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January 11, 2022

Mr. Gregory Rondeau, Chairman
Franklin Planning Board
and
Mr. William Batchelor, Chairman
Franklin Conservation Commission
355 East Central Street
Franklin, MA 02038

**Re: Washington Street – Franklin Flex Space
Site Plan Peer Review**

Mr. Chairman and Board Members,

On behalf of the applicant Franklin Flex Space, LLC., we have provided a summary of the following outstanding comments from BETA Group, Inc. dated December 15, 2021. Our responses are immediately following each comment and they have been italicized.

BETA Group, Inc.

- G1. Confirm legal right to construct portions of the Site on land owned by the New England Power Company (Lot 305-004).

The applicant and his attorney have been communicating with New England Power Company. The site plans will be filed with New England Power Company to obtain final approvals.

BETA2: Information provided. BETA notes this is a private property matter; however, the Board may wish to note this in their findings if the project is approved.

UCI2: The applicant is amenable to BETA's recommendation.

- G2. Provide typical section views and necessary installation details for proposed Geoweb areas adjacent to parking areas, guardrail, retaining walls, and fence. Notes included on Sheet 10 indicate that "tendons" will be installed, which may require work beyond the top of slope or easterly property line. In consideration that the supported 1:1 slopes are proposed adjacent to residential properties and wetland resources, the designer should clarify if there are any local installations that confirm adequate long-term performance. Also clarify if final designs will require the stamp of a structural or geotechnical engineer.

A Presto Geosystems document dated August 31, 2021 has been provided. The document has been provided in the supplemental documents.

BETA2: As noted in the referenced documents, the provided design is for surface stability only and assumes that the underlying slope is stable against failure. If the Board elects to approve the project,

BETA recommends a condition of approval that requires slope stability to be evaluated by a geotechnical engineer and that a representative of Geoweb manufacturing is on site during construction to ensure the system is installed as designed.

UCI2: The applicant has engaged a geotechnical engineer to evaluate the soil conditions and to complete a slope design. The applicant is amenable to the recommended conditions or approval.

Zoning

The Site is located within the Industrial (I) Zoning District. The proposed uses include:

- Light manufacturing, permitted by right (P/SP)
- Warehouse, permitted by right (Y)
- Office, permitted by right (Y or P/SP)

Information has been provided indicating that the anticipated water use is not greater than 15,000 gallons per day. Therefore, a special permit from the Board of Appeals is not required.

Schedule of Lot, Area, Frontage, Yard and Height Requirements (§185 Attachment 9)

The Site meets the requirements for lot area, frontage; front and rear yards; impervious coverage, and building height. The required depth is provided between the rear lot line and a section of frontage that is not part of the required continuous frontage. The Site does not meet requirements for lot width and a note has been provided to refer to Section §185-10.B. (Nonconforming Lots).

21. Conform with the Building Commissioner that the required lot depth does not need to be provided along the section of frontage associated with the required continuous frontage of the lot.

The applicant's attorney is completing a zoning letter regarding this matter.

BETA2: Information provided. Upon receipt of the letter, BETA will defer to the Building Commissioner and or Town Counsel on this issue.

UCI2: The applicant's attorney has completing a revised zoning opinion letter regarding this matter, which has been sent to the Building Commissioner. Once received, we will forward any responses to the Planning Board.

22. Provide documentation confirming that the Site is exempt from the lot width requirements. BETA notes that Section §185-10 does not reference lot width; however, some exceptions are provided for lot width under §185-3.

The applicant's attorney is completing a zoning letter regarding this matter.

BETA2: Information provided. Upon receipt of the letter, BETA will defer to the Building Commissioner and or Town Counsel on this issue.

UCI2: The applicant's attorney has completing a revised zoning opinion letter regarding this matter, which has been sent to the Building Commissioner. Once received, we will forward any responses to the Planning Board.

23. Provide proposed building height, in feet, to evaluate required yard widths to the extent applicable. Per §185 Attachment 9, Note 5, the required side and rear yard widths must be increased by the common building height of a structure when abutting a residential district or use. BETA notes the yard width provided along the eastern lot line is only 31', and this yard abuts a residential use.

The proposed building height of 22' has been added to sheet 1.

BETA2: Information provided. BETA has requested for the Building Commissioner to issue a determination on the proposed development's conformance to the Bylaw and will provide the Board with an updated upon receipt of correspondence.

UCI2: On behalf of the applicant we have requested the Zoning Enforcement officer's response be forwarded to us as well.

P7. Provide a detail for the proposed sidewalk and ramp(s) located to the south of Building 1, with detailed grading, as needed. The location of transition curbs should also be designated.

A detail has been added to sheet 10.

BETA2: Detail provided; however, grades indicate a running slope exceeding 5%. As such, this portion of the walkway is considered a ramp that requires handrails in accordance with 521 CMR 24.5

UCI2: The grading has been revised with a slope of less the 5 percent incorporated.

Industrial District Performance Controls (§185-22)

The project is located in the Industrial District and must conform to this section.

11. Provide information quantifying sound, noise, vibration, odor, and flashing anticipated to be produced at the Site. Confirm that all such disturbances will not be perceptible at a distance 100 ft from the originating premises into the abutting residential district (§185-22.A).

Notes to address the above have been added to sheet 4.

BETA2: Note provided. BETA recommends for the Board to discuss options to ensure conformance with the referenced regulations, such as post-construction monitoring or including special conditions of approval.

UCI2: The applicant is amenable to BETA recommendations.

Floodplain District (§185-24)

A portion of the Site is located within a FEMA-mapped 100-year flood zone (Zone AE) associated with the nearby Mine Brook and Spring Pond; however, proposed work within the flood zone is limited to the installation of a rip rap pad, which is anticipated to result in no net fill.

FP1. Identify that a portion of the Site is within Flood Zone AE and note its associated elevation.

The flood zone line is provided on sheets 2 - 6. The Zone AE designation and elevation have been added. It should be noted that the project revisions include filling and compensation of the flood plain. It is our understanding that this will be reviewed and comments will be received as part of the Conservation Commission review.

BETA2: Flood zone limits provided. BETA will provide evaluation of Flood Zone Impacts as part of the Conservation Review.

UCI2: We have received flood plain review comments from the Conservation Commissions peer review consultant. The flood plain review comments will be addressed with the Conservation Commission.

Site Plan and Design Review (§185-31)

The project has been submitted for Site Plan Review and is required to conform to the requirements of this section.

SP2. The designer has requested waiver from §185-31.1.C (4) (e), requiring that no illumination may extend beyond a Site's property line. The lighting plan shows illumination extending onto the eastern residences. The designer should evaluate if additional measures can be implemented to mitigate spillage, such as providing cutoffs, adjusting light locations, or lowering the mounting height to be equal to or lower than the top of the proposed screening fence.

The site lighting has been revised. The waiver is still being requested for light spillage at the site entranced.

BETA2: The lighting has been revised to eliminate spillage onto residentially used parcels and remaining spillage is limited to a portion of a vacant lot owned by the NE Power Co. BETA notes that the requested waiver appears reasonable and defers to the preference of the Board.

UCI2: We defer to the preference of the Planning Board on this waiver request.

SP4. Evaluate if the seven parking spaces that exceed what is required by the Bylaw are necessary for site operations. Reducing the number of parking spaces at the northern end of the site could potentially eliminate approximately 5,000 sq. ft. of pavement and portions of several retaining walls, which will reduce potential impacts on nearby resource areas (§185-31.1.C(4)(f)).

The parking area has been reconfigured and the retaining walls have been eliminated. The parking count has been increased. The impervious areas have been located further away from the wetland resource areas.

BETA2: Comment noted. BETA notes the reconfigured parking is located further from the wetlands but does increase the overall impervious area. The proponent should clarify if the 19 parking spaces in excess of what is required by the Bylaw is necessary for site operations. Notes on the plans indicate that excess parking spaces will be used for snow storage.

UCI2: The applicant prefers to have the additional parking to provide flexibility for proposed tenants and also to provide for snow storage.

Screening (§185-35)

The project proposes outdoor parking for 10 or more cars which must be screened in accordance with this section. Residential districts abut the property to the east, which are at a higher elevation than proposed parking areas.

The project proposes a six-foot high green vinyl stockade fence along the eastern property line to provide the required screening. Visibility of the majority of parking areas will further be mitigated by the proposed buildings, except for the southeastern lot.

A planting plan has been provided, which proposes the installation of American Elm, Red Maple, and White Birch.

S1. Provide required greenbelt for Industrial districts located within 500 feet of an adjacent residential structure (§185-35.C).

The property is located within an Industrial District and abuts a residential district which has single family residential houses. The single family residential houses are an allowed use in the residential district. As such it does not appear that a greenbelt is necessary. It should be noted that the residential properties are screened from the industrial property by a six foot high solid stockade fence. Additional evergreen plantings have been added at the southeastern boundary.

BETA2: It is BETA's interpretation that the greenbelt is required for uses in the businesses or industrial districts that are prohibited in the abutting residential district. The proposed uses of warehouse and light manufacturing are prohibited in the adjacent district. The proposed uses of warehouse and light manufacturing are prohibited in the adjacent Single Family III district, and office uses are generally prohibited or require a special permit. The Board may wish to consider requesting a determination on the bylaws intent from the Building Commissioner.

UCI2: We have revised the fence and are now proposing a chain link fence. See fence detail on sheet 10. We have added Arborvitae screening along the residentially zoned properties.

S4. Provide proposed building heights and confirm if roof equipment, if proposed, will be readily visible from abutting residences.

The proposed building height of 22 feet has been added to the zoning table. Sheet 1.

BETA2: Height provided. The building roofs will be at approximate elevation 282', which exceeds the screening fence elevation of 278' to 280'. BETA recommends for the Board to require screening of rooftop equipment, if provided.

UCI2: The applicant is not proposing any roof top units. Provisions will be made for solar panels to be roof mounted.

Utilities

The project proposes the following utilities:

- Water: 8" CLDI water main, 4" Fire service, and 2" domestic.
- Sanitary sewer: On-site septic system.
- Electric, Telephone, and CTV: Underground conduit, one utility pole, and transformer.
- Gas: Three underground 200-gallon propane tanks.

Detailed review of utilities and fire service is anticipated to be provided by the Department of Public Works, Fire Chief, and Board of Health, as applicable.

U2. Notes provided on the Grading and Utility Plan indicate that water systems (domestic and fire) are shown schematically. Clarify if any initial coordination has taken place with the Fire Chief regarding the potential need for on-site hydrants. The proposed layout should also indicate typical locations for gate valves and boxes.

Additional gate valves, curb stops and tee's have been added and labeled. Sheet 4. We have provided the hydrant location to the fire department. We anticipate an updated response from the fire department. WE have communicated with the deputy fire chief.

BETA2: BETA defers to the Fire Department on hydrant locations.

UCI2: See attached email from Deputy Fire Chief, Joe Barbieri, and dated December 20, 2021.

Stormwater Management

Stormwater management is proposed via three subsurface infiltration systems. Runoff will be conveyed to these systems via trench drains and catch basin to manhole connections. Overflow from the systems will be discharged via three new outfalls into the wetland buffer zone to the west, where it will flow into Spring Pond. Several of the catch basins and manholes will also function as water quality units.

The project is subject to the Massachusetts Stormwater Management Standards outlined in the MA Stormwater Handbook (MSH). In addition, the proposed development will disturb greater than one acre; therefore, the project is subject to Chapter 153: Stormwater Management of the Town of Franklin Bylaws as well as Chapter 300-11 of the Town of Franklin Subdivision Regulations. Compliance with the standards, the bylaw, and best engineering practices is outlined in the following sections.

GENERAL

Massachusetts Stormwater Management Standards:

No untreated stormwater (Standard Number 1): *No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The project proposes three new outfalls which will discharge to the wetland buffer zone associated with Spring Pond. All runoff through these outfalls will first be treated by deep sump catch basins, subsurface infiltration systems, and, for some areas, water quality units. Riprap aprons are proposed at outlets to mitigate erosion.

