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## MEMORANDUM

**DATE:** 7/26/07  
**TO:** Robert Mackie, P.E. – BETA Group, Inc.  
**FROM:** Mark S. Bartlett, P.E.  
Wayne C. Perry, P.E., LSP  
**PROJECT:** Queset Commons, Easton, MA  
**SUBJECT:** Technical Review Comment Response

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Norfolk Ram Group, LLC (NRG) is in receipt of the BETA Group, Inc, (BETA), memo dated July 20, 2007 regarding their technical peer review of the preliminary design for stormwater, water supply and wastewater associated with the above-referenced Project. Based upon our review we offer the following response to the comments provided in the memo. For ease of review we have listed the BETA comments, in italics, and provide our responses immediately after the comment.

### ***Stormwater Management***

#### **Comment:**

*The plans show roof runoff being routed to infiltration and storage systems (for irrigation) and parking lot and roadway runoff being collected in rain gardens. Based of NRSC soils information, these seem feasible measures. A key concern would be to verify high groundwater levels to make sure that at least a 2 foot clearance is maintained to the bottom of these system devices.*

*The plans will need to be developed to supplement the rain gardens for parking lot and roadway stormwater runoff collection, conveyance and treatment. Maintenance, snow storage, frozen ground and emergency overflow capabilities will need to be coordinated and addressed.*

*The site access road is shown crossing the intermittent stream that bisects the eastern and western portions of the site. Culverts will need to be designed to meet the latest Stream Crossing Guidelines and any wetland impacts will need to be mitigated.*

*After reviewing available data, it appears that stormwater management systems could be designed on-site for this project to meet current federal, state and local standards.*

*As this project progresses, detailed drainage design and calculations will need to be completed and submitted to show that the proposed development will not adversely impact downgradient properties or systems. The proponent will need to file a Notice-of-Intent and be required to meet the nine stormwater management standards as set forth in the Department of Environmental Protection Stormwater Management Policy.*

**Response:**

NRG will file a Notice of Intent for the Project, and at that time detailed drainage design and calculations will be developed and submitted to the Town. The stormwater management plan for the Project will meet standards set forth by the DEP Stormwater Management Policy.

**Water Supply**

**Comment:**

*The proponent has provided the above referenced memorandum summarizing two fire flow tests conducted by the Easton Water Department. This information indicates that there should be adequate quantity and pressure to serve both fire protection as well as domestic use.*

*When the project moves to final design, the proponent should conduct an independent fire flow test and provide detailed fire suppression and domestic use calculations.*

**Response:**

Prior to initiation of the final design of the water supply system NRG will coordinate with the Town Water Department to perform independent fire flow tests. Once this is completed NRG will develop final fire suppression and domestic use design calculations and submit them to the Town for review and approval.

**Wastewater Disposal**

Wastewater Disposal General Comments

**Comment:**

- 1. A MEPA ENF filing will be required in that the Project exceeds the wastewater thresholds established by MEPA (Proposed Flow > 50,000 gpd).*

**Response:** An ENF will be filed for the Project when the design is completed.

**Comment:**

- 2. DEP typically has jurisdiction over projects of this nature. Boards of Health typically have jurisdiction of systems with a design flow of less than 10,000 gpd, unless the Town has a specific Board of Health Regulation pertaining to WWTF's with a flow greater than 10,000 gpd.*

**Response:**

NRG and the Project Proponent met with the Board of Health in 2006 to introduce the project concept and to discuss intent to include a wastewater treatment plant as part of the project. Once the wastewater design is approximately 50 percent complete, NRG and the Project Proponent will meet again with the Board of Health to explain the proposed wastewater design and obtain their comments on that design.

**Comment:**

- 2. It should be noted that the Planning Board has requirements for package sewage treatment plants located within the groundwater protection district. Accordingly, this project will need to be coordinated with the Planning Board and Water Department. Planning Board involvement will follow later in the project.*

**Response:**

To date NRG and the Project Proponent have met with the Planning Board on two occasions to introduce the project concept and we have discussed intent to include a wastewater treatment plant. We have also met with Wayne Southworth, DPW Director to discuss the project concept and issues related to water supply and wastewater disposal; and have discussed water supply issues in a preliminary way with Jack Marsh, Water Superintendent. NRG and the Project Proponent have scheduled another meeting with the Planning Board for August 14, 2007, and expect to meet more times in the future as part of the Project planning and zoning overlay district process. We plan to meet again with the Easton DPW and Water Department officials once the wastewater design is approximately 50 percent complete. Because Section V.C.4. prohibits "Package sewage treatment plants" the Smart Growth Overlay District will need to include a provision to allow for the proposed wastewater treatment plant.

