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HANSON

Pompano Beach Air Park

Stormwater Master Plan

December 2010

Prepared for:
The City of Pompano Beach
1001 Northeast 10th Street
Pompano Beach, FL 33060

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Section 1
Introduction

1.1 Airport General Information and History

Pompano Beach Air Park (PMP) is a public use airport owned and operated by the City of Pompano Beach, Florida. As such, it is covered by comprehensive federal, state, and local planning requirements. This facility is under the overall direction of the Airport Manager who is an employee of the City.

PMP was constructed during World War II to serve as a satellite training field to support the Naval Air Station that was located at what is now Fort Lauderdale-Hollywood International Airport. On August 29, 1947, the City of Pompano Beach obtained the airport under the Surplus Property Act of 1944. Under the provisions of that legislation, aviation-use property conveyed to local governments must be used for aviation purposes unless otherwise authorized by the FAA or the ownership may revert back to the Federal Government. The airport was subsequently renamed Pompano Beach Air Park.

Additional parcels surrounding the Air Park, including land along East Copans Road and The Florida East Coast Railway tracks along the west side of the Air Park were transferred to the City on June 24, 1948, bringing the total acreage at the Air Park to 1,035 acres. On August 5, 1958, ten acres of Air Park property were released to the Broward County School Board for the construction of Pompano Beach Elementary School. Broward County received nine additional acres on September 18, 1967. On March 8, 1968 the City sold sixty acres located at the northeast corner of the Air Park for the private development of the Pompano Square Mall. In 1981 ten acres in the southwestern section of the Air Park were purchased by the Pompano Elks Club. The final transfer of Air Park property occurred in 2009 when additional parcels, including a large portion of the public golf course, a municipal swimming pool and sports complex; the Pompano Beach Amphitheater and Civic Center, a water treatment plant, and a fire station were transferred to the City. These transfers account for the current total of 604 acres that the Pompano Beach Air Park comprises.

Pompano Beach Air Park is located within the geographical boundaries of Broward County and the City of Pompano Beach, Florida. The FAA Airport/Facility Directory lists the airport location as N26°14.83' latitude and W80°06.66' longitude. See Airport Diagram Figure 1.1. As an aviation facility, PMP has 3 runways and serves aircraft ranging from light piston to jet aircraft. The Goodyear Blimp is also based at the facility. The airport supports an estimated 60,000 annual operations based on recent traffic counts. General aviation services are provided by a fixed base operator (FBO) and a number of privately owned aviation related businesses.

The Air Park is sited on Florida's eastern coastal ridge, as is the case with many of the World War II era military aviation training fields located in eastern Florida (See Project Location Map Figure 1.2). The military airfields were typically constructed on the highest ground in the area, and the Pompano Beach Air Park is no exception. The Air Park has seen limited development on the airside in recent years.

The airport has no clearly defined outfall structures and ponding on the airport after higher intensity storm events has not been a major concern. Slopes on the airport are generally flat to mild with well drained soils.

1.2 Project Background / Previous Studies

The primary planning document for an airport is the Airport Master Plan and Airport Layout Plan. This provides the framework for development and land use on both aviation owned and non-aviation owned lands. The Master Plan for PMP was recently updated in 2008 by Hanson Professional Services, Inc.

This Master Stormwater Drainage Plan is funded by the City of Pompano Beach with funds set aside for airport development. The work also relies upon data collected from the Airport's prior and on-going participation in the Florida Statewide Airports Stormwater Study. This information was collected without cost to PMP in a joint FAA and FDOT project, and is available for use on airport engineering and planning projects.

1.3 History of Stormwater Improvements

Review of historical photographs indicates that a system of swales was used, from the inception of the airport until approximately 1980, to convey excess stormwater from the site (Appendix C, Figure C.1 historical aerial 1947). The apparent direction of the stormwater flow was towards the east, discharging into an area near N Federal Highway (U.S. Route 1). Over the years these stormwater swales have been modified to accommodate the City-owned Golf Course (Appendix C, Figure C.2 historical aerial 1957 and Figure C.3 historical aerial 1980). The stormwater flows are typically contained on airport property. During the higher intensity rainfall events stormwater flows to the southeast corner of the Air Park property and is contained on the city owned golf course property.

Until recently the entire golf course was considered part of the airport property. In an agreement between the City and the FAA, portions of the airport property were formally released to the City. While the City maintains ownership of the overall airport and golf course property, specific limitations are imposed on the property specifically designated for airport use. This Master Drainage Plan addresses only the portion of property designated for airport use.

The pond located at the approach end of Runway 24 is man-made and is not shown in either the 1947 or the 1957 aerials. It appears to have been created to provide borrow material for the golf course construction and to contain historical stormwater flows from the swales on the northeast quadrant of the airport. In addition to the borrow pond, a swale was created at the west boundary of the golf course. This swale intercepts the former manmade swale system created during the original airport construction in the 1940's and does not discharge off-site.

1.4 Project Purpose / Scope of Work

The purpose of the Master Drainage Plan (Existing and Planned Conditions) is to provide an orderly framework for the environmental management aspects of airport development out to the 20-year planning horizon. The specific purpose of the Existing Conditions Component of the Master Drainage Plan is to establish baseline hydrology, hydraulics and water quality for the airport. This baseline establishes the limits that future development must either meet or, in some cases, improve to receive a permit. The Future Conditions component of the Master Drainage Plan may be used to acquire a Conceptual Environmental Resource Permit (CERP) from Broward County DPEP. The simulation model developed for the Existing Conditions study

should be used as the baseline for development projects. Model updates should be made at appropriate intervals. We recommend using this as the required model for all projects, which will keep it continuously updated and maintain project consistency. However, this is not required.

1.5 Jurisdictional Entities

Airport improvements are governed by a multitude of agencies outside the administrative staff. These agencies are granted oversight by local, state and federal law and can impact facilities beyond the airport's property limits in connection with needed projects. Among the bodies having jurisdiction are the Federal Aviation Administration (FAA), which regulates the airport environment and operations. As the FAA also provides funding for many projects, the grant conditions establish design criteria and constraints within the Air Operations environment that are constantly in effect. Another body having direct effect is the Florida Department of Transportation (FDOT), which similar to the FAA, provides funds and controls to enhance facilities and safe public aviation use.

Aside from strictly transportation use, several local government entities also impact future use and development. Chief among these are the Regional Planning Councils (RPC's), established by the Growth Management Act of 1985, Florida Statute Chapter 60. The Council's mission is to identify the long-term challenges and opportunities facing Southeast Florida and assist the Region's leaders in developing and implementing creative strategies that result in more prosperous and equitable communities, a healthier and cleaner environment, and a more vibrant economy.

The Council is a planning and public policy agency. Activities respond to statutory requirements as well as the needs of member units of local government. The policy document guides all of the Council's activities in the Strategic Regional Policy Plan for South Florida.

