

FIELDING CONDOS
Rt. 302
WINDHAM, MAINE

STORMWATER MANAGEMENT
REPORT
December 2020
Rev 1-5-2021

Prepared for:

Fielding's Oil Co., Inc
U.S. Route 1
Scarborough, Maine 04074



Northeast Civil Solutions, Inc.
381 Payne Road
Scarborough, ME 04074

Project # 41878

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1) PROJECT DESCRIPTION

This Stormwater Management Report has been prepared for Mr. Bill Fielding to present the stormwater runoff results for a proposed 24-unit condo development. The property is identified as parcel 4-1 on Tax Map 51 and occupies approximately 2.09 acres.

The majority of the site drains southeasterly across flat well-draining soils to a collection area and catch basin just off the Rt. 302 right-of-way that connects to the public drainage system.

The development of the site will result in the following:

Proposed impervious area (on previously vegetated surface)	= 0.98 acres
Proposed disturbed/developed area	= 1.31 acres

2) STORMWATER NARRATIVE

2.1 SITE LOCATION

The project site is located on Roosevelt Trail (Route 302) on a vacant lot in Windham, Maine. The property is currently partially lawn area and cleared with woodland in the rear of the lot.

2.2 RECEIVING WATERS

The majority of runoff from the project drains southeasterly to a drainage catch basin that connects to the public drainage system that eventually discharges to Ditch Brook to Pleasant River.

2.3 HISTORIC FLOODING

The project site is not located with a floodplain as indicated on the Flood Insurance Rate Map for Town of Windham Maine, Panel 15 of 35. Community panel number 230189 0015 B dated September 2, 1981.

2.4 METHODOLOGY AND MODELING ASSUMPTIONS

Runoff and routing calculations have been performed for the watershed areas affected by the proposed development. Times of concentration and runoff curve number calculations have been determined using the method described in the Natural Resource Conservation Service (NRCS) Technical Release 55, (TR-55). Time of concentration calculations have been amended where the values given by the TR-55 method is less than five minutes. In these cases a standard minimum value of five minutes has been used to keep this parameter within the acceptable working range of the model. Each Tc path and corresponding length and slope is identified in the pre and post development drainage area plan. The TR-20

based HydroCAD (version 10.0) modeling software has been utilized to perform the complex runoff and routing calculations.

Design rainfall has been modeled using the SCS Type III hydrograph for 24-hour duration storm events. The rainfall depth for each return period is taken from the Stormwater Management for Maine: Best Management Practices, Appendix H. The rainfall depth values utilized in the stormwater model are indicated in the table below.

24-Hour Rainfall Depths for Cumberland County			
Stormwater Management for Maine: Best Management Practices Appendix H			
Frequency	2-Year	10-Year	25-Year
Rainfall Depth	3.19	4.77	6.01

2.5 SOILS

Soil types in the area of the project were identified using the NRCS Web Soil Survey. The curve numbers (CN) utilized in this analysis relate to the ground cover that was observed on the site. Soils identified on the site (or within close proximity) are identified in the Table below. These soil boundaries have been identified on the Pre and Post Development Watershed Maps.

Soil Types	Symbol	HSG
Hinkley loamy Sand	HIB	A

2.6 PERMITTING REQUIREMENTS

The Town of Windham, section 812.E, Stormwater Management states”

“Adequate provisions shall be made for the collection and disposal of all stormwater that runs off proposed streets, parking areas, roofs, and other surfaces, through a stormwater management plan, which shall not have adverse impacts on abutting or downstream properties.”

And,

‘Major site plans, regardless of size, shall submit a stormwater management plan that complies with Section 4C(2) and Section 4C(3) of the General Standards of the DEP Chapter 500 Stormwater Management, as amended.’

As this project is defined as a Major Site Plan it will be required to meet the Maine DEP Chapter 500 standards.

The project will not require a NRPA wetland fill permit for wetland impacts in the amount of zero square feet.