**Comment:**

- 3. The report does not state what the Infiltration/Inflow allowance is into the proposed sewer system. An allowance should be included into the flows for infiltration inflow, particularly if the collection system is substantial in length.*

**Response:**

The final design will include an allowance for I/I at 250 gpd/in.-mile. We currently estimate that the length of gravity sewers (including the Project and off-site service areas) will be about 2 miles of 8-in dia. sewer. This will result in an I/I flow rate allowance of approximately 4,000 gpd being added to the WWTF influent flow rate.

**Comment:**

- 5. The leach field is currently displayed in the Conceptual Design Report as a "drip disposal" system. From our subsequent discussions with the proponent, this is not correct. A conventional leaching system is anticipated. We suggest the proponent modify the report accordingly.*

**Response:**

A conventional, Title 5 type, leaching field system will be utilized in the final design of the wastewater system for disposal of treated effluent.

Wastewater Disposal Report Comments

Section 1.2 Background

**Comment:**

- 1. Pursuant to the June 15, 2007 Internal File Memorandum prepared by Wayne C. Perry, Norfolk Ram Group, LLC, regarding Wastewater Capacity, there appears to be capacity in the leaching system to handle an additional 63,000 gpd outside of the proposed Queset Development. What is the current position of the proponent with regard to bringing in flow from other neighborhoods outside the Queset Development?*

**Response:**

As noted in the NRG June 15, 2007 memo the Proponent has offered to include wastewater flows from other neighborhoods, such as the Easton Village needs area. It is recognized that to accomplish this a legal agreement between the Town and the Proponent will need to be developed. This agreement will provide the means by which all users of the sewer system can be charged an operation and maintenance fee. This user fee will be needed to provide the funds necessary to meet the monetary obligations of the “district” for the operation and maintenance and capital replacement fund as required by MADEP.

**Comment:**

*The proponent should identify which water supply well(s) the Zone II boundary is contributory to.*

**Response:** These wells are identified by the names Queset Brook Wells #1, 2 and 3.

Section 2.1 Collection System

**Comment:**

*1. At this time, there is no preliminary layout regarding the extent of a sewer collection system for the project. The collection system should be designed in accordance with TR-16 and MADEP recommendations. The following should be addressed in regards to a collection system:*

*The report suggests that there will be one, possibly two, submersible pumping stations.*

- *Where will the pump stations be located?*
- *Who will own and operate the pumping stations? (Refer to General Comment #2 above)*
- *Will the pumping stations be connected to the WWTF’s alarm system, which will notify operators in the event of alarms?*
- *The pumping stations should be equipped with backup power?*
- *The pumping stations should have odor control provisions?*

**Response:**

NRG will prepare final design plans in accordance with TR-16 and the MADEP “Guidelines for the Design, Construction, Operation and Maintenance of Small Wastewater Treatment Facilities with Land Disposal”. It is too preliminary to define pump station locations at this time. However the usual approach is to limit the number of required locations, and to locate them at gravity collection low points. Pump stations on the Project site will be owned by the Proponent, and we expect that alarm systems and backup power systems could be integrated with the WWTF system. Any off-site pump stations handling wastewater flows from other needs areas would be Town owned. Odor control provisions will considered as part of final design.

Section 2.2.1 Wastewater Characteristics

**Comment:**

*1. The proponent should give a more detailed breakdown of the flows and wastewater generation. What types of establishments are planned for the proposed 60,000 square foot retail/commercial area?*

**Response:**

See the attached February 26, 2007 memo from Mark Bartlett to Douglas King which was previously submitted. At this time the Proponent does not have further details beyond those described in the attached memo on tenants of the proposed commercial part of the development.

