



PESCE ENGINEERING & ASSOCIATES, INC.

**43 Porter Lane
West Dennis, MA 02670**
Phone: 508-333-7630
epesce@comcast.net

April 22, 2022

Ms. Lynne Fidler, Chair
Town of Marshfield
Zoning Board of Appeals
870 Moraine Street
Marshfield, MA 02050

Subject: Engineering Peer Review Report, **Proposed Mill Creek Marshfield Project**
Lot 6R, 0 Commerce Way, Marshfield, MA

Dear Ms. Fidler and Members of the Board,

Pesce Engineering & Associates, Inc. is pleased to provide you this engineering review of the proposed Mill Creek Marshfield Chapter 40B residential project. We have evaluated the existing plans for consistency with the Town's Zoning Bylaw, the Marshfield Rules and Regulations Governing the Subdivision of Land (for design standards), and general conformance with the Massachusetts Stormwater Management regulations.

Along with a site visit, and attendance (via Zoom) at the previous Marshfield ZBA hearing on March 8, 2022, we have reviewed the following information to prepare this report:

- Comprehensive Permit Application package, signed by the applicant on February 8, 2022, with exhibit attachments, including project narratives, site & architectural drawings, conceptual landscape plan, Traffic Impact Assessment, and list of waivers from the Marshfield Zoning & General Bylaws.
- Preliminary civil engineering drawings and existing conditions plans, entitled "Mill Creek Marshfield," & "Existing Conditions Plan of Land in Marshfield," MA, 5 sheets, prepared by Hancock Associates, dated February 4, 2022.
- Project Architectural Plans showing floor plans and elevations of the proposed dwellings, prepared by The Architectural Team (13 Sheets), dated February 4, 2022.
- Traffic Impact Assessment, for "Mill Creek Marshfield, Commerce Way, Marshfield, MA," prepared by Vanasse & Associates, Inc., dated January 2022.

The proposed project is to be located on approximately 12.7 acres of land off Commerce Way within Enterprise Park. The project is a multi-family residential development consisting of the following highlights:

- 300 residential units;
- 75 of these units (25% of the total) to be designated as affordable under Ch. 40B;
- Seven (7) 3-story apartment buildings (with some units located on a 4th level, but in the basement);
- Seven (7) multi-unit townhome style buildings;
- and a Clubhouse building with community pool

The housing will offer 1-, 2- & 3-bedroom units in the 3-story apartments, and 3-bedroom units will be provided in the townhomes. This unit mix represents a total of 550 bedrooms proposed for this community.

The site is located primarily in the I-1 Industrial District, with approximately 1.2 acres located in the R-1 Residential Rural District. The entire parcel is also located with the Planned Mixed-Use Overlay District. This site is presently vacant land, with municipal water service available. An on-site wastewater treatment plant is planned to provide sewer service for the new dwellings and clubhouse.

The following are our review comments:

Site Plan, Layout, Traffic & Utilities

1. Please note that Pesce Engineering has teamed with Ron Müller & Associates (RMA) for review of the Traffic Impact Assessment, and Amory Engineers for a review of the drainage and water supply design. We direct the applicant to these separate peer review reports (attached), and ask the applicant to make the appropriate responses to these, as well as for those listed below.
2. We also want to note that a question arose from the Town Planner's office regarding the existing property line (possibly along the east and south). The questions were contained in an e-mail from Mr. Greg Guimond, Marshfield Town Planner, to the undersigned on April 8, 2022, and this was forwarded to the Applicant's engineer, Anthony Donato, on the same day. We ask that this property line question be responded to as well.
3. We recommend that the Mashpee Fire Dept. review these plans and provide comments to the Board (if they haven't already) regarding the adequacy of emergency vehicle access, and the proposed number of fire hydrants and their locations.
4. When discussing this project with the Fire Dept., we also recommend that the applicant review/provide the following:
 - a. A fire truck turning analysis (swept path analysis) with the required fire truck, as directed by the Fire Dept. (we note that this swept path analysis is also a comment in the RMA review report).
 - b. Consideration of a second access/egress to the site (in the northwest corner).
5. We recognize that the design plans submitted are only at the preliminary or conceptual design level. However, we recommend that the following additional information be submitted for final review by the Zoning Board, prior to either issuance of the Comprehensive Permit (CP), or at the discretion of the Board, as a Condition in the CP, to be submitted and reviewed by the Board's consulting engineer prior to the issuance of a Building Permit and the start of construction:
 - a. Floor plan and elevation drawings for the proposed Clubhouse building.

- b. A plan or plans showing the building layouts, all property line setbacks, parking & driveway aisle dimensions, proposed curbing, pavement marking (including crosswalks), ADA accessible parking & ramps at sidewalks and building entrances, and locations of all proposed signage (Note: The RMA report also mentions that all signage and pavement markings shall be installed per MUTCD guidelines).
 - c. An Erosion Control Plan, which should include a detail & location of a rip-rap/crushed stone vehicle tracing pad (20 ft. wide X 50 ft. long minimum), locations of erosion control barriers (including the use of silt sacks or other similar measure for sedimentation control at all catch basins), and the requirement for the contractor to perform regular street sweeping on Commerce Way on a weekly basis, and as needed.
 - d. Final Landscape and Lighting Plans, showing the proposed planting schedule(s) and including a point-to-point photometric plan (Note: all exterior lighting shall be “Dark Sky” compliant).
 - e. Construction & cross-section details for all appropriate items, such as the paved surfaces, curbing & sidewalks, utilities & associated subsurface structures, fencing, pavement marking, etc.
6. As part of the additional information requested above, there are several areas on the site where it makes good safety sense to have the traffic controlled by a “STOP” sign and stop line – in addition to the one recommended by Vanasse & Associates, Inc. at the site exit driveway. We ask that the Applicant’s engineer consider providing additional stop signs at other locations, such as exits from the parking areas, and at the clubhouse (at the exiting lane on the north side of the clubhouse).
 7. We recommend that the proposed buildings be numbered, and the entrance & interior roads be given a letter designation for ease in coordinating locations for design details.
 8. We recommend the applicant discuss and review with the Board the justification for the requested waivers & zoning relief. Please note that we do not see any engineering design related issues with most of the relief requested, and defer to the Zoning Board’s discretion on this relief. However, we have the following comments on specific waivers:

Zoning Bylaw

- a. § 305-6.07 Accessory Buildings in the “R” District. Not sure why this waiver is requested, since there does not appear to be any accessory buildings proposed within the R-1 district?
- b. § 305-809(F) Lighting. We recommend that adequate exterior lighting be provided at all building entrances and parking areas. However, we ask that the applicant clarify the need for this waiver (less than 1.0 footcandle at the point of least illumination of grades).

- c. § 305-10.04 Certificate of Occupancy. We understand why this phased occupancy waiver request is being made, but recommend that the Board's consulting engineer provide a letter for the record (and cc the Building Commissioner) for each phase of completion. This letter would confirm that adequate parking, safe site access, and the necessary utilities systems are completed to support the buildings to be released for occupancy in each phase.
- d. § 305-10.06 Permit Time Limits. We recommend that the Applicant discuss with the Board the time extension desired. At the discretion of the Board, the additional time requested may be included in the draft Comprehensive Permit.

General Bylaw

- e. Chapter 70 Earth Removal. With the relatively large change in elevation on the existing site; ranging from approximately 196' in the southeast corner, to 148' in the northwest corner, we see that the proposed grading may involve earthwork and earth removal activities. We have the following specific comments about earth removal:
 - i. The applicant should be aware that the draft Comprehensive Permit for this project will likely carry provisions and conditions pertaining to earth removal activities, similar to what was included for the Modera Marshfield project.
 - ii. We recommend that an estimated cut & fill analysis be provided to the Board for review.
 - iii. For any removal off site of excess fill, we recommend that the Applicant provide the estimated number of truck trips, the duration of trucking activities (weeks/months), and the proposed truck route to the Board for review.
 - f. Chapter 285, Article II Marshfield Water Conservation Bylaw. For consideration of this waiver, we recommend that the Applicant provide a list of the various water conservation design measures that will be included in the project.
9. In addition to the water conservation measures mentioned above, we recommend the applicant discuss any proposed "green" design components of the project, including energy conservation and "LEED" type design or construction features, provisions for onsite solar power generation, etc.
10. The project site is partially located within a mapped "Priority Habitat", which will require an application filing with the MA Natural Heritage and Endangered Species Program (NHESP). It is our understanding that this permitting may have been completed, and that the mitigation associated with this project may have been satisfied or completed, based on the e-mail correspondence in Exhibit R. However, this correspondence mentions "Phase 1" and there is no way of knowing if this represents full completion for this site, or if there are other phases of mitigation required. We recommend that the applicant provide the Board a copy

of the Conservation and Management Permit (CMP) for this site, and an explanation of the mitigation required (and what has been performed or satisfied), as required by the CMP. Additionally, we recommend that the Applicant submit a copy of the Turtle Protection Plan, when approved by NHESP, and prior to the start of any construction or site clearing activities.

11. We recommend the Applicant review the proposed plan for trash removal and waste recycling (and associated facilities) for the residents.
12. This project proposes to mitigate post-development runoff from the project roads and parking areas with deep sump catch basins (with outlet hoods), piped to a collection system, which is intended to discharge to the existing stormwater piping in Commerce Way, which will ultimately discharge to an existing stormwater detention basin in Enterprise Park off Progress Way. In addition to the stormwater management comments discussed in the letter report from Amory Engineers, we have the following additional comments:
 - a. We recommend that a Stormwater Management Operation & Maintenance Plan be prepared that also includes a line for a name, date, and signature by the owner. This will ensure that the owner/applicant is aware of and understands the recommended maintenance and inspections that will be required in the future.
 - b. The revised grading & drainage plans should show all drainage structure details, including dimensions and cross section details for all recharge areas.

Thank you again for this opportunity to assist the Zoning Board in their review of this project, and please call or e-mail me if you have any questions.

Sincerely,

PESCE ENGINEERING & ASSOCIATES, INC.



Edward L. Pesce., P.E., LEED ® AP

Attachments: Traffic Peer Review by RMA, Letter Report from Amory Engineers

cc: Chief Jeffrey Simpson, Marshfield Fire Dept.
Dep. Chief Michael Laselva, Marshfield Fire Dept.
Greg Guimond, Marshfield Town Planner
Patrick Brennan, P.E., Amory Engineers
Kirsten Braun, P.E., Ron Müller & Associates
Jeffrey Dirk, P.E., PTOE, FITE, Vanasse & Associates, Inc.
Anthony Donato, P.E., LEED AP, Hancock Associates

AMORY ENGINEERS, P.C.