PMP lies within the jurisdiction of the South Florida Regional Planning Council. Other entities which have a significant regulatory oversight over future projects include the South Florida Water Management District (SFWMD), the US Army Corps of Engineers (USACOE), the U.S. Environmental Protection Agency (USEPA), the Florida Fish and Wildlife Conservation Commission (FFWCC), the U.S. Fish and Wildlife Service, and the Broward County Department of Planning and Environmental Protection (DPEP). These agencies regulate on-site water use, storm water management, existing natural wetlands and wildlife species of concern. Their reviews are primarily related to environmental factors, and their requirements affect the engineering effort, construction costs, and the land available for aviation or revenue use within a parcel. Currently, the FFWCC does not appear to have serious concerns from a wildlife perspective given that the local environment is urban residential and commercial. However, they should be consulted when planning for any future development within the airport owned out-parcels.

Airport planning plays an important role in bird strike hazard reduction. Proper planning of an airport can help to recognize land uses on or near the airport site that can potentially attract wildlife. By controlling these land uses, bird strike hazard can be reduced.

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Section 2
Existing Conditions: Study Area / Basin Information / Location / Inventory / General Airport Characteristics

2.1 Introduction

The Air Park serves the public good and is a center for both aviation and non-aviation activity. Several of the City of Pompano Beach's recreational facilities and public utilities surround the Air Park property. The Air Park is not a current source major stormwater issues related to quantity or quality. General Aviation airports which do not have large industrial parks typically are not major contributors to stormwater issues. A majority of all rainfall falling on the property remains within the Air Park and golf course boundaries and provides needed recharge for the ground water. The Pompano Beach wellfield is located along the west side of the airport property and serves as source of potable drinking water for local residents. The historical higher level of ground withdrawals in the past have been reduced due to concerns related to saltwater intrusion. The golf course no longer uses ground water wells for irrigation and has switched to use of reclaimed water. One objective of the master drainage plan is to increase the quantity of stormwater retained on site and further recharge the aquifer to further inhibit the ever present concern of saltwater intrusion. A second objective of the master plan is to minimize and /or eliminate stormwater features which would act as wildlife attractants.

2.2 Study Area / Limits

2.2.1 The limits of Study area are as follows:

Copans Road to the North, NE 5th Avenue to the West, NE 10th Street to the South, and a portion of the Golf Course to the east (See Figure 1.2).

The Airport Master Plan has identified portions of the existing golf course beyond the limits of the Airfield Operating Area (AOA) for future aviation development. This includes a new taxiway parallel to Runway 15-33 to service the FBO's or other interests that would lease space from the Airport. The portion of future development within this area is not included in this Master Drainage plan as it is not expected to be improved within the time limits of a conceptual permit issued by the local authority.

2.3 Drainage Overview / Topography

2.3.1 Broward County Conditions

The surface water management basins of eastern Broward County, Florida were first delineated in the 1950s by the USACOE (Army Corps of Engineers) in their General Design Memorandum (GDM) for the Central and Southern Florida Flood Control Project (Project). Based on the hydrology of the basins, the USACOE designed and constructed a system of canals, levees, and control structures to provide flood protection for southern and central Florida. The Project is dynamic with the new works being constructed and old ones being modified to meet changing needs of southern Florida. Most of the works constructed under the Project are now under the management of the South Florida Water Management District.

The Pompano Air Park is not located within a defined Drainage District. See Figure 2.1

The nine Broward County Drainage Basins are described as: The Hillsboro Canal, C-14, Pompano, C-13, C-12, North River Canal, C-10, C-11, C-9 and the Coastal Basin. These Basins are located in the eastern half of Broward County. Water Conservation Areas 2A, 2B, 3B and 3B occupy the western side of the county. Pompano Beach Air Park falls within the Coastal Basin. See Figure 2.2.

The project canals in Broward County serve a variety of functions. The primary function of all the canals is to provide flood protection for the basins in which they occur. Secondary uses of the canals include land drainage for agriculture and urban or residential development, and regulation of groundwater table elevations to help prevent saltwater intrusion into the local groundwater. Many of the canals are used to supply water for irrigation and to recharge the wellfields of local municipalities.

The Project control structures in Broward County regulate the flow of water in the canals. In general they are used to discharge excess water from the basins during flooding and to maintain minimum water levels during drought periods. Some structures are kept closed to prevent water from passing from one basin to another, but can be opened if needed. The Project's coastal structures have the additional function of helping to prevent saltwater intrusion from tidal surges or storm surges.

2.3.2 Project Conditions

The airport property as described in Section 2.2 has well defined topography. In general it slopes from west (in the vicinity of NE 5th Avenue) to the east with a change in surface elevation ranging from 19.5± near the blimp port to 6.5± in the golf course (See Figure 2.3 at the end of this Section). Developed areas typically have higher finished floor elevations than the adjacent ground surface and the airport movement areas are elevated above original elevations by means of earth embankments in accordance with FAA grading standards. The only open surface water facility inside the project area is the borrow pit pond at the end of runway 24. A dry ditch separates the golf course from the airfield and directs runoff from the north and south. During typical rainfall events there is no discharge from the swales into the borrow pit pond.

There are very few existing drainage structures within the airfield operations area, the most significant of which is a culvert under the north half of Runway 15-33. It's discharge point is at the edge of the east conservation area from which runoff enters an existing drainage system in what is now the golf course. When the golf course was constructed and the dry ditch excavated, runoff was contained in the dry swale and only under extreme storm events would it flow to the borrow pit. A section of the USGS quad map on Figure 2.3 illustrates the original discharge patterns.

The south side general aviation area consists of aprons, taxiways, hangars, and undeveloped lease parcels. Approximately 60% of the areas south and east of Runway 6 and Taxiway Lima are developed. Runoff from this area typically sheet flows across pavements from west to east until it reaches the open ground and eventually travels along a well developed shallow channel to the property's edge. It exits via an existing culvert near the golf clubhouse parking lot during low flow events but during more intense storms it stages up until it encroaches on NE 10 Street.