MDEP Permitting Requirements:

Basic Standards: The basic standards require that grading and other construction activities on the site do not impede or otherwise alter drainage ways to create an unreasonable adverse impact on a protected natural resource. The basic standards will be met by the implementation of an Erosion and Sedimentation Control Plan addressing erosion and sediment control during construction and post-construction stabilization of the site and through the implementation of Stormwater Management Facilities Maintenance Plan identifying various inspection, maintenance and general housekeeping procedures. A copy of the Stormwater Management Facilities Maintenance Plan can be found on sheet 7 of the plan set.

The Erosion and Sedimentation Control Plan was developed following Best Management Practice (BMP) guidelines and has been placed directly on the design plans for reference during construction.

General Standards: The general standards consist of Best Management Practice (BMP) standards. The BMP standards require a project's stormwater management system to include treatment measures that will mitigate the increased frequency and duration of channel erosive flows due to runoff from smaller storms, provide for effective treatment of pollutants in stormwater, and mitigate potential temperature impacts. This must be achieved by using one or more MDEP approved methods to control runoff from no less than 95% of the proposed impervious area and no less than 80% of the proposed developed area associated with a project. As this project will not create one acre or more of new impervious surface area it is not subject to the MDEP General Standards. It will meet the MDEP General standards based on the requirements of section 812.E in the Town of Windham Land Use Ordinance.

Flooding Standard: MDEP requires that projects which create 3 acres or more of impervious area and 20 acres or more of developed area or otherwise require review pursuant to the Site Location of Development Law must control the peak flow of runoff from the site to pre-development rates during the 2-year, 10-year and 25-year, 24-hour storms. As this project does not meet the above criteria the MDEP Flooding Standard does not apply. It will meet the MDEP Flooding standards based on the requirements of section 812.E in the Town of Windham Land Use Ordinance.

2.7 PROPOSED BMPs

The development will utilize a series of infiltration measures and underground detention to capture and treat stormwater derived from the developed areas of the site. The system has been sized to treat a minimum of 1" of runoff from the tributary impervious areas and 0.4" of runoff from the tributary landscaped areas.

2.8 PROJECT IMPACTS

The total developed area proposed is 1.31 acres which includes 0.98 acres of impervious cover (roof/pavement). Additional area will be disturbed during construction and will either be allowed to return to its natural state or not maintained as developed area and only mowed twice a year.

Additionally, there is no impact to wetlands with this development. No wetlands were identified on the property.

3) STORMWATER QUANTITY ANALYSIS

3.1 PRE-DEVELOPMENT CONDITIONS

Under pre-development conditions the site is modeled with two Subcatchment areas (See Plan Set for Pre-Development Drainage Area Plan) draining to two points of analysis, Study Point 1 and 2.

3.2 POST- DEVELOPMENT CONDITIONS

Under the post-development condition, the site area is divided further into twelve subcatchment areas to allow for the effects of localized storage to be calculated. The runoff for the individual subcatchments drain to the same two points of analysis. As such, a direct comparison can be made of the pre-development and post-development runoff values at each Study Point.

The watershed areas and times of concentration of the post-development watersheds vary from the existing conditions based on the proposed site development and grading. The Table below summarizes the results of the hydrologic analysis of the project under pre-development and post-development conditions.

3.3 STORMWATER QUANTITY SUMMARY

Stormwater Runoff Summary Table Pre-Development vs. Post-Development								
<u>Study Point</u>	Total Watershed Area (Ac)		Peak Rates of Runoff (cfs)					
			2-Year		10-Year		25-Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
SP-1	0.93	0.87	0.0	0.0	0.0	0.1	0.1	0.1
SP-2	1.16	1.17	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	2.09	2.05	0.0	0.0	0.0	0.1	0.1	0.1

4) STORMWATER QUALITY ANALYSIS

Water quality treatment is provided for runoff from the majority of the new developed areas associated with the project. The underdrained sand filter provides treatment for 95.6% of the impervious area and 80.4% of the developed area associated with the project. Chapter 500 stipulates treating 95% of the impervious area and 80% of the total developed area: the proposed infiltration measures proposed meet these criteria.

5) CONCLUSIONS

The runoff and routing calculations demonstrate that the development will result in no total increase in the peak rate during the 2-year storm event and insignificant increases in the 10-year or 25-year storm events.