SW8. Evaluate how flows entering the site from Washington Street will be directed and discharged. If overland, discharges are anticipated to require energy dissipation to mitigate erosion potential.

We have had discussions with the Town Engineer regarding the existing catch basin located to the north of the site drive. The entrance has been redesigned to allow for the existing catch basin to be located along the revised curb line. The watershed area was revised to allow for the additional flow from Washington Street.

BETA2: Information provided. There appears to be a significant area of Washington Street directed to the basin and the designer should evaluate the grate's capacity vs. calculated peak flows rates. Any bypass flows must be incorporated into hydrologic models to ensure they will not adversely impact the proposed stormwater management systems.

UCI2: We have evaluated the area contributing to the catch basin upgradient from the driveway entrance. The 100 year storm event rate of runoff is 1.66 cfs. If the catch basin did not receive any flow the runoff would enter the site and be captured in catch basins 1 or 3. The runoff would be routed through pond 1 and discharged at the pipe end and riprap area. With the additional runoff, Pond 1 would have 0.46 feet of freeboard. Refer to attached Washington Street Existing Catch Basin Analysis.

Higher Potential Pollutant Loads (Standard Number 5): *Stormwater discharges from Land Uses with Higher Potential Pollutant Loads require the use of specific stormwater management BMPs.*

The project narrative claims that this standard does not apply. However, the project may qualify as a Land Use with Higher Potential Pollutant Load (LUHPPL) under the definition of a "light industrial activity." The proposed BMPs are considered suitable for use in a LUHPPL.

SW13. Clarify if any of the potential industrial activities are subject to the NPDES Multi-sector permit or have the potential to be classified as a LUHPPL. If so, evaluate if additional BMPs are required and update narrative as necessary. If the project is approved, BETA recommends a condition that requires all industrial activities to take place entirely within the buildings.

The owner will not be allowed to lease or sell units to tenants with industrial activities that are subject to the NPDES Multi-sector permit. All industrial activities will take place within the building. The applicant is amenable to this as a condition of approval.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: The applicant is amenable to this as a condition of approval.

Critical Areas (Standard Number 6): *Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas.*

The project proposed discharges to a Zone II Wellhead Protection area, which is a critical area. The project has been designed to provide 44% TSS pretreatment and infiltrate the 1.0-inch water quality volume. Proposed BMPs are considered suitable for use in a Zone II Wellhead Protection Area.

SW14. Provide source control and pollution prevention plan for industrial activities to ensure resource areas are protected. If potential tenants are unknown and the project is approved, BETA recommends a condition that requires source control and pollution plans to be submitted for each industrial tenant prior to occupancy.

As tenants are not known, the applicant is amenable to this as a condition of approval.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: *The applicant is amenable to this as a condition of approval.*

Illicit Discharges (Standard Number 10): *All illicit discharges to the stormwater management systems are prohibited.*

The project narrative indicates that the owner will provide a signed illicit discharge statement during application for a stormwater permit.

SW 16. If the project is approved, BETA recommends a condition that requires the signed statement to include a pollution prevention plan with measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

The applicant will provide a signed illicit discharge statement with the SWPPP.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: *The applicant is amenable to this as a condition of approval.*

Town Engineer:

1. Height and steepness of slopes in proximity to abutting residential properties. *Refer to response to Vice-Chairman David's comments regarding the slope and abutting properties.*
2. Proposed six foot vinyl fence to be installed at the top of the slope and we're also concerned about the stability of the fence over time. *The fence has been changed from a six foot vinyl fence to a chain link fence. Refer to chain link fence detail on sheet 10.*

Wetland Strategies, Inc.:

1. Revisions to the project have been proposed and include obtaining additional lands north of the project site. The additional lands require a re-notification to the abutters and a new newspaper publication. WSI recommends the Commission receive proof of the new notifications prior to issuance of an Order of Conditions. *The applicant will provide proof of the abutter notification.*
2. The revised plans show that the proposed parking lot has been set back from the wetland edge and out of the 50-foot buffer zone. Doing so eliminates the need for an alternatives analysis required by the Town of Franklin's wetland protection regulations. These same regulations state that the Commission may require mitigation if more than 30% of the 50-100-foot buffer zone will be impervious. WSI recommends the applicant calculate the square footage of the proposed impervious area. *We have determined the 50' to 100 foot buffer zone impervious area will be 45.2 percent impervious. We have provided groundwater recharge that exceeds the regulations. Additionally the slope will be planed with a New England conservation and wild life seed mixture.*
3. Revised plans also provide a work sequence on sheet 6 of 10. WSI recommends the Commission include a condition for a phased construction approach, per notes on sheet 6. In addition, WSI recommends the proposed

monthly site inspections be increased to a weekly inspection during periods when work within the 50-foot buffer results in bare soils or when soils are not frozen or otherwise stabilized.

The above notes have been added to Inspection and Maintenance Schedule Note 1 on Sheet 6.

4. The revised NOI states that the proposed work will occur incur filling within Bordering Lands Subject to Flooding (BLSF). In accordance with the regulations, compensatory flood storage will also be provided. Compensatory storage is proposed to be located in the vicinity of wetland flags AES32, 33 and 34. WSI suggests the applicant provide additional information as to how the compensatory flood storage area will be stabilized during construction. Alternative locations for the compensatory flood storage area may also be advised.

The above notes have been added to the Flood Plain Compensation Planting Area Note 1 on Sheet 5. The area was chosen due to access and the location being in a flatter area of the site.

Planning Boards Comments from the Public Hearing on December 20, 2021:

Chairman Rondeau's

- Underground propane tanks. If above ground bollard locations and size of the bollards should be revised. *The propane tanks have been eliminated from the project. Connection will be made to the gas main in Washington Street.*
- Advance warning sign for Washington Street traffic. *A proposed warning sign has been added to sheet 4. The applicant will be responsible for obtaining approval from the Town prior to installing the sign.*

Vice Chair Davids's comments:

- Bollards at above ground propane tanks. Size of the bollards should be revised. *The propane tanks have been eliminated from the project. Connection will be made to the gas main in Washington Street.*
- Slope stability. *The applicant has engaged a geotechnical engineer. Refer to there letter for slope stability.*
- Slope proximity to abutting residential properties. *The proposed 1 to 1 slope located on the southerly side of the proposed buildings is approximately 907 feet in length. Approximately 279 feet abut a residentially used property while the remaining 628 feet of slope abut a vacant piece parcel that is approximately 48 feet in width and a vacant parcel abutting the Route 495 Layout.*

Clerk Wierling's comments:

- Add days to the hours of operation. *The days of operation have been added to sheet 1.*

Member Williams comments:

- Plantings for neighbors. *Additional plantings have been added at Washington Street frontage. Additional plantings have been added along the southerly property boundary abutting the residentially zoned properties. The fence has been revised to chain link to address stability issues raised by the Town Engineer.*

Rick

From: Joseph Barbieri <jbarbieri@franklinma.gov>
Sent: Monday, December 20, 2021 12:33 PM
To: Rick
Subject: Re: Franklin Flex Space

Good Afternoon,

Thank you for providing the updated plan. The hydrant locations look good to us. Also, the truck turning analysis shows that we should be able to maneuver the site without a problem.

Please let me know if you have any questions.

Thank you.

Joseph Barbieri, Deputy Fire Chief
Franklin Fire Department
40 West Central St.
Franklin, MA 02038
FD #: (508) 528-2323
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Direct Office Line (508) 553-5571

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Washington Street Existing Catch Basin Analysis

To address the review comment (BETA SW8) we have completed the following analysis of the Washington Street catch basin and potential bypass flow. The watershed was determined to be approximately 12,995 sq. ft. in size with 9,695 sq. ft. being impervious and 3,300 sq. ft. being grass. A one hundred year storm event was used to determine the rate of runoff from this watershed which was determined to be 1.66 CFS. This flow will be directed to the existing catch basin located within Washington Street and will be incorporated into the proposed project entrance. The attached hydro-cad report provides for this area which was modeled as Sub-catchment 15S:Wash. If the entire flow bypassed this catch basin it would flow into the site and be captured in catch basin 1 or catch basin 3. These two catch basins are connected to Infiltration Pond 1. We have connected Sub-catchment 15 to Pond 1 to see the effects this additional storm-water flow would produce. As shown on the attached hydro-cad report for Pond 1, the Pond would still have 0.46 feet of free board if the entire Washington Street flow bypassed the existing catch basin.

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.8	50	0.1170	0.30		Sheet Flow, Grass: Short n= 0.150 P2= 3.25"
0.3	48	0.1170	2.39		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.8	185	0.1170	1.71		Shallow Concentrated Flow, Woodland Kv= 5.0 fps
0.0	9	0.2220	3.30		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
0.1	18	0.1000	2.21		Shallow Concentrated Flow, Short Grass Pasture Kv= 7.0 fps
1.0					Direct Entry, Min TC
0.9	226	0.0050	4.17	3.28	Circular Channel (pipe), Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.010 PVC, smooth interior
6.9	536	Total			

Subcatchment 14S: CB14

Runoff = 2.47 cfs @ 12.09 hrs, Volume= 0.182 af, Depth= 5.17"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=6.80"

Area (sf)	CN	Description
14,656	98	Paved parking & roofs
3,692	39	>75% Grass cover, Good, HSG A
18,348	86	Weighted Average
3,692		Pervious Area
14,656		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, MIN. TC
0.1	25	0.0100	4.91	3.86	Circular Channel (pipe), Diam= 12.0" Area= 0.8 sf Perim= 3.1' r= 0.25' n= 0.012 Concrete pipe, finished
6.1	25	Total			

Subcatchment 15S: WASH

Runoff = 1.66 cfs @ 12.09 hrs, Volume= 0.120 af, Depth= 4.84"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=6.80"

Area (sf)	CN	Description
9,695	98	Paved parking & roofs
3,300	39	>75% Grass cover, Good, HSG A
12,995	83	Weighted Average
3,300		Pervious Area
9,695		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry, Min TC

Subcatchment 17S: S17

Runoff = 0.09 cfs @ 12.58 hrs, Volume= 0.046 af, Depth= 0.27"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=6.80"

Area (sf)	CN	Description
21,239	39	>75% Grass cover, Good, HSG A
67,689	30	Woods, Good, HSG A
88,928	32	Weighted Average
88,928		Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.1	50	0.0254	0.07		Sheet Flow,
					Woods: Light underbrush n= 0.400 P2= 3.25"
0.3	13	0.0254	0.80		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
0.5	74	0.2160	2.32		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
0.7	49	0.0510	1.13		Shallow Concentrated Flow,
					Woodland Kv= 5.0 fps
12.6	186	Total			

Subcatchment 18S: S18

Runoff = 0.03 cfs @ 12.44 hrs, Volume= 0.009 af, Depth= 0.33"

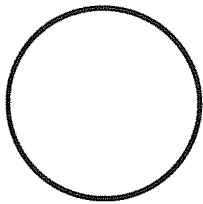
Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
Type III 24-hr 100YR Rainfall=6.80"

Area (sf)	CN	Description
4,448	39	>75% Grass cover, Good, HSG A
10,309	30	Woods, Good, HSG A
14,757	33	Weighted Average
14,757		Pervious Area

Routing by Stor-Ind+Trans method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
 Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 0.00 hrs, Average Depth at Peak Storage= 0.00'
 Bank-Full Depth= 1.00', Capacity at Bank-Full= 7.72 cfs

12.0" Diameter Pipe, n= 0.012 Concrete pipe, finished
 Length= 17.0' Slope= 0.0400 '/'
 Inlet Invert= 246.68', Outlet Invert= 246.00'



