



UNC  
ENVIRONMENT,  
HEALTH & SAFETY

The University of North Carolina at Chapel Hill  
Department of Environment, Health & Safety  
1120 Estes Drive Ext., CB# 1650  
Chapel Hill, North Carolina 27599-1650

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December 22, 2010

S. Jay Zimmerman  
RRO Aquifer Protection Supervisor  
DENR Division of Water Quality  
1628 Mail Service Center  
Raleigh NC 27699-1628

Subject: The University of North Carolina at Chapel Hill (UNC-Chapel Hill) Bingham Facility  
Pump and Haul Permit No. WQ0034607

Dear Mr. Zimmerman:

In accordance with the subject permit, I am writing to provide the project schedule on the future wastewater activities as required by Condition I.2. The University is also including a revised project determination on future wastewater activities (Condition I.1). The schedule and revised project determination address the University's intent to update the existing advanced secondary wastewater treatment facility with a capacity of 3500 gpd to support the existing buildings. No building expansion is planned. This updated wastewater system is anticipated to serve a re-purposed facility that will accommodate only small animal research (i.e. caged rodents) and temporary or quarantine housing for animals that are maintained under conditions that allow their waste to be captured and removed from the site as dry waste. The 3,500 gpd capacity wastewater system will serve only on-site staff, building toilets, sinks, showers, hose-down of rooms, the cage washers and boiler blowdown water.

Please contact me at 919-843-5913 if you have any questions or comments.

Sincerely,

Mary Beth Koza  
Director, Environment, Health and Safety

cc: Larry Daw  
Tom Konsler, Orange County NC Environmental Health Division

# Proposed Wastewater System Improvements (Revised)

## UNC-Bingham Facility

December 21, 2010

### DESCRIPTION OF PROPOSED SYSTEM IMPROVEMENTS

#### 1. Existing "Domestic" Wastewater Gravity Sewer Collection System Improvements

UNC proposes to construct approximately 300 lf of new gravity sewer to connect floor drains in Bingham Building #3 (originally connected to the Animal Wastewater sewer collection system) to the existing "Domestic" sewage collection system. In addition, UNC will re-construct approximately 500 lf of gravity sewer line to a deeper elevation, re-lay one 300' section of existing 8" gravity sewer (because it has settled since construction and accumulates solids) and install (6) new sewer manholes. These "Domestic" gravity sewer improvements will allow UNC to collect all sanitary wastewater generated from existing buildings on-site and convey the flow to the *refurbished* "Domestic" wastewater treatment system (proposed improvements described in subsequent sections).

#### 2. Existing "Domestic" Wastewater Treatment and Spray Irrigation System Improvements

UNC proposes to refurbish the existing "domestic" wastewater treatment system (WWTF) for an average daily flow capacity of 3,500 gpd and to demolish the existing 1.6 MG "animal" effluent storage basin and reconstruct a new 870,000 gallon, clay-lined wet weather storage basin in the same location. In addition, UNC will refurbish the existing "animal" effluent irrigation pumping system and construct a new, dedicated 5-acre secondary effluent sprayfield so as to comply with requirements of North Carolina Administrative Code, Title 15A- "Department of Environment and Natural Resources Division of Water Quality", Subchapter 2T- "Waste Not Discharged to Surface Waters", Section .0500- "Wastewater Irrigation Systems". Generally, the proposed improvements include the following:

- a. Pump-out and clean the existing 8,000 gallon septic tank and duplex effluent pumping station.
- b. Clean, test and refurbish the existing *Advantex* biological process and pump out residual wastewater and biosolids from the process tanks.
- c. Pump-out, clean, and test the existing duplex *Advantex* recirculation pump station.
- d. Replace the existing low-pressure UV disinfection reactor with a new, below-grade 1,500 gallon, baffled chlorine contact tank. Construct a new sodium

hypochlorite chemical storage and feed system (all tanks, equipment and piping to be heat traced and insulated).

