

October 31, 2017

Michael McKnight, Chair Wrentham Planning Board 79 South Street Wrentham, Massachusetts 02093

Re: Stormwater Management Review - 589-591 Washington Street

Dear Chairman McKnight and Members of the Board:

Professional Services Corporation, PC (PSC) has completed the peer review for the proposed NasKart LLC Indoor Karting & Trampoline Center at 589-591 Washington Street Wrentham, including the Definitive Plan of Land for Commerce Way. This letter is provided to outline PSC's findings, comments and recommendations related to the stormwater management design.

BASIS OF REVIEW

PSC received the following documents prepared by Bay Colony Group, Inc., Foxborough, MA which serves as the basis of the review:

- Plans (12 Sheets) entitled *Definitive Plan of Land Commerce Way, Wrentham, MA* dated July 20, 2017 (revised September 20, 2017).
- Plans (19 Sheets) entitled Site Development Plan of Land NasKart LLC Indoor Karting & Trampoline, Wrentham, MA dated July 20, 2017 (Sheets CV, 2, 3, 4, 7 and 8 revised October 19, 2017).
- Flood Impact Analysis and Stormwater Management Plan "Wrentham Business Park" Wrentham, MA dated July, 2017, revised September, 2017.
- Board of Health Supplement to the Flood Impact Analysis and Stormwater Management Plan "Wrentham Business Park", Wrentham MA. dated September 2017, revised October 21, 2017.
- Response letter addressed to the Board of Health regarding *Wrentham Business Park & Commerce Way*, dated October 21, 2017 in response to the October 17, 2017 PSC peer evaluation (including responses to Planning Board comments (Comments 1 through 19).

Review by PSC will include the above items along with the following:

- Rules and Regulations Governing the Subdivision of Land, revised June 16, 2016
- Town of Wrentham Massachusetts Aquifer Protection Districts map, dated November, 2006
- *Massachusetts Department of Environmental Protection Stormwater Standards* as outlined in the Massachusetts Stormwater Handbook in effect January 2, 2008
- 310 CMR 10.00 Massachusetts Wetlands Protection Act Regulations in effect October 24, 2014
- 310 CMR 22.00 Massachusetts Drinking Water Standards
- Flood Insurance Rate Map (FIRM), Norfolk County, Massachusetts (All Jurisdictions), Panel Number 25021C0341E, effective date July 17, 2012.
- United States Department of Agriculture; Natural Resources Conservation Service Soil Survey
- Applicable federal and state regulations.

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SITE AND PROJECT OVERVIEW

The 32 +/- acre project parcel is located off Commerce Way on the easterly side of Route 1 in the C-2 Commercial District. The site is abutted by a truck stop to the north, a sportsman's club and a vehicle salvage yard to the south, cranberry operations to the east and Route 1 to the west. Soils have been mapped by the NRCS as Hinckley and Udorthents, sandy in the upland portions of the project (both A-soils) and Scarboro, D-soils in the vicinity and beneath the wetlands. The site was previously cleared and partially developed under a prior approval in 2001 including construction of two infiltration basins, 1,000 feet of roadway paved to binder and constructed utilities. Soil evaluation and groundwater monitoring For purposes of evaluating the stormwater management design, the pre-2001 condition has been utilized as the pre-developed baseline. The proposed design is modeled to this baseline.

WPA Resource Areas were originally established by an Order of Resource Area Delineation (ORAD) in 2000 and re-issued in 2003 under DEP No 351-755. In 2017, the resource area wetland flags were re-confirmed with the Conservation Agent. Vegetated Wetland (BVW) associated with Rabbit Hill Brook with 50-foot Wrentham No Work Zone and 100-foot buffer zone extend from the BVW into the site. The 100-foot and 200-foot Inner and Outer Riparian Buffer Zones associated with Rabbit Hill Brook extend into the Locus.

Rabbit Hill Brook flows adjacent to the site and is a contributory perennial watercourse within the Wading River Public Supply Watershed in the Taunton River Basin. The Wading River Public Supply Watershed identified as a Class A Outstanding Resource Water (ORW) (314 CMR 4.06). The protection of ORW's are subject to the antidegradation provisions of 314 CMR 4.04, that "in all cases existing uses and the level of water quality necessary to protect existing uses shall be maintained and protected. The Zone A buffer associated with Rabbit Hill Brook represents the area between the upper boundary of the Class A water surface and extends 200 feet laterally from the bank of Rabbit Hill Brook. According to MassGIS mapping, The Zone A buffer extends into the eastern portion of the existing site, extending northward along the rear of Lot 3, 200 feet from the outer edge of the adjacent cranberry bog. A portion of the proposed parking lot extends into the Zone A buffer.

