Dewberry & Davis LLC
ENGINEERS • PLANNERS • SURVEYORS
8401 Arlington Boulevard • Fairfax, Virginia 22031-4666
Voice 703-849-0100 www.dewberry.com

December 30, 2002

Mr. Zaman Nouri
Loudoun County General Services
211 Gibson Street, N.W.
Suite 123
Leesburg, VA 20176

RE: Storm Water Management Retrofit Final Report
Loudoun County Vehicle Maintenance Center
Open-End Architectural and Engineering Services
Loudoun County Contract No. QQ-00720

Dear Mr. Nouri,

Per our contractual agreement as described in our proposals dated May 15, 2002 (Task 4 only) and June 18, 2002, Dewberry & Davis LLC (Dewberry) has completed a hydrologic analysis, an adequate outfall analysis, a preliminary design of retrofits, bathymetric survey, and an evaluation of environmental and floodplain impacts of the two existing storm water management (SWM) facilities. This final report is submitted to fulfill Task 5 of the June 18, 2002 proposal. A draft report, dated September 11, 2002 was submitted for County review. In a telephone conversation on December 9, 2002, the County stated that there were no comments regarding the technical aspects of the report. This final report includes, as attachments, an electronic copy of the bathymetric survey, supporting calculations and models, and drainage area exhibits.

TASK 1: HYDROLOGIC ANALYSIS

The original design of the Loudoun County Vehicle Maintenance Center (LCVMC), which is located east of the Leesburg Municipal Airport, included two SWM facilities. These two SWM facilities were designed to control the storm water runoff from the LCVMC in its ultimate configuration. Since the original design, construction of a new parking area for school buses, east of the LCVMC, and the Loudoun County Juvenile Detention Center (LCJDC), south of the LCVMC, has taken place within the watersheds of the SWM facilities. Additional plans for construction of the Loudoun County Adult Detention Facility (LCADF), the Loudoun County Public Safety Building (LCPSB), and an expansion of the Loudoun County Fire and Rescue Training Center (LCFRTC) within the watershed of Pond B have been developed. In the original design of the two SWM facilities, none of these additions was considered in the ultimate condition. Therefore, an assessment of the adequacy of the SWM facilities to control the storm water from the revised ultimate site condition is required. The information used in this analysis is based on as-built drawings provided by the County, discussions between Dewberry and the County, and the bathymetric survey (Task 4 from the June 18, 2002 proposal). The bathymetric survey was performed by Dewberry in August 2002, and was limited to the bathymetry of the wet pond, survey of the primary spillway and channel of the wet pond, and survey of the primary spillway of the dry pond.

Pond A is the northern pond and is a dry SWM facility. When the water level is at the crest of the riser, Pond A has a surface area of approximately ½ acre. It appears that Pond A was constructed to

control runoff from the eastern and northern portion of the site, which has a land use limited to parking. The volume of Pond A was developed from contours shown on the Parking Lot Expansion plans. Pond A is impounded by an earthen embankment having an approximate length of 470 feet and a maximum height of approximately 10 feet above the downstream toe. The embankment has a top width of approximately 15 feet. The upstream (inside) slope of the embankment is on the order of 3 horizontal (H) to 1 vertical (V). The downstream (outside) slope varies from about 2 H to 1 V along the middle portion to 2.5 H to 1 V near the ends of the embankment. A riprap-lined emergency spillway (ES) was constructed through the embankment near the right (south) end. The ES has a bottom width of 30 feet and crest elevation of 327.5 feet, which is 1.8 feet below the low point (elevation 329.3 feet) on the dam crest. The principal spillway (PS) is a 90-foot long, 18-inch diameter corrugated metal pipe (CMP) conduit that penetrates the embankment under the ES. The upstream (inlet) end of the conduit connects to a 12-inch diameter vertical riser, which has a crest elevation of 326.71 feet. The as-built plans show a Water Quality (WQ) outlet with three (3) one-inch diameter holes at the bottom of the riser. Because the location and size of the WQ orifices could not be field verified due to riprap at the bottom of the riser, it was assumed that the WQ outlet elevation is at the center of the 18-inch outlet pipe. Storm water is directed into Pond A at the northwest corner by a 36-inch diameter reinforced concrete pipe (RCP) that discharges into a 120-foot long open channel that leads to the pond and at the southwest corner by a 24-inch diameter RCP that discharges directly into the pond.

