

Eastern Development Corporation 40 Plains Road Vtrans Stormwater Design Brief May 8, 2019

1. Project Description

Eastern Development Corporation (Applicant) proposes the construction of a 9,100 SF retail building located at 40 Plains Rd in Pittsford, VT. As existing, the 2.78 acre site includes a house, paved drive and concrete slab which will be demolished and removed. This existing development totals to 9,062 SF (0.21) acres) of impervious surface. The proposed project includes a building with roughly a 9,100 SF footprint and a 33-space parking lot, with a total of 34,640 SF (0.80 acres) of impervious surface, or 29% lot coverage (building and parking). The total impervious surface on-site is proposed to increase by 25,578 SF (0.59) acres).

As the total impervious coverage on-site is less than 1 acre, there are no state requirements for stormwater treatment. Per Section 1003.C.2.g of the Pittsford Zoning Regulations, stormwater drainage is to be treated on-site where practical and should not create an adverse impact upon the municipality or neighboring properties. In accordance with Vtrans standards, proposed peak runoff rates for the 25-year and 50-year storms should be less than or equal to the peak rates for the existing conditions where runoff discharges to a state right-of-way. To ensure compliance with these provisions, the existing and proposed sites have been hydrologically modeled.

Receiving Waters

Stormwater runoff from this site currently leaves the property southeast of the development through a culvert beneath the neighboring driveway. This discharge location will be referred to as S/N 001. Water then flows through a swale and eventually crosses Route 7 before it discharges to Otter Creek, approximately 3,000 feet south of the project parcel.

3. Existing Conditions

The site currently consists of a 2.78 acre parcel with a single family home located near Plains Rd. Impervious cover on the site is approximately 9,062 SF and is limited to the existing house, driveway and a large concrete slab. The remainder of the site is open space, with grass predominating on the south portion of the parcel and a Class II wet meadow on the east side of the parcel. The wet meadow contains a seasonal drainage swale which flows to a farm pond. The farm pond then drains through a culvert to a swale southeast off the property. The site is relatively flat, with an approximately 1% grade in the north-south direction and an approximately 2% grade in the east-west direction. In addition to the project area, off-site stormwater flows onto the property. This includes the prominent residential development to the north along Plains Rd. The total drainage area to discharge location S/N 001 is approximately 42.8 acres.

On-site soils are predominately Hydrologic Soil Group (HSG) C, with some HSG A soils in the northwest corner of the property and some HSG D soils in the northeast corner of the property. A "Natural Resources Map" illustrating these site conditions is attached to this report.

4. Existing Stormwater System

Currently, there is no engineered or permitted stormwater system on-site. However, drainage for the property leaves the site in two locations. The majority of the property, including all existing impervious development, flows to the existing Class II wet meadow and exits the site through a culvert beneath the neighboring driveway at S/N 001. The remainder of the property flows to the southwest corner of the property and northwest through a culvert beneath Plains Road and eventually across Route 7 to Otter Creek.

5. Proposed Stormwater System

The proposed site, once developed, will drain to the same two locations as currently exist. The paved area will be graded and crowned for water to sheet flow from the driveway entrance, loading dock and northernmost two parking spaces northwest to the existing grassed area. From there, water will sheet flow to the existing drainage swale, wet meadow, and farm pond where it will infiltrate into the ground or eventually leave the site through S/N 001.

The remaining majority of the parking area will sheet flow to the south where it will be directed by a constructed swale off the end of the parking lot. The swale directs flows back to the wet meadow and farm pond where water will either infiltrate or eventually leave the site through S/N 001. Further, there will be a

timber check dam within the swale to detain flows, allowing for infiltration and controlled discharge through small orifices in the dam.

The remainder of the site drainage area which currently flows to the existing culvert crossing Plains Road has been greatly minimized. The existing culvert under Plains Road will be removed and new HDPE drain pipes and yard drains/catch basins will be installed. This new drain piping will outlet at the western side of Plains Road in the same outlet location as the existing culvert.

6. Stormwater Compliance

As proposed development is less than 1-acre of impervious cover there is no state regulation for stormwater treatment. However, it should be ensured that the proposed project has no undue adverse impacts to the municipality or surrounding properties.

