

**WATER MANAGEMENT
USING THE GENERAL PERMIT (FAC 62-330.449)
SCOPE OF SERVICES**

BASIC SERVICES

Preliminary Project Engineering Activities

1. Design the Grading Plan and Earthwork and prepare construction Specifications to maintain or create favorable overland flow conditions to use the General Permit of 62-330.449 Florida Administrative Code (FAC).
2. Review Prior Permits
Review prior permits issued in order to establish the baseline flow rates the project must meet.
3. Size Airside Drainage Pipes and Inlets
Based on the 5-year, Rational Method size drainage pipes and inlets consistent with Advisory Circular 150/5320-5D Airport Drainage Design. Incorporate information in construction drawings.
4. Estimate Post-Development Flow Rates
Determine flow rates for the ___-year, ___-hour design rainfall event(s) per the Water Management District (WMD) requirements and compare to the baseline flow rates from prior permits. If modifications are needed to either storage or outfalls, provide design features for these.
5. Prepare Drainage/Water Management Narrative Report
Prepare a narrative report describing how the system qualifies for the General Permit of 62-330.449 for the WMD for inclusion in the Engineer's Report for the project.
6. Prepare and Submit the Notice of Intent to Use the General Permit
Sponsor to submit the application electronically which will then be executed electronically by the Sponsor, who will pay the permit fees. Submit any required drawings, narratives, certifications and/or calculations electronically.
7. Respond to Requests
Respond to jurisdictional agency/agencies requests as necessary.

The scope excludes continuous simulation EPA SWMM modeling and anticipates direct use of the General Permit (62-330.449 FAC). The scope excludes any wetland limits or environmental science work. The scope also excludes any construction or closeout phase work,

MASTER DRAINAGE PLAN

SCOPE OF SERVICES

Scope of Services

I. Existing Data

- a. SWPPP Reports
Review and summarize the structural and nonstructural controls in the airport's current National Pollutant Discharge Elimination System (NPDES) Storm Water Pollution Prevention Plans (SWPPPs).
- b. As-Built Drawings
Collect as-built airport plans and review for drainage design details.
- c. Visual and Photographic Reconnaissance
Conduct visual and photographic reconnaissance of the airport and adjacent areas for factors related to drainage and land use. Identify any anomalous areas and conditions observed.
- d. Geotechnical Data
Collect and review design geotechnical information for previous projects that may be available in project files or Engineer's Reports on file at the airport. Collect and review any summarized construction test data from project closeout documents that may be available on file at the airport. Evaluate relevance of data
- e. Airport and Tenant Water Management District (WMD) Permits
Collect existing WMD permits for airport and its tenants that that are readily available in airport or WMD files.
- f. Wetland Delineations and Maps
Excerpt existing wetland information from WMD and USACOE and/or FDEP permits; National Wetland Inventory Maps; current Wildlife Hazard Assessment and/or Wildlife Hazard Management Plans; and/or similar. Also, contact Florida Fish and Wildlife Conservation Commission and U.S. Fish and Wildlife for information on species and habitats of concern on the airport and immediately adjacent lands. Summarize the information on aerial photographs of the airport.
- g. Rainfall Information
Collect at least 10 prior years of 1-hour or finer time increment rainfall records for the Airport from the closest weather station. Obtain monthly evaporation or evapotranspiration data from the nearest available station from IFAS or other source for a design year that will be selected from the rainfall data analysis.
- h. Existing Airport Master Plan
Review the current Airport Master Plan with airport management. Discuss planned future projects and probable changes that will be made to the Master Plan at the next update. Establish outlines of development areas with similar characteristics such as commercial/business parcels, industrial use, airside access business, runways, taxiways, aprons, and similar.

- i. **Aerial Topographic Surveys**
Collect and review aerial topographic survey(s) from the airport. The Sponsor will also furnish rectified aerial topography for use in wetland and Other Surface Water Delineations. If no recent aerial topographic or rectified photograph information is available, this can be obtained as an additional service for a negotiated fee.
- j. **Tide Data (airports that discharge to tidal waters)**
Obtain historical gage or forecast tidal information for surface waters that receive airport discharge from the nearest NOAA reporting or prediction station.
- k. **Discharge Stages**
Collect available information on normal and flood stages of receiving waters, including any time-stag data. Sources can include flood studies, previous permits, gage data, or recollections of airport staff or adjacent landowners, among others.
- l. **Water Quality Data**
Collect and review publicly available water quality monitoring data that may be available and published for the airport and surrounding area.
- m. **Summarize Existing Data**
Summarize or reduce the existing data for relevant and usable information for the project.