Pond 1P: POND 1

Inflow Area = 2.082 ac, Inflow Depth = 3.21" for 100YR event
 Inflow = 7.36 cfs @ 12.10 hrs, Volume= 0.557 af
 Outflow = 3.69 cfs @ 12.27 hrs, Volume= 0.557 af, Atten= 50%, Lag= 10.6 min
 Discarded = 0.81 cfs @ 11.67 hrs, Volume= 0.475 af
 Primary = 2.87 cfs @ 12.27 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs
 Peak Elev= 254.59' @ 12.27 hrs Surf.Area= 0.042 ac Storage= 0.123 af

Plug-Flow detention time= 36.7 min calculated for 0.557 af (100% of inflow)
 Center-of-Mass det. time= 36.7 min (860.9 - 824.3)

Volume	Invert	Avail.Storage	Storage Description
#1	249.80'	0.063 af	20.70'W x 89.00'L x 5.50'H Prismaoid 0.233 af Overall - 0.074 af Embedded = 0.158 af x 40.0% Voids
#2	251.05'	0.074 af	48.0"D x 86.00'L Horizontal Cylinder x 3 Inside #1
		0.138 af	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	249.70'	19.110 in/hr Exfiltration over Surface area above invert Excluded Surface area = 0.000 ac
#2	Primary	253.95'	12.0" Vert. Orifice/Grate X 2.00 C= 0.600

Discarded OutFlow Max=0.81 cfs @ 11.67 hrs HW=249.86' (Free Discharge)
 ↑1=Exfiltration (Exfiltration Controls 0.81 cfs)

Primary OutFlow Max=2.87 cfs @ 12.27 hrs HW=254.59' (Free Discharge)
 ↑2=Orifice/Grate (Orifice Controls 2.87 cfs @ 2.72 fps)



January 18, 2022

Mr. Gregory Rondeau, Chairman
355 East Central Street
Franklin, MA 02038

**Re: Washington Street (Franklin Flex Space)
Site Plan Peer Review Update**

Dear Mr. Rondeau:

BETA Group, Inc. has reviewed revised documents for the project entitled **Site Plan Washington Street** in Franklin, Massachusetts. This letter is provided to update findings, comments, and recommendations.

BASIS OF REVIEW

The following documents were received by BETA and will form the basis of the review:

- Plans (10 sheets) entitled: Site Plan Washington Street, dated June 28, 2021, revised to January 11, 2022, prepared by United Consultants, Inc. of Wrentham, MA.
- Drainage Analysis, dated June 28, 2021, revised November 22, 2021, prepared by United Consultants, Inc., supplemented by:
 - Operation and Maintenance Plan and Stormwater Facilities Plan
 - Watershed Plans
- Photometric Plan, dated August 25, 2021, prepared by SK & Associates of Canton, MA.
- Site Plan Approval Submittal, including:
 - Form P
 - Certificate of Ownership
 - Certified Abutters List
- Supplemental Documents, including:
 - Presto Geosystems – evaluation of Slope Protection System
 - Geotechnical Letter -Slope Stability prepared by Summit Geoen지니어ing Services dated January 13, 2022 signed by Mathew Hardison, PE, Senior Geotechnical Engineer
 - Fujitsu Inverter Heat Driven Pump specifications
 - Contech Stormceptor Operation and Maintenance Guide
 - Contech CDS Operation and Maintenance Guide
- Response to Peer Review Comments, January 11, 2022, prepared by United Consultants, Inc.

Review by BETA will include the above items along with the following, as applicable:

- Site Visit
- **Zoning Chapter 185 From the Code of the Town of Franklin**, current through July 2021
- **Zoning Map of the Town of Franklin, Massachusetts**, attested to October 7, 2020
- **Stormwater Management Chapter 153 From the Code of the Town of Franklin**, Adopted May 2, 2007
- **Subdivision Regulations Chapter 300 From the Code of the Town of Franklin**, current through March 8, 2021
- **Wetlands Protection Chapter 181 From the Code of the Town of Franklin**, dated August 20, 1997
- **Town of Franklin Best Development Practices Guidebook**, dated September 2016

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COMPILED REVIEW LETTER KEY

BETA reviewed this project previously and provided review comments in a letter to the Board dated October 11, 2021 (original/previous comments in standard text), United Consultants, Inc. (UC) provided responses in a letter dated November 30, 2021 (responses in *italic text*). This letter provides BETA's updated comments on the status of each (latest status in **highlighted text**).

INTRODUCTION

The project site includes a 5.257± acre parcel (#304-064) located along Washington Street in the Town of Franklin (the "Site"). The Site is located within the Industrial zoning district and the water resources overlay district. Parcels to the west are also within this zoning district and generally include undeveloped woodlands. Parcels to the east are within the Single Family Residential III district and generally include low-density residences. Spring Pond abuts the Site to the west.

The existing Site is primarily undeveloped woodlands. A gravel access road is present on the southern side of the Site which continues offsite to the west. A 50' Right-of-Way located on Parcel 305-004 abuts the Site to the southwest.

Topography at the Site is generally directed to the west towards Spring Pond. Bordering vegetated wetlands are located along the pond, and the 100-foot wetland buffer zone extends onto the Site. A FEMA-mapped 100-year floodplain (Zone AE) is present around Spring Pond. The Site is within a Zone II Wellhead Protection Area. The Site is not located within an NHESP-mapped estimated habitat of rare or endangered species or any other critical area. NRCS soil maps indicate the presence of Hinckley Loamy Sand with a Hydrologic Soil Group (HSG) rating of A (high infiltration potential).

The project proposes to construct three industrial buildings with footprints of 15,000± sq. ft. each. Parking areas and driveways are proposed along the northern side of the buildings. The parking areas will connect to an access driveway which crosses the 50' ROW to connect to Washington Street near the existing gravel access road entrance. Additional Site alterations include tree clearing, grading, fencing, guardrails, retaining walls, signage, tree plantings, septic systems, propane tanks, and utilities (water, electric, telecommunications). Stormwater management is proposed via three subsurface infiltration systems. Runoff is directed to these systems via new catch basin and manholes connections, and overflows are directed west towards Spring Pond through new outfalls.

FINDINGS, COMMENTS, AND RECOMMENDATIONS

GENERAL

- G1. Confirm legal right to construct portions of the Site on land owned by the New England Power Company (Lot 305-004).

UC: The applicant and his attorney have been communicating with New England Power Company. The site plans will be filed with New England Power Company to obtain final approvals.

BETA2: Information provided. BETA notes this is a private property matter; however, the Board may wish to note this in their findings if the project is approved.

UCI2: The applicant is amenable to BETA's recommendation.

BETA 3: No response required

- G2. Provide typical section views and necessary installation details for proposed Geoweb areas adjacent to parking areas, guardrail, retaining walls, and fence. Notes included on Sheet 10 indicate that “tendons” will be installed, which may require work beyond the top of slope or easterly property line. In consideration that the supported 1:1 slopes are proposed adjacent to residential properties and wetland resources, the designer should clarify if there are any local installations that confirm adequate long-term performance. Also clarify if final designs will require the stamp of a structural or geotechnical engineer.

UCI: A Presto Geosystems document dated August 31, 2021 has been provided. The document has been provided in the supplemental documents.

BETA2: As noted in the referenced documents, the provided design is for surface stability only and assumes that the underlying slope is stable against failure. If the Board elects to approve the project, BETA recommends a condition of approval that requires slope stability to be evaluated by a geotechnical engineer and that a representative of the Geoweb manufacturer is onsite during construction to ensure the system is installed as designed.

UCI2: The applicant has engaged a geotechnical engineer to evaluate the soil conditions and to complete a soil design. The applicant is amenable to the recommended conditions of approval.

BETA 3: Long term stabilization of the slope is the issue not constructability. They are proposing to install 2 rows of trees on the slope and all the runoff from the area between Washington Street and the slope will flow over this grade. The geotechnical report should be revised to address these specific long term maintenance issues.

- G3. Clearly identify the start and end of all proposed retaining walls.

UCI: The retaining walls have been eliminated due to revisions.

BETA2: Walls removed. Issue dismissed.

- G4. Identify or adds note(s) on the Planting Plan to clarify the location of areas to be loamed and seeded.

UCI: A general site planting note has been added to sheet 5.

BETA2: Information provided. Issue resolved.

ZONING

The Site is located within the Industrial (I) Zoning District. The proposed uses include:

- Light manufacturing, permitted by right (P/SP)
- Warehouse, permitted by right (Y)
- Office, permitted by right (Y or P/SP)

Information has been provided indicating that the anticipated water use is not greater than 15,000 gallons per day. Therefore, a special permit from the Board of Appeals is not required.

SCHEDULE OF LOT, AREA, FRONTAGE, YARD AND HEIGHT REQUIREMENTS (§185 ATTACHMENT 9)

The Site meets the requirements for lot area, frontage; front and rear yards; impervious coverage, and building height. The required depth is provided between the rear lot line and a section of frontage that is

not part of the required continuous frontage. The Site does not meet requirements for lot width and a note has been provided to refer to Section §185-10.B. (Nonconforming Lots).

- Z1. Confirm with the Building Commissioner that the required lot depth does not need to be provided along the section of frontage associated with the required continuous frontage of the lot.

UCI: The applicant's attorney is completing a zoning letter regarding this matter.

BETA2: Information provided. Upon receipt of the letter, BETA will defer to the Building Commissioner and or Town Counsel on this issue.

UCI2: The applicant's attorney has completed a revised zoning opinion letter regarding this matter, which has been sent to the Building Commissioner. Once received, we will forward any responses to the Planning Board.

BETA3: BETA will defer to the Building Commissioner and or Town Counsel on this issue.

- Z2. Provide documentation confirming that the Site is exempt from the lot width requirements. BETA notes that Section §185-10 does not reference lot width; however, some exceptions are provided for lot width under §185-3.

UCI: The applicant's attorney is completing a zoning letter regarding this matter.

BETA2: Information provided. Upon receipt of the letter, BETA will defer to the Building Commissioner and or Town Counsel on this issue.

UCI2: The applicant's attorney has completed a revised zoning opinion letter regarding this matter, which has been sent to the Building Commissioner. Once received, we will forward any responses to the Planning Board.

BETA3: BETA will defer to the Building Commissioner and or Town Counsel on this issue.

- Z3. Provide proposed building height, in feet, to evaluate required yard widths to the extent applicable. Per §185 Attachment 9, Note 5, the required side and rear yard widths must be increased by the common building height of a structure when abutting a residential district or use. BETA notes the yard width provided along the eastern lot line is only 31', and this yard abuts a residential use.

UCI: The proposed building height of 22' has been added to sheet 1.

BETA2: Information provided. BETA has requested for the Building Commissioner to issue a determination on the proposed development's conformance to the Bylaw and will provide the Board with an update upon receipt of correspondence.

UCI2: On behalf of the Applicant, we have requested the Zoning Enforcement officer's response be forwarded as well

BETA3: BETA is waiting on the response from the Building Commissioner

PARKING, LOADING AND DRIVEWAY REQUIREMENTS (§185-21)

Access to the Site is proposed via a new 24'± wide driveway connected to Washington Street. The driveway will cross through an existing 50' right-of along the abutting Lot 305-004. The driveway will connect to several new parking areas located adjacent to the proposed buildings which will provide a total of 132 new parking spaces (revised to 144). Proposed parking spaces are 9' wide and 19' long, with 24' min. access aisles. The project will provide 4 accessible parking spaces (revised to 5), 2 of which will be

van accessible, which is fewer than the required number of accessible spaces. The project requires the installation of 14 shade trees, which have been provided on the perimeter of the parking area.

Parking requirements for the Industrial Zoning District are defined by the Zoning Bylaw:

- Industrial buildings: 1 Space required per 400 sq. ft. of gross floor area.
- Offices: 1 space required per 250 sq. ft. of gross floor area.
- Warehouses: 1 space required per 1,000 sq. ft. of gross floor area.