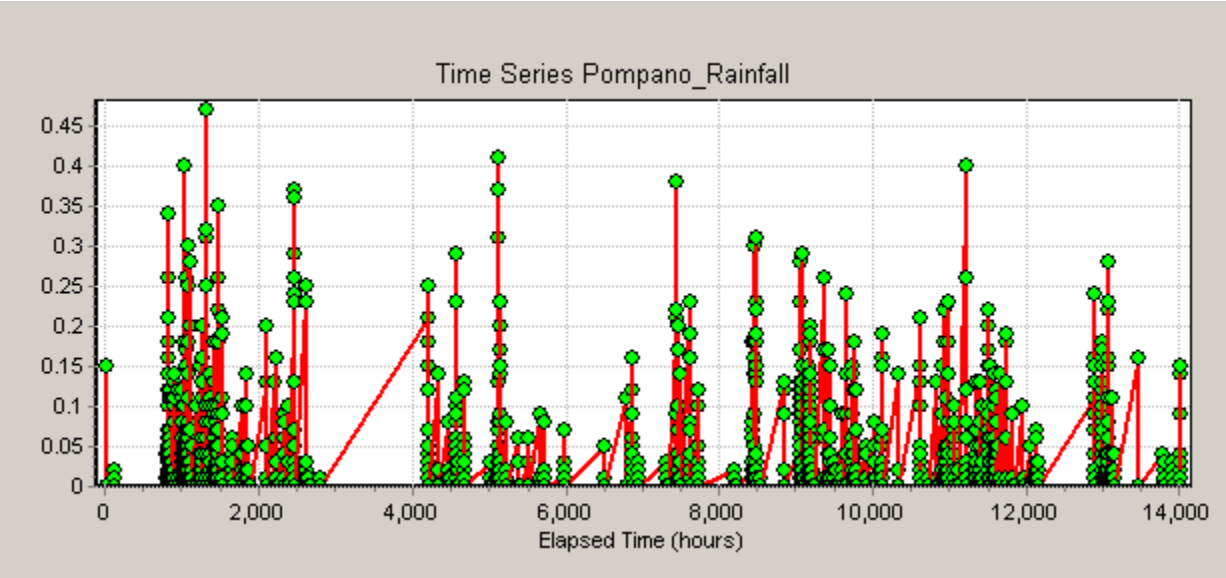
Runoff from infield areas typically infiltrates without a discharge, which is also the case for the existing west side developments with the possible exception of the southwest corner.

The construction of Runway 15-33 and Taxiway Delta extension will modified the drainage patterns slightly by adding additional storage in the infield and on the east side of the runway, and new drainage culverts provide a means to connect infield storage areas. These improvements are indicated on the existing conditions drawings. (See Appendix E)

2.4 Soils and Vegetation

The soils at Pompano Air Park are a mixture of Paola–Urban Sand and Duette-Urban Land-Pomelo Association. See Figure B.1 and the NCRS soil data in Appendix B, and the full soil report in Appendix I for detailed information regarding soils composition at this site. Existing vegetation within the Airfield Operations Area (AOA) consists of native grasses maintained by periodic mowing. Any trees or shrubbery located near the terminal or Fixed Based Operators (FBO's) and are ornamental in nature.

Figure 2.4 Rainfall Continuous Data File used in Calculations



2.5 Climate

Historical, local temperatures range from the 50's to the 70's in the winter and 75's to the 90's in the summer. Rainfalls averages between the years 1971 and 2001 were approximately 57.27" per year, the majority of which occurred between May and September. See Figure 2.4 for Continuous Rainfall Data.

2.6 Land Use

Existing land use is aviation, with adjacent and other specified on-site property use, including civic and municipal structures, parks and recreational lands. Residential land use is separated from airport property by major arterial roadways, which provide access to the Air Park. A shopping center is located on the northeast side and runoff generated from it is collected on their property and discharged into a containment lake in between the air park and the shopping center. As indicated in the Soils and Vegetation section, PMP property includes some easements that were allowed by the US government on the airport property to accommodate the Copans Road widening. See Appendix G for Existing and Future Land Use.

2.7 Floodplain

According to the latest FEMA FIRM map, Pompano Air Park is not located within the 100 year floodplain. However, as identified in the photos, storm water has been retained on airport property in the vicinity of the approach end of Runway 24. The water elevation in the existing pond at the end of Runway 24 fluctuates based on rainfall events and has no known discharge point. See Figures 2.6 a, b, c, and d.

Review of the FEMA flood zone maps indicates that the entire Pompano Beach Air Park appears to be situated in an area with a "Zone X" designation, and the site is surrounded by Zones X, AE and AH. Zone X indicates the flood insurance rate zones that correspond to areas outside the 1-percent annual chance floodplain, areas of 1-percent annual chance sheet flow flooding where average depths are less than 1 foot, areas of 1-percent annual chance stream flooding where the contributing drainage area is less than one square mile, or areas protected from the 1-percent annual chance flood by levees. No Base Flood Elevations or depths are shown within this zone. Insurance purchase is not required in these zones.

Based on the location of the site and its location above the 100-year flood plain, it is unlikely that the proposed improvement projects would impact the flood plain.

Figure 2.5.A

Figure 2.5.B

The two photos above (taken from similar vantage points on airport property) show the typical in water elevation in the existing pond at the end of Runway 24 (Elevation 6±).

2.8 Wellfield & Wellhead Protection

2.8.1 Wellfield Protection

The Pompano Beach Wellfield is located along the west boundary of the Air Park and is a key consideration in developing the stormwater master drainage plan. Water supply systems can be vulnerable to the introduction of chemicals from business and residential uses. Broward County has implemented a Wellfield Protection Ordinance #84-60. The limitations and permitting requirements of the ordinance are detailed in Broward County Code, Division 4, Chapter 27, Sections 191 thru 201, and 376 thru 384.

In order to provide protection to the water supply, Broward County established zones of influence around each wellfield. Zones are delineated by the theoretical time it takes for contaminants to travel from the point they enter the ground water to the wellfield. The Wellfield and Environmental Services Team utilize computer models to delineate wellfield protection zones and a Geographic Information System to store and process the information.

Broward County has three delineated protective zones; Zone 1, Zone 2 and Zone 3. Restrictions are highest in Zone 1. These protected areas act as safety buffers against accidental contaminant releases wherein known contaminants can be reduced before they reach the public supply well. Zone 1 provides a ten day buffer around the wellfield; Zone 2 provides a thirty day buffer and Zone 3 provides a 210 day buffer.

The prohibitions, restrictions and licensing within zones of influence are outlined in Section 27.379 of the Broward County Code. The Broward County Wellfield Protection Ordinance does not specifically limit, or restrict the discharge, of stormwater in Zones 1, 2 or 3 unless the stormwater contains one or more of the listed regulated substances outlined in the ordinance. See Figure 2.7 for protection zones around existing wells.

While the wellfield protection ordinance does not specifically contain limitations on stormwater discharges within wellfield protection zones, other portions of the Broward County Code of Ordinances do contain limitations; specifically: Division V-Water Resource Management, Section 27-200- Criteria for Issuance or Denial of Licenses.

Paragraph 27-200(b) (5) b.4. states;

Water Quality:

"Projects located within the zones of influence of wellfields: Retention/detention area locations shall not reduce hydraulic recharge distances to public water supply wells in excess of two (2) percent, nor shall wet retention/detention areas be closer to public water supply wells than three hundred (300) feet."

Paragraph 27-200(b) (5) b.7. states;

Underground exfiltration systems;

"a)……
b)……
c) Systems located within the contour for a wellfield protection Zone 3 as defined in this article shall incorporate pollution control devices at all inlets. (see plates WM 4.2 through WM 4.5)
d) No systems shall be allowed within the contour for a well field protection Zone 1 as defined in Chapter 27.
e) Only dry exfiltration systems shall be permitted in wellfield protection Zones 2 and 3 as defined in Section 27-376, Wellhead Protection.
f) A dry system is one with the trench bottom at least one (1) foot above the average wet season water table."