Vtrans Compliance

As indicated in Section 5, the proposed site will drain to either the new drain pipe under Plains Road or S/N 001 at the southeast corner of the side. Runoff from the entirety of the impervious surface on the project parcel (excluding a sidewalk) including the parking lot, drive, and building will be routed to S/N 001 at the southeast corner of the site. A small portion of the drainage area along Plains Road and Route 7 will be routed through the new drainage piping and discharge onto the state's right-of-way. As the drainage area discharging to the right-of-way will decrease after development, the proposed peak discharge rates for the 25-year and 50-year storms will be less than the existing peaks thus meeting the Vtrans requirements. The existing and proposed drainage areas discharging to the state's right-of-way have been hydraulically modelled using HydroCAD and the peak discharge rates are listed in the table below.

| Scenario | Plains Road Discharge (cfs) | Decrease (%) |
|------------------------------|--------------------------------|--------------|
| Existing Flow Rate (25-year) | 1.63 | |
| Proposed Flow Rate (25-year) | 0.86 | 47.2 |
| | | |
| Existing Flow Rate (50-year) | 1.95 | |
| Proposed Flow Rate (50-year) | 1.02 | 47.7 |

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7. Conclusions

As outlined in the above table, the proposed development will decrease the amount of runoff discharging onto the State's right-of-way. Additionally, peak stormwater runoff rates for post-development conditions will be reduced for the 25-year and 50-year storms, thus meeting the Vtrans stormwater requirements.

Enclosed:

25 Year & 50 Year HydroCAD Model Natural Resources Map Existing Drainage Area Map Proposed Drainage Area Map



Existing DA to Plains Inlet of Existing Culvert Road



Proposed DA to Plains Inlet of Proposed Drain Road









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Area Listing (selected nodes)

| Area | CN | Description |
|-------------|----|--|
| (acres) | | (subcatchment-numbers) |
| 0.621 | 74 | >75% Grass cover, Good, HSG C (12S, 14S) |
| 0.014 | 98 | Paved parking, HSG C (14S) |
| 0.015 | 98 | Paved parking, HSG D (14S) |
| 0.650 | 75 | TOTAL AREA |

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Soil Listing (selected nodes)

| Area | Soil | Subcatchment |
|---------|-------|--------------|
| (acres) | Group | Numbers |
| 0.000 | HSG A | |
| 0.000 | HSG B | |
| 0.634 | HSG C | 12S, 14S |
| 0.015 | HSG D | 14S |
| 0.000 | Other | |
| 0.650 | | TOTAL AREA |

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Ground Covers (selected nodes)

| HSG-A | HSG-B | HSG-C | HSG-D | Other | Total | Ground | Subcatchment |
|-------------|---------|---------|---------|---------|---------|------------------------|--------------|
| (acres) | (acres) | (acres) | (acres) | (acres) | (acres) | Cover | Numbers |
| 0.000 | 0.000 | 0.621 | 0.000 | 0.000 | 0.621 | >75% Grass cover, Good | 12S, 14S |
| 0.000 | 0.000 | 0.014 | 0.015 | 0.000 | 0.029 | Paved parking | 14S |
| 0.000 | 0.000 | 0.634 | 0.015 | 0.000 | 0.650 | TOTAL AREA | |

Type II 24-hr 25-Year Rainfall=4.50"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 12S: Existing DA to Plains Road Runoff Area=18,923 sf 0.00% Impervious Runoff Depth=1.97" Flow Length=180' Slope=0.0666 '/' Tc=3.7 min CN=74 Runoff=1.63 cfs 0.071 af

Subcatchment 14S: Proposed DA to Plains Road Runoff Area=9,380 sf 13.54% Impervious Runoff Depth=2.28" Flow Length=150' Slope=0.0266 '/' Tc=4.7 min CN=77 Runoff=0.86 cfs 0.041 af

Pond 13P: Inlet of Existing Culvert Inflow=1.63 cfs 0.071 af Primary=1.63 cfs 0.071 af

Pond 15P: Inlet of Proposed Drain Inflow=0.86 cfs 0.041 af Primary=0.86 cfs 0.041 af

Total Runoff Area = 0.650 ac Runoff Volume = 0.112 af Average Runoff Depth = 2.08" 95.51% Pervious = 0.621 ac 4.49% Impervious = 0.029 ac

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Summary for Subcatchment 12S: Existing DA to Plains Road

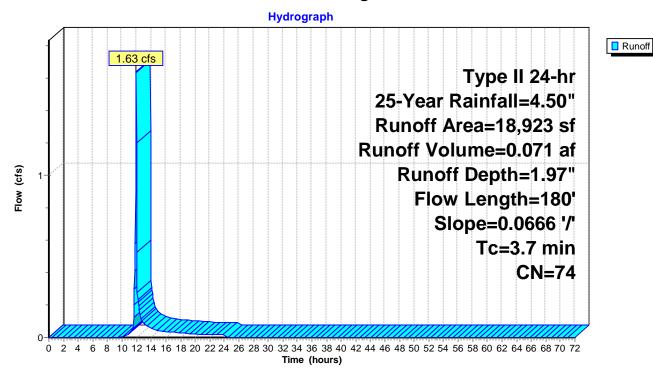
[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.63 cfs @ 11.95 hrs, Volume= 0.071 af, Depth= 1.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=4.50"

| _ | Α | rea (sf) | CN | Description | | |
|---|-------------|------------------|------------------|-------------|-------------------|----------------|
| | | 18,923 | 74 | >75% Gras | s cover, Go | ood, HSG C |
| | | 18,923 | | 100.00% Pe | ervious Area | ea |
| | Tc (min) | Length (feet) | Slope (ft/ft) | • | Capacity (cfs) | Description |
| - | 3.7 | 180 | 0.0666 | | (0.0) | Lag/CN Method, |