Pond B is the southern pond and is a wet SWM facility, having a surface area of approximately 1½ acres. It appears that Pond B was constructed to control runoff from the western and southern portion of the site, which includes the maintenance buildings, the fueling and loading bays, and a portion of the parking area. The storage volume within Pond B is based on contours developed from a bathymetric survey and from the contours shown in the plans for the LCADF. Pond B is impounded by an earthen embankment having an approximate length of 555-feet and a maximum height of approximately 11 feet above the downstream toe. The embankment has a top width that varies from 12 to 15 feet. The upstream slope of the embankment typically is on the order of 2 H to 1 V, although locally it is steeper. The downstream slope typically is on the order of 3 H to 1 V or flatter, but locally is as steep as 2 H to 1 V. The principal spillway is a 115-foot long, 33-inch diameter conduit that penetrates the embankment under the emergency spillway. The conduit is RCP where it passes under the main part of the embankment. However, according to the as-built plans, the RCP connects to a CMP that extends beyond the downstream toe of the main embankment where it is covered with soil mounded over the pipe. The upstream end of the principal spillway pipe connects to a 15-inch riser pipe with a crest elevation of 322.00 feet, which is the normal water surface elevation. A 35-foot wide riprap-lined emergency spillway was constructed through the embankment near the middle at 324.28 feet. Storm water is directed into Pond B by several open channels (drainage swales) that discharge into the pond along the west side from the northwest, west and southwest. The as-built plans show a WQ outlet with seven (7) one-inch diameter holes; however, according to information provided by the County during the site visit, the pond has been wet since construction.

There are several possible reasons for the pond having a permanent pool:

1) The WQ outlet may not have been installed.
2) The WQ outlet may have been covered during construction and not removed.
3) The WQ outlet may have become clogged.

Ultimate site conditions for the purposes of this evaluation include existing and future development. Existing development includes the LCVMC, the LCVMC parking lot expansion, and the LCJDC. Future development includes the LCADF, the LCPSB, and LCFRTC expansion in their fully built conditions. The runoff curve number (RCN) and the time of concentration (t_c) for each pond were determined using the information and data provided by Loudoun County. Pond A collects 13.4 acres with a RCN of 89 and a t_c of 6.4 minutes. Pond B drains 50.6 acres with a RCN of 91 and a t_c of 14.3 minutes. The table below summarizes the inflow and outflow of each pond under ultimate conditions.

	Pond A		Pond B	
Storm Event	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Inflow (cfs)	Peak Outflow (cfs)
2-yr	41	2	144	36
10-yr	69	24	234	132
100-yr	105	86	348	258

TASK 2: ADEQUATE OUTFALL ANALYSIS

The downstream channels of the SWM facilities were analyzed to ensure compliance with Minimum Standard 19 (MS-19) as stated in the Virginia Erosion and Sediment Control Handbook. MS-19 requires manmade channels be designed to convey the 10-year flow within the banks and have non-erosive velocities for the 2-year flow. MS-19 requires natural channels to convey the 2-year flow within the banks and have non-erosive velocities for the 2-year flow.

Pond A

Pond A outfalls through an 18-inch CMP on a 2.78% grade. The existing outfall does not have a defined channel downstream of the outfall pipe to the 100-year flood plain of the large receiving stream. Because there is no existing outfall channel, the conveyance is not considered adequate. Therefore, a channel will need to be constructed from the outfall pipe to the 100-year floodplain of the larger receiving stream to meet MS-19 (10-year flow, 2-year velocity). There is insufficient field information to design an adequate conveyance channel. Additional survey of the downstream area will be needed to develop the final design of the new channel. The channel should be designed to handle the 10-year storm discharge of 18 cubic feet per second (cfs), the expected flow rate after the recommendations listed in Task 3 below have been implemented.