Paragraph 27-200(b)(5)d.6

Excavations:

"a)……
f) Excavations for the creation of permanent water bodies in a wellfield protection zone shall not reduce hydraulic recharge distances to public supply wells in excess of two (2) percent, nor shall such excavations be closer to public water supply wells than three hundred (300) feet. "

With the exception of wet retention/detention systems within 300 feet of a supply well and the above noted limitations on underground exfiltration systems no specific limitations exist which would preclude typical dry retention/detention stormwater systems within the wellfield protection zones.

No new wet retention/detention systems or underground exfiltration systems are proposed within the wellfield area as a part of this Stormwater Master Plan.

2.8.2 Wellhead Protection

The wellhead protection rule promulgated by the Florida Department of Environmental Protection is detailed in Florida Administrative Code (F.A.C.), Chapter 62-521. The intent of the wellhead protection rule is to protect potable water wells, as defined in Rule 62-521.200, F.A.C., from contamination, and to prevent the need for their replacement or restoration due to contamination. The wellhead protection area means an area designated by the Department consisting of a 500 foot radial setback distance around a potable water well and includes the surface and subsurface areas surrounding the well. The discharge of stormwater into the 500 foot radial setback of the wellhead protection area is not specifically prohibited by F.A.C., Chapter 62-521. The limits of wellfield and wellhead protection areas are indicated on Figure 2.7

One of the greatest threats to the existing Pompano Beach Wellfield is saltwater intrusion. See Figure 2.8 for the approximate limit of saltwater intrusion line along the Broward County Coastline. Maximizing the reuse of stormwater on the Air Park property is an effective means of slowing or preventing further progression of the saltwater wedge.

If the saltwater intrusion line is permitted to reach the wellfield, substantial costs will be incurred by the public to further treat the potable water from the wellfield or find new sources to meet local demand. The proposed Stormwater Master Plan serves to promote the recharge of groundwater in the area of the wellfield.

2.9 Wetlands

The Broward County Environmental Protection Department Geographic Information System, Broward County Wetlands, Updated December 31, 2004 does not indicate wetlands at the Pompano Beach Air Park. See Figure 2.9.

A borrow pit pond was created between 1957 and 1980 and is located off the end of Runway 24. The approximate surface area of this water feature is 4.6 acres. See Figure 2.10.

The entire project area was remotely evaluated for the presence of wetlands based on review of the U.S. Geological survey, Soil Conservation Service, and National Wetland Inventory (NWI) databases and maps, as well as current aerial photography. The area indicated above as a borrow pit pond shows up on the National Wetland Inventory as a crescent shaped, isolated wetland further described as a Palustrine System of non-tidal freshwaters, less than 20 acres in size, without active wave-forming or bedrock shoreline features, and having a low water depth of less than 6.6 feet in the deepest part of the basin, and salinity less than 0.5 ppt. This type of wetland is characterized by having emergent wetland vegetation of perennial plants that persist from growing season to the next growing season.

The approximate wetland/borrow pit pond limits were not field verified; however, review of the site does not indicate that wetland areas will be impacted by the proposed Stormwater Master Plan improvements. This water feature may act as a wildlife attractant and its placement is not consistent with current FAA guidance for eliminating such wildlife attractants.

Figure 2.10 Pond at Runway 24 Departure End

2.10 Wildlife Issues

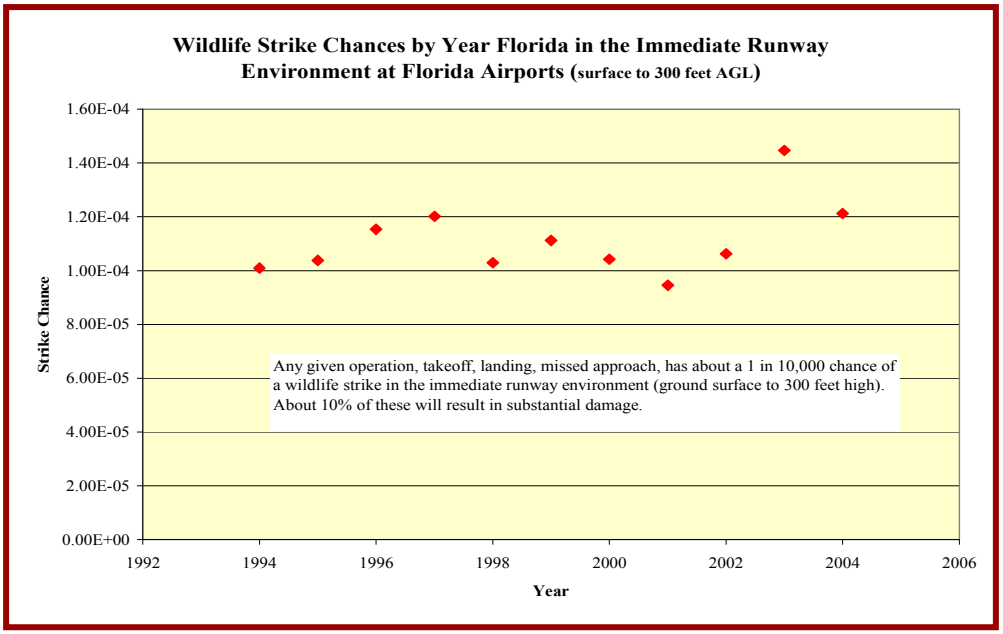
Based on review of available literature, the 2008 Master Plan identified species of special concern that may be impacted by airport projects within or near the airport property. The 2008 Master Plan may be consulted for additional information on the results of the literature search.

Burrowing owls, gopher tortoises, and exotic iguana populations have been identified as living on Air Park property, some within close proximity to runways and taxiways. Future design and construction projects should include the evaluation of the possibility of wildlife issues as part of permitting activities. Refer to Section 3.1 for discussion of airport wildlife issues and how the Master Drainage Plan helps to mitigate their impact.

Figure 2.11 Final Approach to Runway 33

Due to the increasing threat posed by wildlife in and around airports, recent rulemaking has been enacted in Florida which permits the take of wildlife on airport property for the purpose of ensuring aircraft and human safety. Ref. Florida Administrative Code Rule 68A-9.012 effective 7/27/2010 below. Figure 2.11 gives an airborne perspective of the altitude at which most bird strikes occur. Figure 2.12 gives the likelihood of a wildlife strike in the immediate runway environment.

Figure 2.12



68A-9.012 Take of Wildlife on Airport Property.