WATER WORKS • WATER RESOURCES • CIVIL WORKS

25 DEPOT STREET, P.O. BOX 1768
DUXBURY, MASSACHUSETTS 02331-1768

TEL.: 781-934-0178 • FAX: 781-934-6499
WWW.AMORYENGINEERS.COM

April 15, 2022

Mr. Edward L. Pesce, P.E.
Pesce Engineering & Associates, Inc.
43 Porter Lane
West Dennis, MA 02050

Subject: Mill Creek Marshfield, Commerce Way – Comprehensive Permit

Dear Mr. Pesce:

In response to your request, this letter is to provide an update on the status of the stormwater and water supply review for the subject development. As you are aware, we performed the peer review of the Enterprise Park Definitive Subdivision for the Marshfield Planning Board in 2003, we prepared the Marshfield Water System Master Plan Update in 2009 and are currently under contract to update the Water System Master Plan. As consultants for the Marshfield Water Division we have also been involved in water use projections for the Town during the renewal process for the Town's Water Management Act (WMA) Permit, which regulates/authorizes the amount of water that a water supplier (the Town) may withdraw from its sources (aquifers).

Summary of work to date:

- On March 22, 2022 we met with the developer's representatives (Anand Boscha of Mill Creek, Anthony Donato, P.E. and Erik Rolser of Hancock Associates) and Department of Public Works (DPW) staff (Rod Procaccino, Paul DuRoss and Tom Molinari) to discuss water supply requirements of the development. The developer's team provided us with an estimate of anticipated water use of 40,000 gallons per day (GPD) for the proposed development (300 units). They also advised that the water use at the Modera project is averaging just under 30,000 GPD and the project has been fully leased since July/August of 2021 (248 units). The subject of stormwater was raised and Mr. Procaccino expressed concern about the capacity of the existing stormwater system to handle runoff from the entire drainage area (Enterprise Park) because there have been some changes to proposed uses and drainage patterns in the area since the original design.
- We located the HydroCAD stormwater design calculations and Drainage Area Plans for the Enterprise Park Subdivision. I reviewed these documents and prepared a summary table of the stormwater rates and volumes that were projected to come off the Mill Creek site (see Table 1). The rates were the basis for the pipe sizing in Commerce Way and the volumes were incorporated into the sizing of the stormwater basin located at the corner of Commerce Way and Progress Way. I forwarded this information to Mr. Donato via email on April 6, 2022 and advised that the rates and volumes from their site should not

be greater than the rates and volumes originally anticipated from the site. I note that based on the Drainage Area Plan and the HydroCAD calculations, only a portion (± 8 acres) of the Mill Creek site was originally designed to discharge into the Commerce Way drainage system. The rear portion of the property was not analyzed in 2003 because it slopes away from Commerce Way. This represents a conflict with the proposed approach to the Mill Creek stormwater design as the assumption was that the entire parcel area was included in the original Commerce Way design, which it was not.

Table 1 – Summary of Stormwater Runoff (original 2003 design)

Storm Event	Rate (cubic feet/second)	Volume (acre-feet)
2-year	11.62	0.87
10-year	20.34	1.48
25-year	26.68	1.93
100-year	36.82	2.66

- We are in the process of investigating what changes have been made to the proposed uses and drainage patterns in the area since the original design. Reportedly, some of the Town soccer fields off Rockwood Road drain toward the Commerce Way stormwater basin but we have yet to quantify runoff from the fields. We are aware that approximately 1.55 acres of Drainage Lot A¹ was subdivided out of the drainage lot to create the lot at 3 Progress Way, on which a new commercial building was recently constructed. This building is in the location of former Sediment Forebay 2, which was the forebay designed to treat stormwater runoff from the original Progress Way². However, the capacity of the stormwater basin, which the proposed Mill Creek is tributary to, was not affected by the removal of the forebay.
- We have compiled the Water Division’s monthly pumping records for 2015 through 2020 and computed the average daily water usage for the Town for those years. However, we are waiting on the 2021 records from the Water Division to complete our analysis of Town usage vs. WMA authorized withdrawal to determine water available. We expect to receive the 2021 records and complete our analysis within two weeks.

Information needed from the developer’s team to complete review:

1. Drainage analysis to confirm that stormwater runoff rates and volumes will not be greater than what was originally designed for the site.
2. Hydrant flow tests to determine available fire flow capacity.

¹ The Commerce Way stormwater basin is located on Drainage Lot A. The attached plans show the original and revised/current layout of Drainage Lot A.

² The layout of Progress Way has changed from the original layout that had it as a through street connecting Commerce Way to Rockwood Road. Progress Way is now a 750 foot long dead end road off Rockwood Road and the lots along the west side of Progress Way have been consolidated into one lot (see attached plans).

Mr. Edward L. Pesce, P.E.
April 15, 2022
Page 3

Please give us a call should you have any question.

Very truly yours,

AMORY ENGINEERS, P.C.