Pond B

Pond B discharges through a 33-inch CMP on a 1.39% grade. The ultimate design 2-year storm discharges 39 cfs at a velocity of 7.5 fps from the pipe, based on the retrofitted model described below in Task 3. The configuration of the existing channel downstream of the Pond B outlet pipe was taken from field observations. Based on the observed condition, the retrofitted conditions flow will remain in the channel banks and will have a non-erosive velocity of 4.2 fps for the 2-year storm.

TASK 3: PRELIMINARY DESIGN OF RETROFITS

As stated above, data is limited to the information provided by the County and from the bathymetric survey of Pond B. No supporting engineering calculations were provided for the original design of the two ponds. Because the amount of detention provided in the original

design is not known, it was not possible to determine exactly how much detention occurs within the ponds for ultimate build-out relative to existing conditions. In the absence of any information of the detention provided by the ponds, the design outflow associated with the retrofits is comparable to those flow rates that would exist if development occurred and the ponds were not modified. As seen from the table in Task 1, peak flow rates are significantly reduced for both ponds for all storm events. The retrofit analyses that follow address water quality.

Pond A

For a retrofit recommendation, one potential improvement was evaluated. The flows associated with the retrofit were compared to those that would occur if the existing ponds were not modified and development occurred in the watersheds. The inflow to the pond in this alternative was determined in Task 1. According to the Virginia Erosion and Sediment Control Handbook, the existing pond does not provide adequate water quality controls for the existing parking lot expansion of the LCVMC. A Retention Basin II BMP was selected to address this issue due to soil conditions and available area for the pond. The suggested improvements for Alternative 1 provide appropriate BMP treatment for the existing parking lot expansion and retain treatment for the original LCVMC.

Storm Event		Existing Pond	Alternative 1
2-yr	Water Elev. (ft)	326.96	326.79
	Discharge (cfs)	2	8
10-yr	Water Elev. (ft)	327.89	327.57
	Discharge (cfs)	24	18
100-yr	Water Elev. (ft)	328.51	328.19
	Discharge (cfs)	88	62

According to the Virginia Stormwater Management Handbook, Ponds A and B receive water from a fleet storage area, which is classified as a storm water hotspot due to increased hydrocarbon loadings. An impervious liner may be needed due to the proximity of the ground water. This should only affect Pond A because Pond B has standing water year round, so soil permeability may not be an issue. It is recommended that additional soil borings be performed in the bottom of Pond A to accurately determine ground water location and soil permeability.

The recommended improvements that follow list the detailed design retrofits necessary for Pond A. These recommendations are in addition to those stated in the geotechnical analysis that follows. For this pond, no changes to the dam height (crest elevation of 329.3 feet) and emergency spillway configuration (30 feet wide at elevation 327.5 feet) are recommended.

Alternative 1-Recommended Improvements:

- Excavate about 1,600 cubic yards of material from the bottom of the pond.
- Remove the existing riser and replace it with a standard VDOT SWM-1 riser with a 0.5-foot x 2.5-feet middle orifice at elevation 325.25 feet and crest elevation of 326.70 feet.
- Add a drain pipe to the SWM-1 riser.
- Add a WQ orifice pipe with an invert at elevation 324.48 feet.
- Add a sediment forebay with approximately 2,500 cubic yards of excavation.
- Add new structures to direct the storm drains to the sediment forebay.

- Grade a channel to meet MS-19 (10-year flow, 2-year velocity) from the outfall pipe to the 100-year floodplain of the larger receiving stream.

The list below describes what will be necessary for the final design phase of this project.