Subcatchment 12S: Existing DA to Plains Road



Summary for Subcatchment 14S: Proposed DA to Plains Road

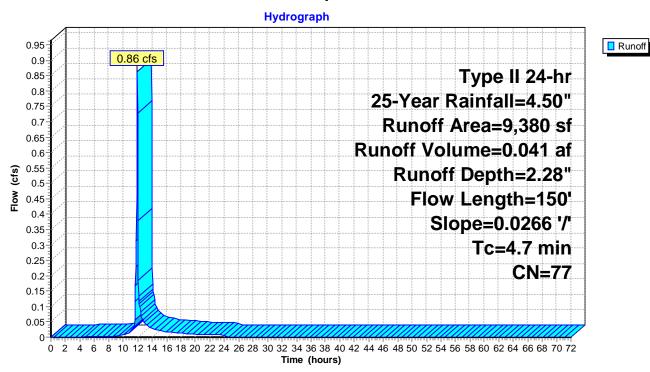
[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.86 cfs @ 11.95 hrs, Volume= 0.041 af, Depth= 2.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 25-Year Rainfall=4.50"

| A | rea (sf) | CN [| Description | | | | |
|-------|----------|---------|----------------------|-------------|----------------|--|--|
| | 602 | 98 F | Paved parking, HSG C | | | | |
| | 668 | 98 F | Paved parking, HSG D | | | | |
| | 8,110 | 74 > | -75% Gras | s cover, Go | od, HSG C | | |
| | 9,380 | 77 \ | Veighted A | verage | | | |
| | 8,110 | 8 | 86.46% Pervious Area | | | | |
| | 1,270 | • | 13.54% lmp | ervious Are | ea | | |
| | | | | | | | |
| Tc | Length | Slope | , | Capacity | Description | | |
| (min) | (feet) | (ft/ft) | (ft/sec) | (cfs) | | | |
| 4.7 | 150 | 0.0266 | 0.53 | | Lag/CN Method, | | |

Subcatchment 14S: Proposed DA to Plains Road



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Summary for Pond 13P: Inlet of Existing Culvert

[40] Hint: Not Described (Outflow=Inflow)

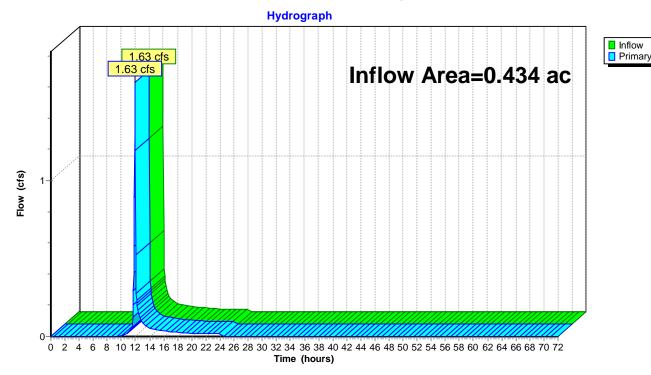
Inflow Area = 0.434 ac, 0.00% Impervious, Inflow Depth = 1.97" for 25-Year event

Inflow = 1.63 cfs @ 11.95 hrs, Volume= 0.071 af

Primary = 1.63 cfs @ 11.95 hrs, Volume= 0.071 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 13P: Inlet of Existing Culvert



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Summary for Pond 15P: Inlet of Proposed Drain

[40] Hint: Not Described (Outflow=Inflow)

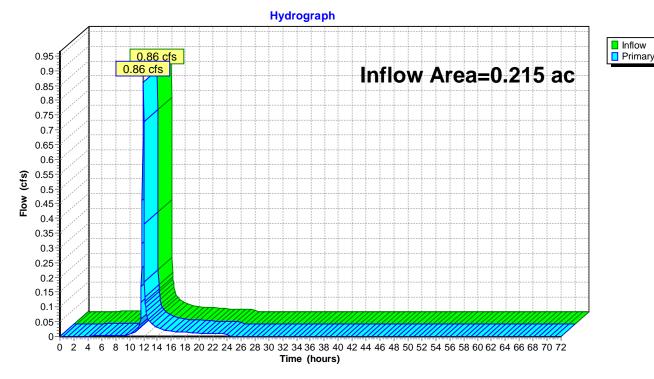
Inflow Area = 0.215 ac, 13.54% Impervious, Inflow Depth = 2.28" for 25-Year event

