

Conceptual SWPPP

Conceptual Stormwater Pollution Prevention Plan

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Ithaca Neighborhood Housing Services
(INHS)

Multi-Family Residential
Town of Dryden, NY

Freese Road & Dryden Road (NYS Route 366)
Town of Dryden, Tompkins County, New York

May 9, 2024

Prepared by:



Prepared For:

INHS
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1.0 Introduction

This project proposes to demolish the existing structure(s), driveways, walkways, utilities, etc. to facilitate the construction of six (6) single family homes and three (3) multi-family apartment buildings and associated site, grading, drainage, utility, lighting and landscaping improvements.

Currently, access to the site is via two (2) driveway entrances, one from Freese Road and the other from Dryden Road. As proposed, this project will eliminate the existing Dryden Road driveway and maintain the one (1) full-access shared driveway to Freese Road which will be reconstructed. In addition to providing vehicular access to the multi-family and single-family residential buildings, this access drive will also be shared with Cornell University so to maintain access to their neighboring property located to the north of this development.

The project area spans two parcels having Tax ID numbers of (Tax IDs: 53.-1-3.2, 53.-1-3.7 and lots 53.-1-1 through 53.-1-16). As part of the project, all of the subject parcels will be combined and then re-subdivided.

2.0 Stormwater

A. Stormwater Management

The total site development (disturbance) area will exceed the allowable site disturbance (1 acre) outlined in the New York State Department of Environmental Conservation's (NYSDEC) General Permit for Stormwater Pollutant Discharges. Therefore, a full Stormwater Pollution Prevention Plan (SWPPP) is required which includes Stormwater Quality and Quantity provisions. While a full SWPPP will be prepared separately, a brief narrative summary is provided in this Conceptual Stormwater Management Plan (CSMP) for initial discussion & coordination with the Town of Dryden.

Since the improvements outlined in the previously approved SWPPP for the Maifly Multi-Family project and Cottages Project were never constructed and given that both projects essentially share stormwater facilities, this CSMP considers development potential of the entire site.

The entire site is located within the jurisdiction of the Town of Dryden, NY. The Town of Dryden is classified as a Municipal Separate Storm Sewer System (MS4) by NYSDEC. Such classification grants the Town of Dryden jurisdiction over stormwater discharges.

The site and surrounding area ultimately drains into Fall Creek. Fall Creek is a class A stream as identified by NYSDEC and is not on the NYSDEC list of impaired waterbodies (303(d) list).



B. Drainage Analysis Methodology:

The Stormwater Management and drainage analysis enclosed was prepared per the requirements outlined in the New York State Department of Environmental Conservation's Stormwater Management Design Manual (SMDM). As outlined in the SMDM, the United States Department of Agriculture, Natural Resources Conservation Service's (NRCS) Urban Hydrology for Small Watersheds, Technical Release 55 (TR55) was used to analyze the runoff characteristics associated with the site's drainage basin.

Rainfall amounts for the 1, 10 & 100 year storm events were taken from Figures 4.2, 4.3 & 4.4 respectively provided in the January 2015 SMDM. Rainfall amounts for the other storm events analyzed were taken from online data provided by <http://precip.eas.cornell.edu/> "Extreme Precipitation in New York & New England."

Three (3) analysis points (Analysis Point #1, Analysis Point #2 & Analysis Point #3) were established to analyze the pre versus post stormwater runoff rates for the project site. Analysis Point #1 is located at the northern corner of the site where surface runoff drains off the site via an existing drainage swale. Analysis Point #2 is located at the western corner of the site where runoff from the project and portions of Freese Road flow to the northwest via an existing roadside ditch. Analysis Point #3 is an arbitrary point where the combined outflows of Analysis Points #1 & 2 are observed. It should be noted that only runoff contributions associated with the project site and some upland areas flowing onto the subject parcel were evaluated in this analysis. The total runoff and drainage contributions of Dryden Road, Freese Road and other upstream drainage infrastructures were not evaluated.

C. Pre-Development Stormwater Conditions:

Under Pre-Development Conditions, the site was delineated into two (2) drainage areas given the existing topography across the site. A description of these subareas is as follows:

Area #1: This drainage area is comprised of portions of the existing site areas of the project site as well as the neighboring development. Ground cover consists of some impervious cover associated with the existing gravel driveway, Dryden Road, Freese Road, etc. as well as the existing lawn areas. Runoff from Area #1 generally flows to the north/northwest via overland flow where it is collected via the existing drainage ditch located along the northern property line, ultimately flowing to Analysis Point #1.