Final Design Requirements:

- Survey the existing storm drain and pond to verify existing conditions.
- Verify capacity and hydraulic grade line of existing storm drain.
- Perform soil borings to determine ground water and soil characteristics to determine need for a clay liner.

Pond B

For retrofit recommendations, one alternative of potential improvements was evaluated and compared the result to leaving the existing pond in the ultimate conditions as shown in the analysis performed in Task 1. The inflow to the pond in this alternative is as determined in Task 1. According to the Virginia Erosion and Sediment Control Handbook, the existing pond does not provide adequate water quality controls for the proposed development within the watershed of the SWM facilities. The existing pond is acting as a Retention Basin II BMP, but does not meet the water quality requirements because the wet storage volume is approximately 1.6 acre-feet below the minimum required storage volume. The suggested improvements will provide required wet storage volume along with additional detention volume.

Storm Event		Existing Pond	Alternative 1
2-yr	Water Elev. (ft)	324.65	323.90
	Discharge (cfs)	36	39
10-yr	Water Elev. (ft)	325.38	325.11
	Discharge (cfs)	132	63
100-yr	Water Elev. (ft)	326.04	325.92
	Discharge (cfs)	258	193

The recommendations below list the detailed design retrofits necessary for the pond. These recommendations are in addition to those described in the geotechnical analysis.

Alternative 1-Recommended Improvements:

- Provide an access road for maintenance.
- Excavate about 3,411 cubic yards of material from the bottom of the pond.
- Fill in the low spot in the northeast corner of the embankment to elevation 325.30 feet, which currently allows the 50-yr storm to leave the pond in a location other than the emergency spillway.
- Remove the existing riser and replace it with a modified VDOT SWM-1 riser with four (4) middle orifices 0.75 feet x 1.5 feet at elevation 321.38 feet and crest elevation of 323.50 feet.
- Add a drain pipe to the SWM-1 riser.
- Raise the emergency spillway to 325.00 feet with a bottom width of 50 feet.
- Raise the crest of the embankment to elevation 327.00 feet to provide one foot of freeboard during the 100-year event. Re-grade the embankment to have

3 horizontal to 1 vertical side slopes as recommended in the Virginia Stormwater Management Handbook.

- Provide sediment forebays for the outfalls from the proposed LCADF and the existing LCVMC.

The list below describes what will be necessary to continue to the final design phase of this project.

Final Design Requirements:

- Obtain final design plans for the proposed facilities.
- Consider utilizing additional BMP's upstream of the pond to reduce the required WQV and therefore minimize the required pond volume.
- Determine the final conditions land use without using a typical commercial area runoff curve number. This would involve obtaining more accurate field data to verify the curve numbers used (i.e. possibly a field visit or an aerial survey to verify ground cover assumptions).

GEOTECHNICAL EVALUATION

The purpose of this geotechnical review is to make a preliminary evaluation of the condition of the embankment dams and the materials used for construction of the embankments, and provide preliminary recommendations for corrective measures and/or further investigation, if needed.

Field Observations

A site visit by a geotechnical engineer was made on July 24, 2002. Weather conditions were cloudy, warm and humid. The field observations follow:

Pond A

The Pond A embankment was observed to be generally overgrown with vegetation, especially within the emergency spillway (ES) area. The ES area was covered with small trees, bushes and a thick undergrowth of briars and weeds; this area was not passable by casual walking. The riprap in the ES area was visible on the control section but not down the outside slope of the dam. The surface of the remaining portion of the embankment was covered with predominantly tall weeds, grass and some vines on the lower part of the outside slope. The dry pond area was observed to also be largely overgrown with small trees, bushes and other vegetation in the area immediately upstream of the embankment. It was observed that the crest of the embankment next to the right (south) side of the ES has been used as a disposal area for yard waste and other spoil materials.