Deliverables

- Summaries of the existing data that will also be included, in part or in whole, within the Master Drainage Plan Narrative Report. The summaries may be narrative, tabular, numeric, drawings, databases, GJS (ESRI ArcGIS) or similar depending on the specific data. Some data, such as multi-year rainfall records, will not be summarized in this task but will be used directly or with further analysis in subsequent modeling and simulation efforts.

II. Wetland and Other Surface Water (OSW) Identification

The objective of this task is to provide an estimate of wetland mitigation requirements and any apparent issues that would make any specific area mitigation significantly more complex and/or expensive. It is not to create a binding jurisdictional wetland or OSW limit or wetland characterization. It is intended to provide support to the Conceptual Environmental Resource Permit, but each construction project that follows the Conceptual ERP is expected to conduct detailed wetland and OSW determinations as required to secure a Construction ERP. The task confirms and/or expands on the information collected in Task I.f.

- a. **Aerial and Field Delineations**
Delineate probable wetlands and Other Surface Waters (OSW) on an aerial photograph furnished by Sponsor in Task I.i. Conduct a site visit to occur concurrently with Task II.b and II.c to review readily accessible wetland and OSW limits on the contiguous airport property.
- b. **Coordination with WMD and USACOE and/or FDEP**

After preliminary wetland and OSW limit delineations using only aerial photography is complete, arrange a joint site visit to confirm general limits with WMD and USACOE and/or FDEP environmental science staff. This site visit shall take place on the same day as Task II.a and II.c site visits. Revise the general limits, if necessary.

c. Characterizations and UMAM

Provide general wetland characterizations based on the site visit concurrent with Task II.a and II.b; provide initial wetland descriptions with structural and functional analyses and an initial Uniform Mitigation Assessment Methodology (UMAM) estimate. Refined and detailed estimates are not included in this project but will be needed for Construction ERP on a project-by-project basis.

Deliverables

- Initial wetland limits and UMAM scoring of the wetlands for use in Conceptual ERP Permitting in PDF format.

III. Surveys

a. Inlets, Pipes and Outlets

Field survey the top and invert elevations, sizes and measurements, pipe type, and the ground surface and channel bottom elevations, as applicable for drainage structures, inlets, outlets and major drainage swales and ditches. For those systems with as-built information, field verify the information for a sample of the structures or features.

b. Channel Cross Sections

Obtain cross sections of on-site channels and wet swales on _____ to _____ ft. intervals. Cross sections will include top of bank, waterline, toe of slope, and bottom at mid-point of channel, along with any definitive slope breaks above the normal waterline. Record elevation data to nearest 0.1 foot.

c. Existing Pond Depths

Conduct depth soundings sufficient to define pond bottom bathymetry. The data will be used to provide rough volume estimates of the ponds for use in water quality analyses.

d. Geographic Information System (GIS)

Start a GIS water management model of the airport based on the survey information. Project specific information associated with the water management plan will be built into the GIS base consistent with modeling and permit requirements. The GIS will be developed in ESRI ArcGIS format.

Deliverables

- Channel cross sections will be provided as AutoCAD/Civil 3D drawings and will be used in Task VI Existing Condition Model.
- Pond bathymetry will be provided as AutoCAD/Civil 3D drawings.
- An interim GIS or drainage map with inlet, outlet, pipe, and major ditch/swale information will be provided.