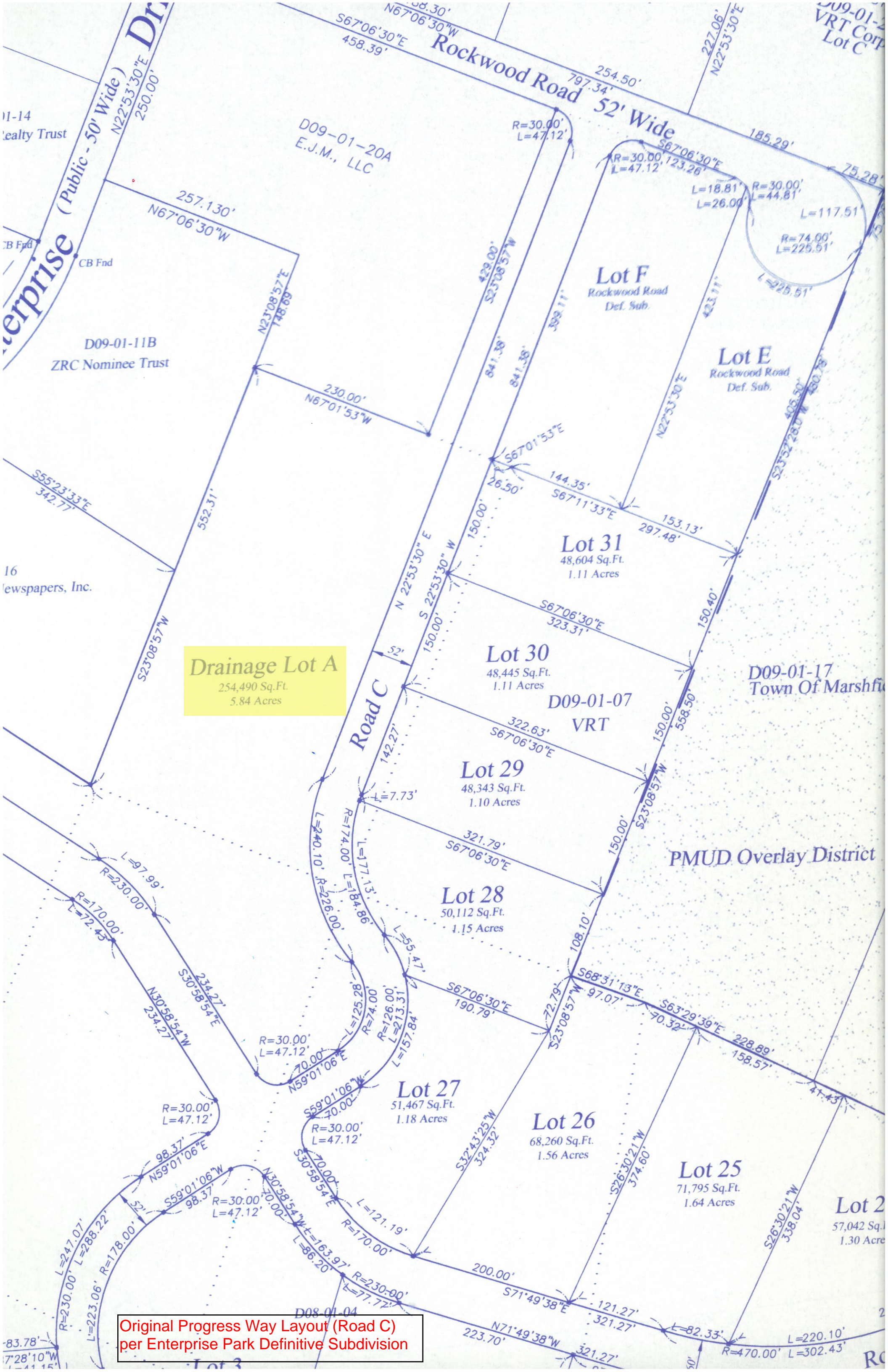
By:



A handwritten signature in blue ink that reads "Patrick G. Brennan".

Patrick G. Brennan, P.E.

PGB
enc.



Drainage Lot A
 254,490 Sq.Ft.
 5.84 Acres

Original Progress Way Layout (Road C)
per Enterprise Park Definitive Subdivision

D09-01-20A
 E.J.M., LLC

D09-01-11B
 ZRC Nominee Trust

Lot F
 Rockwood Road
 Def. Sub.

Lot E
 Rockwood Road
 Def. Sub.