- e. The existing effluent flow measuring system will be relocated (if possible) to the necessary hydraulic grade and physical position downstream of the new chlorine disinfection process. The flow measuring system will then be re-wired and re-configured in a new panel with local readout (both instantaneous flow rate and totalized flow). In the event the existing system cannot be relocated without damaging the flume (which was cast-in-place in a concrete manhole), then a new flume and flowmeter will be installed at the correct line and grade with a new panel and local readout.
- f. Construction of a new secondary effluent pumping station to replace the existing wet weather basin/floating pump system. The new secondary effluent pumping station will consist of a 6' diameter wetwell, two constant speed submersible pumps on slide rails, new level-based pump control system and new duplex control panel with Operator Interface.
- g. Testing, repair and conversion of the existing "animal" effluent forcemain for use as the new secondary effluent forcemain. The existing forcemain will connect the new secondary effluent pump station to the re-constructed wet weather storage basin.
- h. Demolition of the existing 1.6 MG "animal" effluent storage basin and reconstruction of a new 870,000 gallon wet weather storage basin (in the same location) for use with the new 3,500 gpd wastewater system. This work will include demolition and removal of the existing influent and effluent piping, removal of the damaged synthetic liner from the existing fill embankments (but leaving the portion intact covering the bottom of the basin), and excavation and stockpiling fill material from the existing earthen embankments surrounding the wet weather basin. All embankment fill soil will be temporarily stockpiled on-site for use in the re-construction of a new 870,000 gallon (248 days storage capacity) wet weather storage basin at the existing wet weather basin site. The new 870,000 gallon wet weather basin shall be constructed in accordance with 15A NCAC 02T.0505 re-using on-site material to construct structurally-stable earthen embankments. The new basin will be lined with a 12" minimum depth of compacted bentonite clay to achieve a hydraulic conductivity of no greater than  $1 \times 10^{-6}$  centimeters and stabilized to prevent erosion. The completed basin will have a minimum freeboard of 2'-0" as required.
- i. Refurbishment and retrofit of the existing "animal" effluent irrigation pumping station to convey stored secondary effluent from the wet weather basin to the new secondary effluent low-rate land application system. This work will include

replacement of pumps, piping, instrumentation, electrical and control panels. The existing pump building will be reused without modification.

- j. Refurbishment of the existing "medium" wet weather storage basin for use as a "normally dry" emergency upset basin. This will involve removing the existing synthetic liner and constructing a stabilized bentonite clay liner with permeability of less than centimeters per second per 15A NCAC 02T.0505 (f). Although not required by regulation for secondary effluent systems, the availability of an emergency upset basin will provide the Operators with added flexibility to insure non-complying effluent does not get pumped into the wet weather basin for land application. Permanently decommission the existing "small" effluent wet weather storage basin by first removing the existing liner, piping and equipment. Then, the constructed embankments will be systematically pushed back into the excavation and compacted in 12" lifts until the basin has been fully backfilled, regarded and blended with the surrounding grade.
- k. Construction of a new 5 - 6 acre secondary effluent land application system with capacity for up to 3,500 gpd (annual average daily flow). The system will generally consist of buried irrigation transmission mains, buried manifold piping systems and buried laterals. Each lateral will be constructed with multiple risers, each equipped with a conventional impact-style irrigation nozzle. A portion of the new sprayfield will be constructed in the area previously utilized for disposal of treated "animal" wastewater effluent.

### 3. Decommissioning the Existing "Animal" Gravity Sewer Collection System

UNC proposes to permanently decommission the previously constructed "animal" wastewater gravity sewer in its entirety. A portion of this sewer line was constructed within the NCDENR 100' setback from the existing Bingham potable water supply well and must be removed in its entirety. Decommissioning the remainder of the "animal" wastewater collection sewer system will include removing the existing cast iron frames and covers and top precast concrete riser section from *each* existing animal wastewater system manhole. Each of these manholes will then be filled to a depth of 3' with flowable fill (including the entire invert channel). Upon completion, each structure will be backfilled and compacted in 12" lifts to the surface. The existing "animal" wastewater grinder pumping station will also be decommissioned by removing influent and effluent pipe connections and removing the pre-fabricated FRP station from the ground. After permanently capping the buried pipe connections, the excavation shall be backfilled and compacted in-place with clean fill.

#### 4. Decommissioning of the Existing "Animal" Wastewater Treatment Facility

UNC proposes to permanently decommission the previously constructed "animal" wastewater treatment system (including the Capetown package treatment system, the deep bed denitrification filtration system, the effluent flowmeter and UV disinfection system) in its entirety. This effort will entail pumping-out the liquid contents and the residual biosolids from all existing tanks into mobile tank trucks. The process tankage will then be pressure cleaned and the residual washwater will be combined with the other wastewater in the mobile tank trucks. All of the wastewater/biosolids (and filter sand) will be removed from the wastewater tanks and filters and then the residuals will be transported (via privately contracted wastewater hauler) to the OWASA Mason Farm Wastewater Treatment Facility for disposal. (Note: wastewater and biosolids removal and disposal is currently permitted as part of UNC's active Pump and Haul Permit No. WQ0034607. Upon completion of residuals removal, soil will be excavated away from the outside of the buried steel tank structures, exposing buried pipe connections. Buried pipes and conduit will then be disconnected from the tank and permanently capped. Next, the concrete ballast (installed during construction to prevent tank flotation) will be demolished and the anchors removed. Then, all accessory metal (grating) railings, toe plates, and electrical panels will be removed. A crane will then be used to remove the various tank segments from the ground and to load them onto trucks for disposal/sale as surplus material or scrap metal. Lastly, the existing above-grade high density polyethylene (HDPE) chemical storage tank, pumps, electrical panels, emergency generator and associated appurtenances will be removed from the site for resale or disposal.