IV. Geotechnical Exploration

a. Program Design

After reviewing the information collected in Task I, design a program of geotechnical exploration to supplement the information and to provide more detailed soil and groundwater information for use in subsequent computer models.

b. Soil Borings

Conduct soil borings with Standard Penetration tests at locations selected following program design. Visually classify all samples returned. Also, collect bulk samples from auger cuttings of the SPT borings that are representative of the upper 5 feet of soils encountered during the exploration. Record ground water levels on completion and backfill borings.

c. Cone Penetration Test Soundings

Conduct Cone Penetration Test soundings. Provide graphic plots of result to include tip resistance, sleeve friction, friction ratio, pore pressure, estimate of SPT resistance, and estimate of soil type.

d. Field Permeability Testing

Install piezometers on the airport at locations selected following program design. Using the basic time lag or other applicable method, conduct field permeability testing in each piezometer.

e. Laboratory Testing

Test all SPT split spoon samples collected for natural moisture content. Test samples representative of soils encountered for gradation. Conduct specific gravity tests on representative bulk samples of SPT auger cuttings. Conduct laboratory Modified Proctor compaction tests on representative bulk samples from the upper 5 feet of the soil profile. Conduct laboratory vertical permeability tests on laboratory compacted samples.

f. Continuing Data Collection (Optional for calibration)

i. Wet Pond Water Surface

Monitor surface water elevation monthly for at least 8 months that included the typical seasonal high and low water tables in each of the wet ponds existing on the airport property. [Also, during a 24-hour period selected for extremes of astronomical tide, monitor each airport outfall hourly to estimate maximum tidal influence on the system. (Tidal option)]

ii. Water Table

Monitor ground water elevation monthly for at least 8 months in each of the piezometers installed on the airport on the same schedule as surface water monitoring.

Deliverables

- Geotechnical test data in PDF format
- [Water surface and water table data in electronic spreadsheet format (optional)]

V. Water and Sediment Quality Data in Existing Wet Ponds and/or Channels (Optional for Calibration or Water Harvesting/Reuse)

- a. Conduct chemical analysis of the existing wet pond sediments. Bottom Sediment samples will be collected from two locations in up to _____ ponds and analyzed for grain-size distribution, a select group of metals (lead, copper and zinc), polycyclic aromatic hydrocarbons (PAHs), and organochlorinated pesticides.
- b. Samples of existing water quality will be collected. A total of 2 sets of samples will be collected at various locations in stormwater ponds and open channels. Samples will be collected twice during the normal wet season (June – September). In-situ measurements of pH, specific conductance, dissolved oxygen, turbidity and water temperature analyzed for the following parameters:
 - o Total Suspended Solids (TSS)
 - o Total Nitrogen (TN)
 - o Total Phosphorus (TP)

Deliverables:

- Sediment data in electronic spreadsheet format
- Water quality data in electronic spreadsheet format.

VI. Existing Condition Model

- a. Basins
Delineate drainage basins based on topography and drainage patterns. Refine and re-define basins as necessary based on land use and/or groundwater information
- b. Event Mean Concentrations
Update, refine or establish Event Mean Concentration (EMC) data for Total Phosphorus(TP) and Total Nitrogen (TN) for the various land uses in the Existing Conditions. Airside land uses will use the Technical Report and the Best Management Practices Manual (referenced in 62-330.449 FAC) from the Florida Statewide Airport Stormwater Study. Landside land uses will use the data from the Best Management Practices Manual, the Florida Department of Environmental Protection or other available data from the literature acceptable to WMD.
- c. Treatment Efficiencies
 - i. Published Information (minimum required)
Review data from the Statewide Airport Stormwater Study, and WMD/FDEP/USEPA accepted literature and data to establish water management treatment efficiencies for various Best Management Practices.
 - ii. Monitoring Results (Optional Best Practice if Task V. Authorized)
Using monitoring results, estimate the efficiency of the existing water management features.
 - iii. CFD Models (Optional Best Practice)
Develop Computational Fluid Dynamics (CFD) models to predict water management behavior of existing wet ponds.