Lot 31
 48,604 Sq.Ft.
 1.11 Acres

Lot 30
 48,445 Sq.Ft.
 1.11 Acres

D09-01-07
 VRT

Lot 29
 48,343 Sq.Ft.
 1.10 Acres

Lot 28
 50,112 Sq.Ft.
 1.15 Acres

Lot 27
 51,467 Sq.Ft.
 1.18 Acres

Lot 26
 68,260 Sq.Ft.
 1.56 Acres

Lot 25
 71,795 Sq.Ft.
 1.64 Acres

Lot 2
 57,042 Sq.Ft.
 1.30 Acres

PMUD Overlay District

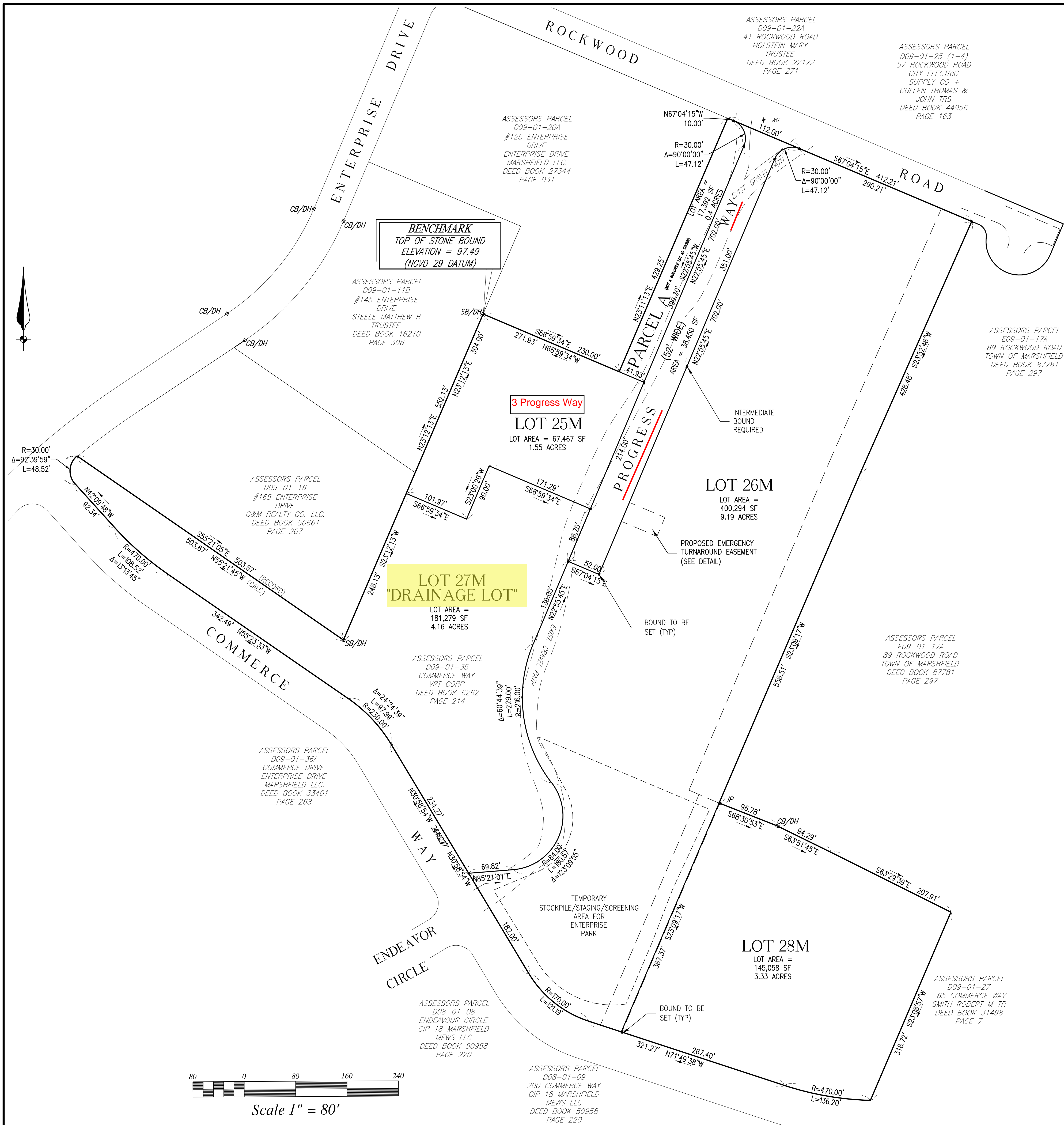
D09-01-17
 Town Of Marshfield

11-14
 Realty Trust

CB Fnd

16
 Newspapers, Inc.

D09-01-2
 VRT Corp
 Lot C

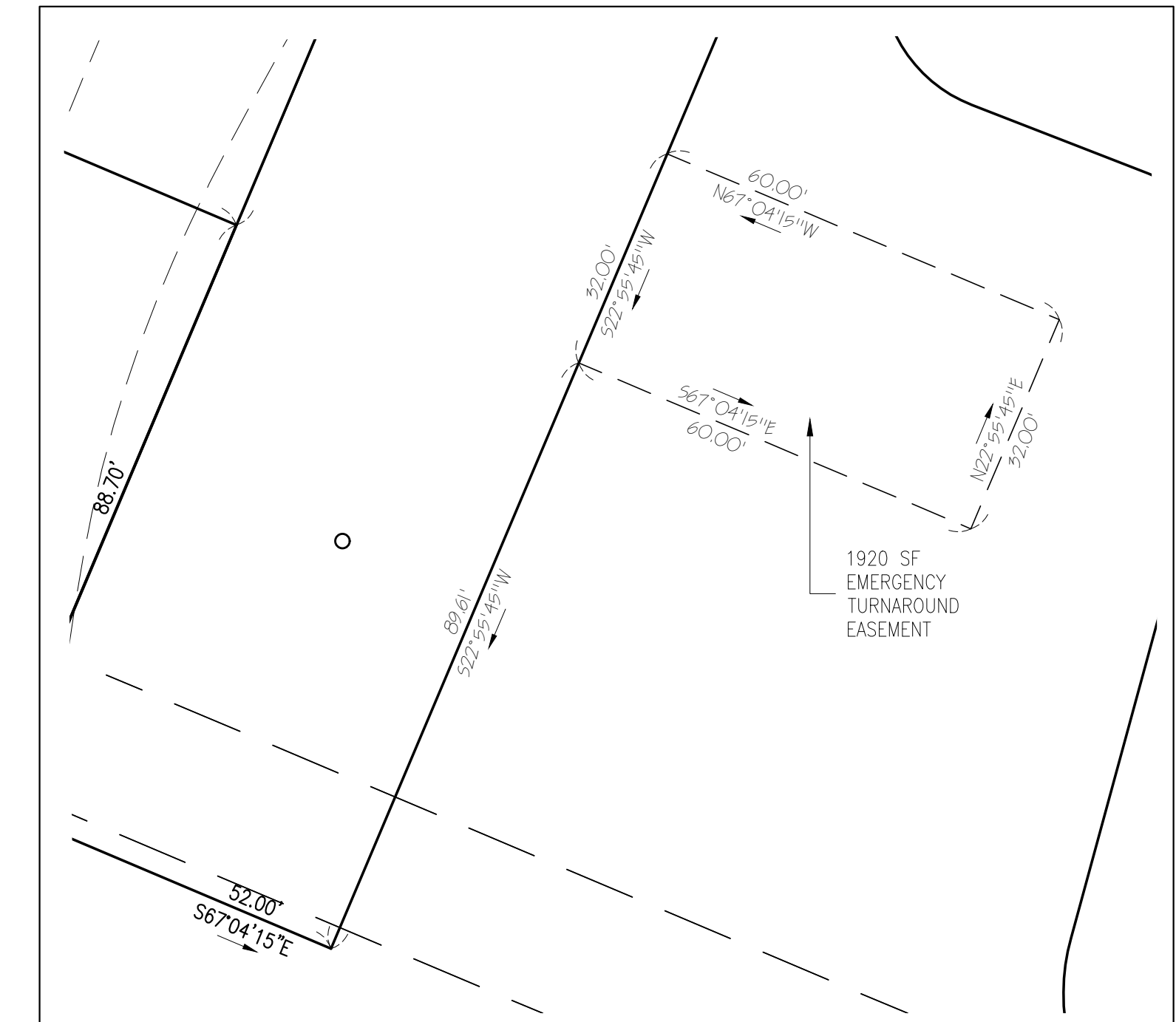


APPROVED UNDER THE SUBDIVISION CONTROL LAW & SUBJECT TO CONDITIONS

_____ DATE

MARSHFIELD PLANNING BOARD

FOR REGISTRY USE ONLY



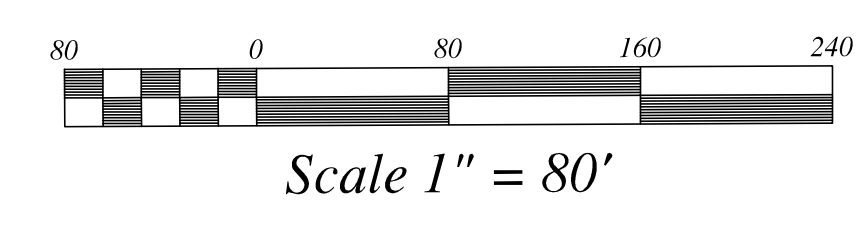
I HEREBY CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMANCE WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASS.

DOUGLAS BAILEY R.L.S. _____ DATE

DEFINITIVE SUBDIVISION
"PROGRESS WAY"
OFF ROCKWOOD ROAD
MARSHFIELD, MASSACHUSETTS

PREPARED FOR:
1 PROGRESS WAY L.L.C.
C/O RICK HOLLSTEIN
1 ATLANTIC STREET
MARSHFIELD MA 02050

SEPTEMBER 18, 2019
SCALE: 1" = 80'
JOB No. 18-275



REVISIONS	
OCTOBER 2, 2019	PEER REVIEW COMMENTS

GC **GRADY CONSULTING, L.L.C.**
Civil Engineers and Land Surveyors
71 Evergreen Street, Suite 1, Kingston, MA 02364
Phone (781) 585-2300 Fax (781) 585-2378



Ref.: 22027

April 21, 2022

Mr. Edward L. Pesce, P.E., LEED AP
Pesce Engineering & Associates, Inc.
43 Porter Lane
West Dennis, MA 02670

Reg.: Traffic Peer Review
Mill Creek Residential
Commerce Way, Marshfield, MA

Dear Ed:

Ron Müller & Associates (RMA) has initiated an independent peer review of the traffic impact and access study and site plan prepared for the proposed multifamily residential development to be located off of Commerce Way within Enterprise Park in Marshfield, Massachusetts. The project proposes to construct 300 multifamily apartment units on site with access via a new driveway that will intersect the south side of Commerce Way, approximately 600 feet east of the Modera Marshfield Phase I driveway and 1,200 feet west of Proprietors Drive. The new site driveway will provide full access to the site. As noted in the traffic study, the site will provide 505 parking spaces with a mix of surface spaces and garage spaces.

The submitted traffic impact study and site plan were reviewed with respect to traffic impacts and site access and compared with state guidelines and standard traffic engineering practice. Based on a review of the submitted materials, we have some comments and recommendations that require further action from the applicant. Once these items are addressed, we will be able to finalize the traffic review of the project. The following lists the documents reviewed as part of the independent peer review:

- *Traffic Impact Assessment; Mill Creek Marshfield, Commerce Way, Marshfield, MA; prepared by Vanasse & Associates, Inc.; January 2022.*
- *Site Plan for Mill Creek Marshfield, Marshfield, MA; prepared by The Architectural Team, Inc.; February 4, 2022.*

The comments below follow the same outline as the submitted traffic study for ease of reading.

TRAFFIC STUDY REVIEW

Existing Conditions

1. The traffic study focused on the following intersections:

- Route 139 at School Street
- Route 139 at Enterprise Drive
- Route 139 at Proprietors Drive & Furnace Street
- Route 139 at Forest Street
- Enterprise Drive at Commerce Way
- Proprietors Drive at Commerce Way & Old Woodlot Road

Based on the site location, expected use, and area roadway network, the study locations are appropriate for analysis.