Any airport may take wildlife on airport property for the purpose of ensuring aircraft and human safety in accordance with this rule. An airport or other entity owning or operating an airport as defined in Section 330.27(2), F.S., or their officers, employees, contractors (or employee of a contractor) or member of the airport's governing body as referenced in Section 379.2293(5), F.S., may carry out the activities specified in this rule. Notwithstanding the provisions of this section, the executive director or a designee may issue permits authorizing the take of additional species of wildlife, additional methods of take or alternative forms of disposition and transportation for justifiable purposes pursuant to Rule 68A-9.002, F.A.C., provided authorizations shall be denied or revoked upon reasonable conclusion that the requested or permitted activity would be detrimental to fish and wildlife resources or public health and safety.

(1) The taking and disposition of species regulated by the United States Departments of Interior or Commerce in 50 C.F.R. §10.13 (Migratory Birds), 50 C.F.R. § 17.11 and §17.12 (Threatened and Endangered Species), 50 C.F.R. §22 (Bald Eagle), 50 C.F.R. §223.102 and §224.102 (Marine Species), is allowed pursuant to federal authorization. No additional Commission authorization is required.

(2) The following paragraphs control the take of black bears and species described in Chapter 68A-27, F.A.C., except species described in subsection (1):

(a) Any of these species may be harassed by persistent, non-injurious disturbance without physical capture or direct handling to disperse wildlife when the wildlife poses an imminent threat to aircraft and human safety.

(b) Any of these species may be otherwise taken when:

1. The wildlife poses an imminent threat to aircraft and human safety; and

2. A situation requires an emergency response which does not allow time for paragraph (2)(a); or

3. Attempts using paragraph (2)(a) have been documented as unsuccessful and when:

a. The airport is implementing a Federal Aviation Administration approved wildlife hazard management plan; and

b. The airport has made habitat management alteration that has eliminated or significantly reduced hazardous wildlife attractants on airport property.

(c) Wildlife burrows, including gopher tortoise burrows, within the safety area as defined in 14 C.F.R. § 139.5 may be destroyed after or while all existing gopher tortoise(s) within the burrows are live captured.

(3) Notwithstanding any provision of Commission rule, an airport authority may take all other wildlife not described in subsections (1) and (2) on airport property if their presence poses a potential threat to aircraft and human safety.

(4) Notwithstanding any provision of Commission rule, wildlife in subsections (2) and (3) taken pursuant to this rule may be taken by any method except the following:

(a) Poison, other than those pesticides that are registered by the Florida Department of Agriculture and Consumer Services without additional authorizations and are only used in a manner consistent with the product labeling and wellfield protection restrictions.

(b) Leg hold traps except those commercially manufactured padded-jaw traps.

(c) Traps, nets and snares unless they are visited at intervals not exceeding 24 hours.

(d) Any method prohibited pursuant to Section 828.12, F.S.

(e) Live capture of any deer, except Key deer as authorized by subsection (1).

(f) The killing of gopher tortoises is prohibited.

(5) Disposition of live-captured wildlife.

(a) Any species described in subsection (2) live captured shall be immediately released provided the release site and capture site are located on a contiguous piece of airport property or a permit or authorization has been obtained from the Commission for off-site release or alternative forms of disposition.

(b) Any species described in subsection (3) live captured by any method shall be released or euthanized within 24 hours following capture or inspection of a trapping device containing wildlife except,

1. Wildlife may only be released if:

a. The wildlife is released on the property of the airport provided the release site and capture site are located on a contiguous piece of property; or

b. The wildlife is a native species; and

c. The property where the animal is to be released is located within the county of capture and is a minimum of 40 contiguous acres; and

d. The person releasing the wildlife is in possession, at time of release, of written permission from the property owner allowing such action.

2. Euthanasia of wildlife shall be humane as defined by the American Association of Zoo Veterinarians or the American Veterinary Medical Association.

3. Euthanasia of any live captured bobcat is prohibited and any live captured bobcat shall be released as provided in subparagraph 1.

(6) Transportation of wildlife.

(a) Live-captured wildlife described in subsection (3), may be transported pursuant to this subsection only for:

1. The purpose of euthanasia as provided in subsection (5); or

2. The purpose of release as provided in subsection (5).

(b) Transportation of wildlife authorized by this subsection shall not supersede the provisions of any rabies alert or area quarantine issued by County Health Departments or County Animal Services.

(7) Wildlife described in subsections (2) and (3) that is killed pursuant to this rule or parts of that wildlife shall not be retained for personal use and shall be buried or incinerated.

(8) Any take that kills wildlife described in subsection (2) shall be reported by the airport. An Airport Wildlife Incident Report (Form FWC-AWIR 06-2010, herein incorporated by reference) must be submitted to the Commission within 5 business days. The form is available at MyFWC.com and must be submitted to the Protected Species Permit Coordinator, 620 S. Meridian Street, Mail Station 2A, Tallahassee, FL 32399-1600 or by email at AirportIncidents@myFWC.com.

Rulemaking Authority Art. IV, Sec. 9, Fla. Const. Law Implemented Art. IV, Sec. 9, Fla. Const. History–New 7-27-10 .

2.11 Local Area of Particular Concern

Local Areas of Particular Concern as defined by the Broward County Development Code exist within the airport boundaries (See Figure 2.13). The locations of these areas are inconsistent with the guidance provided in the Florida Department of Transportation Aviation Office Airport Compatible Land Use Guidebook dated August 2010. Figure 3.3 of this guidebook indicates for airports serving piston-powered aircraft, hazardous wildlife attractants must be 5,000 feet from the nearest air operations area. Paragraph 6 on Page 3-14 of the guidebook states;

> *"Parks, natural resources, and natural areas have the potential to create wildlife hazard attractants on or near airports. Areas that are pre-existing within the separation criteria distances in Figure 3-3 should be assessed on a case by case basis to determine if they pose a risk to aviation safety."*

Review of the 1947 historical aerial indicates the areas on air park property which are currently designated a LAPC's were not historical heavily treed areas. The long range development plan for the airport indicates development may occur in these areas. The conceptual surface water management plan avoids changing the designated uses in these areas.

Section 3
Study Methodology / Project Approach

3.1 Introduction

The analytic approach for the both the Existing and Future Conditions Components of the Master Drainage Plan anticipates non-presumptive, alternative design criteria for future development. That is, the approach used for the baseline is consistent with the approach for the Future Conditions Component that is summarized in this report.

Briefly, alternative designs have reasonable assurance of meeting or exceeding quality and quantity management Conditions of Issuance of Florida Administrative Code (FAC) 40E- 4.301 and 4.302 for a permit. However, they use systems and designs that are not included in the Basis of Review of the South Florida Water Management District. Much of the development on the airport has already been done in this manner, yielding both safety improvements and costs savings.

Use of alternative criteria is in part due to safety related guidance and criteria that are specific to aviation. Most important of these is FAA Advisory Circular 150/5200-33A *Hazardous Wildlife Attractants On or Near Airports*. Florida Statute 333 *Airport Zoning* may also apply safety constraints in its application. Also, the project anticipates continued use of the existing borrow pond at the end of runway 24, an existing wildlife attractant that is unlikely to be substantially altered, in a water quality role. The geometry of the pond and the need to avoid additional habitat creation will require alternative design options. Therefore, the baseline study is done using approaches that will be consistent with those expected elements of the Planned Conditions Component of the Master Drainage Plan and with most airport development.