For the proposed building layout, the total required parking is 125 spaces, and the provided parking layout satisfies this requirement.

- P1. Clarify if access will be maintained to the existing gravel road which extends west from the Site along the New England Power Company property. *UC: A curb cut has been proposed and the location is shown on sheet 3-6. BETA2: Plans revised. Issue resolved.*
- P2. Provide typical dimensions for driveway widths and parking spaces. *UC: Typical driveway and parking spaces dimensions have been added to sheet 3. BETA2: Information provided. Issue resolved.*
- P3. Provide one additional accessible parking space to satisfy ADA requirements. *UC: Five total handicap parking spaces have been provided. Sheet 3. BETA2: Space provided. Issue resolved.*
- P4. Provide a sign for the accessible parking at Building 2. *UC: A sign has been added on sheet 3. BETA2: Plans revised. Issue resolved.*
- P5. Revise location of accessible spaces so that they are located within 200 feet (preferably closer) of all accessible entrances or provide drop off areas in accordance with 521 CMR 23.3.3. Confirm that an accessible route is provided from accessible spaces to all building entrances. *UC: A handicap space is located within 200 feet of all accessible entrances on the parking lot side of the 3 proposed buildings. BETA2: Layout revised. Issue resolved.*
- P6. Provide calculations for sight distance at proposed entrance/exit ways (§185-21.C.7(a)). *UC: Sight distance calculations and information have been added to sheet 4. BETA2: Information provided. Issue resolved.*
- P7. Provide a detail for the proposed sidewalk and ramp(s) located to the south of Building 1, with detailed grading, as needed. The location of transition curbs should also be designated.

UCI: A detail has been added to sheet 10.

BETA2: Detail provided; however, grades indicate a running slope exceeding 5%. As such, this portion of the walkway is considered a ramp that requires handrails in accordance with 521 CMR 24.5.

UCI2: the grading has been revised with a slope of less than 5 percent incorporated.

BETA3: The detail on sheet 10 of 10 has been modified. The ramp grade will now be \leq 5%. Issue resolved.

INDUSTRIAL DISTRICT PERFORMANCE CONTROLS (§185-22)

The project is located in the Industrial District and must conform to this section.

11. Provide information quantifying sound, noise, vibration, odor, and flashing anticipated to be produced at the Site. Confirm that all such disturbances will not be perceptible at a distance 100 ft from the originating premises into the abutting residential district (§185-22.A).

UCI: Notes to address the above have been added to sheet 4.

BETA2: Note provided. BETA recommends for the Board to discuss options to ensure conformance with the referenced regulation, such as post-construction monitoring or including special conditions of approval.

UCI2: The applicant is amenable to BETA recommendations.

BETA3: Issue resolved, no further comments.

EARTH REMOVAL REGULATIONS (§185-23)

The project proposes significant changes to existing grading and thus may be subject to this section.

- E1. The applicant is advised that anticipated earth removal must be quantified and, if necessary, a permit obtained from the Board of Appeals. *UCI: A Special Permit has been applied for with the Zoning Board of Appeals.* **BETA2: Information provided. No further comment.**

FLOODPLAIN DISTRICT (§185-24)

A portion of the Site is located within a FEMA-mapped 100-year flood zone (Zone AE) associated with the nearby Mine Brook and Spring Pond; however, proposed work within the flood zone is limited to the installation of a rip rap pad, which is anticipated to result in no net fill.

- FP1. Identify that a portion of the Site is within Flood Zone AE and note its associated elevation.

UCI: The flood zone line is provided on sheets 2 - 6. The Zone AE designation and elevation have been added. It should be noted that the project revisions include filling and compensation of the flood plain.

BETA2: Flood zone limits provided. BETA will provide evaluation of Flood Zone impacts as part of the Conservation Review.

UCI2: we have received flood plain review comments from the Conservation Commission peer review consultant. The flood plain comments will be addressed with the Conservation Commission.

BETA3: no further comments, issue resolved.

SIDEWALKS (§185-28)

No sidewalks are present along Washington Street in the vicinity of the project, and as the Site is within an Industrial District no sidewalks are required along the frontage. Sidewalks within the site are limited to a section along the southern side of Building 1. Refer to Parking, Loading, and Driveway Requirements section for comments.

CURBING (§185-29)

The project proposes vertical reinforced concrete curbing along the perimeter of paved areas.

- C1. Clearly identify the beginning and end of proposed curbing throughout the site. *UC: Curb labels have been added throughout the site. Sheet 3.* **BETA2: Design intent clarified. Issue resolved.**

- C2. Provide vertical granite curb within the Washington Street right-of-way. *UC: Vertical Granite Curb labels have been added. Sheet 3. A vertical granite curb detail has been added. Sheet 7. BETA2: Plans revised. Issue resolved.*

SITE PLAN AND DESIGN REVIEW (§185-31)

The project has been submitted for Site Plan Review and is required to conform to the requirements of this section.

- SP1. Depict limits of Zone II Wellhead Protection area and the Water Resources District (§185-31.1.C(3)(h)). *UC: The entire site is located within the Water Resource District. See note on page 1. BETA2: Information provided. Issue resolved.*

- SP2. The designer has requested a waiver from §185-31.1.C(4)(e), requiring that no illumination may extend beyond a Site's property line. The lighting plan shows illumination extending onto the eastern residences. The designer should evaluate if additional measures can be implemented to mitigate spillage, such as providing cutoffs, adjusting light locations, or lowering the mounting height to be equal to or lower than the top of the proposed screening fence.

UCI: The site lighting has been revised. The waiver is still being requested for light spillage at the site entrance.

BETA2: The lighting has been revised to eliminate spillage onto residentially used parcels and remaining spillage is limited to a portion of a vacant lot owned by the NE Power Co. BETA notes that the requested waiver appears reasonable and defers to the preference of the Board.

UCI2: We defer to the preference of the Planning Board on this waiver request.

BETA3: The light spillage is limited to a portion of a vacant lot owned by the NE Power Co. at the front of the lot. BETA notes that the requested waiver appears reasonable and defers to the preference of the Board.

- SP3. Indicate proposed limits of tree clearing (§185-31.1.C(3)(k)). *UC: Tree clearing labels have been added to sheet 4. BETA2: Information provided. Issue resolved.*

- SP4. Evaluate if the seven parking spaces that exceed what is required by the Bylaw are necessary for site operations. Reducing the number of parking spaces at the northern end of the site could potentially eliminate approximately 5,000 sq. ft. of pavement and portions of several retaining walls, which will reduce potential impacts on nearby resource areas (§185-31.1.C(4)(f)).

UCI: The parking area has been reconfigured and the retaining walls have been eliminated. The parking count has been increased. The impervious areas have been located further away from the wetland resource areas.

BETA2: Comment noted. BETA notes the reconfigured parking is located farther from the wetlands but does increase the overall impervious area. The proponent should clarify if the 19 parking spaces in excess of what is required by the Bylaw is necessary for site operations. Notes on the plan indicate that excess parking spaces will be used for snow storage.

UCI2: The applicant prefers to have the additional parking to provide flexibility for proposed tenants and also to provide for snow storage.

BETA3: BETA notes that the additional 19 spaces are based upon the increased parking requirements associated with an Industrial use. If in fact the use is primarily warehouse, then there are an additional 76 spaces provided. As noted previously, these additional spaces increase overall impervious surface area of the site and require greater impacts on the adjacent wetland resource areas. Specifically, when you look at the 13 parallel parking spaces opposite building 3, the proposed alteration to the floodplain and the intrusion into the 50' buffer from the wetlands is all required to provide these spaces. BETA continues to note that the proponent should clarify if the 19 parking spaces in excess of what is required by the Bylaw is necessary for site operations. Notes on the plan indicate that excess parking spaces will be used for snow storage

SCREENING (§185-35)

The project proposes outdoor parking for 10 or more cars which must be screened in accordance with this section. Residential districts abut the property to the east, which are at a higher elevation than proposed parking areas.

The project proposes a six-foot high green vinyl stockade fence along the eastern property line to provide the required screening. Visibility of the majority of parking areas will further be mitigated by the proposed buildings, except for the southeastern lot.

A planting plan has been provided, which proposes the installation of American Elm, Red Maple, and White Birch.

- S1. Provide required greenbelt for Industrial districts located within 500 feet of an adjacent residential structure (§185-35.C).

UCI: The property is located within an Industrial District and abuts a residential district which has single family residential houses. The single-family residential houses are an allowed use in the residential district. As such it does not appear that a greenbelt is necessary. It should be noted that the residential properties are screened from the industrial property by a six-foot-high solid stockade fence. Additional evergreen plantings have been added at the southeastern boundary.

BETA2: It is BETA's interpretation that the greenbelt is required for uses in the business or industrial districts that are prohibited in the abutting residential district. The proposed uses of warehouse and light manufacturing are prohibited in the adjacent Single-Family III district, and office uses are generally prohibited or require a special permit. The Board may wish to consider requesting a determination on the Bylaws intent from the Building Commissioner.

UCI2: We have revised the fence and are now proposing a chain link fence. See fence detail on sheet 10. We have added Arborvitae screening along the residentially zoned properties.

BETA3: IT remains BETA's interpretation that the green belt is required and that it should be 15' wide as noted in the by-law. The fence and the plantings as shown are 10' wide. In addition, based upon the 1hor.:1 vert. slope, BETA questions how effective the plantings as proposed will effectively provide a visual screen.

- S2. Clearly indicate extents of proposed vinyl fence; the linework appears to overlap with that of the property line. Also, confirm the fence can be installed/maintained on the property line without encroachment onto the adjacent lot. *UC: The proposed fence will be located within 6" of the property boundary.* **BETA2: Clarification provided. Issue resolved.**

S3. Extend screening to include the southeastern boundary of the Site to screen views from the adjacent residential uses across the street. *UC: We have added 15 arborvitae to the southeast boundary of the site.* **BETA2: Screening provided. Issue resolved.**

S4. Provide proposed building heights and confirm if roof equipment, if proposed, will be readily visible from abutting residences.

UCI: The proposed building height of 22 feet has been added to the zoning table. Sheet 1.

BETA2: Height provided. The building roofs will be at approximate elevation 282', which exceeds the screening fence elevation of 278' to 280'. BETA recommends for the Board to require screening of rooftop equipment, if provided.

UCI2: The applicant is not proposing any rooftop units. Provisions will be made for solar panels to be roof mounted.

BETA3: No rooftop equipment will be provided. Issue resolved.

WATER RESOURCES DISTRICT (§185-40)

The project is located within the Water Resources District and a Zone II Wellhead Protection District.

WD1. Confirm that proposed manufacturing activities will not involve the manufacture, storage, or disposal of toxic or hazardous materials, including storage within the industrial wastewater holding tanks (§185-40.D.1(a)). *UC: A note has been added to sheet 4.* **BETA2: Note provided. Issue resolved.**

WD2. The project proposes the underground storage of propane, which is considered a hazardous material; however, BETA notes that any leakage would become airborne and is not anticipated to be prohibited in the spirit of (§185-40.D.1(d)). *UC: Agreed.* **BETA2: No further comment.**

WD3. Section §185-40.D.(1)(l)(ii) requires that the proposed groundwater recharge efforts must be approved by a hydrogeologist; however, the proposed stormwater management system will fully comply with the Massachusetts Stormwater Management Standards, including discharges to a Zone II, and no adverse impacts to groundwater are anticipated as a result of the project. BETA defers to the preference of the Board to require approval by a hydrogeologist. *UC: Agreed, the project has been designed to comply with the stormwater standards.* **BETA2: No further comment.**

WD4. Provide calculations demonstrating conformance with §185-40.D.1(l) and (k). *UC: Calculations have been added to sheet 4.* **BETA2: Calculations provided. The proposed GPD is below the maximum allowed under this section. Issue resolved.**

WD5. Indicate spill control measures to be implemented to protect the district against hazardous materials discharge (§185-40.E(1)). *UC: Spill control measures have been added to sheet 4.* **BETA2: Measures provided. Issue resolved.**

WD6. The Applicant is advised that placement of construction fill in excess of 15 cubic yards must comply with §185-40.E(5) and a note should be placed on the plans indicating such. *UC: A note has been added to sheet 4.* **BETA2: Information provided. Issue resolved.**

UTILITIES

The project proposes the following utilities:

- Water: 8" CLDI water main, 4" Fire service, and 2" domestic.
- Sanitary sewer: On-site septic system.
- Electric, Telephone, and CTV: Underground conduit, one utility pole, and transformer.
- Gas: Three underground 200-gallon propane tanks.