No tension cracks or notable sags or depressions were observed in the crest. No slumps, slides or other signs of instability were observed in either the inside or outside slopes, but inspection for these conditions was severely hampered by the thick vegetation. The surface soils of the embankment appeared to consist of predominantly sandy silts and silty sands. No erosion was observed on the embankment dam. The riser at the inlet end of the principal spillway (PS) was observed to have filter stone around it. The riser appeared to be functional. No obvious sinkholes or deep depressions were observed in the embankment along the alignment of the PS conduit through the embankment. The discharge end of the PS conduit was not observed due to difficult access presented by the thick vegetation.

Erosion was observed at the lower end of the inlet channel that leads from the 36-inch diameter storm water pipe to the northwest corner of the pond. A stabilization mat in the channel was undermined by back-up of water in the channel to a height above the top edge of the mat on the channel side slopes. The back-up appeared to be due to a berm of riprap across the channel near its mouth where the channel discharges into the pond. Although the drawing of the area furnished by the County depicts check dams across the channel well up-gradient of the channel mouth, no check dams are shown at the channel mouth where the riprap berm was observed. The channel appears to be deeper than originally designed. Conditions at the discharge end of the 24-inch diameter storm water pipe at the southwest corner of the pond appeared to be generally satisfactory, although some erosion was noted within and around the riprap apron at the end of the pipe.

Pond B

The Pond B embankment was observed to be not as overgrown with vegetation as the Pond A embankment. However, the ES area at Pond B was covered with woody vegetation, such as small trees and bushes, and a thick undergrowth of briars and weeds. The riprap in the ES area was visible on the control section but not down the outside slope of the dam. The surface of the remaining part of the embankment was covered with predominantly weeds and grass. The difference in vegetation type and density between the ES area and the rest of the embankment suggests that most of the embankment is mowed occasionally, but not in the riprap-lined spillway control section. A statement was made by a County representative that the embankment is not mowed. The wet pond area was observed to also be open and relatively free of vegetation in the fringe around the perimeter.

No tension cracks or notable sags or depressions were observed in the crest. No slumps, slides or other signs of instability were observed in either the inside or outside slopes of the Pond B embankment. Inspection for these conditions was generally easier than at Pond A, due to the thinner growth of vegetation. The left (north) abutment area appeared in the field to be somewhat lower than the crest of the embankment. Review of the topography shown on the furnished drawing shows that area to be perhaps 1.5 ± feet lower than the crest of the embankment. The surface soils of the embankment appeared to consist of predominantly sandy silts and silty sands. No erosion was observed on the embankment dam. The upstream slope was observed to be well vegetated and generally free of significant wave erosion. No seepage or wet areas were observed along the outside toe of the embankment. The riser, which was in the water, was generally not observable. No obvious sinkholes or deep depressions were observed in the embankment along the alignment of the PS conduit through the embankment. The discharge end of the PS conduit was observed to cantilever out over what appeared to be a riprap-lined apron. The apron appeared to be in satisfactory condition with no noticeable erosion within it or downstream. The discharge end of the 33-inch diameter CMP was obscured by thick vegetation around it, but it appeared to be in satisfactory condition and had only a trickle of water flowing from it. No seepage from around the pipe was evident.

Some minor erosion was observed around a riprap apron at the end of the inlet drainage swale from the northwest. The other two inlet swales, from the west and southwest, were observed to be well vegetated and to cross low ground before reaching the pond.

Evaluation and Recommendations

Both the Pond A and Pond B embankment dams appear stable, although inspection for potential adverse conditions was generally hampered in some areas due to the thick vegetation, particularly at Pond A. Nevertheless, the slopes steeper than about 2.5 H to 1 V (i.e., primarily middle portion of Pond A dam outside slope and Pond B dam inside slope) may not have conventional safety margins against slope failure, even though they are relatively low. In the absence of data concerning the embankment soils, assumed shear strength parameters for sandy silt/silty sand embankment soils should not exceed the following:

- effective angle of internal friction (ø') = 32° (or even 30° if there are no records of compaction during construction)
- effective cohesion (c') = 0

