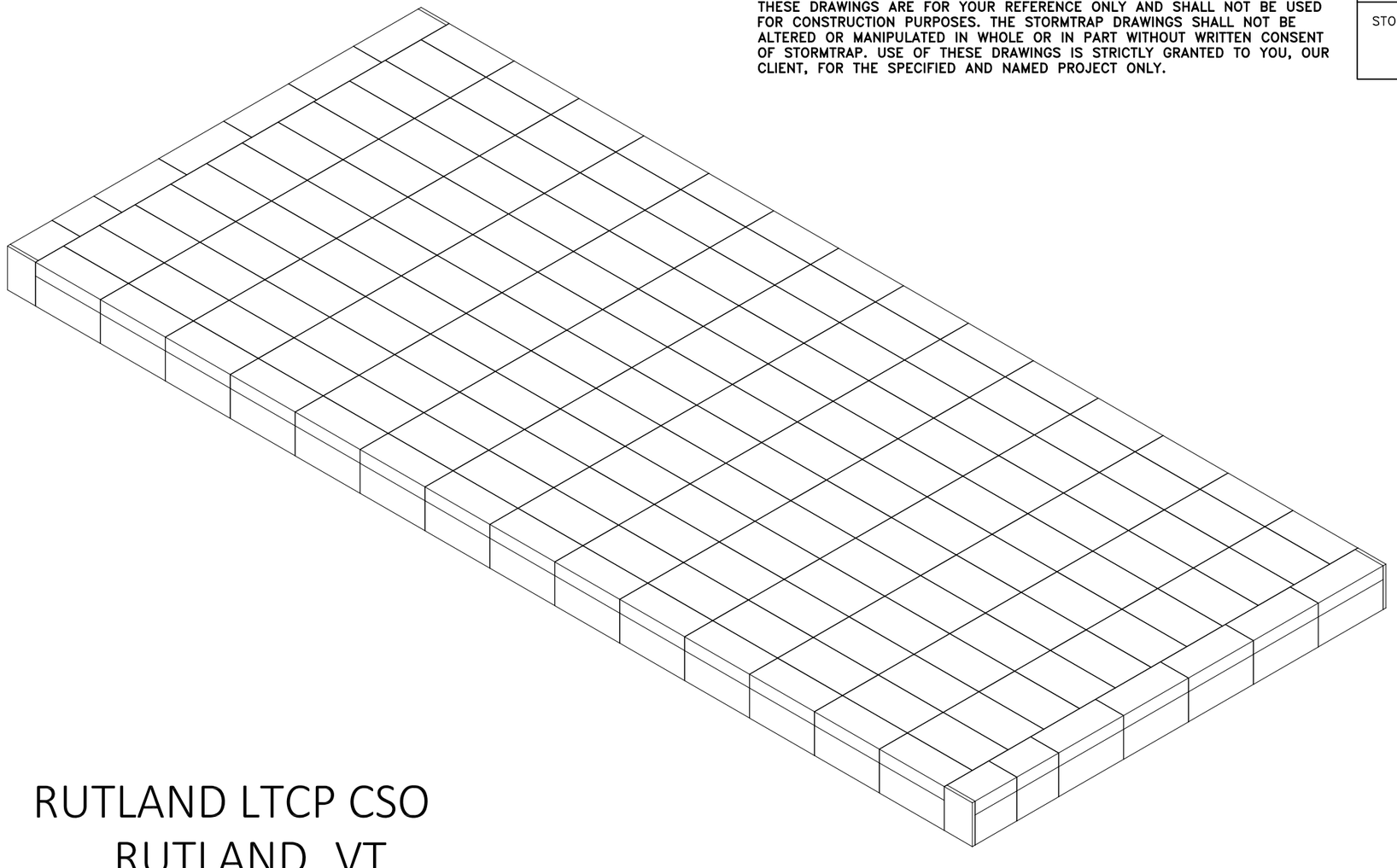
CONNOR PARK
STORAGE STRUCTURE

P: \VT\Rutland VT\2020 CSO Long-term Control Plan\CAD\rutland ltcp - site 2021 0512.dwg

StormTrap®

MODULAR CONCRETE
STORMWATER MANAGEMENT

THESE DRAWINGS ARE FOR YOUR REFERENCE ONLY AND SHALL NOT BE USED FOR CONSTRUCTION PURPOSES. THE STORMTRAP DRAWINGS SHALL NOT BE ALTERED OR MANIPULATED IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT OF STORMTRAP. USE OF THESE DRAWINGS IS STRICTLY GRANTED TO YOU, OUR CLIENT, FOR THE SPECIFIED AND NAMED PROJECT ONLY.



RUTLAND LTCP CSO
RUTLAND, VT

SHEET INDEX

PAGE	DESCRIPTION
0.0	COVER SHEET
1.0	DOUBLETRAP DESIGN CRITERIA
2.0	DOUBLETRAP SYSTEM LAYOUT
3.0	DOUBLETRAP INSTALLATION SPECIFICATIONS
3.1	DOUBLETRAP INSTALLATION SPECIFICATIONS
4.0	DOUBLETRAP BACKFILL SPECIFICATIONS
5.0	RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS
6.0	DOUBLETRAP MODULE TYPES

STORMTRAP CONTACT INFORMATION

STORMTRAP SUPPLIER: STORMTRAP
CONTACT NAME: JOSH COROA
CELL PHONE: 401-429-3491
SALES EMAIL: JCOROA@STORMTRAP.COM

StormTrap®
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WESTON & SAMPSON
98 SOUTH MAIN STREET
SUITE #2
WATERBURY VILLAGE
HISTORIC DISTRICT, VT

PROJECT INFORMATION:

RUTLAND LTCP CSO

RUTLAND, VT

CURRENT ISSUE DATE:

10/18/2021

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	10/18/2021	PRELIMINARY	EB

SCALE:

NTS

SHEET TITLE:

COVER SHEET

SHEET NUMBER:

0.0

STRUCTURAL DESIGN LOADING CRITERIA

LIVE LOADING: **AASHTO HS–20 HIGHWAY LOADING**

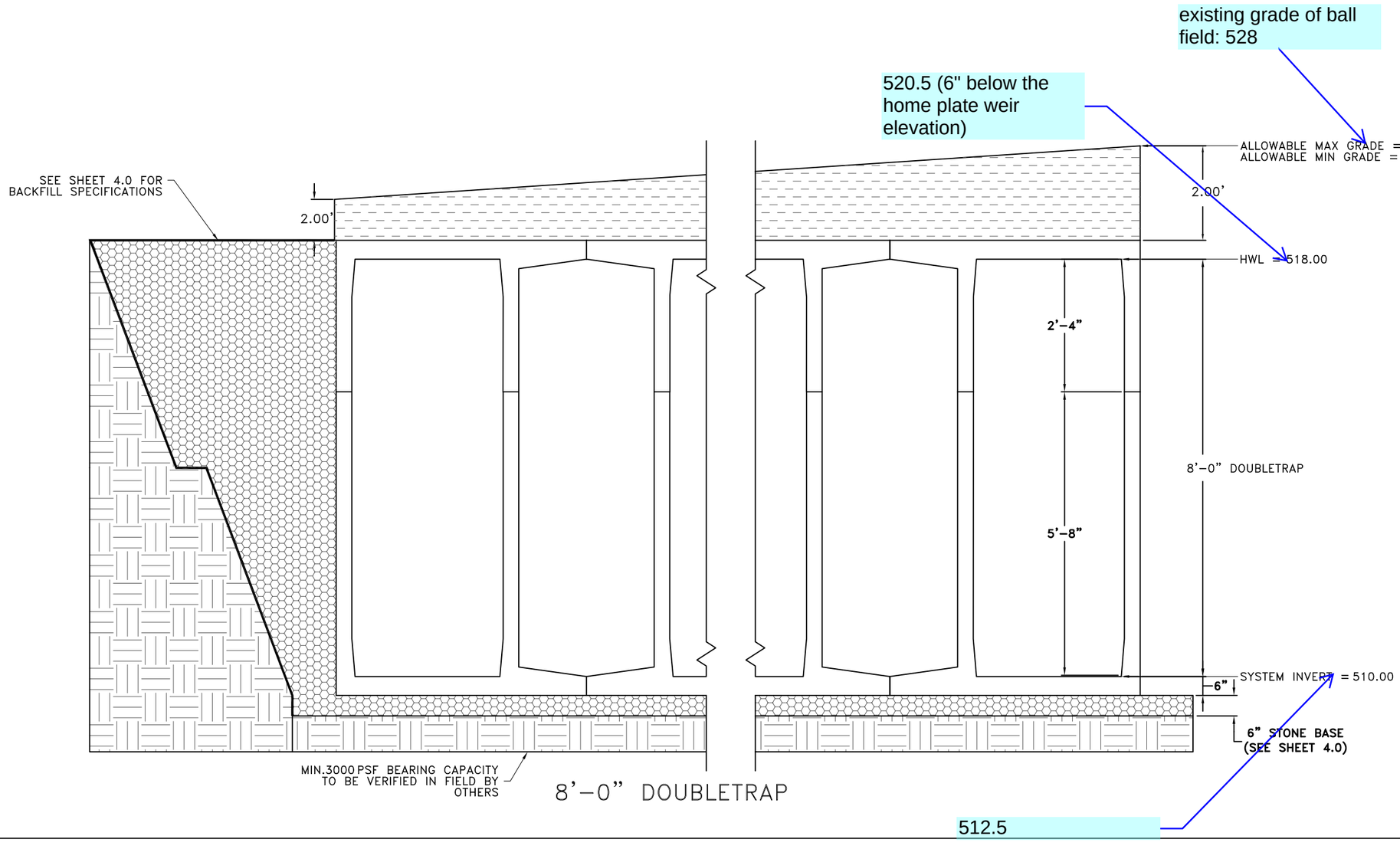
GROUND WATER TABLE: BELOW INVERT OF SYSTEM
SOIL BEARING PRESSURE: 3000 PSF
SOIL DENSITY: 120 PCF
EQUIVALENT UNSATURATED LATERAL ACTIVE EARTH PRESSURE: 35 PSF / FT.
EQUIVALENT SATURATED LATERAL ACTIVE EARTH PRESSURE: 80 PSF/FT. (IF WATER TABLE PRESENT)
APPLICABLE CODES: ASTM C857
ACI–318
BACKFILL TYPE: SEE SHEET 4.0 FOR BACKFILL OPTIONS

STORMTRAP SYSTEM INFORMATION

WATER STORAGE PROV: 164,500.45 CUBIC FEET
UNIT HEADROOM: 8'–0" DOUBLETRAP

SITE SPECIFIC DESIGN CRITERIA

1. STORMTRAP UNITS SHALL BE MANUFACTURED AND INSTALLED ACCORDING TO SHOP DRAWINGS APPROVED BY THE INSTALLING CONTRACTOR AND ENGINEER OF RECORD. THE SHOP DRAWINGS SHALL INDICATE SIZE AND LOCATION OF ROOF OPENINGS AND INLET/OUTLET PIPE TYPES, SIZES, INVERT ELEVATIONS AND SIZE OF OPENINGS.
2. COVER RANGE: MIN. 2.00' MAX. 2.00' CONSULT STORMTRAP FOR ADDITIONAL COVER OPTIONS.
3. ALL DIMENSIONS AND SOIL CONDITIONS, INCLUDING BUT NOT LIMITED TO GROUNDWATER AND SOIL BEARING CAPACITY ARE REQUIRED TO BE VERIFIED IN THE FIELD BY OTHERS PRIOR TO STORMTRAP INSTALLATION.
4. FOR STRUCTURAL CALCULATIONS THE GROUND WATER TABLE IS ASSUMED TO BE BELOW INVERT OF SYSTEM IF WATER TABLE IS DIFFERENT THAN ASSUMED, CONTACT STORMTRAP.
5. **SYSTEM DESIGN MAY ALLOW FOR INCIDENTAL LEAKAGE AND WILL NOT BE SUBJECT TO LEAKAGE TESTING.**



8'–0" DOUBLETRAP

StormTrap®
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WESTON & SAMPSON
98 SOUTH MAIN STREET
SUITE #2
WATERBURY VILLAGE
HISTORIC DISTRICT, VT

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RUTLAND LTCP CSO

RUTLAND, VT

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PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	10/18/2021	PRELIMINARY	EB

SCALE:

NTS

SHEET TITLE:

DOUBLETRAP DESIGN CRITERIA

SHEET NUMBER:

1.0

BILL OF MATERIALS

QTY.	UNIT TYPE	DESCRIPTION	TOP WEIGHT	BASE WEIGHT
0	I	8'-0" DOUBLETRAP	0	0
140	II/I	8'-0" DOUBLETRAP	14286	15698
0	III	8'-0" DOUBLETRAP	0	0
38	IV/III	8'-0" DOUBLETRAP	12249	16153
0	VII	8'-0" DOUBLETRAP	0	0
4	SPIV	8'-0" DOUBLETRAP	VARIES	VARIES
0	T2 PANEL	8" THICK PANEL	0	
4	T4 PANEL	8" THICK PANEL	5963	
0	T7 PANEL	8" THICK PANEL	0	
34	JOINT WRAP	150' PER ROLL		
72	JOINT TAPE	14.5' PER ROLL		
TOTAL PIECES = 364				
TOTAL PANELS = 4				
HEAVIEST PICK WEIGHT = 16,153				

LOADING DISCLAIMER:

STORMTRAP IS NOT DESIGNED TO ACCEPT ANY ADDITIONAL LOADINGS FROM NEARBY STRUCTURES NEXT TO OR OVER THE TOP OF STORMTRAP. IF ADDITIONAL LOADING CONSIDERATIONS ARE REQUIRED FOR STRUCTURAL DESIGN OF STORMTRAP, PLEASE CONTACT STORMTRAP IMMEDIATELY.

THE STORMTRAP SYSTEM HAS NOT BEEN DESIGNED TO SUPPORT THE ADDITIONAL WEIGHT OF ANY TREES. FURTHERMORE, THE ROOTS OF THE TREES MUST BE CONTAINED TO PREVENT FUTURE DAMAGE TO THE STORMTRAP SYSTEM. STORMTRAP ACCEPTS NO LIABILITY FOR DAMAGES CAUSED BY TREES OR OTHER VEGETATION PLACE AROUND OR ON TOP OF THE SYSTEM.

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 520.50
ALLOWABLE MIN GRADE = 520.50
INSIDE HEIGHT ELEVATION = 518.00
SYSTEM INVERT = 510.00

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.

228'-10 1/4"

98'-1 1/4"

IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III
IV/III	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	IV/III
	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	
IV/III	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	IV/III
	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	
IV/III	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	IV/III
	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	
IV/III	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	IV/III
	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	
IV/III	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	IV/III
SPIV	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	SPIV
SPIV	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	II/I	SPIV
	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III	IV/III

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SCALE:

NTS

SHEET TITLE:

DOUBLETRAP
SYSTEM LAYOUT

SHEET NUMBER:

2.0

STORMTRAP INSTALLATION SPECIFICATIONS

1. STORMTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891, STANDARD FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, THE FOLLOWING ADDITIONS AND/OR EXCEPTIONS SHALL APPLY:

2. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ADEQUATE EQUIPMENT IS USED TO SET/INSTALL THE MODULES.

3. STORMTRAP MODULES CAN BE PLACED ON A LEVEL, 6" FOUNDATION OF ¾" AGGREGATE EXTENDING 2'–0" PAST THE OUTSIDE OF THE SYSTEM (SEE DETAIL 1) AND SHALL BE PLACED ON PROPERLY COMPACTED SOILS (SEE SHEET 1.0 FOR SOIL BEARING CAPACITY REQUIREMENTS), AND IN ACCORDANCE WITH ASTM C891 STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES.

4. THE STORMTRAP MODULES SHALL BE PLACED SUCH THAT THE MAXIMUM SPACE BETWEEN ADJACENT MODULES DOES NOT EXCEED ¾" (SEE DETAIL 2). IF THE SPACE EXCEEDS ¾", THE MODULES SHALL BE RESET WITH APPROPRIATE ADJUSTMENT MADE TO LINE AND GRADE TO BRING THE SPACE INTO SPECIFICATION.

5. STORMTRAP MODULES ARE NOT WATERTIGHT. IF A WATERTIGHT SOLUTION IS REQUIRED, CONTACT STORMTRAP FOR RECOMMENDATIONS. THE WATERTIGHT APPLICATION IS TO BE PROVIDED AND IMPLEMENTED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT THE SELECTED WATERTIGHT SOLUTION PERFORMS AS SPECIFIED BY THE MANUFACTURER.

6. THE PERIMETER HORIZONTAL JOINT BETWEEN THE TOP AND BASE LEG CONNECTION OF THE STORMTRAP MODULES SHALL BE SEALED WITH PREFORMED MASTIC JOINT TAPE ACCORDING TO ASTM C891, 8.8 AND 8.12. (SEE DETAIL 3). THE MASTIC JOINT TAPE DOES NOT PROVIDE A WATERTIGHT SEAL.

7. ALL EXTERIOR JOINTS BETWEEN ADJACENT STORMTRAP MODULES SHALL BE SEALED WITH 8" WIDE PRE–FORMED, COLD–APPLIED, SELF–ADHERING ELASTOMERIC RESIN, BONDED TO A WOVEN , HIGHLY PUNCTURE RESISTANT POLYMER WRAP, CONFORMING TO ASTM C891 AND SHALL BE INTEGRATED WITH PRIMER SEALANT AS APPROVED BY STORMTRAP (SEE DETAILS 4 & 5). THE JOINT WRAP DOES NOT PROVIDE A WATERTIGHT SEAL. THE SOLE PURPOSE OF THE JOINT WRAP IS TO PROVIDE A SILT AND SOIL TIGHT SYSTEM. THE ADHESIVE EXTERIOR JOINT WRAP SHALL BE INSTALLED ACCORDING TO THE FOLLOWING INSTALLATION INSTRUCTIONS:

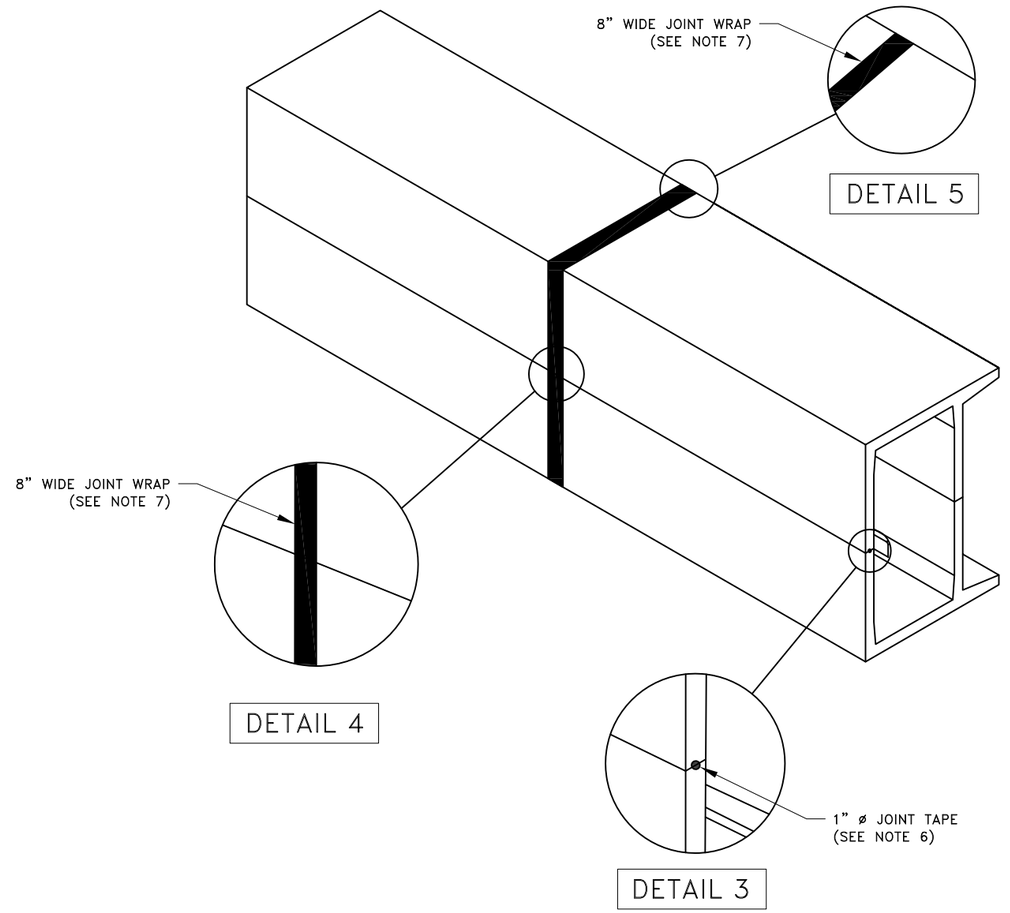
   7.1. USE A BRUSH OR WET CLOTH TO THOROUGHLY CLEAN THE OUTSIDE SURFACE AT THE POINT WHERE JOINT WRAP IS TO BE APPLIED.

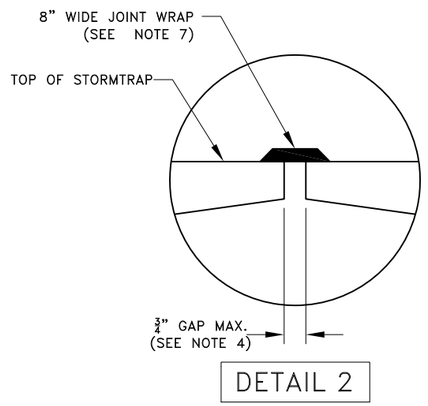
   7.2. A RELEASE PAPER PROTECTS THE ADHESIVE SIDE OF THE JOINT WRAP. PLACE THE ADHESIVE TAPE (ADHESIVE SIDE DOWN) AROUND THE STRUCTURE, REMOVING THE RELEASE PAPER AS YOU GO. PRESS THE JOINT WRAP FIRMLY AGAINST THE STORMTRAP MODULE SURFACE WHEN APPLYING.

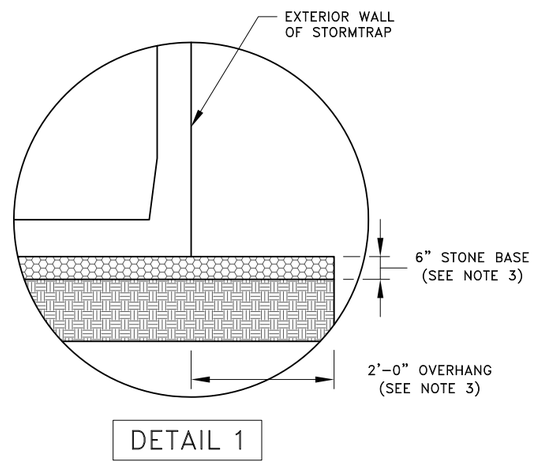
8. IF THE CONTRACTOR NEEDS TO CANCEL ANY SHIPMENTS, THEY MUST DO SO 48 HOURS PRIOR TO THEIR SCHEDULED ARRIVAL AT THE JOB SITE. IF CANCELED AFTER THAT TIME, PLEASE CONTACT THE PROJECT MANAGER.

9. IF THE STORMTRAP MODULE(S) IS DAMAGED IN ANY WAY PRIOR, DURING, OR AFTER INSTALL, STORMTRAP MUST BE CONTACTED IMMEDIATELY TO ASSESS THE DAMAGE AND TO DETERMINE WHETHER OR NOT THE MODULE(S) WILL NEED TO BE REPLACED. IF ANY MODULE ARRIVES AT THE JOBSITE DAMAGED DO NOT UNLOAD IT; CONTACT STORMTRAP IMMEDIATELY. ANY DAMAGE NOT REPORTED BEFORE THE TRUCK IS UNLOADED WILL BE THE CONTRACTOR'S RESPONSIBILITY.

10. STORMTRAP MODULES CANNOT BE ALTERED IN ANY WAY AFTER MANUFACTURING WITHOUT WRITTEN CONSENT FROM STORMTRAP.







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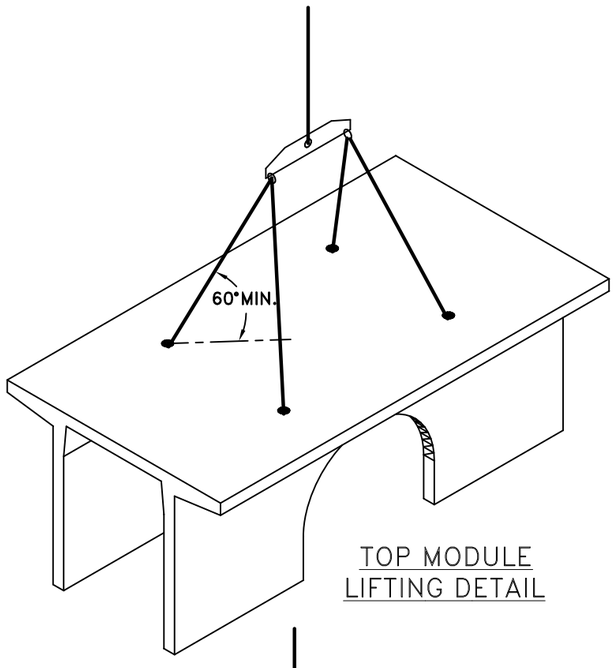
DOUBLETRAP
INSTALLATION
SPECIFICATIONS

SHEET NUMBER:

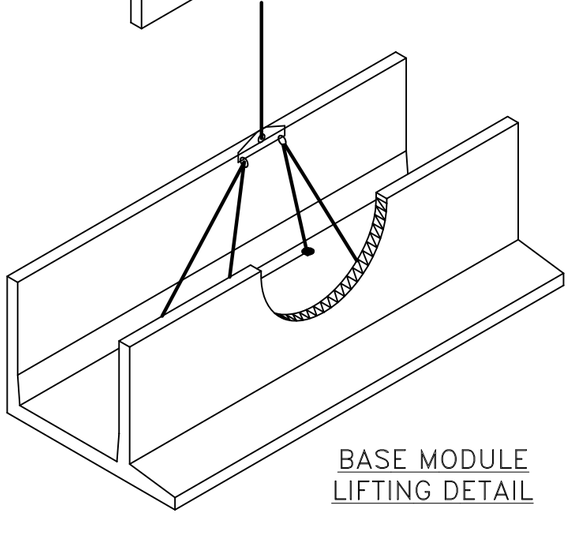
3.0

STORMTRAP MODULE LIFTING INSTALLATION NOTES

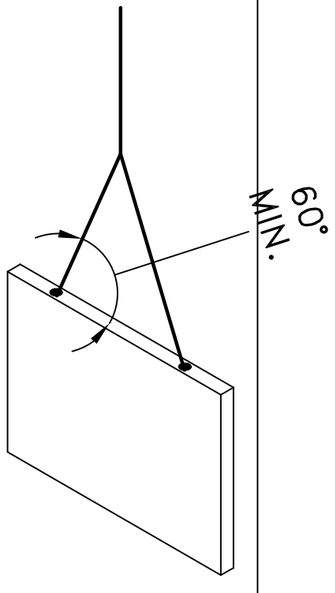
1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL (4) CHAINS/CABLES ARE SECURED PROPERLY TO THE LIFTING ANCHORS AND IN EQUAL TENSION WHEN LIFTING THE STORMTRAP MODULE (SEE RECOMMENDATIONS 2 & 3).
2. MINIMUM 7'-0" CHAIN/CABLE LENGTH TO BE USED TO LIFT STORMTRAP MODULES (SUPPLIED BY CONTRACTOR).
3. CONTRACTOR TO ENSURE MINIMUM LIFTING ANGLE IS 60° FROM TOP SURFACE OF STORMTRAP MODULE. SEE DETAIL.
4. IT IS UNDERSTOOD AND AGREED THAT AT ALL TIMES DURING WHICH HOISTING AND RIGGING EQUIPMENT IS BEING SUPPLIED TO THE PURCHASER, OPERATOR OF SUCH EQUIPMENT SHALL BE IN CHARGE OF HIS ENTIRE EQUIPMENT AND SHALL AT ALL TIMES BE THE JUDGE OF THE SAFETY AND PROPERTY OF ANY SUGGESTION TO HIM FROM THE SELLER, ITS AGENTS OR EMPLOYEES. PURCHASER AGREES TO SAVE, INDEMNIFY AND HOLD HARMLESS SELLER FROM ALL LOSS, CLAIMS, DEMANDS OR CAUSES OF ACTION, WHICH MAY ARISE FROM THE EXISTENCE OR OPERATION OF SAID EQUIPMENT.



TOP MODULE
LIFTING DETAIL



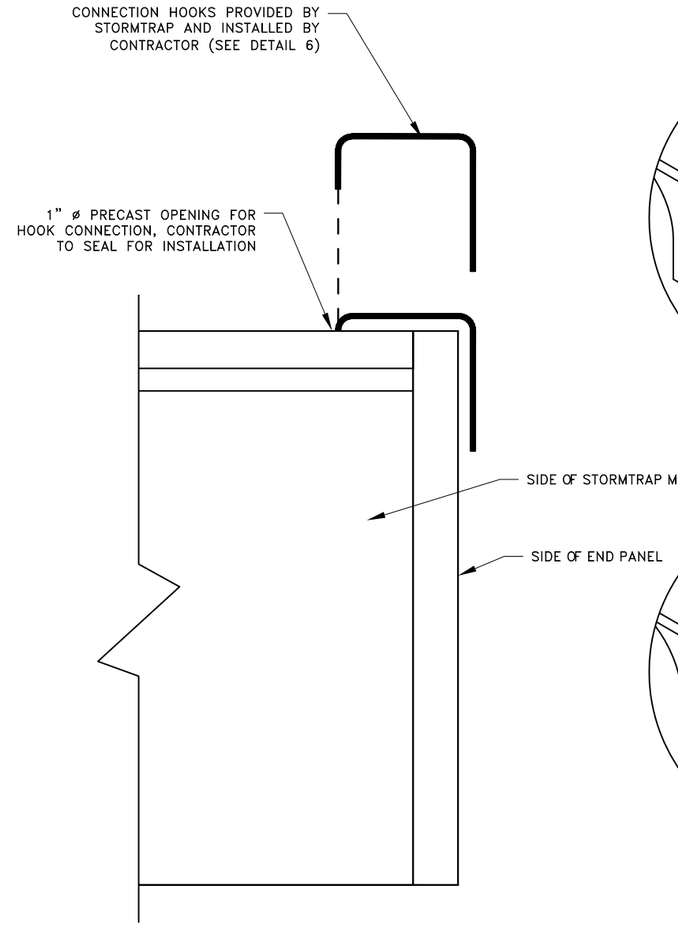
BASE MODULE
LIFTING DETAIL



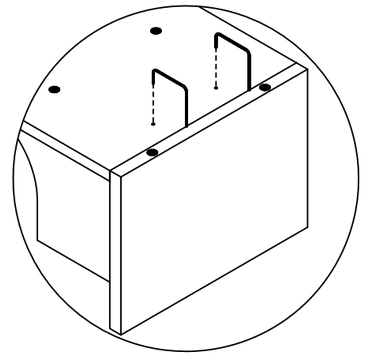
END PANEL
LIFTING DETAIL

END PANEL ERECTION/INSTALLATION NOTES

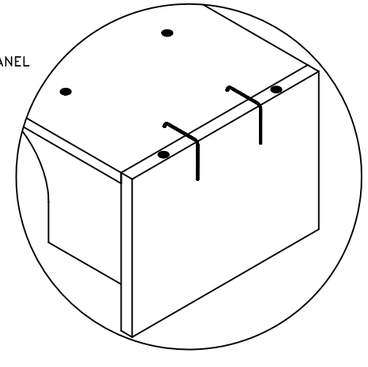
1. END PANELS WILL BE SUPPLIED TO CLOSE OFF OPEN ENDS OF ROWS.
2. PANELS SHALL BE INSTALLED IN A TILT UP FASHION DIRECTLY ADJACENT TO OPEN END OF MODULE (REFER TO SHEET 2.0 FOR END PANEL LOCATIONS).
3. CONNECTION HOOKS WILL BE SUPPLIED WITH END PANELS TO SECURELY CONNECT PANEL TO ADJACENT STORMTRAP MODULE (SEE PANEL CONNECTION ELEVATION VIEW).
4. ONCE CONNECTION HOOK IS ATTACHED, LIFTING CLUTCHES MAY BE REMOVED.
5. JOINT WRAP SHALL BE PLACED AROUND PERIMETER JOINT PANEL (SEE SHEET 3.0).



PANEL CONNECTION
ELEVATION VIEW



STEP 1



STEP 2

DETAIL 6

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DOUBLETRAP
INSTALLATION
SPECIFICATIONS

SHEET NUMBER:

3.1

ZONE CHART		
ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	#5 (¾") STONE AGGREGATE (SEE NOTE 4 FOR DESCRIPTION)
ZONE 2	BACKFILL	UNIFIED SOILS CLASSIFICATION (GW, GP, SW, SP) OR SEE BELOW FOR APPROVED BACKFILL OPTIONS
ZONE 3	FINAL COVER OVERTOP	MATERIALS NOT TO EXCEED 120 PCF

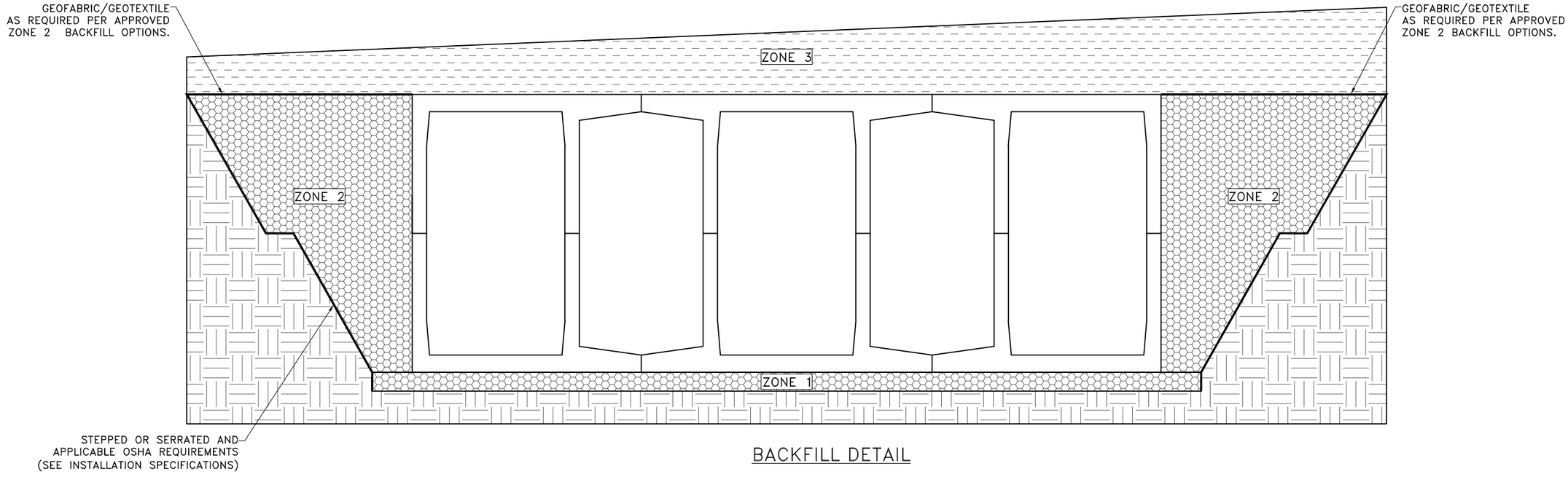
FILL DEPTH	TRACK WIDTH	MAX VEHICLE WEIGHT (KIPS)	MAX GROUND PRESSURE
12"	12"	51.8	1690 psf
	18"	56.1	1219 psf
	24"	68.1	1111 psf
	30"	76.7	1000 psf
	36"	85.0	924 psf

NOTE:
TRACK LENGTH NOT TO EXCEED 15'-4".
ONLY TWO TRACKS PER VEHICLE.

APPROVED ZONE 2 BACKFILL OPTIONS	
OPTION	REMARKS
¾" STONE AGGREGATE	THE STONE AGGREGATE SHALL CONSIST OF CLEAN AND FREE DRAINING ANGULAR MATERIAL. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL (ASTM SIZE #57) AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
SAND	IMPORTED PURE SAND IS PERMITTED TO BE USED AS BACKFILL IF IT IS CLEAN AND FREE DRAINING. THE SAND USED FOR BACKFILLING SHALL HAVE LESS THAN 40% PASSING #40 SIEVE AND LESS THAN 5% PASSING #200 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE SAND BACKFILL.
CRUSHED CONCRETE AGGREGATE	CLEAN, FREE DRAINING CRUSHED CONCRETE AGGREGATE MATERIAL CAN BE USED AS BACKFILL FOR STORMTRAP'S MODULES. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
ROAD PACK	STONE AGGREGATE 100% PASSING THE 1-1/2" SIEVE WITH LESS THAN 12% PASSING THE #200 SIEVE (ASTM SIZE #467). GEOFABRIC AS PER GEOTECHNICAL ENGINEER RECOMMENDATION.

STORMTRAP ZONE INSTALLATION SPECIFICATIONS/PROCEDURES

1. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MUST BE FREE-DRAINING MATERIAL. SEE ZONE 2 BACKFILL CHART ON THIS PAGE FOR APPROVED BACKFILL OPTIONS. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED (PROVIDED BY OTHERS).
2. DURING PLACEMENT OF MATERIAL OVERTOP THE SYSTEM, AT NO TIME SHALL MACHINERY BE USED OVERTOP THAT EXCEEDS THE DESIGN LIMITATIONS OF THE SYSTEM. WHEN PLACEMENT OF MATERIAL OVERTOP, MATERIAL SHALL BE PLACED SUCH THAT THE DIRECTION OF PLACEMENT IS PARALLEL WITH THE OVERALL LONGITUDINAL DIRECTION OF THE SYSTEM WHENEVER POSSIBLE.
3. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED AT A MINIMUM OF 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN HS-20 LOADING CRITERIA TRAVEL OVERTOP THE SYSTEM WITHOUT THE MINIMUM DESIGN COVERAGE. IF TRAVEL IS NECESSARY OVERTOP THE SYSTEM PRIOR TO ACHIEVING THE MINIMUM DESIGN COVER, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. IN SOME CASES, IN ORDER TO ACHIEVE REQUIRED COMPACTION, HAND COMPACTION MAY BE NECESSARY IN ORDER NOT TO EXCEED THE ALLOTTED DESIGN LOADING. SEE CHART FOR TRACKED VEHICLE WIDTH AND ALLOWABLE MAXIMUM PRESSURE PER TRACK.
4. STONE AGGREGATE FOUNDATION IN ZONE 1 IS RECOMMENDED FOR LEVELING PURPOSES ONLY (OPTIONAL).



BACKFILL DETAIL

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DOUBLETRAP BACKFILL SPECIFICATIONS

SHEET NUMBER:

4.0

RECOMMENDED ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THE STORMTRAP SYSTEM ARE 2'–0" IN DIAMETER. ACCESS OPENINGS LARGER THAN 3'–0" IN DIAMETER NEED TO BE APPROVED BY STORMTRAP. ALL OPENINGS MUST RETAIN AT LEAST 1'–0" OF CLEARANCE FROM THE END OF THE STORMTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED ON INSIDE LEG UNLESS OTHERWISE SPECIFIED.
2. PLASTIC COATED STEEL STEPS PRODUCED BY M.A. INDUSTRIES PART #PS3–PFC OR APPROVED EQUAL (SEE STEP DETAIL) ARE PROVIDED INSIDE ANY MODULE WHERE DEEMED NECESSARY. THE HIGHEST STEP IN THE MODULE IS TO BE PLACED A DISTANCE OF 1'–0" FROM THE INSIDE EDGE OF THE STORMTRAP MODULES. ALL ENSUING STEPS SHALL BE PLACED AT A DISTANCE BETWEEN 10" MIN AND 14" MAX BETWEEN THEM. STEPS MAY BE MOVED OR ALTERED TO AVOID OPENINGS OR OTHER IRREGULARITIES IN THE MODULE.
3. STORMTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.
4. STORMTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.
5. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS. STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.
6. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE SECTIONS. (PROVIDED BY OTHERS)

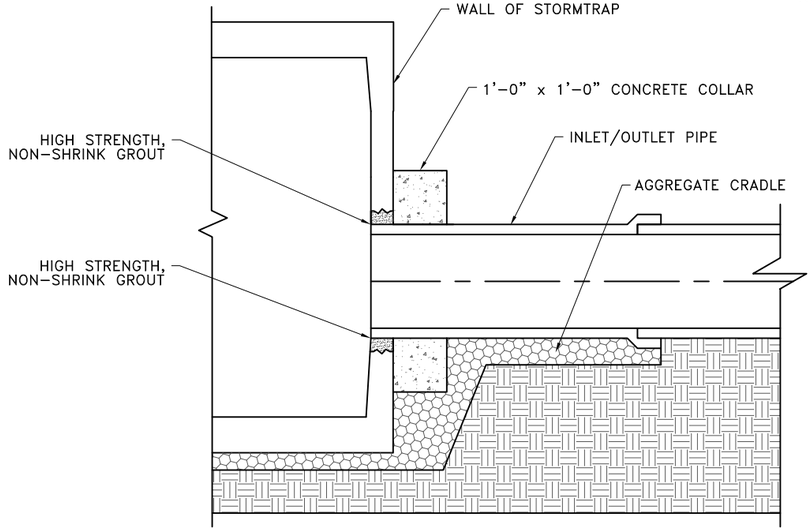
RECOMMENDED PIPE OPENING SPECIFICATION

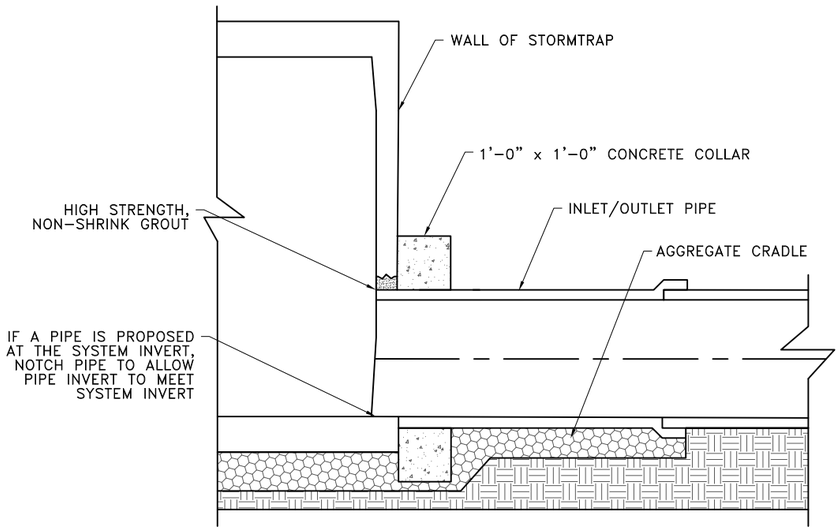
1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'–0".
2. MAXIMUM OPENING SIZE TO BE DETERMINED BY THE MODULE HEIGHT. PREFERRED OPENING SIZE ø 36" OR LESS. ANY OPENING NEEDED THAT DOES NOT FIT THIS CRITERIA SHALL BE BROUGHT TO THE ATTENTION OF STORMTRAP FOR REVIEW.
3. CONNECTING PIPES SHALL BE INSTALLED WITH A 1'–0" CONCRETE COLLAR, AND AN AGGREGATE CRADLE FOR AT LEAST ONE PIPE LENGTH (SEE PIPE CONNECTION DETAIL). A STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON–SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI SHALL BE USED.
4. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON–SHRINK GROUT.

RECOMMENDED PIPE INSTALLATION INSTRUCTIONS

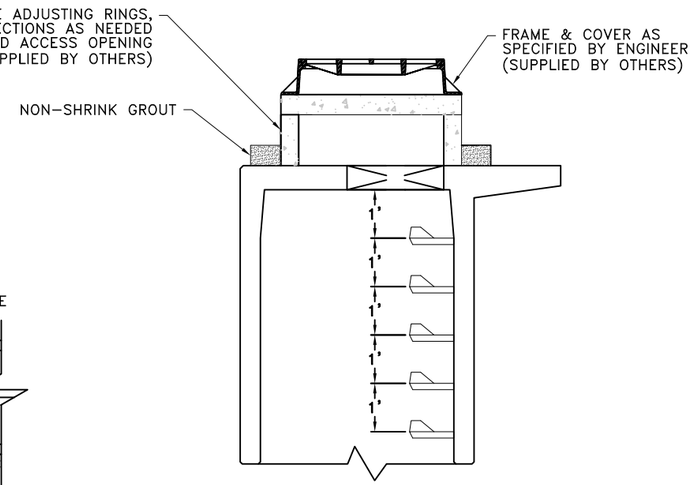
1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO STORMTRAP.
2. IF PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.
3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

NOTE: ALL ANCILLARY PRODUCTS/SPECIFICATIONS RECOMMENDED AND SHOWN ON THIS SHEET ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR AND/OR PER LOCAL MUNICIPAL CODE/REQUIREMENTS.

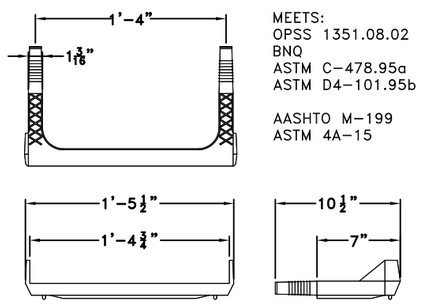




PIPE CONNECTION DETAIL



RISER / STAIR DETAIL



MEETS:
OPSS 1351.08.02
BNQ
ASTM C–478.95a
ASTM D4–101.95b

AASHTO M–199
ASTM 4A–15

STEP DETAIL

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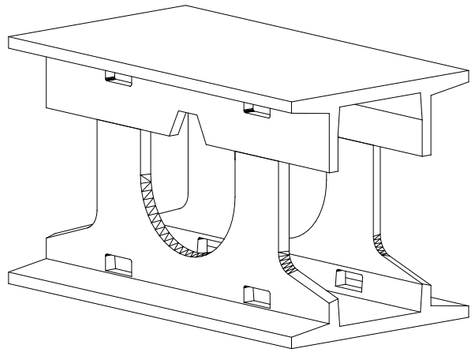
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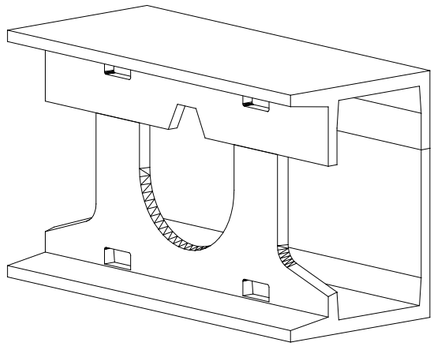
RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS

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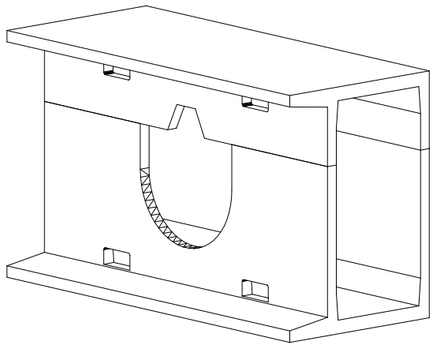
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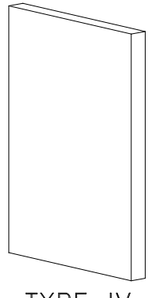
TYPE II/I



TYPE IV/III



TYPE IV



TYPE IV
END PANEL

NOTES:
1. OPENING LOCATIONS AND SHAPES MAY VARY.
2. SP – INDICATES A MODULE WITH MODIFICATIONS.
3. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
4. POCKET WINDOW OPENINGS ARE OPTIONAL.

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1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WESTON & SAMPSON
98 SOUTH MAIN STREET
SUITE #2
WATERBURY VILLAGE
HISTORIC DISTRICT, VT

PROJECT INFORMATION:

RUTLAND LTCP CSO

RUTLAND, VT

CURRENT ISSUE DATE:

10/18/2021

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	10/18/2021	PRELIMINARY	EB

SCALE:

NTS

SHEET TITLE:

DOUBLETRAP
MODULE TYPES

SHEET NUMBER:

6.0

TrashTrap®
NETTING SYSTEMS

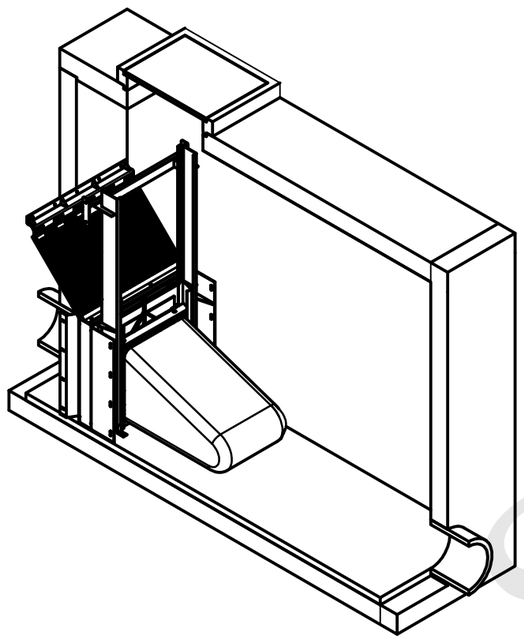
CONTACT STORMTRAP TO REQUEST A DESIGN AND BUDGET FOR YOUR SPECIFIC PROJECT NEEDS.

SHEET INDEX

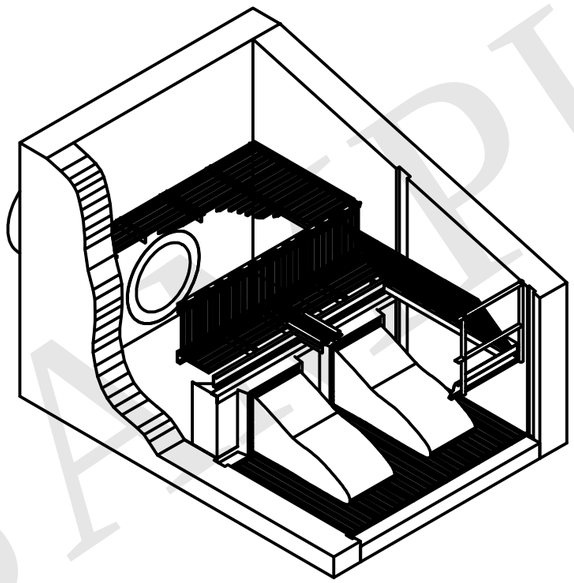
PAGE	DESCRIPTION
0.0	COVER SHEET
1.0	IN-LINE TRASHTRAP SYSTEM LAYOUT
1.1	IN-LINE TRASHTRAP CONNECTION DETAILS
1.2	IN-LINE TRASHTRAP INSTALLATION SPECIFICATIONS
1.3	IN-LINE TRASHTRAP INSTALLATION SPECIFICATIONS
1.4	IN-LINE TRASHTRAP BACKFILL SPECIFICATIONS
1.5	RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS
2.0	END-OF-PIPE TRASHTRAP SYSTEM LAYOUT
2.1	END-OF-PIPE TRASHTRAP CONNECTION DETAILS
3.0	FLOATING TRASHTRAP SYSTEM LAYOUT
3.1	FLOATING TRASHTRAP CONNECTION DETAILS

STORMTRAP CONTACT INFORMATION

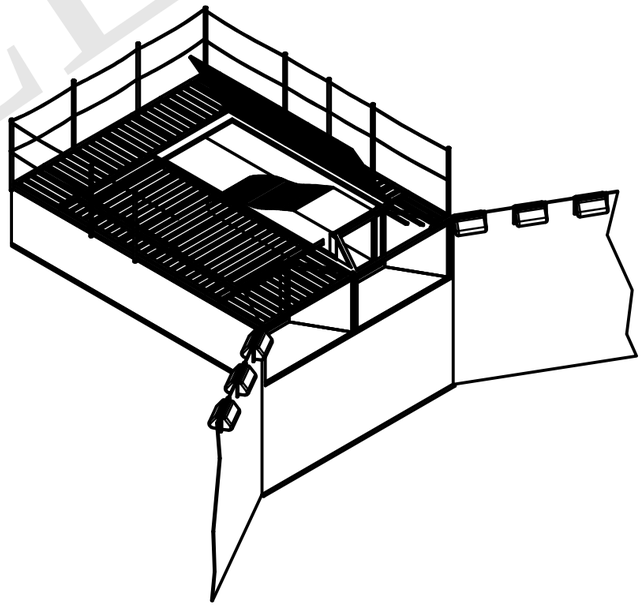
TRASHTRAP SUPPLIER: STORMTRAP
CONTACT NAME: STORMTRAP
CELL PHONE: STORMTRAP
SALES EMAIL: STORMTRAP



ILNTT - IN-LINE TRASHTRAP



EOPNTT - END-OF-PIPE TRASHTRAP



FLNTT - FLOATING TRASHTRAP

SAMPLE

TRASHTRAP®

SAMPLE PROJECT

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REVISIONS:

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SHEET TITLE:

COVER SHEET

SHEET NUMBER:

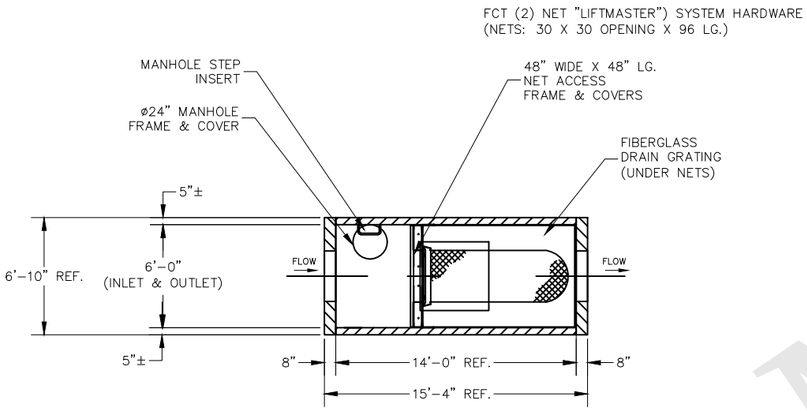
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SYSTEM INFORMATION

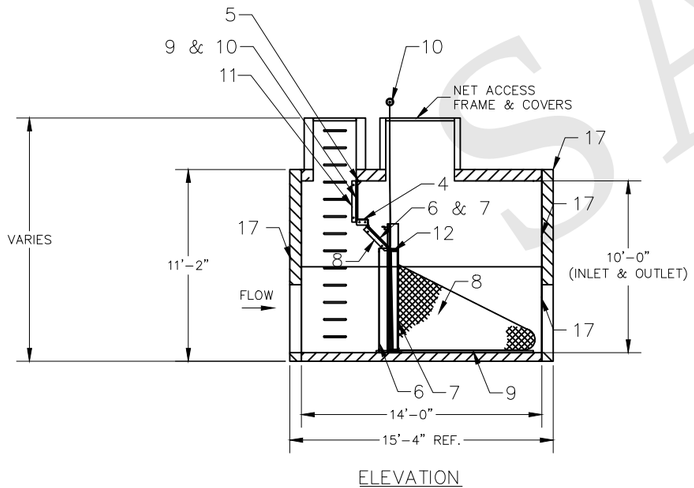
WATER QUALITY FLOW RATE:	X.X CFS (MAXIMUM)
HYDRAULIC RELIEF:	__ CFS *TBD
FOOTPRINT AREA:	104.8 FT²
INLET TYPE:	60" (MAX)
OUTLET TYPE:	60" (MAX)

BILL OF MATERIALS

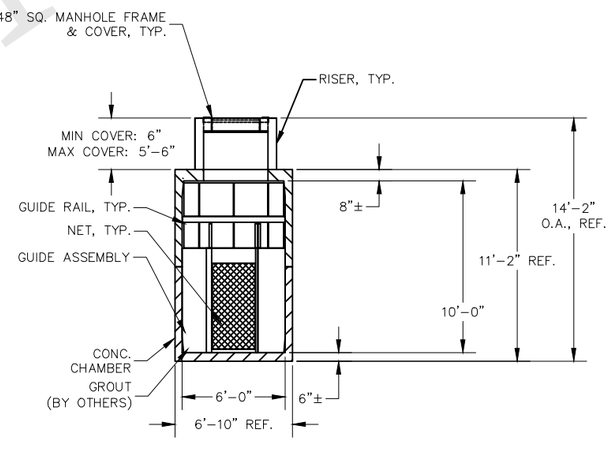
ITEM	QTY	DESCRIPTION	NOTE
1	1	NET GUIDE ASSEMBLY	–
2	2	LIFT FRAME	–
3	2	NET BAG	–
4	1	HINGED/FIXED SCREEN SUPPORT	–
5	1	FIXED SCREEN SUPPORT	–
6	2	HINGED SCREEN (24" WIDE)	–
7	2	HINGED SCREEN (22" WIDE)	–
8L	1	HINGED SCREEN FILLER (LEFT)	–
8R	1	HINGED SCREEN FILLER (RIGHT)	–
9	2	FIXED UPPER SCREEN (24" WIDE)	–
10	2	FIXED UPPER SCREEN (22" WIDE)	–
11	2	FIXED UPPER SCREEN FILLER	–
12	1	HINGED SCREEN HOLD DOWN PLATE	–
13	AS REQ'D	FIBERGLASS DRAIN GRATING	–
14	1	GUIDE RAIL EXTENSION	–
15	2	LIFTING SLING (CABLE W/RING)	–
16	2	ILNTT MODULE TYPE VI	–
17	1	END CAP	–
18	1	NET ACCESS HATCH (48x48)	–
19	1	24" MANHOLE	–



PLAN



ELEVATION



END
(INLET)

NOTES & SPECIFICATIONS:

1. NET BAGS: 96" LG. WITH XX" x XX" INLET OPENING (NOMINAL DIMENSIONS).

2. DESIGN FLOW RATE = XXX MGD. ADDITIONAL FLOW SHALL PASS THROUGH THE PROCESS SCREENING.

3. UNLESS OTHERWISE SPECIFIED: NET GUIDE ASSEMBLY, LIFT FRAME AND ALL ASSOCIATED FCT SYSTEM COMPONENTS SHALL BE TYPE 316 STAINLESS STEEL. ALL FASTENING HARDWARE SHALL BE TYPE 316 STAINLESS STEEL.

4. UNLESS OTHERWISE SPECIFIED: THE NETTING FACILITY SHALL BE CONSTRUCTED SUCH THAT ALL PROCESS BAR SPACINGS, GRATING, HINGED JOINTS AND CONNECTION POINTS OF FRAME WORK SHALL NOT EXCEED 1/2 INCHES. NO OPENINGS SHALL BE ALLOWED WHICH PROVIDE A MEANS OF BYPASSING OR SHORT CIRCUITING MATERIAL 1/2 INCH OR GREATER.

5. HINGED SCREENS TO BE BOLTED IN THE CLOSED POSITION.

6. BAR SCREEN (PROCESS TYPE): 1" x 3/16" BB, 11/16" O.C., 1/2" CLEAR SPACING, TYPE 316 STAINLESS STEEL.

7. FIXED DRAIN GRATING (BELOW NETS): STRONGWELL "SAFDECK" OR EQUAL

8. GENERAL CONTRACTOR TO VERIFY DIMENSIONS AND ELEVATIONS SHOWN.

9. SEE CONTRACT DRAWINGS FOR ADDITIONAL SYSTEM RELATED DETAILS & SPECIFICATIONS.

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ENGINEER INFORMATION:

PROJECT INFORMATION:

TRASHTRAP

CURRENT ISSUE DATE:

ISSUED FOR:

SAMPLE PROJECT

REVISIONS:

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SCALE:

NTS

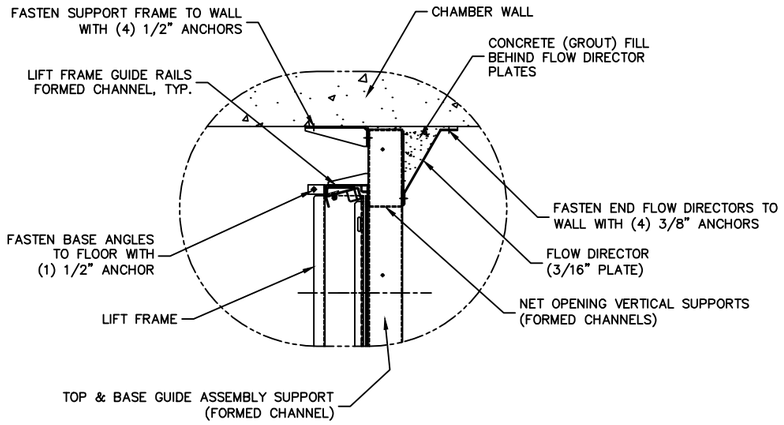
SHEET TITLE:

IN-LINE TRASHTRAP SYSTEM LAYOUT

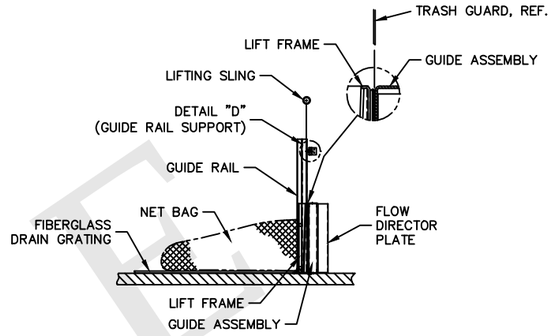
SHEET NUMBER:

1.0

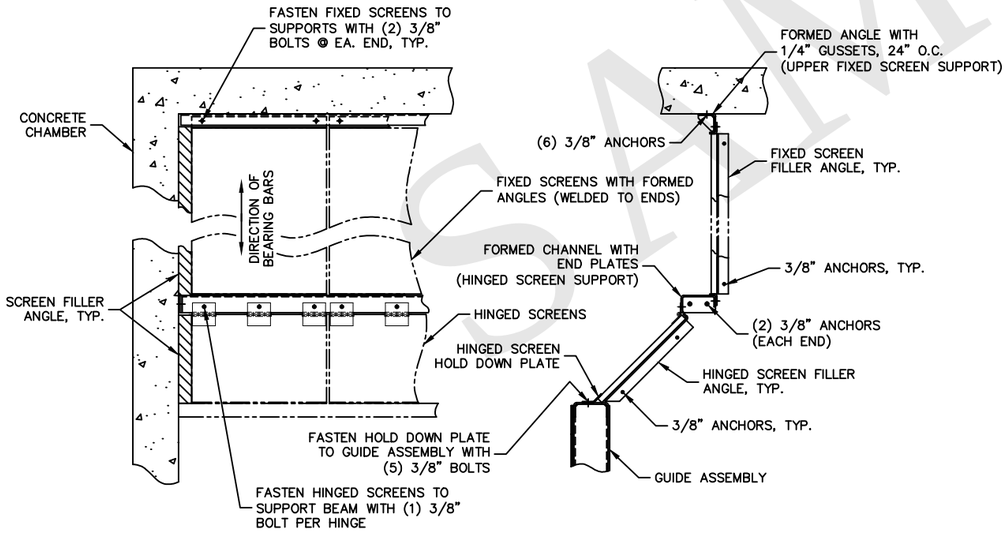
SAMPLE



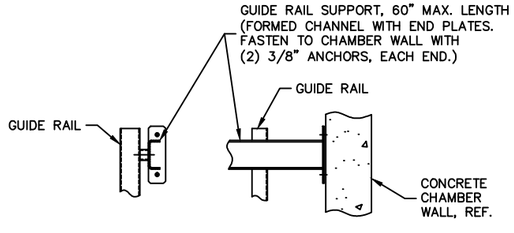
TYPICAL END CONDITION, GUIDE ASSEMBLY



TYPICAL LIFT FRAME ARRANGEMENT



HINGED/FIXED SCREEN ARRANGEMENT



DETAIL "D"

SAMPLE

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SCALE:

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SHEET TITLE:

IN-LINE TRASHTRAP CONNECTION DETAILS

SHEET NUMBER:

1.1

TRASHTRAP INSTALLATION SPECIFICATIONS

1. TRASHTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891, STANDARD FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES, THE FOLLOWING ADDITIONS AND/OR EXCEPTIONS SHALL APPLY:

2. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ADEQUATE EQUIPMENT IS USED TO SET/INSTALL THE MODULES.

3. TRASHTRAP MODULES CAN BE PLACED ON A LEVEL, 6" FOUNDATION OF $\frac{3}{4}$" AGGREGATE EXTENDING 2'-0" PAST THE OUTSIDE OF THE SYSTEM (SEE DETAIL 1) AND SHALL BE PLACED ON PROPERLY COMPACTED SOILS (SEE SHEET 1.0 FOR SOIL BEARING CAPACITY REQUIREMENTS), AND IN ACCORDANCE WITH ASTM C891 STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST UTILITY STRUCTURES.

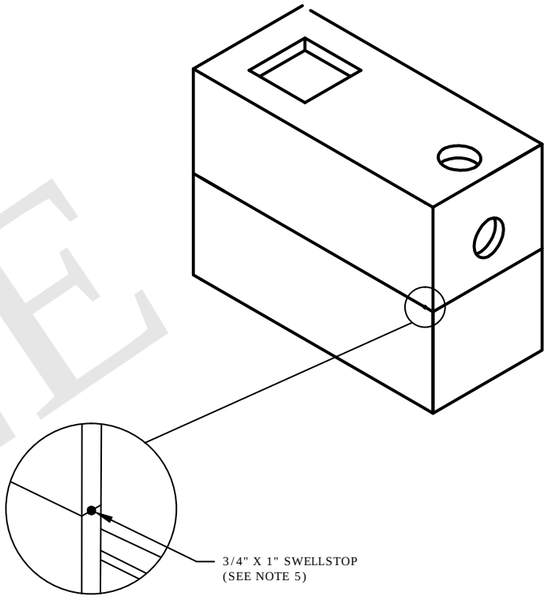
4. THE TRASHTRAP MODULES SHALL BE PLACED SUCH THAT THE MAXIMUM SPACE BETWEEN ADJACENT MODULES DOES NOT EXCEED $\frac{3}{4}$" (SEE DETAIL 2). IF THE SPACE EXCEEDS $\frac{3}{4}$", THE MODULES SHALL BE RESET WITH APPROPRIATE ADJUSTMENT MADE TO LINE AND GRADE TO BRING THE SPACE INTO SPECIFICATION.

5. THE HORIZONTAL JOINT BETWEEN THE TOP AND BASE LEG CONNECTION OF THE TRASHTRAP MODULES SHALL BE SEALED WITH SIKA GREENSTREAK SWELLSTOP 3/4" X 1" PER INSTALLATION INSTRUCTIONS.

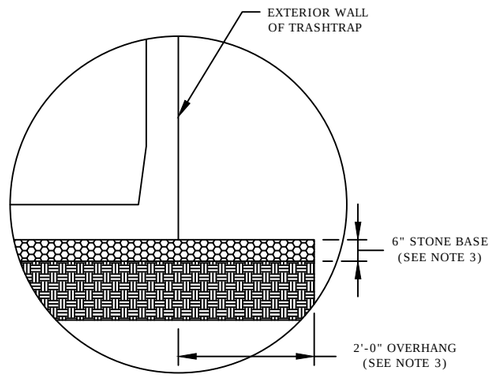
6. IF THE CONTRACTOR NEEDS TO CANCEL ANY SHIPMENTS, THEY MUST DO SO 48 HOURS PRIOR TO THEIR SCHEDULED ARRIVAL AT THE JOB SITE. IF CANCELED AFTER THAT TIME, PLEASE CONTACT THE PROJECT MANAGER.