- d. **Continuous Simulation Rainfall Synthesis**
Using the rainfall records collected in Task I, select an average annual rainfall that approximates the typical condition. Using accepted techniques, normalize the selected rainfall to yield a total annual rainfall that approximates the long period average annual rainfall. Using accepted techniques reduce the rainfall to 5-minute or 15-minute increments and place in spreadsheet format that can be read into EPA SWMM or other selected continuous simulation water management computer program.
- e. **WMD Meetings**
Meet with WMD to negotiate regulatory concurrence with defined basins, EMC for each land use, treatment efficiencies to be used for modeling various Best Management Practices, the continuous simulation rainfall distribution, evapotranspiration data, tidal data and similar. Confirm the event rainfall distribution and flood impact criteria to be used in modeling.
- f. **Computer Simulations and Models**
- i. Establish the EPA SWMM and/or other software and version that will be used for all simulations and modeling – Existing and Future.
 - ii. **Continuous Simulations for Water Quality Management**
Evaluate average annual existing conditions' runoff quality, quantity and management using computer program EPA SWMM or other applicable and accepted software using the one-year continuous simulation rainfall record prepared in this task.
 - iii. **Event Models for Quantity and Flood Management**
Evaluate existing conditions runoff quantity and flood management for the design storm event rainfall distribution specified by the WMD using computer program EPA SWMM or other applicable and accepted software
- g. **Calibration**
Using information collected in Tasks I and IV [and V if done] calibrate the water management computer model for general correspondence with observed or measured existing conditions.

Deliverables

- Existing Condition EPA SWMM and/or other software models (continuous simulation and event).

VII. Alternative Water Management Strategies

- a. **Concept sketches for alternates**
Develop sketches for up to _____ alternates for the airport master water management district.
- b. **Airport Meetings**
Review the alternate concepts for the airport water management system with airport management, maintenance and operations personnel. Discuss qualitatively the basic issues

associated with each option. Solicit airport comments and make any revisions appropriate to the comments. Following discussions with WMD, FAA, and FDOT described in the following two sub-tasks, the comments from those agencies will be discussed with Sponsor and the alternates to be evaluated will be finalized.

c. WMD Meeting

Following the initial review of alternates for airport water management, the options will be discussed with the WMD. Comments will be solicited concerning permissibility, regulatory issues, and general concept suggestions for the alternates

d. FAA/ FDOT Meeting

Following the initial review of alternates for airport water management, the options will be discussed with FAA and FDOT. Comments will be solicited on acceptability and possible funding eligibility from FAA and FDOT.

Deliverables

- Concept sketches in PDF format.
- Meeting agenda for each meeting.
- Meeting minutes from each meeting.

VIII. Preferred Water Management Strategy

a. Airport Meetings

Meet with Airport management to discuss the general construction requirements, potential funding, any wetland/wildlife hazard impacts, and impacts on developable land of the different water management options. After ranking the preferences and subsequent meetings with permitting and funding agencies [and the public], hold a second meeting with management staff to rank alternates. Present the recommended ranking to Sponsor for approval.

b. WMD Meetings

After the initial meeting with Sponsor, meet with WMD to discuss the alternative water management strategies, and any wetland/wildlife impacts various alternates may involve. Solicit comments and feedback on the permissibility of the various option.

c. USACOE and/or FDEP Meeting

After the initial meeting with Sponsor, meet with USACOE and/or FDEP to discuss any wetland/wildlife impacts from the alternative water management strategies, Solicit comments and feedback on the permissibility of the various options.

d. FAA/FDOT Meetings

After the initial meetings with Sponsor, meet with FAA and FDOT to discuss general construction requirements, potential funding, consistency with advisory circulars, any wetland/wildlife hazard impacts, and impacts on developable land of the different water management options. Solicit comments and feedback on acceptability and possible funding eligibility from FAA and FDOT.

Deliverables

- Meeting agenda for each meeting,
- Meeting minutes from each meeting.
- Graphic showing the Preferred Water Management Strategy outline for use in Task IX Future Conditions Model.