The existing observed conditions at the Air Park do not indicate clearly defined offsite stormwater flows from the airport property, even during large rain events. However, in the area near the Fire Station on NE 10th Street, airport staff has indicated stormwater tends to encroach onto the road during extended and intense rain events. The modeled data indicates the highest discharge flow rates in this area of NE 10th Street to outfall “ROAD”. Stormwater has not been observed, by airport staff, encroaching on roadways on the southwest corner of the property. This location has the second highest modeled discharge flows. The model does contain other outfall points with discharge flow rates. These flows would be in the direction of the City owned Golf Course. It is believed that model is highly conservative due to the use of conservative infiltration rate and airport staff observation of site conditions during extreme events.

3.2 Limiting Conditions

The Future Conditions component of the Master Drainage Plan and/or upcoming development projects are based on the principles listed below.

1. Existing wet ponds and/or manmade wet areas may be used for water quality treatment without increasing the hazard to aircraft. This is an existing hazard that, unless substantially physically modified, is not changed by changing use.
2. Quality management should use overland flow, swales or dry systems to reduce pollutant loads to the maximum extent practicable.

3. Post-development pollutant loads (Future Conditions component) should not exceed pre-development pollutant loads (Existing Conditions component), and should be reduced toward a natural vegetative community condition (possible new rule) to the maximum extent practicable.
4. Flood impacts must be fully mitigated. Diversion of water that has received quality treatment to non-flood sensitive areas is utilized.
5. If new wet ponds are required for quantity attenuation or flood management, these must be located to minimize the potential hazard to aircraft, either directly or as a wildlife attractant, and the existing water supply wellfield.

3.3 Evaluation Approach

The specific approach steps and procedures used to establish the baselines in this Existing Conditions Component are outlined following.

3.3.1 Land Use

Delineated areas of similar land use based on those listed in Table 3.1 Land Use Categories Used for Project Analysis. The delineated areas may contain isolated and/or limited examples of other land use, but are predominantly as shown. For example, industrial areas may contain small commercial sites within their limits, but are predominantly industrial.

- Land Use delineations are independent of drainage basin delineations and based on the Airport Master Plan and Airport Layout Plan

Table 3.1 Land Use Categories Used for Project Analysis

Runway
Taxiway
T-Hangars
General Aviation Apron Overland
Undeveloped or Open Land, grassed
Undeveloped or Open Land, forested
Low Intensity Commercial
General Aviation Apron, direct discharge
Golf course

- Event Mean Concentration (EMC) Data for the identified land uses are included in Appendix H.

3.3.2 Drainage Basins and Parameters

- Delineated major drainage basins and flow directions using the topographic mapping done for the project as supplemented by field reconnaissance.
- Determined the types and percentages of land use in each basin in the existing condition.
- Established Green-Ampt Infiltration parameters for the airport. Estimated the storage volume in each basin from topographic maps and contours.
- Basins containing airfield pavements (runways and taxiways) were further subdivided into pavement areas with overland flow areas and remaining infields.
  Refer to Figure 3.1 Typical Sections with Basin Parameters.

3.3.3 Hyetographs

- For event simulations, the 25-year or 100-year, 72-hour NRCS/SCS Type II Florida Modified hyetograph discretized into 5-minute intervals were used. Figure 3.2 graphically shows the incremental hyetograph for the 25-year storm.
- For continuous simulation for load calculations the 5-minute rainfall records collected in the Statewide Airport Stormwater Study for the period from **May 10, 2002** through **September 30, 2002** were used. The hyetograph Figure 2.4 in the previous section graphically illustrates the continuous record available for both the hydrology/hydraulics (dynamic wave) and pollutant load calculation. It also provides summary data information.

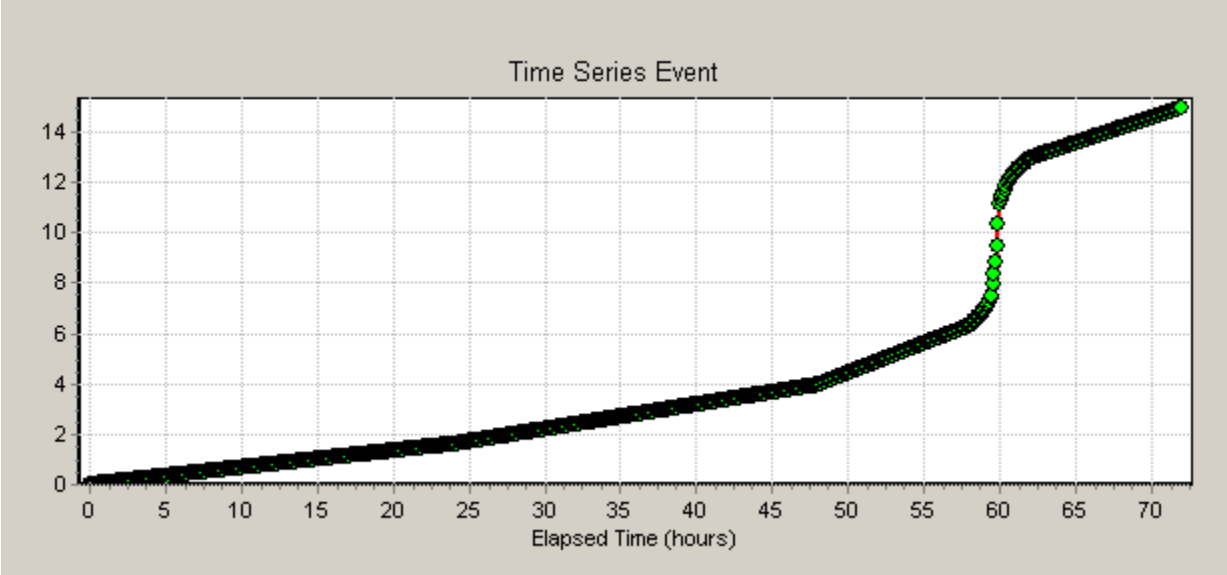


Figure 3.2 Rainfall Data for 72 Hour Event Model Simulation

3.3.4 Receiving Water Elevations

- Used stage data from previous simulations, existing topography or other models
- The event simulation used in time-stage data at exterior boundary nodes, if available.

3.3.5 Aquifer Parameters

Aquifer properties are site specific, based on the conditions at each airport. The values used represent our best estimate of the aquifer properties at Pompano Beach Air Park, based on the available data. Some of the data used in the calculations is derived from existing literature (site specific soil reports or generic mappings), and the summary table in Appendix F provides more information regarding the sources. For any specific project, it will be necessary to do field and laboratory tests to validate or revise that data, site by site, to include as a minimum, the following.