7. IF THE TRASHTRAP MODULE(S) IS DAMAGED IN ANY WAY PRIOR, DURING, OR AFTER INSTALL, STORMTRAP MUST BE CONTACTED IMMEDIATELY TO ASSESS THE DAMAGE AND TO DETERMINE WHETHER OR NOT THE MODULE(S) WILL NEED TO BE REPLACED. IF ANY MODULE ARRIVES AT THE JOBSITE DAMAGED DO NOT UNLOAD IT; CONTACT STORMTRAP IMMEDIATELY. ANY DAMAGE NOT REPORTED BEFORE THE TRUCK IS UNLOADED WILL BE THE CONTRACTOR'S RESPONSIBILITY.

8. TRASHTRAP MODULES CANNOT BE ALTERED IN ANY WAY AFTER MANUFACTURING WITHOUT WRITTEN CONSENT FROM STORMTRAP.



DETAIL 2



DETAIL 1

SAMPLE

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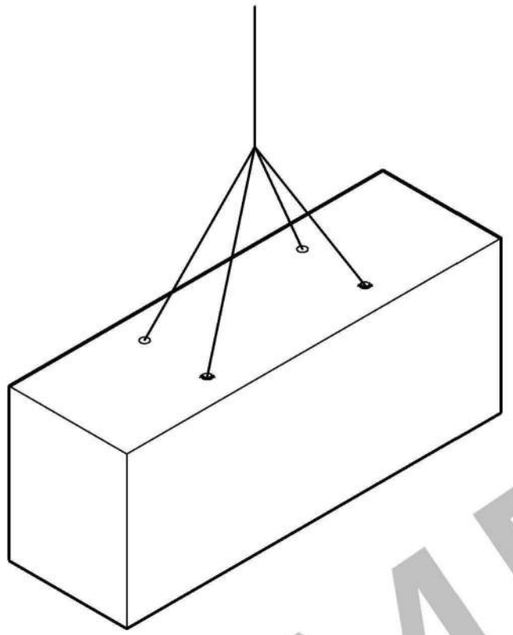
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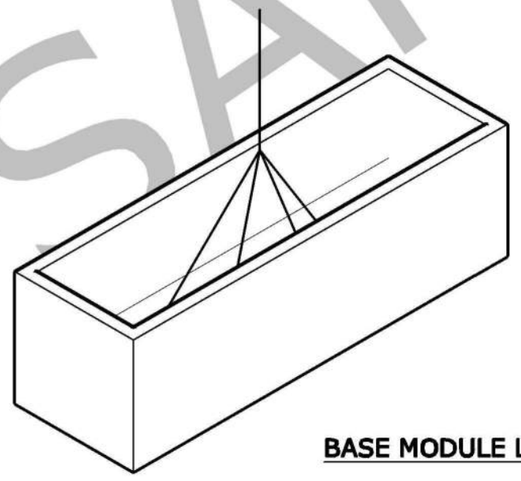
TRASHTRAP INSTALLATION SPECIFICATIONS

SHEET NUMBER:

1.2



TOP MODULE LIFTING DETAIL



BASE MODULE LIFTING DETAIL

SAMPLE

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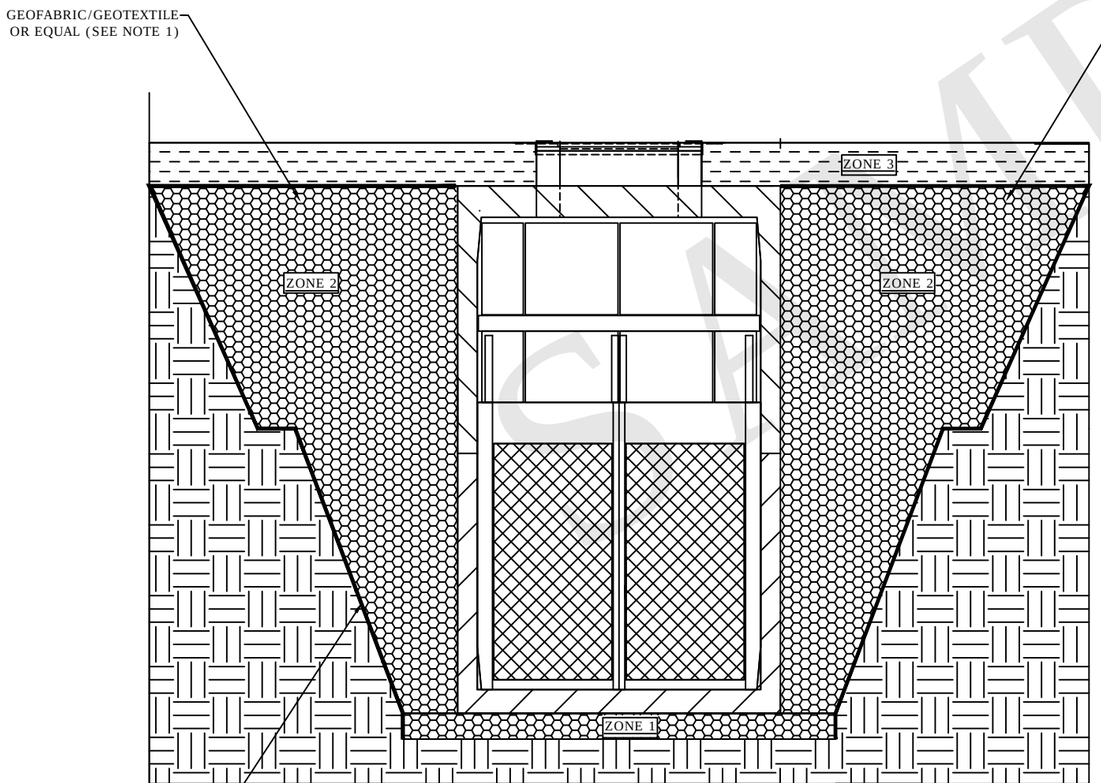
SHEET TITLE:

TRASHTRAP INSTALLATION SPECIFICATIONS

SHEET NUMBER:

1.3

ZONE CHART		
ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	
ZONE 2	BACKFILL	
ZONE 3	FINAL COVER OVERTOP	



BACKFILL DETAIL

TRASHTRAP ZONE INSTALLATION SPECIFICATIONS/PROCEDURES

1. THE FILL PLACED AROUND THE TRASHTRAP MODULES MUST DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MATERIAL SHALL BE CLEAN, CRUSHED, ANGULAR No. 5 (AASHTO M43) AGGREGATE. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED.
2. DURING PLACEMENT OF MATERIAL OVERTOP THE SYSTEM, AT NO TIME SHALL MACHINERY BE USED OVERTOP THAT EXCEEDS THE DESIGN LIMITATIONS OF THE SYSTEM. WHEN PLACEMENT OF MATERIAL OVERTOP, MATERIAL SHALL BE PLACED SUCH THAT THE DIRECTION OF PLACEMENT IS PARALLEL WITH THE OVERALL LONGITUDINAL DIRECTION OF THE SYSTEM WHENEVER POSSIBLE.
3. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED AT A MINIMUM OF 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN HS-20 LOADING CRITERIA TRAVEL OVERTOP THE SYSTEM WITHOUT THE MINIMUM DESIGN COVERAGE. IF TRAVEL IS NECESSARY OVERTOP THE SYSTEM PRIOR TO ACHIEVING THE MINIMUM DESIGN COVER, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. IN SOME CASES, IN ORDER TO ACHIEVE REQUIRED COMPACTION, HAND COMPACTION MAY BE NECESSARY IN ORDER NOT TO EXCEED THE ALLOTTED DESIGN LOADING.
4. FREE DRAINING AGGREGATE - 80% AGGREGATE RETAINED ON $\frac{1}{2}$" SIEVE MAJORITY OF AGGREGATE SIZE BETWEEN $\frac{1}{2}$" AND 1" ONLY 5% OF MATERIAL PASSING #200 SIEVE NO FINES.

SAMPLE

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SHEET TITLE:

TRASHTRAP
BACKFILL
SPECIFICATIONS

SHEET NUMBER:

1.4

RECOMMENDED
ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THE TRASHTRAP SYSTEM ARE 2'-0" IN DIAMETER AND 42" X 42" ACCESS OPENINGS. CONSULT STORMTRAP FOR ALTERNATE OPENING SIZES AND LOCATIONS ALL OPENINGS MUST RETAIN AT LEAST 1'-0" OF CLEARANCE FROM THE END OF THE TRASHTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED AS SHOWN UNLESS OTHERWISE SPECIFIED.

2.TRASHTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.

3.TRASHTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.

4. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS.STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.

5. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE INSPECTIONS.

RECOMMENDED
PIPE OPENING SPECIFICATION

1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'-0".

2. MAXIMUM OPENING SIZE TO BE DETERMINED BY THE MODULE HEIGHT. PREFERRED OPENING SIZE Ø 30" OR LESS. ANY OPENING NEEDED THAT DOES NOT FIT THIS CRITERIA SHALL BE BROUGHT TO THE ATTENTION OF STORMTRAP FOR REVIEW.

3. CONNECTING PIPES SHALL BE INSTALLED WITH STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON-SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI SHALL BE USED (SEE PIPE CONNECTION DETAIL).

4. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON-SHRINK GROUT.

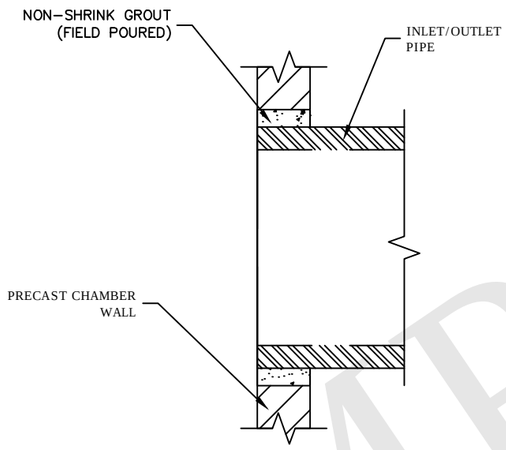
RECOMMENDED PIPE
INSTALLATION INSTRUCTIONS

1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO TRASHTRAP.

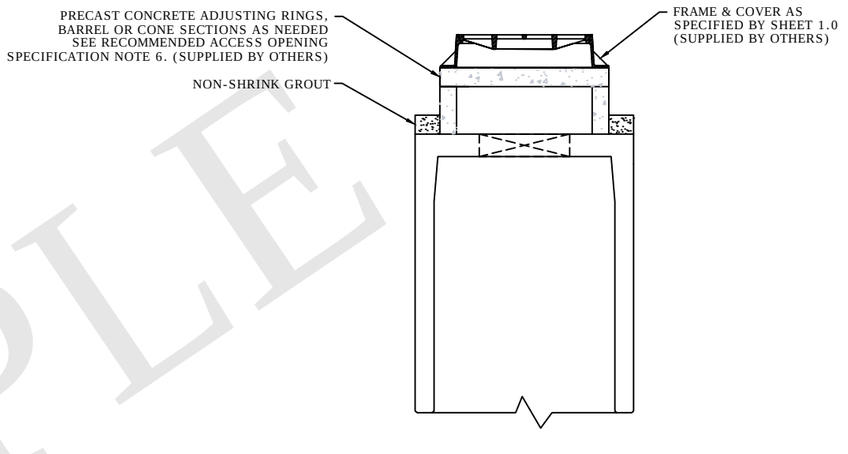
2. IF PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.

3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

NOTE: ALL ANCILLARY PRODUCTS RECOMMENDED AND SHOWN ON THIS SHEET ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR.



PIPE CONNECTION DETAIL



RISER DETAIL

SAMPLE

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RECOMMENDED PIPE / ACCESS OPENING SPECIFICATIONS

SHEET NUMBER:

1.5

CSO Improvement Project – Cottage Grove Heights

Five StormTrap basins were installed in the Cottage Grove Heights neighborhood as part of a combined sewer overflow system for the City of Chicago Department of Water Management.

The existing combined sewer system that runs through the neighborhood was exceeding its capacity during heavy rain events and causing recurring flooding issues, and several residents experienced flooded basements.

“During heavy rains, the runoff overloads the existing 30’’ sewer and mixes with untreated sewage. If the flow rate of the combined sewage exceeds the capacity of the system, it can back up into nearby homes,” explains William L. Schmanski, PE, Project Manager at Alfred Benesch & Company.

The engineering firm contacted StormTrap to assist on this project to add offline storage to upgrade the local combined sewer system. The StormTrap team designed five 5’-8’’ SingleTrap systems that were installed beneath the boulevard of E 97th St between S Ellis Ave & S Avalon Ave. The systems take on storage capacity of combined sewage through a 24’’ diversion pipe during high-intensity rainfall events, minimizing the impact on the downstream sewer system.

The SingleTrap systems were customized for this project. All basins were installed on a sloped concrete slab that incorporates a trench. In the middle of the trench, there is a 4’ precast sump, where the outlet pipe is located, which allows water to drain easily. The systems also have windows on the interior walls of the StormTrap units, which allow for water to flow in both directions. The five systems together are capable of storing 184,514 cf of water and sewage. The tanks are watertight to prevent sewage from contaminating groundwater.

Working closely with Alfred Benesch & Company, MQ Construction, and the City of Chicago Department of Water Management, the project was successfully completed in July 2019, meeting construction timelines and effectively solving the flooding problems. All five basins were installed within two months.

“StormTrap offered a great solution for the project,” stated the project engineer. “The systems allowed for maximizing sewage storage volume while minimizing the project footprint and with customized sloped concrete slab and trench to allow for a complete drain at following the storm.”

Project: CSO Improvement
Location: Chicago, IL

Consulting Engineer: Alfred Benesch & Company
Installing Contractor: MQ Construction



Project Specifications
Application: Storage, Combined Sewer Overflow
Product used: 5’-8’’ SingleTrap
Number of basins: 5
Number of pieces: Basins 1, 2, 3, 4: 58 units each | Basin 5: 48
Total water storage: 184,514 cf

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PENETRON®
TOTAL CONCRETE PROTECTION

PENEBAR™ NS

BUTYL RUBBER SEALANT FOR PRECAST STRUCTURES

DESCRIPTION

PENEBAR™ NS is a unique butyl-rubber-based preformed flexible sealing compound. It is designed to seal as a flexible non-swelling gasket to all types of precast structures.

APPLICATIONS

Manholes

Septic tanks

Box culverts

Concrete vaults

Vertical and horizontal concrete panel structures

DIRECTIONS FOR USE

How to apply PENEBAR™ NS:

1) While applying moderate pressure with the heel of the hand, press a bead of PENEBAR™ NS firmly into position on the standing structure.

2) Tightly butt ends to form a continuous, uninterrupted seal.

3) Peel the protective covering from the exposed side of the installed PENEBAR™ NS.

4) Tightly seat the precast concrete units on the PENEBAR™ NS to form a continuous gasket.

STORAGE / SHELF LIFE

When stored in a dry enclosed area off the ground at a minimum temperature of 45°F (7°C) in unopened, undamaged cartons, shelf life is unlimited.

TECHNICAL DATA

Typical properties @ 70°F (21°C):

Description	Standard	Specification (ASTM C990 Sec 6.2)	Results
Color	-	-	Black
Specific gravity	ASTM D71	1.15-1.5	1.2
Ductility (cm)	ASTM D113	5 min	11.0
Cone Penetration @ 77°F (25°C) dmm	ASTM D217	50-120	55
Cone Penetration @ 32°F (0°C) dmm	ASTM D217	30 min	40
Flash point, C.O.C	ASTM D92	350°F (177°C) min	567°F (297°C)
Fire point, C.O.C	ASTM D92	375°F (191°C) min	569°F (298°C)

Minimum storage temperature:
40°F (4°C). Product should not be allowed to freeze.

Application temperature range:
-9°F to 100°F (-23°C to 38°C)

Service temperature range:
-29°F to 180°F (-34°C to 82°C)

Chemical resistance:
60-Day Immersion Testing: No visible deterioration, no cracking and no swelling when tested in 5% Caustic Potash, 5% Hydrochloric Acid, 5% Sulfuric Acid, and 5% saturated Hydrogen Sulfide.

Hydrostatic test:
PENEBAR™ NS meets the hydrostatic performance requirement, as per ASTM C990 sec 10.1

SAFE HANDLING INFORMATION

Keep out of reach of children. Refer to the Safety Data Sheet for additional information.

WARRANTY: PENETRON INTERNATIONAL, LTD. warrants that the products manufactured by it shall be free from material defects and will conform to formulation standards and contain all components in their proper proportion. Should any of the products be proven defective, the liability to PENETRON INTERNATIONAL, LTD. shall be limited to replacement of the material proven to be defective and PENETRON INTERNATIONAL, LTD. shall in no case be liable otherwise or for incidental or consequential damages. **PENETRON INTERNATIONAL, LTD. MAKES NO WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED.** User shall determine the suitability of the product for its intended use and assume all risks and liability in connection therewith.

PENETRON INTERNATIONAL, LTD.
45 Research Way, Suite 203, East Setauket, NY 11733
(631) 941-9700 • info@penetron.com • penetron.com

PENETRON®
TOTAL CONCRETE PROTECTION

PENETRON ADMIX® SB

CRYSTALLINE WATERPROOFING ADMIXTURE

DESCRIPTION

PENETRON ADMIX® SB (Soluble Bag integral crystalline waterproofing admix) is added to the concrete mix at the time of batching. PENETRON ADMIX® SB consists of Portland cement and various active, proprietary chemicals. These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction, which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete. Thus, the concrete becomes permanently sealed against the penetration of water or liquids from any direction. The concrete is also protected from deterioration due to harsh environmental conditions.

PENETRON ADMIX® SB has been specially formulated to meet varying project and temperature conditions (see Setting time and strength). Consult with a Penetron technical representative for additional detailed support on your project.

APPLICATIONS

Reservoirs
Sewage and water treatment plants
Secondary containment structures
Tunnels and subway systems
Underground vaults
Foundations
Parking structures
Swimming pools
Precast, cast-in-place and shotcrete applications

ADVANTAGES

Resists extreme hydrostatic pressure from either positive or negative surface of the concrete slab
Becomes an integral part of the concrete
Highly resistant to aggressive chemicals
Can seal hairline cracks up to 1/51" (0.5 mm)
Allows concrete to breathe
Non-toxic (NSF 61 certified for potable water applications)
Less expensive than traditional methods
Permanent
Added to the concrete at the time of batching and therefore not subject to climatic restraints
Reduces construction scheduling time
Improves durability of concrete
Permeability Reducing Admixture for Hydrostatic conditions (PRAH)
Zero VOC – PENETRON powdered products contain zero volatile organic compounds and are safe for use both outdoors and in confined indoor spaces
Exceeds requirements of ASTM C494-S (Specific Performance Admixtures)

DIRECTIONS FOR USE

Dosage rate:

PENETRON ADMIX ® SB is designed to be dosed at the rate of one soluble bag per cubic yard (or cubic meter) of concrete. For most mix designs in use, this falls within the range of acceptability of 1% by weight of total cementing material. Consult with Penetron's Technical Department for assistance in verifying the appropriate dosage rate and for further information regarding enhanced chemical resistance and optimum concrete performance for your project.

Mixing:

PENETRON ADMIX® SB must be added to the concrete at the time of batching.

The sequence of procedures for addition will vary according to the type of batch plant operation and equipment. The following are some typical mixing guidelines. For more detailed information on dosing procedures, contact your Penetron representative.

Ready mix plant - Dry batch operation: Add PENETRON ADMIX® SB directly into the drum of the ready-mix truck and immediately before charging the drum with 60%-70% of the required mix water, along with 300-500 lb (136-227 kg) of aggregate. Mix the materials for 2-3 minutes to ensure the PENETRON ADMIX® SB is distributed evenly throughout the mix water. Add the balance of materials to the ready-mix truck in accordance with standard batching practices.

Ready mix plant - Central mix operation: Ideally, PENETRON ADMIX® SB should be added directly into the central mix drum before all other ingredients. However, when this is impractical or unsafe, PENETRON ADMIX® SB can be added directly into the drum of the ready-mix truck immediately before charging with concrete. The dosed concrete should be allowed to mix in accordance with ACI guidelines or for a minimum of 70 revolutions at standard mixing speeds (approximately 5 minutes) to ensure even distribution of PENETRON ADMIX® SB throughout the concrete.

Precast batch plant: Consult with a Penetron technical representative to determine if PENETRON ADMIX® SB would suit your precast batch plant operation or if one of our other packaging solutions may be more appropriate.

NOTE: It is important to obtain a homogeneous mixture of PENETRON ADMIX® SB with the concrete. For further information regarding the proper use of PENETRON ADMIX® SB for a specific project, consult with a Penetron technical representative.

Setting time and strength:

The setting time of concrete is affected by the chemical and physical composition of ingredients, temperature of the concrete and climatic conditions. Retardation of set may occur when using PENETRON ADMIX® SB. The amount of retardation will depend upon the concrete mix design

and the dosage rate of PENETRON ADMIX® SB. However, under normal conditions, PENETRON ADMIX® SB will provide a normal set concrete. Concrete containing PENETRON ADMIX® SB may develop higher ultimate strengths than plain concrete. Trial mixes should be carried out under project conditions to determine setting time and strength of the concrete.

Concrete treated with PENETRON ADMIX® SB should be placed and finished in accordance with good concrete practices. ACI guidelines and recommendations should be observed.

SPECIAL CONSIDERATIONS

When incorporating PENETRON ADMIX® SB, the temperature of the concrete mix should be above 40ºF (4ºC).

PACKAGING

PENETRON ADMIX® SB is available in 6.6-lb (3-kg) soluble bags, packed 6 bags to a plastic pail. For large projects, customized packaging is available.

STORAGE / SHELF LIFE

PENETRON products must be stored dry at a minimum temperature of 45ºF (7ºC). Shelf life is one year when stored under proper conditions.

TECHNICAL SERVICES

For more detailed instructions, alternative application methods, or information concerning the compatibility of the PENETRON treatment with other products or technologies, contact the Penetron Technical Department or your local Penetron representative.

SAFE HANDLING INFORMATION

PENETRON ADMIX® SB is alkaline. As a cementitious powder or mixture, PENETRON ADMIX® SB may cause significant skin and eye irritation. Directions for treating these problems are clearly detailed on all Penetron pails and packaging. Penetron International, Ltd. also maintains comprehensive and up-to-date Safety Data Sheets on all its products. Each sheet contains health and safety information for the protection of your employees and customers. KEEP OUT OF REACH OF CHILDREN.

Contact Penetron International, Ltd. or your local Penetron representative to obtain copies of Safety Data Sheets prior to product storage or use.

CE

004aCPR2013-7-10
EN 934-2
Penetron International, Ltd.
601 South Tenth Street, Unit 300
Allentown, PA 18103
08
PENETRON ADMIX
Crystalline Capillary Admixture
Water Resisting Admixture

Chloride content: < 0,10 % by mass
Alkali content: < 10,3 % by mass
Compressive strength: ≥ 85 % of control
Conventional dry material content: > 99,5 %
Air content in fresh concrete: ≤2 % by volume
Capillary Absorption (after 90 day curing): ≤60 % by mass

WARRANTY: PENETRON INTERNATIONAL, LTD. warrants that the products manufactured by it shall be free from material defects and will conform to formulation standards and contain all components in their proper proportion. Should any of the products be proven defective, the liability to PENETRON INTERNATIONAL, LTD. shall be limited to replacement of the material proven to be defective, and PENETRON INTERNATIONAL, LTD. shall in no case be liable otherwise or for incidental or consequential damages. **PENETRON INTERNATIONAL, LTD. MAKES NO WARRANTY AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE AND THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED.** User shall determine the suitability of the product for its intended use and assume all risks and liability in connection therewith.

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45 Research Way, Suite 203, East Setauket, NY 11733
(631) 941-9700 • info@penetron.com • penetron.com

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Connor Park Storage Structure - Phase 1

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 197,350	$ 197,000
	Bonds and Insurance (8%)	L.S.	1	$ 315,760	$ 316,000
	General Conditions (5%)	L.S.	1	$ 197,350	$ 197,000
				General	**$710,000**
2	**Site Work**				
	Construct/Remove/Maintain Dewatering Det. Pond	L.S.	1	$ 25,000	$ 25,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
	Remove/Replace Ballfield Backstop	L.S.	1	$ 6,500	$ 7,000
	Restore Baseball Diamond	L.S.	1	$ 12,500	$ 13,000
				Site Work	**$55,000**
3	**Pipe Installation**				
	36" SDR-35 PVC (8-12 feet deep)	L.F.	750	$ 800.00	$600,000
	Pipe Bedding	L.F.	750	$ 7.50	$6,000
	Dewatering	Day	10	$ 850.00	$9,000
	New Pre-cast Conc. Sewer MH	V.F.	24	$ 600.00	$15,000
	Misc. Work and Cleanup	L.S.	1	$ 20,000.00	$20,000
				Pipe Installation	**$650,000**
4	**"Trash Trap" Structure**				
	Excavation	C.Y.	200	$ 35.00	$7,000
	Backfill & Compaction	C.Y.	155	$ 6.00	$1,000
	12" of Stone Bedding	C.Y.	10	$ 25.00	$1,000
	Tie-in 36" SDR-35 PVC	Ea.	2	$ 7,500.00	$15,000
	36" PVC Transition Sleeve	Ea.	2	$ 2,200.00	$5,000
	30 MGD "Trash Trap" Unit, incl. Transport	Ea.	1	$ 85,000.00	$85,000
	Install Unit	Ea.	1	$ 21,250.00	$22,000
	Dewatering	Day	10	$ 850.00	$9,000
	Structure Access Riser and Hatch	L.S.	1	12,500	$13,000
	Misc. Work and Cleanup	L.S.	1	$ 20,000.00	$20,000
				"Trash Trap" Structure	**$178,000**
5	**"Storm Trap" Storage Structure**				
	Excavation	C.Y.	12,000	$ 35.00	$420,000
	Backfill & Compaction	C.Y.	2,000	$ 6.00	$12,000
	12" of Stone Bedding	C.Y.	880	$ 25.00	$22,000
	Tie-in 36" SDR-35 PVC	Ea.	2	$ 7,500.00	$15,000
	36" PVC Transition Sleeve	Ea.	2	$ 2,200.00	$5,000
	"Storm Trap" Units, incl. Transport	Ea.	184	$ 7,300.00	$1,344,000
	Install Units (1 MG Total Volume)	Day	8	$ 8,500.00	$68,000
	Dewatering	Day	30	$ 850.00	$26,000
	700 GPM @ 15' TDH Submersible Pumps	Ea.	2	25,000	$50,000
	Equipment Installation	Ea.	2	6,250	$13,000
	Control Panel and Telemetry	L.S.	1	30,000	$30,000
	Electrical Service Drop and XFMR	L.S.	1	$ 15,000.00	$15,000
	Buried Power to Pump Panel from XFMR	L.F.	200	$ 35.00	$7,000
	Misc. Work and Cleanup	L.S.	1	$ 20,000.00	$20,000
	6" Sewage Force Main to CSO OO2 from Pumps	L.F.	150	$ 65.00	$10,000
				"Storm Trap" Storage Structure	**$2,047,000**

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Connor Park Storage Structure - Phase 1

6	**CSO 003 Tie-in**					
	Excavation	C.Y.	200	$ 35.00		$7,000
	12" of Stone Bedding	C.Y.	8	$ 25.00		$1,000
	Backfill & Compaction	C.Y.	190	$ 6.00		$2,000
	Cut into side of CSO 003 Outfall Conduit	L.S.	1	$ 10,000.00		$10,000
	36" PVC Transition Sleeve	Ea.	1	$ 2,200.00		$3,000
	4' x 6' CSO Concrete Outfall Bulkhead	L.S.	1	$ 6,500.00		$7,000
	Modify Structure Invert	L.S.	1	$ 4,000.00		$4,000
	Grading	S.Y.	110	$ 1.50		$1,000
	Misc. Work and Cleanup	L.S.	1	$ 10,000.00		$10,000
				CSO 003 Tie-in		**$45,000**
7	**CSO 002 Tie-in**					
	Excavation	C.Y.	200	$ 35.00		$7,000
	12" of Stone Bedding	C.Y.	8	$ 25.00		$1,000
	Backfill & Compaction	C.Y.	190	$ 6.00		$2,000
	Cut into side of CSO 002	L.S.	1	$ 10,000.00		$10,000
	Modify Structure Invert	L.S.	1	$ 15,000.00		$15,000
	36" PVC Transition Sleeve	Ea.	1	$ 2,200.00		$3,000
	Grading	S.Y.	100	$ 1.50		$1,000
	Misc. Work and Cleanup	L.S.	1	$ 10,000.00		$10,000
				CSO 002 Tie-in		**$49,000**
8	**Meadow Street Storm Drain Re-Route**					
	New Storm Drain & Pavement Restoration	L.F.	200	$ 350	$	70,000
	New Box Culvert	L.F.	300	$ 2,700	$	810,000
	New Drain Manhole	Ea.	1	$ 11,000	$	11,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$	16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$	16,000
				Meadow Street Storm Drain Re-Route		**$923,000**
				Construction Subtotal		**$4,660,000**
				Engineering Fees		$1,072,000
				Project Contingencies (30%)		$1,720,000
				Other Administrative Costs (0.5%)		$233,000
				TOTAL OPINION OF CONSTRUCTION COST		**$7,700,000**

Notes:

1- *ENR-CCI for October 2021 is 12464.94.*

2- *Subtotal amounts have been rounded to the next $1,000 increment.*

3- *Overall anticipated project cost has been rounded to the next $100,000.*

4- *Costs have been developed based on similar recent projects, and 2021 Means Construction Cost Data.*

5- *Permitting fees have not been included.*

6- *No current soil boring data is available for the gravity sewer path. No rock excavation quantities are assumed.*

7- *Contractor's OH&P are included in the unit prices.*

8- *Opinion of cost based on 1.02 MG storage (Phase I). Phase II cost assumed to be similar as scope will be similar.*

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Connor Park Storage Structure - Phase 2

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 2,750	$ 3,000
	Bonds and Insurance (8%)	L.S.	1	$ 168,160	$ 168,000
	General Conditions (5%)	L.S.	1	$ 105,100	$ 105,000
				General	**$276,000**
2	**Site Work**				
	Construct/Remove/Maintain Dewatering Det. Pond	L.S.	1	$ 25,000	$ 25,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
	Remove/Replace Ballfield Backstop	L.S.	1	$ 6,500	$ 7,000
	Restore Baseball Diamond	L.S.	1	$ 12,500	$ 13,000
				Site Work	**$55,000**
3	**"Storm Trap" Storage Structure**				
	Excavation	C.Y.	12,000	$ 35.00	$420,000
	Backfill & Compaction	C.Y.	2,000	$ 6.00	$12,000
	12" of Stone Bedding	C.Y.	880	$ 25.00	$22,000
	Tie-in 36" SDR-35 PVC	Ea.	2	$ 7,500.00	$15,000
	36" PVC Transition Sleeve	Ea.	2	$ 2,200.00	$5,000
	"Storm Trap" Units, incl. Transport	Ea.	184	$ 7,300.00	$1,344,000
	Install Units (1 MG Total Volume)	Day	8	$ 8,500.00	$68,000
	Dewatering	Day	30	$ 850.00	$26,000
	700 GPM @ 15' TDH Submersible Pumps	Ea.	2	25,000	$50,000
	Equipment Installation	Ea.	2	6,250	$13,000
	Control Panel and Telemetry	L.S.	1	30,000	$30,000
	Electrical Service Drop and XFMR	L.S.	1	$ 15,000.00	$15,000
	Buried Power to Pump Panel from XFMR	L.F.	200	$ 35.00	$7,000
	Misc. Work and Cleanup	L.S.	1	$ 20,000.00	$20,000
	6" Sewage Force Main to CSO OO2 from Pumps	L.F.	150	$ 65.00	$10,000
				"Storm Trap" Storage Structure	**$2,047,000**
				Construction Subtotal	**$2,380,000**
				Engineering Fees	$547,000
				Project Contingencies (30%)	$878,000
				Other Administrative Costs (0.5%)	$119,000
				TOTAL OPINION OF CONSTRUCTION COST	**$4,000,000**

Notes:

1- *ENR-CCI for October 2021 is 12464.94.*

2- *Subtotal amounts have been rounded to the next $1,000 increment.*

3- *Overall anticipated project cost has been rounded to the next $100,000.*

4- *Costs have been developed based on similar recent projects, and 2021 Means Construction Cost Data.*

5- *Permitting costs included with engineering.*

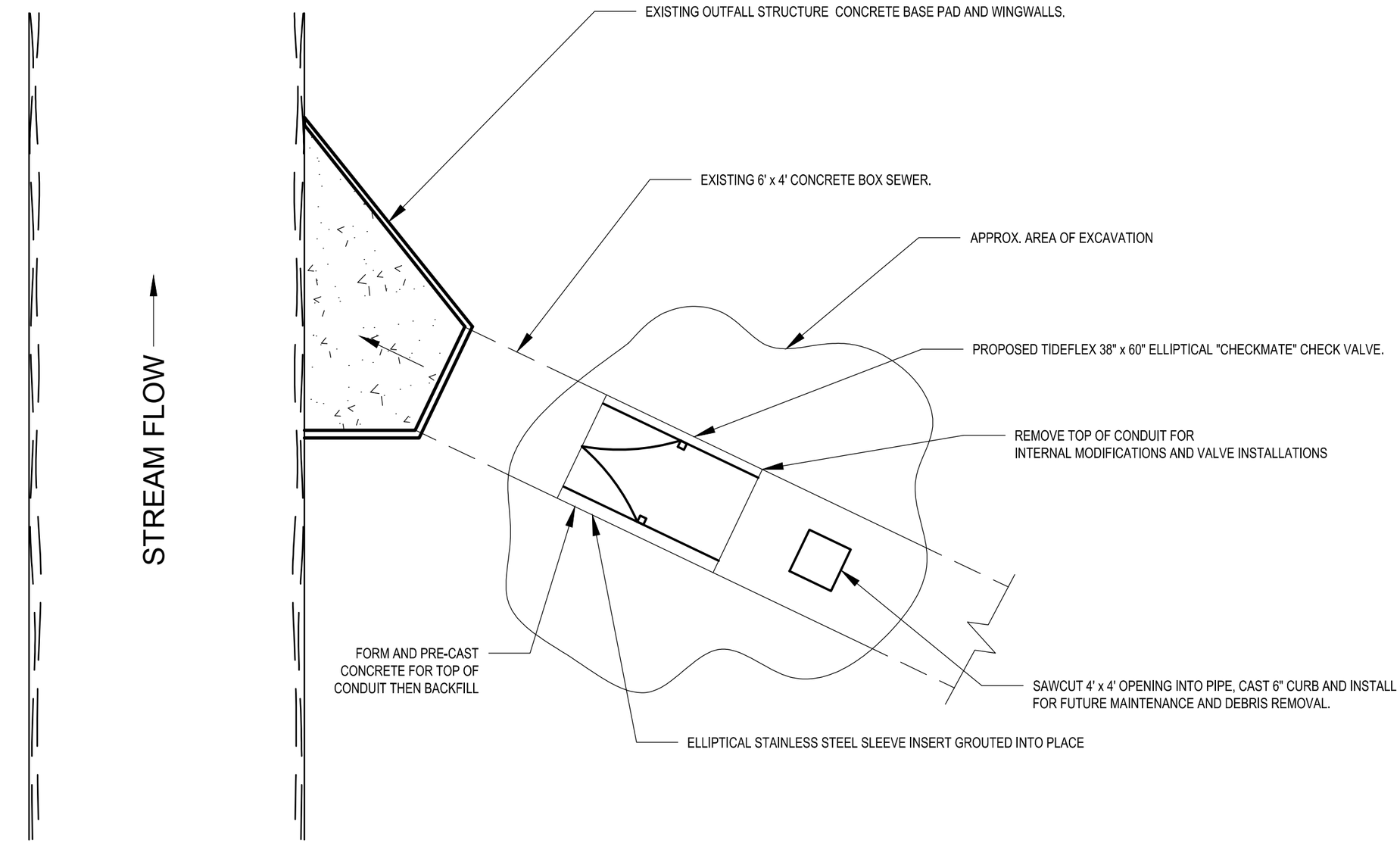
6- *No current soil boring data is available for the gravity sewer path. No rock excavation quantities are assumed.*

7- *Contractor's OH&P are included in the unit prices.*

8- *Opinion of cost based on 1.02 MG storage (Phase I). Phase II cost assumed to be similar as scope will be similar.*

APPENDIX L

CSO Check Valves



P:\VT\Rutland VT\2020 CSO Long-term Control Plan\CAD\rutland ltcp - site 2021 0512.dwg

SCALE: N.T.S

NO	DATE	BY	DESCRIPTION
-	-	-	-

DRAWN BY: REG | CHK'D BY: MAS | 02/25/2022

Weston & Sampson℠

RUTLAND, VERMONT
CSO LONG TERM
CONTROL PLAN

TYPICAL OUTFALL MODIFICATION
WITH CHECK VALVE

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Outfall Check Valve

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	General				
	Mobilization/Demobilization	L.S.	1	$ 13,000	$ 13,000
	Bonds and Insurance (8%)	L.S.	1	$ 20,800	$ 21,000
	General Conditions (5%)	L.S.	1	$ 13,000	$ 13,000
				General	$47,000
2	Site Work - Two Structures				
	Stream Protection/Erosion Control	L.S.	2	$ 20,000	$ 40,000
	Demolish existing outfall 10' from bank	L.S.	2	$ 15,000	$ 30,000
	Cast-in-place concrete outfall	C.Y.	30	$ 800	$ 24,000
	CSO Check Valve	Ea.	2	$ 65,000	$ 130,000
	Check Valve labor	Ea.	2	$ 1,400	$ 2,800
	Aluminum access hatch	Ea.	2	$ 1,000	$ 2,000
	Cast concrete curb	C.Y.	2	$ 500	$ 1,000
	Access Hatch Labor	Ea.	2	$ 1,400	$ 2,800
	Handrails	L.F.	72	$ 100	$ 7,000
	Erosion Prevention and Sediment Control	L.S.	2	$ 10,000	$ 20,000
				Site Work - Two Structures	$260,000
				Construction Subtotal	$310,000
				Contingency (30%)	$114,000
				Engineering Fees	$71,300
				Other Administrative Costs (0.5%)	$15,500
				TOTAL OPINION OF PROJECT COST	$520,000

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting costs have not been included.

7- Contractor's OH&P are included in the unit prices.

APPENDIX M

Field Avenue

PROJECT 6: FIELD AVENUE

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
July 2022

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Area of Combined Sewershed Removed : 42.49 Acres

30' wide easement

Curbside Bioretention (typ)

Install 48" culvert

Connect existing catch basin to new storm drain (typ)

Inset 2

EAST CREEK

COUNTRY GROVEY

COUNTRY GROVE 2Y

COUNTRY GROVE ESTS

Country ClubCity

CHURCH ST

EXETER RD

LINCOLN AV

ROUTE 7 N

N MAIN ST

FIELD AV

GROVE ST

JAN AV

ADAMS ST

PHILLIPS ST

TENNEYBROOK CT

MAYFIELD RD

PEARL ST

VERNON ST

ION ST

Legend

- Project Watershed Boundary
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Combined Sewer
- Sanitary Force Main
- Proposed Storm Drain
- Combined Sewershed
- Sewer Service Area
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- Wetlands
- 100 Year Flood Zone
- 500 Year Flood Zone
- Hazardous Waste Sites
- Easement

Soil Rating Type

- A
- B

Feet
0 155 310

Weston & Sampson

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

N

Path: \\wse03.local\WSE\Depts\GISdata\Client\Rutland VT\Project\ENG20-0028 CSO\LTCP\MapSets\Rutland_VT_LongTerm_CSO\Rutland_VT_LongTerm_CSO.aprx **User:** Perez.Zachary **Saved:** 6/27/2022 9:53 AM **Opened:** 7/5/2022 4:29 PM

Summary for Subcatchment 1S: Field Ave

assumed impervious cover & soil types

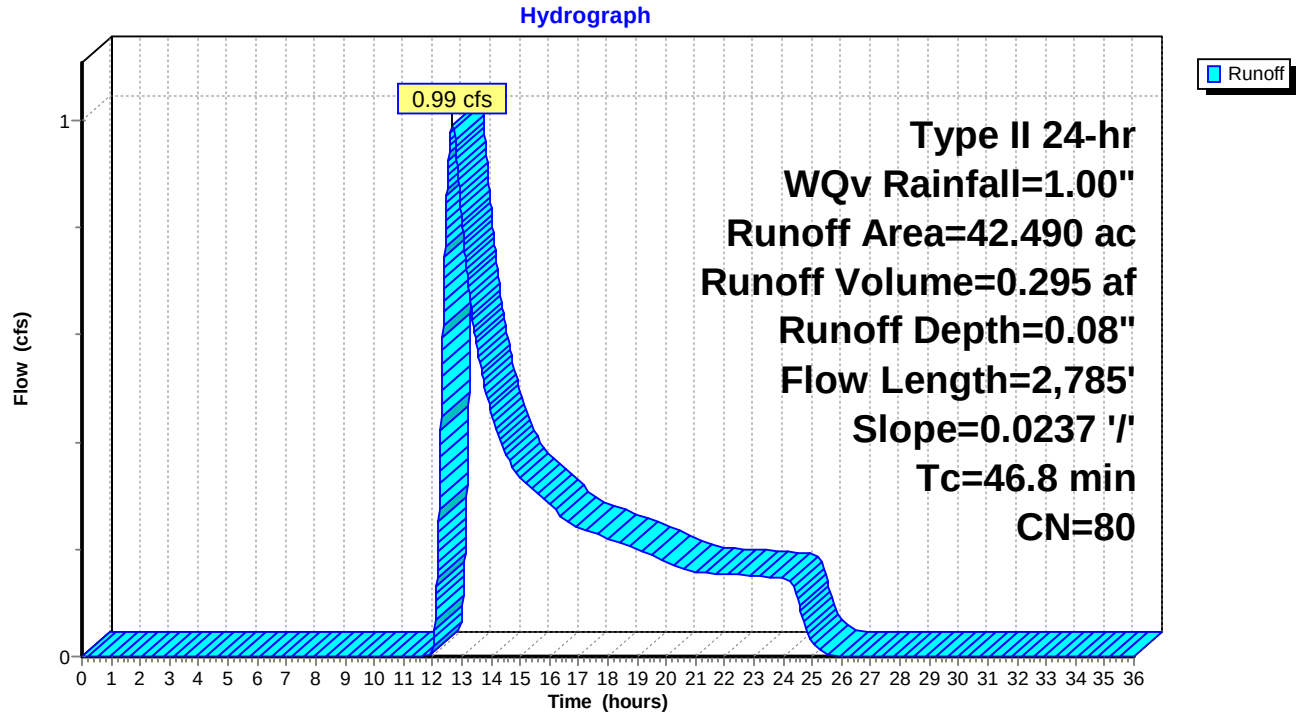
Runoff = 0.99 cfs @ 12.69 hrs, Volume= 0.295 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
42.490	80	1/2 acre lots, 25% imp, HSG C
31.867		75.00% Pervious Area
10.622		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.8	2,785	0.0237	0.99		**Lag/CN Method,**

Subcatchment 1S: Field Ave



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Summary for Pond 21P: discharge culvert

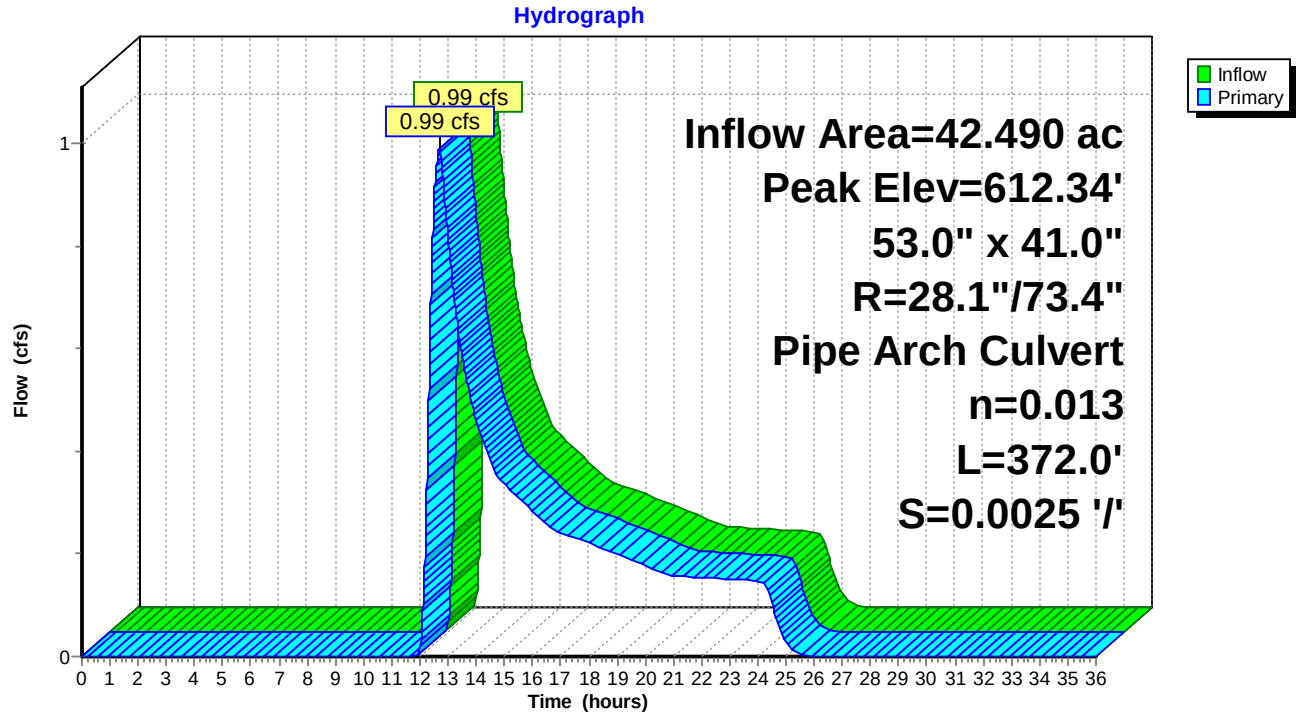
Inflow Area = 42.490 ac, 25.00% Impervious, Inflow Depth = 0.08" for WQv event
Inflow = 0.99 cfs @ 12.69 hrs, Volume= 0.295 af
Outflow = 0.99 cfs @ 12.69 hrs, Volume= 0.295 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.69 hrs, Volume= 0.295 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 612.34' @ 12.69 hrs
Flood Elev= 618.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	612.00'	**53.0" W x 41.0" H, R=28.1"/73.4" Pipe Arch CMP_Arch_1 53x41** L= 372.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 612.00' / 611.07' S= 0.0025 '/' Cc= 0.900 n= 0.013, Flow Area= 12.08 sf

Primary OutFlow Max=0.99 cfs @ 12.69 hrs HW=612.34' (Free Discharge)
1=CMP_Arch_1 53x41 (Barrel Controls 0.99 cfs @ 1.83 fps)

Pond 21P: discharge culvert



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Summary for Subcatchment 1S: Field Ave

assumed impervious cover & soil types

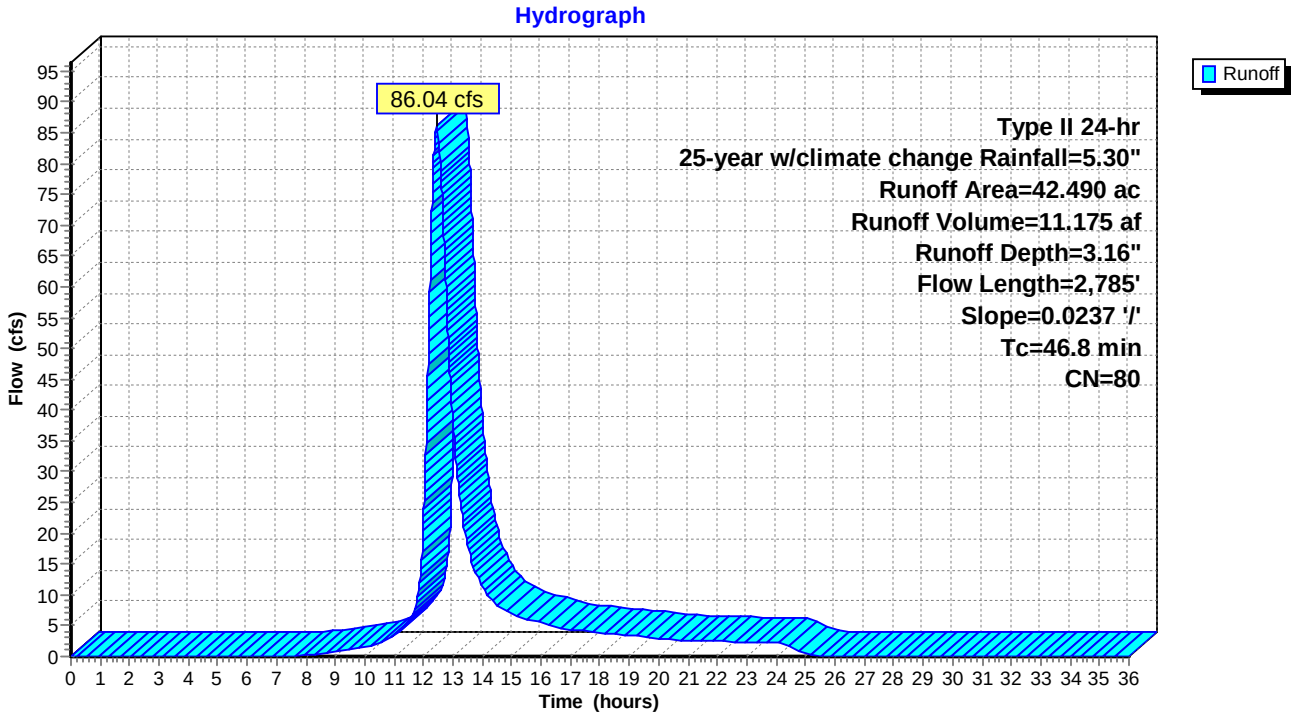
Runoff = 86.04 cfs @ 12.43 hrs, Volume= 11.175 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
42.490	80	1/2 acre lots, 25% imp, HSG C
31.867		75.00% Pervious Area
10.622		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
46.8	2,785	0.0237	0.99		**Lag/CN Method,**

Subcatchment 1S: Field Ave



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Summary for Pond 21P: discharge culvert

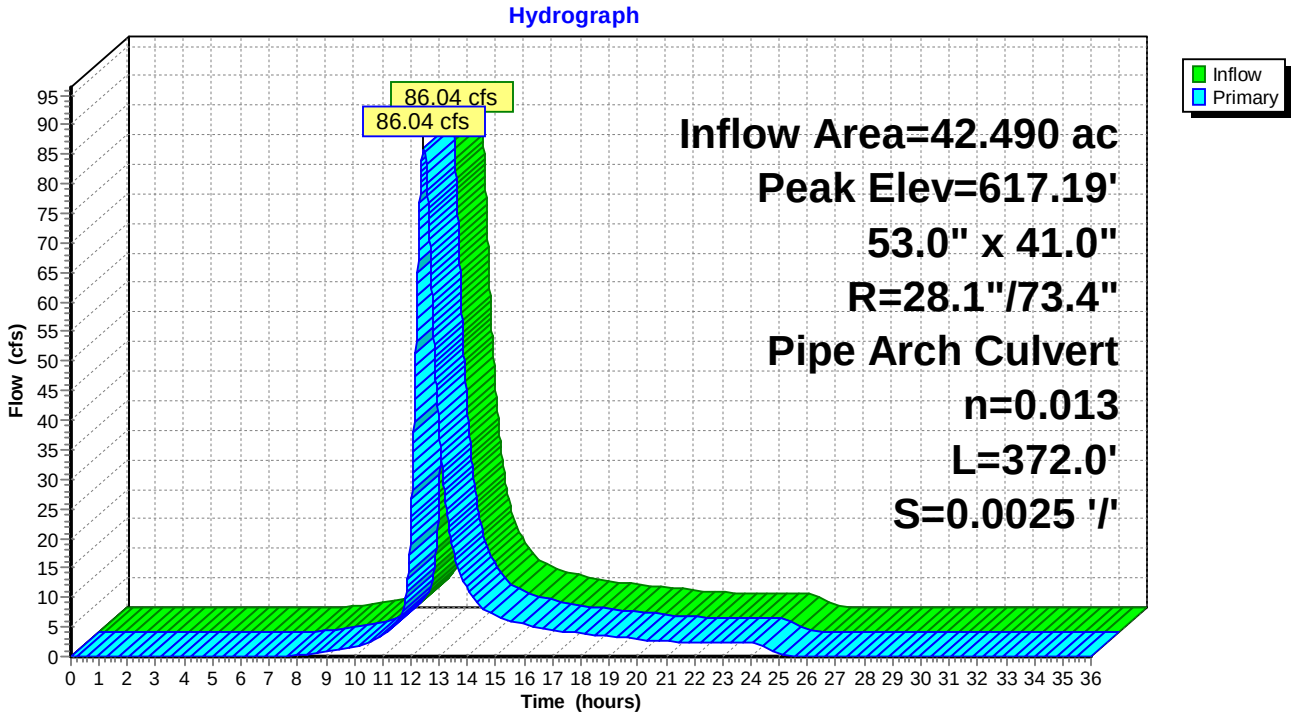
Inflow Area = 42.490 ac, 25.00% Impervious, Inflow Depth = 3.16" for 25-year w/climate change event
Inflow = 86.04 cfs @ 12.43 hrs, Volume= 11.175 af
Outflow = 86.04 cfs @ 12.43 hrs, Volume= 11.175 af, Atten= 0%, Lag= 0.0 min
Primary = 86.04 cfs @ 12.43 hrs, Volume= 11.175 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 617.19' @ 12.43 hrs
Flood Elev= 618.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	612.00'	**53.0" W x 41.0" H, R=28.1"/73.4" Pipe Arch CMP_Arch_1 53x41** L= 372.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 612.00' / 611.07' S= 0.0025 '/' Cc= 0.900 n= 0.013, Flow Area= 12.08 sf

Primary OutFlow Max=85.99 cfs @ 12.43 hrs HW=617.18' (Free Discharge)
1=CMP_Arch_1 53x41 (Barrel Controls 85.99 cfs @ 7.12 fps)

Pond 21P: discharge culvert



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Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Field Avenue Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.		Cost/Unit		Total Cost
1	General						
	Mobilization/Demobilization	L.S.	1	$	186,200	$	186,000
	Bonds and Insurance (8%)	L.S.	1	$	297,920	$	298,000
	General Conditions (5%)	L.S.	1	$	186,200	$	186,000
					General		$670,000
2	Site Work						
	New Storm Drain & Pavement Restoration	L.F.	3200	$	400	$	1,280,000
	New Drain Manhole	Ea.	8	$	11,000	$	88,000
	New Deep Sump Catch Basin	Ea.	14	$	10,000	$	140,000
	Connect Combined CB to New Storm Drain	L.F.	280	$	200	$	56,000
	Replace Sewer Service	Ea.	15	$	4,000	$	60,000
	Replace Water Service	Ea.	15	$	4,000	$	60,000
	Storm Drain Headwall	Ea.	1	$	15,500	$	16,000
	Storm Drain Outfall	Ea.	1	$	15,500	$	16,000
	Swirl Concentrator	L.S.	1	$	20,000	$	20,000
	Stormwater Quality Treatment Device	Ea.	1	$	18,500	$	19,000
	Treatment Device Installation	L.S.	1	$	4,625	$	5,000
	Curbside Bioretention	L.F.	1200	$	1,500	$	1,800,000
	Test Borings	Ea.	5	$	1,000	$	5,000
	Rock Excavation & Disposal	C.Y.	237	$	225	$	53,000
	Unsuitable Material Removal & Structural Fill Replacement	C.Y.	47	$	80	$	4,000
	Hazardous Soils Removal & Disposal	C.Y.	276	$	165	$	46,000
	Traffic Control Signage	L.S.	1	$	10,000	$	10,000
	Flaggers	Hrs.	1000	$	36.00	$	36,000
	Erosion Prevention and Sediment Control	L.S.	1	$	10,000	$	10,000
					Site Work		$3,724,000

Construction Subtotal	$4,400,000
Contingency (30%)	$1,624,000
Engineering Fees	$1,012,000
Easement Cost	$180,000
Other Administrative Costs (0.5%)	$220,000
TOTAL OPINION OF PROJECT COST	$7,440,000

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*
9- *Easement costs based on 1.75x the pro-rated assessed value of the property.*

APPENDIX N

Vernon Street

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Area of Combined Sewershed Removed : 29.48 Acres

Proposed 36" storm drain

Connect to existing storm drain

Connect existing catch basin to new storm drain (typ)

ADAMS

LINCOLN AV

PHILLIPS ST

FIELD AV

VERNON ST

TENNYBROOK CT

TENNEYBROOK CT

MAIN ST

MAP 2 PROJECT AREA : Vernon Street

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

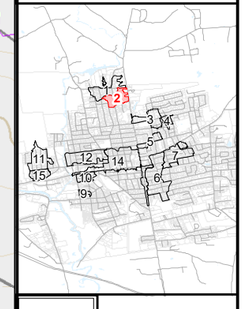
- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 75 150

Weston & Sampson



2

MAP SHEET 2 of 15

Summary for Subcatchment 2S: Vernon St

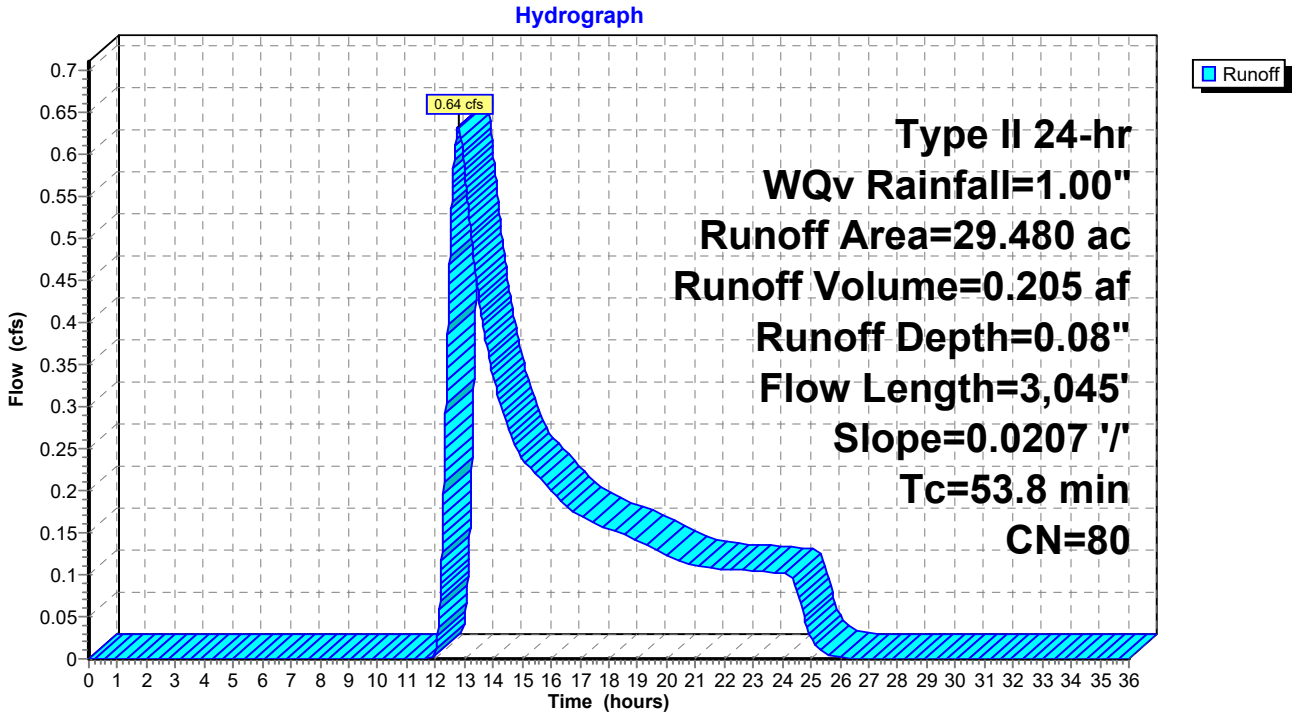
Runoff = 0.64 cfs @ 12.79 hrs, Volume= 0.205 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
29.480	80	1/2 acre lots, 25% imp, HSG C
22.110		75.00% Pervious Area
7.370		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.8	3,045	0.0207	0.94		**Lag/CN Method,**

Subcatchment 2S: Vernon St



Summary for Subcatchment 2S: Vernon St

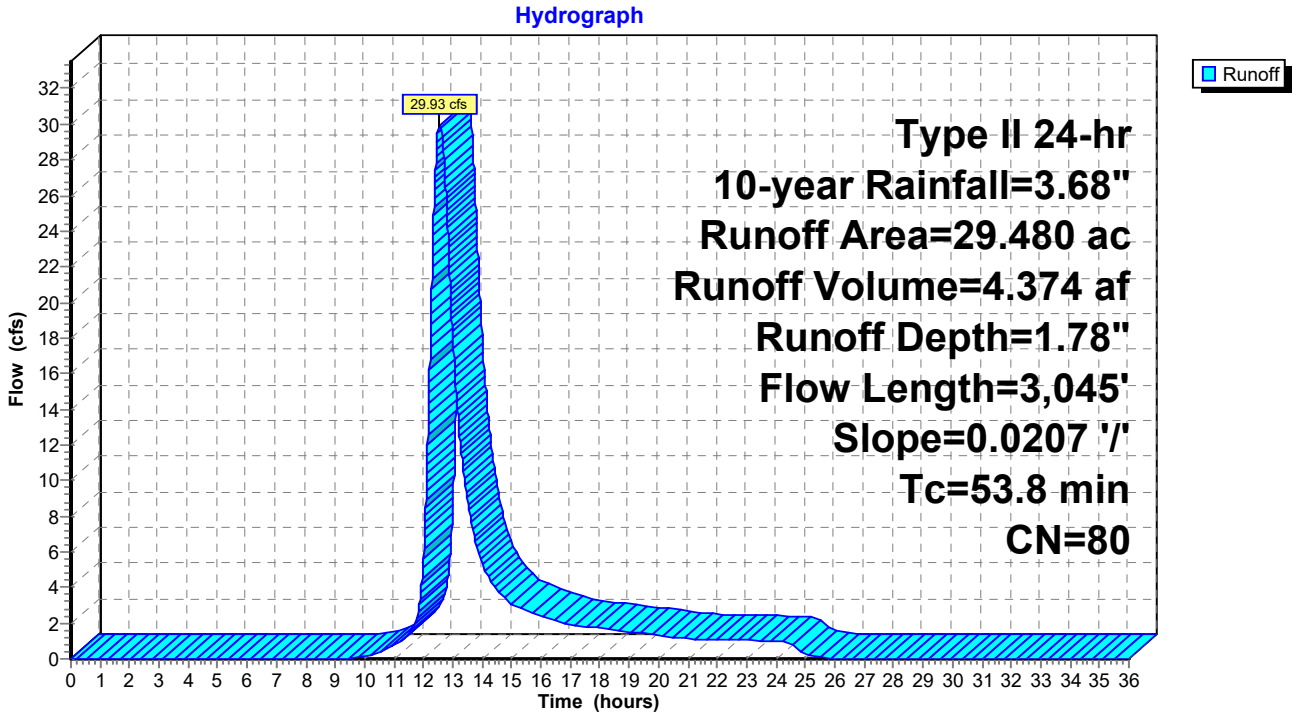
Runoff = 29.93 cfs @ 12.55 hrs, Volume= 4.374 af, Depth= 1.78"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-year Rainfall=3.68"

Area (ac)	CN	Description
29.480	80	1/2 acre lots, 25% imp, HSG C
22.110		75.00% Pervious Area
7.370		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.8	3,045	0.0207	0.94		**Lag/CN Method,**

Subcatchment 2S: Vernon St



Summary for Subcatchment 2S: Vernon St

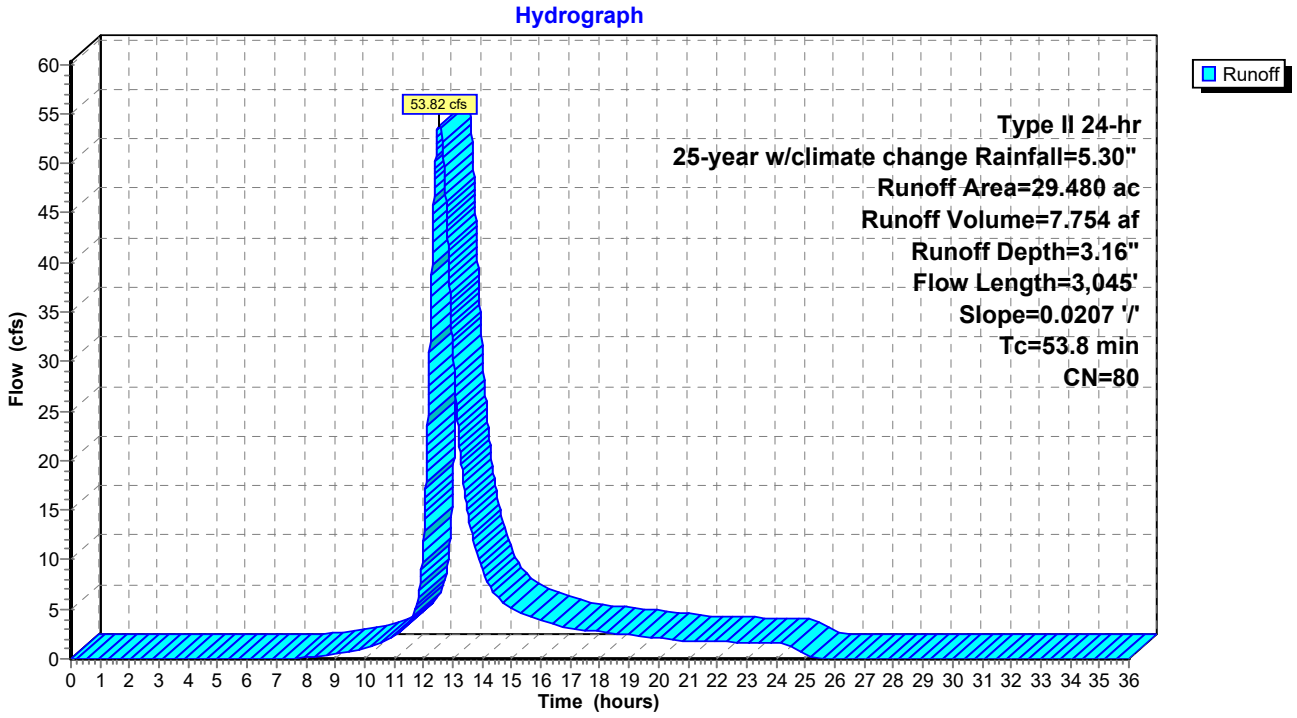
Runoff = 53.82 cfs @ 12.55 hrs, Volume= 7.754 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
29.480	80	1/2 acre lots, 25% imp, HSG C
22.110		75.00% Pervious Area
7.370		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.8	3,045	0.0207	0.94		**Lag/CN Method,**