Detailed review of utilities and fire service is anticipated to be provided by the Department of Public Works, Fire Chief, and Board of Health, as applicable. In response to comments from the Board members, the applicant has decided not to install the three underground propane tanks and instead will connect directly to the gas main on Washington Street.

U1. A note provided on the Site Layout Plan indicates that loading areas are to be provided within the building bays and it is anticipated that floor drains and oil separators will be required per plumbing code and or Title V regulations. BETA notes that the septic and sanitary systems will need to be approved by the Board of Health and a note on the Grading and Utility Plan indicates such. *UC: Agreed. BETA2: No further comment.*

U2. Based upon the response from UCI, the underground propane tanks will not be installed. However, Utility Note 5 on sheet 4 of 10 indicates that there are three 1,000-gallon propane tanks shown. The tank locations are not indicated on the plan. The applicant should clarify.

U3. Notes provided on the Grading and Utility Plan indicate that water systems (domestic and fire) are shown schematically. Clarify if any initial coordination has taken place with the Fire Chief regarding the potential need for on-site hydrants. The proposed layout should also indicate typical locations for gate valves and boxes.

UCI: Additional gate valves, curb stops, and tee's have been added and labeled. Sheet 4. We have provided the hydrant location to the fire department. We anticipate an updated response from the fire department.

BETA2: Information provided. BETA defers to the Fire Department on hydrant locations.

UCI2: See attached email from Deputy Fire Chief, Joe Barbieri, and dated December 20,2021.

BETA3: No further comment

STORMWATER MANAGEMENT

Stormwater management is proposed via three subsurface infiltration systems. Runoff will be conveyed to these systems via trench drains and catch basin to manhole connections. Overflow from the systems will be discharged via three new outfalls into the wetland buffer zone to the west, where it will flow into Spring Pond. Several of the catch basins and manholes will also function as water quality units.

The project is subject to the Massachusetts Stormwater Management Standards outlined in the MA Stormwater Handbook (MSH). In addition, the proposed development will disturb greater than one acre; therefore, the project is subject to Chapter 153: Stormwater Management of the Town of Franklin Bylaws as well as Chapter 300-11 of the Town of Franklin Subdivision Regulations. Compliance with the standards, the bylaw, and best engineering practices is outlined in the following sections.

GENERAL

- SW1. Provide calculations to demonstrate that the project will retain the volume of runoff equivalent to, or greater than, one (1.0) inch multiplied by the total post-construction impervious surface area on the site (§153-16.A(1)(a)). *UC: Calculations have been added to sheet 9.* **BETA2: Information provided. Issue resolved.**
- SW2. Provide signature on MassDEP Stormwater Checklist. *UC: The MassDEP Checklist has been signed.* **BETA2: Signature provided. Issue resolved.**
- SW3. Clarify how runoff from the Site driveway will be directed to the stormwater management system. Proposed grading will direct flows through the proposed curb break on Lot 305-004. *UC: A gutter detail has been added to sheet 10.* **BETA2: Driveway revised to include a 3" lip. Issue resolved.**
- SW4. Clarify how roof runoff is intended to be directed to the trench drains, such as direct connection from roof leaders or overland. If it is the latter and the buildings will be without gutters, then crushed stone or riprap should be provided at the drip edge to prevent erosion. *UC: The roofs are not intended to have trench drains. Crushed stone has been added. A detail has been added to sheet 10.* **BETA2: Information provided. Issue resolved.**
- SW5. Review and revise invert of CB-2, as necessary, which is shown below inlet invert for DMH-1. *UC: The invert of CB-2 has been revised.* **BETA2: Invert revised. Issue resolved.**
- SW6. Provide detail for trench drains. *UC: A trench drain detail can be found on sheet 9.* **BETA2: Detail provided. Issue resolved.**
- SW7. Confirm pipe material proposed for trench drains, noted as PVC on the drainage table and as HDPE at the connection to RCP. *UC: The HDPE label has been added to the drainage table.* **BETA2: Pipe material clarified. Issue resolved.**
- SW7A. Based upon the proximity of the 3 proposed subsurface infiltration structures to the 1:1 slope, BETA recommends that an impermeable barrier be placed at the limit of the remove & replace (5') of the structure on 3 sides adjacent to the slope to prevent breakout during storm events. BETA recommends that the barrier be 8' deep and extend from a point 2' below the floor of the structure up to the top of the structures.

MASSACHUSETTS STORMWATER MANAGEMENT STANDARDS:

No untreated stormwater (Standard Number 1): *No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

The project proposes three new outfalls which will discharge to the wetland buffer zone associated with Spring Pond. All runoff through these outfalls will first be treated by deep sump catch basins, subsurface infiltration systems, and, for some areas, water quality units. Riprap aprons are proposed at outlets to mitigate erosion.

- SW8. Evaluate how flows entering the site from Washington Street will be directed and discharged. If overland, discharges are anticipated to require energy dissipation to mitigate erosion potential.

UCI: We have had discussions with the Town Engineer regarding the existing catch basin located to the north of the site drive. The entrance has been redesigned to allow for the existing catch basin to be located along the revised curb line. The watershed area was revised to allow for the additional flow from Washington Street.

BETA2: Information provided. There appears to be a significant area of Washington Street directed to the basin and the designer should evaluate the grate's capacity vs. calculated peak

flow rates. Any bypass flows must be incorporated into hydrologic models to ensure they will not adversely impact the proposed stormwater management systems.

UCI: We have evaluated the area contributing to the catch basin upgradient from the driveway entrance, The 100-year storm event rate of runoff is 1.66cfs. if the catch basin did not receive any flow the runoff would enter the site and be collected in catch basins 1 or 3. The runoff would be routed through pond 1 and discharged at the pipe end and rip rap area. With the additional runoff, Pond 1 would have 0.46 feet of freeboard. Refer to the attached Washington Street Existing Catch Basin Analysis.

BETA3: The HYDRO-CAD analysis confirms the results noted above. Provide the watershed plan necessary to document the contributing area and land use.

Post-development peak discharge rates (Standard Number 2): Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

The project proposes an increase in overall impervious area and removal of existing woodlands. Three subsurface infiltration systems are proposed to control stormwater runoff. The provided calculations indicate a decrease in post-development peak discharge rates and total runoff volumes compared to pre-development conditions. All proposed infiltration systems will be located a minimum of 100 feet from residential property lines and would therefore meet required setbacks to private wells (100 feet) and septic systems (50 feet), if present.

SW9. Expand watershed plans to include any runoff from Washington Street that enters the site in the existing and proposed conditions. The existing driveway entrance is at a low point and current flow patterns appear to discharge runoff from the street over a riprap pad. *UC: See response to SW8 above. The post development watershed map has not been revised to reflect the catch basin at the proposed curb line and the Washington Street watershed contributing to the site stormwater system. BETA2: Watershed plans revised. Issue resolved.*

SW10. Depict proposed tree line on the watershed plans. Review area of "Woods" used for model of Watersheds TR11, TR12 and TR13; Based on assumed tree clearing limits, the area depicted on the plans is significantly lower than that used in the model. *UC: The proposed tree line has been added to the post-development watershed plan. The areas were revised to reflect the proposed grassed slope. BETA2: Areas revised. Issue resolved.*

SW11. Revise model for Watershed S17 to include the impervious area representative of the proposed retaining walls. Review area of Grass and Woods used for this watershed; it appears that the area used for Grass should actually be modelled as woodlands and vice-versa. *UC: The retaining walls have been eliminated. The Grass and Woods areas have been revised. BETA2: Areas revised. Issue resolved.*

Recharge to groundwater (Standard Number 3): Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to maximum extent practicable.

NRCS soil maps indicate the presence of Hinckley Loamy Sand with a Hydrologic Soil Group (HSG) rating of A (high infiltration potential). Three subsurface infiltration systems are proposed to provide recharge in excess of what is required, and calculations have been provided showing that BMPs will drain within 72 hours.

The Applicant has conducted test pits at the Site, finding that the subsurface soils generally consist of Sandy Loam underlain by Sand & Gravel. In-situ hydraulic conductivity tests have been conducted to determine design exfiltration rates for stormwater BMPs and are based on one half of the lowest value determined in the field. BETA notes that test pits were conducted in June, outside of the seasonal period for high groundwater; however, due to the depth of the test pits, groundwater issues are not anticipated.

SW12. Provide relevant notes and specifications for fill materials to be placed around and below proposed infiltration systems. Portions of Pond 3 will be located significantly above the existing ground (6± feet) and fill materials must have an exfiltration capacity equal to or greater than the parent materials below. Restrictive A and B horizons must also be fully removed below the proposed system. *UC: Notes for soil removal and fill material specifications have been added to sheet 9. BETA2: Notes provided indicating that proposed fill material is intended to reflect granular sand. Issue resolved.*

80% TSS Removal (Standard Number 4): *For new development, stormwater management systems must be designed to remove 80% of the annual load of Total Suspended Solids.*

The project proposes a treatment train consisting of deep sump catch basins, water quality units, and subsurface infiltration systems. The treatment train will provide the required TSS removal and water quality volume. As the project is within a wellhead protection area, treatment trains have been designed to provide the required 44% TSS pretreatment prior to infiltration.

Higher Potential Pollutant Loads (Standard Number 5): *Stormwater discharges from Land Uses with Higher Potential Pollutant Loads require the use of specific stormwater management BMPs.*

The project narrative claims that this standard does not apply. However, the project may qualify as a Land Use with Higher Potential Pollutant Load (LUHPPL) under the definition of a “light industrial activity.” The proposed BMPs are considered suitable for use in a LUHPPL.

SW13. Clarify if any of the potential industrial activities are subject to the NPDES Multi-sector permit or have the potential to be classified as a LUHPPL. If so, evaluate if additional BMPs are required and update narrative as necessary. If the project is approved, BETA recommends a condition that requires all industrial activities to take place entirely within the buildings.

UCI: The owner will not be allowed to lease or sell units to tenants with industrial activities that are subject to the NPDES Multi-sector permit. All industrial activities will take place within the building. The applicant is amenable to this as a condition of approval.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: The applicant is amenable to this as a condition of approval.

BETA3: No further comments

Critical Areas (Standard Number 6): *Stormwater discharges to critical areas must utilize certain stormwater management BMPs approved for critical areas.*

The project proposed discharges to a Zone II Wellhead Protection area, which is a critical area. The project has been designed to provide 44% TSS pretreatment and infiltrate the 1.0-inch water quality volume. Proposed BMPs are considered suitable for use in a Zone II Wellhead Protection Area.

SW14. Provide source control and pollution prevention plan for industrial activities to ensure resource areas are protected. If potential tenants are unknown and the project is approved, BETA

recommends a condition that requires source control and pollution plans to be submitted for each industrial tenant prior to occupancy.

UCI: As tenants are not known, the applicant is amenable to this as a condition of approval.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: The applicant is amenable to this as a condition of approval.

BETA3: No further comments

Redevelopment (Standard Number 7): *Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable.*

The project is not a redevelopment - **not applicable.**

Construction Period Erosion and Sediment Controls (Standard Number 8): *Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.*

The project will disturb greater than one acre of land; therefore, a Notice of Intent with EPA and a Stormwater Pollution Prevention Plan (SWPPP) are required. The project proposes the use of erosion control barrier (compost sock), catch basin inlet protection, and stabilized construction entrance.