Area #2: This drainage area is comprised of portions of the existing site areas of the project site as well as the neighboring development. Ground cover consists of some impervious cover associated with the existing roof, gravel driveways, Freese Road, etc. as well as the existing lawn areas. Runoff from Area #2 generally flows to the north/northwest via overland flow where it is collected via the existing drainage ditch located along the north side of Freese Road, ultimately flowing to Analysis Point #2.



Table 1 below provides a summary of Pre-Development runoff rates (CFS) at the chosen Analysis Points (APs).

Table 1

	Analysis Point #1 (Existing)	Analysis Point #2 (Existing)	Analysis Point #3 (Existing)
1 year	0.06	0.01	0.06
2 year	0.25	0.02	0.25
10 year	1.59	0.84	1.96
100 year	6.63	5.44	10.11

Refer to Appendix C for the associated HydroCAD drainage analysis.

D. Post-Development Stormwater Conditions:

Under Post-Development Conditions, the site was separated into six (6) subareas given the proposed topography across the site. A description of these subareas is as follows:

Area #1: This drainage area is comprised of impervious cover associated with the new buildings, parking, asphalt driveway, etc. as well as some lawn areas. Under proposed conditions, runoff from the roof areas will be collected via gutters and downspouts and piped to the face of curb where it will combine with surface runoff from the parking lot and driveway before ultimately discharging into Bioretention Area #1. Flows from Bioretention Area #1 then enter the new storm sewer system where it combines with the flows from Bioretention Areas #2 & #5 which ultimately discharge to the proposed Detention Pond. Discharge from the pond combines with flows from Area #3 & #6 at Analysis Point #1.

Area #2: This drainage area is comprised of lawn area as well as some impervious cover associated with the existing gravel and proposed asphalt driveway areas. Under proposed conditions, runoff from this area drain directly into the proposed Detention Pond where it will combine with flows from Bioretention Areas #1, & 2. Flows from the detention pond will ultimately discharge to Analysis Point #1 where they will combine with runoff from Areas #3 & #6.

Area #3 This drainage area is comprised of lawn area running along the northern property boundary as well as some impervious cover associated with the existing gravel driveway. Under proposed conditions, runoff from this area will discharge directly to Analysis Point #1 where it combines with runoff from Area #8 and flows from the proposed Detention Pond.



Area #4: This drainage area is comprised of impervious cover associated with Freese Road, the proposed asphalt driveway and concrete sidewalk along the property frontage to Freese Road. Under proposed conditions, runoff will drain into the existing roadside drainage ditch where it will discharge directly to Analysis Point #2.

Area #5: This drainage area is comprised of impervious cover associated with the single family home portion of the project as well as some lawn area. Under proposed conditions, runoff from this area will drain to Bioretention Area #2 before flowing through the onsite storm sewer and discharging to the proposed Detention Pond.

Area #6: This drainage area is comprised of the impervious cover associated with the new asphalt driveways, sidewalks, Freese Road and Dryden Road as well as lawn area running along Freese Road, Dryden Road and the shared property boundary with Cornell University. Under proposed conditions, surface runoff is collected by a proposed roadside drainage ditch where it either flows off site or drains into the onsite storm sewer before discharging off the site to the northeast. The runoff will then flow north/northwest where it ultimately discharges to Analysis Point #1.

Table 2 below provides a summary of Post-Development runoff rates (CFS) at the chosen Analysis Points (APs).

Table 2

	Analysis Point #1 (Proposed)	Analysis Point #2 (Proposed)	Analysis Point #3 (Proposed)
1 year	0.06	0.00	0.06
2 year	0.13	0.00	0.13
10 year	0.80	0.00	0.80
100 year	6.40	0.51	6.90

Refer to Appendix C for the associated HydroCAD drainage analysis.

E. Storm Water Quality:

This project proposes both new impervious surfaces and the disturbance to existing impervious surfaces. Portions of this project (disturbance of existing impervious areas) qualifies as a “Redevelopment Project” as defined in Chapter 9 of the SMDM. However, the stormwater management practices for the new development portion of the project must be designed in accordance with Chapter 4 of the SMDM.