Subcatchment 2S: Vernon St



Summary for Subcatchment 2S: Vernon St

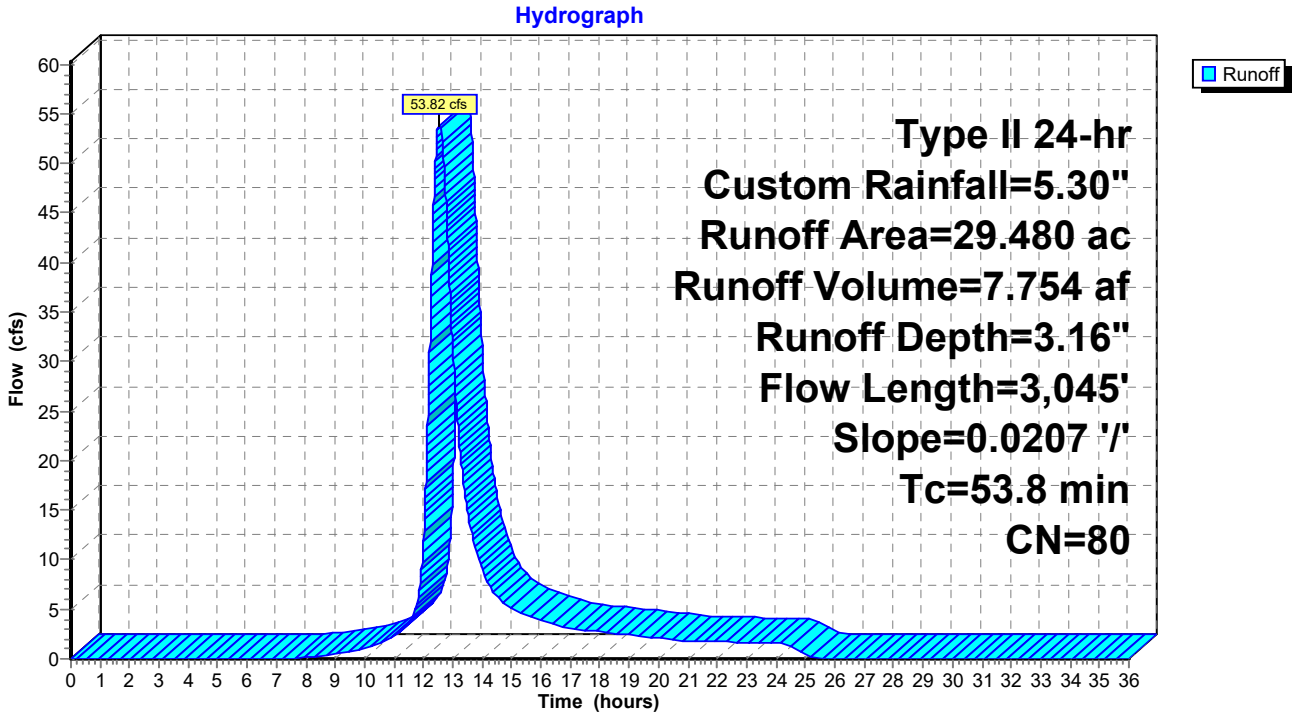
Runoff = 53.82 cfs @ 12.55 hrs, Volume= 7.754 af, Depth= 3.16"

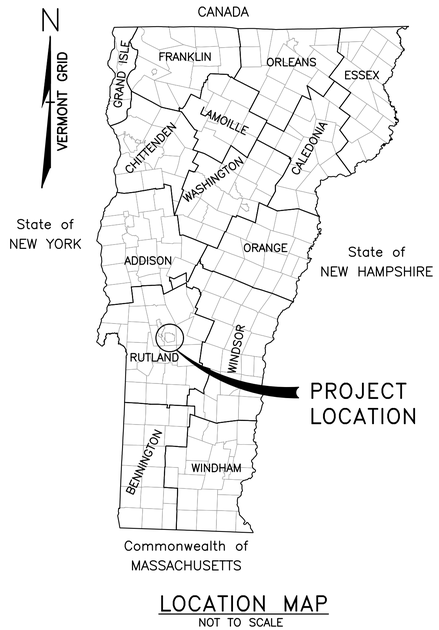
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr Custom Rainfall=5.30"

Area (ac)	CN	Description
29.480	80	1/2 acre lots, 25% imp, HSG C
22.110		75.00% Pervious Area
7.370		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.8	3,045	0.0207	0.94		**Lag/CN Method,**

Subcatchment 2S: Vernon St



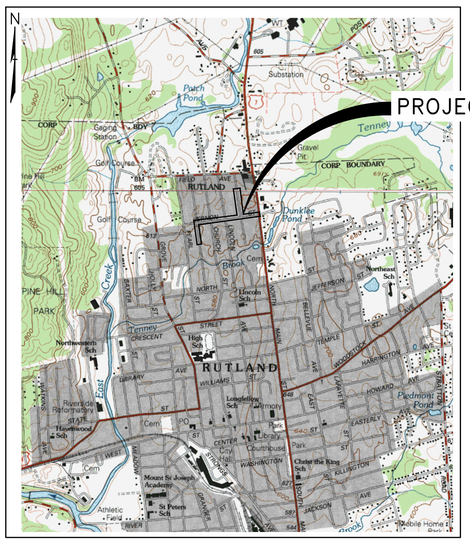


LOCATION MAP
NOT TO SCALE

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

JANUARY 2018



PROJECT AREA PLAN
SCALE: 1" = 24,000 FEET ±

DuBois & King inc.

engineering
planning
management
development

LIST OF DRAWINGS

TITLE	SHEET NO.	TITLE	SHEET NO.
TITLE SHEET	G1 1 OF 11	STORM SEWER DETAILS	D1 8 OF 11
SHEET INDEX & GENERAL NOTES	G2 2 OF 11	EPSC DETAILS	D2 9 OF 11
SITE PLAN AND PROFILE	C1 3 OF 11	UTILITY CROSSING & RELOCATION DEATAILS	D3 11 OF 11
SITE PLAN AND PROFILE	C2 4 OF 11	SITE WORK DETAILS	D4 11 OF 11
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SITE PLAN AND PROFILE	C4 6 OF 11		
SITE PLAN AND PROFILE	C5 7 OF 11		

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BRANDON, VT 05733
TEL: (802) 465-8396
www.dubois-king.com
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PROFESSIONAL SEAL

NOT FOR CONSTRUCTION PRELIMINARY PLANS

NO.	DATE	DESCRIPTION	BY	CK'D

CLIENT
RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT
VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE
TITLE SHEET

DRAWN BY	DATE
AJS	JAN. 2018
CHECKED BY	D&K PROJECT #
JBA	223755
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER
G1

SHEET 1 OF 11

B:\2\223775 Rutland Vernon and Phillips Streets SW Separation\DWG\223775-TTL01.dwg 1/23/2018 10:30 AM



LEGEND

EXISTING		PROPOSED	
	RIGHT OF WAY LIMITS		EDGE OF PAVEMENT
	EDGE OF PAVEMENT		CURB
	CONCRETE CURB	S	SANITARY SEWER
	MINOR CONTOUR		STORM
	MAJOR CONTOUR	W	WATER
S	SEWER	D	PIPE CAPPING
D	STORM		CATCH BASIN INLET
W	WATER		DRAINAGE STRUCTURE
	STRUCTURE		
	HEDGE LINE		
	HORIZONTAL AND VERTICAL CONTROL		
	BENCH MARK		
S	SEWER MANHOLE		
	CATCH BASIN		
GV	GATE VALVE		
	WATER SHUT OFF		
	DECIDUOUS TREE		
	SHRUB		
	UTILITY POLE		
	GUY ANCHOR		
	SIGN		

NOTES

1. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE SYSTEM OWNER(S) OR THEIR REPRESENTATIVE(S).
2. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTORS FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES.
3. CONTRACTOR IS RESPONSIBLE FOR OBTAINING DIG–SAFE CLEARANCE OF THE SITE PRIOR TO COMMENCING EXCAVATION ACTIVITIES AND FOR MAINTAINING DIG–SAFE CLEARANCE AND MARKINGS THROUGHOUT THE DURATION OF THE WORK.
4. THE ENGINEER SHALL BE NOTIFIED IN WRITING OF ANY UTILITIES FOUND DURING CONSTRUCTION, INCLUDING SIZE, TYPE, LOCATION, DEPTH AND DAMAGE THAT MAY HAVE OCCURRED.
5. THE PROPERTY LINES, EASEMENTS, AND OTHER REAL PROPERTY DESCRIPTIONS PROVIDED IN THIS DRAWING SET DO NOT DEFINE LEGAL RIGHTS OR MEET LEGAL REQUIREMENTS FOR A LAND SURVEY AND SHALL NOT BE USED IN LIEU OF A SURVEY AS THE BASIS OF ANY LAND TRANSFER OR ESTABLISHMENT OF AN PROPERTY RIGHT.
6. THESE SITE PLANS ARE BASED UPON ON A FIELD SURVEY COMPLETED BY DUBOIS & KING, INC. ON ??. INFORMATION REGARDING THE LOCATION OF SEWER AND WATER UTILITIES WAS PROVIDED BY THE CITY OF RUTLAND.
7. GEO–REFERENCED 2016 IMAGERY FROM THE VERMONT CENTER OF GEOGRAPHIC INFORMATION IS SHOWN FOR ILLUSTRATION PURPOSES ONLY.
8. WRITTEN DIMENSIONS HAVE PRECEDENCE OVER SCALED DIMENSIONS. IN CASE OF CONFLICT BETWEEN THIS PLAN SET AND ANOTHER DRAWING AND / OR TECHNICAL SPECIFICATIONS, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY FOR CLARIFICATION.
9. CONTRACTOR IS RESPONSIBLE FOR LAYOUT OF THE CONSTRUCTION BASELINES, STAKE OUT OF LIMITS OF PROPOSED WORK, STAKING OF THE LOCATION OF PROPOSED IMPROVEMENTS AND REVIEW WITH THE ENGINEER PRIOR TO CONSTRUCTION.
10. EXISTING CATCH BASINS
    - 10.1. WHERE INDICATED, EXISTING CATCH BASINS SHALL BE REMOVED AND DISPOSED OFF–SITE IN A LEGAL MANNER.
    - 10.2. WHERE EXCAVATIONS WILL NOT BE USED FOR INSTALLATION OF NEW STRUCTURES, EXCAVATIONS SHALL BE BACKFILLED WITH APPROVED, COMPACTED FINAL BACKFILL MATERIAL (SEE BACKFILL NOTES, SHEET D1) TO SUBGRADE DEPTH FOLLOWED BY APPROPRIATE SURFACE RESTORATION.
11. EXISTING SEWER & DRAINAGE PIPING
    - 11.1. DRAINAGE PIPING SHALL BE CAPPED AT THE EDGE OF ALL EXCAVATIONS INCLUDING THOSE MADE FOR INSTALLATION OF NEW PIPING AND THOSE MADE FOR REMOVAL OF EXISTING CATCH BASINS.
    - 11.2. CAPPING SHALL BE ACCOMPLISHED USING FERNCO OR EQUAL PIPE CAPS AND STAINLESS STEEL BANDS.
    - 11.3. EXISTING COMBINED–SEWER AND SEWER PIPING SHALL BE PROTECTED FROM DAMAGE, OR REPLACED WITH SDR 35 PVC PIPE OF AN EQUAL SIZE, ATTACHED USING FERNCO OR EQUAL COUPLINGS AND STAINLESS STEEL BANDS.
    - 11.4. SURFACE WATER, SEDIMENT OR DEBRIS SHALL UNDER NO CIRCUMSTANCES BE ALLOWED TO ENTER THE EXISTING COMBINED SEWER. PIPING CONNECTED TO THE EXISTING COMBINED SEWER SHALL BE CAPPED, EITHER TEMPORARILY OR PERMANENTLY IMMEDIATELY AFTER IT IS BREACHED, BROKEN OR CUT.
12. SITE ACCESS & TRAFFIC CONTROL
    - 12.1. CONTRACTOR SHALL MAINTAIN ONE–LANE VEHICULAR ACCESS TO ALL PROPERTIES ADJACENT TO THE SITE DURING CONSTRUCTION. MAINTAINING THROUGH–TRAFFIC IS NOT REQUIRED DURING WORKING HOURS.
    - 12.2. CONTRACTOR SHALL MAKE EVERY EFFORT TO MAINTAIN ACCESS TO PRIVATE DRIVEWAYS. WHEN BLOCKING ACCESS TO PRIVATE DRIVEWAYS IS NECESSARY, CONTRACTOR SHALL MINIMIZE THE AMOUNT OF TIME ACCESS WILL BE BLOCKED AND SHALL NOTIFY THE OWNER AT LEAST 72 HOURS IN ADVANCE.
    - 12.3. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL SUBMIT TO THE OWNER A TRAFFIC CONTROL PLAN, DESCRIBING TRAFFIC CONTROL MEASURES THAT WILL BE USED TO MAINTAIN VEHICULAR ACCESS TO PROPERTIES ADJACENT TO THE SITE WHILE PROTECTING THE SAFETY OF THE PUBLIC.
13. THE CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SHORING, WATER DIVERSION, AND DEWATERING REQUIREMENTS NEEDED FOR THE PROJECT.
14. AT THE COMPLETION OF WORK, THE CONTRACTOR MUST RESTORE ALL AFFECTED PROPERTY, INCLUDING STAGING AREAS, CITY RIGHTS–OF–WAY AND PRIVATELY–OWNED UTILITIES AND DRIVEWAYS TO PRE–CONSTRUCTION CONDITION. RESTORATION MAY INCLUDE PLACEMENT OF GRAVEL OR ASPHALT ON EXISTING DRIVES AND / OR APPLICATION OF TOPSOIL, GRASS SEED, FERTILIZER, AND MULCH TO AFFECTED GRASS AREAS. ALL OTHER FEATURES OR STRUCTURES SHALL BE RESTORED OR REPLACED TO ORIGINAL CONDITION OR BETTER.
15. BEFORE FINAL COMPLETION OF WORK, CONTRACTOR SHALL REMOVE ALL EQUIPMENT, EXCESS MATERIAL AND DEBRIS FROM THE SITE. A CERTIFICATE OF FINAL COMPLETION WILL NOT BE ISSUED UNTIL FULL SITE CLEAN UP AND DEMOBILIZATION IS COMPLETED.

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PROFESSIONAL SEAL

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NO.	DESCRIPTION	DATE	BY	CK'D

CLIENT

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

SHEET INDEX GENERAL & CONSTRUCTION NOTES

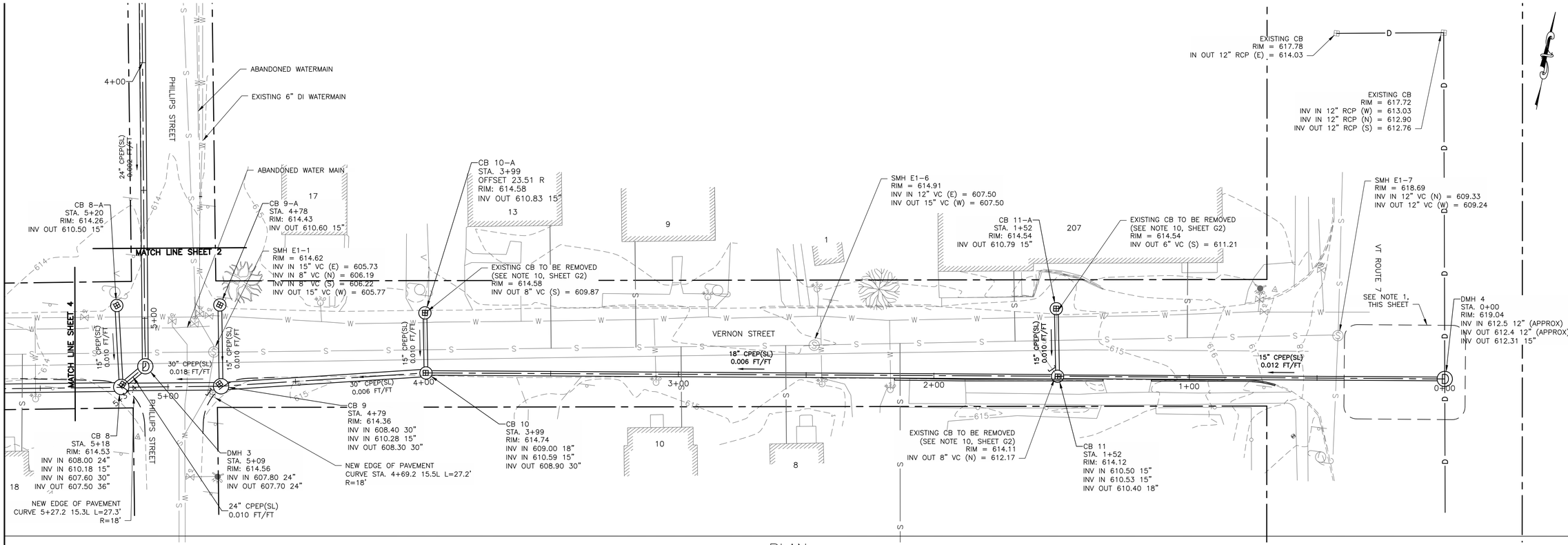
DRAWN BY	DATE
AJS	JAN. 2018
CHECKED BY	D&K PROJECT #
JBA	223755
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER

G2

SHEET 2 OF 11

h:\2\223755 Rutland Vernon and Phillips Streets SW Separation\DWG\223775–SP01.dwg 1/23/2018 10:30 AM

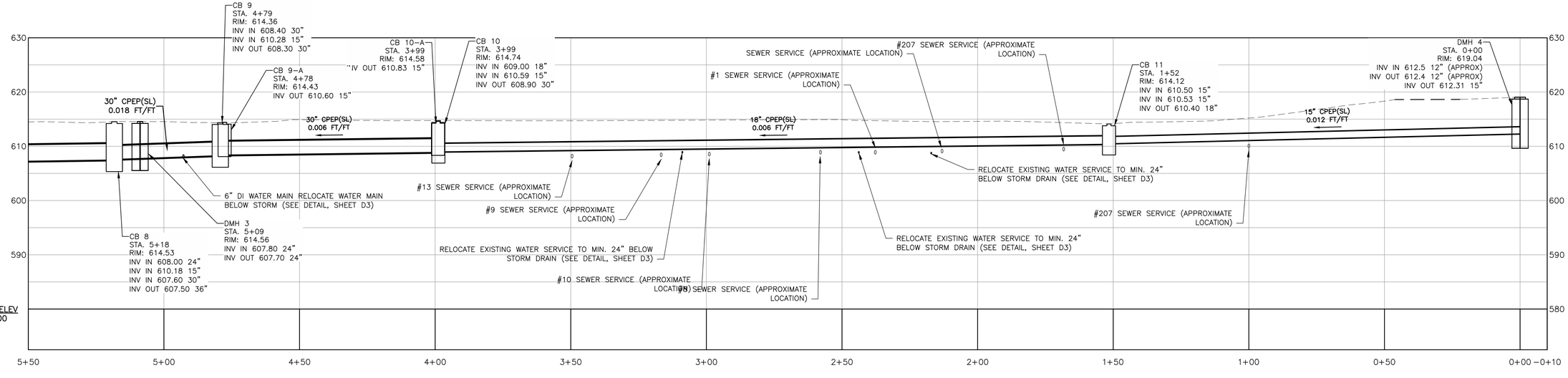


PLAN

20 0 10 20 40 80

SCALE IN FEET
1" = 20'
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"

NOTES:
1. THIS AREA IS NOT SURVEYED. BEFORE COMMENCING WORK CONTRACTOR SHALL MEASURE INVERTS OF UPSTREAM AND DOWNSTREAM CATCH BASINS AND SEWER MANHOLES AND REVIEW SITE CONSTRAINTS WITH THE ENGINEER. FOR BIDDING PURPOSES ONLY ASSUME PLAN AND PROFILE IN THIS AREA IS ACCURATE.



DATUM ELEV
580.00

10 0 5 10

20 10 0 20

SCALE IN FEET
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"

PROFILE

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PROFESSIONAL SEAL

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NO.	DESCRIPTION	DATE	BY	CK'D

CLIENT

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

PLAN AND PROFILE

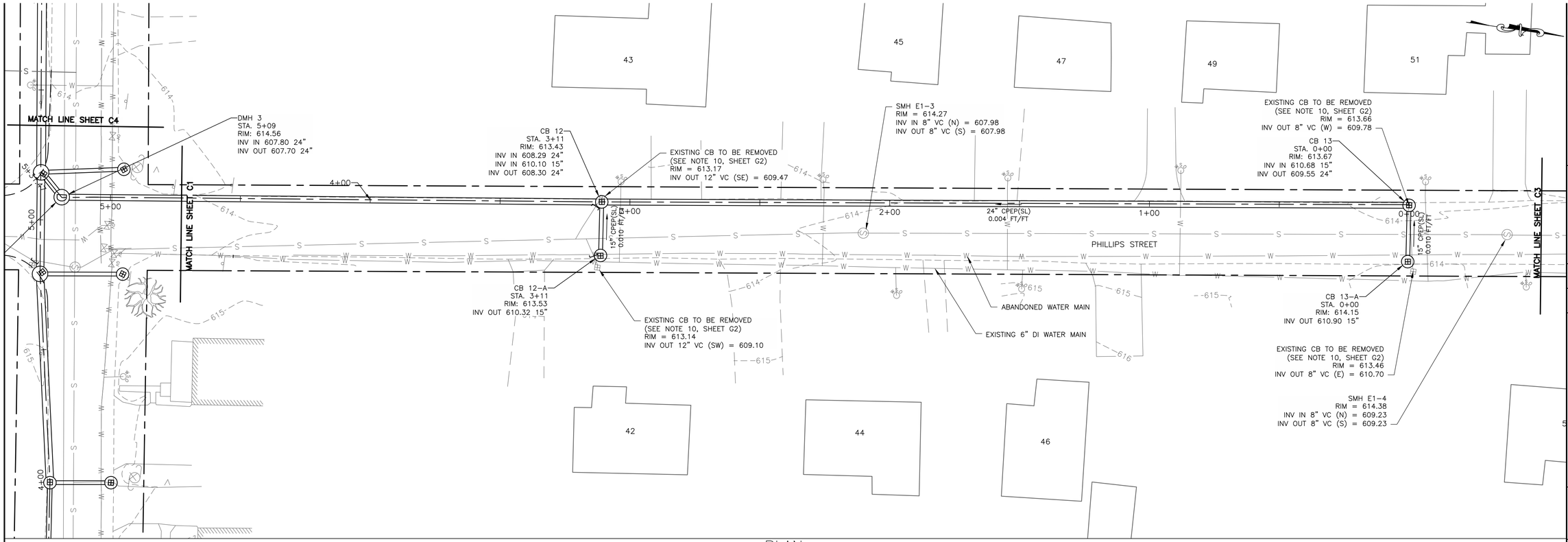
DRAWN BY	DATE
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CHECKED BY	D&K PROJECT #
JBA	223755
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER

C1

SHEET 3 OF 11

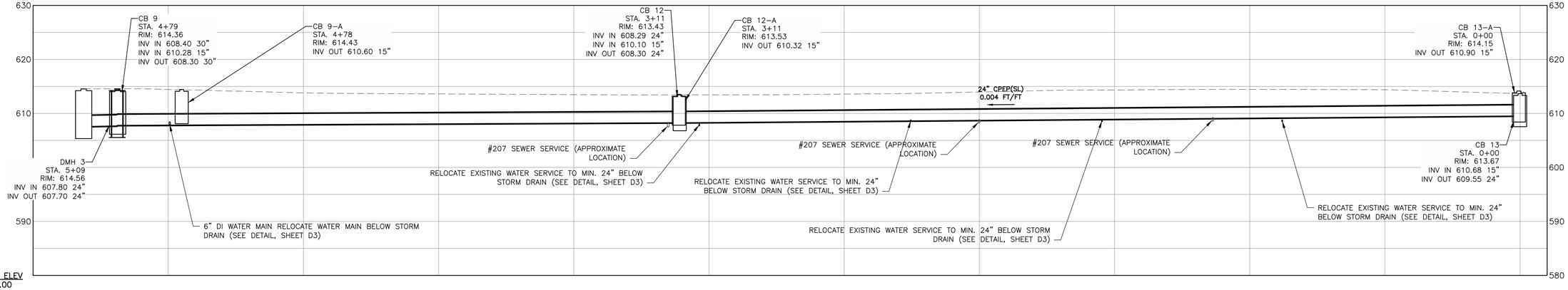
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PLAN

20 0 10 20 40 80

SCALE IN FEET
1" = 20'
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"



DATUM ELEV
580.00

5+50 5+00 4+50 4+00 3+50 3+00 2+50 2+00 1+50 1+00 0+50 0+00 – 0+10

10 0 5 10

20 10 0 20

SCALE IN FEET
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"

PROFILE

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TEL: (802) 465-8396
www.dubois-king.com
RANDOLPH, VT
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PROFESSIONAL SEAL

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NO.	DATE	DESCRIPTION	BY	CK'D

CLIENT

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

PLAN AND PROFILE

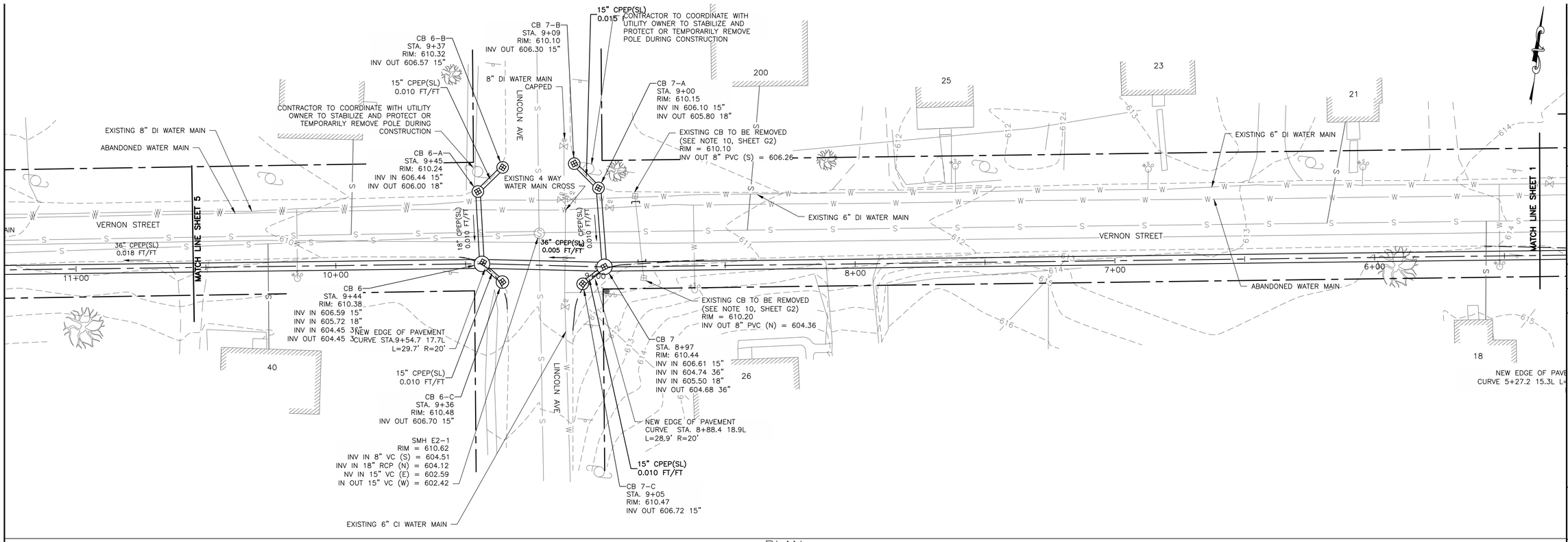
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JBA	223755
PROJ. ENG.	D&K ARCHIVE #
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SHEET NUMBER

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SHEET 4 OF 11

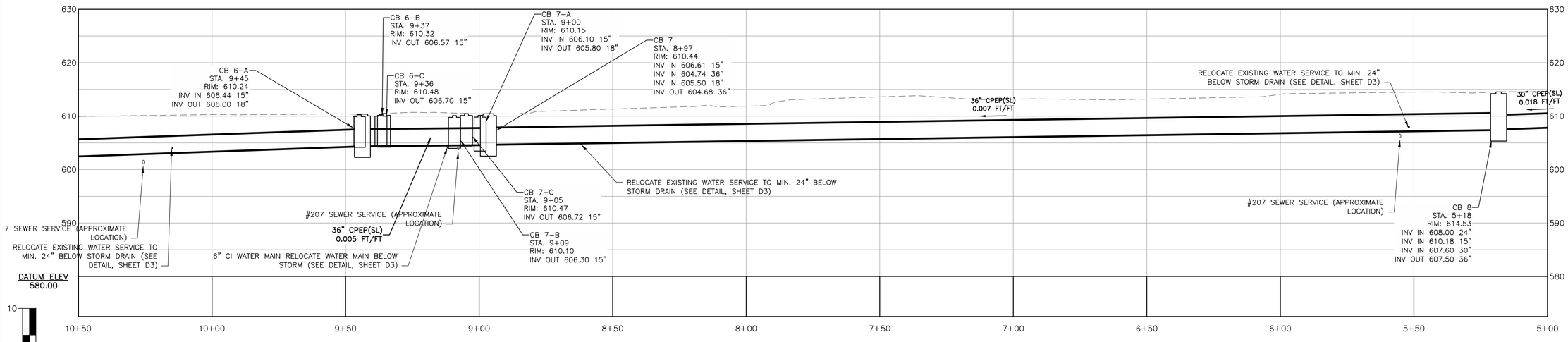
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PLAN

20 0 10 20 40 80

SCALE IN FEET
1" = 20'
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"



10 0 5 10

20 10 0 20

FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"

SCALE IN FEET

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PROJECT

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SHEET TITLE

PLAN AND PROFILE

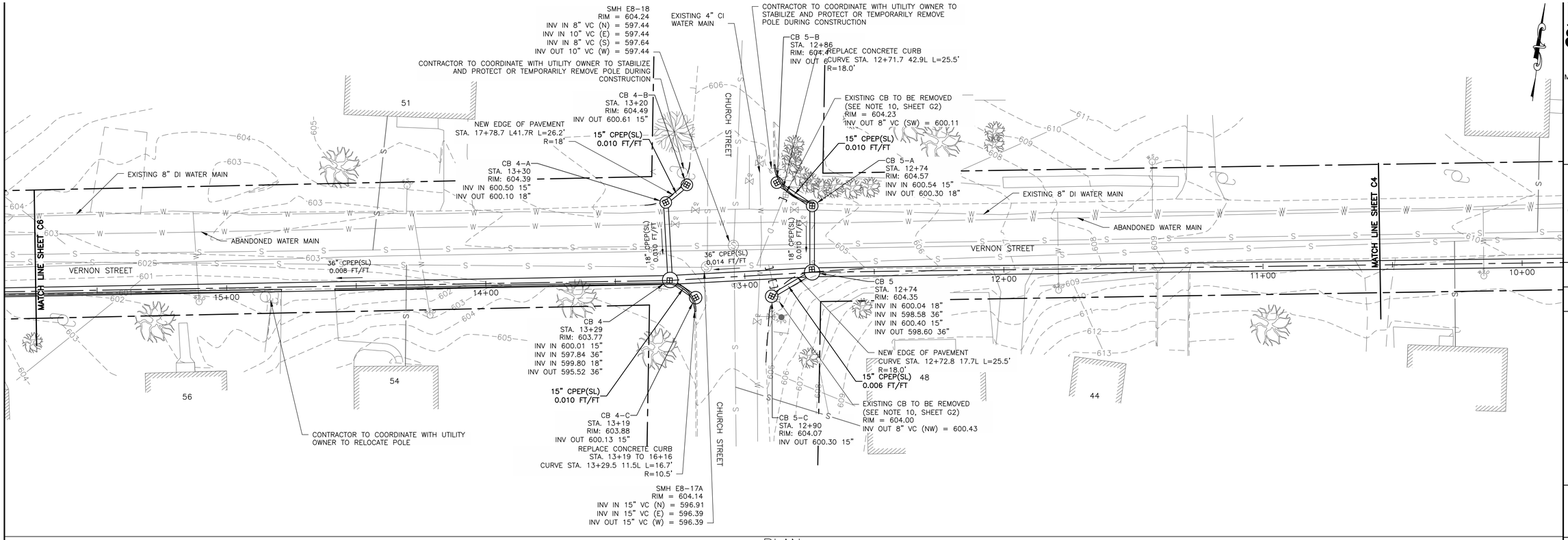
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SHEET 5 OF 11

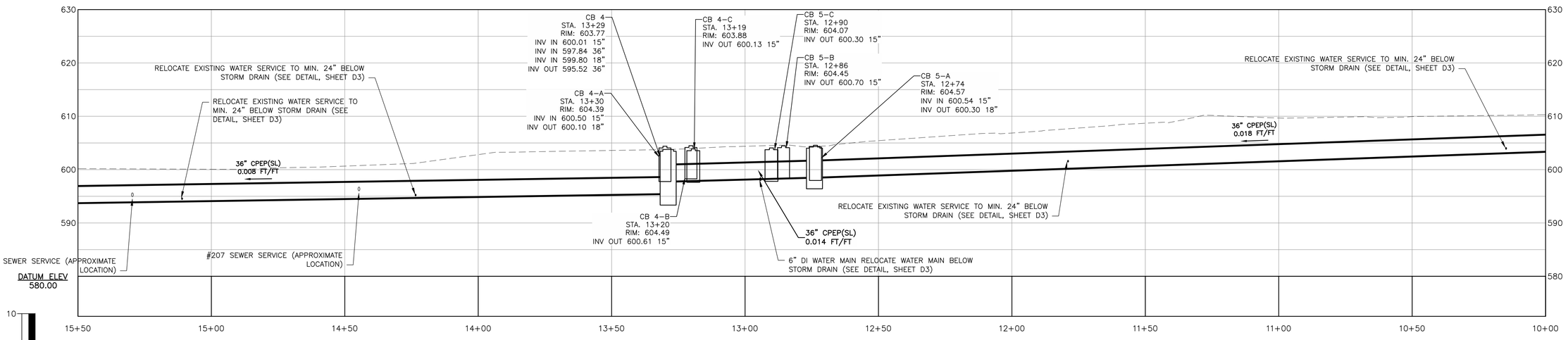
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PLAN

20 0 10 20 40 80

SCALE IN FEET
1" = 20'
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"



10 0 5 10 20 10 0 20

FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"
SCALE IN FEET

PROFILE

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SHEET TITLE

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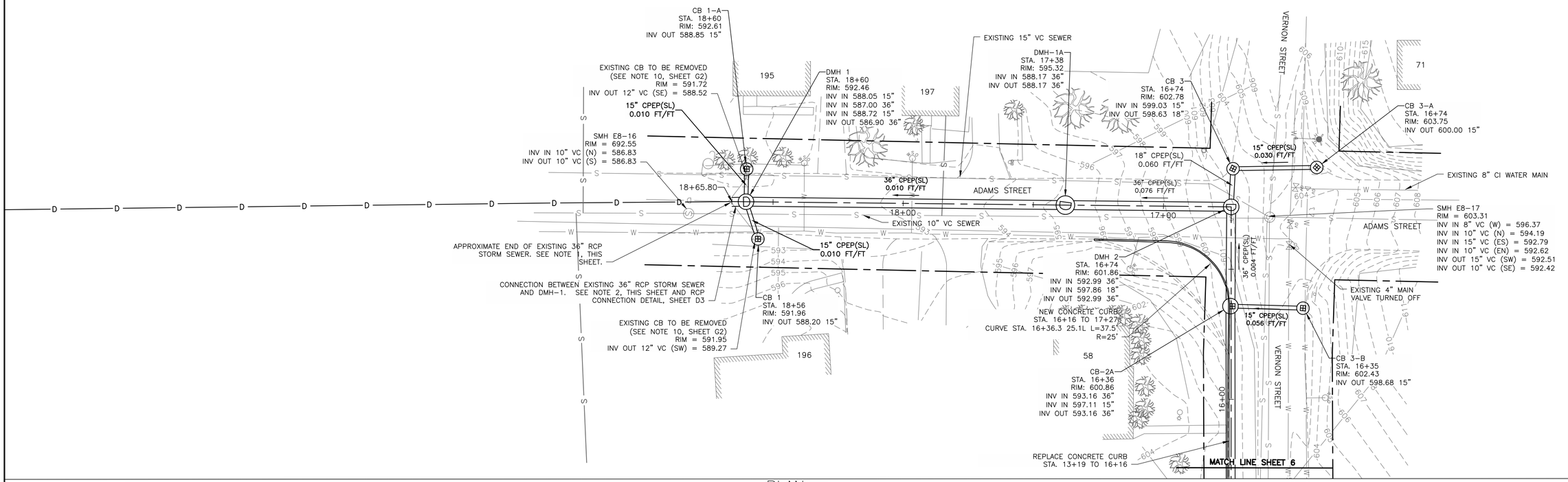
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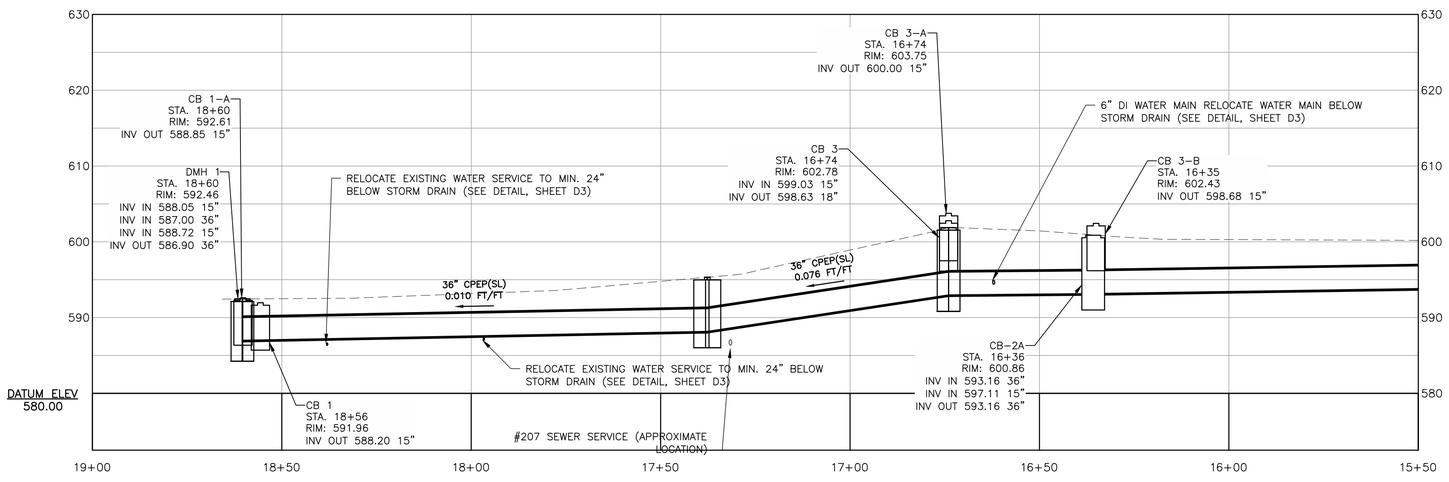


NOTES:
1. CONTRACTOR SHALL TEST PIT AND VERIFY LOCATION AND INVERT OF END OF EXISTING 36" RCP STORM SEWER AND REPORT TO ENGINEER PRIOR TO ORDERING ANY STRUCTURES AND COMMENCING ANY WORK. FINAL MANHOLE SHALL BE LOCATED APPROXIMATELY 8 FEET FROM END OF EXISTING TRUNK.
2. CONTRACTOR TO PROVIDE APPROXIMATELY 5' OF 36" CPEP(SL) BETWEEN DMH–1 THE CONNECTION TO THE EXISTING RCP STORM PIPE.

PLAN

20 0 10 20 40 80

SCALE IN FEET
1" = 20'
FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"



PROFILE

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FULL SIZE AT 22"X34"
HALF SIZE AT 11"X17"
SCALE IN FEET

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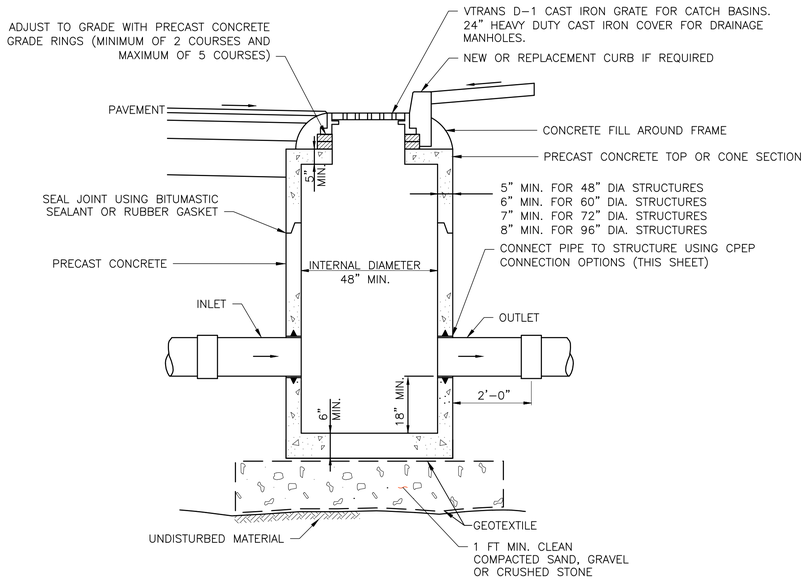
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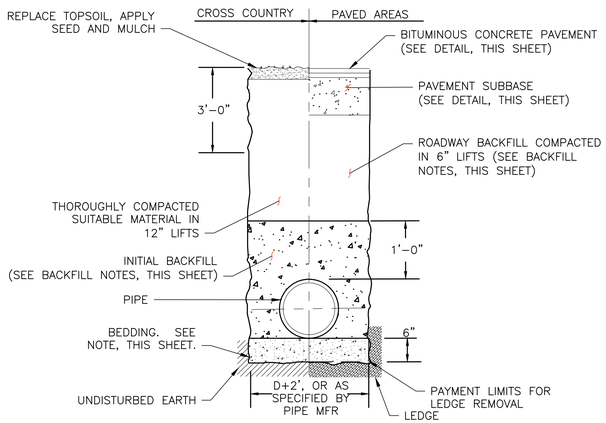
SHEET 7 OF 11



DRAINAGE MANHOLE & CATCH BASIN NOTES:

1. DRAINAGE MANHOLES AND CATCHBASINS SHALL BE CAPABLE OF WITHSTANDING H-20 WHEEL LOADS. ADDITIONAL REINFORCING AND/OR WALL THICKNESS MAY BE REQUIRED TO MEET THE H-20 WHEEL LOAD.
2. LARGER STRUCTURES MAY BE REQUIRED TO ACCOMODATE PIPE PENETRATIONS.

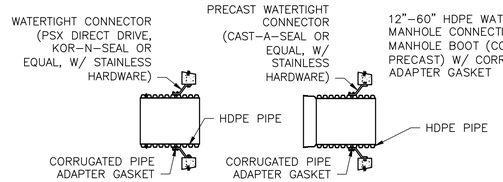
CATCH BASIN/DRAINAGE MANHOLE DETAIL
NOT TO SCALE

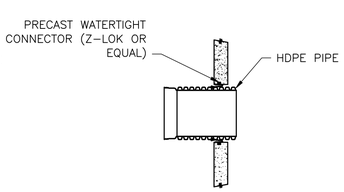


BACKFILL NOTES:

1. BEDDING & INITIAL BACKFILL: SUITABLE MATERIAL SHALL BE CLASS I, II OR III (PER ASTM D2321). IF CRUSHED STONE IS USED, IT SHALL BE COMPLETELY SEPARATED FROM THE SURROUNDING MATERIAL USING TWO LAYERS OF NON-WOVEN GEOTEXTILE. PRIOR TO INSTALLING PIPE, AN EVEN BEDDING SURFACE SHALL BE PLACED AND COMPACTED. PIPE ENVELOPE MATERIAL SHALL BE THOROUGHLY KNIFED INTO PLACE AROUND THE PIPE AND COMPACTED IN 6" LIFST TO MINIMUM 95% STANDARD PROCTOR THEORETICAL MAXIMUM DENSITY.
2. FINAL BACKFILL: SUITABLE MATERIAL MAY BE NATIVE MATERIAL. UNDER OR WITHIN ROAD STRUCTURAL PRISMS, MATERIAL SHALL BE COMPACTED IN 6" LIFTS TO A MINIMUM OF 95% STANDARD PROCTOR THEORETICAL MAXIMUM DENSITY. IN OPEN COUNTRY, MATERIAL SHALL BE COMPACTED IN 12" LIFTS TO A MINIMUM 90% THEORETICAL MAXIMUM DENSITY. BACKFILL SHALL BE FREE OR ORGANIC MATERIAL, AND SHALL NOT BE FROZEN OR EXCESSIVELY WET. REJECTED MATERIAL SHALL BE REPLACED WITH APPROVED GRANULAR BACKFILL.

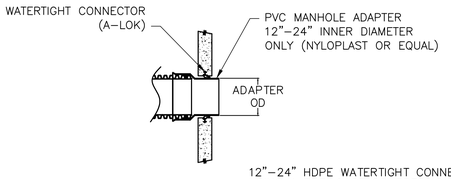
STORM SEWER PIPE TRENCH DETAIL
NOT TO SCALE





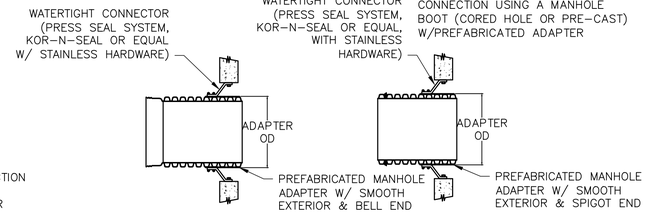
12"-36" HDPE WATERTIGHT MANHOLE CONNECTION USING Z-LOK BOOT OR EQUAL

CPEP CONNECTION 1
NOT TO SCALE

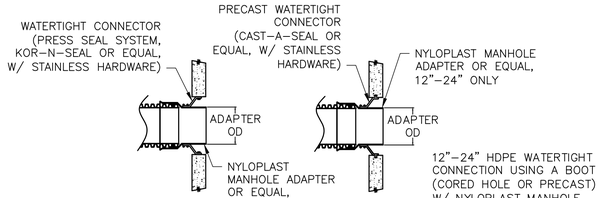


12"-24" HDPE WATERTIGHT CONNECTION USING A PRE-CAST COMPRESSION GASKET W/ PVC MANHOLE ADAPTER

CPEP CONNECTION 2
NOT TO SCALE



CPEP CONNECTION 3
NOT TO SCALE



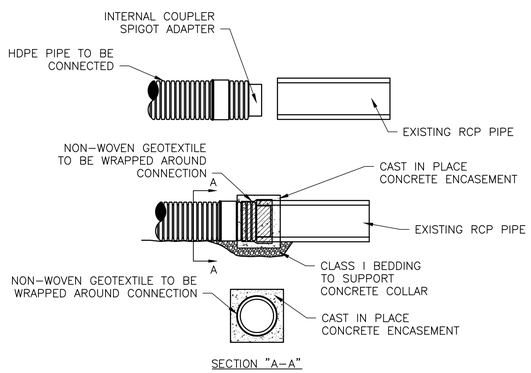
CPEP CONNECTION 4
NOT TO SCALE

HDPE WATERTIGHT CONNECTION 1-6 NOTES:

1. CONTRACTOR MAY SELECT ANY OF THE OPTIONS SHOWN. CONTRACTOR IS RESPONSIBLE FOR CONFIRMING THE AVAILABILITY OF REQUIRED COMPONENTS AND ENSURING THAT STRUCTURES ARE PROVIDED WITH THE APPROPRIATE DIMENSIONS AND PENETRATIONS FOR THE SELECTED OPTION.
2. FOR CONNECTIONS REQUIRING MACHINE-ASSISTED ASSEMBLY, FITTINGS SHALL BE PRESSED TOGETHER USING A SACRIFICIAL JOINT-PUSHER SO AS NOT TO DAMAGE THE PIPE. A MANUFACTURED JOINT PUSHER OR A SHORT (12-18" LONG) SECTION OF PIPE OF THE SAME NOMINAL DIAMETER AS THE FITTING BEING ASSEMBLED MAY BE USED.
3. METALLIC COMPONENTS SHALL BE STAINLESS STEEL.

CPEP CONNECTION 5
NOT TO SCALE

CORRUGATED POLYETHYLENE PIPE (CPEP) CONNECTION OPTIONS



SECTION "A-A"

HDPE TO RCP CONNECTION NOTES:

1. CONNECTION AND PIPE TO BE BACKFILLED PER ASTM D2321.
2. IN LIEU OF AN INTERNAL CYLINDER, AN HDPE WATERTIGHT REPAIR COUPLER CAN BE USED TO CONNECT HDPE PIPE TO CMP.
3. INTERNAL CYLINDER ADAPTER IS NOT RECOMMENDED FOR DOWNSTREAM CONNECTIONS.

HDPE TO RCP CONNECTION
NOT TO SCALE

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NO.	DATE	DESCRIPTION	BY	CK'D

CLIENT

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

DETAILS

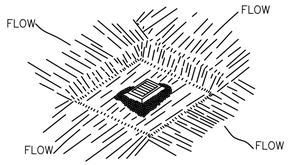
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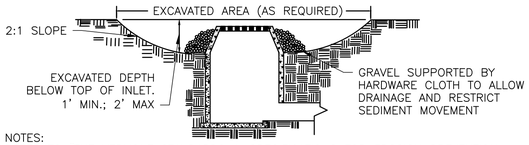
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SHEET 8 OF 11

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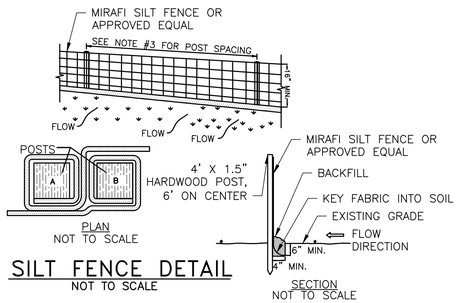




NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL –2006– " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

1. CLEAR THE AREA OF ALL DEBRIS THAT WILL HINDER EXCAVATION.
2. GRADE APPROACH TO THE INLET UNIFORMLY AROUND THE BASIN.
3. WEEP HOLES SHALL BE PROTECTED BY GRAVEL.
4. UPON STABILIZATION OF CONTRIBUTING DRAINAGE AREA, GRADE SOIL TO BASIN, COMPACT PROPERLY, AND STABILIZE WITH PERMANENT SEEDING.
5. MAXIMUM DRAINAGE AREA 1 ACRE.

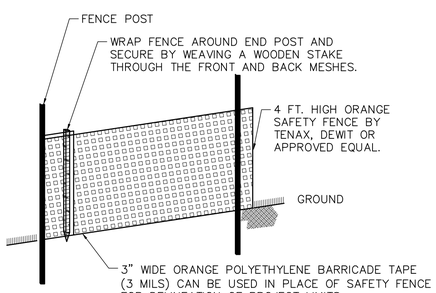
DROP INLET PROTECTION
NOT TO SCALE



SILT FENCE DETAIL
NOT TO SCALE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL –2006– " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

1. WOVEN WIRE REINFORCED FENCE IS REQUIRED WITHIN 100' UPSLOPE OF RECIEVING WATER WHEN THE PROJECT FALL UNDER A CONSTRUCTION STORMWATER PERMIT. WOVEN WIRE SHALL BE A MIN. 14 GAUGE WITH A 6" MAX MESH OPENING.
2. FILTER CLOTH SHALL BE EITHER FILTER X, MIRAFI 1100X, STABLINKA T140N OR APPROVED EQUAL.
3. POST SPACING FOR WIRE–BACKED FENCE SHALL BE 10' MAXIMUM FOR FILTER–CLOTH FENCE, WHEN ELONGATION IS >50% POST SPACING SHALL NOT EXCEED 4 AND WHEN ELOGATION IS < 50%, POST SPACING SHALL NOT EXCEED 6.
4. WOVEN WIRE FENCE IS TO BE FASTENED SECURELY TO FENCE POSTS WITH WIRE TIES. FILTER CLOTH IS TO BE FASTENED SECURELY TO WOVEN WIRE FENCE WITH TIES SPACED EVERY 24" AT TOP AND MID SECTION.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER THEY SHALL BE OVER–LAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND MATERIAL REMOVED WHEN SEDUMENT REACHES HALF OF FABRIC HEIGHT.



NOTE:
WHERE FENCE IS REQUIRED AROUND TREES TO BE PRESERVED THE FENCE SHALL BE INSTALLED AS SHOWN ON THE PLAN AND BE ATTACHED TO THE TREE TRUNK.

CONSTRUCTION FENCE DETAIL
NOT TO SCALE

EROSION PREVENTION AND SEDIMENT CONTROL (EPSC) NOTES

1. THE ON–SITE COORDINATOR (OSC) FOR THE EROSION PREVENTION AND SEDIMENT CONTROL PLAN (EPSC) WILL BE DETERMINED PRIOR TO CONSTRUCTION ONCE A CONTRACTOR IS SELECTED. INSPECTION CHECKLIST SHALL BE COMPLETED THROUGHOUT CONSTRUCTION BY THE OSC. REFER TO THE SPECIFICATIONS FOR A COPY OF THIS CHECKLIST. THESE INSPECTION CHECKLISTS SHALL REMAIN ON SITE AND BE MADE AVAILABLE UPON REQUEST.

2. CONSTRUCTION OF THIS PROJECT SHALL PROCEED USING THE PHASING APPROACH DETAILED ON THIS SHEET OF THE EPSC PLAN.

3. PRIOR TO LARGE OR INTENSE RAINFALL/RUNOFF EVENTS, THE CONTRACTOR SHALL APPLY MULCH TO STABILIZE DISTURBED AREAS NOT STABILIZED BY VEGETATION.

4. ALL DRAINAGE AND EROSION CONTROL CONSTRUCTION SHALL BE LOCATED AS DEPICTED ON THE PLAN AND AS REQUIRED BY THE ENGINEER IN THE FIELD DEPENDENT ON THE ACTUAL PROGRESS AND SEQUENCE OF CONSTRUCTION.

5. A TEMPORARY PERIMETER DRAINAGE SWALE MAY BE CONSTRUCTED PRIOR TO MAJOR EARTHWORK OPERATIONS AND SHALL BE MAINTAINED AS LONG AS PRACTICAL TO PREVENT SURFACE RUNOFF FROM ENTERING DISTURBED AREAS.

6. SILT FENCE SHALL BE INSTALLED AROUND ALL STOCKPILED MATERIAL. STOCKPILES TO REMAIN IN PLACE FOR MORE THAN 30 DAYS SHALL BE SEEDED. THE CONTRACTOR SHALL UTILIZE THE IDENTIFIED STOCKPILE/ STAGING AREAS WITHIN THE CONTRACT DOCUMENTS AND PROVIDE INFORMATION ON ANY APPROVED OFF–SITE DISPOSAL AREAS USED.

7. CONTRACTOR SHALL INSTALL ALL EROSION CONTROL MEASURES AS SHOWN ON PLANS AND DETAILS PRIOR TO ANY CONSTRUCTION. THE CONTRACTOR SHALL MONITOR AND MAINTAIN EPSC DEVICES THROUGHOUT CONSTRUCTION AND REMOVE AFTER PROJECT AREA AND DRAINAGE COURSES ARE FULLY ESTABLISHED AND STABLE.

8. IF NOT OTHERWISE DIRECTED ON THE PLANS, THE CONTRACTOR SHALL FOLLOW EROSION CONTROL PRACTICES AS OUTLINED IN "VERMONT HANDBOOK FOR SOIL EROSION AND SEDIMENT CONTROL ON CONSTRUCTION SITES" SPECIAL PUBLICATION NO. 3, VERMONT GEOLOGICAL SURVEY 1982 OR LATEST EDITION.

9. CATCH BASIN AND CULVERT INLETS SHALL BE PROTECTED BEFORE ADJACENT AREAS ARE DISTURBED, AND MAINTAINED UNTIL AREA IS STABILIZED. SEE CATCH BASIN AND TEMPORARY STONE CHECK DAM EPSC DETAILS.

10. TEMPORARY STONE CHECK DAMS SHALL BE MAINTAINED THROUGHOUT CONSTRUCTION AND REMOVED ONCE VEGETATION IS ESTABLISHED.

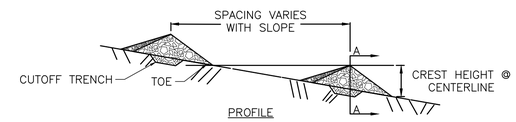
11. ANY SLOPES GREATER THAN OR EQUAL TO 3:1 SHALL BE MATTED WITH NATURAL FIBER EROSION CONTROL MAT SUCH AS NORTH AMERICAN GREEN, OR APPROVED EQUAL. SEE EROSION CONTROL MATTING SPECIFICATIONS TABLE, AND REFER TO EROSION MATTING DETAILS FOR INSTALLATION.

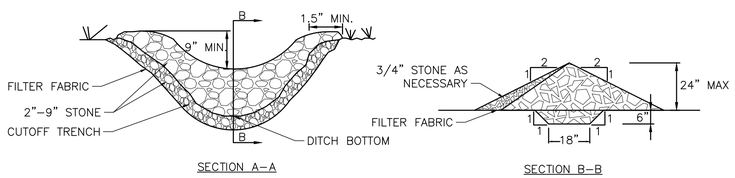
12. ANY DRAINAGE SWALE LESS THAN 5% REFER TO GRASS LINED CHANNEL DETAIL. SLOPES GREATER THAN 5% SHALL RECEIVE LIGHT RIP–RAP. REFER TO RIP–RAP LINED CHANNEL DETAIL.

13. SILTATION FENCE SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. WHERE POSSIBLE SILT FENCES SHALL BE ALIGNED PARALLEL TO SLOPE CONTOURS WITH CURVED UPHILL. THE SILT FENCE SHALL BE INSPECTED WEEKLY AND REPAIRED AS NECESSARY. SEDIMENT BUILD–UP SHALL BE REMOVED AND STABILIZED IN A LOCATION WITH LOW RISK OF RUN OFF.

14. THE NOTICE OF INTENT AND CONSTRUCTION GENERAL PERMIT SHALL BE POSTED ON SITE AND VISIBLE FOR THE PUBLIC TO VIEW. THESE PERMIT REQUIREMENTS SHALL BE FOLLOWED THROUGHOUT CONSTRUCTION.

15. ANY SOIL DISTURBANCE THAT OCCURS BETWEEN OCTOBER 15 AND MAY 1, OR ANY BARE SOIL LEFT UNSTABILIZED BY VEGETATION AFTER OCTOBER 15, REQUIRES APPROVAL FROM THE AGENCY OF NATURAL RESOURCES. WINTER EPSC PLANS MUST BE SUBMITTED BY SEPTEMBER 15TH AND ARE SUBJECT TO APPROVAL FOR EARTHWORK ACTIVITIES AFTER OCTOBER 15TH.





CHECK DAM
NOT TO SCALE

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL –2006– " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

1. STONE WILL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. CHECK DAMS SHALL BE SPACED SO THAT THE ELEVATION OF THE CREST OF THE DOWNSTREAM DAM IS AT THE SAME ELEVATION AS THE TOE OF THE UPSTREAM DAM.
3. 3/4" FILTERING STONE MAY BE ADDED TO THE FACE OF THE CHECK DAM AS NECESSARY.
4. EXTEND THE STONE A MINIMUM OF 1.5' BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
5. PROTECT CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUT AND EROSION WITH STONE OR LINER AS APPROPRIATE.
6. ENSURE THE CHANNEL APPURTENANCES SUCH AS CULVERT ENTRANCES BELOW CHECK DAMS ARE NOT SUBJECT TO DAMAGE OR BLOCKAGE FROM DISPLACED STONE.
7. MAXIMUM DRAINAGE AREA 2 ACRES.

VAOT URBAN LAWN MIX					
	LBS/AC				
WEIGHT	BROADCAST	HYDOSEED	NAME	LATIN NAME	GERM	PURITY
42%	34	68	CREEPING RED FESCUE	FESTUCA RUBRA VAR. RUBRA	85%	98%
20%	16	32	PERENNIAL RYE GRASS	LOLIUM PERENNE	90%	95%
32%	26	52	KENTUCKY BLUE GRASS	POA PRATENSIS	85%	85%
5%	4	8	ANNUAL RYEGRASS	LOLIUM MULTIFLORUM	85%	95%
100%	80	160				

GENERAL AMENDMENT GUIDANCE		
FERTILIZER	LIME	
10/20/20	AG LIME	PELLITIZED
500 LBS/AC	2 TONS/AC	1 TON/AC

MULCH AND SEED NOTES

NOTES:
REFER TO "THE VERMONT STANDARDS & SPECIFICATIONS FOR EROSION PREVENTION & SEDIMENT CONTROL –2006– " FROM THE VT AGENCY OF NATURAL RESOURCES FOR ADDITIONAL GUIDANCE.

SEEDING
1. SEED MIX– THE CONTRACTOR SHALL COORDINATE WITH THE RESIDENT ENGINEER ON WHICH SEED MIX TO USE.
2. SEED MIX– USE AS INDICATED IN THE PLANS AND/OR FOR ALL ESTABLISHED UPLAND (NON WETLAND) AREAS DISTURBED BY THE CONTRACTOR.
3. ALL SEED MIXTURES SHALL NOT HAVE A WEED CONTENT EXCEEDING 0.40% BY WEIGHT AND SHALL BE FREE OF ALL NOXIOUS SEED.
4. FERTILIZER AND LIMESTONE SHALL FOLLOW RATES SHOWN ON PLAN OR AS DIRECTED BY THE ENGINEER.
5. HYDROSEEDING– ALTHOUGH GUIDANCE IS GIVER ABOVE THE SITE CONDITIONS AND THE TYPE OF HYDROSEED PROPOSED FOR USE WILL ULTIMATELY DICTATE THE AMOUNTS AND TYPES OF SOIL AMENDMENT TO BE APPLIED.
6. TURF ESTABLISHMENT– PLACING SEED, FERTILIZER, LIME AND MULCH PRIOR TO SEPTEMBER 15 AND AFTER APRIL 15 CAN BETTER ENSURE A VIGOROUS GROWTH OF GRASS.

MULCH
1. HAY MULCH SHALL BE CHOPPED TO BE PLACE ON EARTH SLOPE AT THE RATE OF 2 TONS/ACRES TO ACHIEVE 90% GROUND COVER WITH APPROXIMATELY 2 INCHES UNIFORM THICKNESS AT LOOSE MEASUREMENT OR AS DIRECTED BY THE ENGINEER. EXCESSIVE AMOUNTS OR BUNCHING OR MULCH WILL NOT BE PERMITTED.
2. MULCH SHALL BE ANCHORED BY AN ACCEPTABLE METHOD.
3. UNLESS OTHERWISE SPECIFIED, MULCH SHALL BE LEFT IN PLACE AND ALLOWED TO DECOMPOSE.
4. ANY ANCHORAGE OR MULCH THAT HAS NOT DECOMPOSED AT THE TIME OF FIRST MOWING SHALL BE REMOVED. ANCHORS MAY BE REMOVED OR DRIVE FLUSH WITH GROUND SURFACE.

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25 UNION STREET
BRANDON, VT 05733
TEL: (802) 465-8396
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PROFESSIONAL SEAL

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NO.	DATE	DESCRIPTION	BY	CK'D

CLIENT

RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

DETAILS

DRAWN BY	DATE
AJS	JAN. 2018
CHECKED BY	D&K PROJECT #
JBA	223755
PROJ. ENG.	D&K ARCHIVE #
JBA	

SHEET NUMBER

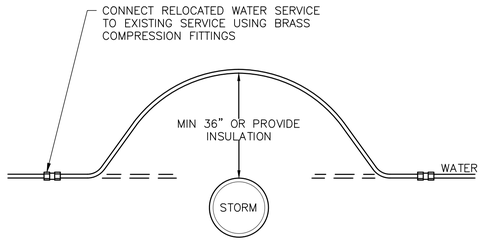
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SHEET 9 OF 11

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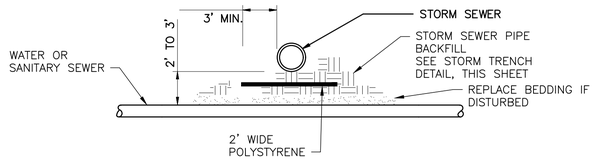
NOTES:

1. WHERE STORMWATER PIPING AND WATER PIPING ARE LESS THAN 36" APART, ADD RIGID INSULATION ON THE SIDE OF THE ENROACHMENT, 2" FOR EACH FOOT CLOSER THAN 36". INSULATION SHALL BE 2' WIDE, CENTERED ON THE WATER SERVICE AND EXTEND 3' TO EITHER SIDE OF THE CROSSING.
2. WHERE EXISTING WATER PIPE AND PROPOSED STORM PIPING CONFLICT, THE WATER SERVICE SHALL BE RELOCATED AS SHOWN. THE WATER SERVICE MAY BE RELOCATED ABOVE OR BELOW THE STORM PIPING.
3. METAL WATER SERVICES WITH A DIAMTER LESS THAN OR EQUAL TO 2" SHALL BE RELOCATED USING TYPE K COPPER AND BRASS COMPRESSION FITTINGS OF A DIAMETER EQUAL TO THE EXISTING SERVICE.
4. PLASTIC WATER SERVICES WITH A DIAMTER LESS THAN OR EQUAL TO 2" SHALL BE RELOCATED USING CLASS 200 HDPE, BRASS COMPRESSION FITTINGS AND STAINLESS STEEL STIFFENER TUBES OF A DIAMETER EQUAL TO THE EXISTING SERVICE.
5. LARGER-DIAMETER WATER LINES SHALL BE RELOCATED USING CLASS 200 DUCTILE IRON WITH EITHER THRUST BLOCKS OR JOINT RESTRAINTS. DIAMETER OF THE RELOCATED PIPING SHALL MATCH THE EXISTING WATER PIPING.
6. BEFORE PLACING THE RELOCATED WATER SERVICE INTO USE, IT SHALL BE THOROUGHLY FLUSHED AND DISINFECTED.
7. IF THE RELOCATED PORTION OF THE WATER SERVICE WILL BE LESS THAN FIVE FEET BELOW FINISHED GRADE, INSULATION SHALL BE INSTALLED. SEE INSULATION NOTE & TABLE, THIS SHEET.