The existing stormwater basin (Detention Basin C3), completed in 2001 is located between the 50-foot and 100-foot BVW buffer. Although no additional work is proposed in the basin, portions of the site parking and exterior site grading will extend into the 100-foot BVW buffer. All work is designed to remain outside the 50-foot No Work Zones.

The entire project includes development of a 95,050 sq-ft indoor karting and trampoline facility, a 2,000 sq-ft coffee shop, a 5,000 sq-ft family-style restaurant and two commercial and/or warehouse buildings of a combined 184,000 square-feet. The project will result in a total of 11.1 acres of impervious area, based upon the gross square footage of building footprint parking spaces, internal driveway and miscellaneous hardscape for the facilities.

The currently presented plan of Lot 2 only, includes the 95,050 sq-ft indoor karting and trampoline facility and a shortened 500-foot interior access drove that is to remain under private ownership.

STORMWATER MANAGEMENT REVIEW

The stormwater management system relies primarily upon a conventional closed-drainage design for conveyance to stormwater management Basin C3, which was constructed in 2000/2001 for previously approved project. The basin is designed to fully infiltrate flows from the entrance roadway, the proposed facility roof, parking and miscellaneous hardscape. The roofwater is partially infiltrated in two



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stormwater subsurface recharge galley systems. Overflows from both systems discharge to the basin basin.

The presented stormwater management calculations include the full-buildout of the 31.2 acre site including mitigation of post-developed stormwater flows from ten (10) subcatchments. The current phase which includes the modified site drive, the NasKart facility, parking and the existing Basin #C2 involves four (4) of the ten subcatchments and a total land area of 12.15 acres. The two hydrologic design points under consideration for the current design include discharges from the basin into Rabbit Hill Brook and overland discharges to the wetland on the southerly property line.

The following are general comments and or recommendations for issues not specifically included in subsequently covered State or Local review sections.

1. The 200-foot Zone A buffer associated with the Rabbit Hill Brook contributory ORW is not shown on the drawings. The eastern portion of the proposed parking lot extends into the buffer. To identify potential impacts to the Zone A, the existing conditions plan should be updated to include its limits.

Response: The Zone A from the MassGIS has been added to the plans (all Sheets).

PSC: OK.

2. The Rabbit Hill Brook has been identified on the Flood Insurance Rate Map 25021C0341E as a Zone AE with profiled 100-year flood elevation 181 along most of the easterly property line and rising to 183 at the outlet edge of the cranberry bog and 185 along the outer extents of the bog. Although the entirety of the project lies above the flood plain, the existing conditions plan should be updated to include the Zone AE flood plain.

Response: The Zone AE has been added to all sheets. There is no impact to the project.

PSC: OK.

3. Although the NasKart facility represents only 12.15 acres of impacts to the site hydrology, stormwater management calculations have been provided for the entirety of the anticipated 32.2 acre build-out. To better determine compliance with peak flowrates and volumes, this set of calculations should be tailored for the smaller project. Specifically, the existing subcatchment 8S (Watershed EC) should be reduced from 23.4 acres to approximate the area that contributes to Basin #C3 from the NasKart Facility and entrance drive (10.84 combined acres from Watershed DA and the roof runoff systems).

Response: We further discussed this with PSC and we agreed that this is not necessary since the design point is where the brook exits the site. But we did modify the developed conditions to remove all the future construction that is not part of this submittal. The model will be adjusted in the future as the site is further developed.

PSC: OK.

4. Deep Hole Tests 2017-4 and 2017-5 noted standing water at elevation 184.1 beneath proposed <u>Infiltration System "A"</u>. The bottom of stone beneath the system is proposed at elevation 198.7. Infiltration System "A" is located outside the Zone A associated with Rabbit Hill Brook and has sufficient separation to groundwater. **OK**.