Stormwater runoff from this site has been designed to meet the MDEP Basic and General Standards for stormwater quality treatment for the project site.

The proposed project is designed to fit into the topography and natural features of the site to the maximum extent practical. Stormwater runoff from the development will be captured, detained and treated in a series of BMPs and discharged to the same locations as under the pre-development conditions.

An Erosion and Sedimentation Control Plan will be implemented to address erosion and sediment control during construction and the post-construction stabilization of the site. These construction requirements have been developed following BMP guidelines and have been placed directly on the design plans for construction reference.

APPENDIX A

PRE-DEVELOPMENT HYDROCAD OUTPUT

APPENDIX B

POST DEVELOPMENT HYDROCAD OUTPUT

APPENDIX C

STORMWATER QUALITY CALCULATIONS

NORTHEAST CIVIL SOLUTIONS, INC.

Surveying - Engineering - Land Planning
381 Payne Road, Scarborough, Maine 04074
Tel: 207-883-1000 Fax: 207-883-1001

Project: 41878 Fielding Condos
Sheet No. 1 Of 1
Calc by: TAL Date: .12-16-20
Check by: _____ Date: _____
Scale: _____

Underground Infiltration #1

Impervious Area: 31409 sf

Landscaped Area: 2262 sf

Filter Area: A = (5% impervious area) + (2% landscaped area)

A = 1570 sf + 45.2 sf

A = 1616 sf

Area Provided = 2042 ✓

Volume: V = (1" x impervious area) + (0.4" x landscaped area)

V = 2617.416667 cf 75 cf

V = 2693 cf

Volume Provided = 4809 ✓

in a 25 year storm the pond detains 4809 cf of water

Given: 1.0 in/hr, infiltration rate

2042 sf, filter area

4809 cf, detention volume

Time = volume / rate

Rate = area x infiltratio rate

Rate = 2042 x 1.0 = 0.05 cfs

Time = 4809 / 0.05

Time = **28.3 hr** ✓ Drains within 24-48 Hours

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381 Payne Road, Scarborough, Maine 04074
Tel: 207-883-1000 Fax: 207-883-1001

Project: 41878 Fielding Condos
Sheet No. 2 Of 2
Calc by: TAL Date: .12-16-20
Check by: _____ Date: _____
Scale: _____

Drip Edge Sizing Calculations

Givens:

Width = 3 ft

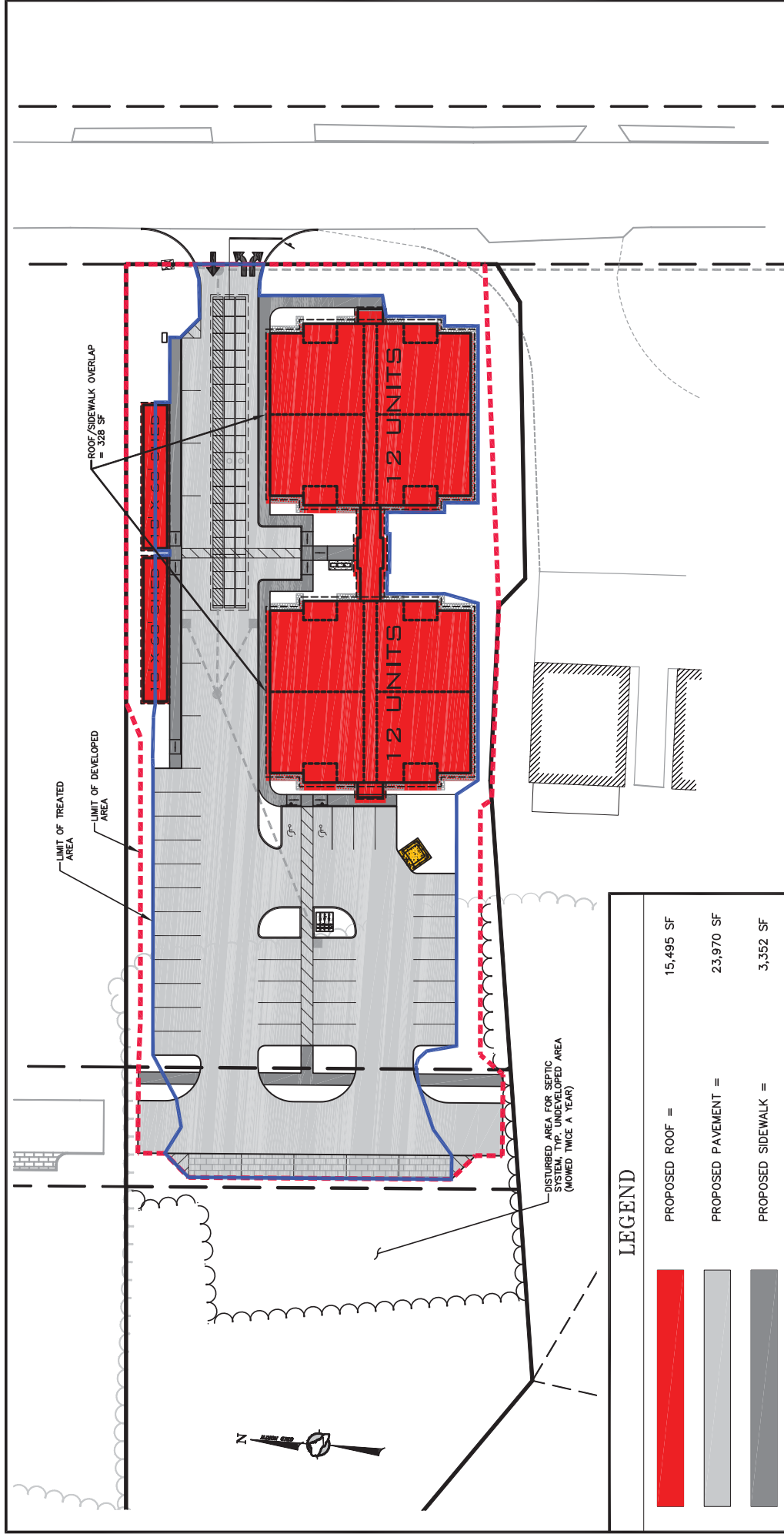
Void Ratio = 40%

Subcatchment	Roof Area*** (SF)	Length*** (FT)	Calc*	Calc**	Depth Prop (FT)	
			Volume Req (CF) (CF)	Depth Req (FT)		
S5	1008	40	84	1.75	2.0	✓
S6	979	40	81.6	1.7	2.0	✓
S7	979	40	81.6	1.7	2.0	✓
S8	1026	40	85.5	1.78	2.0	✓
S9	6582	246	549	1.86	2.0	✓

* Volume Required = 1 inch runoff x Roof Area

** Depth = $\frac{\text{Volume Required}}{\text{Void Ratio} \times (\text{Length} \times \text{Width})}$

*** From Design Plans



LEGEND

	PROPOSED ROOF =	15,495 SF
	PROPOSED PAVEMENT =	23,970 SF
	PROPOSED SIDEWALK =	3,352 SF
	PROPOSED DUMPSTER PAD =	100 SF
TOTAL IMPERVIOUS =		42,595 SF
PROPOSED TOTAL DEVELOPMENT =		56,894 SF
PROPOSED TREATED AREA =		45,720 SF
		= (80.4% OF TOTAL)
IMPERVIOUS AREA =		40,919 SF
		= (95.6% OF TOTAL)

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SURVEYING ENGINEERING LAND PLANNING



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Drawing Name:
STORMWATER TREATMENT FIGURE

Project Name and Location:
FIELDING CONDOS
ROOSEVELT TRAIL, WINDHAM, MAINE

DATE: JANUARY 5, 2021 ACAD FILE: XXXX.DWG

APPENDIX D

SOILS INFORMATION

ADAMS (Typic Haplorthods)