WATER SERVICE RELOCATION FOR STORM CROSSINGS DETAIL

NOT TO SCALE



NOTES:

1. WHERE WATER OR SANITARY SEWER PIPING IS LESS THAN TWO FEET FROM STORM SEWERS OR STORM SEWER STRUCTURES, INSTALL POLYSTYRENE INSULATION, 2' WIDE, CENTERED ON THE WATER MAIN, EXTENDING A MINIMUM OF 3' TO EITHER SIDE OF THE STORM SEWER AND PLACED APPROXIMATELY 6" FROM THE WATER MAIN. INSULATION THICKNESS SHALL BE 2".
2. WHERE WATER MAINS OR SERVICES ARE RELOCATED TO LESS THAN 5' BELOW FINISHED GRADE, INSTALL POLYSTYRENE INSULATION, 2' WIDE, CENTERED ON THE WATER MAIN OR SERVICE, EXTENDING THE FULL LENGTH OVER WHICH A MINIMUM OF 5' OF COVER IS NOT MAINTAINED AND PLACED APPROXIMATELY 6" ABOVE THE CROWN OF THE WATER PIPE. INSULATION THICKNESS SHALL BE AS SHOWN IN THE FOLLOWING TABLE

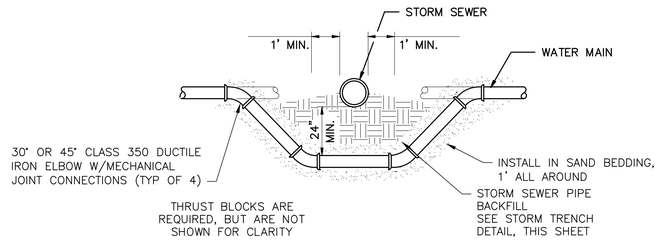
REQUIRED INSULATION THICKNESS TABLE	
DEPTH (FEET)	RIGID INSULATION THICKNESS (IN)
5'-1" – 5'-6"	1
4'-1" – 5'-0"	2
3'-1" – 4'-0"	3
2'-0" – 3'-0"	4

INSULATION REQUIREMENTS

NOT TO SCALE

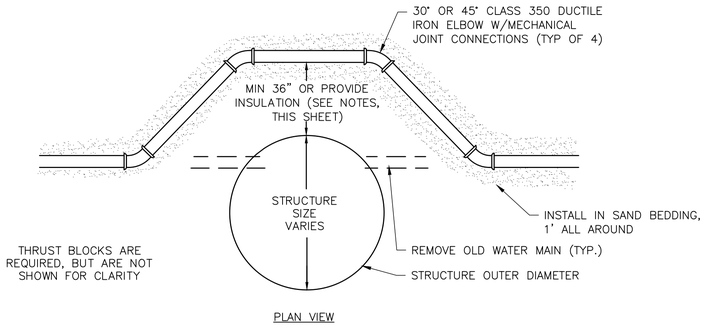
WATER MAIN RELOCATION NOTES:

1. WHERE WATER MAIN PIPING AND STORM SEWER STRUCTURES OR PIPING ARE LESS THAN 36" APART, ADD RIGID INSULATION ON THE SIDE OF THE ENCROACHMENT, 2" FOR EACH FOOT CLOSER THAN 36". INSULATION SHALL BE 2' WIDE, CENTERED ON THE WATER PIPE AND EXTEND 3' TO EITHER SIDE OF THE ENROACHMENT.
2. WHERE WATER MAIN PIPING AND STORM SEWER STRUCTURES OR PIPING ARE LESS THAN 24" APART, THE WATER MAIN SHALL BE RELOCATED SUCH THAT IT IS 24", AND PREFERABLY 36" AWAY FROM STORM SEWER STRUCTURES OR PIPING.
3. THRUST BLOCKS ARE REQUIRED AT ALL BENDS, BUT ARE NOT SHOWN FOR CLARITY.
4. AFTER INSTALLATION OF PIPING, RELOCATED SECTIONS OF WATER MAIN SHALL BE FLUSHED, PRESSURE TESTED, DISINFECTED AND FLUSHED AGAIN AS SPECIFIED IN AWWA C651-14. EFFECTIVENESS OF DISINFECTION SHALL BE PROVEN USING NOT LESS THAN TWO BAC-T SAMPLES
5. WHERE A WATER MAIN OF NON-STANDARD SIZE IS ENCOUNTERED, HY-MAX COUPLINGS OR EQUAL MAY BE USED.
6. ABANDONED WATER MAINS DO NOT REQUIRE RELOCATION, BUT SHALL BE CAPPED IN A PERMANENT AND WATERTIGHT MANNER.



WATER MAIN RELOCATION FOR STORM SEWER CROSSINGS DETAIL

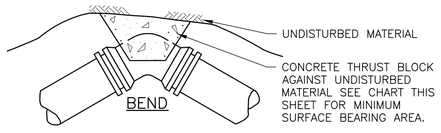
NOT TO SCALE



WATER MAIN RELOCATION FOR STORM SEWER STRUCTURES DETAIL

NOT TO SCALE

NOTE: WHERE RELOCATION OF WATERLINE AS SHOWN WILL REDUCE WATER-SANITARY SEWER ISOLATION DISTANCES TO LESS THAN 10', CONSULT WITH ENGINEER



THRUST BLOCK TABLE NOTES

1. FIGURES BASED ON 300 PSI.
2. WHEN MORE THAN ONE SOIL TYPE IS ENCOUNTERED, THE ONE WITH LEAST BEARING CAPACITY SHALL BE USED.
3. RETAINING RODS OR RESTRAINED JOINT PIPE, AS APPROVED BY THE ENGINEER, SHALL BE USED IN PLACE OF THRUST BLOCKS WHEN MUCK IS ENCOUNTERED.
4. CONTRACTOR MAY PROPOSE SMALLER THRUST BLOCKS BASED ON PIPE SIZES AND MAXIMUM PRESSURES.

AREA OF BEARING FACE OF CONCRETE THRUST BLOCKS IN SQUARE FEET

PIPE SIZE (IN)	SOFT WET CLAY, SAND OR SILT	DRY SAND	COMPACT COARSE SAND OR GRAVEL HARDPAN
SOIL BEARING CAPACITIES (APPROXIMATE)			
	1,250 lbs/ft^2	4,000 lbs/ft^2	6,000 lbs/ft^2
DEAD END OR TEE			
8 OR LESS		5	4
1/4 BEND			
8 OR LESS		7	5
1/8 BEND			
8 OR LESS		4	3
1/16 BEND			
8 OR LESS		2	2

CONCRETE THRUST BLOCK DETAIL

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170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

DETAILS

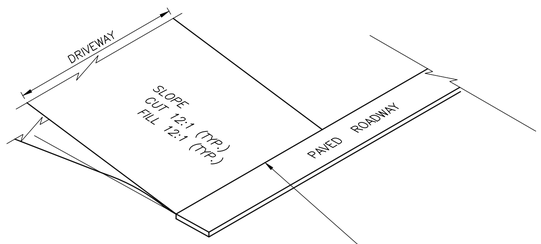
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SHEET NUMBER

D3

SHEET 10 OF 11

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TYPICAL DRIVE WITH TRAVERSABLE CURB

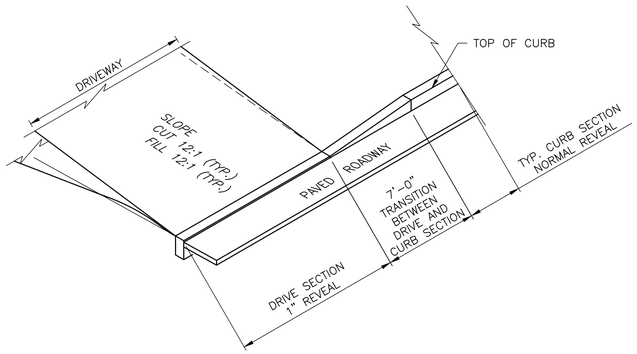
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DRIVE MATERIAL NOTES:

GRAVEL DRIVE:
PAVE DRIVE TO R.O.W. BEYOND R.O.W. GRADE EXISTING GRAVEL MATERIAL TO CUT/FILL LIMITS, SEE PLAN VIEW FOR LIMITS.

PAVED DRIVE:
PAVE WITH 2" TYPE III BITUMINOUS CONCRETE FROM R.O.W. UNTIL GRADE MATCHES, SEE PLAN VIEW FOR LIMITS, SAW CUT EXISTING PAVEMENT AT LIMITS

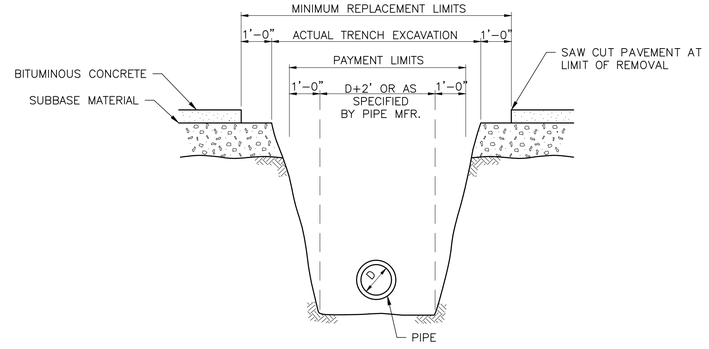
CONCRETE DRIVE:
CONCRETE TO BE REPLACED FROM BACK OF CURB/SIDEWALK, USE FELT MATERIAL AT JOINT, UNTIL GRADE MATCHES, SEE PLAN VIEW FOR LIMITS, SAW CUT EXISTING AT LIMITS USE FELT MATERIAL AT JOINT REFER TO TYPICAL CURB (DRIVE) W/ SIDEWALK DETAIL FOR CONCRETE THICKNESS AND REINFORCING



TYPICAL DRIVE WITH CURB

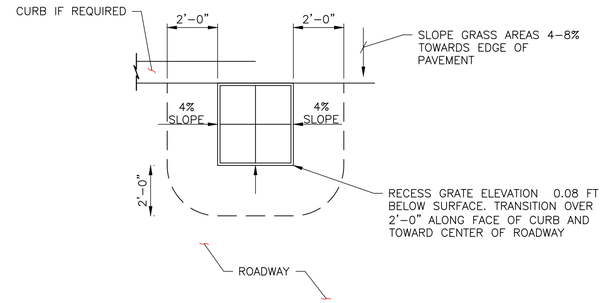
NOT TO SCALE

OTHER REQUIRED SITEWORK RESTORATION:
1. PUBLIC AND PRIVATE PROPERTY DAMAGED OR DISTURBED SH
2. TRAFFIC SIGNS SHALL BE TEMPORARILY REMOVED AND STORED BY THE CONTRACTOR AND RE-INSTALLED AT THE COMPLETION OF WORK.
3. ROADWAY STRIPING SHALL BE REPLACED IN-KIND USING A VAOT-APPROVED ROAD SURFACE PAINT.
4. SIDEWALKS



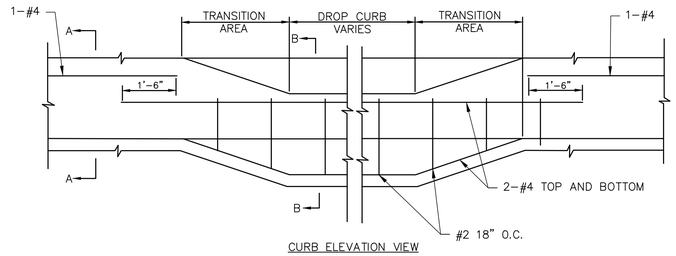
PAVEMENT REPLACEMENT DETAIL

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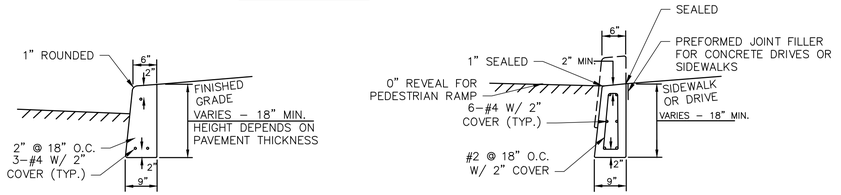


PAVEMENT TRANSITION AT CATCH BASIN PLAN

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CURB ELEVATION VIEW



NORMAL CURB

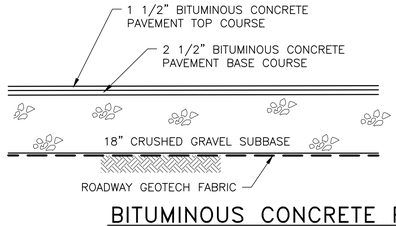
CURB W/ ADDITIONAL REINFORCEMENT - FOR DRIVEWAYS & DRIVEWAY TRANSITIONS

NOTES:
1. CONCRETE SHALL BE CLASS A-40 4,000 PSI.
2. STEEL REINFORCEMENT SHALL BE AS PER ASTM615, GRADE 60.
3. THE SLOPE OF THE TOP CURB SHALL CONFORM TO SLOPE OF SIDEWALK IN ALL CASES.
4. EXPANSION JOINTS IN CURB SHALL NOT EXCEED 20'-0" O.C.
5. THE EXPANSION JOINS OF THE CURB SHOULD LINE UP WITH THE EXPANSION JOINS IN THE CONCRETE SIDEWALK.

NOTE:
REVEAL AT PEDESTRIAN RAMPS SHALL BE 0" AS SHOWN. REVEAL AT DRIVEWAY TO BE 1-1/2".

REINFORCED CONCRETE CURB AND DROP CRUB

NOT TO SCALE



REPLACEMENT ROAD MATERIAL TYPE AND THICKNESS
1-1/2" TYPE III BITUMINOUS CONCRETE WEARING COURSE
2-1/2" TYPE II BITUMINOUS CONCRETE BINDER COURSE
6" FINE CRUSHED GRAVEL SUBBASE
12" MIN. GRAVEL BASE

BITUMINOUS CONCRETE PAVEMENT SECTION

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RUTLAND NATURAL RESOURCES CONSERVATION DISTRICT

170 SOUTH MAIN STREET STE. 4
RUTLAND, VT 05701

PROJECT

VERNON AND PHILLIPS STREET STORMWATER SEPARATION

SHEET TITLE

DETAILS

DRAWN BY	DATE
AJS	JAN. 2018
CHECKED BY	D&K PROJECT #
JBA	223755
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JBA	

SHEET NUMBER

D4

SHEET 11 OF 11

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Rutland - Vernon & Phillips Street Stormwater Separation
Preliminary Opinion of Probable Project Costs 2/6/2018

Alternative 1Cw - New Storm & Sanitary Sewer, Water Improvements

Item No.	Description	Estimated Quantity	Units	Cost Per Unit	Amount	Notes
Storm Drain Construction Costs						
2	48" CB/DMH Base, Top Section, Frame & Grate/Cover	28	EA	$ 2,300	$ 64,400	Salisbury Route 53, Middlebury Cross Street
3	48" CB/DMH Riser	77	VLF	$ 230	$ 17,710	Salisbury Route 53, Middlebury Cross Street
5	60" CB/DMH Base, Top Section, Frame & Grate/Cover	2	EA	$ 3,800	$ 7,600	Brandon Segment 6, Barre HMGP Draing, Salisbury Route 53
6	60" CB/DMH Riser	15	VLF	$ 360	$ 5,400	Brandon Segment 6, Barre HMGP Drain, Salisbury Route 53
8	72" CB/DMH Base, Top Section, Frame & Grate/Cover	10	EA	$ 5,600	$ 56,000	Brandon Segment 6, Barre HMGP Drain
9	72" CB/DMH Riser	46	VLF	$ 520	$ 23,920	Brandon Segment 6, Barre HMGP Drain
12	18" CPEP(SL) Storm Pipe	660	LF	$ 100	$ 66,000	Hancock Churchville Road, Salisbury Route 53
13	24" CPEP(SL) Storm Pipe	530	LF	$ 120	$ 63,600	Hancock Churchville Road, New Haven Pearson Road, Salisbury Route 53
14a	30" CPEP(SL) Storm Pipe, Inv 5' - 9' deep	122	LF	$ 150	$ 18,300	New Haven Pearson Road, Salisbury Route 53
14b	30" CPEP(SL) Storm Pipe, Inv 9' - 13' deep	0	LF	$ 175	$ -	New Haven Pearson Road, Salisbury Route 53
15a	36" CPEP(SL) Storm Pipe, Inv 5'-9' deep	1,345	LF	$ 175	$ 235,375	Barre HMGP, Hancock Churchville Road, Brandon Segment 6
15b	36" CPEP(SL) Storm Pipe, Inv 9'-13' deep	0	LF	$ 215	$ -	Barre HMGP, Hancock Churchville Road, Brandon Segment 6
15c	36" CPEP(SL) Storm Pipe, Inv >13' deep	0	LF	$ 255	$ -	Barre HMGP, Hancock Churchville Road, Brandon Segment 6
16	Water/Storm Crossing/Relocation	8	EA	$ 2,000	$ 16,000	Engineer Estimate
17	CIP Concrete Curb	400	LF	$ 30	$ 12,000	Middlebury Seminary Street, Middlebury College Street
18	Road Reconstruction	1,200	SY	$ 40	$ 48,000	Middlebury Seminary Street, Middlebury College Street
19	Greenspace Restoration	600	SY	$ 5	$ 3,000	Engineer Estimate
20	Utility Pole Relocation/Protection	3	EA	$ 3,000	$ 9,000	Engineer Estimate
21	Adams Street Tie-In	1	LS	$ 5,000	$ 5,000	Engineer Estimate
22	Exploratory Excavation	10	CY	$ 75	$ 750	VAOT Price List
23	Traffic Control	1	LS	$ 5,000	$ 5,000	Engineer Estimate
24	Remove/Replace Unsuitable Material	10	CY	$ 20	$ 200	Waitsfield Water, Northfield King Street, Northfield Rte 12, Northfield Central Street
25	Mobilization	1	LS	3.5%	$ 22,700	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
26	Erosion Prevention and Sediment Controls	1	LS	2.0%	$ 13,000	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
27	General Conditions and Miscellaneous Work	1	LS	10.0%	$ 64,700	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater, Waitsfield Contract 1, 2, 3, 4, & 6, Town of Northfield Rte 12, Central Street, and King Street, Rochester Brook Street, SAFD2
	SUBTOTAL STORM DRAIN CONSTRUCTION				**$ 757,655**	

Rutland - Vernon & Phillips Street Stormwater Separation
Preliminary Opinion of Probable Project Costs 2/6/2018

Alternative 1Cw - New Storm & Sanitary Sewer, Water Improvements

Item No.	Description	Estimated Quantity	Units	Cost Per Unit	Amount	Notes
Sewer Construction Costs						
28	48" SMH Base, Top Section, Frame & Cover	10	EA	$ 900	$ 9,000	Salisbury Route 53, Middlebury Cross Street
29	48" SMH Riser	70	VLF	$ 300	$ 21,000	Salisbury Route 53, Middlebury Cross Street
30	6" PVC Sewer	850	EA	$ 55	$ 46,750	Middlebury College Street, Middlebury Cross Street, Brandon Segment 6, Rochester Brook Street
31	12" PVC Sewer	1870	LF	$ 100	$ 187,000	Middlebury College Street, Brandon Segment 6
32	New Sewer Services in ROW	800	LF	$ 43	$ 34,400	Middlebury College Street, Middlebury Seminary Street, Rochester Brook Street
33	Sewer Main Tie-In	8	EA	$ 250	$ 2,000	Engineer Estimate
34	Road Reconstruction	1500	SY	$ 40	$ 60,000	Middlebury Seminary Street
35	Remove/Replace Unsuitable Material	10	CY	$ 20	$ 200	Waitsfield Water, Northfield King Street, Northfield Rte 12, Northfield Central Street
36	Mobilization	1	LS	3.5%	$ 12,700	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
37	Erosion Prevention and Sediment Controls	1	LS	2.0%	$ 7,500	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
38	General Conditions and Miscellaneous Work	1	LS	10.0%	$ 38,100	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater, Waitsfield Contract 1, 2, 3, 4, & 6, Town of Northfield Rte 12, Central Street, and King Street, Rochester Brook Street, SAFD2
	SUBTOTAL SEWER CONSTRUCTION				**$ 418,650**	
Water Construction Costs						
39	Cut-In 8"x6" or 8"x8" Tee	2	EA	$ 2,000	$ 4,000	Middlebury College Street, Palmer Springs, Breadloaf Campus, Waitsfield, Northfield Route 12, Waitsfield Water, Middlebury Painter Hill
40	New 6" or 8" Valve	5	EA	$ 1,650	$ 8,250	Middlebury College Street, Palmer Springs, Breadloaf Campus, Waitsfield, Sheldon Water Transmission,
41	Remove 4", 6" or 8" Cross or Tee	4	EA	$ 1,000	$ 4,000	Middlebury College Street, Palmer Springs, Breadloaf Campus, Waitsfield, Northfield Route 12, Middlebury Painter Hill, Barre Mill Street, Northfield Central, Northfield King Street, SAFD2
42	New 8" DI Water Main	700	LF	$ 100	$ 70,000	Barre Mill Street, Northfield Rt. 12, Mill Street, Central Street, Proctor West Side Phase 1
43	3/4" or 1" Corp & Curb Stops	14	EA	$ 650	$ 9,100	Middlebury College Street, Waitsfield, Breadloaf Campus, Sheldon Water Transmission, Northfield Rt. 12, Northfield Central Street, Northfield King Street
44	1" PE Water Service to Edge of ROW	350	LF	$ 36	$ 12,600	Waitsfield, Breadloaf Campus, Sheldon Water Transmission
45	Water Main Tie-In	6	EA	$ 500	$ 3,000	Engineer Estimate
46	Exploratory Excavation	10	CY	$ 75	$ 750	VAOT Price List
47	Road Reconstruction	450	SY	$ 40	$ 18,000	Middlebury Seminary Street, Middlebury College Street
48	Mobilization	1	LS	3.5%	$ 4,600	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
49	Erosion Prevention and Sediment Controls	1	LS	2.0%	$ 2,600	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater
50	General Conditions and Miscellaneous Work	1	LS	10.0%	$ 13,000	Bradford Vermont Sewer Project, South Ridge Construction, Addison Wastewater, Waitsfield Contract 1, 2, 3, 4, & 6, Town of Northfield Rte 12, Central Street, and King Street, Rochester Brook Street, SAFD2
	SUBTOTAL WATER IMPROVEMENTS				**$ 149,900**	
	TOTAL CONSTRUCTION COST				**$ 1,326,205**	

Rutland - Vernon & Phillips Street Stormwater Separation
Preliminary Opinion of Probable Project Costs 2/6/2018

Alternative 1Cw - New Storm & Sanitary Sewer, Water Improvements

Item No.	Description	Estimated Quantity	Units	Cost Per Unit	Amount	Notes
Engineering Costs						
51	Preliminary				$ 20,590	ANR Facilities Engineering Division Engineering Fee based upon project being less than $780,000
52	Sewer Camera Inspection				$ 11,727	Hartigans quote
53	Final Engineering - Storm				$ -	To be completed under RNRCD Contract
54	Final Engineering - Sewer				$ 30,837	ANR Facilities Engineering Division Engineering Fee based upon project being less than $780,000
55	Final Engineering - Water'				$ 12,293	ANR Facilities Engineering Division Engineering Fee based upon project being less than $780,000
56	Bid and Construction Phase Services				$ 161,652	ANR Facilities Engineering Division Engineering Fee based upon project being more than $780,000
Municipal Project Allowances						
57	Legal/Fiscal	1	LS	2.0%	$ 26,600	2% of the Construction Costs
58	Administration/Project Management	1	LS	1.0%	$ 13,300	1% of the Construction Costs
Contingency						
59	Contingency	1	LS	10%	$ 132,700	10% of the Construction Costs
				TOTAL PROJECT COST	**$ 1,736,000**	

Notes:
1. Mobilization/Demobilization and Erosion Prevention & Sediment Control assume installation of sewer, stormwater and water utilities are completed under a single contract.

Cost escalation for February 2018 - January 2022: 21.54%

2022 project cost: $2,110,000

Figures provided by the City of Rutland

APPENDIX O

Rotary Park

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Install 36" culvert

Diversion Manhole

Swirl Concentrator

Subsurface Retention Gallery

Connect existing catch basin to new storm drain (typ)

Area of Combined Sewershed Removed : 33.23 Acres

LIPS ST
BELLEVUE AV
MAROLIN ACRES
EASTVIEW CT
HIGHLAND AV EXT
EMERITUS ST
HILLCREST RD
MONA VISTA AV
DIVISION ST
CLEMATIS AV
TUTTLE MEADOW DR
THRALL AV
THOMAS ST
N MAIN ST
LINCOLN AV
CHURCH ST
NORTH ST
NORTH ST EXT
BELLEVUE AV
BELMONT AV
HIGH ST
CRESCENT ST
WOOD AV
HIGHLAND AV
PARK CT
STAFFORD LN
BELMONT AV EXT
CLARK ST

MAP 3
PROJECT AREA : Rotary Park
CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 125 250

Weston & Sampson

3

N

MAP SHEET 3 of 15

Project 8: Rotary Park Treatment Schematic

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN

July 2022

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Install 36" culvert

Diversion Manhole

Swirl Concentrator (Vortechs VX1000 or approved equal)

Subsurface stormwater detention structure (by Contech or approved equal)

TENNEY BROOK

PHILLIPS ST

N MAIN ST

590

600

610

inset 3

VCGI, Maxar, Microsoft

Legend

- Project Watershed Boundary
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Combined Sewer
- Sanitary Force Main
- Proposed Storm Drain
- Combined Sewershed
- Sewer Service Area
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- Wetlands
- 100 Year Flood Zone
- 500 Year Flood Zone
- Hazardous Waste Sites

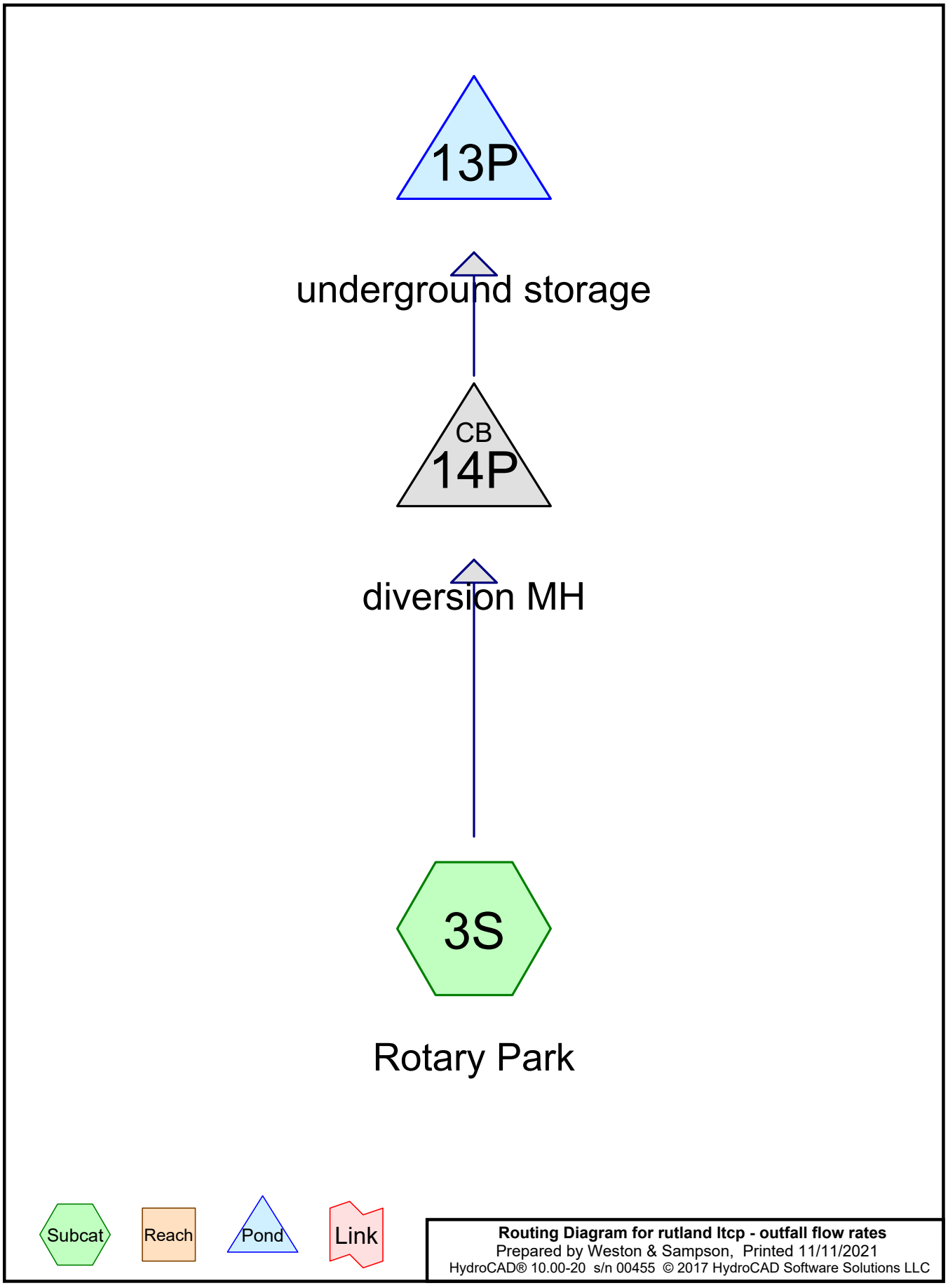
Soil Rating Type

- A
- B

Feet
0 25 50

Weston & Sampson

N


13P
underground storage
CB
14P
diversion MH
3S
Rotary Park
Subcat
Reach
Pond
Link
Routing Diagram for rutland ltcp - outfall flow rates
Prepared by Weston & Sampson, Printed 11/11/2021
HydroCAD® 10.00-20 s/n 00455 © 2017 HydroCAD Software Solutions LLC

Summary for Subcatchment 3S: Rotary Park

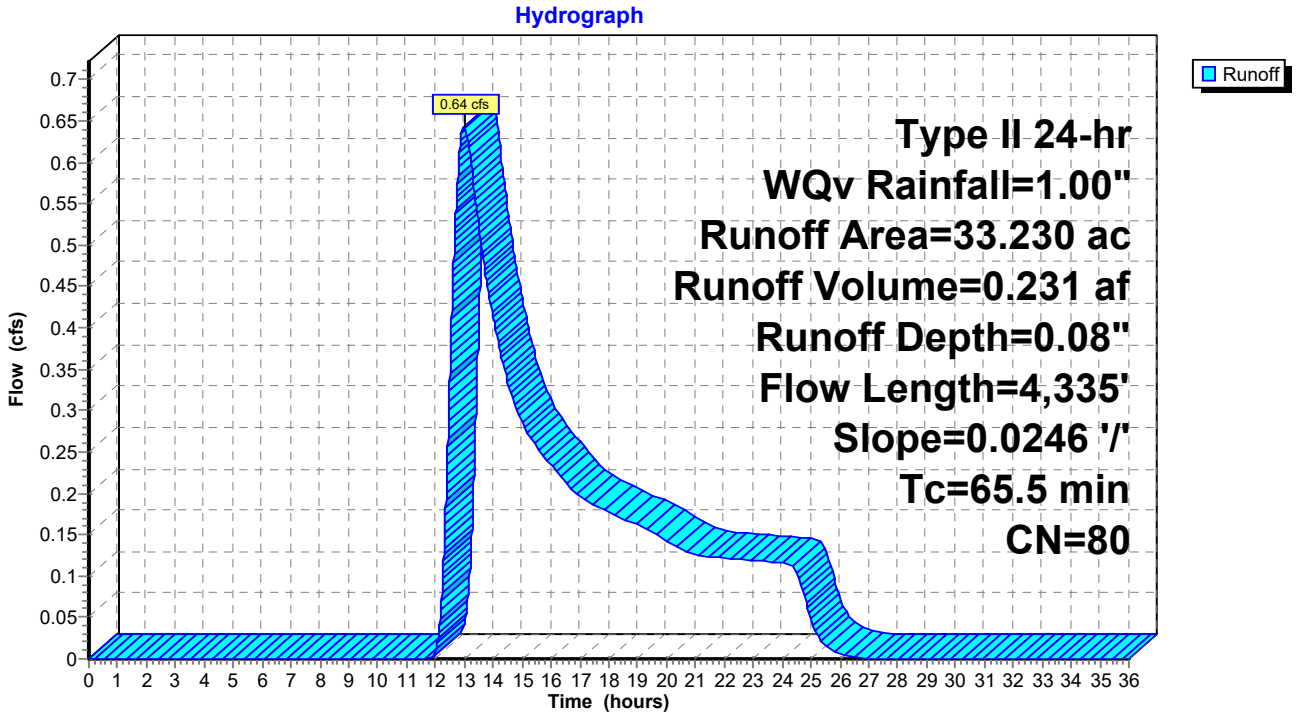
Runoff = 0.64 cfs @ 13.02 hrs, Volume= 0.231 af, Depth= 0.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
33.230	80	1/2 acre lots, 25% imp, HSG C
24.923		75.00% Pervious Area
8.307		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.5	4,335	0.0246	1.10		**Lag/CN Method,**

Subcatchment 3S: Rotary Park



Summary for Pond 13P: underground storage

Inflow Area = 33.230 ac, 25.00% Impervious, Inflow Depth = 0.08" for WQv event
Inflow = 0.64 cfs @ 13.02 hrs, Volume= 0.231 af
Outflow = 0.40 cfs @ 14.06 hrs, Volume= 0.227 af, Atten= 38%, Lag= 62.2 min
Primary = 0.40 cfs @ 14.06 hrs, Volume= 0.227 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 100.36' @ 14.06 hrs Surf.Area= 0.115 ac Storage= 0.042 af

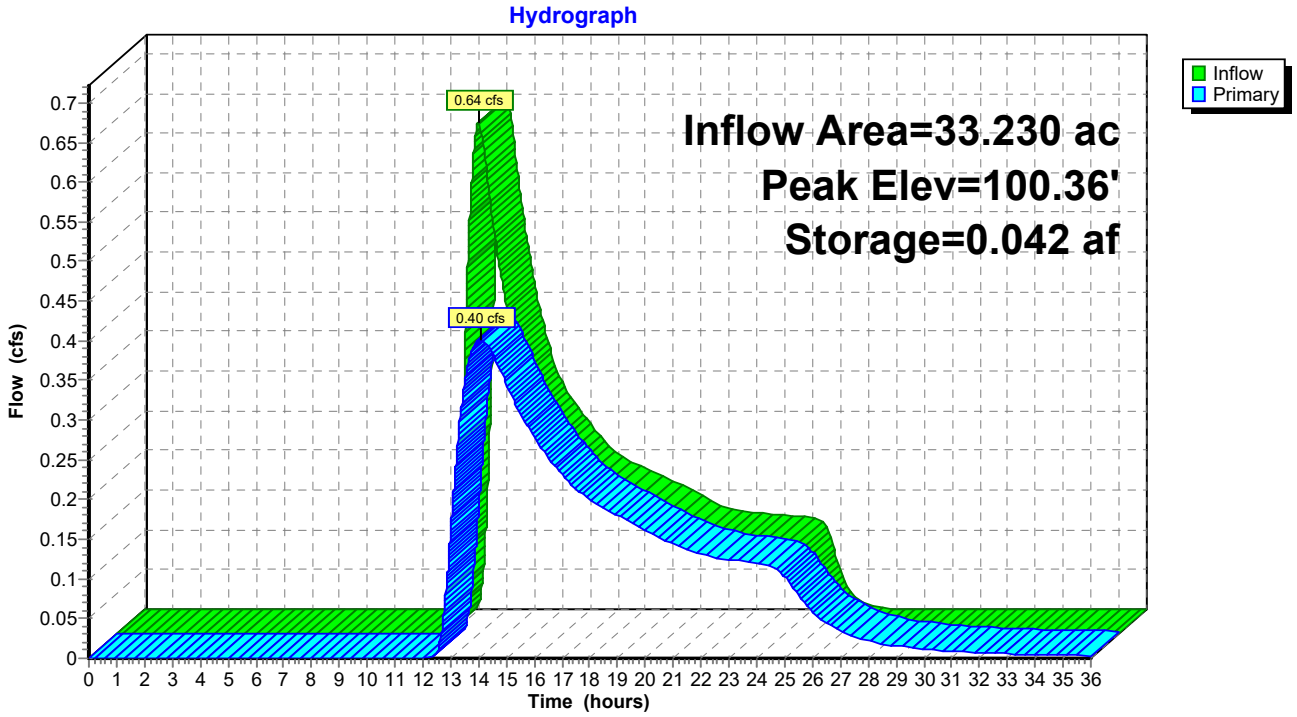
Plug-Flow detention time= 104.7 min calculated for 0.227 af (99% of inflow)
Center-of-Mass det. time= 97.1 min (1,103.9 - 1,006.7)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	0.459 af	**50.00'W x 100.00'L x 4.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**18.0" Round discharge culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	100.00'	**8.0" Vert. control orifice** C= 0.600
#3	Device 1	103.25'	**48.0" W x 6.0" H Vert. overflow weir** C= 0.600

Primary OutFlow Max=0.40 cfs @ 14.06 hrs HW=100.36' (Free Discharge)
└**1=discharge culvert** (Passes 0.40 cfs of 0.68 cfs potential flow)
└**2=control orifice** (Orifice Controls 0.40 cfs @ 2.06 fps)
└**3=overflow weir** (Controls 0.00 cfs)

Pond 13P: underground storage



Summary for Pond 14P: diversion MH

Inflow Area = 33.230 ac, 25.00% Impervious, Inflow Depth = 0.08" for WQv event
Inflow = 0.64 cfs @ 13.02 hrs, Volume= 0.231 af
Outflow = 0.64 cfs @ 13.02 hrs, Volume= 0.231 af, Atten= 0%, Lag= 0.0 min
Primary = 0.64 cfs @ 13.02 hrs, Volume= 0.231 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

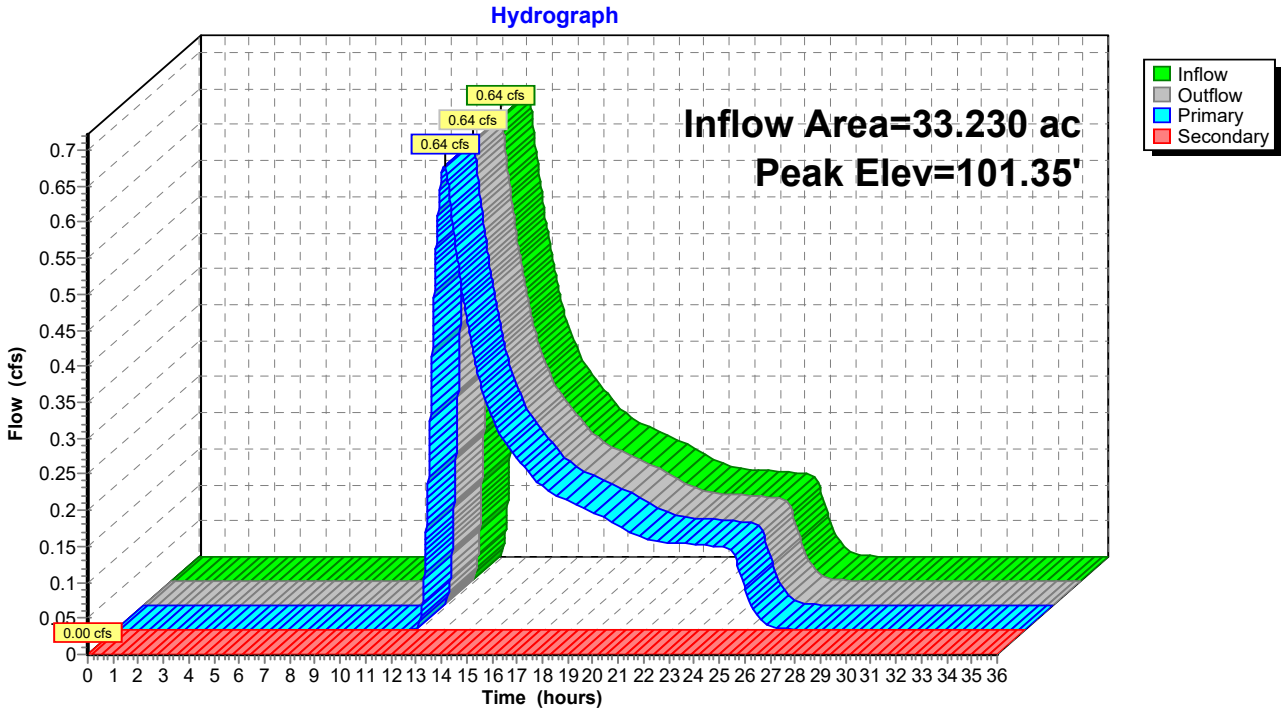
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 101.35' @ 13.02 hrs
Flood Elev= 107.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**18.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	103.50'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 103.50' / 98.00' S= 0.1100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=0.64 cfs @ 13.02 hrs HW=101.35' TW=100.22' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.64 cfs @ 2.03 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=101.00' (Free Discharge)
└**2=Culvert** (Controls 0.00 cfs)

Pond 14P: diversion MH



Summary for Subcatchment 3S: Rotary Park

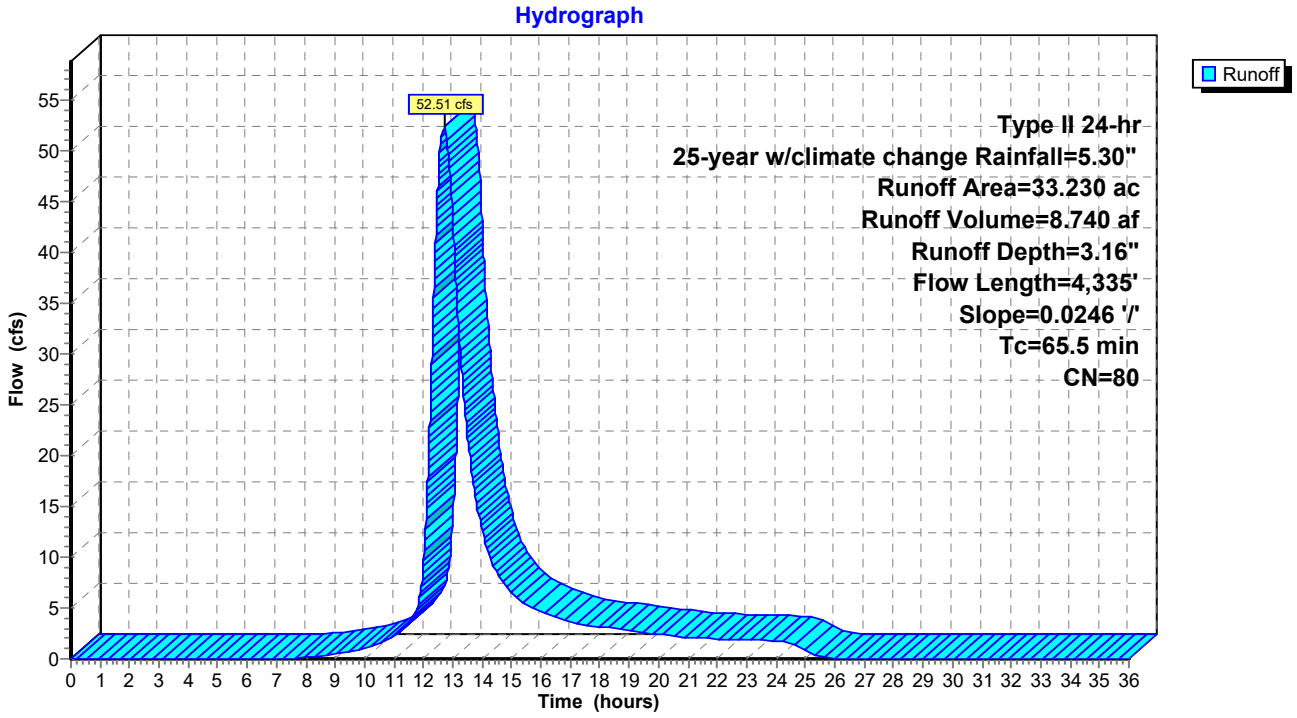
Runoff = 52.51 cfs @ 12.73 hrs, Volume= 8.740 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
33.230	80	1/2 acre lots, 25% imp, HSG C
24.923		75.00% Pervious Area
8.307		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
65.5	4,335	0.0246	1.10		**Lag/CN Method,**

Subcatchment 3S: Rotary Park



Summary for Pond 13P: underground storage

[93] Warning: Storage range exceeded by 0.64'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 33.230 ac, 25.00% Impervious, Inflow Depth = 1.80" for 25-year w/climate change event
Inflow = 13.18 cfs @ 12.72 hrs, Volume= 4.994 af
Outflow = 13.76 cfs @ 12.43 hrs, Volume= 4.989 af, Atten= 0%, Lag= 0.0 min
Primary = 13.76 cfs @ 12.43 hrs, Volume= 4.989 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 104.64' @ 12.43 hrs Surf.Area= 0.115 ac Storage= 0.459 af

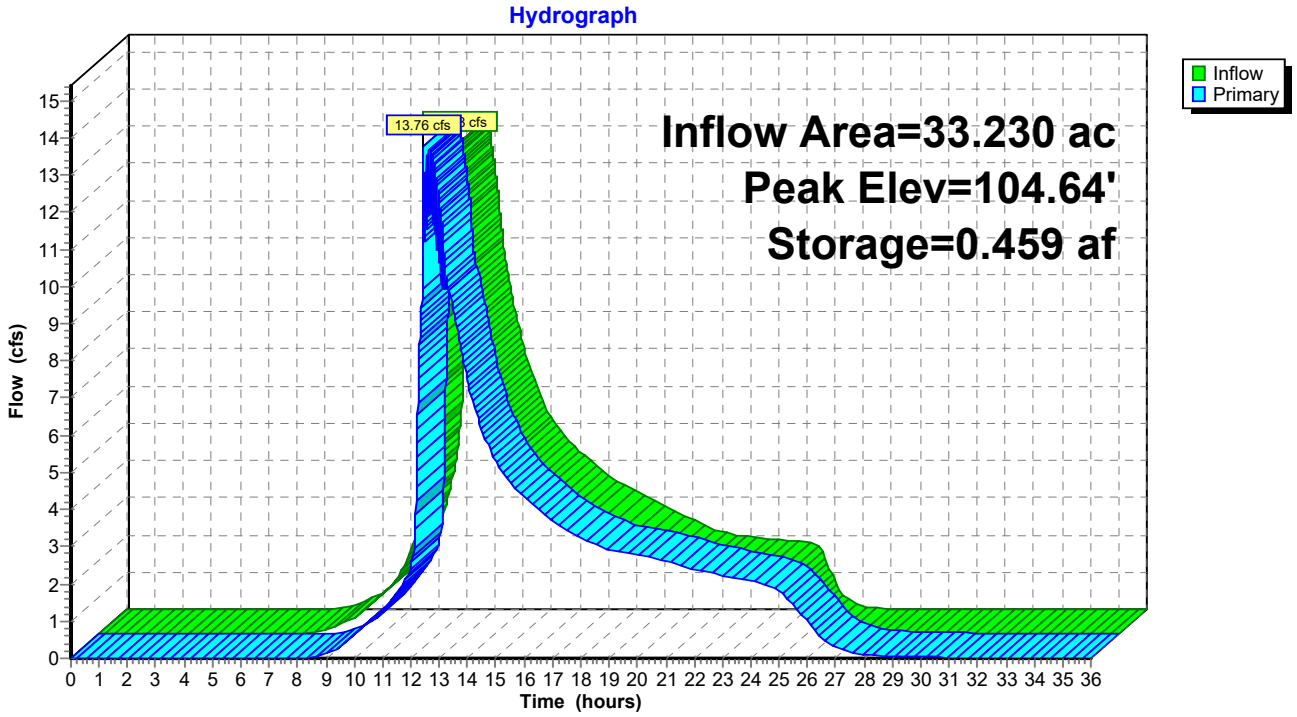
Plug-Flow detention time= 60.8 min calculated for 4.989 af (100% of inflow)
Center-of-Mass det. time= 60.2 min (998.8 - 938.6)

Volume	Invert	Avail.Storage	Storage Description
#1	100.00'	0.459 af	**50.00'W x 100.00'L x 4.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	100.00'	**18.0" Round discharge culvert** L= 50.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 100.00' / 99.00' S= 0.0200 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	100.00'	**8.0" Vert. control orifice** C= 0.600
#3	Device 1	103.25'	**48.0" W x 6.0" H Vert. overflow weir** C= 0.600

Primary OutFlow Max=13.69 cfs @ 12.43 hrs HW=104.63' (Free Discharge)
└**1=discharge culvert** (Passes 13.69 cfs of 16.75 cfs potential flow)
  ├**2=control orifice** (Orifice Controls 3.48 cfs @ 9.98 fps)
  └**3=overflow weir** (Orifice Controls 10.20 cfs @ 5.10 fps)

Pond 13P: underground storage



Summary for Pond 14P: diversion MH

Inflow Area = 33.230 ac, 25.00% Impervious, Inflow Depth = 3.16" for 25-year w/climate change event
Inflow = 52.51 cfs @ 12.73 hrs, Volume= 8.740 af
Outflow = 52.51 cfs @ 12.73 hrs, Volume= 8.740 af, Atten= 0%, Lag= 0.0 min
Primary = 13.18 cfs @ 12.72 hrs, Volume= 4.994 af
Secondary = 40.02 cfs @ 12.73 hrs, Volume= 3.746 af

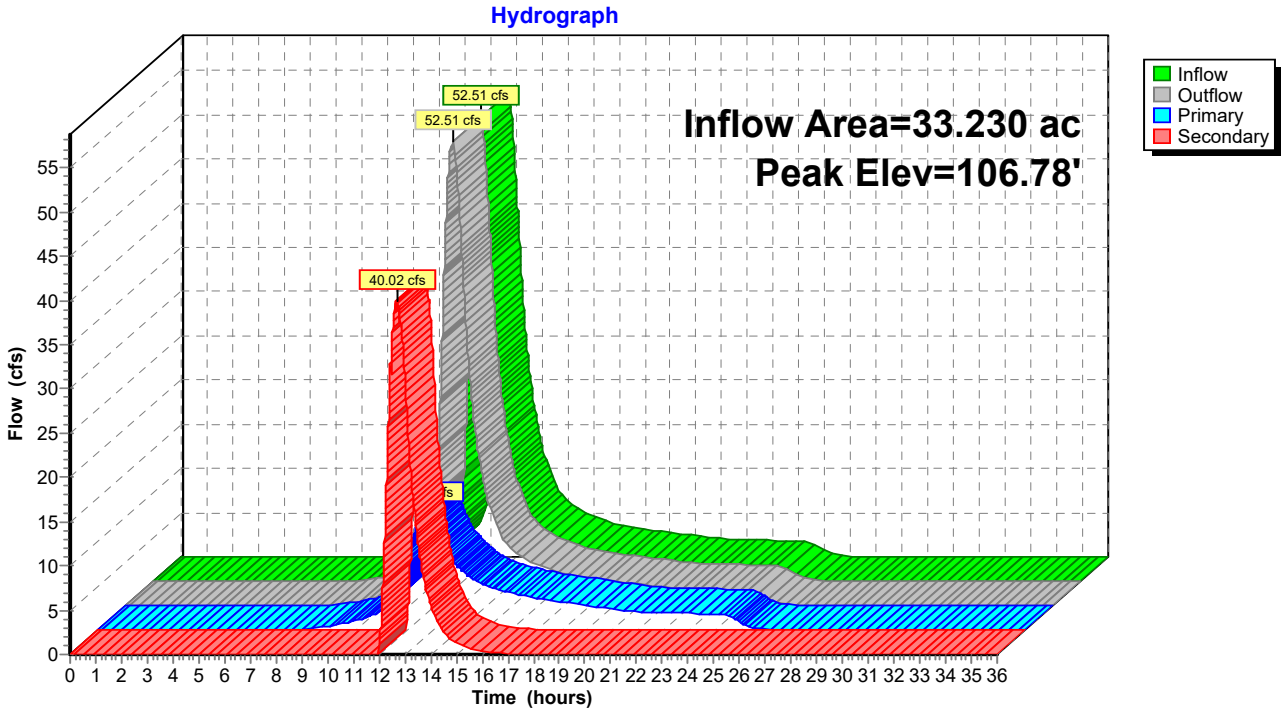
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 106.78' @ 12.73 hrs
Flood Elev= 107.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	101.00'	**18.0" Round Culvert** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 101.00' / 100.00' S= 0.0500 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Secondary	103.50'	**36.0" Round Culvert** L= 50.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 103.50' / 98.00' S= 0.1100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=12.31 cfs @ 12.72 hrs HW=106.71' TW=104.62' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 12.31 cfs @ 6.97 fps)

Secondary OutFlow Max=40.00 cfs @ 12.73 hrs HW=106.77' (Free Discharge)
└─**2=Culvert** (Inlet Controls 40.00 cfs @ 5.66 fps)

Pond 14P: diversion MH



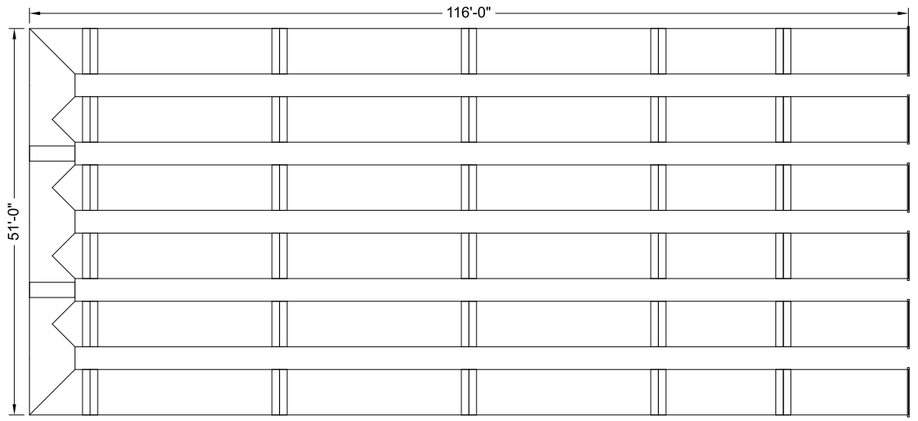
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20 & HS25
- APPROX. LINEAR FOOTAGE = 711 lf.

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 20,000 cf.
- PIPE STORAGE VOLUME = 20,103 cf.
- BACKFILL STORAGE VOLUME = 0 cf.
- TOTAL STORAGE PROVIDED = 20,103 cf.

PIPE DETAILS
- DIAMETER = 72 IN.
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = Solid
- BARRELL SPACING = 36 IN.

BACKFILL DETAILS
- WIDTH AT ENDS = 12 IN.
- ABOVE PIPE = 0 IN.
- WIDTH AT SIDES = 12 IN.
- BELOW PIPE = 0 IN.



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 20'

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DATE	REVISION DESCRIPTION	BY

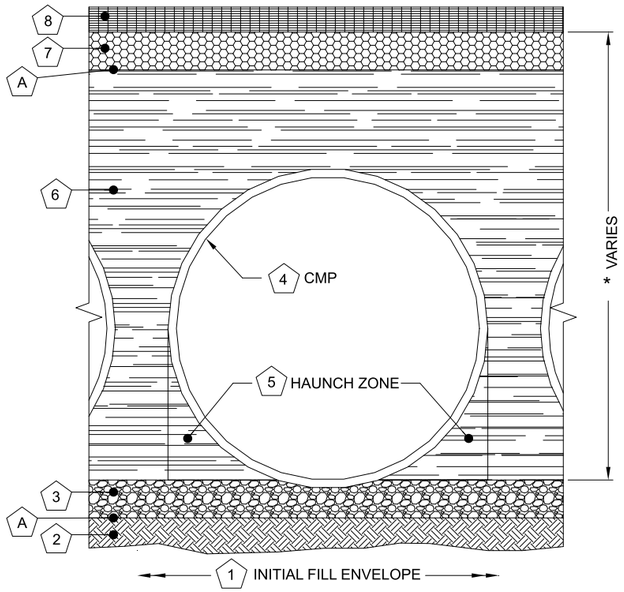
CONTECH ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10821 Rutland LTCP
Pond 13P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10821	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D1		

C:\EXPORTS\TEMPLATES\CMP_V5.DWG 10/18/2019 10:02 AM



DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
Material Location	Description	Material Designation	Designation
8 Rigid or Flexible Pavement (if applicable)			
7 Road Base (if applicable)			
A Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6 Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3 Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
* *Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

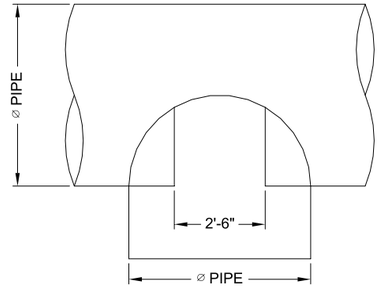
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

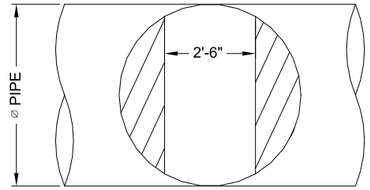
BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



PLAN

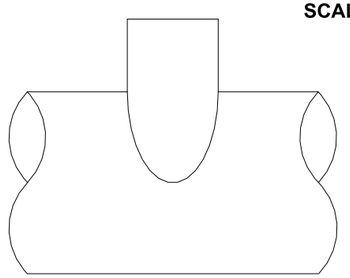


FRONT

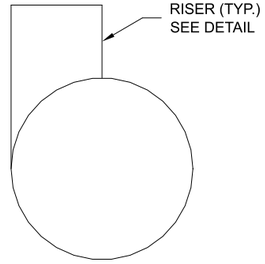
NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



ELEVATION

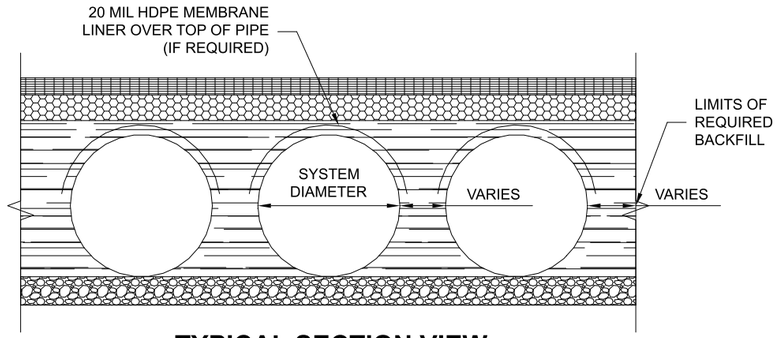


END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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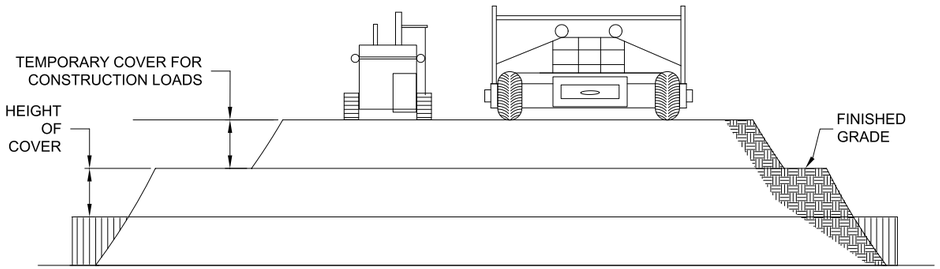
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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10821 Rutland LTCP
Pond 13P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10821	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D2		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

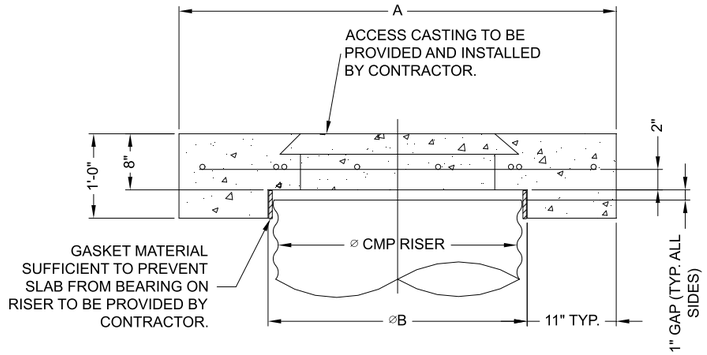
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

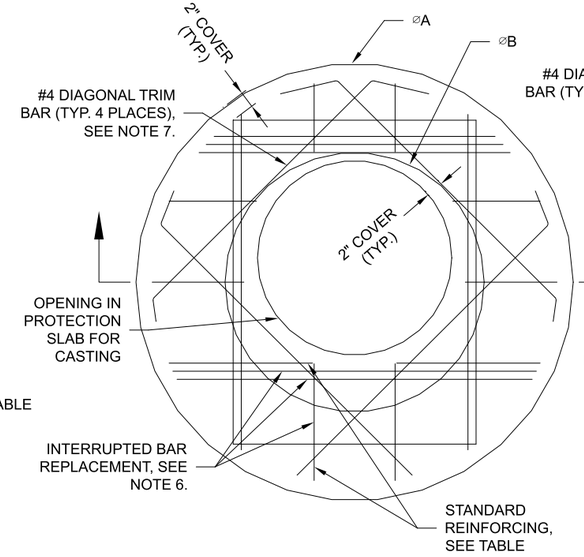
NOTE:
THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.