IX. Future Condition Models

a. Basins

Re-define drainage basins based on the Airport Master Plan and expected improvements for the preferred alternate from Task VIII. Basins may be re-defined based on expected grading consistent with FAA standards, projected changes in land use, or similar.

b. Event Mean Concentrations

Establish any EMC data for future land use not already established in Task VI for Total Phosphorus (TP) and Total Nitrogen (TN). The same method and acceptance criteria of Task VI apply.

c. Treatment Efficiencies

i. Published Information (minimum required)

Review data from the Statewide Airport Stormwater Study, and WMD/FDEP/USEPA accepted literature and data to establish or update water management treatment efficiencies for various Best Management Practices.

ii. CFD Models (Optional Best Practice)

Develop Computational Fluid Dynamics (CFD) models to predict water management behavior of existing wet ponds modified to improve efficiencies.

d. EPA SWMM Models

i. Continuous Simulations for Water Quality Management

Evaluate average annual proposed conditions' runoff quality, quantity and management using computer program EPA SWMM or other applicable and accepted software as one-year continuous simulations. One model for the preferred Water Management Alternative will be prepared.

ii. Event Models for Quantity and Flood Management

Evaluate proposed conditions runoff quantity and flood management for the design storm events specified by the SWFWMD using computer program *EPA SWMM* or other applicable and accepted software. One model for the preferred Water Management Alternative will be prepared.

Deliverables

- Future condition EPA SWMM and/or other software models (continuous simulation and event) for preferred alternate.

X. Approvals and Permitting

a. WMD ERP

Prepare an application for a Conceptual ERP for Sponsor to submit electronically to the WMD. Respond to two sets of requests for additional information from WMD.

b. Prepare modifications to existing or new WMD Consumptive Use Permits that the preferred option may require. (Optional, if needed)

c. FAA ALP Update

Update the ALP set to include drawings showing the proposed water management system and submit to FAA for approval per Guidance Letter dated November 1997. Owner recognizes that Consultant cannot guarantee the acceptability of any design including ponds on airport property, although consultant has previous success in such efforts and the FAA guidelines allow ponds conforming to specific criteria.

Deliverables

- Copy of electronically submitted permit applications in electronic format.
- Copy of electronically submitted responses to RAI for the permit applications.
- Updated ALP drawings depicting the proposed water management system in AutoCAD or Civil 3D or Arc GIS format. Format depends on airport furnished base ALP drawings format.

XI. Master Drainage Plan

a. Narrative Report

Prepare the Master Drainage Plan narrative report describing the approach, analyses, results, conclusions and recommendations for the project. Calculations will be included on diskette as an appendix to the report narrative. Wetland mitigation recommendations (if required) will be part of the document.

b. Using guidance from the Florida Statewide Stormwater Study, prepare ledgers for allowable development by land use for each Airport quadrant. These will be applicable when the water management facilities of the conceptual ERP are in place and operational for that quadrant.

c. Design Criteria

Summarize the design criteria for the structural controls of the Master Drainage Plan. These will be the basis for the detailed design that will be done during the construction of the upgraded Master Drainage system.

d. Capital Improvement Program

Prepare an opinion of probable construction cost for the recommended Master Drainage Plan structural controls for water quality and quantity and any identified wetland mitigation.

e. Prepare a phasing plan for construction in consultation with Airport Management and in concert with the development schedule from the concurrent Master Plan. The phasing plan is for planning and permitting guidance. Actual phasing will likely be demand driven and will differ from the proposed phasing plan as a consequence.

Deliverables

- Master Drainage Plan Narrative Report, allowable development ledger(s) including the design criteria recommendations, Capital Improvement Program, and phasing plan.

WATER MANAGEMENT
SCOPE OF SERVICES UTILIZING THE LEDGER
FROM AN OPERATIONAL MASTER DRAINAGE SYSTEM

Water Management Design and Environmental Resource Permitting

Level of Service:

Assist the Airport with Environmental Resource Permitting with the Water Management District.

Calculations - Refine the Master Drainage Plan calculations from a conceptual to a design level of detail for Project hydraulic design (pipes, inlets, ditches, etc.) Obtain the latest update of and adjust the ledger(s) from the Master Drainage Plan/Conceptual ERP to reflect the project.

Water Management District Pre-Application Meeting - Arrange and attend a pre- application meeting with staff of the water management district to discuss project and permit application details.

Permit Application - A permit application submittal package will be prepared in accordance with water management district rules and results of discussions at the pre-application meeting. This will normally be a letter or minor modification to the permit,

Responses to Questions - This scope includes responses for up to two Requests for Additional Information. It also includes two meetings either at the airport or at the WMD offices.

Deliverables:

- Permit applications and responses