



133 Keyes Road  
Concord, MA 01742

**DATE:** October 1, 2020

**MEMORANDUM**

**TO:** Elizabeth Hughes, Town Planner  
**COPY:** Alan Cathcart, Director of Public Works  
John Hodges PE, Water/Sewer Superintendent  
**VIA:** Steve Dookran PE, Town Engineer  
**FROM:** Justin Richardson PE, Assistant Town Engineer  
**SUBJECT:** 246 Old Road to Nine Acre Corner: Concord Country Club Earth Removal Special Permit

Concord Public Works has reviewed the application submitted for a Special Permit dated September 1, 2020, prepared by Stamski and McNary, Inc., for the construction of an irrigation pond at the Concord Country Club and offer the following:

Engineering Division Comments:

1. TP 6-1 is not located in the correct location. The correct location shown below, is located immediately adjacent to the earth pile that is shown on the existing topographic plan below.



Further confirmation of the hole locations are from pictures from the June 2, 2020 site visit and a level run that was performed by Onyx Corporation prior to the hole being dug which specified an elevation of 155.10'. This has considerable effects to the design setting the seasonal high

ground water elevation at 139.10'. Pursuant to Zoning Bylaw Section 7.6.6.11, removal of soil, loam, sand, gravel, or any other mineral substance within four feet of the historical high groundwater table elevation is prohibited within the Groundwater Conservancy District.

2. TP 7-2 according to the point description and existing conditions survey is at elevation 154.435'. The soil log is consistent with Engineering's notes from the site visit on July 2, 2020 that seasonal high ground water is located 86-inches measured from the ground surface as the hole location (154.435'). This means that the seasonal high ground water elevation in that area is 147.27', which means that the bottom of the basin is within the four foot to seasonal high groundwater. Pursuant to Zoning Bylaw Section 7.6.6.11, removal of soil, loam, sand, gravel, or any other mineral substance within four feet of the historical high groundwater table elevation is prohibited within the Groundwater Conservancy District.
3. Because the bottom of the irrigation pond is within four feet of the historical high groundwater table elevation the proposed development is prohibited. The Engineering division will not review the submittal until a plan that is not prohibited is provided. The Engineering Divisions reserves the right to comment on future submittals related to any new or previously submitted information provided to the Town.

#### Water/Sewer Division Comments:

Per item # 3 under the Engineering Division comments, the project as submitted is prohibited. Should the applicant present a project that meets the requirements outlined Zoning Bylaw Section 7.6.6.11, the applicant is advised that the property is located in the Groundwater Conservancy District within the recharge zone of one of the Town's drinking water supply wells. As such the Water/Sewer Division is requesting that should the applicant present a project that is feasible, the following information be submitted regarding the proposal in order to satisfy Zoning Bylaw Section 7.6.2.2:

1. A site plan or location plan showing pertinent features, including their extent where applicable, which includes:
  - a. Existing Town water supply wells
  - b. Existing CCC irrigation wells
  - c. Groundwater Conservancy District
  - d. Topography
  - e. Wetlands
  - f. Soils
  - g. Proposed pond
  - h. Test pits
  - i. Cross sections
2. Cross sections, with exaggerated vertical scale for ease of understanding, of at least the relative horizontal and vertical distances between the wells and the proposed pond including groundwater elevations, with and without related drawdowns.
3. Narrative summary, generated by, or with input from, an experienced hydrogeologist (or equivalent) of the information requested above, and additional information listed below, which relates to the material in order to provide a determination as to conformance with Zoning Bylaws Section 7.6.2.2 and 7.6.6.11:

- a. Historic irrigation pumping (“... including peak and average day demands.” As previously requested in CPW correspondence dated 3/2/2020
- b. Responses previous requests included in CPW correspondence dated 4/21/2020
- c. Hydrologic, drought and evapotranspiration data
- d. Likely typical and worst-case groundwater fluctuation, i.e., mounding and drawdown

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**DATE: March 2, 2020****MEMORANDUM**

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**TO:** Elizabeth Hughes, Town Planner  
**VIA:** Alan Cathcart, Acting Director of Public Works  
**VIA:** Steve Dookran PE, Town Engineer  
**FROM:** Valerie Doerrer, Public Works Engineer-Water Systems  
**FROM:** Justin Richardson, Assistant Town Engineer  
**SUBJECT:** 246 Old Road to Nine Acre Corner: Concord Country Club Earth Removal Special Permit

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Concord Public Works has reviewed the application submitted for a Special Permit dated January 31, 2020, prepared by Stamski and McNary, Inc., for the construction of an irrigation pond at the Concord Country Club and offer the following:

Engineering Division Comments:

1. Because of the extent of the alteration please provide a Stormwater Pollution Prevention Plan (SWPPP)
2. A revised plan is required that identifies more existing contour label on the plan especially on the easterly side of the site. The revised plan dated February 14, 2020 does not label any existing contours.
3. It appears from the plan that some surface water will flow into the pond from the east. Please provide more survey data on the east side of the pond so that the total area generating stormwater runoff to the pond can be determined. The overflow device is considered a new point discharge where one did not previously exist, and measures should be taken to spread the overflow so that it is not a point discharge.
4. Please provide stormwater calculations, including pre and post development plans showing the extent of the drainage area, to prove that this development does not increase stormwater runoff to the resource area and does not affect downstream properties or infrastructure. The Pond is considered new impervious area that is added to the site. Please update the Special Permit Application to include the existing and proposed total impervious coverage for the site.
5. Soil testing was performed on the west side of the pond embankment, but no testing was performed inside the pond or on the east embankment at the higher ground elevations. A minimum of six (6) additional soil tests shall be performed in the areas indicated on the attached plan to ensure that groundwater is not affected by the new pond. The soil testing shall go down four (4) feet deeper than the bottom elevation of the pond, be performed on soil in its natural state (undisturbed), and be observed by a Town representative. Pursuant to Zoning Bylaw Section 7.6.6.11, removal of soil, loam, sand, gravel, or any other mineral substance within four feet of the historical high groundwater table elevation is prohibited within the Groundwater Conservancy District.

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6. The Cut/Fill Report shows cut and fill factors of one (1). Please provide information on whether this volume of soil is in its natural state. Additionally, the volume of material that will be hauled (loose-measure volume) should have a swell factor applied to it based on the soil classification. Please verify that this factor was applied when determining the amount of material that will be hauled, and if a swell factor was not applied, please provide additional cut/fill calculations showing the swell factor included for the hauling volume.
7. The plan and documents do not show inflow pipes. Please provide information on how the pond will be filled and continually fed with inflow pipe locations and details.
8. The plan and documents do not provide any shut off devices for the inflow pumping system, and this could significantly affect the groundwater levels in the Groundwater Conservancy District. Please provide information and details of how the inflow pumping system will shut off and at what water elevation this will occur.
9. The plans and the application do not provide any information on what measures will be taken to ensure that the inflow does not cause internal erosion of the pond or cause issues with the liner.
10. If the Special Permit is approved, prior to resuming hauling the Applicant shall submit a performance bond acceptable to Concord Public Works to secure the condition of the haul roads from any identifiable damage due to construction vehicles associated with the earth removal.

Water/Sewer Division Comments:

The applicant is advised that the property is located in the Groundwater Conservancy District within the recharge zone of one of the Town's drinking water supply wells, as such the Water/Sewer Division is requesting additional information be submitted regarding the proposed pond and the planned operation of the irrigation system.

1. Provide a site plan showing existing and proposed irrigation infrastructure.
2. Provide an estimate of the proposed daily water withdrawals of the irrigation system including peak and average day demand. Estimates should be based on data from historic metered irrigation use at the site, if available.
3. Provide information on the operation, use, and maintenance of the irrigation pond that can be incorporated into a "Pond Management Plan", or similar, demonstrating the following:
  - a. Effective management of the water level within the irrigation pond to avoid having groundwater obtained from onsite irrigation wells being released through the overflow as part of overall irrigation system operation, and precipitation events.

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**CONCORD PUBLIC WORKS**

**Tel: 978 - 318 - 3210**  
**Fax: 978 - 318 - 3245**

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- b. Best Management Practices associated with irrigation system usage, irrigation system maintenance, and pond maintenance (i.e. algae management).
  
4. Upon approval of the proposed irrigation pond, the property owner will be required to submit daily irrigation water pumping totals to Concord Water on an annual basis.

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**TO:** Elizabeth Hughes, Town Planner  
**From:** Alan H. Cathcart, Director of Public Works  
**Prepared by:** Valerie Doerrer, Public Works Engineer-Water Systems  
Justin Richardson PE, Assistant Town Engineer  
**CC:** Steve Dookran PE, Town Engineer  
**SUBJECT:** 246 Old Road to Nine Acre Corner: Concord Country Club Earth Removal  
Special Permit

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Concord Public Works (CPW) acknowledges receipt of the additional information provided by Stamski and McNary, Inc., dated March 19, 2020, and Golf Water, LLC., dated March 17, 2020. However, in order to proceed with a detail review of this additional information, CPW requires that the applicant address fully the Engineering Division Comment, Item 5 (restated below) from the Concord Public Works correspondence dated March 2, 2020. The test pits must be observed by a Town representative to ensure that the irrigation pond complies with Zoning Bylaw Section 7.6.6.11 which states that removal of soil, loam, sand, gravel, or any other mineral substance within four feet of the historical high groundwater table elevation is prohibited within the Groundwater Conservancy District. While the applicant indicates that the additional test pits were completed, the Town was not contacted to witness that work. Also, the applicant seems to identify the concern as only needing any finish grades outside the four-foot zone. The law requires no excavation of undisturbed soil within that zone and this needs to be demonstrated.