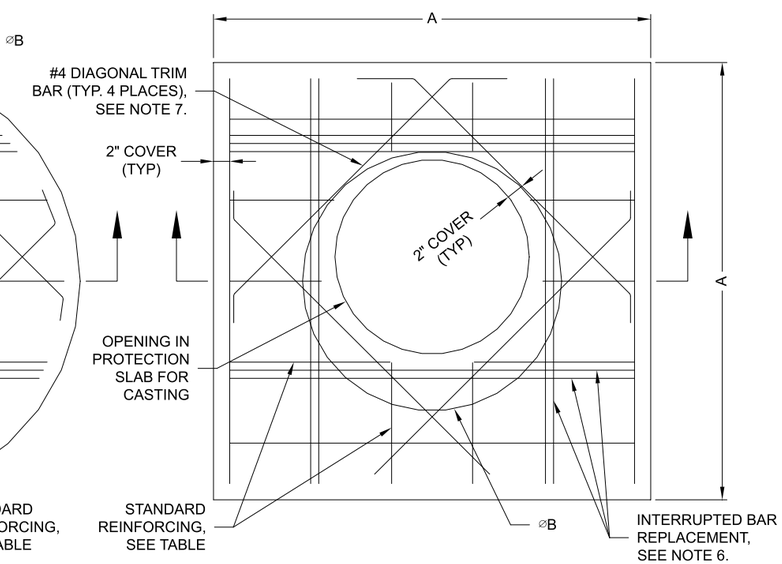
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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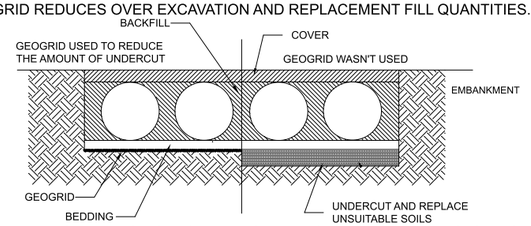
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

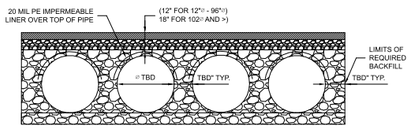


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

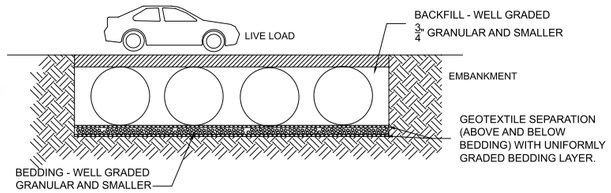
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

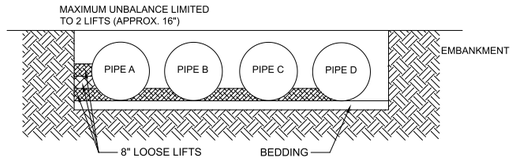
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



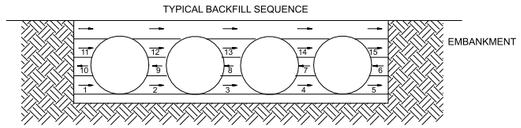
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

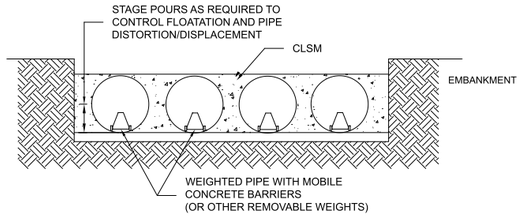


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

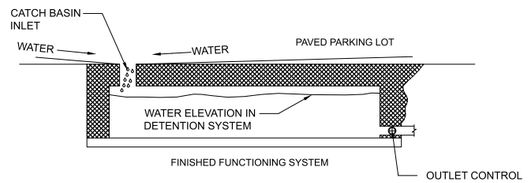


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS

CONTECH **DYODS** DRAWING

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Pond 13P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
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SHEET NO.: D4		

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Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Rotary Park Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 143,350	$ 143,000
	Bonds and Insurance (8%)	L.S.	1	$ 229,360	$ 229,000
	General Conditions (5%)	L.S.	1	$ 143,350	$ 143,000
				General	**$515,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	4800	$ 400	$ 1,920,000
	New Drain Manhole	Ea.	9	$ 11,000	$ 99,000
	New Deep Sump Catch Basin	Ea.	14	$ 10,000	$ 140,000
	Connect Combined CB to New Storm Drain	L.F.	280	$ 200	$ 56,000
	Replace Sewer Service	Ea.	13	$ 4,000	$ 52,000
	Replace Water Service	Ea.	13	$ 4,000	$ 52,000
	Storm Drain Headwall	Ea.	2	$ 15,500	$ 31,000
	Storm Drain Outfall	Ea.	2	$ 15,500	$ 31,000
	Stormwater Quality Treatment Device	Ea.	1	$ 18,500	$ 19,000
	Treatment Device Installation	L.S.	1	$ 4,625	$ 5,000
	Stormwater Detention Device	Ea.	1	$ 175,000	$ 175,000
	Structural Backfill for Stormwater Detention	C.Y.	1110	$ 50	$ 56,000
	Topsoil, Seed & Mulch	S.F.	45000	$ 0.80	$ 36,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	356	$ 225	$ 80,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	71	$ 80	$ 6,000
	Hazardous Soils Removal & Disposal	C.Y.	153	$ 165	$ 25,000
	Traffic Control Signage	L.S.	1	$ 15,000	$ 15,000
	Flaggers	Hrs.	1500	$ 36.00	$ 54,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$2,867,000**
				Construction Subtotal	**$3,390,000**
				Contingency (30%)	$1,251,000
				Engineering Fees	$780,000
				Other Administrative Costs (0.5%)	$169,500
				TOTAL OPINION OF PROJECT COST	**$5,600,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX P

Thrall Avenue

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

BELMONT AV

BELMONT AV EXT

LN

AFFORD

JEFFERSON ST

THOMAS ST

DIVISION ST

CLEMATIS AV

PARK CT

CLARK ST

JEFFORDS ST

THRALL AV

NORTH ST EXT

MERRICK ST

ROSEMARY AV

700

710

690

Area of Combined Sewershed Removed : 9.08 Acres

Connect existing catch basin to new storm drain (typ)

Install 28" x 20" arch culvert

MAP 4
PROJECT AREA :
Thrall Avenue

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN

October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

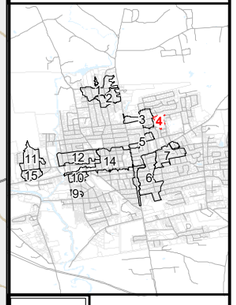
- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 50 100

Weston & Sampson



4

MAP SHEET 4 of 15

Summary for Subcatchment 4S: Thrall Ave

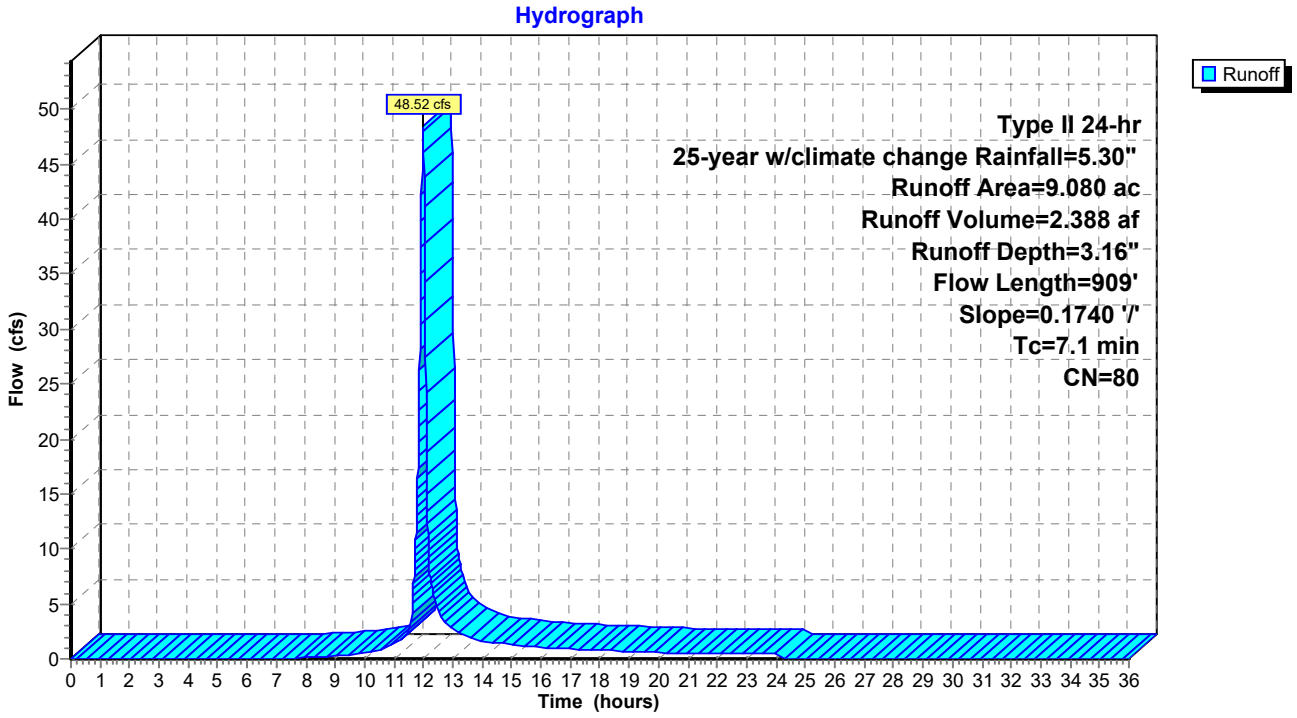
Runoff = 48.52 cfs @ 11.98 hrs, Volume= 2.388 af, Depth= 3.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
9.080	80	1/2 acre lots, 25% imp, HSG C
6.810		75.00% Pervious Area
2.270		25.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	909	0.1740	2.15		**Lag/CN Method,**

Subcatchment 4S: Thrall Ave



Summary for Pond 22P: discharge culvert

[58] Hint: Peaked 1.58' above defined flood level

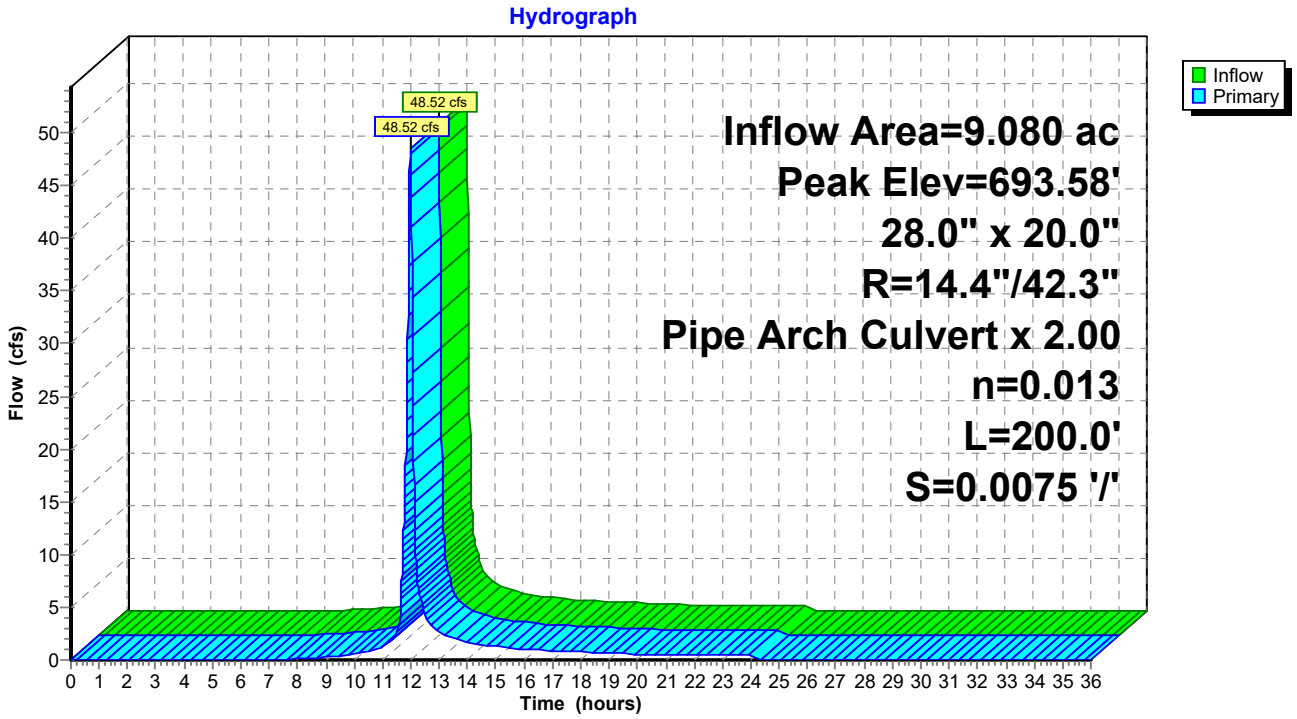
Inflow Area = 9.080 ac, 25.00% Impervious, Inflow Depth = 3.16" for 25-year w/climate change event
Inflow = 48.52 cfs @ 11.98 hrs, Volume= 2.388 af
Outflow = 48.52 cfs @ 11.98 hrs, Volume= 2.388 af, Atten= 0%, Lag= 0.0 min
Primary = 48.52 cfs @ 11.98 hrs, Volume= 2.388 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 693.58' @ 11.98 hrs
Flood Elev= 692.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	689.50'	**28.0" W x 20.0" H, R=14.4"/42.3" Pipe Arch CMP_Arch_1/2 28x20 X 2.00** L= 200.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 689.50' / 688.00' S= 0.0075 '/' Cc= 0.900 n= 0.013, Flow Area= 3.10 sf

Primary OutFlow Max=48.43 cfs @ 11.98 hrs HW=693.56' (Free Discharge)
↑—**1=CMP_Arch_1/2 28x20** (Barrel Controls 48.43 cfs @ 7.82 fps)

Pond 22P: discharge culvert



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Thrall Avenue Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 121,300	$ 121,000
	Bonds and Insurance (8%)	L.S.	1	$ 194,080	$ 194,000
	General Conditions (5%)	L.S.	1	$ 121,300	$ 121,000
				General	**$436,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	500	$ 400	$ 200,000
	New Box Culvert	L.F.	750	$ 2,700	$ 2,025,000
	New Drain Manhole	Ea.	4	$ 11,000	$ 44,000
	New Deep Sump Catch Basin	Ea.	6	$ 10,000	$ 60,000
	Connect Combined CB to New Storm Drain	L.F.	120	$ 200	$ 24,000
	Replace Sewer Service	Ea.	5	$ 4,000	$ 20,000
	Replace Water Service	Ea.	5	$ 4,000	$ 20,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	37	$ 225	$ 8,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	7	$ 80	$ 1,000
	Traffic Control Signage	L.S.	1	$ 2,000	$ 2,000
	Flaggers	Hrs.	200	$ 36.00	$ 7,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$2,426,000**
				Construction Subtotal	**$2,870,000**
				Contingency (30%)	$1,059,000
				Engineering Fees	$660,000
				Other Administrative Costs (0.5%)	$143,500
				TOTAL OPINION OF PROJECT COST	**$4,740,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX Q

Temple Street

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Area of Combined Sewershed Removed : 14.83 Acres

Connect to existing storm drain

Proposed 42" storm drain

Connect existing catch basin to new storm drain (typ)

CLINTON AV
NEWTON ST
STAFFORD LN
HIGHLAND AV
DAVIS ST
KINGSLEY AV
N MAIN ST
ROBERTS AV
TEMPLE ST
BELLEVUE AV
LINCOLN AV
KENDALL AV
NICHOLS ST
IVES AV
LITCHFIELD AV
DEER ST
BURNHAM AV
MERRILL ST

MAP 5
PROJECT AREA : Temple Street
CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 87.5 175

Weston & Sampson

5

N

MAP SHEET 5 of 15

Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Temple St Runoff Area=14.830 ac 38.00% Impervious Runoff Depth=0.13"
Flow Length=2,265' Slope=0.0229 '/' Tc=36.7 min CN=83 Runoff=0.91 cfs 0.163 af

Pond 19P: NW Neighborhood Peak Elev=569.50' Inflow=0.91 cfs 0.163 af
18.0" Round Culvert x 2.00 n=0.013 L=81.0' S=0.0099 '/' Outflow=0.91 cfs 0.163 af

Summary for Subcatchment 5S: Temple St

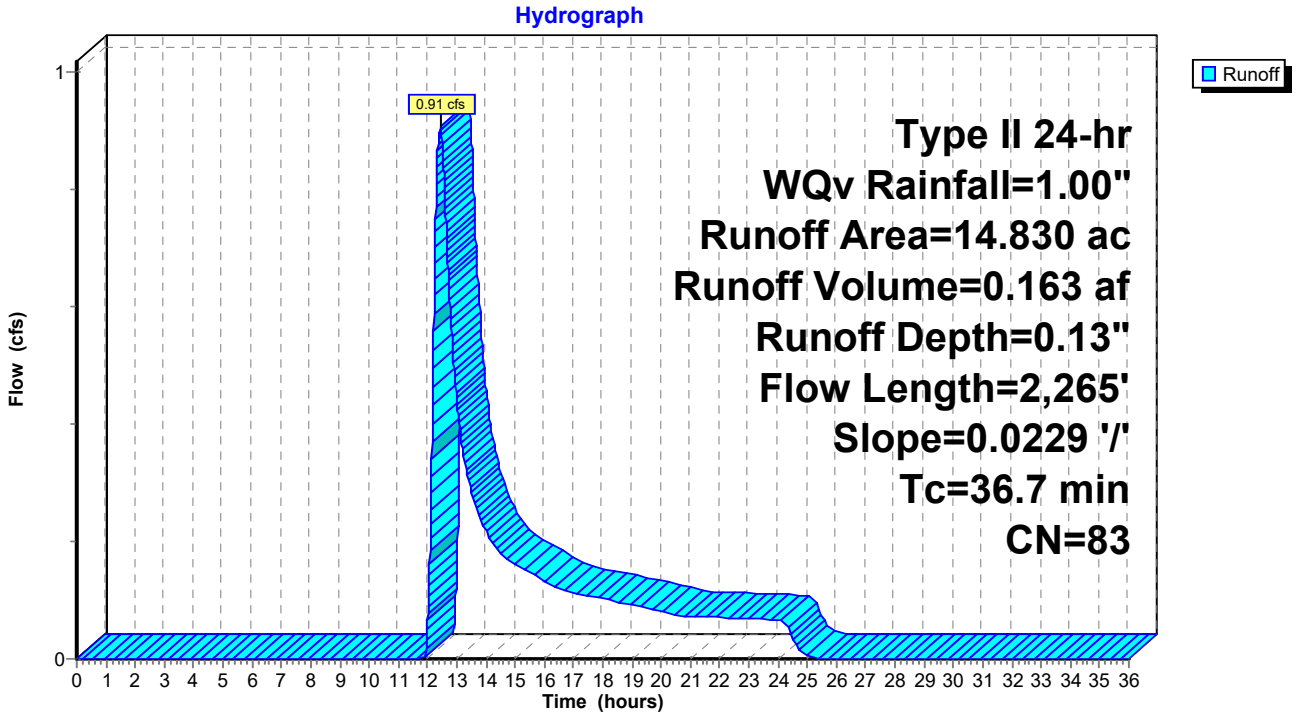
Runoff = 0.91 cfs @ 12.44 hrs, Volume= 0.163 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
14.830	83	1/4 acre lots, 38% imp, HSG C
9.195		62.00% Pervious Area
5.635		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.7	2,265	0.0229	1.03		**Lag/CN Method,**

Subcatchment 5S: Temple St



Summary for Pond 19P: NW Neighborhood

elevations taken from NW Neighborhood record drawings

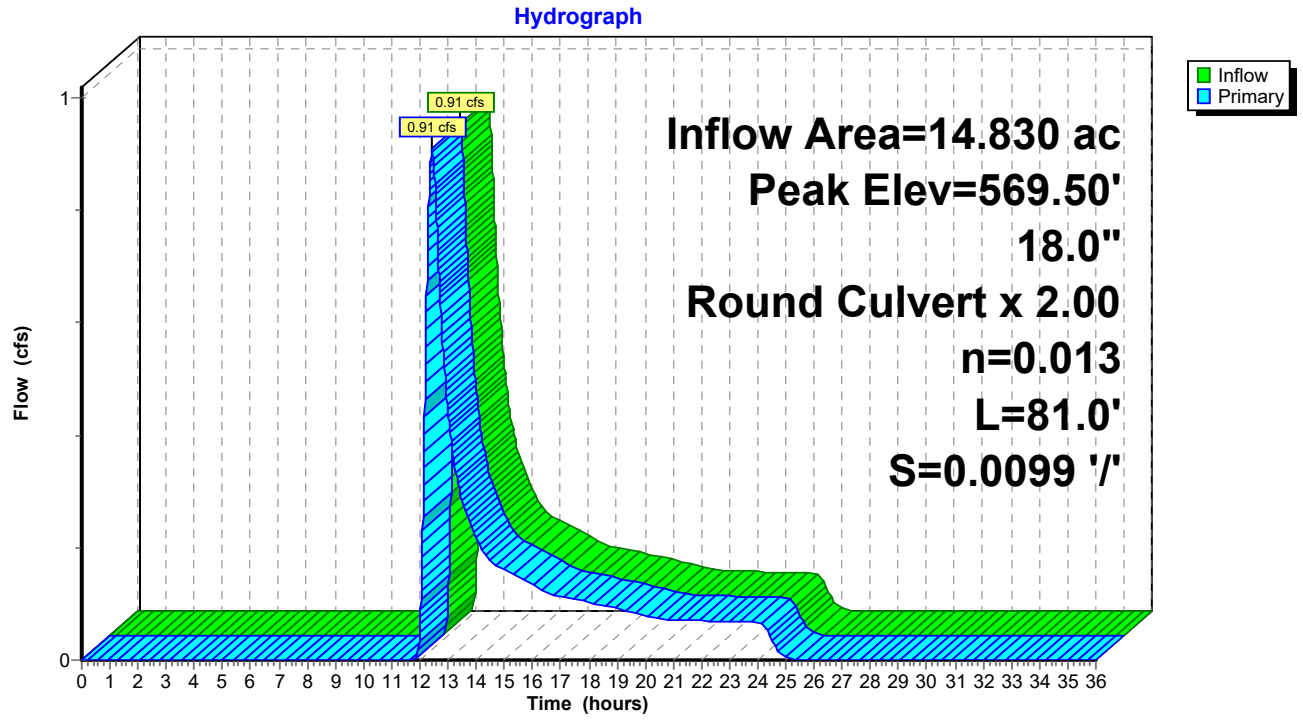
Inflow Area = 14.830 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 0.91 cfs @ 12.44 hrs, Volume= 0.163 af
Outflow = 0.91 cfs @ 12.44 hrs, Volume= 0.163 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.44 hrs, Volume= 0.163 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 569.50' @ 12.44 hrs
Flood Elev= 573.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	569.20'	**18.0" Round Culvert X 2.00** L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.20' / 568.40' S= 0.0099 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.91 cfs @ 12.44 hrs HW=569.50' (Free Discharge)
1=Culvert (Inlet Controls 0.91 cfs @ 1.85 fps)

Pond 19P: NW Neighborhood



Time span=0.00-36.00 hrs, dt=0.01 hrs, 3601 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 5S: Temple St Runoff Area=14.830 ac 38.00% Impervious Runoff Depth=3.45"
Flow Length=2,265' Slope=0.0229 '/' Tc=36.7 min CN=83 Runoff=38.74 cfs 4.260 af

Pond 19P: NW Neighborhood Peak Elev=575.46' Inflow=38.74 cfs 4.260 af
18.0" Round Culvert x 2.00 n=0.013 L=81.0' S=0.0099 '/' Outflow=38.74 cfs 4.260 af

Summary for Subcatchment 5S: Temple St

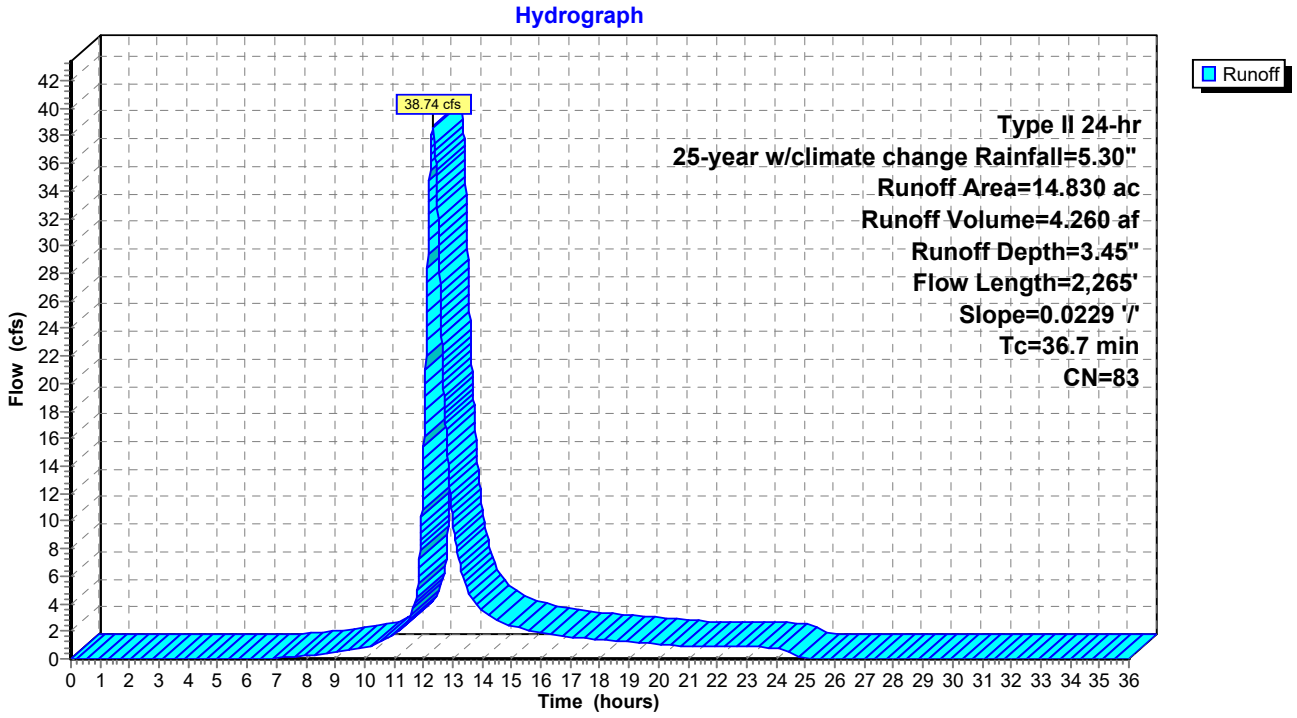
Runoff = 38.74 cfs @ 12.32 hrs, Volume= 4.260 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
14.830	83	1/4 acre lots, 38% imp, HSG C
9.195		62.00% Pervious Area
5.635		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.7	2,265	0.0229	1.03		**Lag/CN Method,**

Subcatchment 5S: Temple St



Summary for Pond 19P: NW Neighborhood

elevations taken from NW Neighborhood record drawings

[58] Hint: Peaked 1.56' above defined flood level

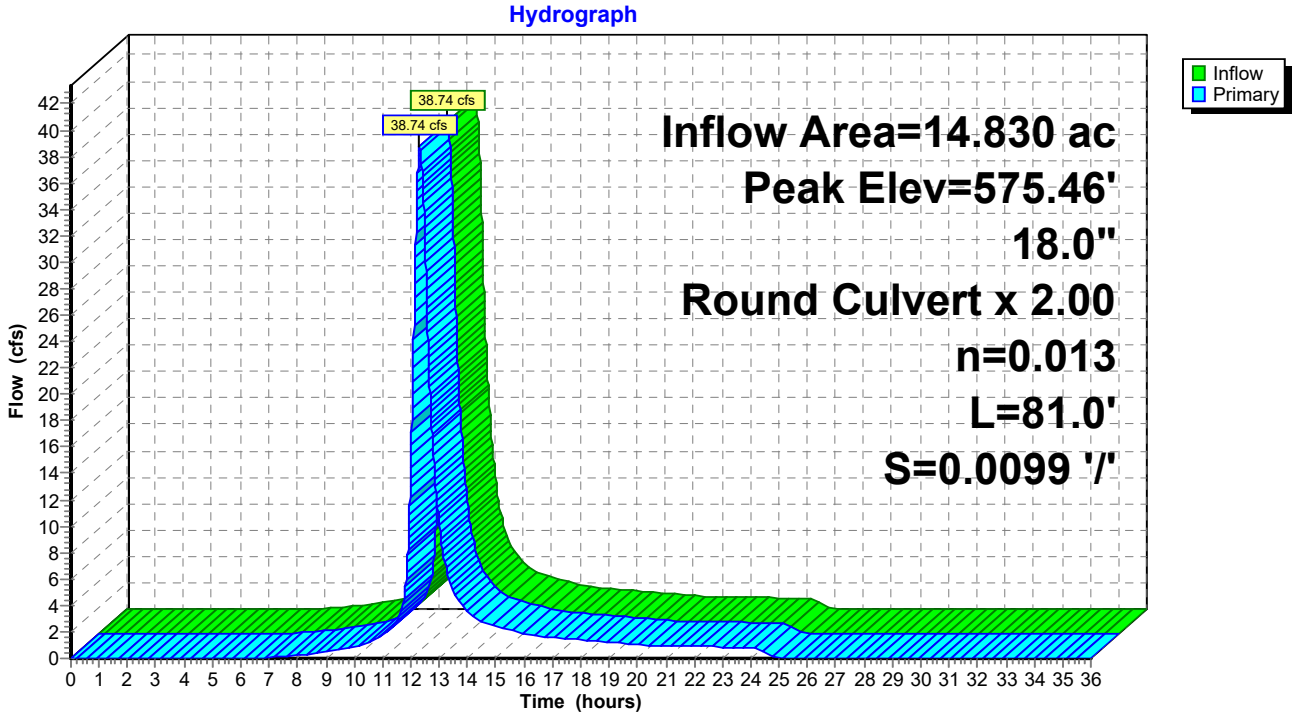
Inflow Area = 14.830 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 38.74 cfs @ 12.32 hrs, Volume= 4.260 af
Outflow = 38.74 cfs @ 12.32 hrs, Volume= 4.260 af, Atten= 0%, Lag= 0.0 min
Primary = 38.74 cfs @ 12.32 hrs, Volume= 4.260 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 575.46' @ 12.32 hrs
Flood Elev= 573.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	569.20'	**18.0" Round Culvert X 2.00** L= 81.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 569.20' / 568.40' S= 0.0099 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

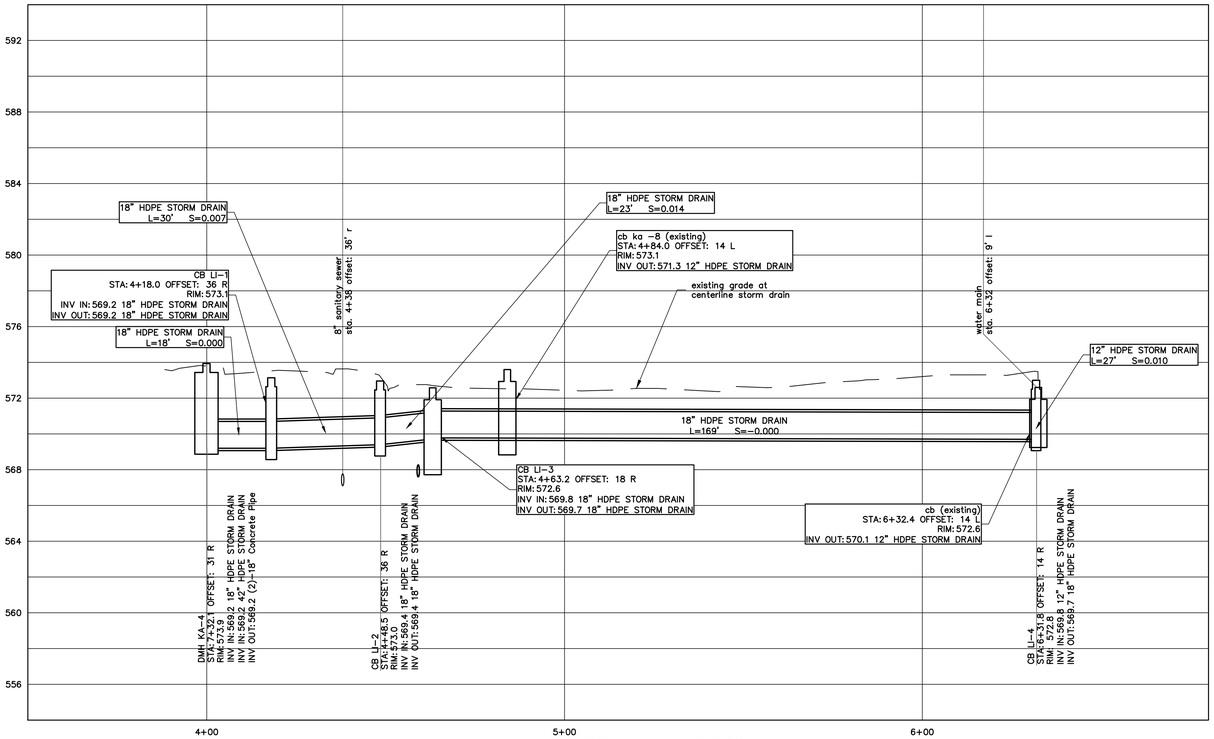
Primary OutFlow Max=38.73 cfs @ 12.32 hrs HW=575.46' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 38.73 cfs @ 10.96 fps)

Pond 19P: NW Neighborhood



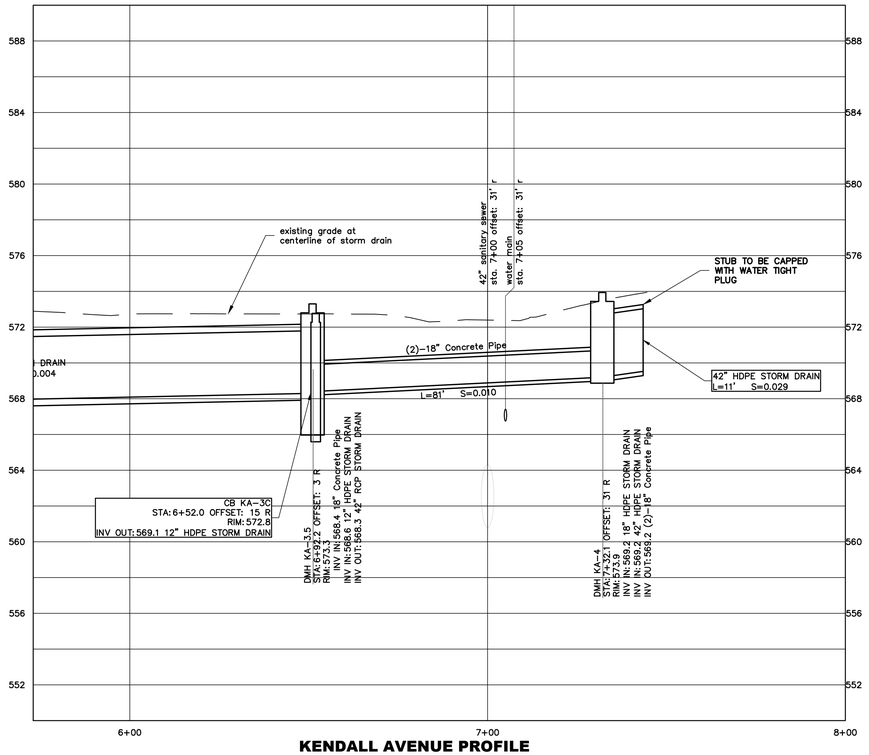
RECORD DRAWING

Record drawings have been prepared on the basis of information furnished by others. The engineer is not responsible for errors or omissions which have been incorporated into this document as a result. The location of items shown without labeled dimensions shall be considered as approximate. Profiles show general layout. Due to changes during construction, alignment, station and elevation information may not be correct. The site was not re-surveyed after construction, so "as-built" locations, elevations and finish grades are approximate and shall be considered "schematic". Details and cross sections may not reflect "as built" conditions.
Prepared by : Otter Creek Engineering, Inc., East Middlebury, Vermont.



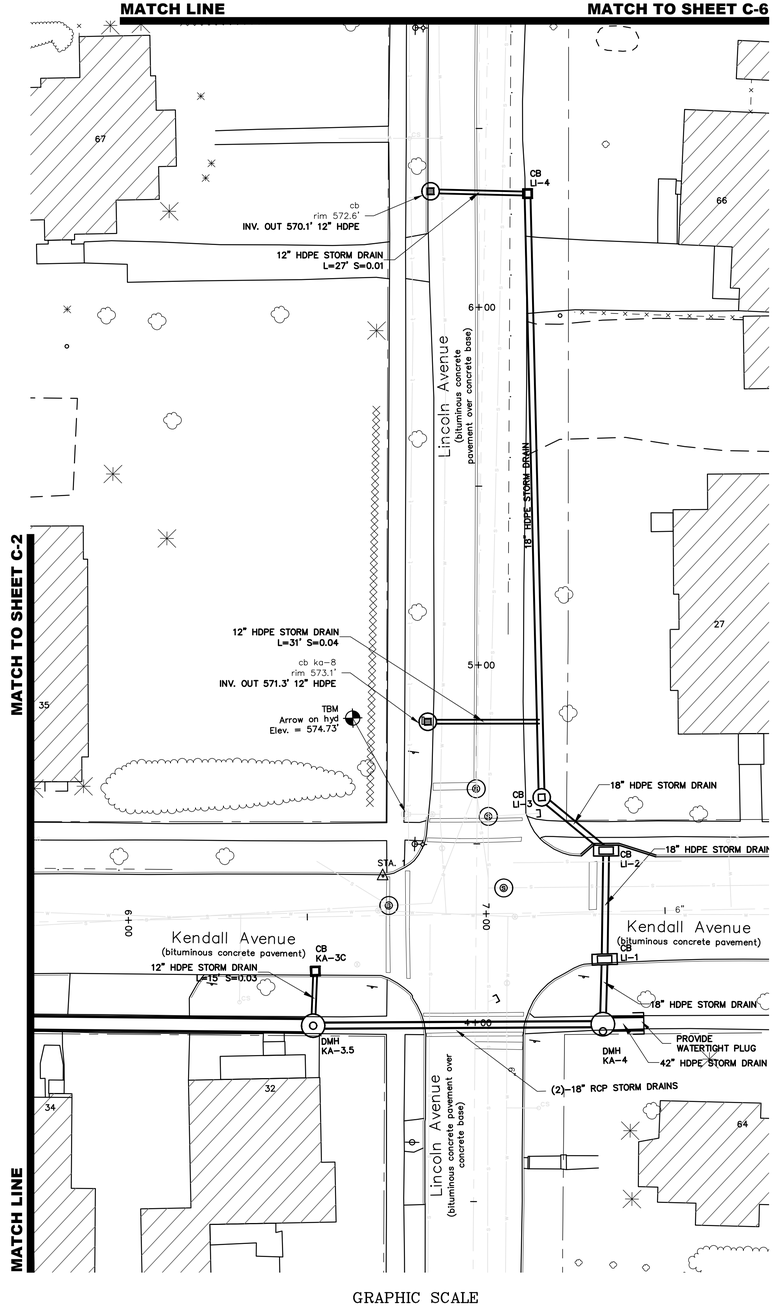
LINCOLN AVENUE PROFILE

SCALE: 1"=20' HORIZONTAL
1"=4' VERTICAL



KENDALL AVENUE PROFILE

SCALE: 1"=20' HORIZONTAL
1"=4' VERTICAL



GRAPHIC SCALE

20 0 10 20 40 80
(IN FEET)
1 inch = 20 ft.

OTTER CREEK ENGINEERING

404 East Main Street
P.O. Box 712
East Middlebury, VT 05740
Telephone: 802 382-8522
Fax: 802 382-8640

110 Merchants Row
4th Floor, Suite 15
Rutland, VT 05701
Telephone: 802 747-3080
Fax: 802 747-4820

E-mail: info@ottercrk.com

STAMP AND SIGNATURE:

STATE OF VERMONT · CRAIG JEWELL · NO. 027.0006 · LICENSED · PROFESSIONAL ENGINEER

DESIGN ENGINEER

THESE DRAWINGS SHALL NOT BE ALTERED IN ANY WAY WITHOUT THE WRITTEN APPROVAL OF THE ENGINEER. ANY REVISIONS SHALL BE MADE BY THE ENGINEER AND NOTED IN THE REVISION BLOCK. © 2021

OTTER CREEK ENGINEERING, INC.

GRID NORTH

CITY OF RUTLAND
NORTHWEST NEIGHBORHOOD SEWER SEPARATION PHASE 1A
RUTLAND CITY, VERMONT

RECORD

DATE ISSUED:	4/5/2021
REVISIONS:	
DRAWN BY:	JL/HB
CHECKED BY:	CJ
SCALE:	1" = 20'
PROJECT NO.:	372.022
CADD FILE:	372-012

TITLE:
KENDALL AVENUE & LINCOLN AVENUE PLAN AND STORM DRAIN PROFILE

DRAWING NO.
C-3

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Temple Street Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 69,200	$ 69,000
	Bonds and Insurance (8%)	L.S.	1	$ 110,720	$ 111,000
	General Conditions (5%)	L.S.	1	$ 69,200	$ 69,000
				General	**$249,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	2445	$ 400	$ 978,000
	New Drain Manhole	Ea.	6	$ 11,000	$ 66,000
	New Deep Sump Catch Basin	Ea.	10	$ 10,000	$ 100,000
	Connect Combined CB to New Storm Drain	L.F.	200	$ 200	$ 40,000
	Replace Sewer Service	Ea.	13	$ 4,000	$ 52,000
	Replace Water Service	Ea.	13	$ 4,000	$ 52,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	181	$ 225	$ 41,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	36	$ 80	$ 3,000
	Traffic Control Signage	L.S.	1	$ 8,000	$ 8,000
	Flaggers	Hrs.	800	$ 36.00	$ 29,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$1,384,000**
				Construction Subtotal	**$1,640,000**
				Contingency (30%)	$605,000
				Engineering Fees	$377,000
				Other Administrative Costs (0.5%)	$82,000
				TOTAL OPINION OF PROJECT COST	**$2,710,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX R

East Street

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Connect existing catch basin to new storm drain (typ)

Area of Combined Sewershed Removed : 79.14 Acres

Proposed diversion manhole

Proposed 48" storm drain

Proposed swirl concentrator

Proposed subsurface stormwater detention system

MORSE PL
PARK DR
WASHINGTON ST
CENTER ST
SQ
COURT
MANSFIELD PL
SHELDON PL
NORTON PL
WOODSTOCK AV
LEVUE AV
ROYCE ST
ON ST
S MAIN ST
HOPKINS ST
CLOVER ST
SPELLMAN TERR
E CENTER ST
EAST ST
EDGERTON ST
TERRILL ST
E CENTER ST
LAFAYETTE ST
BIRCHWOOD AV
CHARLES ST
EASTERLY AV
WALLACE AV
HOWARD AV
TAFT AV
SARGENT AV
AVENUE A
AVENUE B
AVENUE C
AVENUE D
KILLINGTON AV
JACKSON AV
ENGREM AV
E WASHINGTON ST
BUTTERFLY AV
RONALDO CT
BILLINGS DR
PIEDMONT AV
LYMAN AV
RY LN

MAP 6
PROJECT AREA : East Street
CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

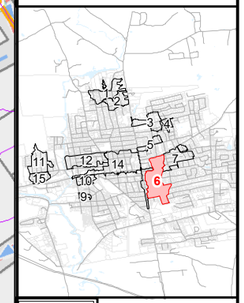
- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

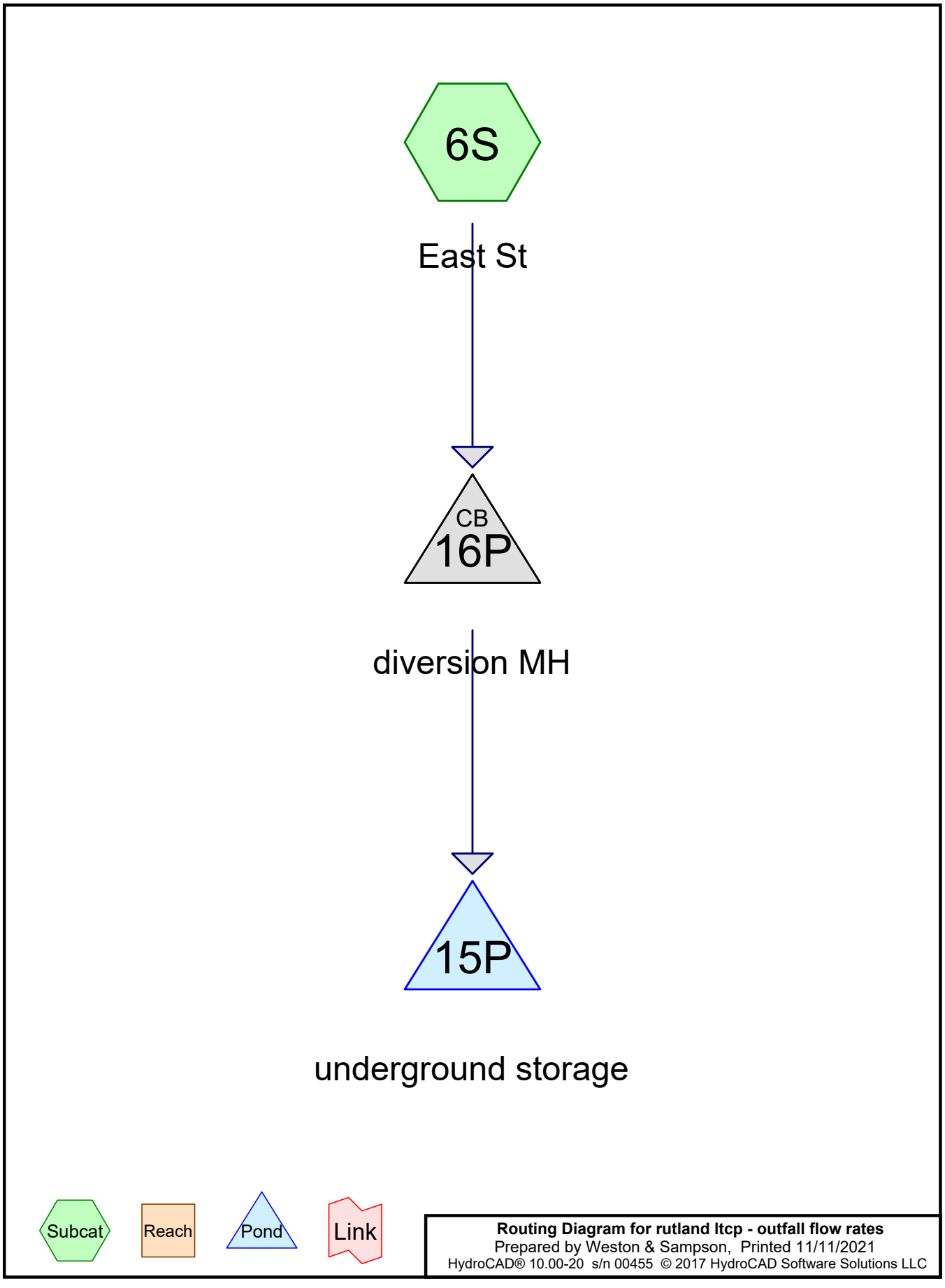
Feet
0 150 300

Weston & Sampson



6

MAP SHEET 6 of 15


6S
East St
CB
16P
diversion MH
15P
underground storage
Subcat
Reach
Pond
Link
Routing Diagram for rutland ltcp - outfall flow rates
Prepared by Weston & Sampson, Printed 11/11/2021
HydroCAD® 10.00-20 s/n 00455 © 2017 HydroCAD Software Solutions LLC

Summary for Subcatchment 6S: East St

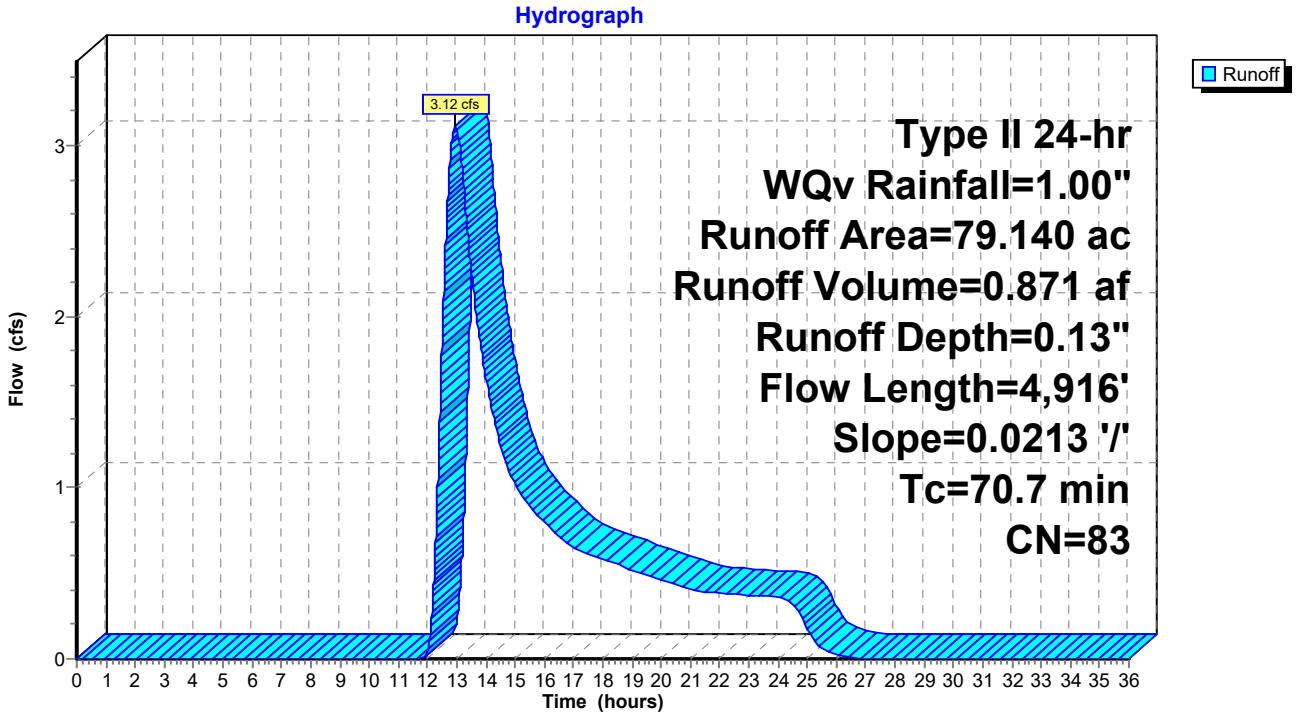
Runoff = 3.12 cfs @ 12.96 hrs, Volume= 0.871 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
79.140	83	1/4 acre lots, 38% imp, HSG C
49.067		62.00% Pervious Area
30.073		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
70.7	4,916	0.0213	1.16		**Lag/CN Method,**

Subcatchment 6S: East St



Summary for Pond 15P: underground storage

Inflow Area = 79.140 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 3.12 cfs @ 12.96 hrs, Volume= 0.871 af
Outflow = 1.36 cfs @ 14.33 hrs, Volume= 0.837 af, Atten= 56%, Lag= 82.0 min
Primary = 1.36 cfs @ 14.33 hrs, Volume= 0.837 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 545.53' @ 14.33 hrs Surf.Area= 0.473 ac Storage= 0.249 af

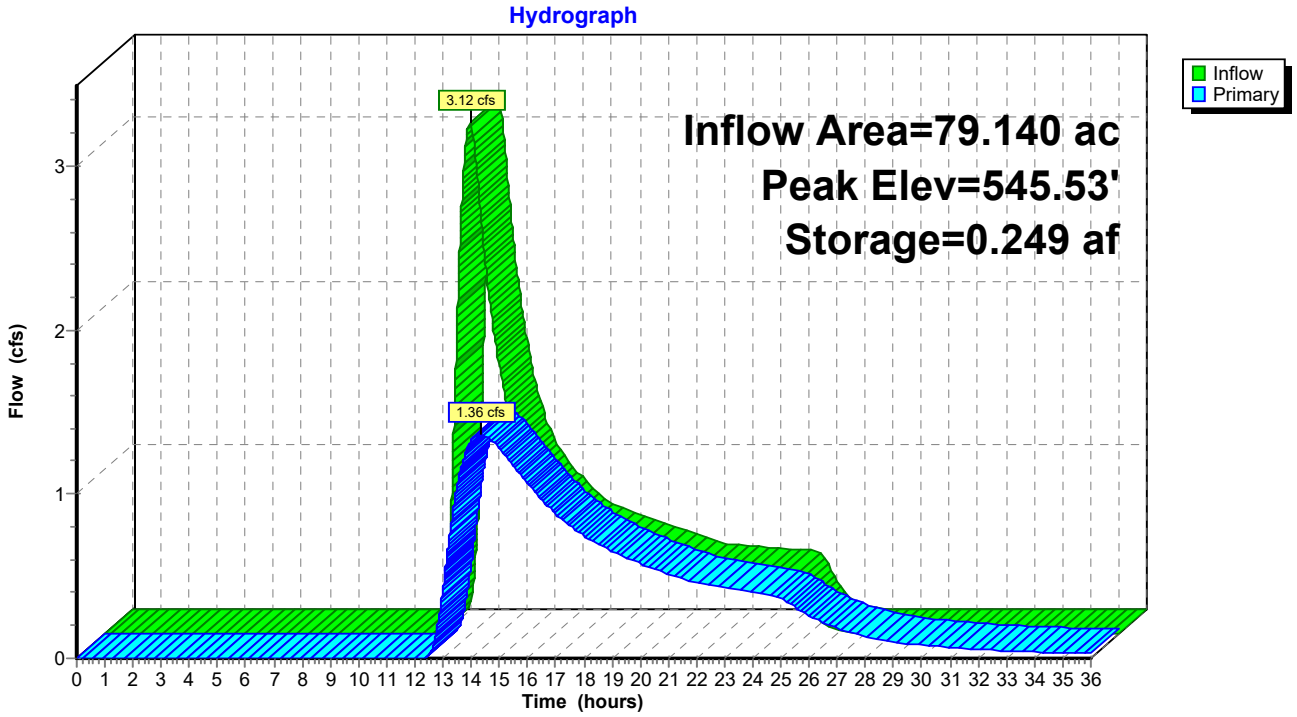
Plug-Flow detention time= 176.0 min calculated for 0.837 af (96% of inflow)
Center-of-Mass det. time= 155.8 min (1,132.5 - 976.7)

Volume	Invert	Avail.Storage	Storage Description
#1	545.00'	1.894 af	**75.00'W x 275.00'L x 4.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	545.00'	**18.0" Round discharge culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 545.00' / 540.00' S= 0.0307 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	545.00'	**18.0" Vert. control orifice** C= 0.600
#3	Device 1	548.25'	**48.0" W x 6.0" H Vert. overflow weir** C= 0.600

Primary OutFlow Max=1.36 cfs @ 14.33 hrs HW=545.53' (Free Discharge)
└**1=discharge culvert** (Controls 1.36 cfs)
└**2=control orifice** (Orifice Controls 1.36 cfs @ 2.47 fps)
└**3=overflow weir** (Controls 0.00 cfs)

Pond 15P: underground storage



Summary for Pond 16P: diversion MH

Inflow Area = 79.140 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 3.12 cfs @ 12.96 hrs, Volume= 0.871 af
Outflow = 3.12 cfs @ 12.96 hrs, Volume= 0.871 af, Atten= 0%, Lag= 0.0 min
Primary = 3.12 cfs @ 12.96 hrs, Volume= 0.871 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

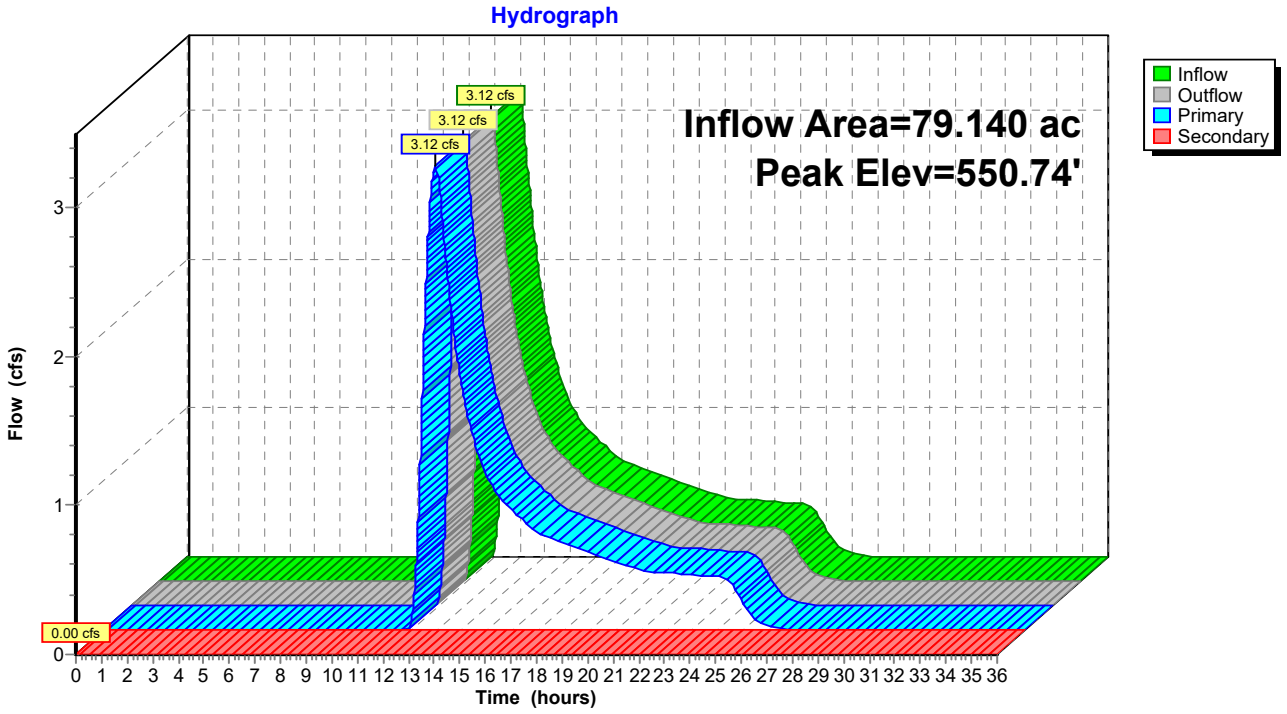
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 550.74' @ 12.96 hrs
Flood Elev= 560.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	550.00'	**24.0" Round to treatment** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 550.00' / 545.00' S= 0.2500 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	554.50'	**48.0" Round overflow** L= 280.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 554.50' / 542.00' S= 0.0446 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf

Primary OutFlow Max=3.12 cfs @ 12.96 hrs HW=550.74' TW=545.27' (Dynamic Tailwater)
└─**1=to treatment** (Inlet Controls 3.12 cfs @ 2.93 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=550.00' (Free Discharge)
└─**2=overflow** (Controls 0.00 cfs)

Pond 16P: diversion MH



Summary for Subcatchment 6S: East St

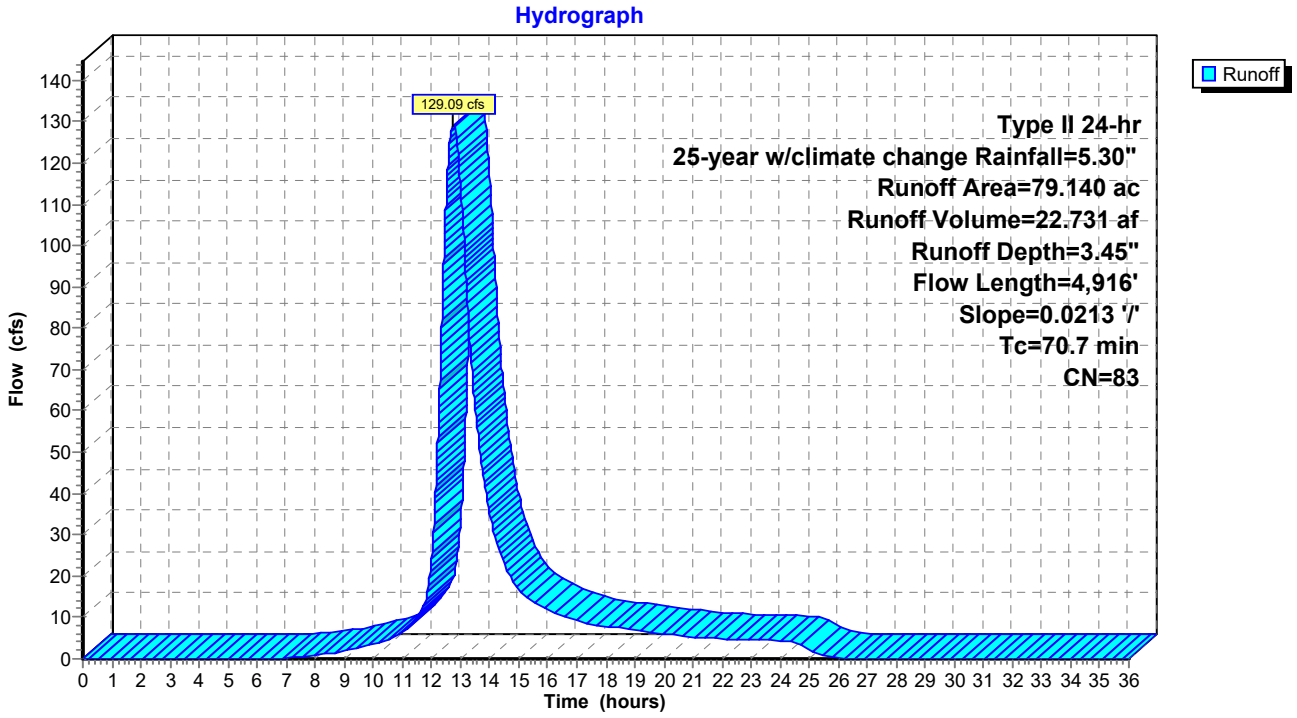
Runoff = 129.09 cfs @ 12.73 hrs, Volume= 22.731 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
79.140	83	1/4 acre lots, 38% imp, HSG C
49.067		62.00% Pervious Area
30.073		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
70.7	4,916	0.0213	1.16		**Lag/CN Method,**

Subcatchment 6S: East St



Summary for Pond 15P: underground storage

[93] Warning: Storage range exceeded by 89.59'
[90] Warning: Qout>Qin may require smaller dt or Finer Routing
[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=24)
[80] Warning: Exceeded Pond 16P by 79.50' @ 12.73 hrs (134.87 cfs 3.751 af)

Inflow Area = 79.140 ac, 38.00% Impervious, Inflow Depth = 2.09" for 25-year w/climate change event
Inflow = 43.04 cfs @ 12.73 hrs, Volume= 13.816 af
Outflow = 66.01 cfs @ 12.73 hrs, Volume= 13.772 af, Atten= 0%, Lag= 0.0 min
Primary = 66.01 cfs @ 12.73 hrs, Volume= 13.772 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 638.59' @ 12.73 hrs Surf.Area= 0.473 ac Storage= 1.894 af

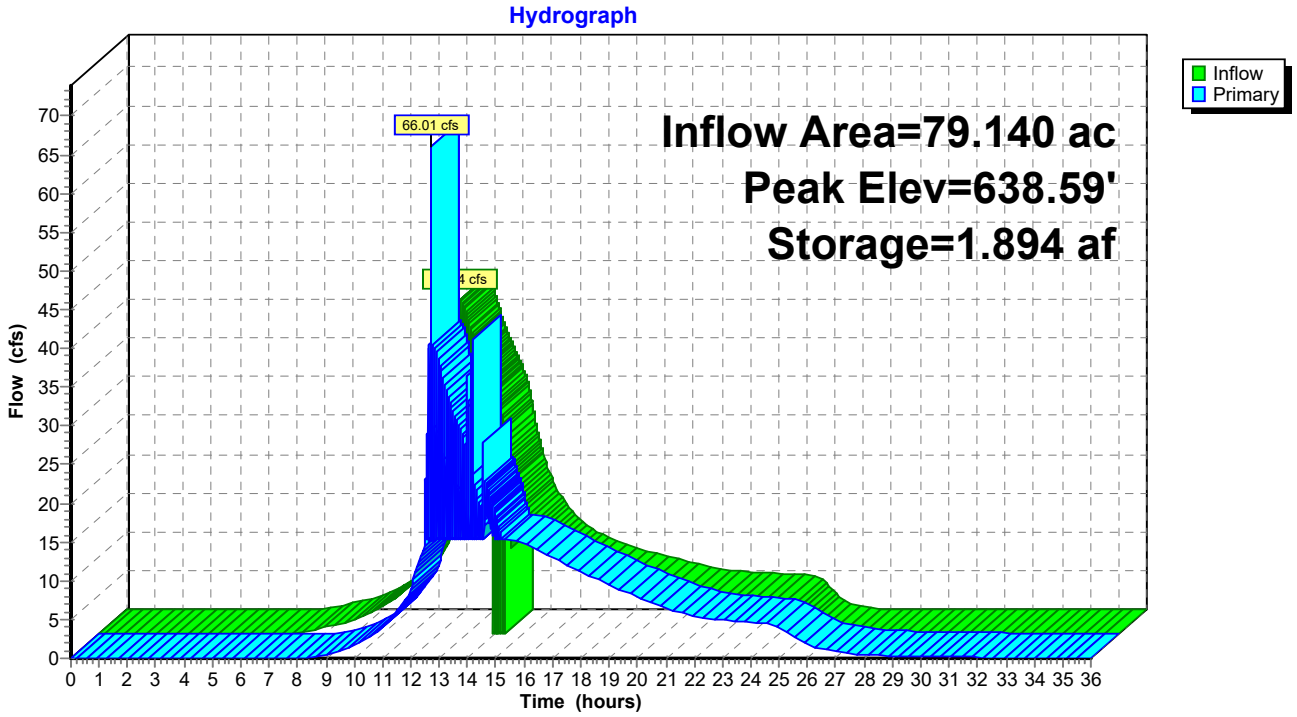
Plug-Flow detention time= 74.3 min calculated for 13.768 af (100% of inflow)
Center-of-Mass det. time= 72.5 min (997.1 - 924.6)

Volume	Invert	Avail.Storage	Storage Description
#1	545.00'	1.894 af	**75.00'W x 275.00'L x 4.00'H Prismatoid**

Device	Routing	Invert	Outlet Devices
#1	Primary	545.00'	**18.0" Round discharge culvert** L= 163.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 545.00' / 540.00' S= 0.0307 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	545.00'	**18.0" Vert. control orifice** C= 0.600
#3	Device 1	548.25'	**48.0" W x 6.0" H Vert. overflow weir** C= 0.600

Primary OutFlow Max=66.00 cfs @ 12.73 hrs HW=638.56' (Free Discharge)
└**1=discharge culvert** (Barrel Controls 66.00 cfs @ 37.35 fps)
  ├**2=control orifice** (Passes < 81.97 cfs potential flow)
  └**3=overflow weir** (Passes < 91.39 cfs potential flow)

Pond 15P: underground storage



Summary for Pond 16P: diversion MH

[58] Hint: Peaked 2.35' above defined flood level

Inflow Area = 79.140 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 129.09 cfs @ 12.73 hrs, Volume= 22.731 af
Outflow = 129.09 cfs @ 12.73 hrs, Volume= 22.731 af, Atten= 0%, Lag= 0.0 min
Primary = 43.04 cfs @ 12.73 hrs, Volume= 13.816 af
Secondary = 129.09 cfs @ 12.74 hrs, Volume= 8.916 af

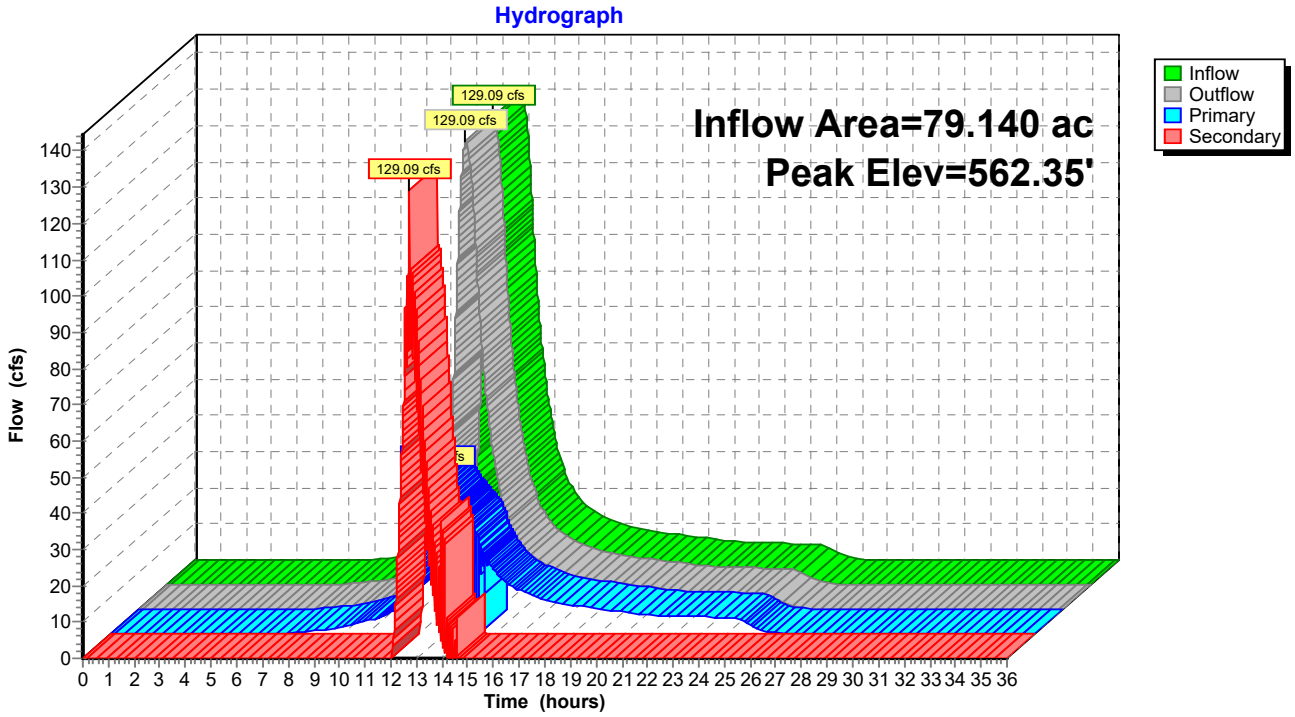
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 562.35' @ 12.74 hrs
Flood Elev= 560.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	550.00'	**24.0" Round to treatment** L= 20.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 550.00' / 545.00' S= 0.2500 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	554.50'	**48.0" Round overflow** L= 280.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 554.50' / 542.00' S= 0.0446 '/' Cc= 0.900 n= 0.013, Flow Area= 12.57 sf

Primary OutFlow Max=0.00 cfs @ 12.73 hrs HW=559.10' TW=638.59' (Dynamic Tailwater)
1=to treatment (Controls 0.00 cfs)

Secondary OutFlow Max=129.09 cfs @ 12.74 hrs HW=562.35' (Free Discharge)
2=overflow (Inlet Controls 129.09 cfs @ 10.27 fps)

Pond 16P: diversion MH



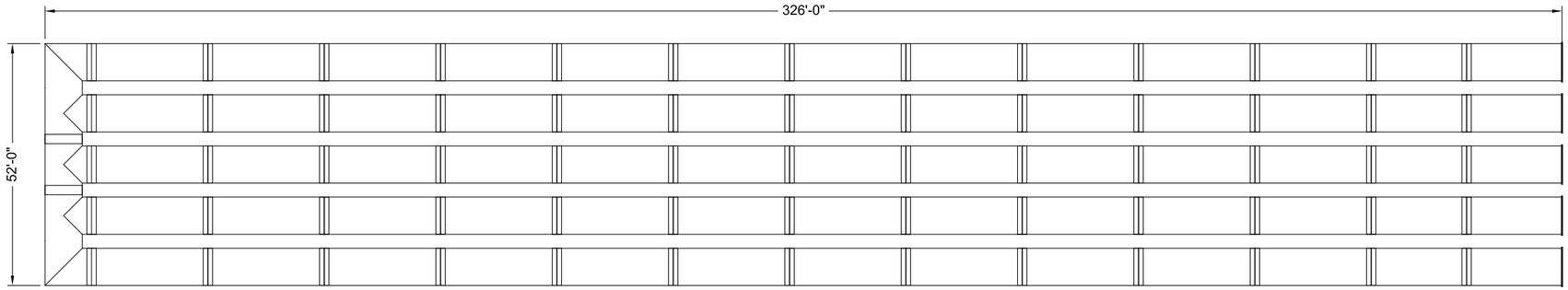
PROJECT SUMMARY

CALCULATION DETAILS
- LOADING = HS20 & HS25
- APPROX. LINEAR FOOTAGE = 1,642 lf.

STORAGE SUMMARY
- STORAGE VOLUME REQUIRED = 82,500 cf.
- PIPE STORAGE VOLUME = 82,536 cf.
- BACKFILL STORAGE VOLUME = 0 cf.
- TOTAL STORAGE PROVIDED = 82,536 cf.

PIPE DETAILS
- DIAMETER = 96 IN.
- CORRUGATION = 5x1
- GAGE = 16
- COATING = ALT2
- WALL TYPE = Solid
- BARRELL SPACING = 36 IN.

BACKFILL DETAILS
- WIDTH AT ENDS = 12 IN.
- ABOVE PIPE = 0 IN.
- WIDTH AT SIDES = 12 IN.
- BELOW PIPE = 0 IN.



NOTES

- ALL RISER AND STUB DIMENSIONS ARE TO CENTERLINE. ALL ELEVATIONS, DIMENSIONS, AND LOCATIONS OF RISERS AND INLETS, SHALL BE VERIFIED BY THE ENGINEER OF RECORD PRIOR TO RELEASING FOR FABRICATION.
- ALL FITTINGS AND REINFORCEMENT COMPLY WITH ASTM A998.
- ALL RISERS AND STUBS ARE $2\frac{2}{3}$" x $\frac{1}{2}$" CORRUGATION AND 16 GAGE UNLESS OTHERWISE NOTED.
- RISERS TO BE FIELD TRIMMED TO GRADE.
- QUANTITY OF PIPE SHOWN DOES NOT PROVIDE EXTRA PIPE FOR CONNECTING THE SYSTEM TO EXISTING PIPE OR DRAINAGE STRUCTURES. OUR SYSTEM AS DETAILED PROVIDES NOMINAL INLET AND/OR OUTLET PIPE STUB FOR CONNECTION TO EXISTING DRAINAGE FACILITIES. IF ADDITIONAL PIPE IS NEEDED IT IS THE RESPONSIBILITY OF THE CONTRACTOR.
- BAND TYPE TO BE DETERMINED UPON FINAL DESIGN.
- THE PROJECT SUMMARY IS REFLECTIVE OF THE DYODS DESIGN, QUANTITIES ARE APPROX. AND SHOULD BE VERIFIED UPON FINAL DESIGN AND APPROVAL. FOR EXAMPLE, TOTAL EXCAVATION DOES NOT CONSIDER ALL VARIABLES SUCH AS SHORING AND ONLY ACCOUNTS FOR MATERIAL WITHIN THE ESTIMATED EXCAVATION FOOTPRINT.
- THESE DRAWINGS ARE FOR CONCEPTUAL PURPOSES AND DO NOT REFLECT ANY LOCAL PREFERENCES OR REGULATIONS. PLEASE CONTACT YOUR LOCAL CONTECH REP FOR MODIFICATIONS.