Inflow = 0.86 cfs @ 11.95 hrs, Volume= 0.041 af

Primary = 0.86 cfs @ 11.95 hrs, Volume= 0.041 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 15P: Inlet of Proposed Drain



Type II 24-hr 50-Year Rainfall=5.00"

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Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-Q
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 12S: Existing DA to Plains Road Runoff Area=18,923 sf 0.00% Impervious Runoff Depth=2.36" Flow Length=180' Slope=0.0666 '/' Tc=3.7 min CN=74 Runoff=1.95 cfs 0.086 af

Subcatchment 14S: Proposed DA to Plains Road Runoff Area=9,380 sf 13.54% Impervious Runoff Depth=2.69" Flow Length=150' Slope=0.0266 '/' Tc=4.7 min CN=77 Runoff=1.02 cfs 0.048 af

Pond 13P: Inlet of Existing Culvert Inflow=1.95 cfs 0.086 af Primary=1.95 cfs 0.086 af

Pond 15P: Inlet of Proposed Drain Inflow=1.02 cfs 0.048 af Primary=1.02 cfs 0.048 af

Total Runoff Area = 0.650 ac Runoff Volume = 0.134 af Average Runoff Depth = 2.47" 95.51% Pervious = 0.621 ac 4.49% Impervious = 0.029 ac

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Summary for Subcatchment 12S: Existing DA to Plains Road

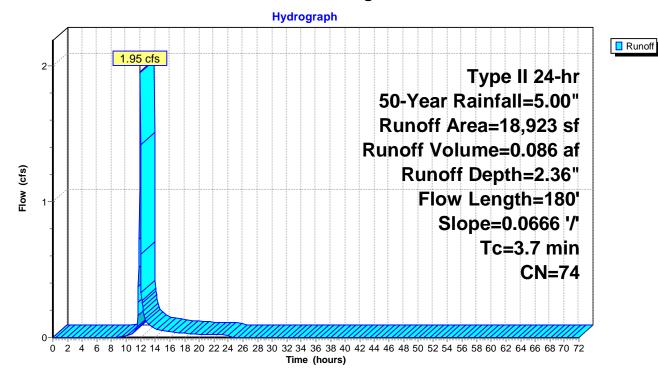
[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.95 cfs @ 11.94 hrs, Volume= 0.086 af, Depth= 2.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 50-Year Rainfall=5.00"

| _ | Α | rea (sf) | CN [| Description | | |
|---|-------|----------|---------|-------------|--------------|----------------|
| | | 18,923 | 74 > | >75% Gras | s cover, Go | ood, HSG C |
| | | 18,923 | • | 100.00% Pe | ervious Area | a |
| | Tc | Length | Slone | \/elocity | Capacity | Description |
| | (min) | (feet) | (ft/ft) | (ft/sec) | (cfs) | Description |
| _ | 3.7 | 180 | 0.0666 | 0.80 | | Lag/CN Method, |

Subcatchment 12S: Existing DA to Plains Road



Summary for Subcatchment 14S: Proposed DA to Plains Road

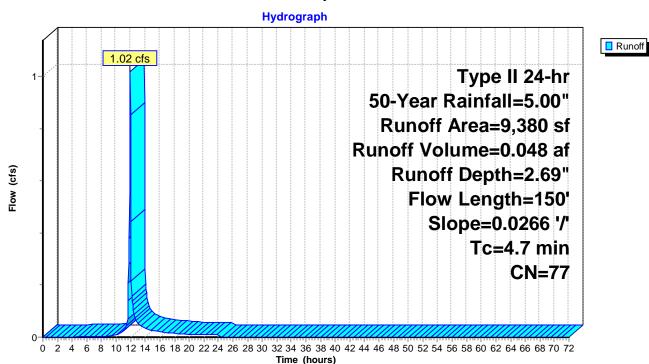
[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.02 cfs @ 11.95 hrs, Volume= 0.048 af, Depth= 2.69"