2. The study provided a description of the area roadway network. Manual traffic counts were performed in September 2021 during the weekday AM, PM and Saturday midday peak periods at the study area intersections. Automatic Traffic Recorder counts were also conducted on the study area roadways during two Thursday through Saturday periods in September 2021. ATR data were collected on Route 139, Enterprise Drive, Commerce Way and Proprietors Drive. RMA concurs with the selected time periods used for analysis.
3. Based on available 2019 MassDOT permanent count station data at Station 20 located on Route 3 in Plymouth, September volumes are approximately 7.1 percent higher than annual average-month conditions and therefore the existing volumes were not downwardly adjusted to provide a conservative analysis. RMA concurs with these findings.
4. Given the current traffic conditions associated with the coronavirus pandemic, the study reviewed historic traffic data to determine if the traffic data needed to be adjusted to represent normal, pre-COVID traffic conditions. The 2021 traffic data at the intersection of Route 139 and Enterprise Drive were compared to traffic data collected at the same intersection in 2019. The 2019 traffic volumes were expanded to 2021 by applying the traffic growth procedure detailed in the April 2020 “Guidance on Traffic Counting Data” published by MassDOT. Based on this comparison, it was determined that traffic volumes within the study area are within 5 percent of the traffic volume conditions pre-COVID. This difference is within the daily and seasonal fluctuation of traffic and therefore no adjustment to the traffic volume

data was made. RMA reviewed traffic volumes at Station 20, mentioned above, during September 2019 and September 2021. Based on this information, traffic volumes in 2019 were actually lower than traffic volumes collected in 2021. Therefore, RMA concurs with the findings that no COVID adjustments be made to the traffic data.

5. Figures 3, 4 and 5 show the existing weekday AM, PM and Saturday midday peak hour traffic volumes at the study area intersections. A review was made of the figures to ensure that the traffic volumes match the traffic volumes from the counts. All of the volumes are correct with the exception of the right turn movement from School Street to Plain Street (Route 139) during the weekday PM peak hour. This traffic volume is mislabeled as 15 when the actual turning movement volume based on the counts is 151. **It is recommended that this volume be updated to reflect the turning movement counts. Furthermore, this comment impacts the No-Build and Build networks. Those networks should also be updated to reflect the proper volume on that movement.**
6. Accident data were reviewed and summarized within the traffic study. Calculated crash rates were found not to be significant. RMA concurs with these findings.

Future Conditions

7. A 7-year design horizon was used for the No-Build and Build condition analyses consistent with MassDOT's *Transportation Impact Assessment Guidelines*. An annual growth rate of 1.0 percent per year was used to project the future No-Build volumes. The study used seven count stations to determine an annual growth rate to project the No-Build volumes. Six of the seven stations were located in Marshfield and another was located in Pembroke. Traffic data were collected between 2009 and 2019. It should be noted that a large proportion of the data used to estimate an annual growth rate included grown data and not actual count data.

RMA reviewed count data at continuous count station #36 on Route 3, south of River Street in Norwell. Based on these data, over the last 10 years, traffic volumes have increased by 1.05 percent per year while over the last 5 years traffic counts have only increased by 0.27 percent per year. Based on this information, RMA concurs with the use of a one percent annual growth rate.

8. Based on discussions between the applicant and the Town of Marshfield, no site-specific developments are proposed in the area that would have an impact on future traffic volumes at the study area intersections. **Given the proximity of the site to Pembroke, it is recommended that the applicant contact the town to see if any developments there would have an impact on traffic volumes within the study area.**
9. The applicant also reviewed if there were any roadway improvements proposed within the study area that would have an impact on traffic operations. It was identified that as a

condition of approval of a recreational marijuana retail establishment located at 985 Plain Street, the Applicant will design, permit and provide funding for the installation of a traffic control signal at the Route 139/School Street intersection. The applicant analyzed the intersection under future conditions as both an unsignalized and signalized intersection and found that signalization would greatly improve operations for left turn movements from School Street. Under signalization, the intersection is expected to operate at an overall LOS A during all time periods.

10. Based on the site plan there will be a mix of townhouse style buildings and three-story apartment buildings with ground floor garages. Therefore, the anticipated trip generation of the proposed 300-unit multifamily housing development was appropriately estimated using the Institute of Transportation Engineers (ITE) *Trip Generation Manual* for Multifamily Housing Low-Rise (Land Use Code 220).
11. The traffic study describes that the trip distribution methodology was based on Journey-to-Work data obtained from the U.S. Census for persons residing in the Town of Marshfield and then refined based on existing travel patterns in the study area. Based on these data, the study assumes 63 percent of the new site traffic will be on Plain Street (Route 139) to/from the west and 25 percent of the new site traffic will be on Plain Street (Route 139) to/from the east. In addition, one percent of the new trips were assigned on School Street to/from the north and the remaining 11 percent to/from the north on Furnace Street. The distribution of new site trips appears reasonable.