ASSEMBLY
SCALE: 1" = 30'

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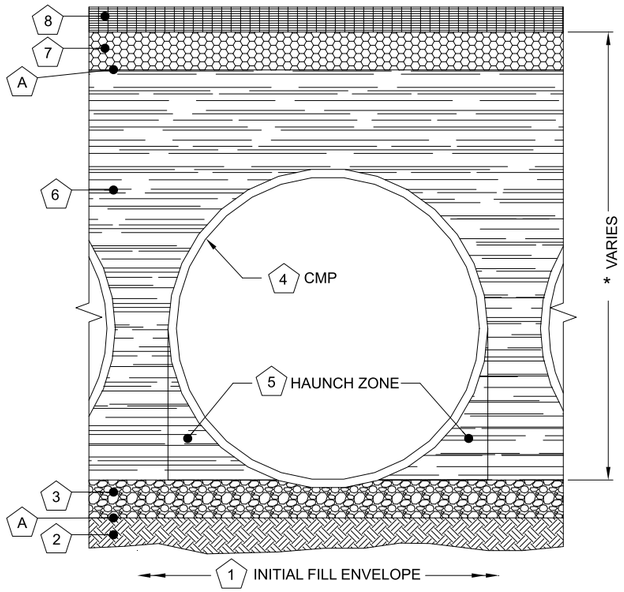
DATE	REVISION DESCRIPTION	BY

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH® CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10822 Rutland LTCP
Pond 15P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10822	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D1		



	DETENTION SYSTEMS - CMP DETENTION / CMP DRAINAGE			
	Material Location	Description	Material Designation	Designation
8	Rigid or Flexible Pavement (if applicable)			
7	Road Base (if applicable)			
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
6	Backfill	Well graded granular material which may contain small amounts of silt or clay.	AASHTO M 145- A-1, A-2, A-3	Placed in 8" +/- loose lifts and compacted to 90% Standard Proctor Per AASHTO T 99
3	Bedding Stone	Well graded granular bedding material w/maximum particle size of 3"	AASHTO M43 - 3,357,4,467, 5, 56, 57	Engineer to determine if bedding is required. Pipe may be placed on the trench bottom of a relatively loose, native suitable well graded & granular material. For Arch pipes it is recommended to be shaped to a relatively flat bottom or fine-grade the foundation to a slight v-shape. Unsuitable material should be over-excavated and re-placed with a 4"-6" layer of well graded & granular stone per the material designation. See AASHTO 26.3.8.1 / 26.5.3 Bedding info.
A	Geotextile Layer	Non-Woven Geotextile	CONTECH C-40 or C-45	Engineer Decision for consideration to prevent soil migration into varying soil types
*	*Note: Backfill using controlled low-strength material (CLSM, "flash fill" or "flowable fill") when the spacing between the pipes will not allow for placement and adequate compaction of the backfill.*			

1 MINIMUM WIDTH DEPENDS ON SITE CONDITIONS AND ENGINEERING JUDGEMENT

FOUNDATION/BEDDING PREPARATION

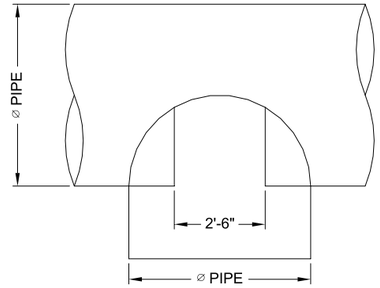
2 PRIOR TO PLACING THE BEDDING, THE FOUNDATION MUST BE CONSTRUCTED TO A UNIFORM AND STABLE GRADE. IN THE EVENT THAT UNSUITABLE FOUNDATION MATERIALS ARE ENCOUNTERED DURING EXCAVATION, THEY SHALL BE REMOVED AND BROUGHT BACK TO THE GRADE WITH A FILL MATERIAL AS APPROVED BY THE ENGINEER.

5 HAUNCH ZONE MATERIAL SHALL BE PLACED AND UNIFORMALLY COMPACTED WITHOUT SOFT SPOTS.

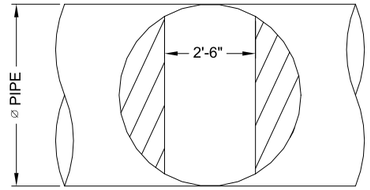
BACKFILL

WHEN PLACING THE FIRST LIFTS OF BACKFILL IT IS IMPORTANT TO MAKE SURE THAT THE BACKFILL IS PROPERLY COMPACTED UNDER AND AROUND THE PIPE HAUNCHES. BACKFILL SHALL BE PLACED SUCH THAT THERE IS NO MORE THAN A TWO LIFT (16") DIFFERENTIAL BETWEEN ANY OF THE PIPES AT ANY TIME DURING THE BACKFILL PROCESS. THE BACKFILL SHALL BE ADVANCED ALONG THE LENGTH OF THE DETENTION SYSTEM AT THE SAME RATE TO AVOID DIFFERENTIAL LOADING ON THE PIPE.

OTHER ALTERNATE BACKFILL MATERIAL MAY BE ALLOWED DEPENDING ON SITE SPECIFIC CONDITIONS, AS APPROVED BY SITE ENGINEER.



PLAN

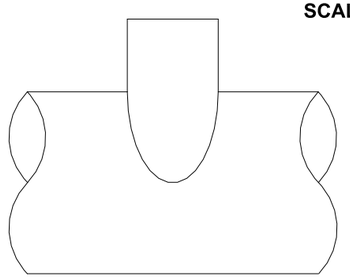


FRONT

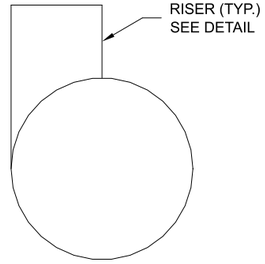
NOTE:
MANWAY DETAIL APPLICABLE FOR CMP SYSTEMS WITH DIAMETERS 48" AND LARGER. MANWAYS MAY BE REQUIRED ON SMALLER SYSTEMS DEPENDING ON ACTUAL SITE SPECIFIC CONDITIONS.

TYPICAL MANWAY DETAIL

SCALE: N.T.S.



ELEVATION

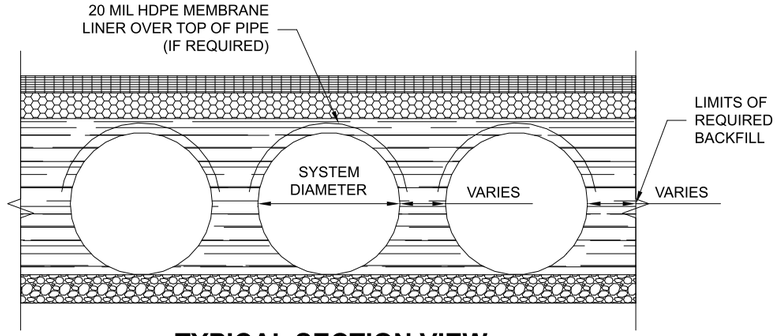


END

NOTE:
LADDERS ARE OPTIONAL AND ARE NOT REQUIRED FOR ALL SYSTEMS.

TYPICAL RISER DETAIL

SCALE: N.T.S.



TYPICAL SECTION VIEW

LINER OVER ROWS
SCALE: N.T.S.

NOTE: IF SALTING AGENTS FOR SNOW AND ICE REMOVAL ARE USED ON OR NEAR THE PROJECT, AN HDPE MEMBRANE LINER IS RECOMMENDED WITH THE SYSTEM. THE IMPERMEABLE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM A CHANGE IN THE SURROUNDING ENVIRONMENT OVER A PERIOD OF TIME. PLEASE REFER TO THE CORRUGATED METAL PIPE DETENTION DESIGN GUIDE FOR ADDITIONAL INFORMATION.

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DATE	REVISION DESCRIPTION	BY

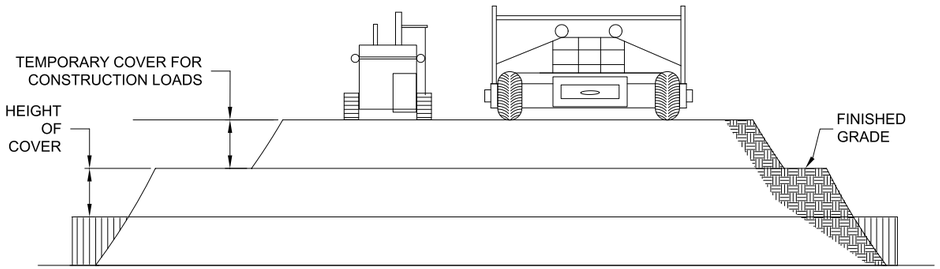
CONTECH ENGINEERED SOLUTIONS LLC
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9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10822 Rutland LTCP
Pond 15P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10822	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D2		

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CONSTRUCTION LOADS

FOR TEMPORARY CONSTRUCTION VEHICLE LOADS, AN EXTRA AMOUNT OF COMPACTED COVER MAY BE REQUIRED OVER THE TOP OF THE PIPE. THE HEIGHT-OF-COVER SHALL MEET THE MINIMUM REQUIREMENTS SHOWN IN THE TABLE BELOW. THE USE OF HEAVY CONSTRUCTION EQUIPMENT NECESSITATES GREATER PROTECTION FOR THE PIPE THAN FINISHED GRADE COVER MINIMUMS FOR NORMAL HIGHWAY TRAFFIC.

PIPE SPAN, INCHES	AXLE LOADS (kips)			
	18-50	50-75	75-110	110-150
	MINIMUM COVER (FT)			
12-42	2.0	2.5	3.0	3.0
48-72	3.0	3.0	3.5	4.0
78-120	3.0	3.5	4.0	4.0
126-144	3.5	4.0	4.5	4.5

*MINIMUM COVER MAY VARY, DEPENDING ON LOCAL CONDITIONS. THE CONTRACTOR MUST PROVIDE THE ADDITIONAL COVER REQUIRED TO AVOID DAMAGE TO THE PIPE. MINIMUM COVER IS MEASURED FROM THE TOP OF THE PIPE TO THE TOP OF THE MAINTAINED CONSTRUCTION ROADWAY SURFACE.

CONSTRUCTION LOADING DIAGRAM

SCALE: N.T.S.

SPECIFICATION FOR DESIGNED DETENTION SYSTEM:

SCOPE
THIS SPECIFICATION COVERS THE MANUFACTURE AND INSTALLATION OF THE DESIGNED DETENTION SYSTEM DETAILED IN THE PROJECT PLANS.

MATERIAL
THE MATERIAL SHALL CONFORM TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2 STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-274 OR ASTM A-92.

THE GALVANIZED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-218 OR ASTM A-929.

THE POLYMER COATED STEEL COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-246 OR ASTM A-742.

THE ALUMINUM COILS SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF AASHTO M-197 OR ASTM B-744.

CONSTRUCTION LOADS
CONSTRUCTION LOADS MAY BE HIGHER THAN FINAL LOADS. FOLLOW THE MANUFACTURER'S OR NCSPA GUIDELINES.

PIPE
THE PIPE SHALL BE MANUFACTURED IN ACCORDANCE TO THE APPLICABLE REQUIREMENTS LISTED BELOW:

ALUMINIZED TYPE 2: AASHTO M-36 OR ASTM A-760

GALVANIZED: AASHTO M-36 OR ASTM A-760

POLYMER COATED: AASHTO M-245 OR ASTM A-762

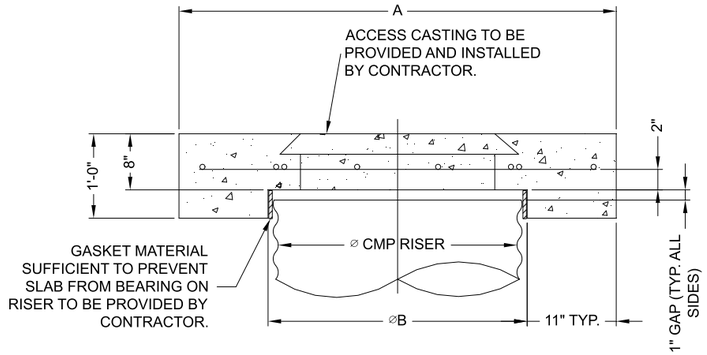
ALUMINUM: AASHTO M-196 OR ASTM B-745

HANDLING AND ASSEMBLY
SHALL BE IN ACCORDANCE WITH NCSP'S (NATIONAL CORRUGATED STEEL PIPE ASSOCIATION) FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL. SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS FOR ALUMINUM PIPE.

INSTALLATION
SHALL BE IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, SECTION 26, DIVISION II DIVISION II OR ASTM A-798 (FOR ALUMINIZED TYPE 2, GALVANIZED OR POLYMER COATED STEEL) OR ASTM B-788 (FOR ALUMINUM PIPE) AND IN CONFORMANCE WITH THE PROJECT PLANS AND SPECIFICATIONS. IF THERE ARE ANY INCONSISTENCIES OR CONFLICTS THE CONTRACTOR SHOULD DISCUSS AND RESOLVE WITH THE SITE ENGINEER.

IT IS ALWAYS THE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW OSHA GUIDELINES FOR SAFE PRACTICES.

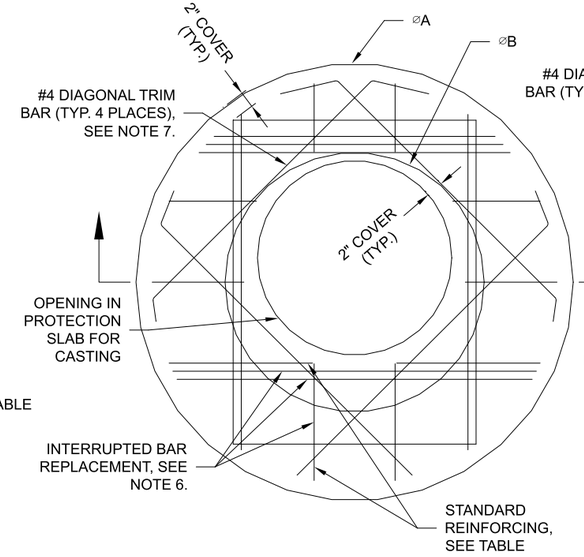
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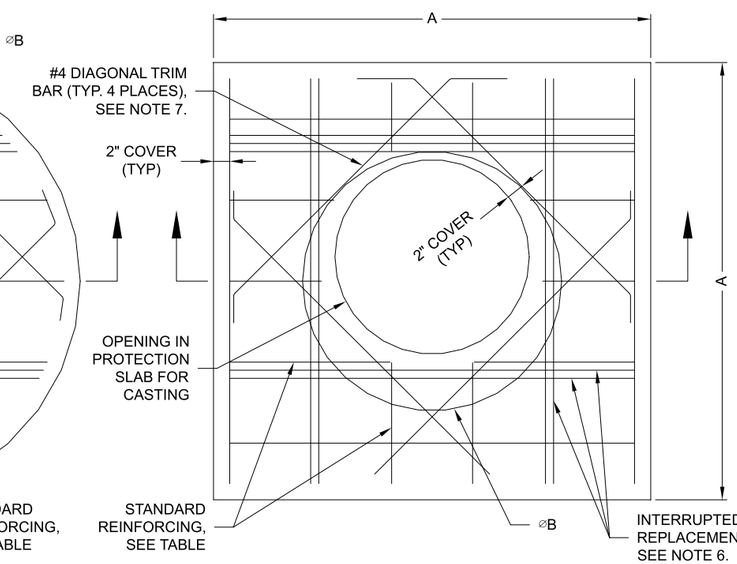
SECTION VIEW

REINFORCING TABLE				
⌀ CMP RISER	A	⌀ B	REINFORCING	**BEARING PRESSURE (PSF)
24"	⌀ 4' 4'X4'	26"	#5 @ 12" OCEW #5 @ 12" OCEW	2,410 1,780
30"	⌀ 4'-6" 4'-6" X 4'-6"	32"	#5 @ 12" OCEW #5 @ 12" OCEW	2,120 1,530
36"	⌀ 5' 5' X 5'	38"	#5 @ 10" OCEW #5 @ 10" OCEW	1,890 1,350
42"	⌀ 5'-6" 5'-6" X 5'-6"	44"	#5 @ 10" OCEW #5 @ 9" OCEW	1,720 1,210
48"	⌀ 6' 6' X 6'	50"	#5 @ 9" OCEW #5 @ 8" OCEW	1,600 1,100

** ASSUMED SOIL BEARING CAPACITY



ROUND OPTION PLAN VIEW



SQUARE OPTION PLAN VIEW

NOTES:

1. DESIGN IN ACCORDANCE WITH AASHTO, 17th EDITION.
2. DESIGN LOAD HS25.
3. EARTH COVER = 1' MAX.
4. CONCRETE STRENGTH = 3,500 psi
5. REINFORCING STEEL = ASTM A615, GRADE 60.
6. PROVIDE ADDITIONAL REINFORCING AROUND OPENINGS EQUAL TO THE BARS INTERRUPTED, HALF EACH SIDE. ADDITIONAL BARS TO BE IN THE SAME PLANE.
7. TRIM OPENING WITH DIAGONAL #4 BARS, EXTEND BARS A MINIMUM OF 12" BEYOND OPENING, BEND BARS AS REQUIRED TO MAINTAIN BAR COVER.
8. PROTECTION SLAB AND ALL MATERIALS TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
9. DETAIL DESIGN BY DELTA ENGINEERING, BINGHAMTON, NY.

MANHOLE CAP DETAIL

SCALE: N.T.S.

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800-338-1122 513-645-7000 513-645-7993 FAX

CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10822 Rutland LTCP
Pond 15P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10822	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D3		

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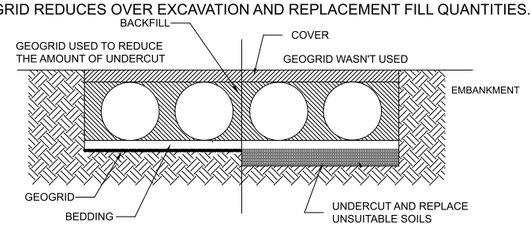
CMP DETENTION INSTALLATION GUIDE

PROPER INSTALLATION OF A FLEXIBLE UNDERGROUND DETENTION SYSTEM WILL ENSURE LONG-TERM PERFORMANCE. THE CONFIGURATION OF THESE SYSTEMS OFTEN REQUIRES SPECIAL CONSTRUCTION PRACTICES THAT DIFFER FROM CONVENTIONAL FLEXIBLE PIPE CONSTRUCTION. CONTECH ENGINEERED SOLUTIONS STRONGLY SUGGESTS SCHEDULING A PRE-CONSTRUCTION MEETING WITH YOUR LOCAL SALES ENGINEER TO DETERMINE IF ADDITIONAL MEASURES, NOT COVERED IN THIS GUIDE, ARE APPROPRIATE FOR YOUR SITE.

FOUNDATION

CONSTRUCT A FOUNDATION THAT CAN SUPPORT THE DESIGN LOADING APPLIED BY THE PIPE AND ADJACENT BACKFILL WEIGHT AS WELL AS MAINTAIN ITS INTEGRITY DURING CONSTRUCTION.

IF SOFT OR UNSUITABLE SOILS ARE ENCOUNTERED, REMOVE THE POOR SOILS DOWN TO A SUITABLE DEPTH AND THEN BUILD UP TO THE APPROPRIATE ELEVATION WITH A COMPETENT BACKFILL MATERIAL. THE STRUCTURAL FILL MATERIAL GRADATION SHOULD NOT ALLOW THE MIGRATION OF FINES, WHICH CAN CAUSE SETTLEMENT OF THE DETENTION SYSTEM OR PAVEMENT ABOVE. IF THE STRUCTURAL FILL MATERIAL IS NOT COMPATIBLE WITH THE UNDERLYING SOILS AN ENGINEERING FABRIC SHOULD BE USED AS A SEPARATOR. IN SOME CASES, USING A STIFF REINFORCING GEOGRID REDUCES OVER EXCAVATION AND REPLACEMENT FILL QUANTITIES.

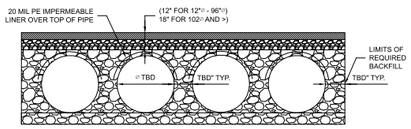


GRADE THE FOUNDATION SUBGRADE TO A UNIFORM OR SLIGHTLY SLOPING GRADE. IF THE SUBGRADE IS CLAY OR RELATIVELY NON-POROUS AND THE CONSTRUCTION SEQUENCE WILL LAST FOR AN EXTENDED PERIOD OF TIME, IT IS BEST TO SLOPE THE GRADE TO ONE END OF THE SYSTEM. THIS WILL ALLOW EXCESS WATER TO DRAIN QUICKLY, PREVENTING SATURATION OF THE SUBGRADE.

GEOMEMBRANE BARRIER

A SITE'S RESISTIVITY MAY CHANGE OVER TIME WHEN VARIOUS TYPES OF SALTING AGENTS ARE USED, SUCH AS ROAD SALTS FOR DEICING AGENTS. IF SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE, A GEOMEMBRANE BARRIER IS RECOMMENDED WITH THE SYSTEM. THE GEOMEMBRANE LINER IS INTENDED TO HELP PROTECT THE SYSTEM FROM THE POTENTIAL ADVERSE EFFECTS THAT MAY RESULT FROM THE USE OF SUCH AGENTS INCLUDING PREMATURE CORROSION AND REDUCED ACTUAL SERVICE LIFE.

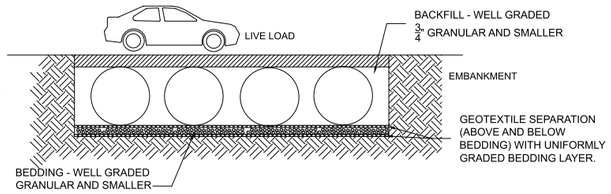
THE PROJECT'S ENGINEER OF RECORD IS TO EVALUATE WHETHER SALTING AGENTS WILL BE USED ON OR NEAR THE PROJECT SITE, AND USE HIS/HER BEST JUDGEMENT TO DETERMINE IF ANY ADDITIONAL PROTECTIVE MEASURES ARE REQUIRED. BELOW IS A TYPICAL DETAIL SHOWING THE PLACEMENT OF A GEOMEMBRANE BARRIER FOR PROJECTS WHERE SALTING AGENTS ARE USED ON OR NEAR THE PROJECT SITE.



IN-SITU TRENCH WALL

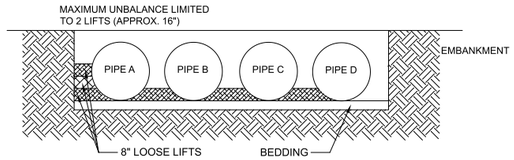
IF EXCAVATION IS REQUIRED, THE TRENCH WALL NEEDS TO BE CAPABLE OF SUPPORTING THE LOAD THAT THE PIPE SHEDS AS THE SYSTEM IS LOADED. IF SOILS ARE NOT CAPABLE OF SUPPORTING THESE LOADS, THE PIPE CAN DEFLECT. PERFORM A SIMPLE SOIL PRESSURE CHECK USING THE APPLIED LOADS TO DETERMINE THE LIMITS OF EXCAVATION BEYOND THE SPRING LINE OF THE OUTER MOST PIPES.

IN MOST CASES THE REQUIREMENTS FOR A SAFE WORK ENVIRONMENT AND PROPER BACKFILL PLACEMENT AND COMPACTION TAKE CARE OF THIS CONCERN.



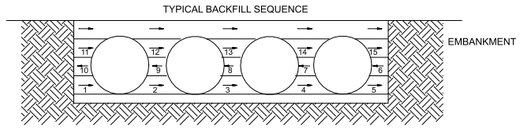
BACKFILL PLACEMENT

MATERIAL SHALL BE WORKED INTO THE PIPE HAUNCHES BY MEANS OF SHOVEL-SLICING, RODDING, AIR TAMPER, VIBRATORY ROD, OR OTHER EFFECTIVE METHODS.

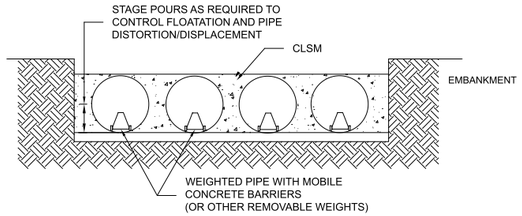


IF AASHTO T99 PROCEDURES ARE DETERMINED INFEASIBLE BY THE GEOTECHNICAL ENGINEER OF RECORD, COMPACTION IS CONSIDERED ADEQUATE WHEN NO FURTHER YIELDING OF THE MATERIAL IS OBSERVED UNDER THE COMPACTOR, OR UNDER FOOT, AND THE GEOTECHNICAL ENGINEER OF RECORD (OR REPRESENTATIVE THEREOF) IS SATISFIED WITH THE LEVEL OF COMPACTION.

FOR LARGE SYSTEMS, CONVEYOR SYSTEMS, BACKHOES WITH LONG REACHES OR DRAGLINES WITH STONE BUCKETS MAY BE USED TO PLACE BACKFILL. ONCE MINIMUM COVER FOR CONSTRUCTION LOADING ACROSS THE ENTIRE WIDTH OF THE SYSTEM IS REACHED, ADVANCE THE EQUIPMENT TO THE END OF THE RECENTLY PLACED FILL, AND BEGIN THE SEQUENCE AGAIN UNTIL THE SYSTEM IS COMPLETELY BACKFILLED. THIS TYPE OF CONSTRUCTION SEQUENCE PROVIDES ROOM FOR STOCKPILED BACKFILL DIRECTLY BEHIND THE BACKHOE, AS WELL AS THE MOVEMENT OF CONSTRUCTION TRAFFIC. MATERIAL STOCKPILES ON TOP OF THE BACKFILLED DETENTION SYSTEM SHOULD BE LIMITED TO 8- TO 10-FEET HIGH AND MUST PROVIDE BALANCED LOADING ACROSS ALL BARRELS. TO DETERMINE THE PROPER COVER OVER THE PIPES TO ALLOW THE MOVEMENT OF CONSTRUCTION EQUIPMENT SEE TABLE 1, OR CONTACT YOUR LOCAL CONTECH SALES ENGINEER.



WHEN FLOWABLE FILL IS USED, YOU MUST PREVENT PIPE FLOATATION. TYPICALLY, SMALL LIFTS ARE PLACED BETWEEN THE PIPES AND THEN ALLOWED TO SET-UP PRIOR TO THE PLACEMENT OF THE NEXT LIFT. THE ALLOWABLE THICKNESS OF THE CLSM LIFT IS A FUNCTION OF A PROPER BALANCE BETWEEN THE UPLIFT FORCE OF THE CLSM, THE OPPOSING WEIGHT OF THE PIPE, AND THE EFFECT OF OTHER RESTRAINING MEASURES. THE PIPE CAN CARRY LIMITED FLUID PRESSURE WITHOUT PIPE DISTORTION OR DISPLACEMENT, WHICH ALSO AFFECTS THE CLSM LIFT THICKNESS. YOUR LOCAL CONTECH SALES ENGINEER CAN HELP DETERMINE THE PROPER LIFT THICKNESS.

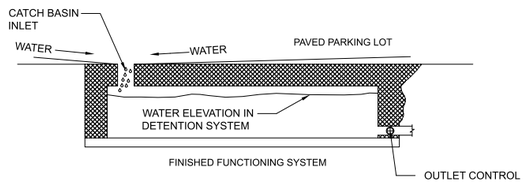


CONSTRUCTION LOADING

TYPICALLY, THE MINIMUM COVER SPECIFIED FOR A PROJECT ASSUMES H-20 LIVE LOAD. BECAUSE CONSTRUCTION LOADS OFTEN EXCEED DESIGN LIVE LOADS, INCREASED TEMPORARY MINIMUM COVER REQUIREMENTS ARE NECESSARY. SINCE CONSTRUCTION EQUIPMENT VARIES FROM JOB TO JOB, IT IS BEST TO ADDRESS EQUIPMENT SPECIFIC MINIMUM COVER REQUIREMENTS WITH YOUR LOCAL CONTECH SALES ENGINEER DURING YOUR PRE-CONSTRUCTION MEETING.

ADDITIONAL CONSIDERATIONS

BECAUSE MOST SYSTEMS ARE CONSTRUCTED BELOW-GRADE, RAINFALL CAN RAPIDLY FILL THE EXCAVATION; POTENTIALLY CAUSING FLOATATION AND MOVEMENT OF THE PREVIOUSLY PLACED PIPES. TO HELP MITIGATE POTENTIAL PROBLEMS, IT IS BEST TO START THE INSTALLATION AT THE DOWNSTREAM END WITH THE OUTLET ALREADY CONSTRUCTED TO ALLOW A ROUTE FOR THE WATER TO ESCAPE. TEMPORARY DIVERSION MEASURES MAY BE REQUIRED FOR HIGH FLOWS DUE TO THE RESTRICTED NATURE OF THE OUTLET PIPE.



CMP DETENTION SYSTEM INSPECTION AND MAINTENANCE

UNDERGROUND STORMWATER DETENTION AND INFILTRATION SYSTEMS MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF CMP DETENTION SYSTEMS AND IS EASILY PERFORMED. CONTECH RECOMMENDS ONGOING, ANNUAL INSPECTIONS. SITES WITH HIGH TRASH LOAD OR SMALL OUTLET CONTROL ORIFICES MAY NEED MORE FREQUENT INSPECTIONS. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/ CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM

MAINTENANCE

CMP DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING THE DISCHARGE ORIFICE.

ACCUMULATED SEDIMENT AND TRASH CAN TYPICALLY BE EVACUATED THROUGH THE MANHOLE OVER THE OUTLET ORIFICE. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE. MANHOLE COVERS SHOULD BE SECURELY SEATED FOLLOWING CLEANING ACTIVITIES. CONTECH SUGGESTS THAT ALL SYSTEMS BE DESIGNED WITH AN ACCESS/INSPECTION MANHOLE SITUATED AT OR NEAR THE INLET AND THE OUTLET ORIFICE. SHOULD IT BE NECESSARY TO GET INSIDE THE SYSTEM TO PERFORM MAINTENANCE ACTIVITIES, ALL APPROPRIATE PRECAUTIONS REGARDING CONFINED SPACE ENTRY AND OSHA REGULATIONS SHOULD BE FOLLOWED.

ANNUAL INSPECTIONS ARE BEST PRACTICE FOR ALL UNDERGROUND SYSTEMS. DURING THIS INSPECTION, IF EVIDENCE OF SALTING/DE-ICING AGENTS IS OBSERVED WITHIN THE SYSTEM, IT IS BEST PRACTICE FOR THE SYSTEM TO BE RINSED, INCLUDING ABOVE THE SPRING LINE SOON AFTER THE SPRING THAW AS PART OF THE MAINTENANCE PROGRAM FOR THE SYSTEM.

MAINTAINING AN UNDERGROUND DETENTION OR INFILTRATION SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE UNDERGROUND PIPE SYSTEMS USED FOR STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES. INSPECTION AND MAINTENANCE RELATED TO THE STRUCTURAL INTEGRITY OF THE PIPE OR THE SOUNDNESS OF PIPE JOINT CONNECTIONS IS BEYOND THE SCOPE OF THIS GUIDE.

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CONTECH CMP DETENTION SYSTEMS
CONTECH DYODS DRAWING

DYO10822 Rutland LTCP
Pond 15P
Rutland, VT
DETENTION SYSTEM

PROJECT No.:	SEQ. No.:	DATE:
6735	10822	10/6/2021
DESIGNED: DYO	DRAWN: DYO	
CHECKED: DYO	APPROVED: DYO	
SHEET NO.: D4		

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Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

East Street Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 302,500	$ 303,000
	Bonds and Insurance (8%)	L.S.	1	$ 484,000	$ 484,000
	General Conditions (5%)	L.S.	1	$ 302,500	$ 303,000
				General	**$1,090,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	9200	$ 400	$ 3,680,000
	New Drain Manhole	Ea.	25	$ 11,000	$ 275,000
	New Deep Sump Catch Basin	Ea.	44	$ 10,000	$ 440,000
	Connect Combined CB to New Storm Drain	L.F.	880	$ 200	$ 176,000
	Replace Sewer Service	Ea.	40	$ 4,000	$ 160,000
	Replace Water Service	Ea.	40	$ 4,000	$ 160,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	Stormwater Quality Treatment Device	Ea.	1	$ 28,000	$ 28,000
	Treatment Device Installation	L.S.	1	$ 7,000	$ 7,000
	Stormwater Detention Device	Ea.	1	$ 585,000	$ 585,000
	Structural Backfill for Stormwater Detention	C.Y.	3500	$ 50	$ 175,000
	Topsoil, Seed & Mulch	S.F.	25000	$ 0.80	$ 20,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	681	$ 225	$ 153,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	136	$ 80	$ 11,000
	Traffic Control Signage	L.S.	1	$ 29,000	$ 29,000
	Flaggers	Hrs.	2900	$ 36.00	$ 104,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$6,050,000**
				Construction Subtotal	**$7,140,000**
				Contingency (30%)	$2,635,000
				Engineering Fees	$1,642,000
				Other Administrative Costs (0.5%)	$357,000
				TOTAL OPINION OF PROJECT COST	**$11,780,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX S

Easterly Avenue

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Connect existing catch basin to new storm drain (typ)

Area of Combined Sewershed Removed : 42.78 Acres

Proposed 36" storm drain

Swirl Concentrator

Proposed diversion manhole

ROSS ST
CROWN ST
RUTLAND AV
DARTMOUTH ST
HARVARD ST
HOWARD AV
BILLINGS AV
DEER ST
HARRINGTON AV
BELLEVUE AV
WOODSTOCK AV
EDGERTON ST
BIRCHWOOD AV
CHARLES ST
WALLACE AV
LAFAYETTE ST
EAST ST
TERRILL ST
SHELDON PL
E CENTER ST
MANSFIELD PL
TAFT AV
SARGENT AV
E WASHINGTON ST
EASTERLY AV
RONALDO CT
BUTTERFLY AV
PIEDMONT DR N
PIEDMONT DR E
PIEDMONT DR
PIEDMONT PKWY
PIEDMONT POND
CESNA PL
STRATTON RD
MEADOWBROOK RD
KILLINGTON AV
ENGREM AV

MAP 7
PROJECT AREA : Easterly Avenue
CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 125 250

Weston & Sampson

MAP SHEET 7 of 15

Summary for Subcatchment 7S: Easterly Ave

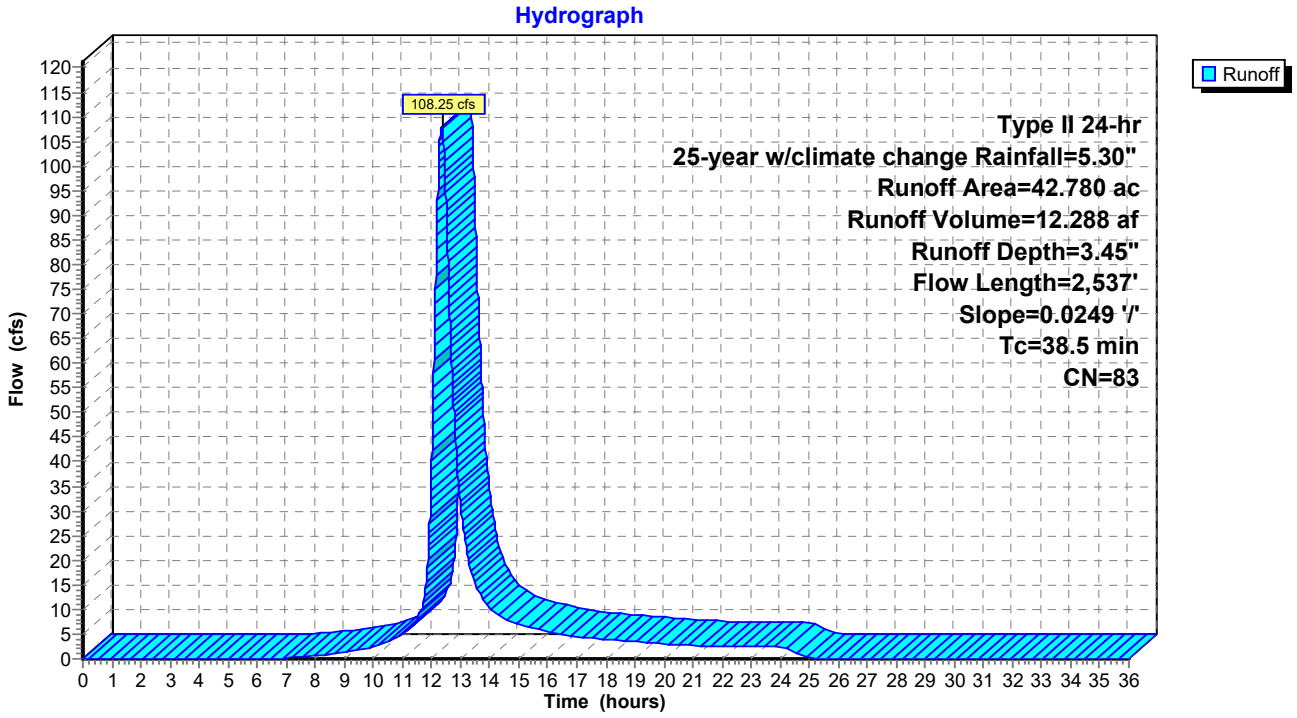
Runoff = 108.25 cfs @ 12.36 hrs, Volume= 12.288 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
42.780	83	1/4 acre lots, 38% imp, HSG C
26.524		62.00% Pervious Area
16.256		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
38.5	2,537	0.0249	1.10		**Lag/CN Method,**

Subcatchment 7S: Easterly Ave



Summary for Pond 17P: diversion MH

[58] Hint: Peaked 2.59' above defined flood level

Inflow Area = 42.780 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 108.25 cfs @ 12.36 hrs, Volume= 12.288 af
Outflow = 108.25 cfs @ 12.36 hrs, Volume= 12.288 af, Atten= 0%, Lag= 0.0 min
Primary = 38.84 cfs @ 12.36 hrs, Volume= 7.872 af
Secondary = 69.41 cfs @ 12.36 hrs, Volume= 4.416 af

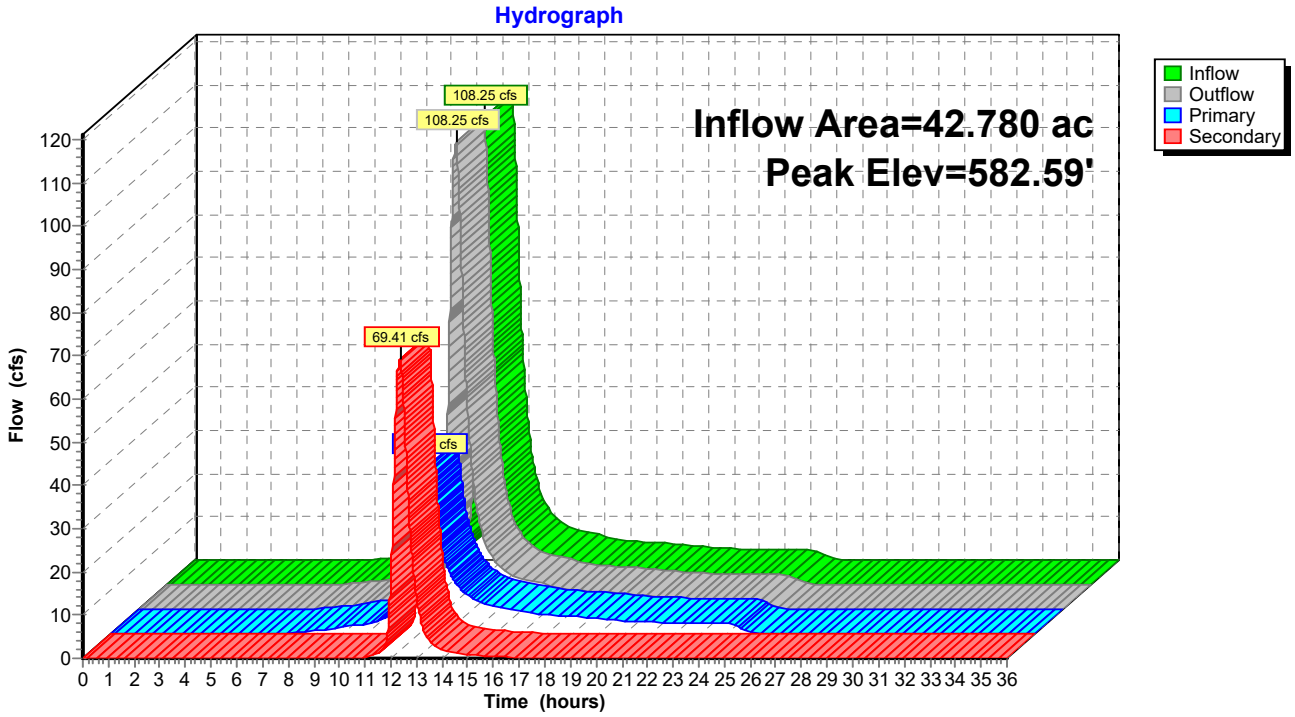
Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 582.59' @ 12.36 hrs
Flood Elev= 580.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	575.00'	**24.0" Round Culvert** L= 40.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 575.00' / 574.00' S= 0.0250 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf
#2	Secondary	575.75'	**36.0" Round overflow** L= 40.0' CPP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 575.75' / 574.00' S= 0.0437 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=38.82 cfs @ 12.36 hrs HW=582.59' (Free Discharge)
↑—**1=Culvert** (Inlet Controls 38.82 cfs @ 12.36 fps)

Secondary OutFlow Max=69.37 cfs @ 12.36 hrs HW=582.59' (Free Discharge)
↑—**2=overflow** (Inlet Controls 69.37 cfs @ 9.81 fps)

Pond 17P: diversion MH



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Eastery Avenue Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 110,250	$ 110,000
	Bonds and Insurance (8%)	L.S.	1	$ 176,400	$ 176,000
	General Conditions (5%)	L.S.	1	$ 110,250	$ 110,000
				General	**$396,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	3518	$ 400	$ 1,407,000
	New Drain Manhole	Ea.	17	$ 11,000	$ 187,000
	New Deep Sump Catch Basin	Ea.	23	$ 10,000	$ 230,000
	Connect Combined CB to New Storm Drain	L.F.	460	$ 200	$ 92,000
	Replace Sewer Service	Ea.	12	$ 4,000	$ 48,000
	Replace Water Service	Ea.	12	$ 4,000	$ 48,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	Stormwater Quality Treatment Device	Ea.	1	$ 25,500	$ 26,000
	Treatment Device Installation	L.S.	1	$ 6,375	$ 6,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	261	$ 225	$ 59,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	52	$ 80	$ 4,000
	Traffic Control Signage	L.S.	1	$ 11,000	$ 11,000
	Flaggers	Hrs.	1100	$ 36.00	$ 40,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$2,205,000**
				Construction Subtotal	**$2,610,000**
				Contingency (30%)	$963,000
				Engineering Fees	$600,000
				Other Administrative Costs (0.5%)	$130,500
				TOTAL OPINION OF PROJECT COST	**$4,310,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX T

Harrington Avenue

Area of Combined Sewershed Removed : 5.49 Acres

Connect existing catch basin to new storm drain (typ)

Proposed 24" storm drain

Upsize existing storm drain to 30"

Connect to existing 30" storm drain

PORTER ST
WOODSTOCK AV
CROWN ST
ROSS ST
CLARKSON ST
NELSON DR
JASMIN LN
HARRINGTON AV
STRATTON RD
DURHAM DR
NEWPORT DR
PIEDMONT DR N
PIEDMONT DR
DARTMOUTH ST
HARVARD ST
RUTLAND AV
EDGERTON ST
HOWARD AV
BILLINGS AV
SARGENT AV

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Project 13: Harrington Avenue

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN

June 2022

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Combined Sewer
- Sanitary Force Main
- Proposed Storm Drain
- Combined Sewershed
- Sewer Service Area
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- Wetlands
- 100 Year Flood Zone
- 500 Year Flood Zone
- Hazardous Waste Sites

Soil Rating Type

- A
- B

Feet
0 75 150

Weston & Sampson

N

Summary for Subcatchment 8S: Harrington Ave

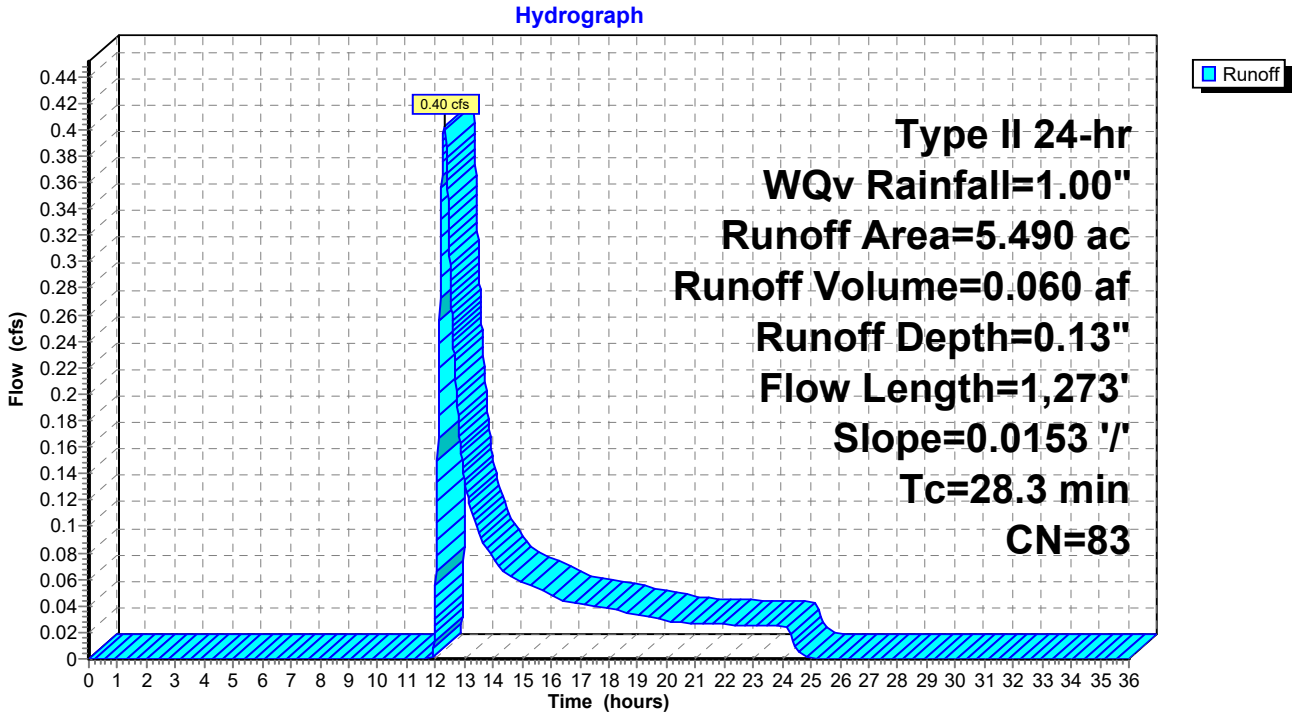
Runoff = 0.40 cfs @ 12.30 hrs, Volume= 0.060 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
5.490	83	1/4 acre lots, 38% imp, HSG C
3.404		62.00% Pervious Area
2.086		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	1,273	0.0153	0.75		**Lag/CN Method,**

Subcatchment 8S: Harrington Ave



Summary for Pond 23P: connect to ex drain

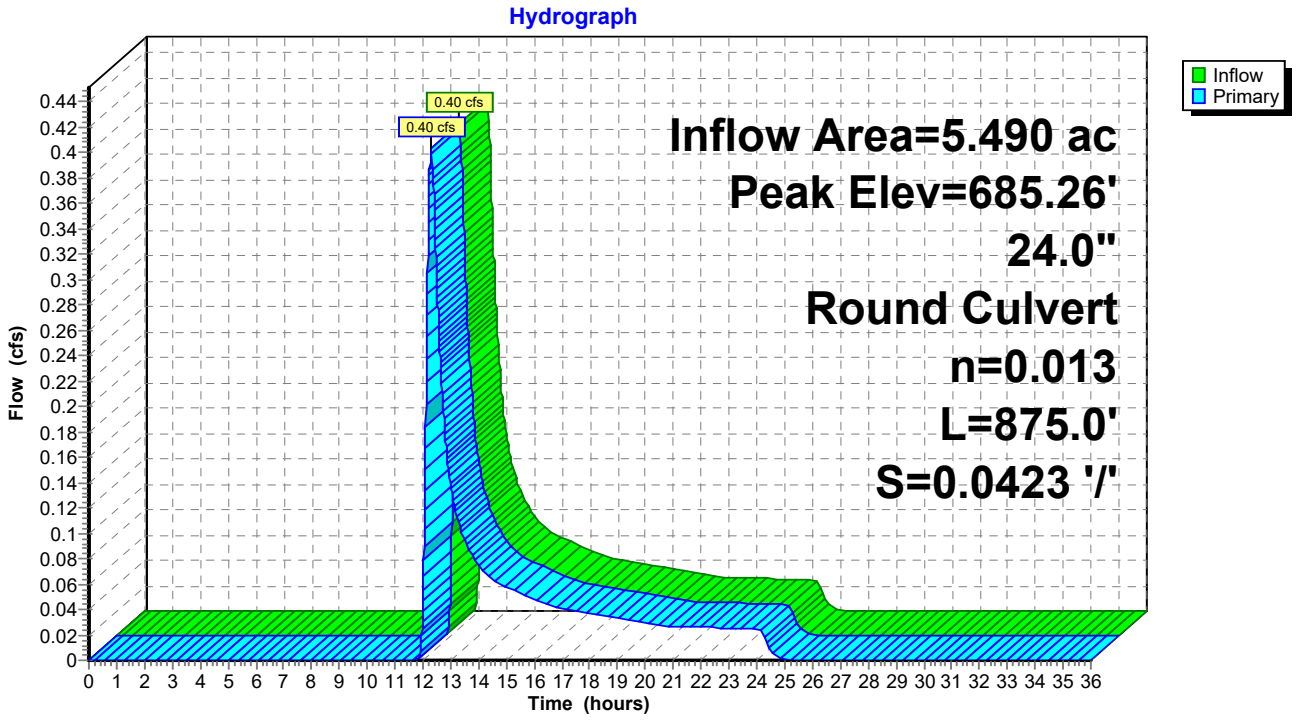
Inflow Area = 5.490 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 0.40 cfs @ 12.30 hrs, Volume= 0.060 af
Outflow = 0.40 cfs @ 12.30 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min
Primary = 0.40 cfs @ 12.30 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 685.26' @ 12.30 hrs
Flood Elev= 690.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**24.0" Round Culvert** L= 875.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 685.00' / 648.00' S= 0.0423 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=0.40 cfs @ 12.30 hrs HW=685.26' (Free Discharge)
1=Culvert (Inlet Controls 0.40 cfs @ 1.72 fps)

Pond 23P: connect to ex drain



Summary for Subcatchment 8S: Harrington Ave

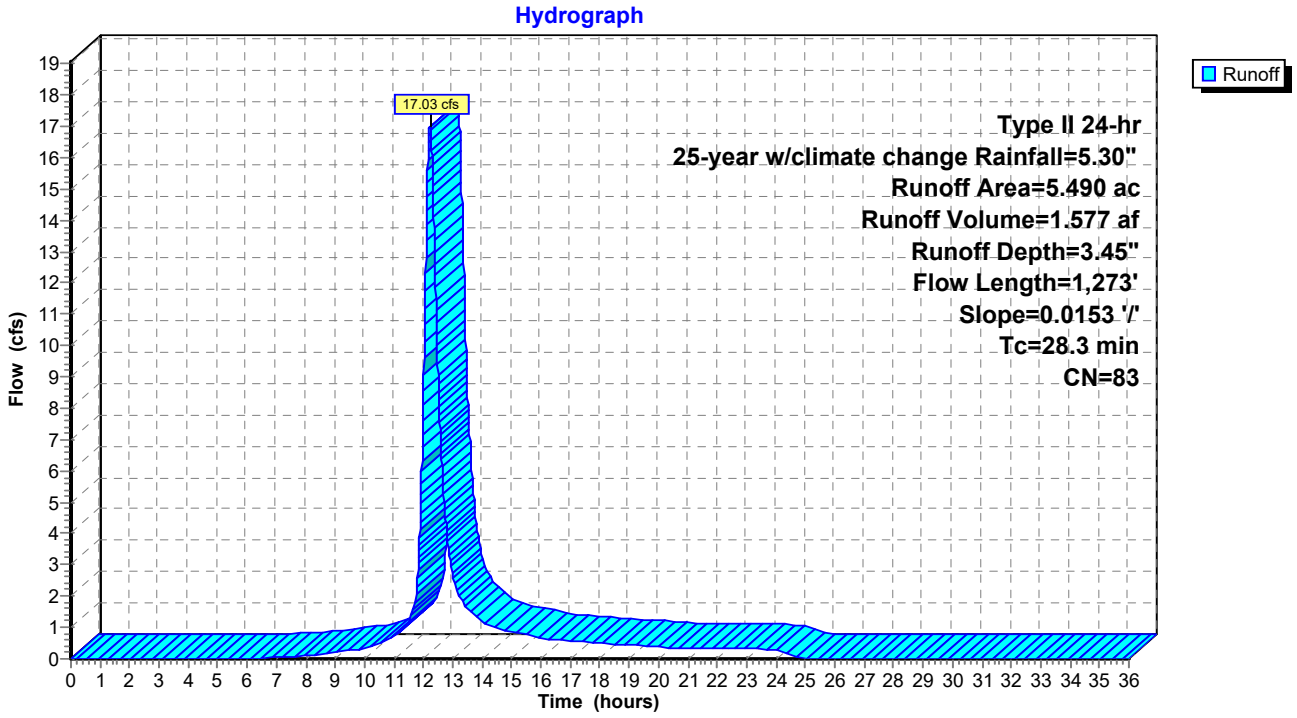
Runoff = 17.03 cfs @ 12.23 hrs, Volume= 1.577 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
5.490	83	1/4 acre lots, 38% imp, HSG C
3.404		62.00% Pervious Area
2.086		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
28.3	1,273	0.0153	0.75		**Lag/CN Method,**

Subcatchment 8S: Harrington Ave



Summary for Pond 23P: connect to ex drain

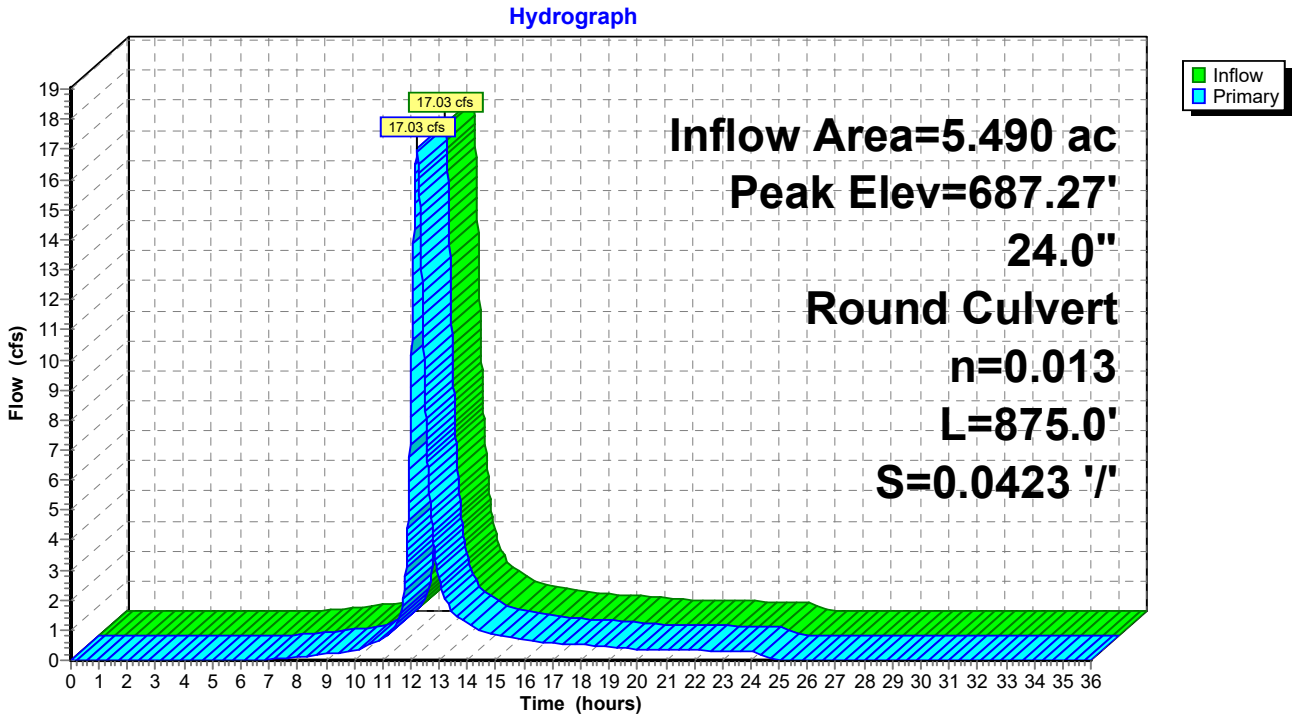
Inflow Area = 5.490 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 17.03 cfs @ 12.23 hrs, Volume= 1.577 af
Outflow = 17.03 cfs @ 12.23 hrs, Volume= 1.577 af, Atten= 0%, Lag= 0.0 min
Primary = 17.03 cfs @ 12.23 hrs, Volume= 1.577 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 687.27' @ 12.23 hrs
Flood Elev= 690.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	685.00'	**24.0" Round Culvert** L= 875.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 685.00' / 648.00' S= 0.0423 '/' Cc= 0.900 n= 0.013, Flow Area= 3.14 sf

Primary OutFlow Max=17.01 cfs @ 12.23 hrs HW=687.26' (Free Discharge)
1=Culvert (Inlet Controls 17.01 cfs @ 5.42 fps)

Pond 23P: connect to ex drain



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Harrington Avenue Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 52,600	$ 53,000
	Bonds and Insurance (8%)	L.S.	1	$ 84,160	$ 84,000
	General Conditions (5%)	L.S.	1	$ 52,600	$ 53,000
				General	**$190,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	897	$ 400	$ 359,000
	Upgrade of Existing Storm Drain	L.F.	1200	$ 400	$ 480,000
	New Drain Manhole	Ea.	6	$ 11,000	$ 66,000
	New Deep Sump Catch Basin	Ea.	5	$ 10,000	$ 50,000
	Connect Combined CB to New Storm Drain	L.F.	100	$ 200	$ 20,000
	Replace Sewer Service	Ea.	4	$ 4,000	$ 16,000
	Replace Water Service	Ea.	4	$ 4,000	$ 16,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	66	$ 225	$ 15,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	13	$ 80	$ 1,000
	Traffic Control Signage	L.S.	1	$ 3,000	$ 3,000
	Flaggers	Hrs.	300	$ 36.00	$ 11,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$1,052,000**
				Construction Subtotal	**$1,250,000**
				Contingency (30%)	$461,000
				Engineering Fees	$288,000
				Other Administrative Costs (0.5%)	$62,500
				TOTAL OPINION OF PROJECT COST	**$2,070,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

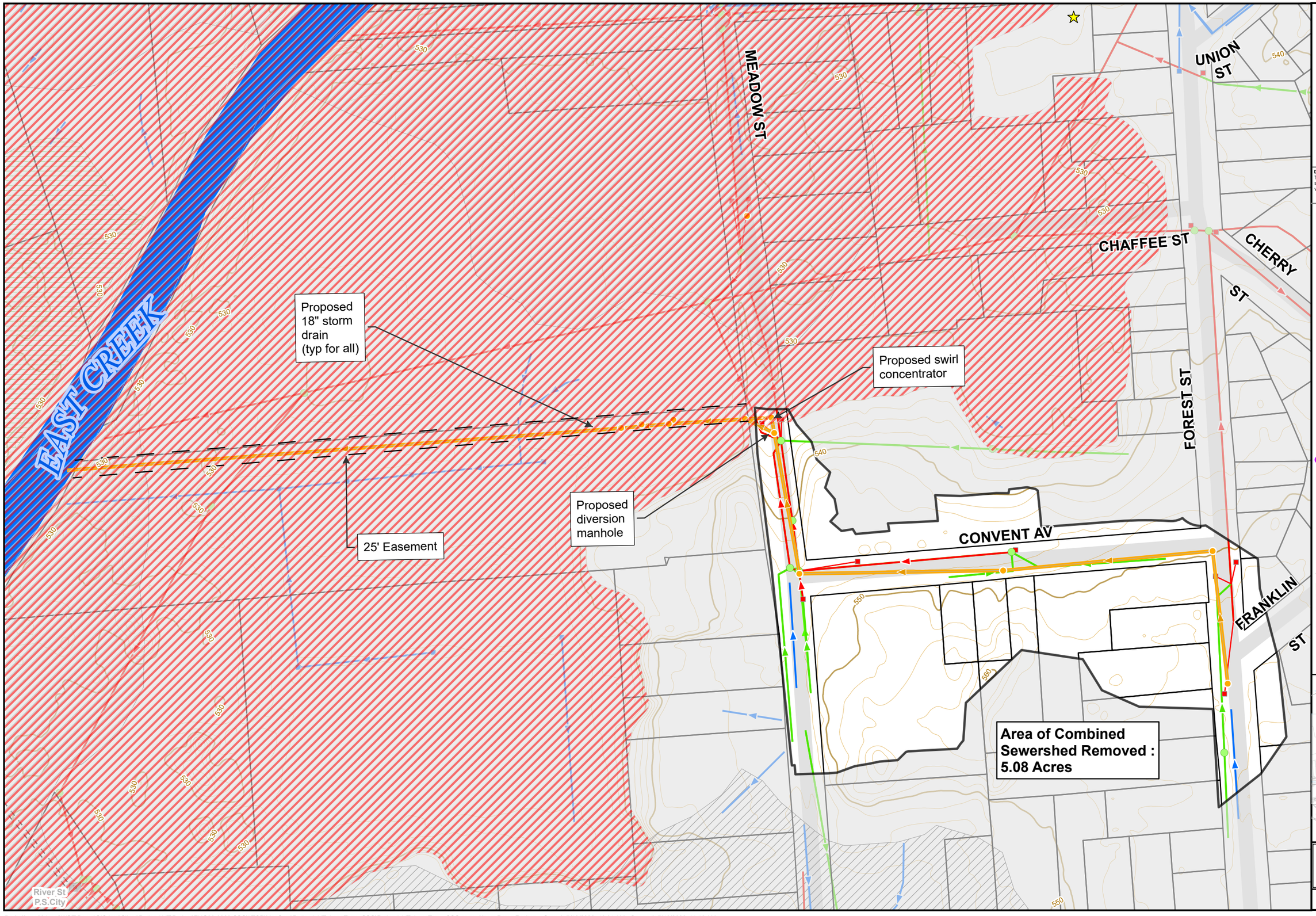
6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX U

Convent Avenue



Project 14: Convent Avenue

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN

July 2022

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Combined Sewer
- Sanitary Force Main
- Proposed Storm Drain
- Combined Sewershed
- Sewer Service Area
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- Wetlands
- 100 Year Flood Zone
- 500 Year Flood Zone
- Hazardous Waste Sites
- Easement

Soil Rating Type

- A
- B

Feet
0 62.5 125

Weston & Sampson

N

Summary for Subcatchment 9S: Convent Ave

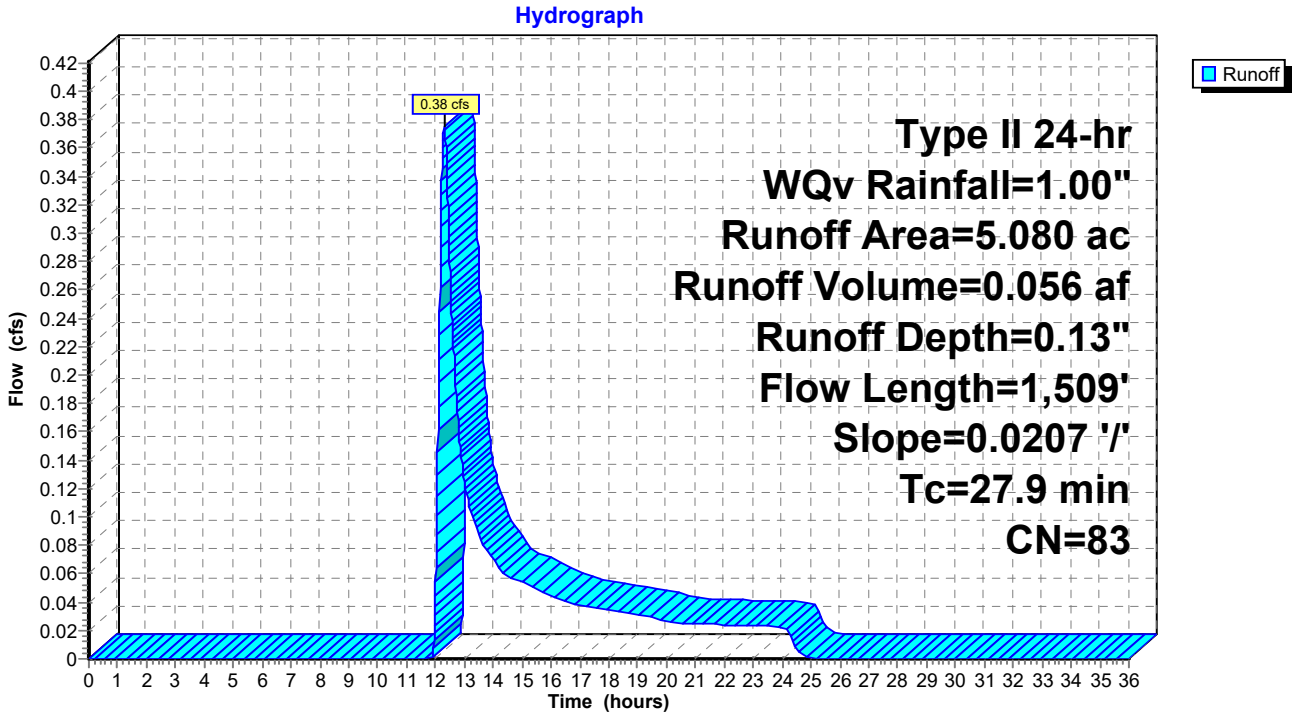
Runoff = 0.38 cfs @ 12.30 hrs, Volume= 0.056 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
5.080	83	1/4 acre lots, 38% imp, HSG C
3.150		62.00% Pervious Area
1.930		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	1,509	0.0207	0.90		**Lag/CN Method,**