Runoff by SCS TR-20 method, UH=SCS, Weighted-Q, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs Type II 24-hr 50-Year Rainfall=5.00"

| _ | Aı | rea (sf) | CN | Description | | | | | |
|---|-------|----------|---------|----------------------|--------------|----------------|--|--|--|
| | | 602 | 98 | Paved parking, HSG C | | | | | |
| | | 668 | 98 | Paved parking, HSG D | | | | | |
| _ | | 8,110 | 74 | >75% Gras | s cover, Go | ood, HSG C | | | |
| | | 9,380 | 77 | Weighted A | verage | | | | |
| | | 8,110 | | 86.46% Pervious Area | | | | | |
| | | 1,270 | | 13.54% lmp | pervious Are | ea | | | |
| | | | | | | | | | |
| | Tc | Length | Slope | • | Capacity | Description | | | |
| _ | (min) | (feet) | (ft/ft) | (ft/sec) | (cfs) | | | | |
| | 4.7 | 150 | 0.0266 | 0.53 | | Lag/CN Method, | | | |

Subcatchment 14S: Proposed DA to Plains Road



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Summary for Pond 13P: Inlet of Existing Culvert

[40] Hint: Not Described (Outflow=Inflow)

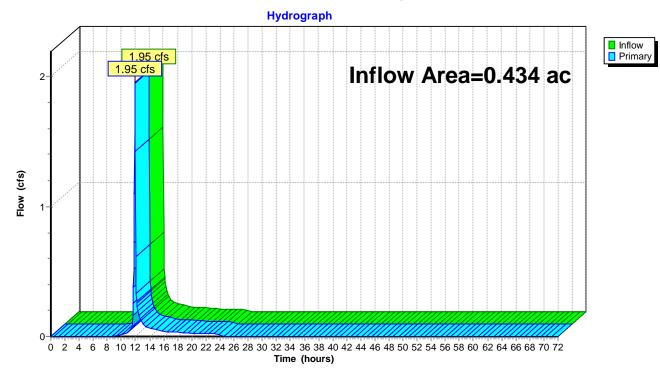
Inflow Area = 0.434 ac, 0.00% Impervious, Inflow Depth = 2.36" for 50-Year event

Inflow = 1.95 cfs @ 11.94 hrs, Volume= 0.086 af

Primary = 1.95 cfs @ 11.94 hrs, Volume= 0.086 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 13P: Inlet of Existing Culvert



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Summary for Pond 15P: Inlet of Proposed Drain

[40] Hint: Not Described (Outflow=Inflow)

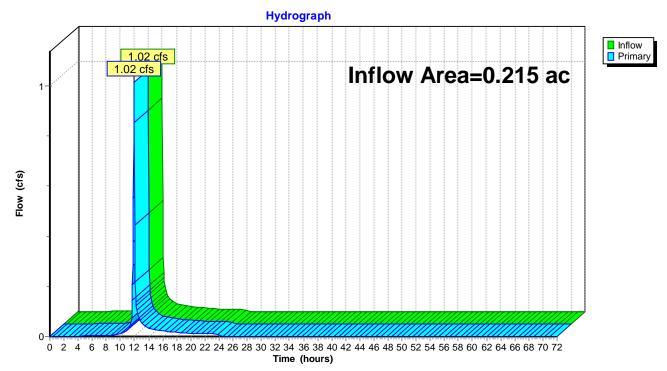
Inflow Area = 0.215 ac, 13.54% Impervious, Inflow Depth = 2.69" for 50-Year event