SETTING

Parent Material:	Derived from outwash, stratified drift material.
Landform:	Occupy outwash terraces and sand plains, deltas, lake plains, moraines, terraces and eskers.
Position in Landscape:	Usually occupies the upper positions of landform.
Slope Gradient Ranges:	(A) 0-3% (B) 3-8% (C) 8-20% (D) 20%+

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Somewhat excessively to excessively well drained, with no evidence of high groundwater table within 3.5 feet of the soil surface.		
Typical Profile Description:	Surface layer:	Pinkish gray sand, 0-4"	
	Subsurface layer:	Dark brown loamy sand, 4-10"	
	Subsoil layer:	Brown & yellowish brown sand,10-26"	
	Substratum:	Grayish brown sand, 26-70"	
Hydrologic Group:	Group A		
Surface Run Off:	Very slow to medium		
Permeability:	Rapid or very rapid		
Depth to Bedrock:	Very deep, greater than sixty inches		
Hazard to Flooding:	None		

INCLUSIONS (Within Mapping Unit)

Similar:	Soils that are fine sandy loam to very fine sandy loam to a depth of 20 inches, Colton.
Dissimilar:	Croghan soils that are moderately well drained and occur in shallow depressions.

USE AND MANAGEMENT

Development with subsurface wastewater disposal: Adams soil is suitable for subsurface wastewater disposal in accordance with State of Maine Rules for Subsurface Wastewater Disposal. This soil requires a 24-inch separation distance from the bottom of the disposal area and the seasonal high groundwater table. This soil requires a minimum hydraulic loading rate of 2.6 square feet/gpd for disposal system design. Adams soil is suited for building site development.

Development with public sewer and water: Adams soil is suited for building site development. Proper foundation drainage is recommended.

Stormwater Design: The Adams soil is well drained to excessively well drained. The groundwater table is typically below 4.0'. The groundwater table in this particular setting within the study area is greater than 8.0'. This soil is well suited for subsurface stormwater treatments. The expected soil permeability is 6.0 to 20.0 inches/hour in the upper horizon approximately 0-2', and 20.0 inches/hour in the lower horizons.

COLTON (Typic Haplorthods)

SETTING

Parent Material:	Glacio-fluvial deposits.
Landform:	Terraces, kames, eskers, and outwash plains.
Position in Landscape:	Upper portions of landforms.
Slope Gradient Ranges:	(B) 3-8% (C) 8-20% (D) 20%+

COMPOSITION AND SOIL CHARACTERISTICS

Drainage Class:	Excessively drained, with no observed water table within 6 feet of the soil surface.		
Typical Profile Description:	Surface layer:	Grayish brown gravelly loamy sand, 0-7"	
	Subsurface layer:	Dark reddish brown gravelly loamy sand, 7-11"	
	Subsoil layer:	Reddish brown gravelly loamy sand, 11-16"	
	Substratum:	Yellowish brown and pale brown very gravelly sand, 16-70"	
Hydrologic Group:	Group A		
Surface Run Off:	Slow		
Permeability:	Rapid or very rapid in the solum, very rapid in the substratum.		
Depth to Bedrock:	Very deep, greater than 60".		
Hazard to Flooding:	None		

INCLUSIONS (Within Mapping Unit)

Similar:	Hermon, Adams, Stetson
Dissimilar:	Duane, Croghan, Hermon, Waumbek

USE AND MANAGEMENT

Development with subsurface wastewater disposal: Colton soil is suitable for development. In addition, Colton soil meets the minimum requirements for subsurface wastewater disposal, in accordance with the State of Maine Rules for Subsurface Wastewater Disposal. Colton soil requires a 24" separation distance between the seasonal high groundwater table and the bottom of any disposal area, and also requires a minimum of 2.6 and 1.3 sq.ft/gpd for disposal beds and chamber area, respectively.

Soil Limitations for Proposed Use: The soil limiting factor for proposed development is large stones, which offer 'moderate' limitation. Typically, larger excavators and associated heavy machinery easily overcome limitations:

For stormwater design: Colton soils are excessively drained, generally with no water table within 6' of the soil surface. Permeabilities are greater than 6 inches per hour from 0-22", and greater than 20 inches per hour in the coarse textured subsoils (22"-65").