Subcatchment 9S: Convent Ave



Summary for Pond 24P: connect to ex drain

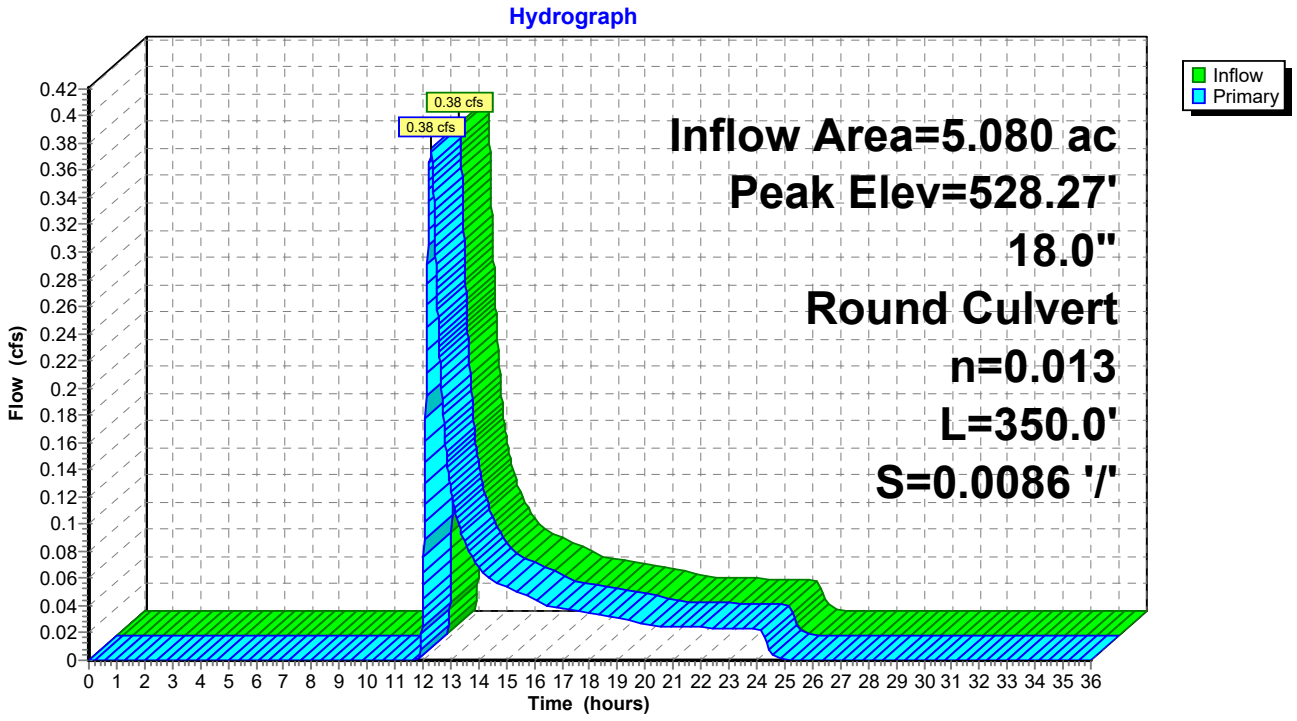
Inflow Area = 5.080 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 0.38 cfs @ 12.30 hrs, Volume= 0.056 af
Outflow = 0.38 cfs @ 12.30 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.38 cfs @ 12.30 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 528.27' @ 12.30 hrs
Flood Elev= 532.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	528.00'	**18.0" Round Culvert** L= 350.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 528.00' / 525.00' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=0.38 cfs @ 12.30 hrs HW=528.27' (Free Discharge)
1=Culvert (Barrel Controls 0.38 cfs @ 2.62 fps)

Pond 24P: connect to ex drain



Summary for Subcatchment 9S: Convent Ave

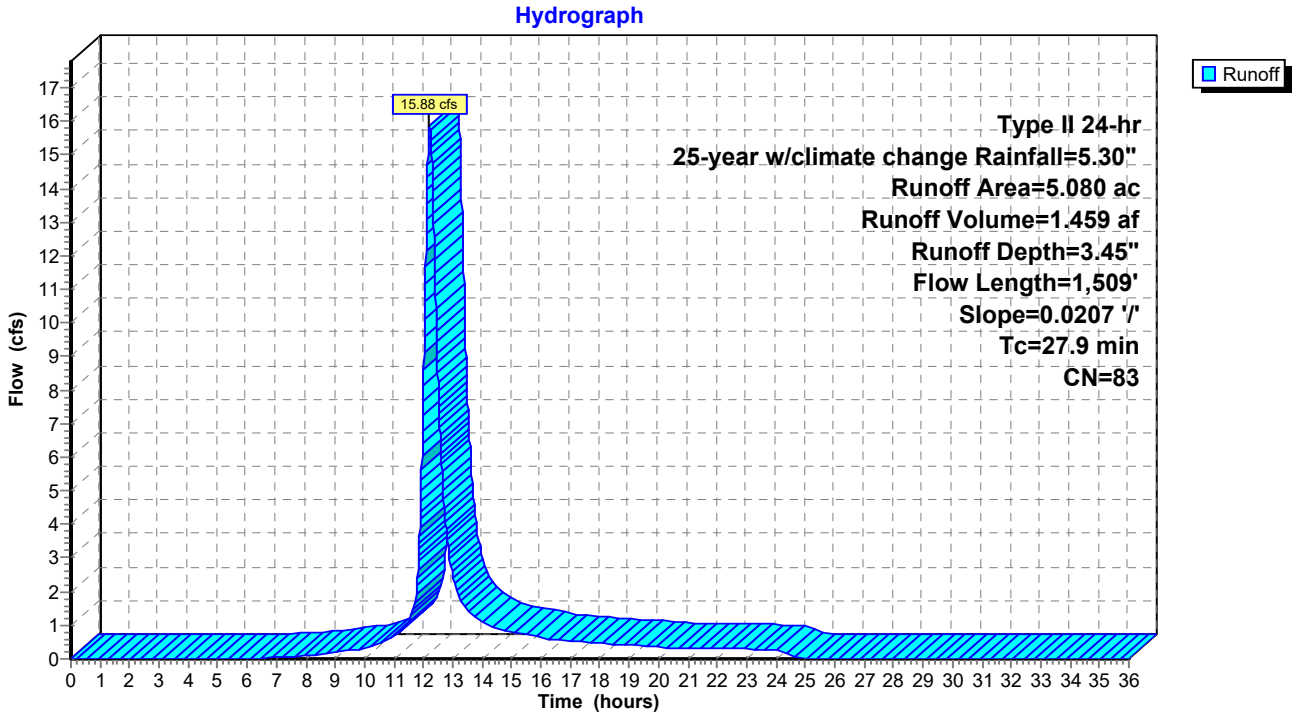
Runoff = 15.88 cfs @ 12.21 hrs, Volume= 1.459 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
5.080	83	1/4 acre lots, 38% imp, HSG C
3.150		62.00% Pervious Area
1.930		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
27.9	1,509	0.0207	0.90		**Lag/CN Method,**

Subcatchment 9S: Convent Ave



Summary for Pond 24P: connect to ex drain

[58] Hint: Peaked 4.40' above defined flood level

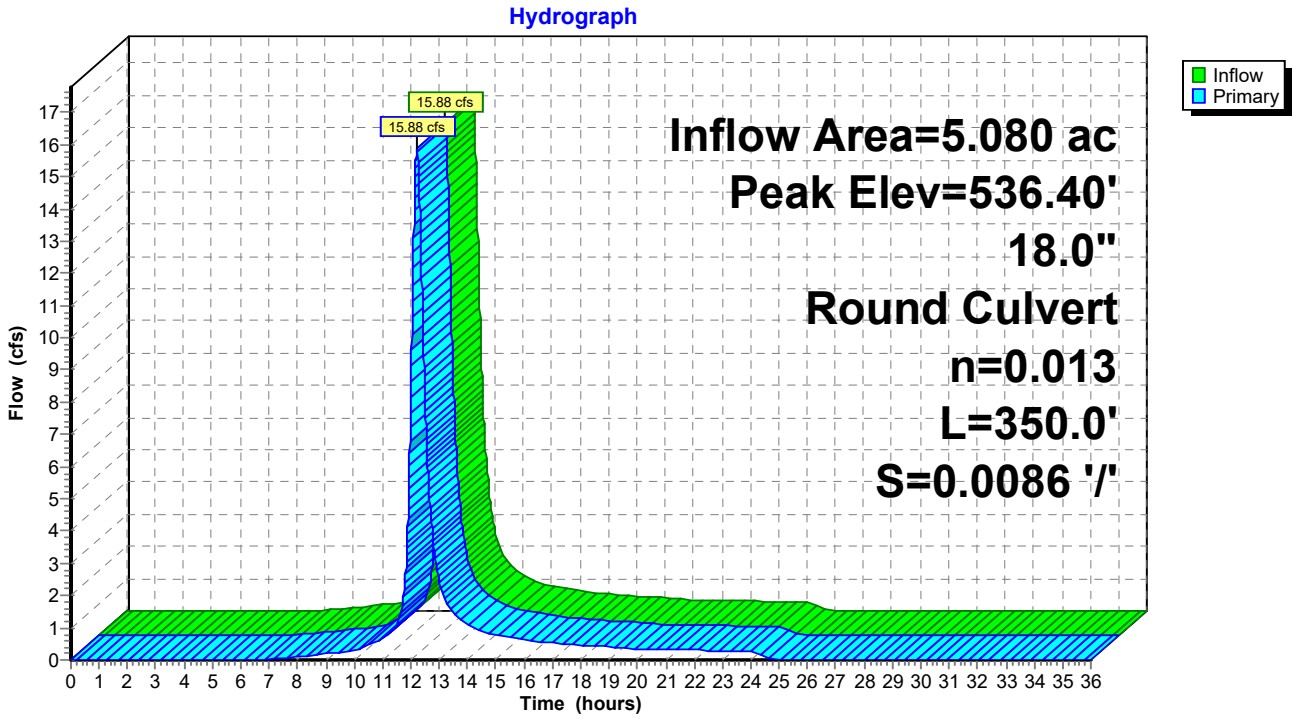
Inflow Area = 5.080 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 15.88 cfs @ 12.21 hrs, Volume= 1.459 af
Outflow = 15.88 cfs @ 12.21 hrs, Volume= 1.459 af, Atten= 0%, Lag= 0.0 min
Primary = 15.88 cfs @ 12.21 hrs, Volume= 1.459 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 536.40' @ 12.21 hrs
Flood Elev= 532.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	528.00'	**18.0" Round Culvert** L= 350.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 528.00' / 525.00' S= 0.0086 '/' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf

Primary OutFlow Max=15.87 cfs @ 12.21 hrs HW=536.40' (Free Discharge)
1=Culvert (Barrel Controls 15.87 cfs @ 8.98 fps)

Pond 24P: connect to ex drain



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Convent Avenue Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 42,750	$ 43,000
	Bonds and Insurance (8%)	L.S.	1	$ 68,400	$ 68,000
	General Conditions (5%)	L.S.	1	$ 42,750	$ 43,000
				General	**$154,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	1400	$ 400	$ 560,000
	New Drain Manhole	Ea.	7	$ 11,000	$ 77,000
	New Deep Sump Catch Basin	Ea.	8	$ 10,000	$ 80,000
	Connect Combined CB to New Storm Drain	L.F.	160	$ 200	$ 32,000
	Replace Sewer Service	Ea.	3	$ 4,000	$ 12,000
	Replace Water Service	Ea.	3	$ 4,000	$ 12,000
	Stormwater Quality Treatment Device	Ea.	1	$ 15,000	$ 15,000
	Treatment Device Installation	L.S.	1	$ 3,750	$ 4,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	104	$ 225	$ 23,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	21	$ 80	$ 2,000
	Traffic Control Signage	L.S.	1	$ 5,000	$ 5,000
	Flaggers	Hrs.	500	$ 36.00	$ 18,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$855,000**
				Construction Subtotal	**$1,010,000**
				Contingency (30%)	$373,000
				Engineering Fees	$232,000
				Other Administrative Costs (0.5%)	$50,500
				TOTAL OPINION OF PROJECT COST	**$1,670,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX V

Meadow Street

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Connect existing catch basin to new storm drain (typ)

Proposed 57" x 38" arch storm drain

Proposed swirl concentrator & diversion manhole

Connect existing drain manhole with dual 24" storm drains into new drainage network

Area of Combined Sewershed Removed : 15.38 Acres

BAXTER ST
MEADOW ST
TRAVERSE PL
SCHOOL ST
FOREST ST
UNION ST
PINE ST
EVELYN ST
SHOPPING PLAZA RD
HOWE ST
CHAFFEE ST

MAP 10 PROJECT AREA : Meadow Street

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

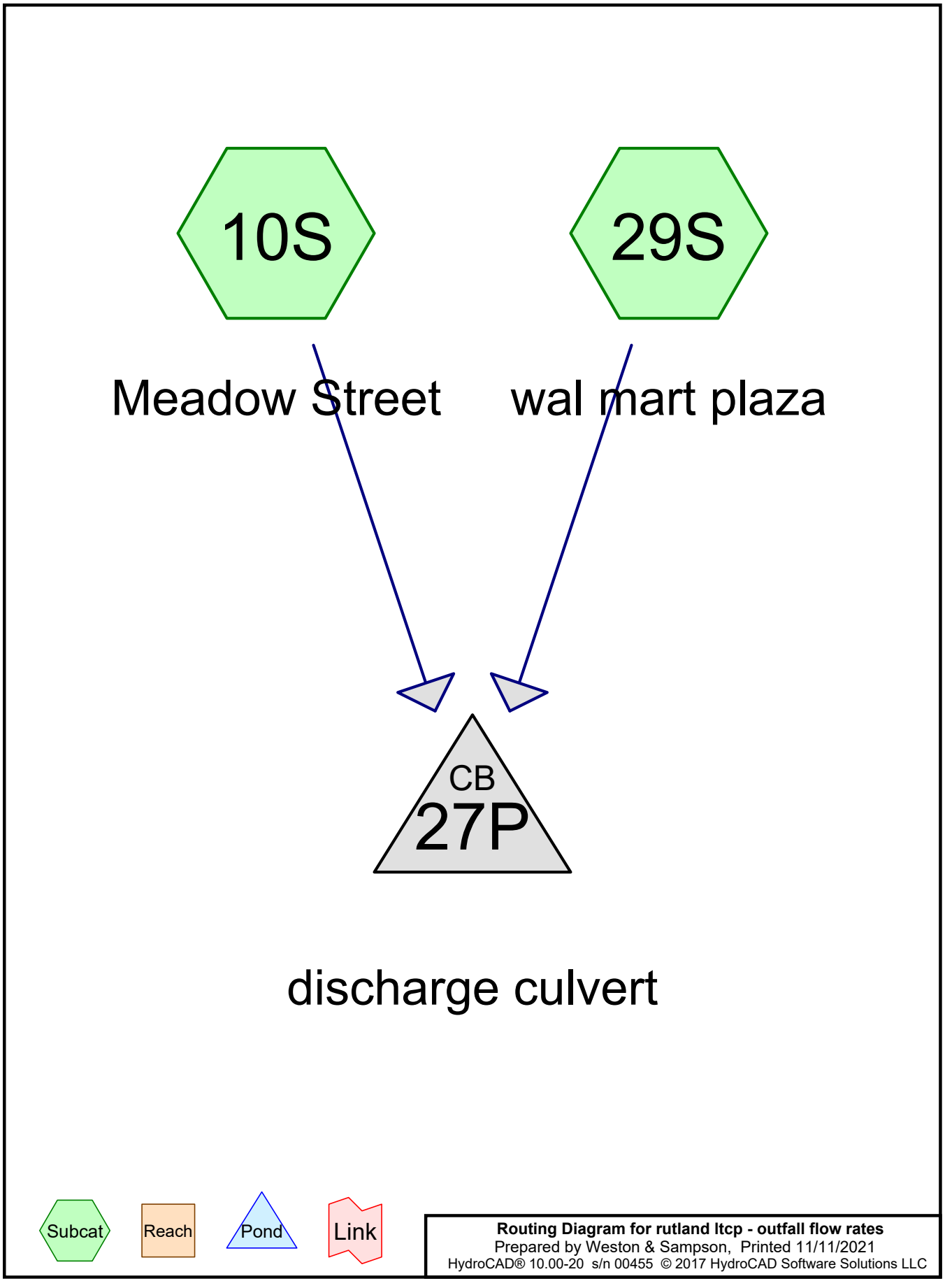
Feet
0 70 140

Weston & Sampson

10

N

MAP SHEET 10 of 15



Routing Diagram for rutland ltcp - outfall flow rates
Prepared by Weston & Sampson, Printed 11/11/2021
HydroCAD® 10.00-20 s/n 00455 © 2017 HydroCAD Software Solutions LLC

Summary for Subcatchment 10S: Meadow Street

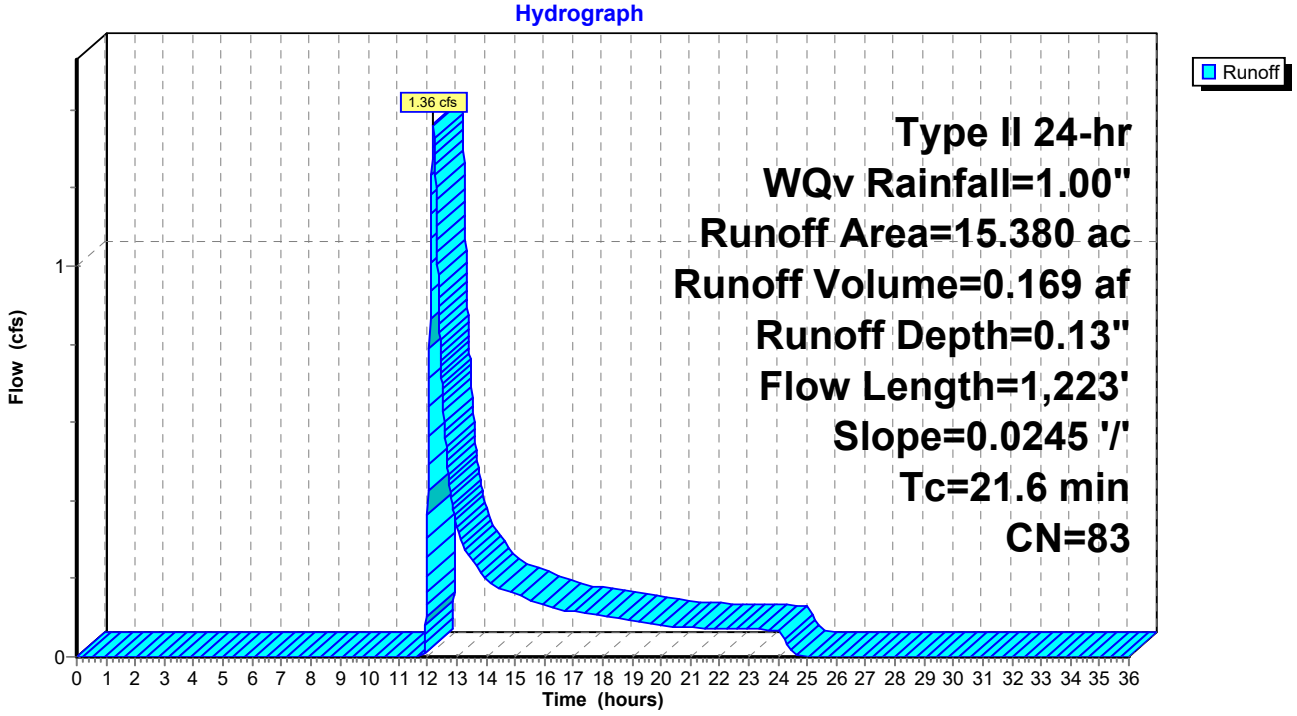
Runoff = 1.36 cfs @ 12.21 hrs, Volume= 0.169 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
15.380	83	1/4 acre lots, 38% imp, HSG C
9.536		62.00% Pervious Area
5.844		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	1,223	0.0245	0.94		**Lag/CN Method,**

Subcatchment 10S: Meadow Street



Summary for Subcatchment 29S: wal mart plaza

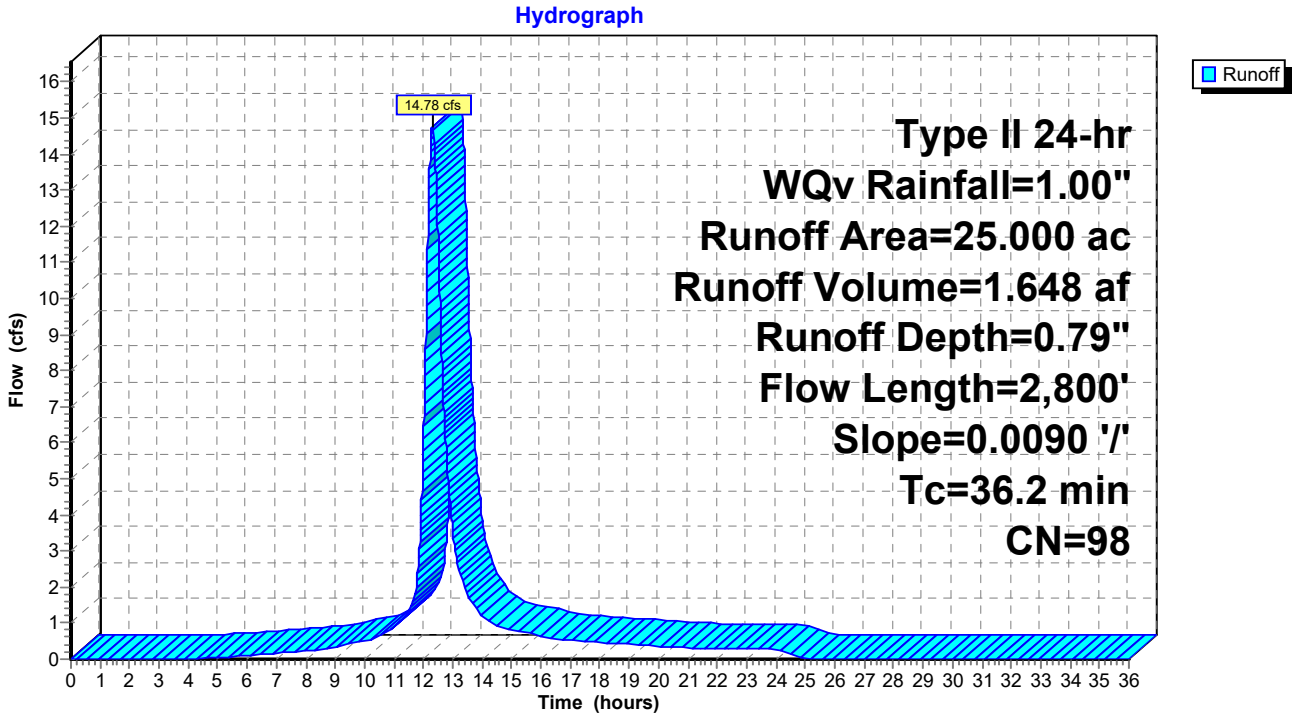
Runoff = 14.78 cfs @ 12.31 hrs, Volume= 1.648 af, Depth= 0.79"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
25.000	98	Paved parking, HSG C
25.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.2	2,800	0.0090	1.29		**Lag/CN Method,**

Subcatchment 29S: wal mart plaza



Summary for Pond 27P: discharge culvert

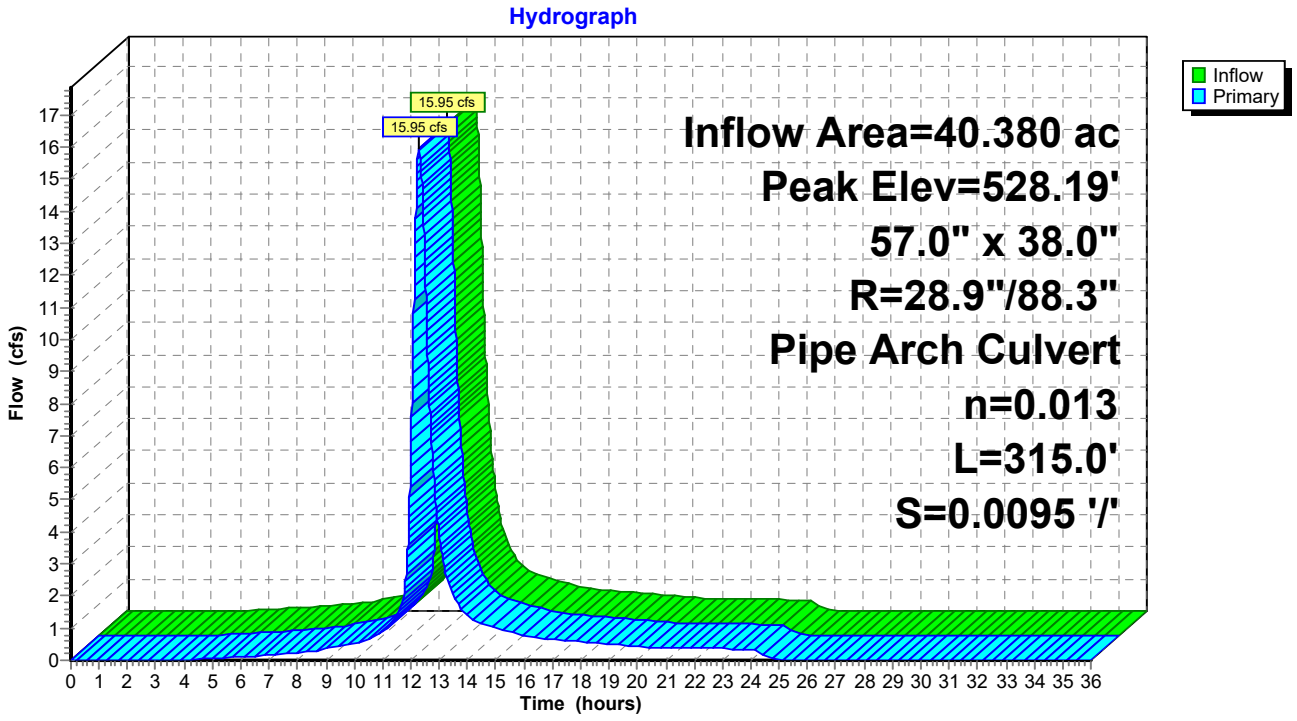
Inflow Area = 40.380 ac, 76.39% Impervious, Inflow Depth = 0.54" for WQv event
Inflow = 15.95 cfs @ 12.28 hrs, Volume= 1.817 af
Outflow = 15.95 cfs @ 12.28 hrs, Volume= 1.817 af, Atten= 0%, Lag= 0.0 min
Primary = 15.95 cfs @ 12.28 hrs, Volume= 1.817 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 528.19' @ 12.28 hrs
Flood Elev= 532.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	527.00'	**57.0" W x 38.0" H, R=28.9"/88.3" Pipe Arch CMP_Arch_1/2 57x38** L= 315.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 527.00' / 524.00' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 11.89 sf

Primary OutFlow Max=15.95 cfs @ 12.28 hrs HW=528.19' (Free Discharge)
1=CMP_Arch_1/2 57x38 (Inlet Controls 15.95 cfs @ 3.29 fps)

Pond 27P: discharge culvert



Summary for Subcatchment 10S: Meadow Street

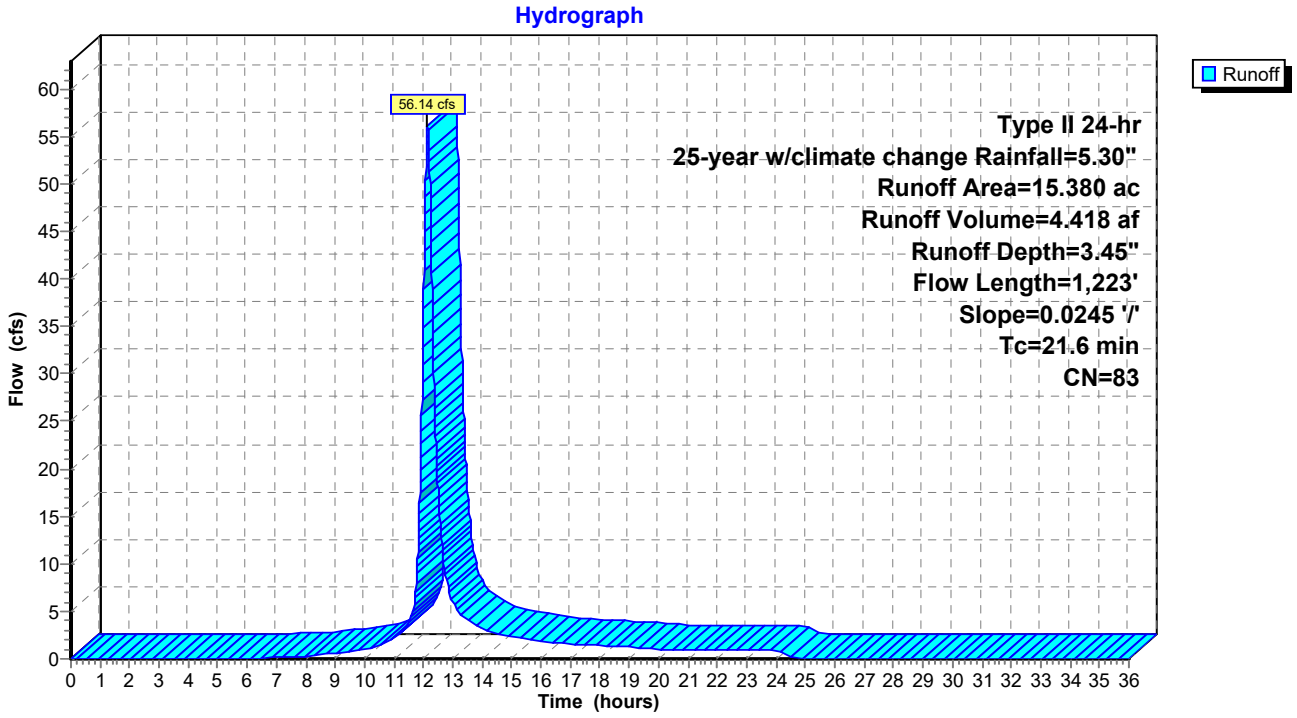
Runoff = 56.14 cfs @ 12.14 hrs, Volume= 4.418 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
15.380	83	1/4 acre lots, 38% imp, HSG C
9.536		62.00% Pervious Area
5.844		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
21.6	1,223	0.0245	0.94		**Lag/CN Method,**

Subcatchment 10S: Meadow Street



Summary for Subcatchment 29S: wal mart plaza

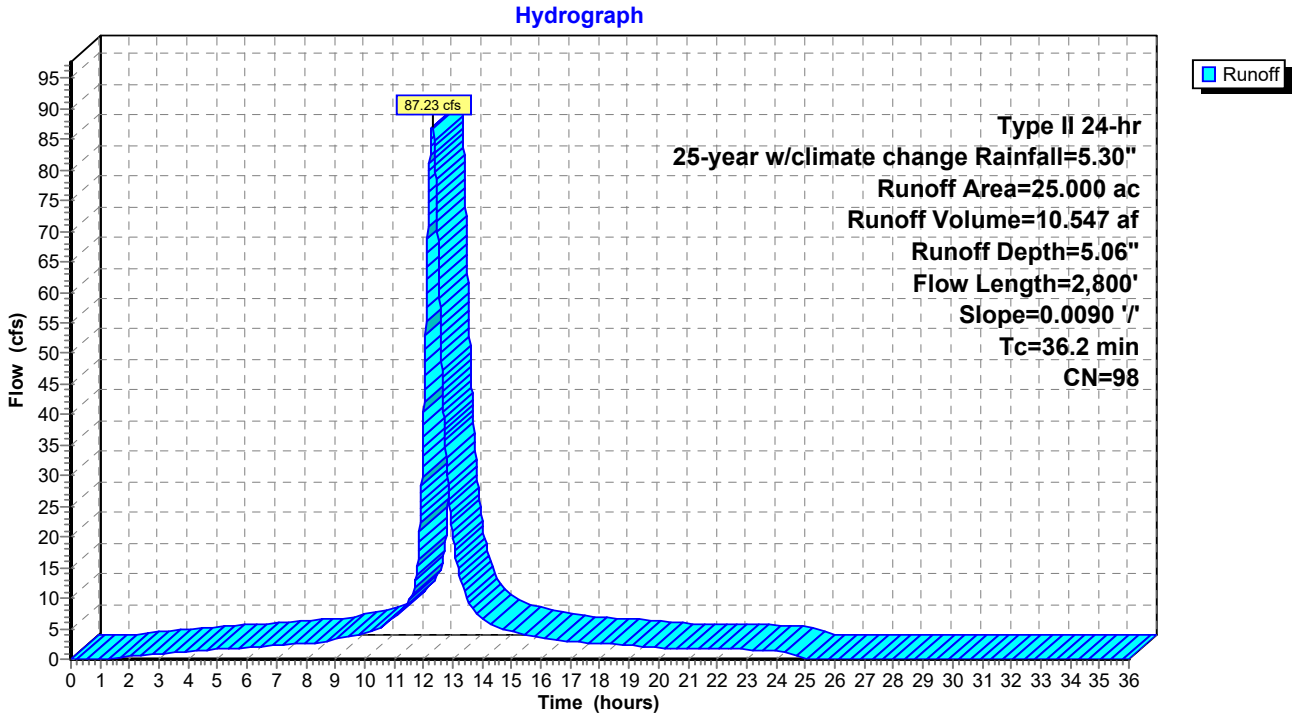
Runoff = 87.23 cfs @ 12.30 hrs, Volume= 10.547 af, Depth= 5.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
25.000	98	Paved parking, HSG C
25.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.2	2,800	0.0090	1.29		**Lag/CN Method,**

Subcatchment 29S: wal mart plaza



Summary for Pond 27P: discharge culvert

[58] Hint: Peaked 1.35' above defined flood level

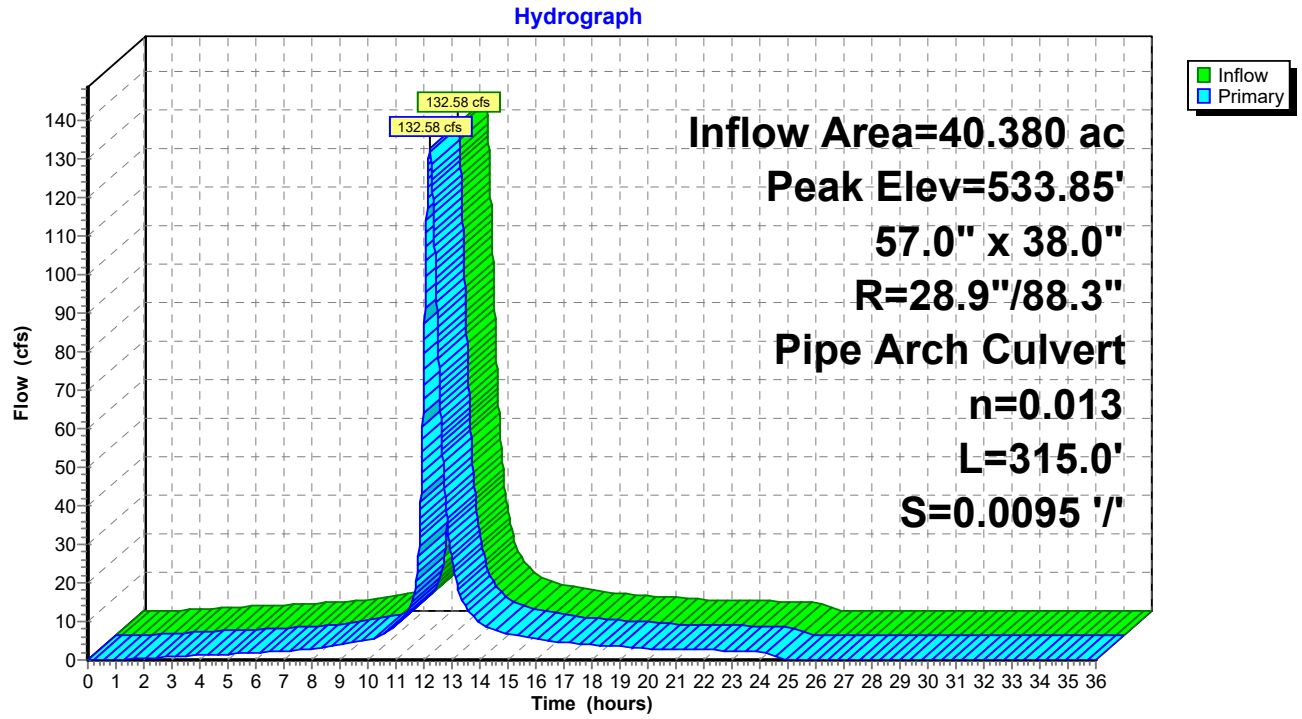
Inflow Area = 40.380 ac, 76.39% Impervious, Inflow Depth = 4.45" for 25-year w/climate change event
Inflow = 132.58 cfs @ 12.22 hrs, Volume= 14.965 af
Outflow = 132.58 cfs @ 12.22 hrs, Volume= 14.965 af, Atten= 0%, Lag= 0.0 min
Primary = 132.58 cfs @ 12.22 hrs, Volume= 14.965 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 533.85' @ 12.22 hrs
Flood Elev= 532.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	527.00'	**57.0" W x 38.0" H, R=28.9"/88.3" Pipe Arch CMP_Arch_1/2 57x38** L= 315.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 527.00' / 524.00' S= 0.0095 '/' Cc= 0.900 n= 0.013, Flow Area= 11.89 sf

Primary OutFlow Max=132.55 cfs @ 12.22 hrs HW=533.85' (Free Discharge)
↑—**1=CMP_Arch_1/2 57x38** (Inlet Controls 132.55 cfs @ 11.14 fps)

Pond 27P: discharge culvert



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

Meadow Street Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 119,600	$ 120,000
	Bonds and Insurance (8%)	L.S.	1	$ 191,360	$ 191,000
	General Conditions (5%)	L.S.	1	$ 119,600	$ 120,000
				General	**$431,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	1000	$ 400	$ 400,000
	New Drain Manhole	Ea.	7	$ 11,000	$ 77,000
	New Deep Sump Catch Basin	Ea.	15	$ 10,000	$ 150,000
	Connect Combined CB to New Storm Drain	L.F.	300	$ 200	$ 60,000
	Replace Sewer Service	Ea.	4	$ 4,000	$ 16,000
	Replace Water Service	Ea.	4	$ 4,000	$ 16,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	Stormwater Quality Treatment Device	Ea.	1	$ 18,500	$ 19,000
	Treatment Device Installation	L.S.	1	$ 4,625	$ 5,000
	Tree Box Planters	Ea.	61	$ 25,000	$ 1,525,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	74	$ 225	$ 17,000
	Hazardous Soils Removal & Disposal	C.Y.	247	$ 165	$ 41,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	15	$ 80	$ 1,000
	Traffic Control Signage	L.S.	1	$ 4,000	$ 4,000
	Flaggers	Hrs.	400	$ 34.26	$ 14,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$2,392,000**

Construction Subtotal	**$2,830,000**
Contingency (30%)	$1,044,000
Engineering Fees	$651,000
Easement Costs	$143,000
Other Administrative Costs (0.5%)	$141,500
TOTAL OPINION OF PROJECT COST	**$4,810,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*
9- *Easement costs based on 1.75x the pro-rated assessed value of the property.*

APPENDIX W

State Street West

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

SHEPHERD LN

CARDINAL PL

Connect existing catch basin to new storm drain (typ)

WATKINS AV

EVERGREEN AV

STATE ST

WEST ST

EMMETT AV

PIERPOINT AV

FAIRVIEW AV

GENO AV

EARL ST

CRESCENT ST

PREVILLE AV

CLEVELAND AV

PARK AV

BAXTER ST

Area of Combined Sewershed Removed : 44.32 Acres

Proposed 36" storm drain

Diversion Manhole

Swirl Concentrator

Connect to existing storm drain

MAP 11 PROJECT AREA : State Street West

CITY OF RUTLAND, VT LONG TERM CONTROL PLAN

October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

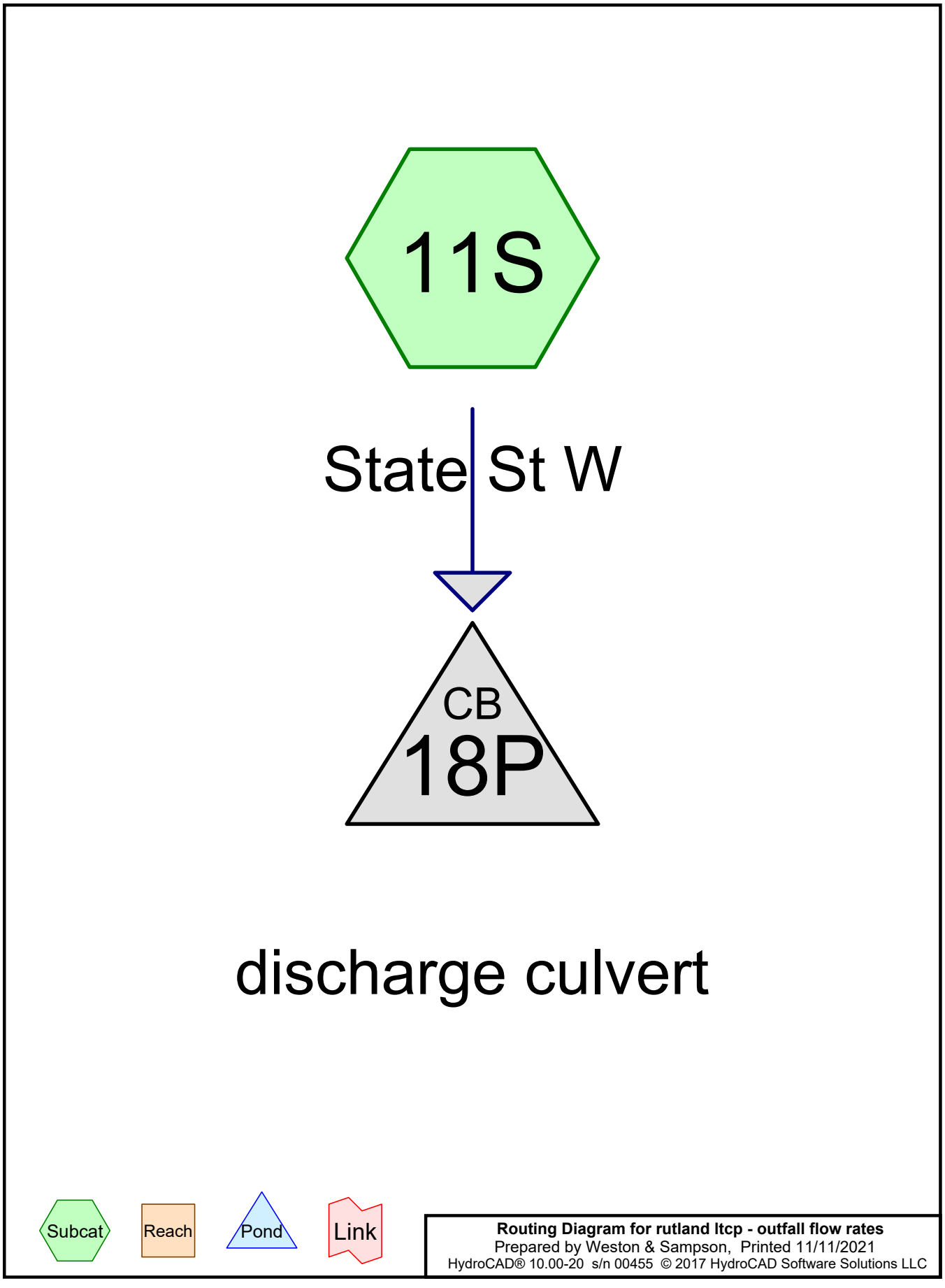
- A
- B

Feet
0 125 250

Weston & Sampson

11

MAP SHEET 11 of 15



Routing Diagram for rutland ltcp - outfall flow rates
Prepared by Weston & Sampson, Printed 11/11/2021
HydroCAD® 10.00-20 s/n 00455 © 2017 HydroCAD Software Solutions LLC

Summary for Subcatchment 11S: State St W

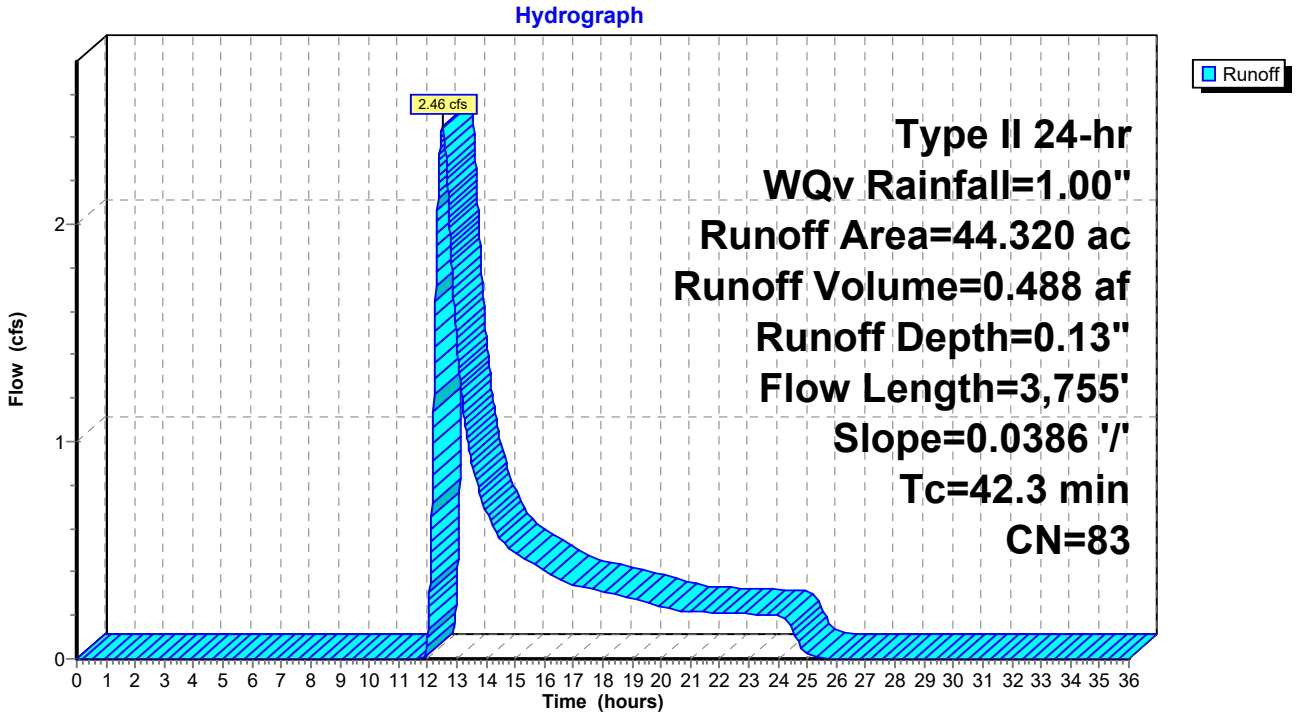
Runoff = 2.46 cfs @ 12.54 hrs, Volume= 0.488 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
44.320	83	1/4 acre lots, 38% imp, HSG C
27.478		62.00% Pervious Area
16.842		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.3	3,755	0.0386	1.48		**Lag/CN Method,**

Subcatchment 11S: State St W



Summary for Pond 18P: discharge culvert

existing route from Pier Point/State St intersection to East Creek outfall

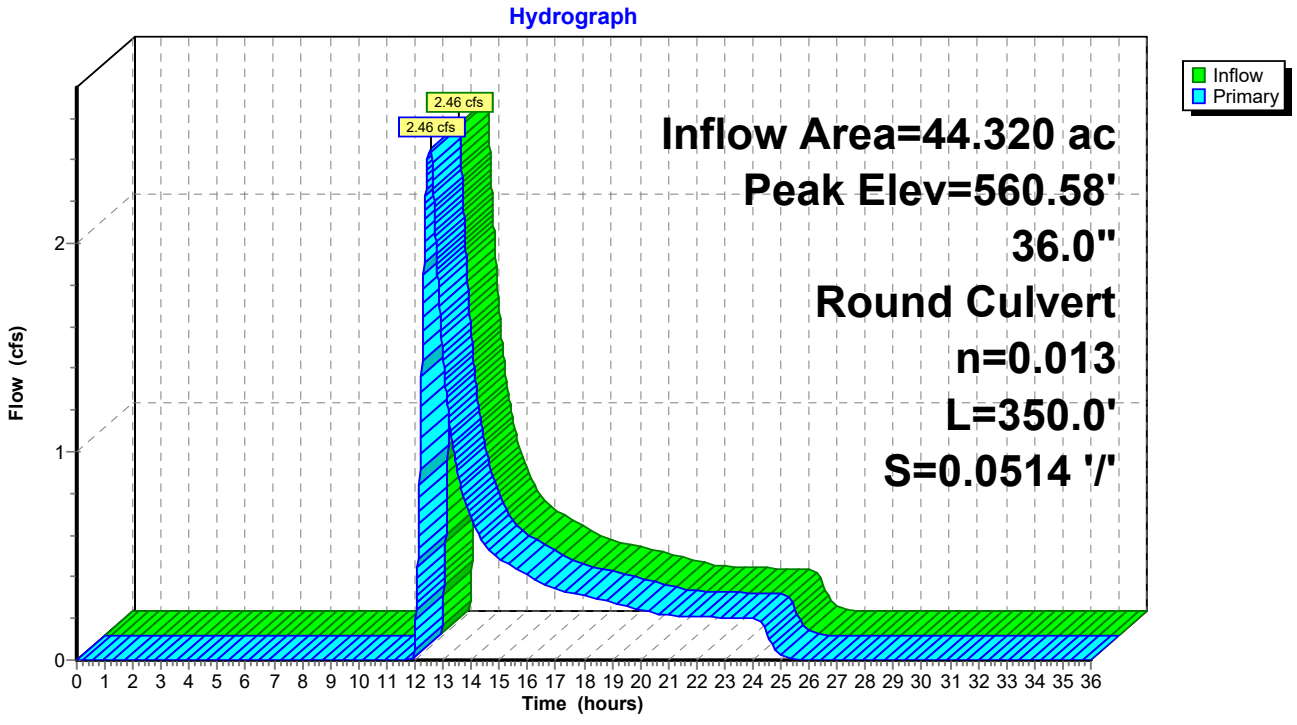
Inflow Area = 44.320 ac, 38.00% Impervious, Inflow Depth = 0.13" for WQv event
Inflow = 2.46 cfs @ 12.54 hrs, Volume= 0.488 af
Outflow = 2.46 cfs @ 12.54 hrs, Volume= 0.488 af, Atten= 0%, Lag= 0.0 min
Primary = 2.46 cfs @ 12.54 hrs, Volume= 0.488 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 560.58' @ 12.54 hrs
Flood Elev= 566.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	560.00'	**36.0" Round Culvert** L= 350.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 560.00' / 542.00' S= 0.0514 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=2.46 cfs @ 12.54 hrs HW=560.58' (Free Discharge)
1=Culvert (Inlet Controls 2.46 cfs @ 2.59 fps)

Pond 18P: discharge culvert



Summary for Subcatchment 11S: State St W

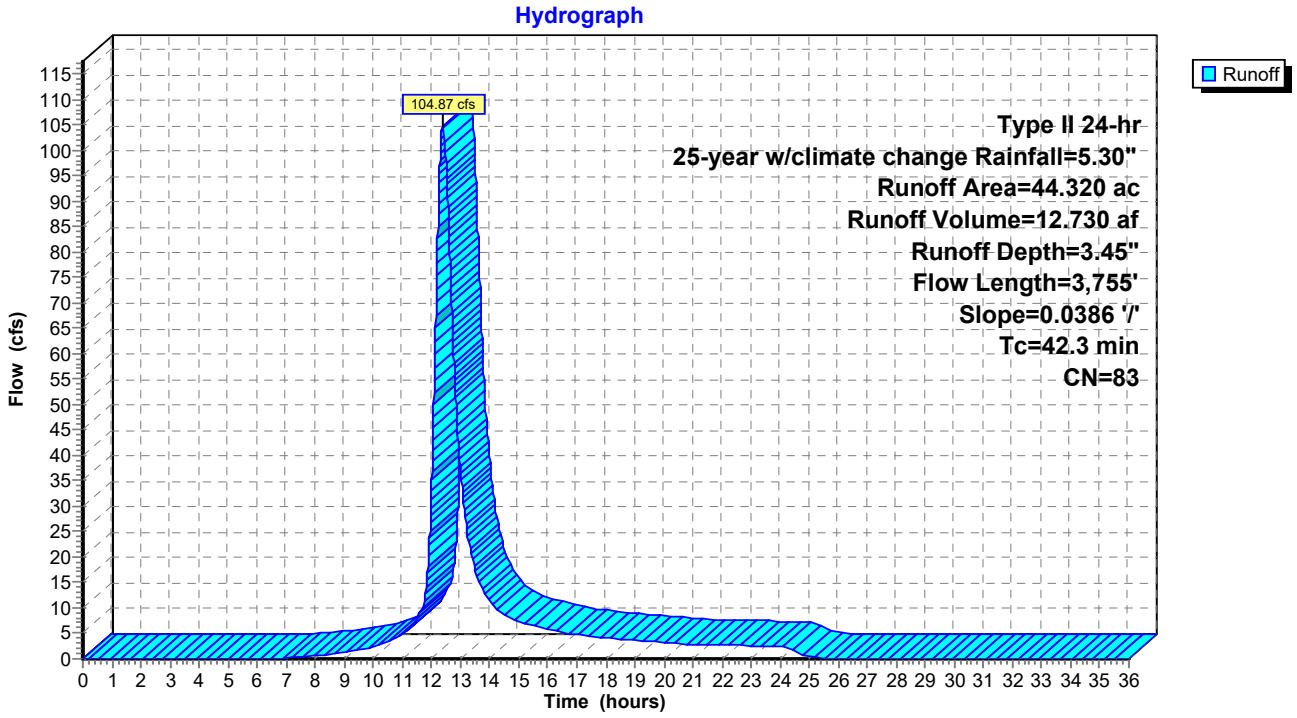
Runoff = 104.87 cfs @ 12.37 hrs, Volume= 12.730 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
44.320	83	1/4 acre lots, 38% imp, HSG C
27.478		62.00% Pervious Area
16.842		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
42.3	3,755	0.0386	1.48		**Lag/CN Method,**

Subcatchment 11S: State St W



Summary for Pond 18P: discharge culvert

existing route from Pier Point/State St intersection to East Creek outfall

[58] Hint: Peaked 4.99' above defined flood level

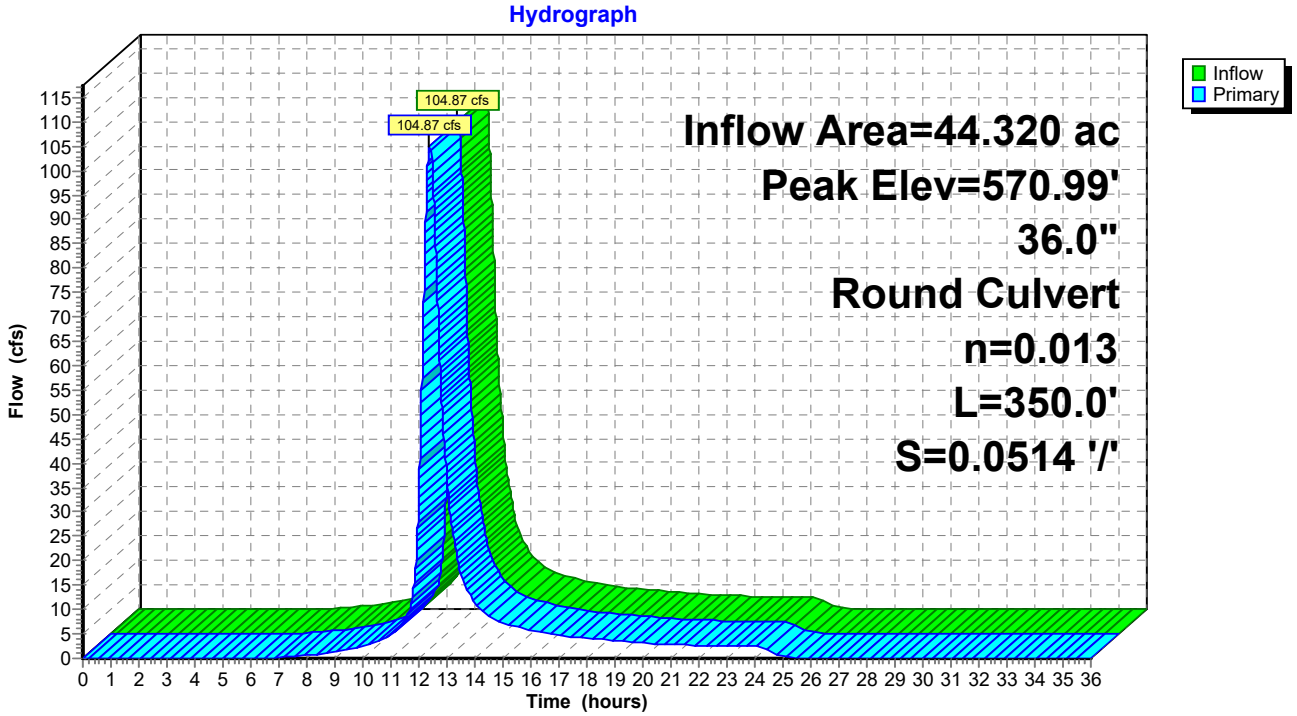
Inflow Area = 44.320 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 104.87 cfs @ 12.37 hrs, Volume= 12.730 af
Outflow = 104.87 cfs @ 12.37 hrs, Volume= 12.730 af, Atten= 0%, Lag= 0.0 min
Primary = 104.87 cfs @ 12.37 hrs, Volume= 12.730 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 570.99' @ 12.37 hrs
Flood Elev= 566.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	560.00'	**36.0" Round Culvert** L= 350.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 560.00' / 542.00' S= 0.0514 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf

Primary OutFlow Max=104.87 cfs @ 12.37 hrs HW=570.99' (Free Discharge)
1=Culvert (Inlet Controls 104.87 cfs @ 14.84 fps)

Pond 18P: discharge culvert



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

State Street West Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 157,900	$ 158,000
	Bonds and Insurance (8%)	L.S.	1	$ 252,640	$ 253,000
	General Conditions (5%)	L.S.	1	$ 157,900	$ 158,000
				General	**$569,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	5590	$ 400	$ 2,236,000
	Existing Storm Drain Upgrade	L.F.	380	$ 400	$ 152,000
	New Drain Manhole	Ea.	13	$ 11,000	$ 143,000
	New Deep Sump Catch Basin	Ea.	12	$ 10,000	$ 120,000
	Connect Combined CB to New Storm Drain	L.F.	240	$ 200	$ 48,000
	Replace Sewer Service	Ea.	23	$ 4,000	$ 92,000
	Replace Water Service	Ea.	23	$ 4,000	$ 92,000
	Stormwater Quality Treatment Device	Ea.	1	$ 28,000	$ 28,000
	Treatment Device Installation	L.S.	1	$ 7,000	$ 7,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	414	$ 225	$ 93,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	83	$ 80	$ 7,000
	Hazardous Soils Removal & Disposal	C.Y.	254	$ 165	$ 42,000
	Traffic Control Signage	L.S.	1	$ 18,000	$ 18,000
	Flaggers	Hrs.	1800	$ 36.00	$ 65,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$3,158,000**
				Construction Subtotal	**$3,730,000**
				Contingency (30%)	$1,376,000
				Engineering Fees	$858,000
				Other Administrative Costs (0.5%)	$186,500
				TOTAL OPINION OF PROJECT COST	**$6,160,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX X

State Street East

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Connect existing catch basin to new storm drain (typ)

Area of Combined Sewershed Removed : 50.21 Acres

Proposed 36" x 60" box culvert

HARRISON AV
KINGSLEY CT
LIBRARY AV
CHURCH ST
CHESTNUT AV
MAPLE ST
CLEVELAND AV
BAXTER ST
ROBBINS ST
PINE ST
SUMMER ST
WILLIAMS ST
GROVE ST
WATER ST
NOYES AV
STATE ST
JUSTICE SQ
MERCHANTS ROW
COTTAGE ST
LALOR AV
WEST ST

Project 17: State Street East

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
July 2022

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

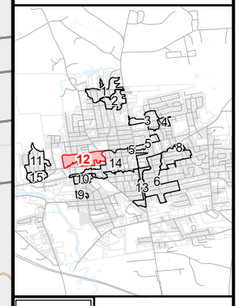
- Project Watershed Boundary
- Sanitary Sewer Manhole
- Combined Sewer Manhole
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Combined Sewer
- Sanitary Force Main
- Proposed Storm Drain
- Combined Sewershed
- Sewer Service Area
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone
- 500 Year Flood Zone
- Hazardous Waste Sites
- Bioretention Bump-out
- Bioretention

Soil Rating Type

- A
- B

Feet
0 100 200

Weston & Sampson



N

Summary for Subcatchment 12S: State St E

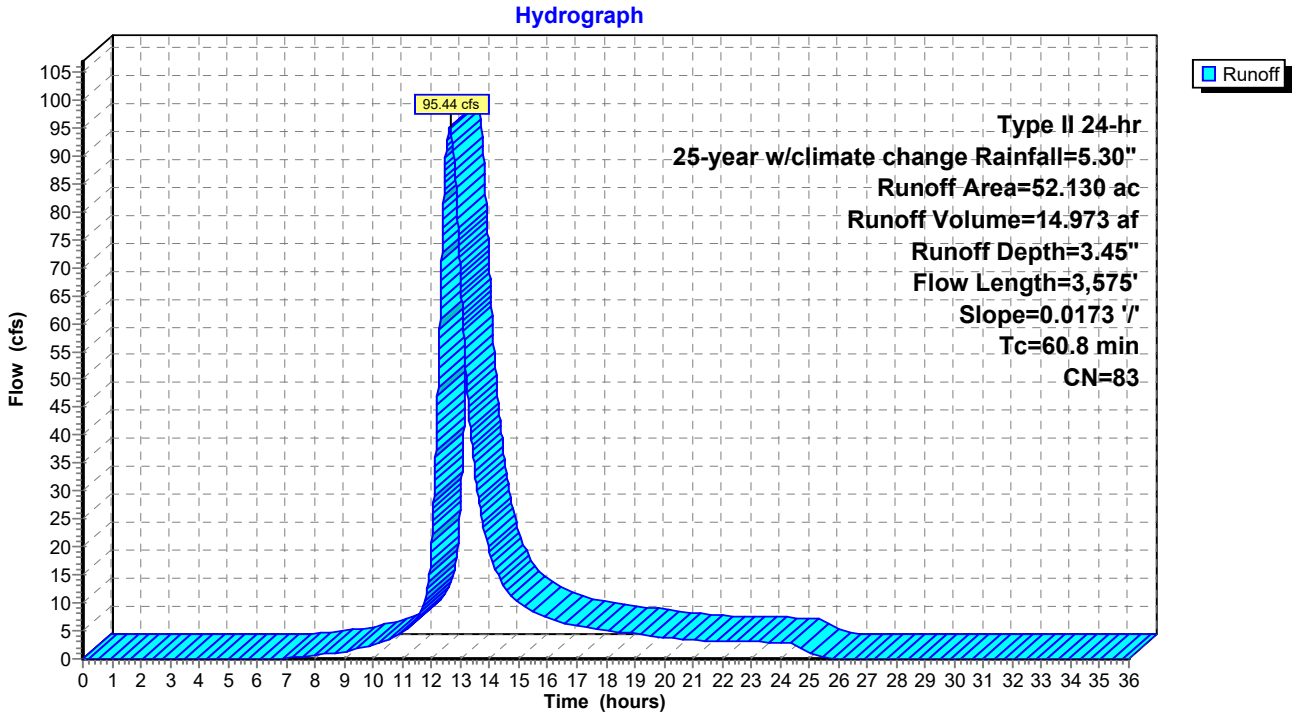
Runoff = 95.44 cfs @ 12.63 hrs, Volume= 14.973 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
52.130	83	1/4 acre lots, 38% imp, HSG C
32.321		62.00% Pervious Area
19.809		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
60.8	3,575	0.0173	0.98		**Lag/CN Method,**

Subcatchment 12S: State St E



Summary for Pond 20P: discharge culvert

from cleveland ave intersection to outfall

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[58] Hint: Peaked 1.06' above defined flood level

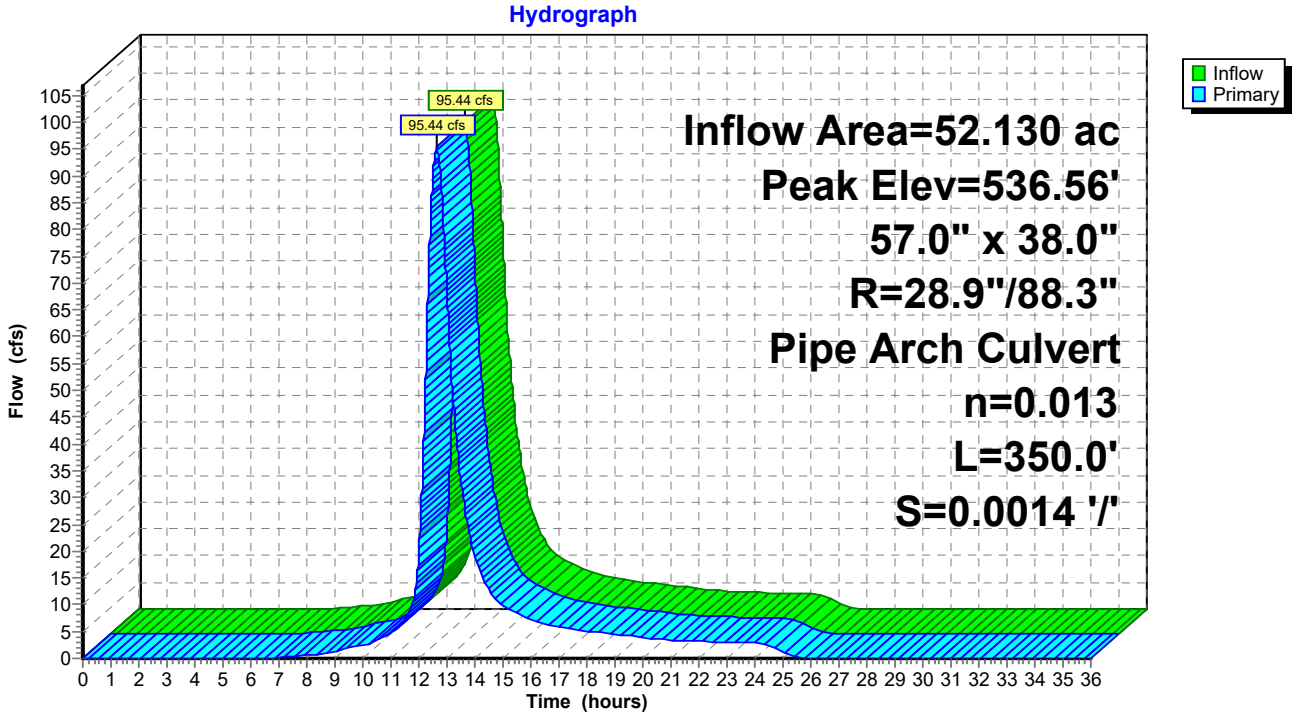
Inflow Area = 52.130 ac, 38.00% Impervious, Inflow Depth = 3.45" for 25-year w/climate change event
Inflow = 95.44 cfs @ 12.63 hrs, Volume= 14.973 af
Outflow = 95.44 cfs @ 12.63 hrs, Volume= 14.973 af, Atten= 0%, Lag= 0.0 min
Primary = 95.44 cfs @ 12.63 hrs, Volume= 14.973 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Peak Elev= 536.56' @ 12.63 hrs
Flood Elev= 535.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	530.50'	**57.0" W x 38.0" H, R=28.9"/88.3" Pipe Arch CMP_Arch_1/2 57x38** L= 350.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 530.50' / 530.00' S= 0.0014 '/' Cc= 0.900 n= 0.013, Flow Area= 11.89 sf

Primary OutFlow Max=95.42 cfs @ 12.63 hrs HW=536.56' (Free Discharge)
↑—**1=CMP_Arch_1/2 57x38** (Barrel Controls 95.42 cfs @ 8.02 fps)

Pond 20P: discharge culvert



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

State Street East Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 437,300	$ 437,000
	Bonds and Insurance (8%)	L.S.	1	$ 699,680	$ 700,000
	General Conditions (5%)	L.S.	1	$ 437,300	$ 437,000
				General	**$1,574,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	6596	$ 400	$ 2,638,000
	New Box Culvert	L.F.	750	$ 2,700	$ 2,025,000
	New Drain Manhole	Ea.	12	$ 11,000	$ 132,000
	New Deep Sump Catch Basin	Ea.	38	$ 10,000	$ 380,000
	Connect Combined CB to New Storm Drain	L.F.	760	$ 200	$ 152,000
	Replace Sewer Service	Ea.	37	$ 4,000	$ 148,000
	Replace Water Service	Ea.	37	$ 4,000	$ 148,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	Curbside Bioretention	L.F.	1910	$ 1,500	$ 2,865,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	489	$ 225	$ 110,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	98	$ 80	$ 8,000
	Traffic Control Signage	L.S.	1	$ 21,000	$ 21,000
	Flaggers	Hrs.	2100	$ 34.26	$ 72,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$8,746,000**
				Construction Subtotal	**$10,320,000**
				Contingency (30%)	$3,808,000
				Engineering Fees	$2,374,000
				Other Administrative Costs (0.5%)	$516,000
				TOTAL OPINION OF PROJECT COST	**$17,020,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX Y

South Main Street

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Proposed 24" storm drain

Area of Combined Sewershed Removed : 17.33 Acres

Diversion Manhole

Swirl Concentrator

Proposed 24" storm drain

WALES ST
COURT ST
WASHINGTON ST
CENTER ST
COURT SQ
WEST ST
WOODSTOCK AV
NORTON PL
N MAIN ST
SOUTH ST
POST ST
PROSPECT ST
PLEASANT ST
NICKWACKETT ST
MADISON ST
STRONGS AV
MANSFIELD PL
SHELDON PL
TERRILL ST
S MAIN ST
E CENTER ST
MORSE PL
PARK DR
SCALE AV
HOPKINS ST
ROYCE ST
ENGREM AV
SPELLMAN TERR
E WASHINGTON ST
EAST ST
E CENTER ST
CLOVER ST
IVY ST
AVENUE B
AVENUE C
JACKSON AV
KILLINGTON AV
LAFAYETTE ST
EASTERLY AV
BUTTERFLY AV

MAP 13
PROJECT AREA : South Main Street
CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

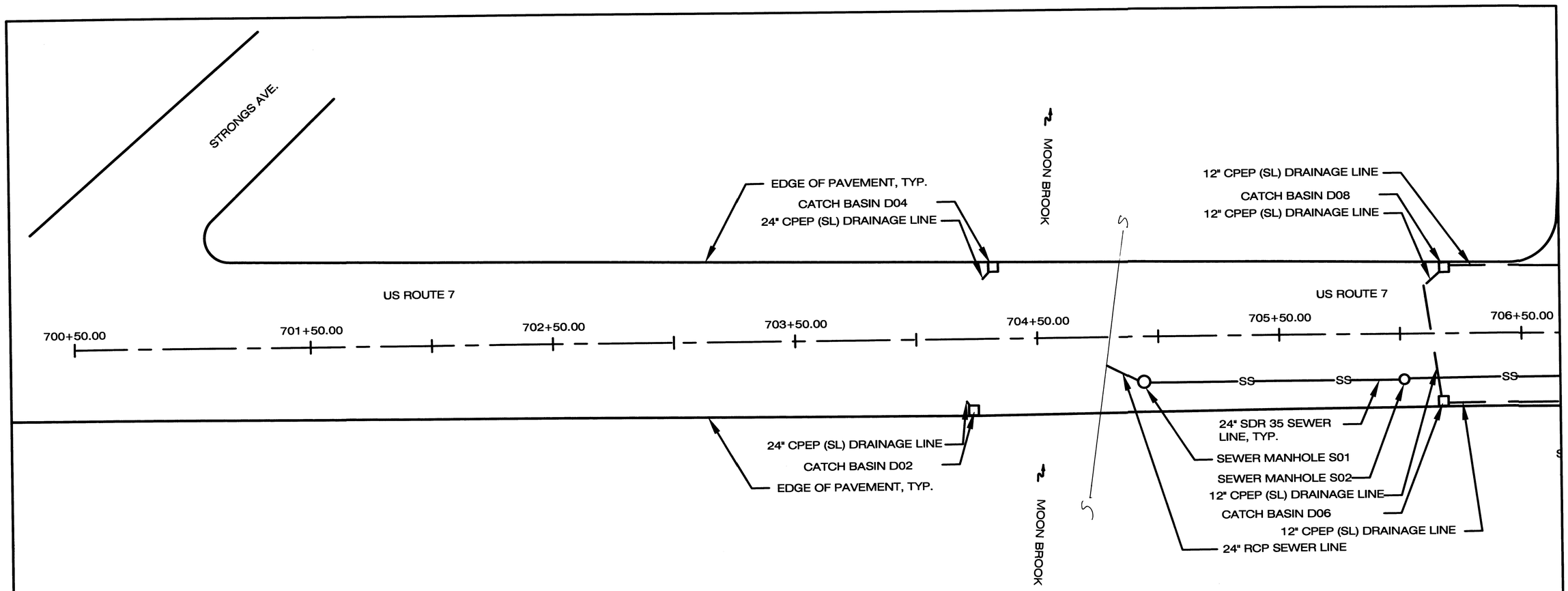
- A
- B

Feet
0 150 300

Weston & Sampson

13

MAP SHEET 13 of 15



LEGEND:

EDGE OF PAVEMENT:	———	SEWER STRUCTURE:	○
SANITARY SEWER LINE:	——SS——	CATCH BASIN:	□
DRAINAGE LINE:	——— — ———	WATER VALVE:	⧗
WATER LINE:	——W——		

Description	Northing	Easting	Invert Out Elevation
Catch Basin D02	401198.1320'	1515768.1625'	534.170'
Catch Basin D04	401199.4940'	1515708.4540'	533.950'
Catch Basin D06	401390.6685'	1515742.6185'	536.720'
Catch Basin D08	401384.7040'	1515687.7195'	535.540'
Sewer Manhole S01	401266.6970'	1515748.7235'	531.820'
Sewer Manhole S02	401373.4845'	1515735.4625'	533.290'

CCI:

casella CONSTRUCTION, INC.