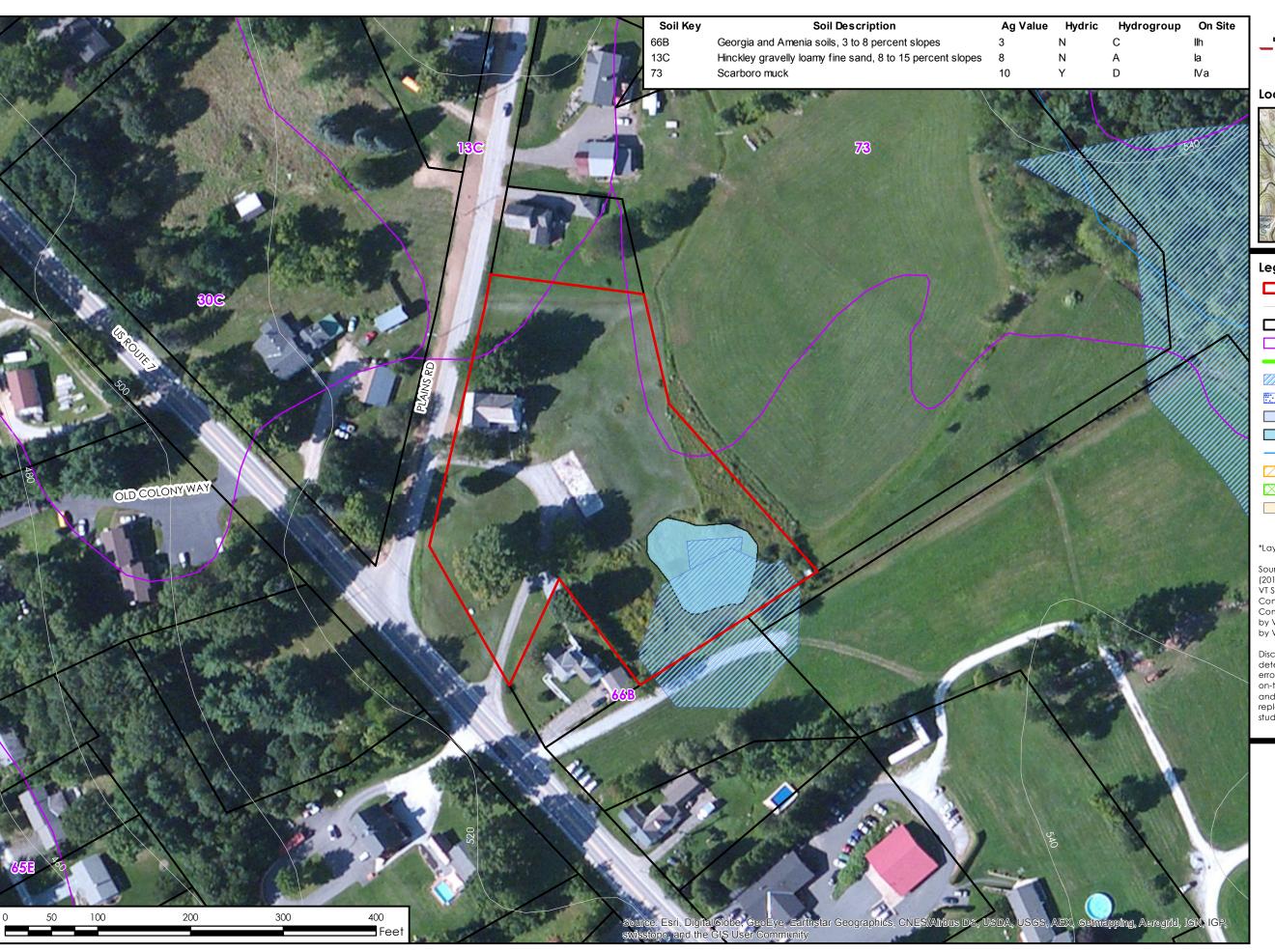
Inflow = 1.02 cfs @ 11.95 hrs, Volume= 0.048 af

Primary = 1.02 cfs @ 11.95 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Pond 15P: Inlet of Proposed Drain







Location



Legend

- ☐ Project Parcel
- Contour (20')
- ☐ Tax Parcel Boundary
- Soil
- Outstanding Resource Waters*
- State Significant Wetland
- State Class 3 Wetland*
- State River Corridor*
- VHD Open Water
- VHD Stream*
- ✓ State RTE Species*
- State Uncommon Species*
- State Deer Wintering Area*

*Layer does not occur within map extent.

Sources: Bing Basemap Imagery (2015); Streams by VHD (2013); Project Area by TCE (2015); VT E911 Roads (2015); VT Significant Wetland by ANR (2010); Soils by NRCS (2011); Contours by VCGI (2012); RTE Species and Natural Community by VT Fish & Wildlife (2015); Uncommon Species by VT Fish & Wildlife (2015). Tax Parcel Boundary compiled by VCGI; Deer Wintering Area by ANR (2011).