Engineering Division Comment Item 5 from March 2, 2020 Correspondence:

Soil testing was performed on the west side of the pond embankment, but no testing was performed inside the pond or on the east embankment at the higher ground elevations. A minimum of six (6) additional soil tests shall be performed in the areas indicated on the attached plan to ensure that groundwater is not affected by the new pond. The soil testing shall go down four (4) feet deeper than the bottom elevation of the pond, be performed on soil in its natural state (undisturbed), and be observed by a Town representative. Pursuant to Zoning Bylaw Section 7.6.6.11, removal of soil, loam, sand, gravel, or any other mineral substance within four feet of the historical high groundwater table elevation is prohibited within the Groundwater Conservancy District.

*Applicant's response: Additional soil testing has been performed to demonstrate that the proposed excavation will not result in any finished grades that are within 4' of the historical high water table where the pre-development finished grade is/was greater than 4' above the historical high water table. In light of the chaos surrounding the current COVID-19 situation, these test pits were not observed by a representative from the town. Confirmatory test pits can be performed prior to the issuance of the permit or commencement of the work.*

CPW performed a cursory review of the additional information submitted in regards to the irrigation system and offer the following for the applicant to consider:

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The information presented by Concord Country Club's consultants suggests the proposed irrigation system improvement project has the potential to allow for improved irrigation system operation and efficiencies. Based on the supporting documentation provided, it remains unclear as to what, if any, impact these modifications will have on the municipal water supply wells located immediately down-gradient of this site.

When the applicant's consultant states "*The more efficient irrigation system supplied by existing wells will have increased water distribution uniformity and efficiency and by utilizing a new storage base, demand on well water will be reduced.*", it is not entirely clear as to how they arrive at this conclusion. While it is possible that these claims could be accurate, it requires a more detailed explanation as to site specific operating conditions and constraints. Without this evaluation, it is not too difficult to surmise that during high demand periods, especially during extended period of droughts, make-up water pumped to the irrigation pond will be predominantly from the existing groundwater wells. By design, the new irrigation pond would eliminate existing controls on groundwater withdrawals, notably well and pump design and efficiencies. As such, if groundwater withdrawal volumes are simply regulated relying upon "average" daily withdrawal values or annual water registration allowances, it is quite possible that groundwater withdrawals could be more significant during hydrogeologically stressed conditions.

Again, depending on specific operational conditions, the statement suggesting that "*the average daily flow will not change with the new system installation and the new pumping scenario from a pond*" presents a false sense of protection that is not supported by the information provided. For instance, the operation of both wells at their maximum available pumping capacities (again dictated by well and pump efficiencies) may significantly exceed the 120,000 gallons per day "average" for weeks or months at a time. Without sufficient detail and clarification, such withdrawal rates could intercept essential recharge that would otherwise flow towards the Town's drinking water supply wells – especially during a prolonged drought. To this same point, the statement suggesting the proposed irrigation system modifications "*will reduce the burden on the wells and reduce the impact on the water table while providing the same gross volume*" is entirely dependent upon actual withdrawal rates anticipated over very specific periods of time during very specific hydrogeologic conditions. The town is most interested in understanding what the impact will be on the municipal wells when it most matters, when the hydrogeologic system is stressed.

To be clear, it is quite possible that the irrigation system could be designed and operated in a manner that would allow for more water to be drawn during periods of water abundance (with appropriate considerations as to time of year, duration, and other environmental factors), and in a manner that the irrigation pond could act as a buffer and actually improve availability for the Town during droughts. However, lacking such detail, the Public Works Commission (PWC) will be unable to provide the ZBA with recommendations as to how the issuance of this Special Permit will either a.) impact the health, safety, and general welfare of the community by ensuring an adequate quality and quantity of drinking water for the residents, institutions, and businesses of the Town of Concord or, b.) preserve and protect the Town's existing and potential sources of public drinking water supplies, as outlined within the Groundwater Conservancy District Zoning regulations.

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Everyone including the applicant involved in this effort would be best served if the applicant could provide an irrigation system plan that clearly identifies all irrigation system components including the location and appropriate characteristics of wells, piping systems, storage systems and discharge points as well as operating protocols to be implemented during normal and more importantly, drought periods. Once this information is provided, we can expect to have a better understanding as to if this project will have an adverse impact on the municipal water supply, or not. Such a program would be well advised regardless of this permitting effort and would be in keeping with sustainable water resource practices that are being developed within the golf course industry.

Given the project's size, scale, complexity, potential impact or use of the land and Town's drinking water supply, it may be warranted for the ZBA to call for the assistance of outside consultants to assist in this review, in accordance with MGL Ch.44, Section 53G.

In conclusion, whereas the information provided to date makes it difficult to reasonably determine if the project as proposed will or will not have a deleterious impact on the municipal water supply well, the applicant is directed to present its case to the PWC so that the PWC can be educated as to the project and provide an informed recommendation to the ZBA.