Response: No response necessary

5. Deep Hole Test 2017-8, beneath <u>Infiltration System "B"</u> was advanced within fill material to an elevation of approximately 182.2. No evidence of groundwater was logged to that depth. Nearby, Deep Hole Test 2017-1 identified standing water at elevation 181.3. The bottom of stone beneath the system is proposed at elevation 195.0. Although provided adequate separation to groundwater, the steep bank just south of the system may be prone to breakout from recharge. The system should be shifted to the north, closer to the building.

Response: The system was moved to the north away from the slope (Sheet 4).

PSC: OK.

REGULATIONS OF THE TOWN OF WRENTHAM PLANNING BOARD

Section 4.5 sets forth the Board's stormwater management objectives, with design and installation requirements detailed in Section 5 and Section 6 of the Rules and Regulations.

6. The existing Basin #C3 has been constructed with a footprint elevation of 185. A monitoring well (MW#6) was installed prior to construction of this basin in 2000/2001 that was surveyed in March, 2000 by Carr Research Laboratory Associates. Measured groundwater on the March 30, 2000 observation was elevation 185.03, above the invert of the basin. Infiltration Basins must have a minimum separation from seasonal high groundwater of at least 2 feet. (PB §5.216 and PB §5.211 (ref Vol 2, Chap 2 *Massachusetts Stormwater Handbook*)).

Response: During discussions with PSC we agreed that the basin would continue to act as a hybrid wet basin/infiltration basin but that the infiltration would not start until 2' above the estimated high ground water and that one half of the measured permeability rate would be used.

PSC: The calculated exfiltration rate was modified as required in Vol 3, Ch. 1- Stormwater Management Handbook. OK.

7. This basin should be designed as detention only and the HydroCAD calculations should be adjusted to remove the exfiltration component for this system. Table 3. *Summary of Stormwater Basin Flood Elevations* in the calculations should be updated.

Response: The inflow/outflow analysis was revised based on the discussion in Item 6 and a revised storm water report has been provided. The top of the basin must be raised 0.12' in order to maintain 1' of freeboard (Sheet 3.)

PSC: The exfiltration component of the design was adjusted, requiring reshaping of the basin berm. OK.

8. The project is required to maintain the same total <u>rate of runoff</u> between pre and postdevelopment conditions. The calculations indicate that flowrates have been maintained below pre-development conditions for the South Property Line Study Point. The Rabbit Hill Brook Study Point should be checked, incorporating Comments 3 and 7. (R&R §4.51.g).

Response: The storm water report has been revised in accordance with Item 6 and the new peak rates of runoff are in Table 1 of the Board of Health Supplement.



PSC: OK.

9. The project is required to endeavor to maintain the volume of water being discharged offsite. The calculations should address whether runoff volumes will be maintained below pre-development conditions for both analysis points. (R&R §4.51.g)

Response: The storm water report has been revised in accordance with Item 6 and the new peak rates of runoff are in Table 1 of the Board of Health Supplement.

PSC: OK.

10. Required Recharge Volume calculations were provided, based upon the requirement that the first 0.6 inches of runoff from all impervious areas are to be recharged. For this project, recharge is required for 3.99 acres of pavement and 2.18 acres of building roof area for a total required volume of 0.3086 acre-feet. Infiltration Systems "A" and "B" with a combined 0.37 acre-feet satisfy this requirement. **OK**.

Response: No response required.

11. Total Suspended Solids TSS removal calculations have been provided for the roadway and parking lot conveyance system through Basin #3C. The stormwater quality treatment train consists of Tree Box Filters, Deep Sump catchbasins with hoods and Infiltration Basin to meet the 80% removal requirement. Based upon the Tree Box Filters and Deep Sump catchbasin removal rates of 80% and 25% respectively, the parking area is compliant; however the entrance drive portion of the drain system bypasses the Tree Box filters which would make this part of the treatment train non-compliant with respect to TSS removal. (Reference PB Section 5.211)

Response: Tree box filters have been added around CB#3C (Sheet 4.)

PSC: OK.

12. In addition to perimeter erosion controls, temporary sediment/settling basins should be provided along the perimeter of the work area during construction to direct overland runoff and treat sediment prior to runoff entering Basin #C3 and the southerly wetlands.

Response: The SWPPP has been modified to show a sediment basin that can be placed along the perimeter (Sheet 8).

PSC: OK.

13. A dedicated equipment refueling area should be provided on the plan.

Response: An area has been designated on Sheet 8.