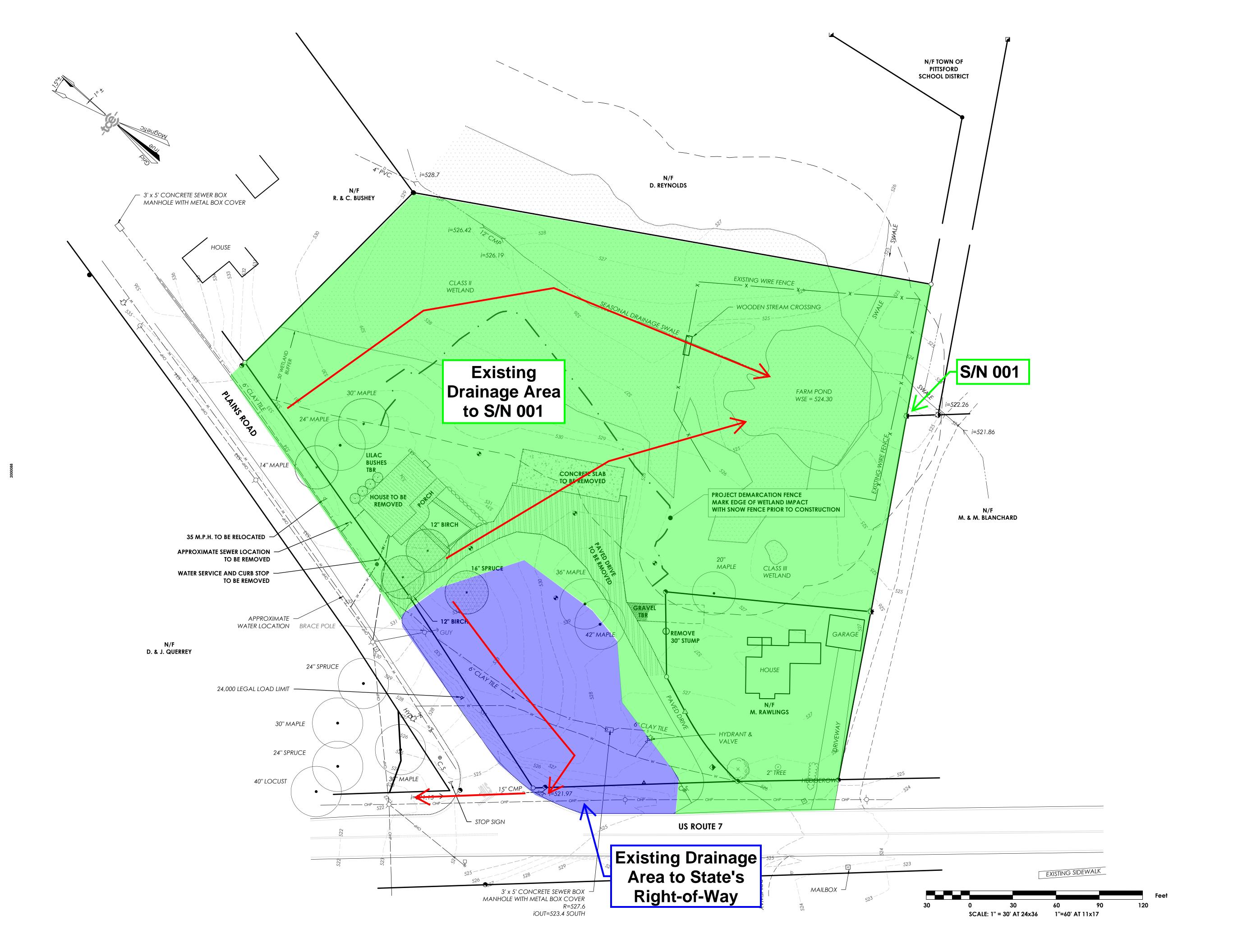
Disclaimer: The accuracy of information presented is determined by its sources.TCE is not responsible for any errors or omissions that may exist. Questions of on-the-ground location can be resolved by site inspections and/or surveys by a registered surveyor. This map is not a replacement for surveyed information or engineering studies.

Zaremba 36 Plains Road Pittsford, VT

Natural Resource Map

Project: 16-021 Prepared By: LJW 02/10/2016 1 inch = 100 feet







TRUDELL CONSULTING ENGINEERS

478 BLAIR PARK ROAD | WILLISTON, VERMONT 05495 802 879 6331 | WWW.TCEVT.COM

Revisions No. Description

Date

TAX ID: 20-306-0040

Use of These Drawings
1. Unless otherwise noted, these Drawings are intended for preliminary planning, coordination with other disciplines or utilities, and/or approval from the regulatory authorities.

They are not intended as construction drawings unless noted as such or marked approved by a regulatory authority.

2. By use of these drawings for construction of the Project, the Owner represents that they have reviewed, approved, and accepted the drawings, obtained all necessary permits, and have met with all applicable parties/disciplines, including but not limited to, the Engineer and the Architect, to insure these plans are properly coordinated including, but not limited to, contract documents, specifications, owner/contractor agreements, building and mechanical plans, private and public utilities, and other pertinent permits for construction.

3. Owner and Architect, are responsible for final design and location of buildings shown, including an area measured a minimum five (5) feet around any building and coordinating final utility connections shown on these plans.

4. Prior to using these plans for construction layout, the user shall contact TCE to ensure the plan contains the most current revisions.

5. These Drawings are specific to the Project and are not transferable. As instruments of service, these drawings, and copies thereof, furnished by TCE are its exclusive property. Changes to the drawings may only be made by TCE. If errors or omissions are discovered, they shall be brought to the attention of TCE immediately.