- Determine hydraulic conductivity for in-situ and engineered soils
- Estimate water table elevation based on local conditions
- Verify Green-Ampt soil parameters

For this project, aquifer values for 3 general areas were selected. These include one for the wellfield area designated GWW, one for the Airfield (GWA), and one for the golf course (GWE). They were selected based on existing local conditions, either noted during field reconnaissance or provided by the City of Pompano Beach personnel, as well as data such as the Broward County model. See Figure 3.3 for Draft Broward County Water Table Map (Dry Season).

3.3.6 Event Hydrology and Hydraulics

- Used computer program *EPA-SWMM 5* (United States Environmental Protection Agency Storm Water Management Model version 5) to calculate event runoff quantity and stage. Runoff is based on Green-Ampt infiltration with site specific calibrations and parameter measurements. The full Dynamic Wave routing provides an explicit solution of the St. Venant equations for routing.

3.3.7 Continuous Simulation Hydrology for Pollutant Load Estimates

- Used computer program *EPA-SWMM 5* with the 5-minute continuous hyetograph.
- Used Event Mean Concentrations (EMC) from Appendix H – EMC Data Subcatchment Land Use Pollutant Wash Off Summary. The selected process multiplies the runoff times the EMC to develop the load. The load is summed to develop a cumulative load over the simulation period.
- Used BMP efficiencies for overland flow from the Statewide Airport Stormwater Study. Used pond and swale efficiencies from literature search.

3.4 Baseline Conditions

3.4.1 Existing Hydrology and hydraulics Summary

The SWMM simulations for the design event and for the historical, continuous rainfall are included on an attached disk. Existing Storage Areas for the SWMM Model are shown on Figure 3.4.

Results are summarized following:

Table 3.2 Existing Condition Water Quantity Summary

Length of Simulation	Total Rainfall (af)	Rainfall Depth (in)	Outlet Location	Maximum Outlet Discharge (cfs)
72 hours / 25 year	**744.67** (Total System)	**14.95** (Total System)	North Golf Course Golf Course Clubhouse NE 10th Street Southwest **Total System**	65.36 253.07 106.15 380.10 160.32 **665.93**
72 hours / 100 year	**1042.54** (Total System)	**20.93** (Total System)	North Golf Course Golf Course Clubhouse NE 10th Street Southwest **Total System**	129.41 476.30 147.31 581.57 429.32 **1676.51**

Table 3.2 Existing Condition Water Quantity Summary

Length of Simulation	Total Rainfall (af)	Rainfall Depth (in)	Outlet Location	Maximum Outlet Discharge (cfs)
May 10, 2002 to September 30, 2002	**1393.80** (Total System)	**27.98** (Total System)	North Golf Course Golf Course Clubhouse NE 10th Street Southwest **Total System**	5.87 54.68 32.54 48.14 37.13 **130.66**

Outfall areas are enumerated as follows:

North Golf Course	O-49 and O-49a
Golf Course	O-47 and O-47a
Clubhouse	O-12, O-13, O-13a
NE 10th Street	Road
Southwest	O-1

3.4.2 Existing Water Quality Summary

Table 3.3 Water Quality Pollutants included in Evaluation

Constituent	Constituent
Total Suspended Solids (TSS)	Copper (Cu)
Total Nitrogen (TN)	Lead (Pb)
Total Phosphorus (TP)	Zinc (Zn)

The following table summarizes the loads leaving the airport, after infiltration and after treatment on site. This may serve as a baseline that future development should not exceed. Storage areas for the existing conditions SWMM model area included as Figure 3.4.

Table 3.4 Existing Conditions Quality Simulation Results

Location	Q	TSS Lbs.	TN Lbs.	TP Lbs.	Cu Lbs.	Pb Lbs.	Zn Lbs.
N. Golf Course	5.87	1640.84	241.93	15.57	0.210	1.052	1.262
Golf Course	54.68	2080.77	272.21	19.63	0.456	1.342	1.692
Clubhouse	32.54	1638.07	93.55	69.79	0.537	1.799	4.115
NE 10th Street	48.14	586.22	25.70	30.83	0.191	0.699	1.738
Southwest	37.13	980.57	59.11	7.63	0.298	1.213	1.217
Total System	**130.66**	**6926.49**	**692.40**	**143.46**	**1.690**	**6.106**	**10.024**

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Section 4
Planned Conditions and Associated Costs

4.1 Introduction

The goal of the conceptual plan is to provide a storm water management system to accommodate planned future improvements. In order to accomplish this, parameters established in the Florida Statewide Airport Storm Water Study will be utilized to identify current levels of service for the system, and provide either conceptual design modifications or drainage criteria to meet airport needs and jurisdictional requirements.

One probable requirement of any future development is to provide pre-treatment for runoff on the individual sites. This is not the current requirement, but will be needed to satisfy load reduction and/or water quality standards of USEPA, FDEP and SFWMD Proposed Rules. Absent a "treatment train" approach, non-airside projects are unlikely to meet new standards.

4.2 Future Conditions Study Results

4.2.1 Future Hydrology and Hydraulics Summary

The SWMM simulations for the design event and for the historical, continuous rainfall are included on an attached disk. It should be noted that the model includes a portion of the golf course that will not change land use under phase 1. In the future, redevelopment of this portion of the golf course to aviation use is proposed, so the model limits include 2 basins (47 and 49) that remain relatively unchanged in this project. Results are summarized following:

Table 4.1 Future Condition Water Quantity Summary

Length of Simulation	Total Rainfall (af)	Rainfall Depth (in)	Outlet Location	Max. Outlet Discharge (cfs)		
				Existing	Future	δ
72 hours / 25 Year	**751.19** (Total System)	**14.95** (Total System)	N. Golf Course	65.36	62.73	2.63
			Golf Course	253.07	204.87	48.20
			Clubhouse	106.15	99.30	6.85
			NE 10th Street	380.10	310.93	69.17
			Southwest	160.32	96.31	64.01
			Total System	**665.93**	**583.30**	**82.63**
72 hours / 100 year	**1044.16** (Total System)	**20.93** (Total System)	N. Golf Course	129.41	124.79	4.62
			Golf Course	476.30	427.88	53.04
			Clubhouse	147.31	140.49	59.86
			NE 10th Street	581.27	356.52	224.75
			Southwest	429.32	376.47	52.85
			Total System	**1676.51**	**1152.01**	**524.50**
May 10 2002 to Sep 30 2002	**1395.97** (Total System)	**27.98** (Total System)	N. Golf Course	5.80	5.87	0
			Golf Course	54.68	35.75	18.93
			Clubhouse	32.54	24.75	7.79
			NE 10th Street	48.14	43.72	4.42
			Southwest	37.13	12.75	24.38
			Total System	**130.66**	**78.21**	**52.45**

NOTE: The results reported above are summarized from the calculations. The differential (δ) summary from individual results will not equate to the system total because the individual maximums occur at different times. Therefore, only the system discharge differentials will be summarized. According to the results, proposed discharge is less than existing, per Water Management District and Broward County regulations.