Operations/maintenance plan (Standard Number 9): *A Long-Term Operation and Maintenance Plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

A Long-Term Operation and Maintenance (O&M) Plan has been provided.

SW15. Provide information from manufacturer regarding inspection and maintenance requirements for water quality units. *UC: The inspection and maintenance requirements have been provided in the supplemental documents packet.* **BETA2: Information provided. Issue resolved.**

Illicit Discharges (Standard Number 10): *All illicit discharges to the stormwater management systems are prohibited.*

The project narrative indicates that the owner will provide a signed illicit discharge statement during application for a stormwater permit.

SW16. If the project is approved, BETA recommends a condition that requires the signed statement to include a pollution prevention plan with measures to prevent illicit discharges to the stormwater management system, including wastewater discharges and discharges of stormwater contaminated by contact with process wastes, raw materials, toxic pollutants, hazardous substances, oil, or grease.

UCI: The applicant will provide a signed illicit discharge statement with the SWPPP.

BETA2: Information provided. If the Board elects to approve the project, BETA recommends for the Board to include this as a condition of approval.

UCI2: The applicant is amenable to this as a condition of approval.

BETA3: No further comments

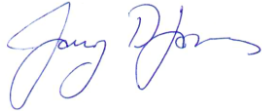
Mr. Anthony Padula, Chairman

January 18, 2022

Page 15 of 15

If we can be of any further assistance regarding this matter, please contact us at our office.

Very truly yours,
BETA Group, Inc.

A handwritten signature in blue ink, appearing to read "Gary D. James".

Gary D. James, PE
Senior Project Manager

cc: Amy Love, Planner



TOWN OF FRANKLIN

DEPARTMENT OF PUBLIC WORKS

Franklin Municipal Building

257 Fisher Street

Franklin, MA 02038-3026

January 20, 2022

Mr. Greg Rondeau, Chairman
Members of the Franklin Planning Board
355 East Central Street
Franklin, MA 02038

RE: Site Plan – Washington Street Flex Space

Dear Mr. Chairman and Members:

We have reviewed the latest materials for the subject project and offer the following:

The applicant has provided a letter from a geotechnical engineer regarding the proposed steep slopes on the site. That engineer indicated that they would be providing designs for the long term soil stability on the site. We recommend that this be completed prior to approval of the project, or if the Board decides to approve this project as shown, it is conditioned that the submission of the soil stabilization designs be completed prior to the start of construction.

As we previously noted, the construction of the proposed slopes will extend right up to the property line behind the abutting homes. If approved by the Board, we recommend as a condition that the property line along the top of the proposed slope be staked out at least every 100 feet to help ensure construction activity does not extend onto the adjacent properties.

Should you have any questions or require additional information, please do not hesitate to contact me.

Sincerely,

Michael Maglio, P.E.
Town Engineer

Town of Franklin

355 East Central Street
Franklin, Massachusetts 02038-1352



Phone: (508) 520-4907
www.franklinma.gov

DEPARTMENT OF PLANNING AND COMMUNITY DEVELOPMENT

DATE: January 18, 2022
TO: Franklin Planning Board
FROM: Department of Planning and Community Development
RE: Washington St
Site Plan

The DPCD has reviewed the above referenced Site Plan application for the Monday, January 24, 2022 Planning Board meeting and offers the following commentary:

General:

1. The site is located on Washington St in the Industrial Zoning District (Assessors Map 304 Lot 064).
2. The applicant is proposing to construct three (3) buildings, access road with stormwater management system and septic.

Waivers:

- To allow less than 42" of cover over the RCP drain pipe. Proposed use of Class V RCP
- To allow the use of HDPE pipe for the manifolds and Pond 1, Pond 2, Pond 3 and the Trench Drains
- To allow minimal Light spillage onto the abutting properties

Comments from December 20, 2021:

1. Applicant still needs approval from the Conservation Commission.
2. Planning Board asked hours of operation be on the plans. Applicant has shown on the Plans.
3. Planning Board may want to consider rules for outside storage.
4. Planning Board requested color rendering – Still Outstanding
5. Planning Board requested any signage – Still outstanding
6. The site abuts a residential zone. The Applicant is requesting a waiver for light spillage.
7. Applicant has provided a tree line of Aborvitae on the residential side of the property.
8. Applicant has submitted a Zoning letter that is satisfactory to the Town Attorney.–
 - a. Provide documentation confirming that the Site is exempt from the lot width requirements. BETA notes that Section §185-10 does not reference lot width; however, some exceptions are provided for lot width under §185-3.

LAW OFFICES
WALTERS, SHANNON & JENSEN
27 HARVARD STREET
BROOKLINE, MASSACHUSETTS 02445

(617) 232-9765
FAX 232-9766

December 20, 2021

Mr. Gregory Rondeau, Chairman
Franklin Planning Board
355 East Central Street
Franklin, MA 02038

O Washington Street, Franklin
Franklin Flex Space LLC development project

Dear Mr. Rondeau:

We furnish this opinion to you in connection with the above-referenced proposed development project at 0 Washington Street, Franklin (collectively "parcels") proposed by Franklin Flex Space LLC ("Applicant") on property presently owned by Abruzzi Realty Trust and Ferrara Family Realty Trust (collectively "Owner") and under Agreements to purchase by the Applicant. We understand that this opinion is a condition of the Town of Franklin in issuing permits for development thereof, and that the Town intends to rely on the opinions herein. The property consists of two parcels of land identified by deeds recorded with the Norfolk County Registry of Deeds in Book 36454, Page 293 (Map 304, Parcel 064-000, said lot containing 228,995 s.f. of land, more or less) and Book 36281, Page 195 (Map 304, Parcel 064-001, said lot containing 21,634 s.f. of land, more or less) (the "Property"), located at 0 Washington Street, Franklin, Massachusetts.

In rendering this opinion, we have examined, are familiar with and to the extent we have deemed appropriate, relied upon the following:

- (i) The zoning map ([dated February 24, 1967, as amended](#)) and index for the Town of Franklin; and
- (ii) A site plan, and supporting documentation prepared for United Consultants Inc. for the Applicant dated June 28, 2021, as filed with the Town of Franklin;

It is our opinion that:

1. The Property is in the Industrial (I) District.
2. The Property complies with all requirements of the Zoning Code, or consists of a pre-existing, non-conforming parcel, and comprises an undeveloped parcel of land.
[A. Pursuant to Section 185-10 of the Zoning Code, the two parcels may be combined without losing the exemption for non-conforming lots "so long as the](#)

change does not increase the actual potential number of buildable lots";

B. The Property meets the 175' frontage requirements, with 253 continuous feet of frontage on Washington Street, and significantly exceeds the required 40,000 s.f. minimum;

C. The Property is exempt from Width and Depth regulations, as both lots were in existence prior to, the effective dates of the relevant Bylaw Amendments, dated 5-20-98 and 11-4-1988 respectively.

2.3. The use of the Property for business, warehouse, distribution facility, manufacturing, and contractor yard/bays is permitted, subject to a Special Permit if resulting in an increase in estimated water consumption of more than 15,000 gallons per day.

3.4. The Town Assessor's records confirm the Property as industrial developable land.

4.5. As of the date hereof no proceeding for the exercise of the power of eminent domain with respect to the Property or any part of the Property is now pending.

5.6. The Property has direct access to a public way, without the need for easements or rights over property of any other person or entity (other than the right of the Owner and its successors and assigns to pass and repass over and upon a strip of land owned by New England Power Service Company (National Grid), 50 feet in width, which strip of land bisects property of the Owner, which rights are permissible pursuant to a duly reserved Easement recorded in Book 3907 Page 440).

Accordingly, the use and development of the Property for business, warehouse, distribution facility, manufacturing, and contractor yard/bays is permissible.

Very truly yours,
Walters, Shannon & Jensen, LLC,

David J. Jensen

by: David J. Jensen

January 13, 2022
Summit #22012

Peter Genta
MPG Capital LLC
13 Clovelly Road
Wellesley, MA 02481

Reference: Geotechnical Letter – Slope Stability Summary
Washington Street, Franklin, MA

Dear Peter,

Summit Geoengineering Services (SGS) has been retained by you to perform geotechnical analyses and provide design drawings for the proposed site slopes at the project referenced above. To date, SGS has reviewed the project information and performed preliminary slope stability analyses to evaluate the stability of the new slopes as proposed, and to determine the options for stabilizations measures, where needed, to ensure adequate factors of safety of the constructed slopes. Reference is made to the following documents:

- “Geotechnical Summary Report – Proposed Commercial Development, Washington Street” Geotechnical Report prepared by UTS of Massachusetts, Inc. dated January 10, 2022.
- “Site Plan – Washington Street” Civil Plan Set prepared by United Consultants, Inc. dated June 28, 2021.

We understand that the currently proposed development includes the construction of three new buildings. The proposed buildings will have footprints of approximate 15,000 ft², will be pre-engineered metal buildings, and will have first floor slabs-on-grade. Additional components for the development include various subsurface detention chambers, and paved access drives and parking lots around the new buildings.

Existing grades at the site are sloping up from west to east across the development area from approximate elevation 240 feet up to approximate elevation 280 feet. The proposed site development includes the construction/re-grading of site slopes to 1.0H:1.0V. In general, there are two proposed slopes at the site:

- | | |
|---|--|
| <ul style="list-style-type: none">• <u>“Downhill” Slope</u>○ 1.0H:1.0V Slope○ Located along the west side of the site at the low end○ Fill slope (proposed grade is higher than existing grade)○ Total length of approximately 1,000 feet○ Maximum height of approximately 18 feet. | <ul style="list-style-type: none">• <u>“Uphill” Slope</u>○ 1.0H:1.0V Slope○ Located along the east side of the site at the high end○ Cut slope (proposed grade is lower than existing grade)○ Total length of approximately 900 feet○ Maximum height of approximately 20 feet. |
|---|--|

In general, there are two types of potential slope instability; *surface* and *deep-seated*. The surface stability encompasses shallow slumping and erosion issues which may de-stabilize the surface of a slope. The deep-seated failure, or global stability failure, occurs when the entire soil mass becomes destabilized and the slope experiences a “landslide” type failure.

SGS will be evaluating the stability of the Downhill and Uphill slopes and providing engineered designs to ensure the long term stability of these slopes for both surface and deep-seated conditions. SGS has performed preliminary analyses based on the soil conditions encountered in the geotechnical report (see reference above), and is in the process of developing stabilization solutions for the proposed slopes. Our stability models include the loading from the proposed building foundations and the stormwater detention ponds.

The surface stability of the Downhill and Uphill slopes, if kept at a 1.0H:1.0V, will include the installation of the Presto® Geoweb product. Included in the attachments to this letter is a preliminary design of the Geoweb system for this site.

The deep-seated stability can be addressed with various approaches; including the construction of a Reinforced Soil Slope (horizontal layers of geogrid within the constructed slope), the installation of retaining walls at the toe of the slope to flatten the overall slope, the installation of soil nails, and other methods.

SGS is confident that with proper slope stabilization techniques, the proposed site slopes can be constructed safely.

We appreciate the opportunity to serve you during this phase of the project. If there are any questions or additional information is required, please do not hesitate to call.

Sincerely yours,

A handwritten signature in black ink that reads "Mathew Hardison".

Mathew Hardison, PE
Senior Geotechnical Engineer

Attachments:

Preliminary Geoweb Design

PRELIMINARY GEOWEB DESIGN

August 31, 2021

Mike Everhart
EJ PRESCOTT, INC.
PO Box 600
Gardiner, ME 04345

RE: PR21545 Franklin Flex Space
Slope Protection System

Dear Mike:

Presto Geosystems has completed the evaluation for the Franklin Flex Space Slope Protection System. Our recommendations are provided and detailed in the attached cross section and calculation. The evaluation is copyrighted and based on the unique engineering properties of Geoweb® system. Any use of this evaluation for any product other than that manufactured by Presto Products makes this evaluation invalid.