CCI: **CASELLA CONSTRUCTION, INC.**
25 INDUSTRIAL LANE
MENDON, VERMONT 05701
PHONE: 802.773.0052
FAX: 802.747.7992

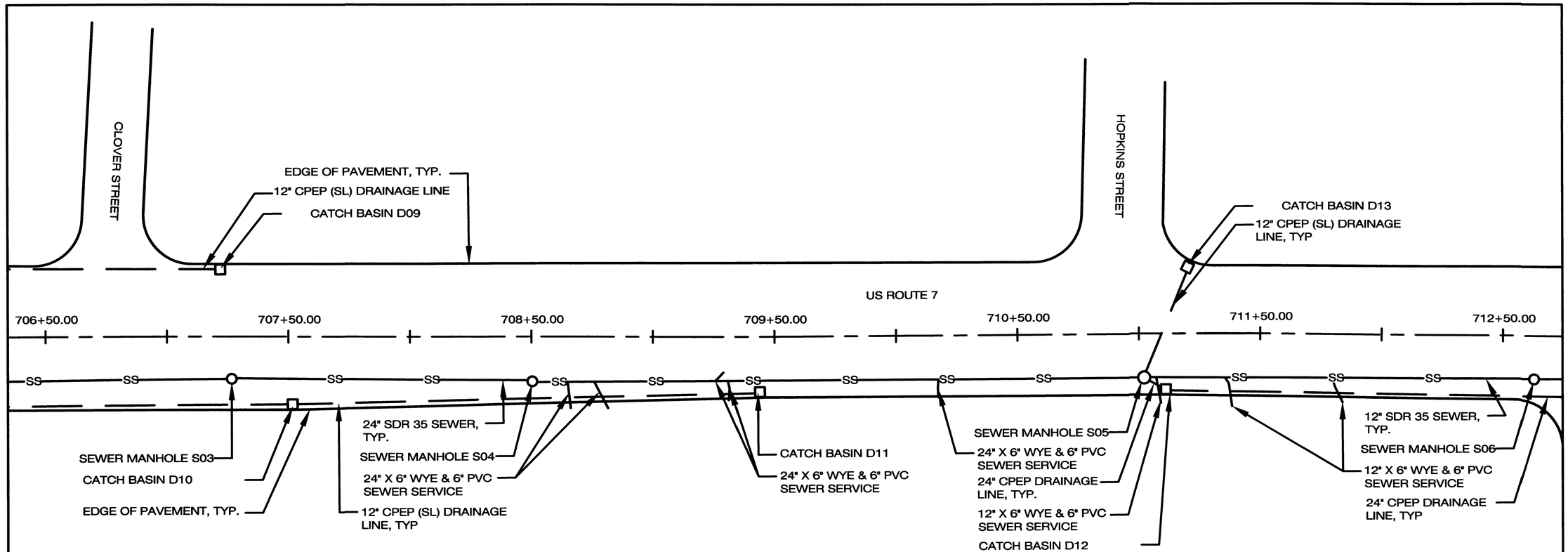
PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT
South Main St - New Sanitary sewer and New separated (partially) Storm sewer

DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

CLIENT: **PECKHAM INDUSTRIES, INC.**
1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845
PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	1 OF 6
DRAWING SCALE:	1"= 40'

1349-F



LEGEND:

EDGE OF PAVEMENT: ——————

SANITARY SEWER LINE: ——SS——

DRAINAGE LINE: — — —

WATER LINE: ——W——

SEWER STRUCTURE: ○

CATCH BASIN: □

WATER VALVE: ⧗

Description	Northing	Easting	Invert Out Elevation
Catch Basin D09	401487.3978'	1515674.5677'	537.460'
Catch Basin D10	401523.6055'	1515725.9160'	539.560'
Catch Basin D11	401713.8275'	1515697.5995'	555.560'
Catch Basin D12	401879.6025'	1515676.3815'	568.060'
Catch Basin D13	401882.4878'	1515625.3885'	570.190'
Sewer Manhole S03	401497.3930'	1515718.5215'	535.290'
Sewer Manhole S04	401620.3005'	1515704.5630'	545.990'
Sewer Manhole S05	401870.0855'	1515672.6495'	565.840'
Sewer Manhole S06	402029.4295'	1515653.6320'	576.450'

CCI:

CCI: **CASELLA CONSTRUCTION, INC.**

25 INDUSTRIAL LANE
MENDON, VERMONT 05701

PHONE: 802.773.0052
FAX: 802.747.7992

PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT

DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

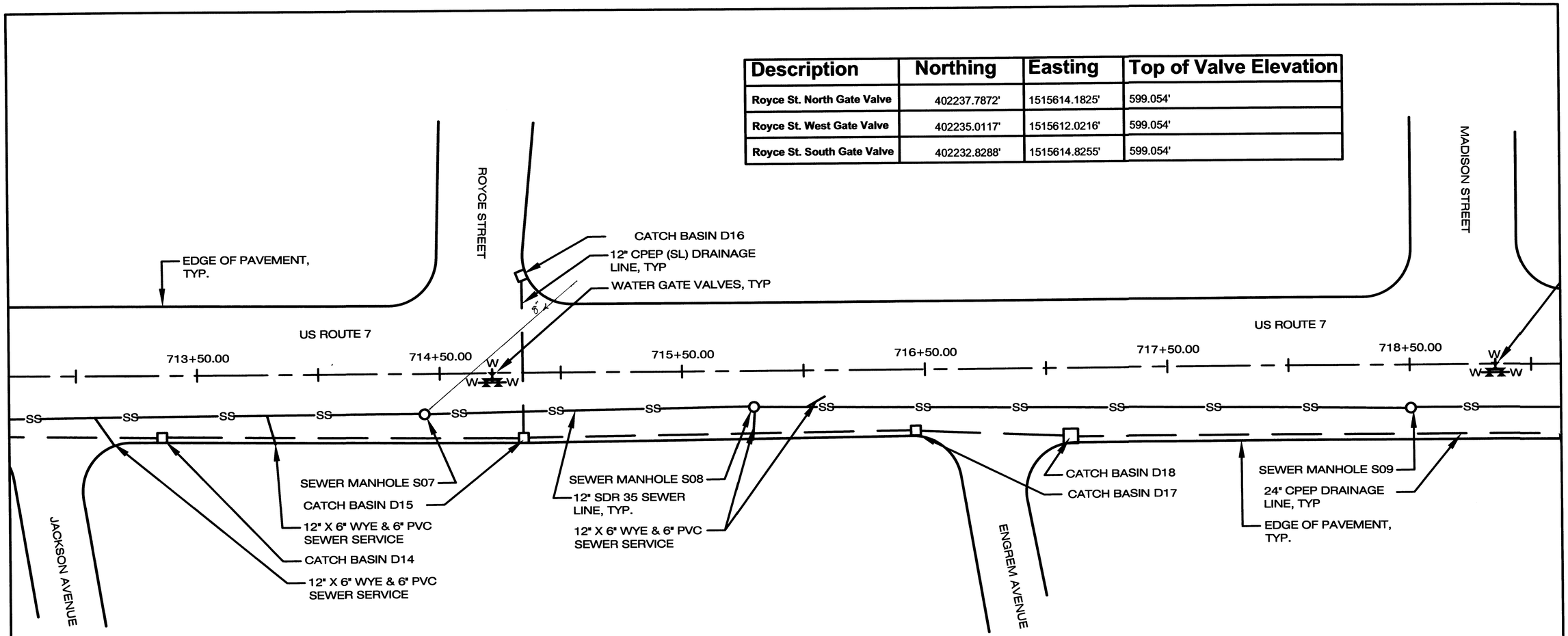
CLIENT: **PECKHAM INDUSTRIES, INC.**

1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845

PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	2 OF 6
DRAWING SCALE:	1"= 40'

Description	Northing	Easting	Top of Valve Elevation
Royce St. North Gate Valve	402237.7872'	1515614.1825'	599.054'
Royce St. West Gate Valve	402235.0117'	1515612.0216'	599.054'
Royce St. South Gate Valve	402232.8288'	1515614.8255'	599.054'



LEGEND:

EDGE OF PAVEMENT: ——————

SANITARY SEWER LINE: ——SS——

DRAINAGE LINE: —— —— ——

WATER LINE: ——W——

SEWER STRUCTURE: ○

CATCH BASIN: □

WATER VALVE: ⧗

Description	Northing	Easting	Invert Out Elevation
Catch Basin D14	402102.7500'	1515652.8795'	580.170'
Catch Basin D15	402250.8285'	1515635.6780'	592.990'
Catch Basin D16	402242.2234'	1515569.4595'	596.130'
Catch Basin D17	402410.9990'	1515613.9970'	602.310'
Catch Basin D18	402474.7285'	1515608.9850'	605.530'
Sewer Manhole S07	402208.9760'	1515630.5475'	588.400'
Sewer Manhole S08	402343.4880'	1515611.8905'	597.240'
Sewer Manhole S09	402612.7490'	1515581.1950'	612.600'

CCI:

CCI: **CASELLA CONSTRUCTION, INC.**

25 INDUSTRIAL LANE
MENDON, VERMONT 05701

PHONE: 802.773.0052
FAX: 802.747.7992

PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT

DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

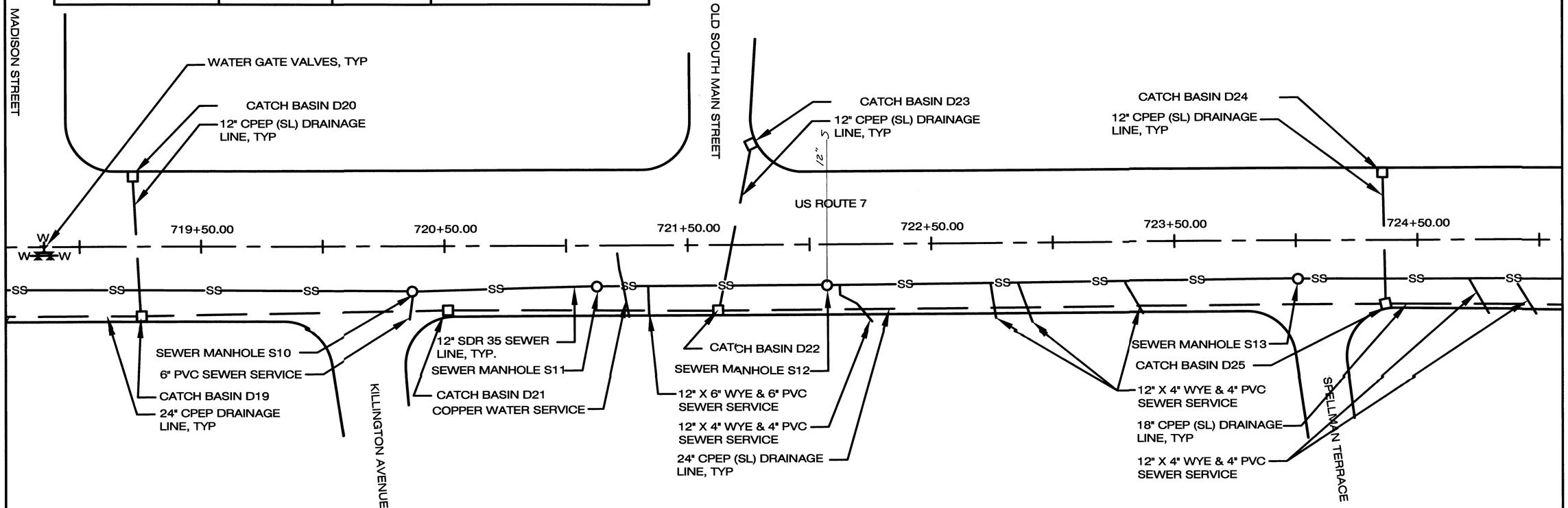
CLIENT: **PECKHAM INDUSTRIES, INC.**

1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845

PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	3 OF 6
DRAWING SCALE:	1"= 40'

Description	Northing	Easting	Top of Valve Elevation
Madison St. North Gate Valve	402648.2602'	1515562.4695'	618.009'
Madison St. West Gate Valve	402645.4595'	1515560.3118'	618.009'
Madison St. South Gate Valve	402643.3018'	1515563.1125'	618.009'



LEGEND:

EDGE OF PAVEMENT: ——————

SANITARY SEWER LINE: ——SS——

DRAINAGE LINE: —— ——

WATER LINE: ——W——

SEWER STRUCTURE: ○

CATCH BASIN: □

WATER VALVE: ⧗

Description	Northing	Easting	Invert Out Elevation
Catch Basin D19	402688.6110'	1515582.6685'	615.790'
Catch Basin D20	402678.1112'	1515526.2317'	617.140'
Catch Basin D21	402813.2925'	1515564.8700'	619.850'
Catch Basin D22	402923.5805'	1515551.3800'	622.740'
Catch Basin D23	402928.6200'	1515481.8803'	624.560'
Catch Basin D24	403187.7146'	1515461.9294'	626.430'
Catch Basin D25	403195.5620'	1515515.2625'	624.950'
Sewer Manhole S10	402797.6960'	1515558.8585'	617.640'
Sewer Manhole S11	402872.7710'	1515547.6440'	619.390'
Sewer Manhole S12	402966.5245'	1515535.4485'	621.520'
Sewer Manhole S13	403158.4440'	1515509.5460'	622.780'

CCI:

CCI: **CASELLA CONSTRUCTION, INC.**

25 INDUSTRIAL LANE
MENDON, VERMONT 05701

PHONE: 802.773.0052
FAX: 802.747.7992

PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT

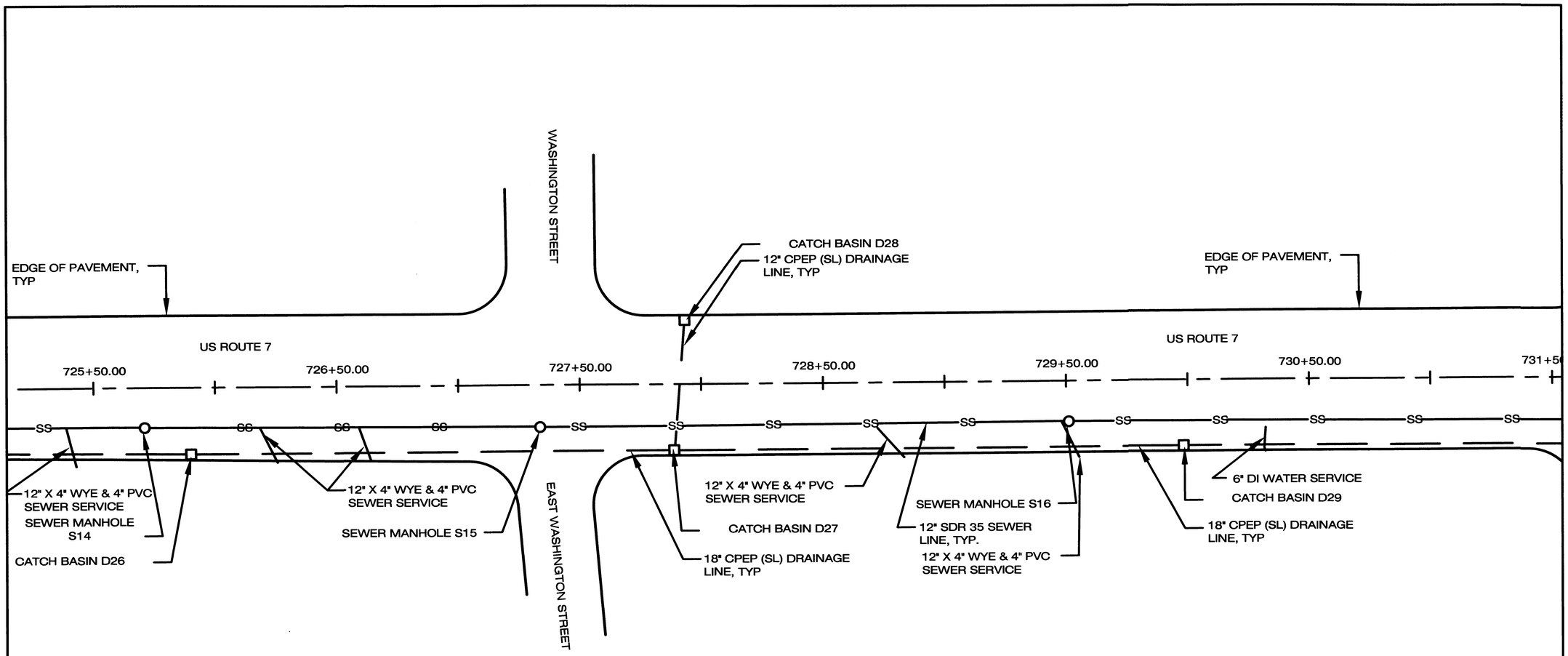
DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

CLIENT: **PECKHAM INDUSTRIES, INC.**

1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845

PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	4 OF 6
DRAWING SCALE:	1"= 40'



LEGEND:

EDGE OF PAVEMENT: ———

SANITARY SEWER LINE: ——SS——

DRAINAGE LINE: — — —

WATER LINE: ——W——

SEWER STRUCTURE: ○

CATCH BASIN: □

WATER VALVE: ⧗

Description	Northing	Easting	Invert Out Elevation
Catch Basin D26	403347.7115'	1515496.8440'	627.700'
Catch Basin D27	403544.7825'	1515471.0295'	629.050'
Catch Basin D28	403542.5830'	1515417.3782'	631.330'
Catch Basin D29	403752.5610'	1515443.9945'	629.930'
Sewer Manhole S14	403327.3460'	1515488.2975'	626.150'
Sewer Manhole S15	403488.7940'	1515468.2575'	627.170'
Sewer Manhole S16	403704.3300'	1515439.6815'	629.070'

CCI:

CCI: **CASELLA CONSTRUCTION, INC.**

25 INDUSTRIAL LANE
MENDON, VERMONT 05701

PHONE: 802.773.0052
FAX: 802.747.7992

PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT

DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

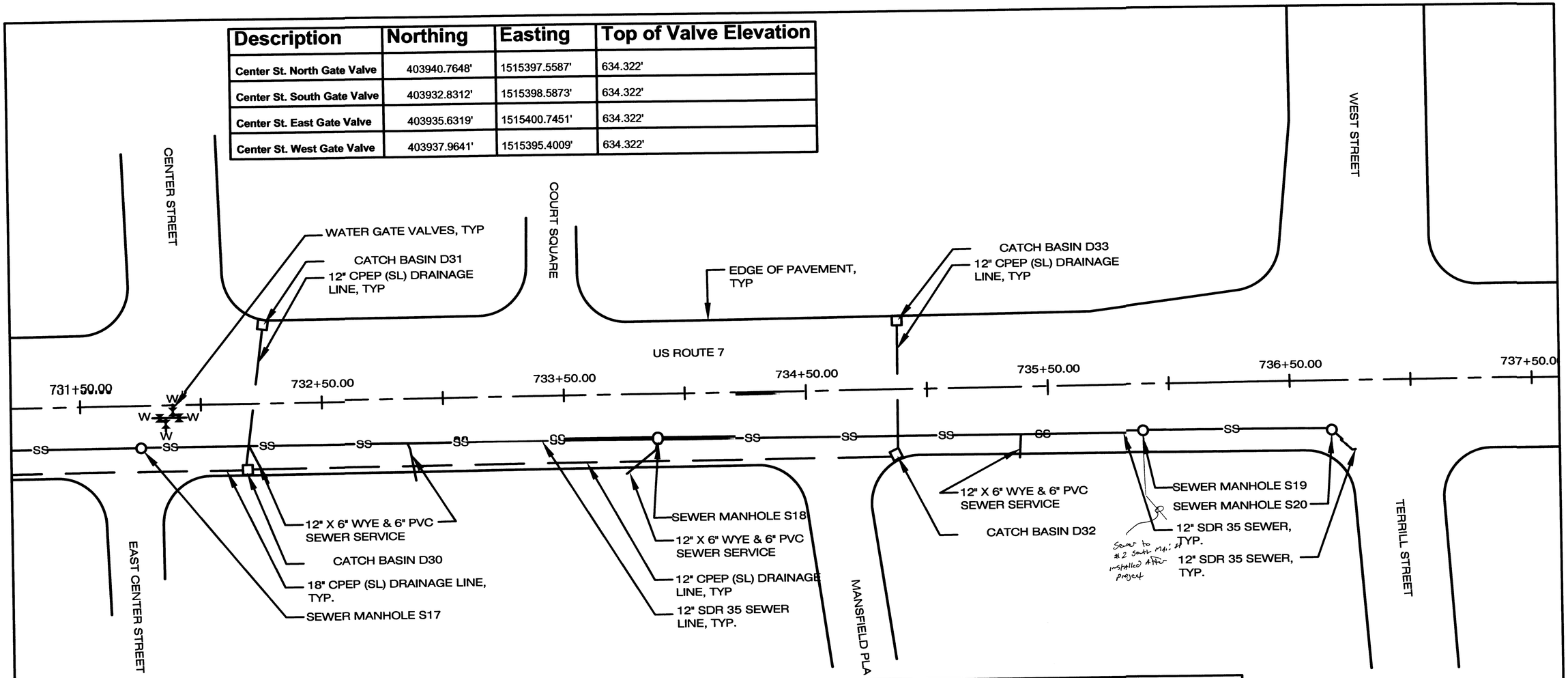
CLIENT: **PECKHAM INDUSTRIES, INC.**

1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845

PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	5 OF 6
DRAWING SCALE:	1"= 40'

Description	Northing	Easting	Top of Valve Elevation
Center St. North Gate Valve	403940.7648'	1515397.5587'	634.322'
Center St. South Gate Valve	403932.8312'	1515398.5873'	634.322'
Center St. East Gate Valve	403935.6319'	1515400.7451'	634.322'
Center St. West Gate Valve	403937.9641'	1515395.4009'	634.322'



Description	Northing	Easting	Invert Out Elevation
Catch Basin D30	403971.3785'	1515415.7640'	631.100'
Catch Basin D31	403971.0231'	1515356.4238'	633.630'
Catch Basin D32	404236.9380'	1515380.2745'	635.490'
Catch Basin D33	404231.2592'	1515326.1275'	636.320'
Sewer Manhole S17	403926.4910'	1515411.6705'	630.090'
Sewer Manhole S18	404138.3700'	1515384.7280'	630.660'
Sewer Manhole S19	404337.3755'	1515360.1510'	634.330'
Sewer Manhole S20	404414.9010'	1515351.2385'	635.440'

LEGEND:

EDGE OF PAVEMENT: ——————

SANITARY SEWER LINE: ——SS——

DRAINAGE LINE: —— ——

WATER LINE: ——W——

SEWER STRUCTURE: O

CATCH BASIN: □

WATER VALVE: ⧗

CCI:

CCI: **CASELLA CONSTRUCTION, INC.**

25 INDUSTRIAL LANE
MENDON, VERMONT 05701

PHONE: 802.773.0052
FAX: 802.747.7992

PROJECT: **RUTLAND CITY STP 019 - 3 (57)**
RUTLAND, VERMONT

DRAWING: UTILITY ASBUILT (SEWER, WATER, AND DRAINAGE)

CLIENT: **PECKHAM INDUSTRIES, INC.**

1557 STATE ROUTE 9, SUITE 3
LAKE GEORGE, NEW YORK 12845

PHONE: 518.792.3157
FAX: 518.792.3138

DRAWN BY:	JDR
CHECKED BY:	KRC
DATE:	11/19/14
DRAWING NUMBER:	6 OF 6
DRAWING SCALE:	1"= 40'

Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

South Main Street Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 28,850	$ 29,000
	Bonds and Insurance (8%)	L.S.	1	$ 46,160	$ 46,000
	General Conditions (5%)	L.S.	1	$ 28,850	$ 29,000
				General	**$104,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	1000	$ 400	$ 400,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	New Deep Sump Catch Basin	Ea.	3	$ 10,000	$ 30,000
	Connect Combined CB to New Storm Drain	L.F.	60	$ 200	$ 12,000
	New Drain Manhole	Ea.	1	$ 11,000	$ 11,000
	Stormwater Quality Treatment Device	Ea.	1	$ 20,000	$ 20,000
	Treatment Device Installation	L.S.	1	$ 5,000	$ 5,000
	Replace Sewer Service	Ea.	2	$ 4,000	$ 8,000
	Replace Water Service	Ea.	2	$ 4,000	$ 8,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	74	$ 225	$ 17,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	15	$ 80	$ 1,000
	Traffic Control Signage	L.S.	1	$ 4,000	$ 4,000
	Flaggers	Hrs.	400	$ 36.00	$ 14,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$577,000**
				Construction Subtotal	**$690,000**
				Contingency (30%)	$255,000
				Engineering Fees	$159,000
				Other Administrative Costs (0.5%)	$34,500
				TOTAL OPINION OF PROJECT COST	**$1,140,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX Z

West Street East

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

Area of Combined Sewershed Removed : 92.31 Acres

Connect existing catch basin to new storm drain (typ)

Proposed swirl concentrator & diversion manhole

Proposed swirl concentrator & diversion manhole

Proposed swirl concentrator & diversion manhole

Proposed 60" x 46" pipe arch storm drain

KENDALL AV
TEMPLE ST
N MAIN ST
BURNHAM AV
LIBRARY AV
MAPLE ST
GROVE ST
CHESTNUT AV
WILLIAMS ST
PINE ST
AIKEN PL
WOODSTOCK AV
ELM ST
CHURCH ST
GRANT AV
NICHOLS ST
NORTON PL
ROBBINS ST
CLEVELAND AV
BAXTER ST
NOYES AV
STATE ST
MERCHANTS ROW
JUSTICE SQ
COTTAGE ST
LINCOLN AV
TERRILL ST
S MAIN ST
WEST ST
WILLOW ST
EVELYN ST
COURT ST
CENTER ST
COURT SQ
NICKWACKETT ST
WASHINGTON ST
PLEASANT ST
MORSE PL
PARK DR
TRAVERSE PL
MEADOW ST
SCHOOL ST
UNION ST

MAP 14
PROJECT AREA : West Street East

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN
October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 150 300

Weston & Sampson

14

N

MAP SHEET 14 of 15

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Summary for Subcatchment 28S: Nichols St

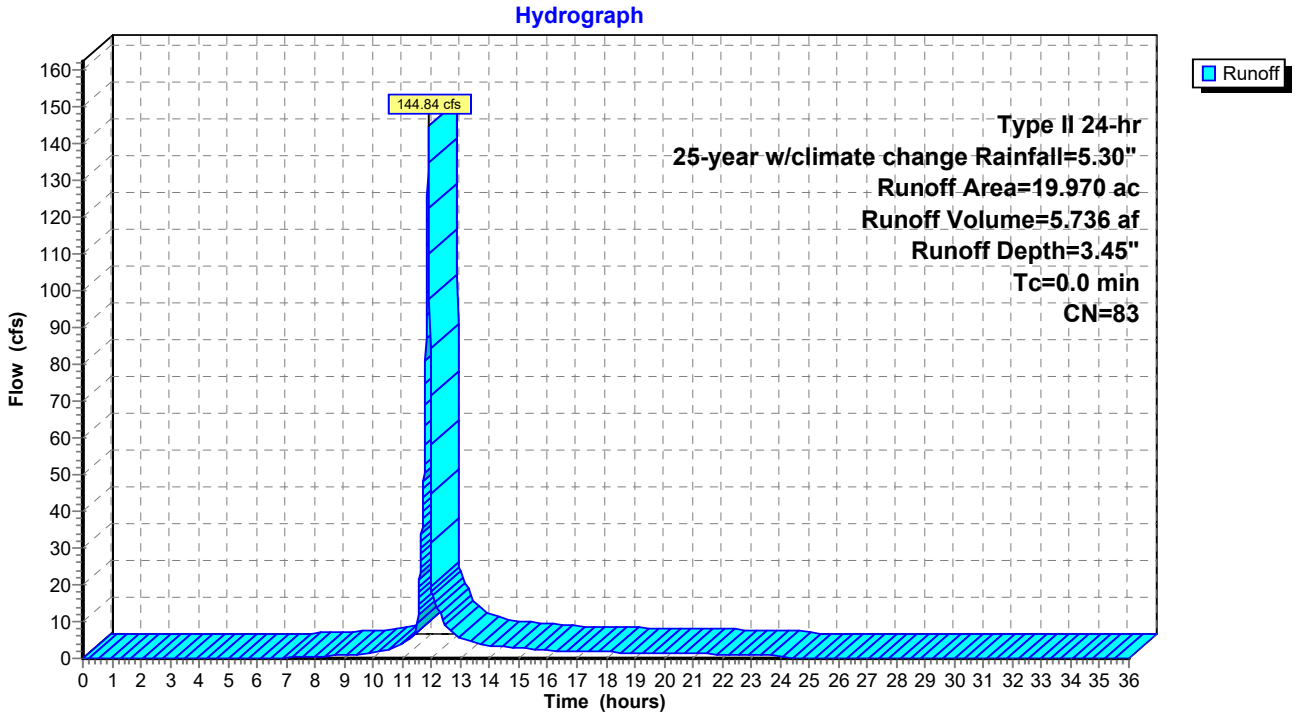
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 144.84 cfs @ 11.90 hrs, Volume= 5.736 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
19.970	83	1/4 acre lots, 38% imp, HSG C
12.381		62.00% Pervious Area
7.589		38.00% Impervious Area

Subcatchment 28S: Nichols St



Summary for Subcatchment 30S: Elm St

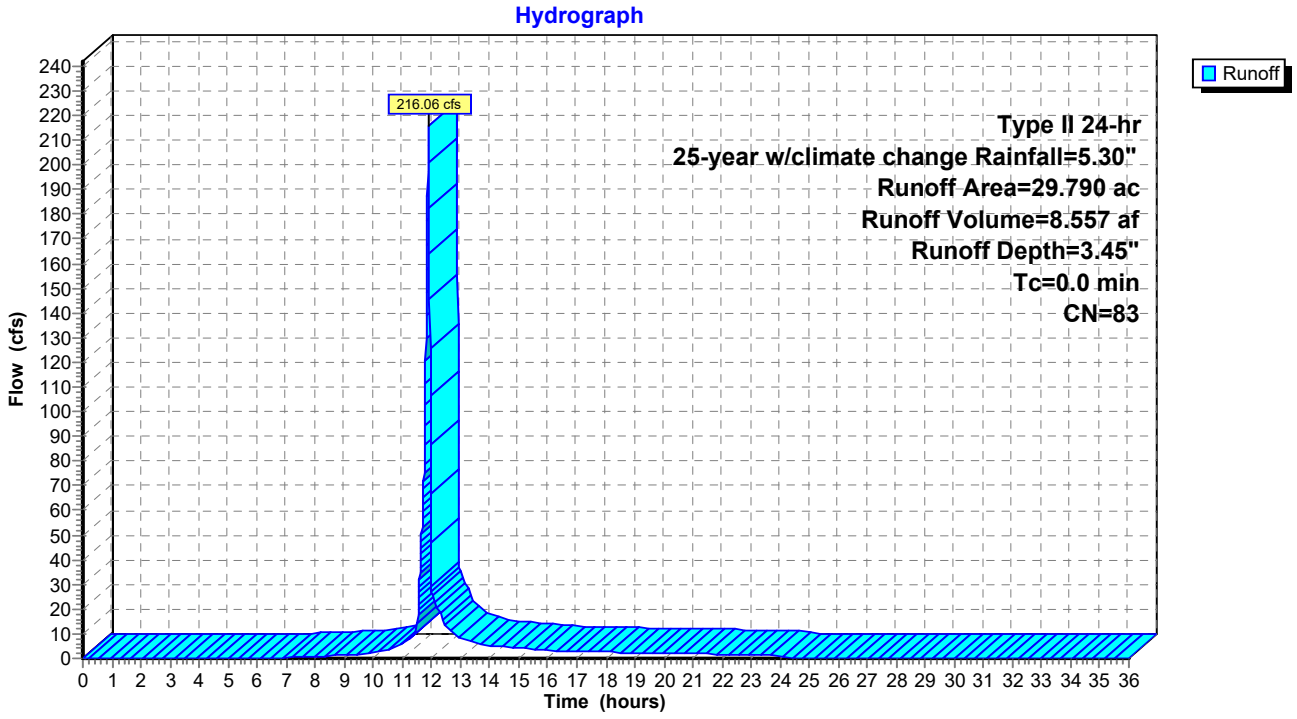
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 216.06 cfs @ 11.90 hrs, Volume= 8.557 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
29.790	83	1/4 acre lots, 38% imp, HSG C
18.470		62.00% Pervious Area
11.320		38.00% Impervious Area

Subcatchment 30S: Elm St



Summary for Subcatchment 31S: Church St

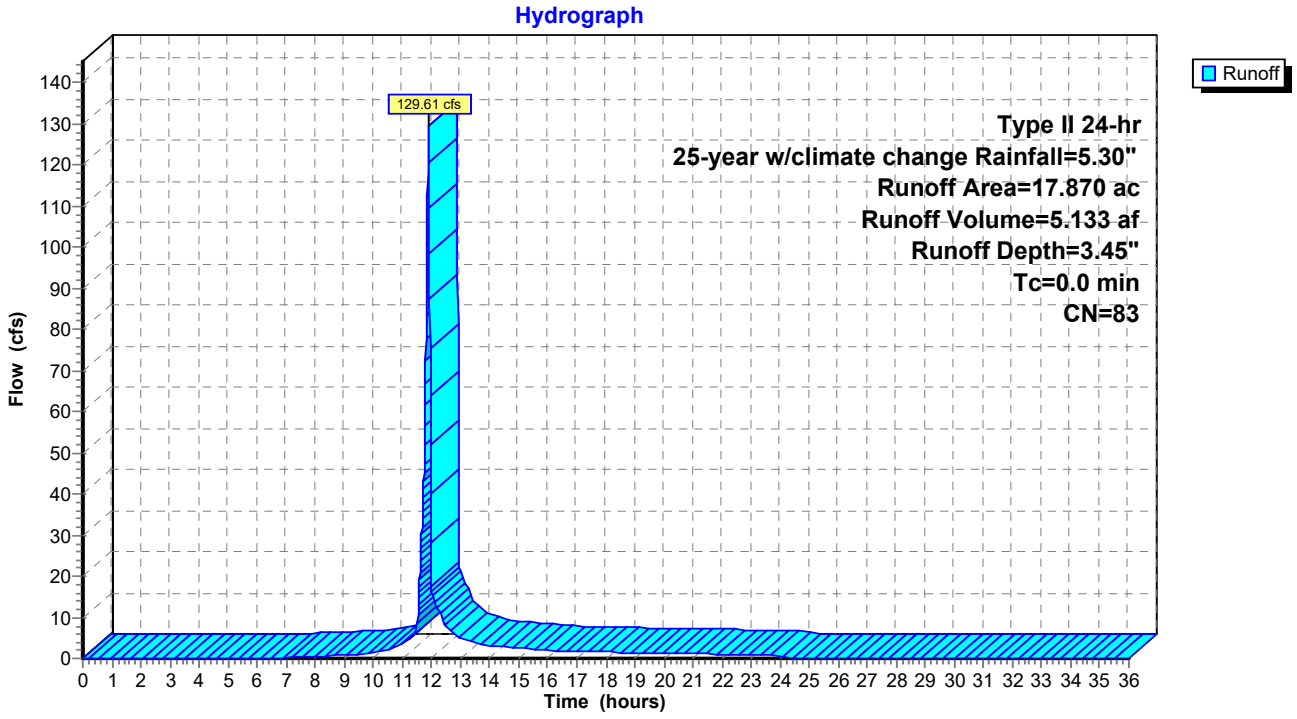
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 129.61 cfs @ 11.90 hrs, Volume= 5.133 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
17.870	83	1/4 acre lots, 38% imp, HSG C
11.079		62.00% Pervious Area
6.791		38.00% Impervious Area

Subcatchment 31S: Church St



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

West Street East Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 788,100	$ 788,000
	Bonds and Insurance (8%)	L.S.	1	$ 1,260,960	$ 1,261,000
	General Conditions (5%)	L.S.	1	$ 788,100	$ 788,000
				General	**$2,837,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	8300	$ 400	$ 3,320,000
	New Box Culvert	L.F.	2800	$ 2,700	$ 7,560,000
	New Drain Manhole	Ea.	26	$ 11,000	$ 286,000
	New Deep Sump Catch Basin	Ea.	86	$ 10,000	$ 860,000
	Connect Combined CB to New Storm Drain	L.F.	1720	$ 200	$ 344,000
	Replace Sewer Service	Ea.	37	$ 4,000	$ 148,000
	Replace Water Service	Ea.	37	$ 4,000	$ 148,000
	Storm Drain Headwall	Ea.	1	$ 15,500	$ 16,000
	Storm Drain Outfall	Ea.	1	$ 15,500	$ 16,000
	Stormwater Quality Treatment Device	Ea.	3	$ 21,000	$ 63,000
	Treatment Device Installation	L.S.	1	$ 15,750	$ 16,000
	Tree Box Planters	Ea.	105	$ 25,000	$ 2,625,000
	Stormwater Device Installation			$	$ -
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	615	$ 225	$ 138,000
	Hazardous Soils Removal & Disposal	C.Y.	496	$ 165	$ 82,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	123	$ 80	$ 10,000
	Traffic Control Signage	L.S.	1	$ 26,000	$ 26,000
	Flaggers	Hrs.	2600	$ 34.26	$ 89,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$15,762,000**
				Construction Subtotal	**$18,600,000**
				Contingency (30%)	$6,863,000
				Engineering Fees	$4,278,000
				Other Administrative Costs (0.5%)	$930,000
				TOTAL OPINION OF PROJECT COST	**$30,680,000**

Notes:

1- Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23

2- Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)

3- Subtotal amounts have been rounded to the next $1,000.

4- Overall anticipated project cost has been rounded to the next $10,000.

5- Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.

6- Permitting fees have not been included.

7- Contractor's OH&P are included in the unit prices.

8- Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included

APPENDIX AA

West Street West

Notes:

1. Topography, parcel boundary, sewer service area, flood hazard areas and soils information provided by the Vermont Center for Geographic Information.
2. Existing utility information taken from City of Rutland GIS data.
3. Proposed storm drain layout conceptual and does not constitute a final design.

HAZEL ST
STATE ST
EMMETT AV
PIERPOINT AV
WATER ST
CLEVELAND AV
LALOR AV
CRAMTON AV
WATKINS AV
EVERGREEN AV
COLUMBIAN AV
WEST ST
GREENS HILL LN
BELDEN RD
Belden RdCity

Connect existing catch basin to new storm drain (typ)

Area of Combined Sewershed Removed : 20.07 Acres

Proposed 36" storm drain

Connect proposed storm drain to existing network

MAP 15
PROJECT AREA : West Street West

CITY OF RUTLAND, VT
LONG TERM CONTROL PLAN

October 2021

Disclaimer:
The information shown is for planning purposes only and should not be considered exact. Field inspection and verification is required.

Legend

- Project Watershed Boundary
- Sewer Manhole
- Possible Combined Node
- Combined Catch Basin
- Catch Basin
- Proposed Drain Manhole
- Proposed Outfalls
- Sanitary Main
- Storm Drain
- Storm Line to Combined
- Sanitary Force Main
- Proposed Storm Drain
- Subsurface Retention
- Combined Sewershed
- Sewer Service
- Parcels
- Open Water
- Drainage Swale
- Stream/River
- 100 Year Flood Zone

Soil Rating Type

- A
- B

Feet
0 100 200

Weston & Sampson

15

N

MAP SHEET 15 of 15

Summary for Subcatchment 15S: West Street W

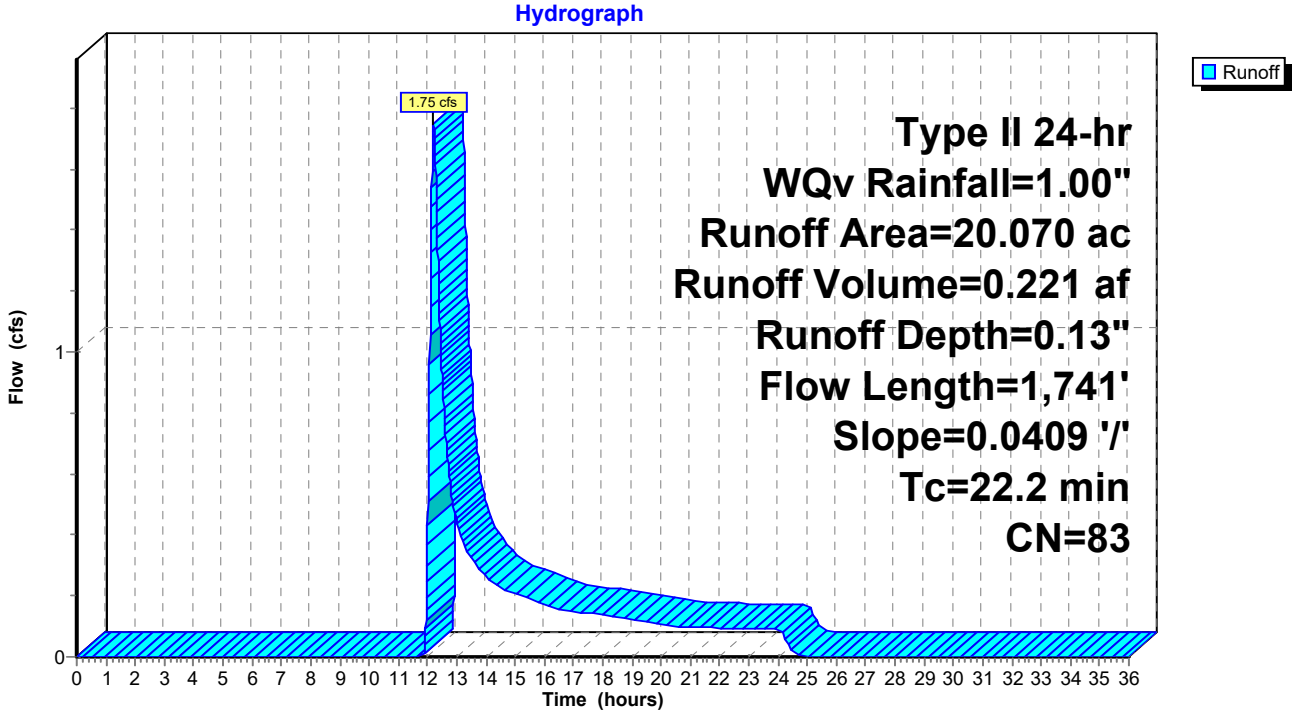
Runoff = 1.75 cfs @ 12.21 hrs, Volume= 0.221 af, Depth= 0.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr WQv Rainfall=1.00"

Area (ac)	CN	Description
20.070	83	1/4 acre lots, 38% imp, HSG C
12.443		62.00% Pervious Area
7.627		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	1,741	0.0409	1.31		**Lag/CN Method,**

Subcatchment 15S: West Street W



Summary for Subcatchment 15S: West Street W

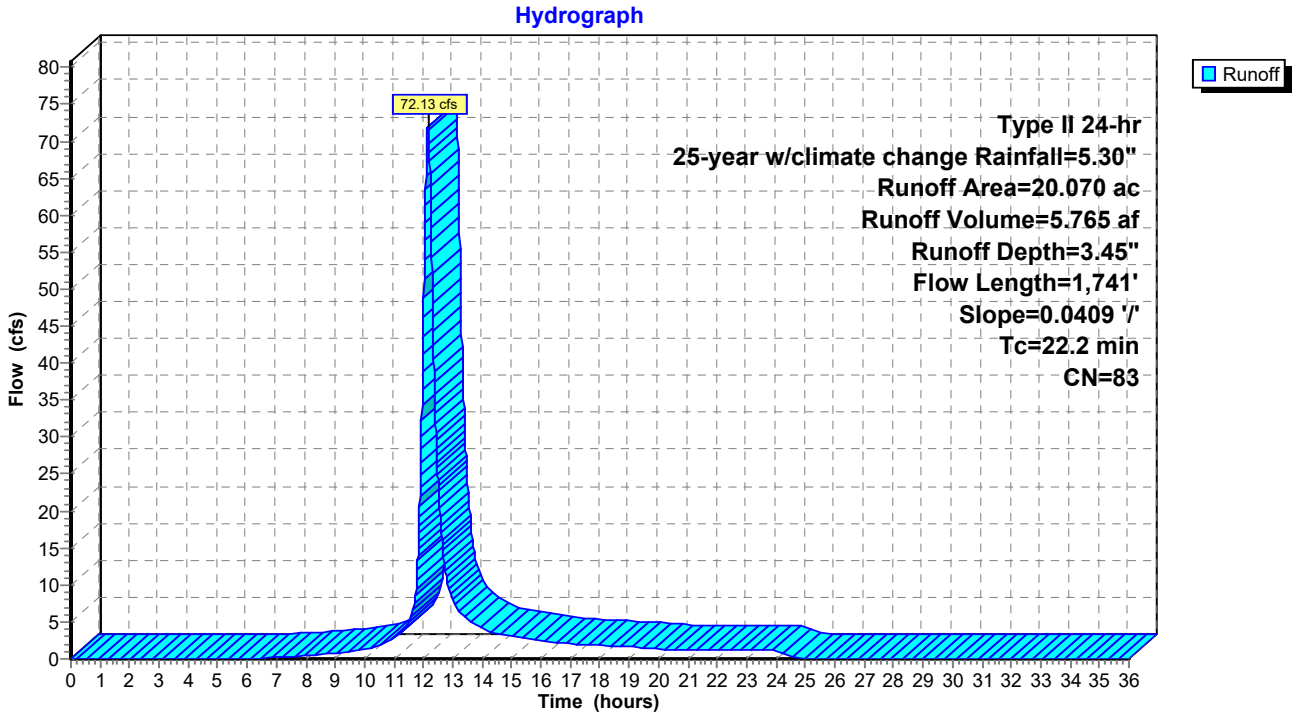
Runoff = 72.13 cfs @ 12.15 hrs, Volume= 5.765 af, Depth= 3.45"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type II 24-hr 25-year w/climate change Rainfall=5.30"

Area (ac)	CN	Description
20.070	83	1/4 acre lots, 38% imp, HSG C
12.443		62.00% Pervious Area
7.627		38.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.2	1,741	0.0409	1.31		**Lag/CN Method,**

Subcatchment 15S: West Street W



Rutland CSO Long Term Control Plan

Preliminary Opinion of Project Cost

West Street West Combined Sewer Separation

Item No.	Description	Unit	Est. Qty.	Cost/Unit	Total Cost
1	**General**				
	Mobilization/Demobilization	L.S.	1	$ 161,500	$ 162,000
	Bonds and Insurance (8%)	L.S.	1	$ 258,400	$ 258,000
	General Conditions (5%)	L.S.	1	$ 161,500	$ 162,000
				General	**$582,000**
2	**Site Work**				
	New Storm Drain & Pavement Restoration	L.F.	2325	$ 400	$ 930,000
	Existing Storm Drain Upgrade	L.F.	1500	$ 350	$ 525,000
	New Drain Manhole	Ea.	9	$ 11,000	$ 99,000
	New Deep Sump Catch Basin	Ea.	10	$ 10,000	$ 100,000
	Connect Combined CB to New Storm Drain	L.F.	200	$ 200	$ 40,000
	Replace Sewer Service	Ea.	7	$ 4,000	$ 28,000
	Replace Water Service	Ea.	7	$ 4,000	$ 28,000
	Stormwater Treatment & Detention Device	Ea.	1	$ 861,443	$ 861,000
	Test Borings	Ea.	5	$ 1,000	$ 5,000
	Rock Excavation & Disposal	C.Y.	172	$ 225	$ 39,000
	Hazardous Soils Removal & Disposal	C.Y.	3180	$ 165	$ 525,000
	Unsuitable Material Removal & Structural Fill Replaceme	C.Y.	34	$ 80	$ 3,000
	Traffic Control Signage	L.S.	1	$ 8,000	$ 8,000
	Flaggers	Hrs.	800	$ 36.00	$ 29,000
	Erosion Prevention and Sediment Control	L.S.	1	$ 10,000	$ 10,000
				Site Work	**$3,230,000**
				Construction Subtotal	**$3,820,000**
				Contingency (30%)	$1,410,000
				Engineering Fees	$879,000
				Other Administrative Costs (0.5%)	$191,000
				TOTAL OPINION OF PROJECT COST	**$6,300,000**

Notes:

1- *Engineering New Record (ENR) Construction Cost Index (CCI) for October 2021 is 12023.23*
2- *Line items taken from VTrans assigned an ENR CCI of 10878.01 (January 2018)*
3- *Subtotal amounts have been rounded to the next $1,000.*
4- *Overall anticipated project cost has been rounded to the next $10,000.*
5- *Anticipated costs have been developed based on similar recent projects, and equipment manufacturer's cost data.*
6- *Permitting fees have not been included.*
7- *Contractor's OH&P are included in the unit prices.*
8- *Paving costs are limited to trench restoration only, curb-to-curb pavement replacement not included*

APPENDIX BB

5-Year Project Implementation Schedule

PROPOSED LONG TERM CONTROL PLAN
5-YEAR PROJECT IMPLEMENTATION SCHEDULE
(FY 2023 - FY 2027)

	Project Name	Engineering & Construction Costs				Project Effectiveness		2022	2023		2024		2025		2026		2027	Total 5-Year Term Cost
		Step 2 Engineering (Final Design)	Step 3 Engineering (Construction & Admin)	Construction Cost	Total Cost	Gallons Removed	$/Gallons Removed	July 1 - Dec 31	Jan 1 - June 30	July 1 - Dec 31	Jan 1 - June 30	July 1 - Dec 31	Jan 1 - June 30	July 1 - Dec 31	Jan 1 - June 30	July 1 - Dec 31	Jan 1 - June 30	
								FY2023		FY2024		FY2025		FY2026		FY2027		
LTCP CSO PROJECTS	1. CSO Check Valves*	$ 23,000	$ 43,000	$ 454,000	$ 520,000	*See Note 1*	*N/A*	$ 23,000	$ 43,000 $ 454,000									$ 520,000
	2. Vernon St. Separation**	$ 45,000	$ 330,000	$ 2,870,000	$ 3,245,000	251,000	$ 12.93	$ 45,000			$ 330,000 $ 2,870,000							$ 3,245,000
	3. South Main St. Separation***	$ 47,000	$ 86,000	$ 957,000	$ 1,090,000	214,000	$ 5.09		$ 47,000				$ 86,000 $ 957,000					$ 1,090,000
	4. Connor Park Storage - Phase 1	$ 234,000	$ 430,000	$ 7,036,000	$ 7,700,000	1,100,000	$ 7.00			$ 234,000					$ 430,000 $ 7,036,000			$ 7,700,000
	5. WWTF Improvements	$ 68,000	$ 124,000	$ 1,448,000	$ 1,640,000	1,622,000	$ 1.41			$ 68,000								$ 68,000
	6. River St. Pump Station Upgrade	$ 29,000	$ 52,000	$ 559,000	$ 640,000	*See Note 2*	*N/A*			$ 29,000								$ 29,000
	7. Otter Creek Interceptor Upgrade	$ 368,000	$ 674,000	$ 9,358,000	$ 10,400,000	1,714,000	$ 6.07					$ 368,000						$ 368,000
	8. Calvary Storage	$ 142,000	$ 261,000	$ 3,297,000	$ 3,700,000	129,000	$ 28.68					$ 142,000						$ 142,000
	Totals	**$ 956,000**	**$ 2,000,000**	**$ 25,979,000**	**$ 28,935,000**	**5,030,000**												**$ 13,162,000**

TOTAL COSTS FOR RECOMMENDED PROJECTS PER FISCAL YEAR **CITY COMMITMENT TO BECOME 1272 ORDER IF D.E.C. APPROVES PLAN**	Step 2 Engineering (Final Design)	$ 115,000	$ 331,000	$ 510,000	-	-	$ 956,000
	Step 3 Engineering (Construction & Admin)	$ 14,333	$ 138,667	$ 220,000	-	-	$ 373,000
	Construction	$ 151,333	$ 1,259,333	$ 1,913,333	-	-	$ 3,324,000
	Total Cost Per Fiscal Year	**$ 280,667**	**$ 1,729,000**	**$ 2,643,333**	**$ 0**	**$ 0**	**$ 4,653,000**
TOTAL COSTS FOR ADDITIONAL PROJECTS PER FISCAL YEAR **DEPENDING ON HOW LONG CSO FUNDING (CWSRF/PC GRANT/ARPA) IS MADE AVAILABLE, THE CITY MAY WANT TO CONSTRUCT ADDITIONAL PROJECTS BEFORE FUNDING IS EXHAUSTED (See Note 2)**	Step 3 Engineering (If State/Federal Funds are Available)	-	-	$ 28,667	$ 200,667	$ 286,667	$ 516,000
	Construction (If State/Federal Funds are Available)	-	-	$ 319,000	$ 2,983,333	$ 4,690,667	$ 7,993,000
	Total Cost Per Fiscal Year	**$ 0**	**$ 0**	**$ 347,667**	**$ 3,184,000**	**$ 4,977,333**	**$ 8,509,000**
	Fiscal Year	**FY2023**	**FY2024**	**FY2025**	**FY2026**	**FY2027**	**Total 5-Year Cost**

* The City currently has an open contract with Weston & Sampson to complete the design of the CSO Check Valves. Additional design is required in order to satisfy CWSRF funding guidelines.

** The Vernon Street Separation project was previously designed by DuBois & King. Additional design is required in order to satisfy CWSRF funding guidelines.

*** The South Main Street Separation Project is subject to the Department of Environmental Conservation's guidelines that are forthcoming, with respect to stormwater discharges into Moon Brook, which is an impaired waterway.

NOTES

1 For projects that are constructed over the course of two fiscal years, costs estimates were determined as follows:

Construction during Jan 1 - June 30 = 1/3 Construction Cost

Construction during July 1 - Dec 31 = 2/3 Construction Cost

2 Substituion/addition of alternative projects may occur following the final design process.

Appendix CC

Affordability Analysis & Lifecycle Cost Analysis

Rutland Long-Term Control Plan

Affordability Analysis

2/24/2022

	FY22 Budget	FY23 Proposed	FY24 Projected	FY25 Projected	FY26 Projected	FY27 Projected	FY28 Projected	FY29 Projected	FY30 Projected
WWT & WWC Rate	$ 6.34								
WWT Rate Increase	5.7%								
Annual Cost per ERU	$ 653.16	$ 683.21	$ 696.87	$ 715.04	$ 760.80	$ 824.01	$ 951.20	$ 1,080.93	$ 1,213.25
Inflation		4.6%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Median Household Income (MHI)	$ 48,492	$ 48,633	$ 48,774	$ 48,915	$ 49,057	$ 49,199	$ 49,342	$ 49,485	$ 49,629
ERU Sewer Cost as % MHI	1.35%	1.40%	1.43%	1.46%	1.55%	1.67%	1.93%	2.18%	2.44%
LTCP Project Cost per ERU		$ -	$ -	$ 4.24	$ 31.46	$ 47.99	$ 110.71	$ 110.71	$ 110.71
WWT Expenditures	$ 4,489,130	$ 4,741,000	$ 4,835,820	$ 4,932,536	$ 5,031,187	$ 5,131,811	$ 5,234,447	$ 5,339,136	$ 5,445,919
WWC Expenditures	$ 1,095,286	$ 1,209,460	$ 1,265,095	$ 1,323,290	$ 1,384,161	$ 1,447,832	$ 1,514,433	$ 1,584,096	$ 1,656,965
Pump Station Budget	$ 59,920	$ 62,676	$ 65,559	$ 68,575	$ 71,730	$ 75,029	$ 78,481	$ 82,091	$ 85,867
Existing WW Debt Payments (P&I)	$ 669,505	$ 863,877	$ 860,389	$ 880,433	$ 876,994	$ 874,922	$ 873,008	$ 632,998	$ 632,998
LTCP Debt Payments (P&I)		$ -	$ -	$ 31,801	$ 236,187	$ 360,335	$ 831,242	$ 831,242	$ 831,242
Total WW Expenditures & Debt Payments	$ 5,644,336	$ 6,877,013	$ 7,026,864	$ 7,236,636	$ 7,600,259	$ 7,889,930	$ 8,531,610	$ 8,469,563	$ 8,652,991
CSO Check Valves				$ 520,000					
Vernon Street					$ 3,245,000				
South Main Street						$ 1,520,000			
Connor Park - Phase 1							$ 7,700,000		
WWTF Improvements					$ 68,000				
River Street Pump Station Upgrade					$ 29,000				
Otter Creek Interceptor Upgrade						$ 368,000			
Calvary Storage						$ 142,000			

Residential Units Connected to System	7,400	per Jeff W ("households" number)
Total Annual Non-Residential Usage (gal)	8,308,234	per Jeff W (FY22 rate study)
ERUs:	7,508	calculated per EPR Ch. 2

Notes:

1 FY23 inflation rate from https://cpiinflationcalculator.com/2022-cpi-and-inflation-rate-for-the-united-states/
2 Subsequent inflation rates based on 1/2% reduction year over year to 2%
3 MHI based on US Census "QuickFacts" for Rutland City 2015 - 2019
4 MHI annual escalation (0.29%/year) based on US Federal Reserve data for Rutland County, 2015 - 2019
5 Annual Cost per ERU based on metered rates for a typical family of 4 using 210 gpd (average daily flow for a single-family residence served by a WWTF with >50k gpd capacity)
LTCP Debt Payments are based on a Equivalent Uniform Annual Cost (EUAC) assuming 2% interest rate over 20 years
Existing Debt Payments taken from City of Rutland FY21 annual report
FY22 and FY23 expenditures taken from FY23 sewer rate study

Rutland, VT - CSO Long Term Control Plan

Uniform Series Present Worth Calculations

February 28, 2022

		Maintenance Category												
Project No.	Project Name	Maintenance Labor	Chemicals	Equipment Maintenance	Additonal Power	Number of Catch Basins	Unit Cost of CB Cleaning[2]	Total O&M Cost	Interest Rate	Payment Period	USPW of O&M Costs	Capital Cost[1]	Salvage Value[3]	Net Present Value
1.1	RSPS Upgrade	$ 4,920		$ 5,100	$ 8,000			$ 18,020	2%	20	$ 294,653	$ 387,000	$ -	**$ 681,653**
1.2	WWTF Upgrade	$ 9,840	$ 9,113	$ 13,750	$ 500			$ 33,203	2%	20	$ 542,908	$ 991,000	$ -	**$ 1,533,908**
2	Otter Creek Interceptor Upgrade	$ 7,227						$ 7,227	2%	20	$ 118,172	$ 6,249,000	$ -	**$ 6,367,172**
3	Calvary Storage	$ 11,502		$ 1,000				$ 12,502	2%	20	$ 204,426	$ 2,224,000	$ -	**$ 2,428,426**
4	Connor Park Storage (Phase 1 & 2)	$ 11,502		$ 8,250	$ 1,364			$ 21,116	2%	20	$ 345,279	$ 4,660,000	$ -	**$ 5,005,279**
5	CSO Check Valves	$ 2,952						$ 2,952	2%	20	$ 48,269	$ 454,000	$ -	**$ 502,269**
6	Field Ave					14	$ 330	$ 4,620	2%	20	$ 75,544	$ 4,400,000	$ -	**$ 4,475,544**
7	Vernon Street					16	$ 330	$ 5,280	2%	20	$ 86,336	$ 1,730,000	$ -	**$ 1,816,336**
8	Rotary Park					14	$ 330	$ 4,620	2%	20	$ 75,544	$ 3,390,000	$ -	**$ 3,465,544**
9	Thrall Avenue					6	$ 330	$ 1,980	2%	20	$ 32,376	$ 2,870,000	$ -	**$ 2,902,376**
10	Temple Street					10	$ 330	$ 3,300	2%	20	$ 53,960	$ 1,640,000	$ -	**$ 1,693,960**
11	East Street					44	$ 330	$ 14,520	2%	20	$ 237,423	$ 7,140,000	$ -	**$ 7,377,423**
12	Easterly Avenue					23	$ 330	$ 7,590	2%	20	$ 124,107	$ 2,610,000	$ -	**$ 2,734,107**
13	Harrington Avenue					5	$ 330	$ 1,650	2%	20	$ 26,980	$ 1,250,000	$ -	**$ 1,276,980**
14	Convent Avenue					8	$ 330	$ 2,640	2%	20	$ 43,168	$ 1,010,000	$ -	**$ 1,053,168**
15	Meadow Street					15	$ 330	$ 4,950	2%	20	$ 80,940	$ 2,830,000	$ -	**$ 2,910,940**
16	State Street West					12	$ 330	$ 3,960	2%	20	$ 64,752	$ 3,730,000	$ -	**$ 3,794,752**
17	State Street East					38	$ 330	$ 12,540	2%	20	$ 205,047	$ 10,320,000	$ -	**$ 10,525,047**
18	South Main Street					26	$ 330	$ 8,580	2%	20	$ 140,295	$ 690,000	$ -	**$ 830,295**
19	West Street West					10	$ 330	$ 3,300	2%	20	$ 53,960	$ 3,820,000	$ -	**$ 3,873,960**
20	West Street East					86	$ 330	$ 28,380	2%	20	$ 464,054	$ 18,600,000	$ -	**$ 19,064,054**

Notes:

1 - Capital Costs represent the Engineer's Opinion of Probable Cost without contingency, engineering, permitting, or administrative costs.

2 - CB cleaning unit costs taken from data provided by the City of Rutland. Per basin costs include materials disposal, labor, fuel costs, maintenance costs and ammortized equipment costs for the Vactor truck.

3 - Salvage Value is assumed to be $0 for sewer pipe, sewer process equipment and buried structures. Wastewater treatment and conveyance systems typically do not have value at the end of their life cycle.