6. It is the User's responsibility to ensure this copy contains the most current revisions.

Project I

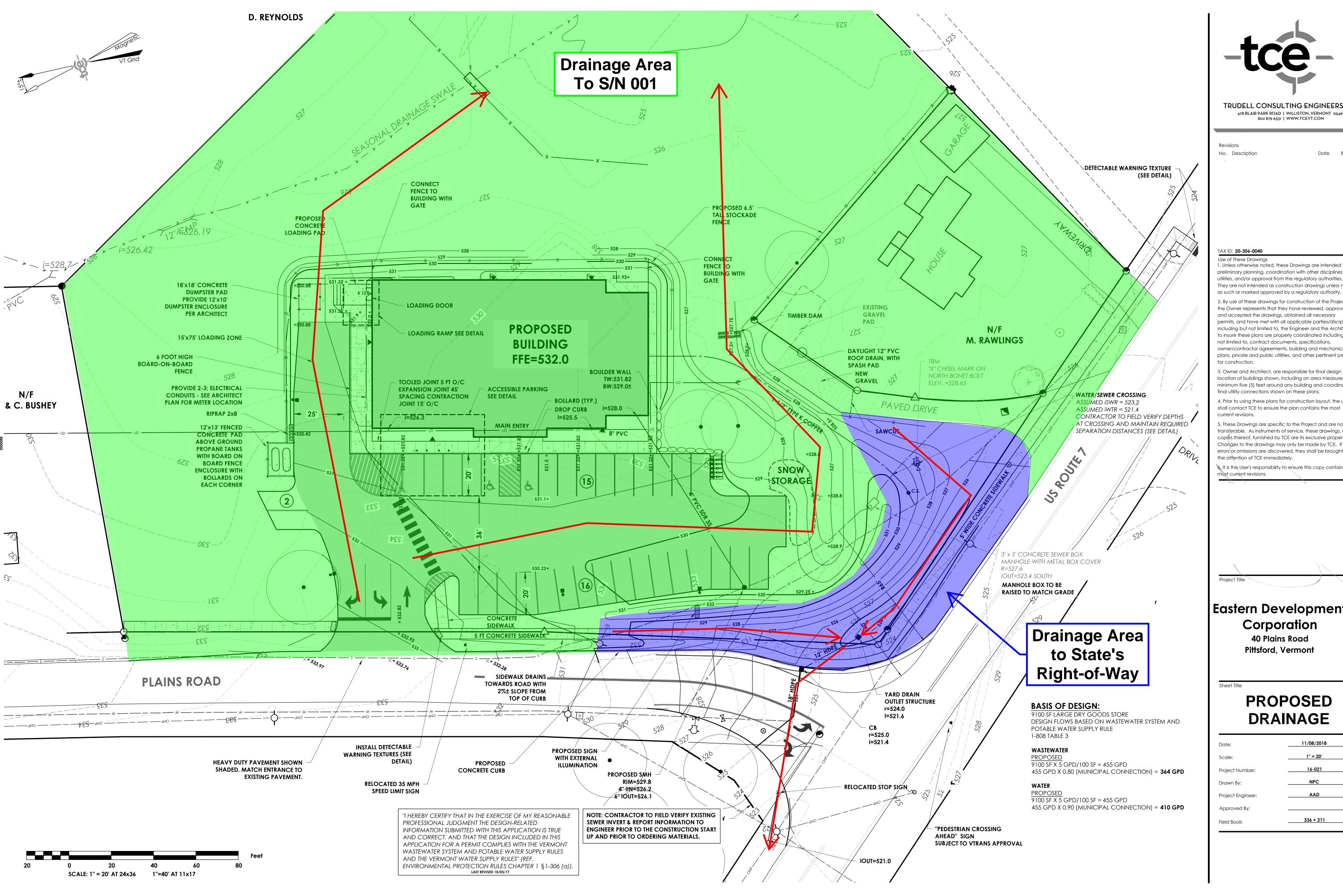
Eastern Development Corporation

40 Plains Road Pittsford, Vermont

Sheet T

Existing Drainage

| Date: | 11/08/2018 |
|-------------------|------------|
| Scale: | 1" = 30' |
| Project Number: | 16-021 |
| Drawn By: | NPC |
| Project Engineer: | AAD |
| Approved By: | |
| Field Book: | 336 + 211 |





TRUDELL CONSULTING ENGINEERS 478 BLAIR PARK ROAD | WILLISTON, VERMONT 05495

802 879 6331 | WWW.TCEVT.COM

Revisions

TAX ID: 20-306-0040

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Eastern Development Corporation

40 Plains Road Pittsford, Vermont

PROPOSED DRAINAGE

| 11/08/2018 |
|------------|
| 1" = 20' |
| 16-021 |
| NPC |
| AAD |
| |
| 336 + 211 |
| |