**Comment:**

*2. The design listed is based on Title 5 flows. What are the average, min, and max flows? What is the minimum flow at which the facility can actually operate? How is this project going to be phased/constructed? Will all connections be able to be made at once, or will the plant have to operate at a low flow for a period of time until all connections are made. Operating with too little flow can lead to operational difficulties at the WWTF.*

**Response:**

The Title 5 flows are considered the maximum daily flows for the Project. Average flows are approximately one half of this rate. Minimum flows have not been projected at this time. The Project will be constructed Phases. It is not known at this time what exactly will be included in each phase. However the WWTF will have two trains of treatment components. If necessary during start-up one train can be taken off-line. This will aid in the system's ability to properly treat the wastewater it receives. Further, the Zenon membrane system has the ability to be operated at extremely low flows and still maintain its required effluent quality. Moreover, the four existing establishments to be served by the WWTF could be connected in a very short period of time and therefore provide a good influent flow rate to the WWTF in a relatively short period of time.

**Comment:**

*3. Grease concentrations should be discussed. The project will connect the Stone Forge Restaurant, an assisted living facility with its own kitchen, a proposed 15,000 square foot food market, and 60,000 square feet of retail/commercial space (with the potential for food preparation facilities, and other restaurants). All of these facilities produce grease. Grease can accumulate in the pump stations. This will cause odors and operational problems with the pumping stations, if not properly and regularly removed from grease removal systems and grease traps. Grease can blind the membranes systems and disrupt the wastewater treatment efficiency of the system, as well as blind the screening equipment.*

**Response:**

The "Smart Growth District" will include sewer use regulations which will require that a maximum concentration of 100 mg/l of grease and oil be maintained in the wastewater discharged by all users to the district collection system. This is achieved by requiring facilities to have oil and grease trap tanks that are properly sized and maintained on a regular basis – and we believe that the existing facilities noted already have such tanks in place. The WWTF membrane treatment system and the rotary brush screen each can properly operate with an influent waste stream having this oil and grease concentration.

**Comment:**

*4. Has any sampling been performed at existing similar facilities to validate, and properly weight the expected influent concentrations? It is mentioned that the values are based on accepted published information? What are the sources of this information? No references have been given for this report.*

**Response:**

No sampling has been performed on any other wastewater. We believe that the mixture of establishments being served will result in a wastewater that is fairly “typical” to that which is documented in TR-16 and Ten States Standards. There will be a majority of residential flow mixed some restaurant flow and some commercial flow. We do not believe that there is any aspect of the proposed flow that will result in an “unbalanced” type of wastewater. Therefore typical characteristics, as provided in TR-16 and or “Wastewater Engineering” by Metcalf & Eddy Inc., should be representative of the expected wastewater for the proposed development.

Section 2.2.2 Effluent Characteristics

**Comment:**

*1. The proposed effluent concentrations presented are based on the assumption that the travel time of the effluent to the nearest water supply well is greater than two years. The effluent is required to meet the criteria established in MADEP’s “Interim Guidelines on Reclaimed Water” (IG’s). The IG’s criteria have a fecal coliform effluent limit. This limit should be listed.*

**Response:**

NRG will add the following fecal coliform limit for the WWTF effluent:

*“median of no detectable colonies/100ml over continuous, running 7 day sampling periods, are not to exceed 14/100 ml or 200colonies /100 ml.”*

**Comment:**

*2. What is the proposed phosphorus limit?*

**Response:**

There is no set phosphorus limit at his time. However, the membrane system as presently proposed should be able to provide an effluent with a maximum of 4 mg/l. It can be designed to remove much more but this parameter is not expected to be a requirement placed on the WWTF in the groundwater discharge permit to be issued by the MADEP.

Section 2.2.3 Treatment System Components

**Comment:**

*1. Verify that the proposed capacities of the flow equalization tanks are adequate. MBR systems typically should be equipped with an adequate to conservative preliminary treatment and flow equalization system, since the flow rate through the plant is limited by the flux rate through the membranes. Typically, MADEP requires the design capacity of the flow equalization tanks for systems between 40,000 and 100,000 gpd have a minimum effective liquid capacity of 33% of the design flow. The “effective liquid capacity” is the available fluctuating volume in the flow equalization tank. Does the level in the first flow equalization tank vary? If not, this would indicate the available equalization capacity only fluctuates in only one of the tanks, providing a maximum of 12,500 gallons of capacity, or about 3-hours of equalization capacity. This also would classify the first equalization tank as a trash trap or sludge storage tank.*

**Response:**

The level in the first tank does vary. The sizing of this equalization tankage is based on Zenon’s experience with this type of treatment system with similar wastewater generators. It should be

noted that because this Project will involve residential and commercial flow, equalization of the influent is not expected to be as critical as in a project comprised entirely of residential flow.