Preliminary calculations using "infinite slope" analysis and assuming ø' = 32° show that the factor of safety (FS) against shear failure of the slopes steeper than 2.5 H to 1 V is less than the conventionally accepted FS of 1.5 for steady-state conditions. However, potential failure surfaces with lower than conventionally accepted FS under the above shear strength parameter assumption are usually shallow (less critical), rather than deep-seated (more critical). Such shallow potential failures are more of a maintenance issue than a concern for massive failures that could breach the embankment dams. Therefore, no modification to the slope geometry appears warranted at this time for these embankments, which appear to have low hazard potential.

It is not known whether the Pond A and Pond B embankment dams were constructed with clay cores or cutoff trenches. However, based on the apparently successful function of both the dams since their construction and no obvious evidence of seepage or piping (internal erosion), the dams appear to have satisfactory water tightness under the low head service conditions for which they were designed.

The low area around the left (north) end of the Pond B embankment dam will serve as a secondary emergency spillway. This is not an issue unless flow velocity through that area exceeds that permissible for the type of vegetation covering that area.

The mound over the Pond B PS conduit, which underlies the ES, will cause flow from the ES control section to split into two more constricted and concentrated flows along each side of the linear mound. This may or may not be an issue depending on the velocity of the constricted flows over the vegetative cover in those areas.

Based on the observations and evaluations of the geotechnical engineer, the following recommendations are offered:

Pond A

- Make one test boring to a depth of 15 or 20 feet near the north edge of the ES to verify the embankment soil conditions and check the foundation soil conditions. Continuous split-spoon sampling should be performed in the boring and at least one relatively undisturbed (Shelby-tube) sample of any soft or loose material encountered should be obtained if possible, for potential quantitative laboratory testing. A geotechnical engineer should evaluate the data obtained. If the subsurface conditions

revealed are much worse than assumed in the above preliminary evaluation, more detailed analyses of stability, seepage and piping potential should be performed based on quantitative laboratory test results, and remedial measures developed and implemented, depending on the results of the detailed geotechnical analyses.

- Clear small trees, bushes and other vegetation from the ES area, from around the discharge end of the PS conduit, and from the pond area. Keep these areas clear by periodic maintenance (annually at a minimum).

- Mow the crest and slopes of the embankment dam to keep them free of a tall growth of weeds and grass. Maintain these areas by periodic mowing (at least twice a year, at middle and end of growing season).

- Repair eroded area in inlet channel at northwest corner of the pond, by replacing the stabilization mat to higher on the channel side slopes and removing the riprap berm at the mouth of the channel. The riprap may be repositioned to form a blanket at the mouth of the channel, with top of riprap blanket matching the bottom grade of the channel.

- Reposition shifted riprap at the riprap apron below the discharge end of the inlet pipe at the southwest corner of the pond, and repair eroded areas around the riprap apron.

Pond B

- Same as 1 above.

- Same as 2 above, except the Pond B area does not need to be cleared.

- Same as 3 above.

- Repair eroded riprap apron at discharge end of inlet swale from the northwest.

- Evaluate potential flood flow velocities in the split flow paths below the ES and in the low area around the left end of the dam to check whether they are excessive for the type of vegetative cover in those areas. If the velocities are excessive, develop and implement remedial measures to prevent erosion in these areas during flood flows through these areas.

TASK 4: ENVIRONMENTAL AND FLOODPLAIN PERMITTING REQUIREMENTS

- **Clean Water Act**

Regulations established under the Clean Water Act, Sections 401 and 404, established federal regulatory authority over waters of the United States. In Virginia, two primary agencies regulate waters and wetlands using these statutes. These two agencies are the U.S. Army Corps of Engineers (ACOE) and the Virginia Department of Environmental Quality (DEQ). As waters and wetlands appear to exist on site, it is recommended that a delineation of jurisdictional waters of the U.S. be conducted as soon as possible. After the delineation has been completed, the permitting requirements can be evaluated for the proposed projects.