Redevelopment portion is proposed to apply to the two existing tax parcels considered in the previous Maifly Development (53.-1-3.2 & 63.-1-3.7) which currently are or previously were developed as residential home lots with gravel driveways.

As outlined in the SMDM, for Redevelopment Projects that reconstruct existing impervious areas and construct new impervious areas, the WQv shall be calculated for 25% of the disturbed existing impervious area and 100% of the additional impervious area. A summary of the accounting for existing and proposed impervious cover used in calculating the WQv is provided in Appendix C.

Existing impervious cover to be disturbed within the multi-family portion includes roof areas associated with the existing buildings, asphalt drives and parking areas as well as concrete walkways proposed to be demolished as part of this project. Approximately **0.30** acres of impervious cover exists within the project area to be disturbed and approximately **1.79** acres upon completion of the project.

Based on the above and the impervious cover accounting provided in Appendix C, a total of **±1.57 acres** of impervious cover is to be used in calculating the required WQv for the project site. Using the NYSDEC's Green Infrastructure Worksheets (11/09/15 version), the calculated total WQv to be provided is **±0.15 ac-ft.**

Per the NYSDEC SMDM, Storm Water Quality is addressed by capturing and treating 90% of the average annual stormwater runoff volume. This captured volume is considered the Water Quality Volume (WQv). WQv is directly related to the amount of impervious cover created/maintained on site.

To address Water Quality concerns, two (2) bioretention areas (Bioretention Area #1 and Bioretention Area #3) are proposed to be used. Through the use of the bioretention areas and RRv credits associated with this practice, the volume reduced and treated is equal to or greater than the WQv required for both projects.

Bioretention Areas:

The SMDM outlines required elements to be incorporated into the design for bioretention which includes: pretreatment, separation from water table, minimum planting soil media depth and surface mulch treatments.

Pretreatment: As noted above, the SMDM requires that a grass filter strip and/or a gravel diaphragm be used as pretreatment. All bioretention areas will utilize a combination of stone mulch, filter fabric and outlet protection for pretreatment.



Separation from Water Table: The SMDM requires that a 2' vertical separation be maintained between the bottom of bioretention practices and the groundwater. A geotechnical subsurface investigation has not been completed for this project site. According to the available NRCS Soil Survey information, the depth to the water table is greater than 80". With the proposed section depth of the bioretention areas and the anticipated depth to groundwater, it is likely that the 2' vertical separation criteria can be achieved. Therefore, all bioretention areas will not be lined.

Minimum Planting Soil Media Depth: As outlined in the SMDM, the minimum bioretention soil media depth is 2.5' which equals the depth of soil media provided. The bioretention areas proposed all provide the required 2.5' minimum soil media depth.

Surface Mulch Treatments: The SMDM recommends that aged hardwood mulch be used as a surface treatment in the bioretention areas. However, in an effort to prolong the operational life of the bioretention area and possibly the introduction of additional phosphorus into the stormwater discharges, rolled river stone mulch on non-woven geotextile is proposed in lieu of hardwood bark mulch.

Maximum Ponding Depth: The SMDM recommends limiting the WQv ponding depth to no more than six (6) inches within the bioretention area. Flows in excess of the WQv would need to be discharged from the bioretention area(s) via a non-erosive outlet.

The Bioretention Areas proposed all provide the 6 inches of available ponding between the stone mulch surface and the overflow outlet. The overflow for all Bioretention Areas consists drainage inlets (catch basins) which is routed to the site storm sewer.

Stormwater Hotspot Concern: According to the NYSDEC Stormwater Management Design Manual (SMDM), a Stormwater Hotspot is defined as a land use or activity that generates higher concentrations of hydrocarbons, trace metals or toxicants than are found in typical stormwater runoff, based on monitoring studies. Residential uses are not considered stormwater hotspots.

F. Runoff Reduction Volume:

The goal of Runoff Reduction Volume (RRv) as defined Chapter 4 of the NYSDEC SMDM is the 100% reduction of the Water Quality Volume (WQv) by the application of green infrastructure techniques and Stormwater Management Practices (SMPs) to replicate pre-development hydrology. However, projects may experience limitations which may prevent this design goal from being achieved.