**Comment:**

*Is the rotary brush screen the appropriate screen type, if the influent wastewater has a higher than expected Oil & Grease concentration?*

**Response:** See response to Comment no. 3 under Section 2.2.1 Wastewater Characteristics.

**Comment:**

*3. Suspended growth systems typically require daily to weekly wasting of sludge to regulate the effectiveness and reliability of the treatment efficiency. The report does not discuss sludge disposal or other storage options, other than "ease of sludge removal" in the description of the flow equalization tank. Will there be a sludge storage tank? Will it be aerated? Sludge tanks are typically sources of odor.*

**Response:**

There is no separate sludge holding tank. The sludge is allowed to build up in the bottom of the bioreactor tanks where depth is monitored by the operator. When the depth reaches the pre-determined height it is then pumped by a septage hauler and taken to a licensed sludge receiving facility for disposal. It is anticipated that sludge wasting will occur 3 or 4 times per year.

**Comment:**

*4. Odor control provisions were not discussed, but should be included. What is the direction on the prevailing winds? Which abutting properties could be adversely affected by odors, should any occur? The proponent should consider connecting all tanks to an odor control system.*

**Response:**

Odor control requirement will be fully evaluated during final design of the WWTF and the necessary controls will be installed. Please note that all the proposed treatment system will be installed inside of a building, therefore the "prevailing winds" should not be a major factor in the control of odors at the Facility.

**Comment:**

*5. Figure 3 WWTF Schematic depicts the effluent disposal system to be comprised of "drip" systems. Please correct this and show the conventional leaching fields as discussed.*

**Response:** See response to comment No. 5 under "Wastewater Disposal General Comments".

**Comment:**

*6. The system is proposed to pump the treated wastewater to the new effluent disposal fields, as well as pumping a portion of the treated effluent back to the existing disposal fields at the Stone Forge, and at the assisted living facility. This will "save" on the area of new disposal field that will have to be constructed. Will the effluent pumping system include provisions that will allow the same quantity of flow that is currently permitted to be discharged at those site, so as not to alter the current groundwater elevations at each of the existing sites (i.e. will the system hydraulically allow 15,000 gpd (max) of treated effluent be pumped back to the assisted living*

*facility disposal field, and 10,000 gpd (max) back to the Stone Forge site)? Allocation of flows to the leaching fields should be addressed in final design.*

**Response:**

The allocation of flows back to the existing establishments will be addressed in the final design. The quantity of treated effluent sent back to each of the existing establishment will be same as their respective approved Title 5 design flows.

**Comment:**

*7. Since the system will connect an assisted living facility and a CVS with a pharmacy, has consideration been given to account for higher than expected concentrations of pharmaceuticals? Assisted living facilities and pharmacies typically have to dispose of excess or unused medications, and will often times end up down the toilet. This can lead to process upsets with the biological system. This is a matter that should be considered by the proponent.*

**Response:**

Presently there are no regulations for limitation of pharmaceuticals in wastewater. Again the “Smart Growth District” should have regulations to prohibit the disposal of excess unused medications “down the drain”. They should be disposed of as solid waste.

Section 2.2.4 Preliminary WWTF Layout

**Comment:**

*1. There is no sludge tank depicted [see previous BETA comment regarding Sec 2.2.3 (comment #3)].*

**Response:** See response to Section 2.2.3, No. 3.

**Comment:**

*2. The report mentions that an automatic electric generator system will be used in the event of power failure. What is the fuel source for the generator? If a diesel generator set is proposed, the proponent should keep in mind that the WWTF will be sited in a Zone II and storage/containment of diesel fuel should be considered and discussed. Additionally, generators store coolant and lubricant and should be equipped with liquid containment measures. Also, generators are typically programmed to automatically exercise on a regular basis. Will sound attenuation be equipped for the generator? Each pump station should be equipped with a generator.*

**Response:**

It is presently envisioned that natural gas will be the fuel source for the generators. Sound attenuation will be addressed during design. It is presently envisioned that some if not all of the pumping stations will be connected back to the generator at the WWTF. This will be ultimately determined during final design. All facilities will be designed with environmental best management practices for spill prevention and spill control.