The objective of this evaluation is to propose a Geoweb cellular confinement system for stabilization of the slope. This evaluation is not applicable to the stability of the slope against a deep-seated failure. It is assumed herein that the slope is stable against failure except for the problem of surface erosion.

As the originator and leader in geocell technology, Presto offers the following advantages:

- **Manufacturer Certificate of Analysis.** Presto Geosystems manufactures Geoweb, ATRA keys ATRA Stake Clips and ATRA tendon clips in accordance with stringent ISO and CE quality standards. Our quality management system allows Presto to provide Certificates of Compliance (COC) and Certificates of Analysis (COA) that allow traceability on all materials produced and supplied for this project. We do not provide geocell materials through private label manufacturers, which is often the case with our competitors. The ability for the Owner to receive COC and COA for geocell is critical to the integrity of the project.
- **Design Calculations.** The attached calculations are based specifically on Geoweb material characteristics, research/testing and accessories. Our design calculations are based on the site-specific characteristics and information contained in the request for project evaluation. The

recommendations are based on Geoweb panels, ATRA® key connection device and ATRA tendon clip load transfer device. The anchorage recommendations are specific to our product and DO NOT apply to any other geocell manufacturers.

- **ATRA Key connection device.** ATRA keys provide a permanent and stronger panel connection compared to metal staples or zip ties. ATRA keys are made of high density polyethylene and are the strongest method available for panel connection. ATRA keys will not corrode or degrade and provide a permanent connection. ATRA keys were used to determine the anchorage recommendations. If a different connection device is proposed, the Presto recommendation DOES NOT apply. ATRA keys allow multiple panels to be installed concurrently decreasing installation time and preventing panel separation during installation and compaction. Panel separation may occur with metal staples or zip ties during installation, which can lead to long-term maintenance issues.
- **Installation Assistance.** Representatives of Presto, or the local distributor, are available to be on-site at the beginning of construction to ensure that the Geoweb panels and accessories are installed as the design intended. We are committed to train the Contractor based on our in-depth product knowledge and installation experience. Our past project successes will minimize installation time and issues. As with any material, there are advantageous techniques of installation, which we can offer during our visit.

Design and Materials

It is our understanding that the relevant dimensions of the slope, for the purpose of this analysis, are as follows:

Parameters:

Maximum Slope Angle, degrees	1:1 (45°)
Vertical Height, ft	20
Slope Length, ft	28
Friction Angle ϕ , degree	28
Infill Type	Topsoil
Infill Weight γ , lbs/ft ³	100
Sub Grade Type	Native

Based on the evaluation, the following materials are recommended for the Geoweb application at the site.

1. If required, provide a non-woven geotextile separation layer and install per Manufacturer recommendations including overlaps
2. Presto Products Co. Geoweb GW30V4 (4-inch) panels.
3. Connect the Geoweb sections with ATRA® Keys at each interleaf and end to end connection.
4. Provide four, TP-93 tendons per Geoweb section in cells 1, 3, 5 & 7.
5. Provide an ATRA® Tendon Clip tied to each tendon every 4th cell down the slope.
6. Provide an 6-inch solid wall PVC pipe deadman buried a minimum of 3 feet below crest elevation. If a deadman is not feasible, provide earth anchors with a minimum tension of 1,650 lbs (579 lbs/ft x 8.5 ft/panel ÷ 3 tendons/panel) plus the recommended Manufacturer's factor of safety tied to each tendon. Earth anchor pullout strength shall be determined by the Engineer of Record based on recommended Manufacturer's factor of safety and site soil conditions.
7. Pre-shape the Geoweb system before infill placement.
8. Limit the drop of the infill into the Geoweb panels to prevent distortion.
9. Provide surface protection (hydroseed, erosion control blanket or turf reinforcement mat) over the Geoweb sized for hydraulic conditions to prevent soil washout prior to establishment of vegetation.

For additional Slope Protection Resources, click here:
[Slope Protection Design Engineering Resource Package](#)

If you have any questions or need any additional information, please call.

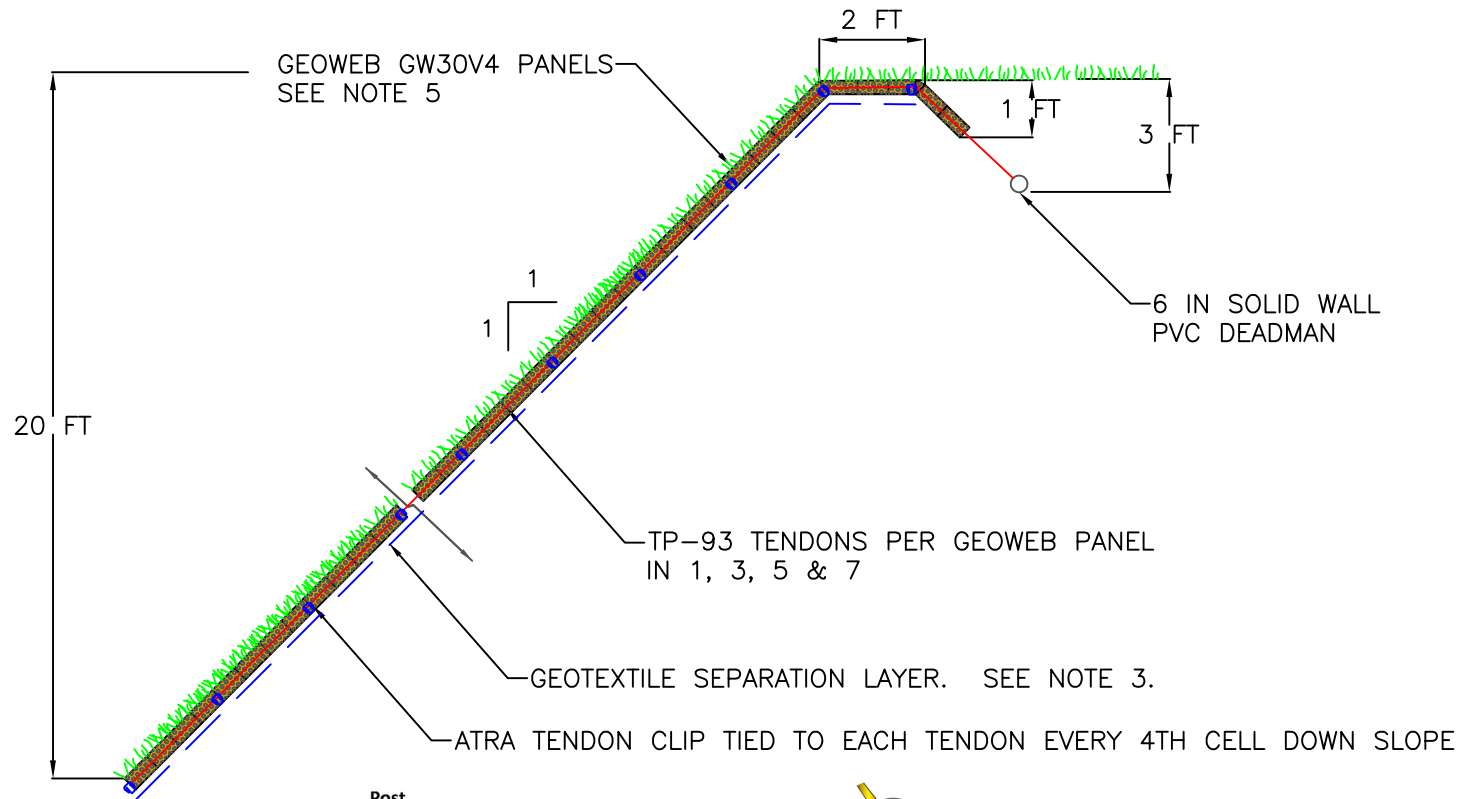
Sincerely,



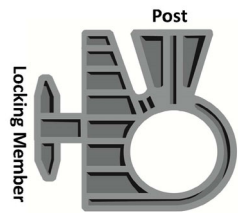
Bryan Wedin, P.E.
Chief Design Engineer
Presto Geosystems

Notes:

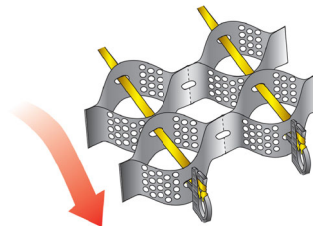
1. This evaluation is copyrighted and is based on the use of Geoweb manufactured by Reynolds Presto Products Inc. All rights reserved. Any use of this evaluation for any geocell product other than that manufactured by Presto is strictly prohibited and makes this evaluation invalid.
2. The evaluation assumes that the slope is globally stable. Global stability shall be confirmed prior to the installation of the Geoweb system by the Project Engineer.
3. If required, provide a non-woven geotextile separation layer and install per Manufacturer recommendations.
4. The Geoweb panels shall be connected with ATRA keys at each interleaf and end to end connection.
5. Geoweb infill shall be nutrient-rich topsoil. Limit the drop of infill to prevent panel distortion.
6. Provide surface protection (hydroseed, ECB or TRM) sized for channel hydraulic and shear stress conditions to prevent cell wash-out prior to the establishment of vegetation.



ATRA KEY



ATRA TENDON CLIP

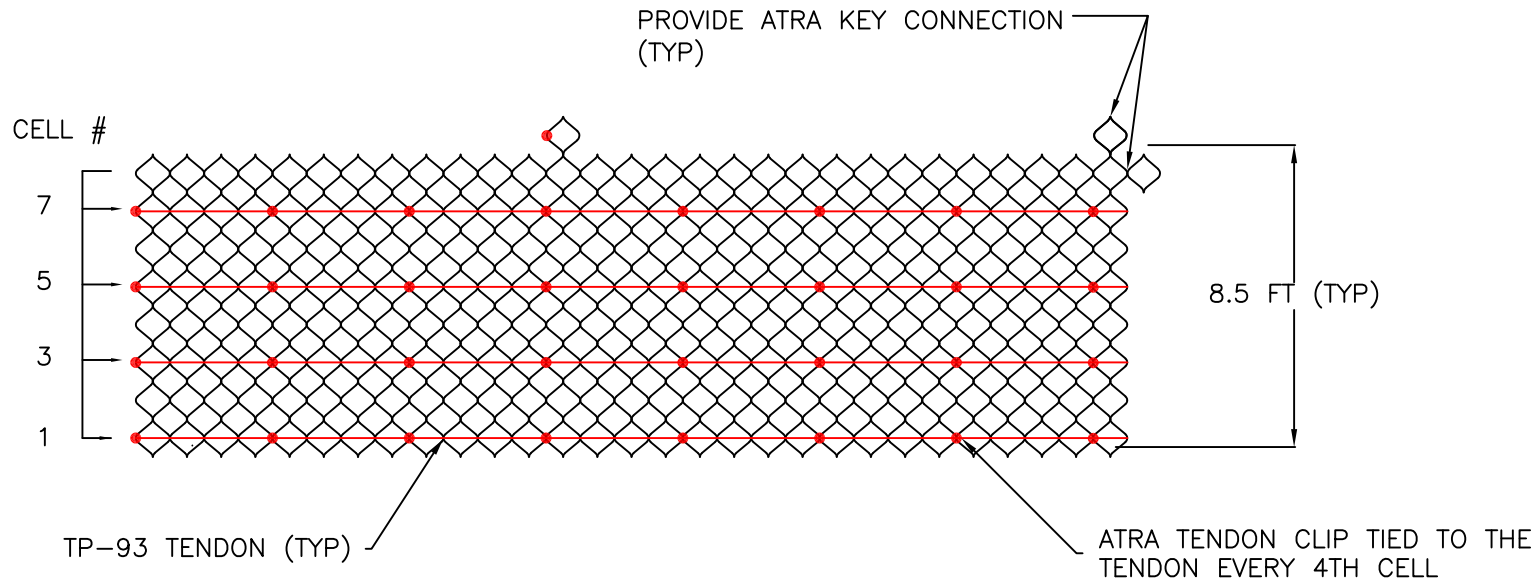


INSTALLATION

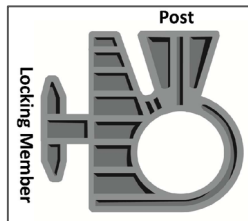
<p>STRENGTH. FROM THE GROUND UP. <small>Since 1929</small></p>	<p>REYNOLDS® PRESTO PRODUCTS, INC 670 NORTH PERKINS STREET APPLETON, WI 54914 920-738-1342 WWW.PRESTOCEO.COM</p>
	<p>PR21545 – FRANKLIN FLEX GEOWEB SLOPE PROTECTION</p> <p>GEOSYSTEMS®, PRESTO®, GEOWEB® AND ATRA® ARE REGISTERED TRADEMARKS OF REYNOLDS PRESTO PRODUCTS, INC.</p>
<p>DATE AUGUST 31, 2021</p>	<p>FILE NAME SHEET 1</p>
<p>SCALE NTS</p>	<p>SHEET 1 OF 1</p>