PSC: OK.

14. The Estimated Operations and Maintenance Budget includes items for inspections (3x/year), catchbasin cleaning 4x/year, mowing (2x/year) and treebox filter maintenance. Line items and anticipated annual costs should be added for street sweeping, maintenance of the detention basin and inspection/cleaning of the subsurface galley systems.

Response: The O&M Budget has been modified to reflect this comment (Appendix C.).

PSC: OK.



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- 15. Conveyance calculations were provided for the closed drainage system, based upon the 25-year storm event and construction of the current project (Commerce Way, the NasKart facility and associated parking). The following were noted:
 - a. The Town recognizes NOAA Atlas 14 rainfall intensities. The 25-year design storm should be based upon NOAA Atlas 14 (vs TP40).

Response: It was agreed that the subdivision regulations (Section 5.213) require the use of TP40 and that the Board of Health Regulations are silent on closed systems.

PSC: We concur. OK.

b. All proposed pipes beneath paved areas should be upgraded from HDPE to RCP. The manning's roughness coefficient should be adjusted in the conveyance calculations to RCP.

Response: All piping, except for the roof drain piping and piping to and from the underground infiltration basin is RCP. N=0.013 is used for both types of pipe.

PSC: RCP is preferred over HDPE, particularly beneath pavement sections.

c. CB#7 should be rerouted to DMH#100 in the conveyance spreadsheet and recalculated.

Response: The spreadsheet has been modified (Appendix D).

PSC: OK.

d. The full-flow velocities should be provided for all pipes. If possible, the 30-inch outflow pipe (average velocity 11.0 fps) should be redesigned with a velocity below 10 fps to reduce scour of riprap.

Response: I have flattened the slope of the outfall pipe in order to bring the velocity below 10 ft/sec (Sheet 4 and Appendix D).

PSC: OK.

e. The Downstream Structure Hydraulic Grade elevations should be checked in the spreadsheet (below the invert elevations in several instances).

Response: The tailwater condition for this system is the 25 year water elevation in Basin C3 or the infiltration basins. Since those elevations are below the inlets into the structure I changed the model to a free outfall (Appendix D).

PSC: OK.

16. Calculations and narrative should be provided to document the effect of the 100-year storm on drainage pipes and should demonstrate how all stormwater discharges to the basin. (PB §5.217)

Response: There are four areas on the site where storm water is collected. All of them are located in sag areas where the runoff is trapped by curbs and by grading (CB#7, 103A, 103B &104A). During storms where the inlet capacity of catch basins is overwhelmed the storm water will pond around the catch basin until the inlet capacity "catches up" with the runoff. There is no condition where the runoff bypasses a basin during a large event and goes into a public street or into a resource area.

PSC: OK.



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17. Appendix B should also calculation should be provided that addresses detention and treatment of the first flush (1" rainstorm). (PB §5.212).

Response: The roof infiltration basins are considered clean runoff because they are directly channeled to the infiltration system and no pretreatment is necessary. The water quality elements of Basin C3 are discussed in detail in Appendix D of the 2001 Stormwater Report. They include a forebay, a high marsh, and a low marsh and calculations of pollutant uptake are included (copy attached). The tree box filters are designed to treat 90% of the annual runoff. The north parking lot would require 3 tree box filters for treatment (4 are provided) and the west parking lot would require one tree box filter (4 are provided). See Filterra Sizing Table Appendix B.

PSC: OK.

18. Stormwater basins having a volume greater than 500 cu-yds are required to be screened from adjacent lots by a double row of greenbelt plantings. The existing vegetation within the resource area buffer may sufficiently buffer Basin #C3. (PB §5.225).

Response: A waiver has been requested from the Board.

PSC: Waiver request noted.

19. Documents allowing the town to enter the property should be recorded at the Norfolk Registry of Deeds, allowing access to permit the town to make any necessary repairs to the basins. (Section 5.248).

Response: Documents will be provided to the town to address this item prior to signature of plans.

PSC: Open item.

SUMMARY

Additional documentation and design as noted above is required to show compliance with the Town of Wrentham and MassDEP Stormwater Management Standards.

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

Very Truly Yours, Professional Services Corporation, PC

David W. Sanderson, PE Senior Vice President

Cc: John Charbonneau, William Buckley