According to the NYSDEC Green Infrastructure Worksheets, while using bioretention areas with underdrain(s) a project may receive a 40% credit toward the required Runoff Reduction Volume



(RRv). The worksheets completed for this project are provided in Appendix E of this SWPPP. The Bioretention Areas were sized to provide a total RRv of **±0.136 ac-ft**.

The SMDM outlines minimum RRv criteria for sites which cannot reduce 100% of the WQv through the use of green infrastructure practices. Using the information presented in the SMDM, the minimum RRv which must be provided is **±0.028 ac-ft**. Therefore, while the goal to reduce 100% of the WQv through green infrastructure techniques could not be achieved, the provided RRv meets the minimum required therefore the RRv design criteria is satisfied.

G. Stormwater Water Quantity:

To address the water quantity requirements outlined in the SMDM, this project proposes the reconstruction/expansion of the previously approved stormwater detention pond.

- **Stream Channel Protection Volume, CPv:**
CPv is defined as the 24 hour extended detention of the post-development 1-year, 24-hour storm event. As discussed in the SMDM the CPv requirement does not apply where a reduction in the total CPv volume is achieved through Runoff Reduction practices. While this project proposes Runoff Reduction practices as noted above, a total reduction of the CPv is not feasible. The enclosed calculations provided in Appendix C illustrates the initial total required CPv is **±0.236 ac-ft**. As noted in the SMDM, volume reduction achieved through green infrastructure can be deducted from the required CPv. Therefore, using the provided RRv noted above, the adjusted total required CPv is **±0.166 ac-ft**. This volume is temporarily detained within the proposed Detention Pond. With the provided average head on the low flow outlet, a 1.9" diameter orifice would be required to discharge the required CPv over 24 hours. Given the clogging potential of such an orifice size, a 3" diameter orifice was chosen for the Detention Pond. Per the SMDM, for sites where the CPv orifice is considered too small, such a configuration from the calculated required orifice size is appropriate. Refer to Appendix C for CPv calculations for the Detention Pond.
- **Overbank Flood Control, Qp (10 year storm event):**
Chapter 4 of the NYSDEC SMDM requires that Qp control be provided such that the peak discharge rate from the 10-year storm event under Post-Development Conditions be reduced so to not exceed the Pre-Development Conditions. As illustrated in Table 3 below, the 10-year storm event discharge rate under Post-Development Conditions is less than that of the Pre-Development conditions. Therefore, the Overbank Flood Control (Qp) requirement is satisfied.
- **Extreme Flood Control Criteria, Qf (100 year storm event):**



Chapter 4 of the NYSDEC SMDM requires that Qf control be provided such that the peak discharge rate from the 100-year storm event under Post-Development Conditions be reduced so to not exceed the Pre-Development Conditions. As illustrated in Table 3 below, the 100-year storm event discharge rate under Post-Development Conditions is less than that of the Pre-Development conditions. Therefore, the Extreme Flood Control (Qf) requirement is met.

Table 3 below provides a comparison of Pre and Post Development runoff rates (CFS) at the chosen Analysis Points (APs) and respective peak flow reduction percentage.

Table 3

	AP #1 (Ex)	AP #1 (Pr)	AP #2 (Ex)	AP #2 (Pr)	AP #3 (Ex)	AP #3 (Pr)
1 year	0.06	0.06	0.01	0.00	0.06	0.06
2 year	0.25	0.13	0.02	0.00	0.25	0.13
10 year	1.59	0.80	0.84	0.00	1.96	0.80
100 year	6.63	6.40	5.44	0.51	10.11	6.90

In conclusion, this Project’s proposed Bioretention Area and Stormwater Detention Ponds satisfies the Stormwater Quantity, Quality and Runoff Reduction requirements outlined in the NYSDEC SMDM and that required by the Town of Dryden.

H. Conveyance

The onsite stormwater runoff will be conveyed via surface drainage and the proposed onsite storm sewers toward the proposed stormwater management practices. The onsite storm sewers will be sized to convey runoff generated from the 10-year storm event.

I. Conclusions

Based on our evaluation, the stormwater management practices proposed for both projects are anticipated to comply with the stormwater design requirements as outlined in the NYSDEC SMDM.

Appendix A

Drainage Info/Maps & Hydrologic Analysis