Notes:

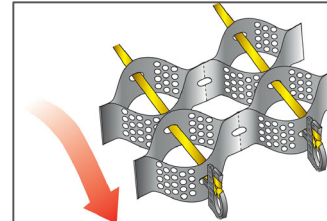
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2. The evaluation assumes that the slope is globally stable. Global stability shall be confirmed prior to the installation of the Geoweb system by the Project Engineer.
3. If required, provide a non-woven geotextile separation layer and install per Manufacturer recommendations.
4. The Geoweb panels shall be connected with ATRA keys at each interleaf and end to end connection.
5. Geoweb infill shall be nutrient-rich topsoil. Limit the drop of infill to prevent panel distortion.
6. Provide surface protection (hydroseed, ECB or TRM) sized for channel hydraulic and shear stress conditions to prevent cell wash-out prior to the establishment of vegetation.




ATRA KEY



ATRA TENDON CLIP



INSTALLATION

 <p>STRENGTH. FROM THE GROUND UP. <small>Since 1972</small></p>	<p>REYNOLDS PRESTO PRODUCTS, INC 670 NORTH PERKINS STREET APPLETON, WI 54914 920-738-1342 WWW.PRESTOCEO.COM</p>
	<p>PR21545 – FRANKLIN FLEX GEOWEB SLOPE PROTECTION</p>
<p>PRESTO, GEOWEB, AND ATRA ARE REGISTERED TRADEMARKS OF REYNOLDS PRESTO PRODUCTS, INC.</p>	
<p>DATE AUGUST 31, 2021</p>	<p>FILE NAME SHEET 2</p>
<p>SCALE NTS</p>	<p>SHEET 2 OF 2</p>

PRESTO

Project Name: FRANKLIN FLEX SPACE
Presto Project Number: PR 21545
Date: 8/31/2021


INPUT PARAMETERS

English or Metric (E or M)	E	
Slope Angle	45	Slope (H:V) 1.00
Slope Length (ft)	28.28	
Vertical Height (ft)	20	
Minimum Interface Friction Angle (degrees)	28	Between Different Surfaces
Geoweb Cell Type	GW30V	
Web Thickness (in)	4	
Infill type	Topsoil	Infill Weight (lb/ft) 942.8
Infill Unit Weight (lb/ft3)	100	
Additional Cover (in.)	0	Cover Weight (lb/ft) 0.0
Cover Unit Weight (lb/ft3)	0	
Design Factor of Safety	1.4	Total Weight (lb/ft) 942.8
Toe Load (lb/ft)	0	
Passive Resistance at toe (Y or N)	No	
Angle of internal friction of soil at toe	0	
Unit weight of soil at toe (lb/ft3)	0	

Calculations

Driving Force (lb/ft)	666.67	Weight+Toe Load (Gravity)
Factored Driving Force (lb/ft)	933.33	Weight Only
Factored Driving Force (lb/ft)	933.33	Weight+Toe Load
Resisting Force (lb/ft)	354.47	Shear Only (Min Between Surfaces)
Passive Earth Force (lb/ft)	0.00	
Available Resistance (lb/ft)	0.00	Geoweb
Factor of Safety	0.53	Shear Only
Maximum Available F.S.	0.88	Shear and Geoweb Seam Strength


ATRA® KEY

Connection Strength	275 lbs	<p>Note: Anchorage pattern is based on the use of ATRA keys for panel to panel connection. If staples or zip ties are used, the anchorage pattern will increase.</p>  <p>ATRA Key Clickable Spec</p>

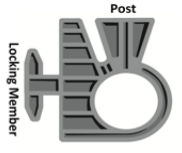
ATRA® ANCHOR DETAILS

Net Driving (lb/sqft)	20.47	Factored
Max. Unrestrained GW length (ft)	11.5	Unrestrained

Input Parameters

Length (in)	No Stakes	ATRA Anchor	Spacing (in)
Diameter or Width (in)	0.50		0.0
Downslope spacing (# of cells)	0		0.0
Horizontal spacing (# of cells)	0		0.0
Soil Friction Angle (degrees)	28	<p>Note: Anchorage pattern is based on the use of ATRA keys for panel to panel connection. If staples or zip ties are used, the anchorage pattern will increase.</p>  <p>ATRA Anchors Clickable Spec</p>	
Soil Cohesion (lb/ft2)	0		
Slope Soil Type	Native		
Unit Weight (lb/ft3)	100		
Kp (Coefficient)	0.00		
Buried Anchor Length (ft)	0.00		
Anchor Resistance (lb)	0.00	Single Anchor	
Number of Rows of Anchors	0		
Anchor Resistance (lb/ft)	0.0	Resultant	
Anchor Resistance (lb/ft2)	0.00	Net Resultant	
Resisting Force (lb/ft)	354	Shear plus Anchors	
Anchor density (anchors/ft2)	0.00		
Anchors per Geoweb Section Width	0		
Factor of Safety	No Anchors	Shear and ATRA Anchored Geoweb	

TENDONS

Required Tension (lb/ft)	579	Tendons only			
Input Parameters		<p style="color: red;">Note: Tendons and load transfer device quantity and spacing is based on the use of only ATRA Tendon Clips for load transfer. If substitute devices are used, this analysis is void.</p>	 ATRA Tendon Clip Clickable Spec		
Tendon Type	TP-93				
Ultimate Strength (lb)	2090				
F.S. (Creep)	1.10				
F.S. (Knots)	1.10				
F.S. (Construction damage)	1.10				
F.S. (Chemical/Biological Durability)	1.10				
F.S. (Overall Uncertainties)	1.25			Overall Factor of Safety	1.83
Number of Tendons/GW Section	4				
ATRA Tendon Clip Spacing (no. of cells downslope)	4			Maximum Allowable	6
Tendon Hole Spacing (in)	12.6				
Available Tension/tendon (lb)	1,142				
Average No. of Tendons/slot	0.5				
Available Tension/slot (lb)	571.0				
Available Tension (lb/ft)	544	OK			
Tendon density (ft/ft ²)	0.630	Includes 15% extra for knots and wastage and deadman bury length.			
Tendon Length per 8.5' Geoweb Section	150				
Atra Tendon Clips/8.5' Geoweb Section	36	Atra Tendon Clip Density (#/ft ²)	0.152		
Factor of Safety	1.35	Shear and Tendon Anchorage			

CREST/SLOPE ANCHORAGE

Required Anchorage (lb/ft)	579	
Input Parameters		
Horizontal Embedment Length (ft)	2	From Slope Face to Key Trench
Depth Below Crest (in)	4	Crest to Bottom of Geoweb
Slope Angle of Key Trench (degrees)	45	
Depth of Key Trench (in)	12	
Horiz. Length at Bottom of Trench (in)	0	
Soil Unit Weight (lb/ft ³)	100	
Soil Friction (degrees)	28	
Available Resisting Force (lb/ft)	62.03	OK
Factor of Safety	0.62	Crest Anchorage and Shear
Factor of Safety	No Anchors	Crest Anchorage and Atra Anchors
Factor of Safety	1.44	Crest Anchorage and Tendons

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PRESTO

GEOSYSTEMS

**PROJECT: FRANKLIN FLEX SPACE
DEADMAN ANCHORAGE**

English or Metric (E or M)	E		
Required Anchorage	517	lb/ft	
Cell Depth	4	in	
Height of Deadman, h	0.5	ft	
Width of Deadman, w	0.5	ft	
Unit weight of Deadman	0	lb/ft	
Length of Deadman, l	1	ft	
Depth to base of Deadman, H	3	ft	
Distance between centers, L	1	ft	
Soil Cover Friction Angle	28	degrees	
Unit weight of Deadman Soil Cover	100	lb/ft ³	
Deadman to Soil Friction	5	degrees	
W - Weight of Deadman	0.00	lb/ft	
Vertical Stress @ Midpoint of Depth, qm	275	lb/ft ³	
Earth Pressure Coefficient, Ka	0.361		
Hydrostatic Earth Pressure, Ph	450	ft	
Normal Earth Pressure, Pa	162.5	ft	
Tangential Earth Pressure, Fa	-86.4	ft	
	Chart	Rankine	Coulomb
Kg	Fig. 46c	tan(delta)=	0.087
	3.00	2.77	3.21
Anchor Resistance Factor, Ro	2.64	2.41	2.85
E	0.83	0.83	0.83
B	0.00	0.00	0.00
Anchor Resistance Factor, R	5.31	4.70	5.90
Ultimate Anchor Resistance, A _{ult} lbs	730.4	646.9	811.2
Ultimate Anchor Resistance per foot, T _{ult} lb/ft	730.4	646.9	811.2
Factor of Safety - Deadman	1.41	1.25	1.57

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Wedin, Bryan S.

From: projectevaluation@info.prestogeo.com
Sent: Tuesday, August 31, 2021 12:39 PM
To: Dickey, Michael J.; Wedin, Bryan S.; Schneider, Cory S.; Bocskor, Katie L.; Wilz, Katrina J.; Beyer, Ashley J.; Vander Linden, Jennifer A.; George, Jose Pablo; Justice, Sam M.
Subject: New submission from Free Project Evaluation : Slope Protection System

Categories: Tracked To Dynamics 365

Contact Name
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Phone Number
6037671263
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State or Province
Maine
Zip or Postal Code
04345
Country
United States
Relationship with Project
<ul style="list-style-type: none">Other
Did you speak with a Presto Distributor/Rep about your project?
<ul style="list-style-type: none">No
Project Name
Franklin Flex Space
Project City
Franklin

Project State or Province
MA
Project Country
USA
Estimated GEOWEB Area
27546
Units of Measure for GEOWEB Area
Standard
Describe problem to be solved by the GEOWEB system
Project Spec'd with Geoweb. 1:1 slopes, needing to be vegetated.
Preliminary Design Needed By
soon as possible
Projected Bid Date
N/A
Planned Construction Startup
under construction
Units of measure for this section
Standard
What is the embankment type?
multiple areas, some cuts and some fills
Slope angle
1:1
Vertical height (or text note with range)
max 20'H, min 10'H
Native Soil Description
Gravel
Infill Description
Top soil
What are the hydraulic conditions?
<ul style="list-style-type: none"> • Surface Sheet Runoff
Choose GEOWEB infill type:
Topsoil
What GEOWEB type is desired?
<ul style="list-style-type: none"> • GW30V Cell • 100 mm (4 in) depth

What anchoring systems are desired?

- Tendons & Earth Anchoring

Project Application - Hidden

Slope Protection System