Upon visual inspection, there appears to be jurisdictional waters including wetlands located within Pond A. The area appears to be fairly small, and as such, proposed changes to the pond will likely qualify for a nationwide or other general permit from the ACOE and the DEQ. Pond B, however, appears to be wholly jurisdictional with wetlands and waters draining to it. The construction of the sediment forebays to Pond B and the construction of the Adult Detention Facility will likely require a permit. The wetland delineation will assist with determining which types of permits will be necessary to obtain for the proposed wetland disturbance.

For construction of the recommended improvements to Pond A, the pond will need to be drained, according to the Clean Water Act. This is allowable so long as it is temporary. An appropriate plan of action would be:

1) Drain the pond by pumping over the berm. The pumping must be performed so that sediment in the bottom of the pond does not become suspended and affect the water conditions downstream.
2) Remove the required amount of material from the pond bottom and stockpile on-site.
3) Replace the riser structure.
4) Allow the pond to fill.

According to the Clean Water Act, the soil excavated from the pond must be stockpiled in an area to allow it to dry. Because the soil must be left in the open, it must be protected by erosion control measures. After the soil has dried, if the material is suitable, it can be used to bring the berm to the recommended elevations as described in Task 3.

- **Virginia Pollutant Discharge Elimination System**

A VPDES permit for construction activities will be necessary for the construction of the Adult Detention facility because more than five acres of land will be disturbed. (As of December 4, 2002, all sites disturbing one or more acres will require a VPDES permit for construction activities.) Therefore, it recommended that the improvements described in Task 3 above to Pond B be made in conjunction with the construction of the LCADF and LCPSB. The improvements to Pond B will address the VPDES permit requirements for the runoff from both sites during construction.

The improvements to Pond A could be added to the LCADF design plans but is not necessary because the improvements to Pond A are not related to the construction of that site. If the improvements to Pond A are made using a stand-alone set of plans, a VPDES construction permit may not be required less than one acre is disturbed.

Another VPDES permit issue could be the industrial classification of the maintenance facility. This type of permit is necessary for industrial sites with certain types of maintenance facilities such as gasoline fueling pumps, petroleum storage, vehicle storage facilities, etc. If the site does not already have a permit, a VPDES permit application should be made for industrial activities at the facility. If the permit application has already been made, a modification to the Storm Water Pollution Prevention Plan will be necessary to include the proposed changes to the ponds and the LCADF.

- **Floodplains**

  According to Loudoun County's floodplain mapping, the large stream that receives the site's drainage is not a studied floodplain. However, according to the Loudoun County Zoning Ordinance, Section 4-1505, storm water management improvements in watersheds less than 640 acres (1 square mile) in size are permitted within the floodplain. A floodplain study should not be necessary for the proposed improvements.

- **Other Permits**

  Another permit that may be necessary is through the Federal Aviation Administration (FAA). Due to the proximity of the Leesburg Airport, the airport must be contacted to inform them of the proposed changes to the wet pond and the conversion of the dry pond to a wet pond. The FAA has certain regulations regarding the creation or enlarging of the habitat for wildlife strike hazards (in this case, the geese). Changes to the wet pond can increase the habitat for the geese that already reside at the pond. The FAA may require that you take certain measures reduce the geese population at the pond.

Dewberry & Davis LLC appreciates the opportunity to be of service to Loudoun County.

Sincerely,

Robert J. Titus, P.E.
Project Engineer

Timothy Culleiton, P.E., Senior Associate
Project Manager

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLEITON
No. 0402 020112
1/3/03
PROFESSIONAL ENGINEER

Attachments
- Hydrologic Criteria
- Pond A Hydrologic Model
- Pond B Hydrologic Model
- Drainage Area Sheet 1
- Drainage Area Sheet 2
- Drainage Area Sheet 3
- Drainage Area Sheet 4
- Bathymetric Survey AutoCAD File (3.5" diskette)