**Comment:**

*3. Will the building size/type require special approvals or review from local officials (30x60 = 1800sf – use classification)?*

**Response:**

Other than the correcting for the aforementioned zoning prohibition, we do not anticipate that special approval or review will be required from Town officials for the WWTF building.

Section 3.1 Existing Field Investigations

**Comment:**

*1. This section describes the various test pits, percolation tests, and types of soils encountered on the properties that are proposed to connect to the system. The two most relevant sections for this review are the soils encountered at the Stone Forge (#10 Stone Forge), and at the assisted living facility (#7 Roosevelt). The soils were logged at the Stone Forge in December 2004, and indicate the determination of seasonal high groundwater elevations by means of redoxymorphic feature identification. The test pits at the assisted living facility were conducted in March 1993, and are not up to current standards. Since this project appears to have been designed in 1993, and has a flow of 15,000 gpd (> 2,000 gpd), was a groundwater mounding analysis ever performed at this site to properly site the leaching facility for the assisted living facility? What is its current groundwater separation? This should be verified with the original design information, and with the as-built plans to verify if re-using the field will allow for adequate separation to groundwater. The same comments apply to flow rate and groundwater separation for the Stone Forge.*

**Response:**

We do not know of any groundwater mounding analysis performed for 7 Roosevelt Circle. There is no known documentation on the present separation between the leaching field and groundwater at these leaching fields. However, when the final hydrogeologic study is performed, elevations of the leaching fields and the normal and high groundwater will be determined and evaluated. It should be noted that any effluent discharges at the existing leaching fields will be at the same rates originally approved for the leaching field of the particular establishment. Further, the quality wastewater being discharged at these systems presently is only septic tank effluent and what is proposed to be discharged will meet reclaimed water standards. Therefore, large separation to groundwater will not be as critical as it was when the system was originally approved for construction.

Section 3.2 Proposed Soil Investigations

**Comment:**

*1. The report mentions that the proposed percolation tests are proposed to be performed in the "C" layer of the proposed test pits. They should be performed in the most restrictive layer observed in the naturally occurring pervious layer.*

**Response:**

The percolation tests are to be performed in the most restrictive soils observed in the 'C' layer. We will not be installing the leaching system in either the "B" or "A" layers.

**Comment:**

*2. The proponent should coordinate the number of test pits and their locations with MADEP.*

Response: NRG will coordinate all field work with MADEP.

### Section 3.3 Preliminary Leaching Field Design

#### Comment

*1. The assumptions in regards to preliminary sizing and loading rates appear reasonable based on the information presented. The proponent proposes field verification/test pits and percolation testing, as well as hydrogeological testing will be performed to properly size and site the effluent disposal fields. [Also refer to BETA comments regarding section 4.7 (comment #1) and section 2.2.3 (comment #5)].*

Response: No response necessary.

### Section 4.2 Identify Existing Area Water Supplies

#### Comment:

*1. The project flow is 99,500 gpd. The plant/disposal fields are located within an approved Zone II. This means the plant must perform to the Interim Guidelines for Reuse standards. The Guidelines state that systems 100,000 gpd or greater that discharge into a Zone II should analyze, if it will alter the Zone II boundary. The IG's also state that if the proposed discharge (regardless of flow) will exceed 20% of the approved yield of the well drawing from that Zone II, an analysis must be made to determine if the effluent discharge will alter the boundary. This should be verified by the project team. The proponent is proposing to redirect 25,000 gpd of treated effluent back to the fields at the Stone Forge and the assisted living facility (10,000 + 15,000), making the total discharge into the Zone II 74,500 gpd. Also, the travel time of nitrates to the well should be calculated. If it is less than 2 years, then the effluent parameters become more stringent. This should also be verified in the Hydro-Geological Report, which should be conducted during the final design.*

#### Response:

As noted these issues will all be addressed in the Hydrogeologic Report to be developed and submitted with the groundwater discharge permit application.

### Section 4.7 Evaluate Data and Develop Final Report

#### Comment:

*1. Groundwater mounding impacts and their affect on Morse's pond should be evaluated in final design.*

#### Response:

Any effects on Morse's pond will be evaluated and documented in the Hydrogeologic Report to be developed and submitted with the groundwater discharge permit application.