Traffic Operations Analysis

12. As mentioned in Comment 5, the traffic volume shown on the southbound right turn movement at the intersection of School Street and Route 139 is incorrect during the weekday PM peak hour. This incorrect volume is carried through to the No-Build and Build conditions. **Analysis at this intersection during all peak hours should be rerun with the correct volume.**
13. The unsignalized capacity analyses tables do not include the volume-to-capacity (v/c) ratio for each movement. **It is recommended that these tables be updated to show the v/c ratio as this measure of effectiveness can be helpful in determining the project's impacts in particular with movements that are approaching capacity.**
14. The signalized intersection analyses were performed using the Highway Capacity Manual (HCM) 2000 methodology. **It is recommended that the results be updated to reflect the newest HCM 6th methodology, or a reason be provided why this older version of the methodology was used.**

15. The capacity analysis worksheets indicate vehicle queues and delays are expected to increase to unacceptable levels on the westbound and northbound left turn approaches at the intersection of Route 139 and Enterprise Drive. Although these conditions are expected to occur with or without the project, the overall intersection operations are expected to incur a significant increase in delay during the Saturday peak hour with the addition of the site traffic. **The Town of Marshfield should determine if this project warrants improvements to this intersection. This is further discussed in Comment 19.**

Sight Distance Evaluation

16. Available sight distances from the proposed site driveway were measured and compared with minimum requirements as established by the American Association of State Highway and Transportation Officials (AASHTO) assuming a travel speed on Commerce Way of 35 mph. Based on the speed data, these minimum requirements should be based on an 85th percentile speed of 31 mph eastbound and 32 mph westbound, however use of a higher speed of 35 mph results in a more conservative assessment. Based on a speed of 35 mph, the minimum required sight distance would be 250 feet in both directions. Table 11 in the study shows that the minimum required distances can be exceeded. A field investigation of the proposed site driveway confirms this information.

Recommendations

17. A number of onsite recommendations were made in the report pertaining to site access and circulation. It is recommended in the report that the driveway be 24 feet in width and operate under STOP control. It is further recommended that the drive aisle behind perpendicular parking be 23 feet wide. All crosswalks proposed on site should include ADA compliant wheelchair ramps and any signage and pavement markings be installed per MUTCD guidelines. It was further suggested that any signs or landscaping near the site driveway be placed outside of sight triangles and that any snow accumulation within these sight lines be removed. RMA concurs with these recommendations, depending on the depth of proposed perpendicular parking spaces as further discussed in our Site Plan Review comments.
18. Based on the analysis, an off-site recommendation was made at the intersection of Route 139 and Enterprise Drive. The applicant has suggested optimized signal timing and phasing to improve operations. Multiple movements currently operate at or over capacity with delays expected to increase in the future with the additional site traffic. These enhancements will improve operations on all movements from LOS F to LOS E or better. **These improvements will require MassDOT permitting as Route 139 in this area is under MassDOT jurisdiction.**

19. Based on discussions with the town, there have been longstanding traffic issues associated with the intersections of Route 139 at Enterprise Drive and Route 139 at Furnace Street/Proprietors Drive. To rectify these issues, the town would like to widen Enterprise Drive to provide two left turn lanes onto Route 139 as well as to install protective/permissive left turn phasing for the northbound and southbound Proprietors Drive and Furnace Street approaches at their intersection with Route 139. It is our understanding that the prior athletic complex that was proposed on the site as part of the Enterprise Park Master Plan committed to a contribution toward these improvements in the amount of \$90,000. **The applicant and the town should discuss whether a similar contribution is appropriate based on the project's anticipated traffic impacts.**

SITE PLAN REVIEW

20. The site plan proposes one full access driveway to the site off of Commerce Way, approximately 600 feet east of the Modera Marshfield Phase I driveway and 1,200 feet west of Proprietors Drive. The proposed access driveway is to be 24 feet wide. Although not striped on the plan, it is assumed that 12-foot-wide travel lanes will be provided. A sidewalk is proposed along the western side of the driveway to connect to the existing sidewalk on the south side of Commerce Way. **It is recommended that a crosswalk with ADA compliant wheelchair ramps be proposed across the driveway. It is further recommended that a stop line and STOP sign (R1-1) be placed on the driveway exit. The stop line should be located 5 feet from the proposed crosswalk and the stop sign should be placed adjacent to the stop line.**
21. The fire department's largest vehicle should be able to traverse the site. **It is recommended that AutoTurn (or a similar program) be used to show a swept-path analysis of the largest fire truck to be used around the site. It is also recommended that the proponent coordinate with the Marshfield Fire Department regarding accessibility to all sides of each building.**
22. **The site plan should show the sight triangles at the proposed driveways to assure that any proposed landscaping or signs are outside these sight triangles and do not impede driver visibility.**
23. The site plan does not show any interior signing, striping, or dimensions. **It is recommended that the applicant include a signing and striping plan of the interior drive aisles showing the dimensions of each and the proposed parking spaces. If the parking spaces are less than 20 feet deep, then the adjacent drive aisles should be 24 feet, rather than the 23 feet recommended in the traffic study. Pedestrian connectivity through the site by way**

of crosswalks and ADA-compliant wheelchair ramps should also be included on these plans.

24. The site plan proposes 505 parking spaces which equates to a parking ratio of 1.68 spaces per unit. As labeled on the site plan, 306 parking spaces will be surface parking and 204 spaces will be garage and tandem spaces. Based on this information, the total number of parking spaces will be 510 not 505. **The applicant should confirm the total number of parking spaces.**
25. Based on the ITE *Parking Generation Manual*, the proposed supply of spaces (whether 505 or 510) exceeds the average and peak parking demands of the sites survey by the ITE.

Once the above comments have been addressed, we will be able to finalize our independent traffic peer review of the proposed residential project. Please feel free to contact me if you have any questions regarding this review.

Sincerely,

Ron Müller & Associates



Kirsten Braun, P.E.
Associate