4.2.2 Future Water Quality Results

Table 4.2 Future Condition Quality Simulation Results

Location	Q	TSS Lbs.	TN Lbs.	TP Lbs.	Cu Lbs.	Pb Lbs.	Zn Lbs.
N. Golf Course	5.87	1641.01	241.94	15.569	0.210	1.052	1.262
Golf Course	35.75	1722.78	226.14	16.065	0.371	1.094	1.381
Clubhouse	24.75	269.74	32.98	2.814	0.075	0.162	0.221
NE 10th Street	43.72	20.42	2.99	0.200	0.003	0.013	.016
Southwest	12.75	298.85	12.74	1.108	0.082	0.476	0.405
Total System	**78.21**	**3952.85**	**516.79**	**35.755**	**0.740**	**2.797**	**3.286**

4.3 Planned Improvements Summary

The following table summarizes future projects identified in the July 2008 Master Plan, infrastructure improvements needed to implement them and probable costs. Reference Figure 4.1 for the proposed airside improvements. Additional projects such as hangars for FBOs or commercial developments for out parcels are also included in the summary, as facilities that would enhance revenue streams or landside operations for the airport. Section 4.5 discusses the basin improvements in more detail.

Note that the following summary includes drainage infrastructure costs only, not costs associated with minor drainage improvements that are part of individual projects.

Table 4-3 Planned Projects With Infrastructure Costs

Project Description Basin Location	Proposed Drainage Infrastructure Improvements	Estimate Drainage Improvements Costs (2010 Dollars)
Initial Development of Parcel 4A and X; Basin 1A, 2A, 3A, 4A	Swales, culverts, dry detention areas	$150,000
Development of 2 additional parcels in the southwest corner of the airport; Basin 1A, 2A, 3A, 4A	Swales, culverts, dry detention areas	$150,000

Table 4-3 Planned Projects With Infrastructure Costs

Project Description Basin Location	Proposed Drainage Infrastructure Improvements	Estimate Drainage Improvements Costs (2010 Dollars)
All development on southwest quadrant of the airport Including taxiway and runway extension. Basin 1A, 2A, 3A, 4A	Swales, culverts, dry detention areas	$250,000
Development of Parcel F; Basin 12	Dry detention grading Runway 15 -33 RSA,	$75,000
Development of Parcel YY; Basin 50	Dry storage area	$20,000

4.4 Limitations of Future Development Implementation

Construction of the projects listed in this report can occur in any sequence following permitting of the system retrofits. However, it should be noted that improvements beyond the limits of a particular parcel may be necessary to meet water management requirements. Basin location maps for the existing and future conditions are included in Appendix J. This is explained in more detail in the following section with regard to projects located on the south area of the airport:

4.5 Detail of Planned Improvements by Basin

Basins 1A, 2A, 3A, and 3B

Refer to attached Figure 4.2.1 (At the end of this Section)

These basins present infrastructure improvements designed to support development in Parcels 4A, BB and X on the south side of the airport adjacent to NE 10th Street. Currently, excess runoff from Basin 3A that does not infiltrate is routed to either Basin 3 or 3B and across paved surfaces to the east where it discharges across NE 10th Street or in the direction of the clubhouse parking lot, contributing to existing flooding in the vicinity. In conjunction with development of the three referenced parcels, the following infrastructure improvements are necessary to divert runoff to infield storage areas. Any connecting piping is assumed to consist of inverted siphons or similar geometries in local use.

Basin 1A

Basin 1A is that portion of Basin 1 that remains when existing Runway 6-24 Runway Safety Area (RSA) becomes available upon decommissioning of Runway 6-24. This area is expected to support development of T-hangars or similar aviation uses and current runoff from the existing vegetated condition collects in an existing low area designated S-1 where it infiltrates or discharges from the site. For the future condition, which anticipates 75% impervious coverage of the available site, runoff should be directed to the new collection impoundment S-1A from which it is routed across the RSA to Basin 2A.

This connection is proposed as a culvert to meet local wellhead protection zone concerns and FAA regulations while Runway 6-24 remains in service. Recommended pipe materials in areas to remain vegetated may be at the construction designer's option.

Basin 2A
Basin 2A is that portion of existing Basin 2 necessary to support development of extensions of Runway 10, Taxiways Lima and Kilo. The remainder of Basin 2 is not available for development as it includes Well #9 protection zone and overlapping runway Building Restriction Lines (BRL). Runoff from this area currently flows overland to collect in storage Area S-1.

Storage Area S-2A should be constructed on the north end of the Runway 6-24 RPZ to provide the terminus for the culvert system from S-1A. It is also intended as the initial water management system element for the parcels indicated in drawing 4.2.1, which can be extended toward the north to the limits of the Runway 10 RPZ (refer to Drawing 4.2.3).

Note that this area is available for water management for any of the undeveloped parcels along NE 10th Street. As development of the remaining parcels occurs, the system can be extended around the end of Runway 10 and discharged into the AOA infield. This will be addressed in later sections of this report.

Basin 3A and 4A
This sub basin includes Parcels 4A and BB and is currently minimally developed (an existing FBO is located in the southwest corner) with a grassed infield surrounded by taxi lanes and surface roads. Runoff from paved surfaces tends to collect in the infield and infiltrate but has the potential to overtop the existing tower access road during extreme or intense rain events. In the event this occurs, the additional shallow concentrated flow across the T-hangar area increases the probability of flooding in the ARFF vicinity (refer to Sub-basin 12A on Drawing 4.2.2). To prevent this, a new swale to collect runoff associated with development in these parcels or structural controls such as shallow curbs should be constructed to divert captured rain water back toward a new culvert(s) across the FBO's taxilane to S-1A. This will connect this sub basin to the future water management system for the area. Typical sequencing is shown in Figure 4.7.1, 4.7.2, 4.7.3.

Basin 3B and 4
These infield areas bounded by taxiways and aprons provide a limited amount of storage in the current geometry. The plan recommends these areas be graded as indicated in Drawing 4.2.1 and 4.2.2 to provide additional capacity for infiltration and decrease contributions to flooding in Sub-basin 12A.

Basins 4, 12, and 12A
Refer to Attached Figure 4.2.2 (At the end of this Section)

Basin 12
Currently, Sub-basin 12 consists of open grassed areas bounded by NE 10th Street, a parking lot, aprons, and other airfield operations pavements. Runoff from pavements sheet flows to the pavement edge where it spreads across the open ground. Some of the runoff is trapped and infiltrated there, but topographic data in this area indicates a well developed shallow channel parallel to Taxiway Lima extending to the southeast corner of the airport operations area (AOA).

Discharge from this area is via a small diameter culvert under the ARFF building driveway or over grade breaks between sub basin 12 and 13 or across NE 10th Street.

Future developments proposed for the area include grading the Runway 15 Safety Area (RSA) at the end of Runway 33 to FAA standards and Parcel F improvements. Grading the RSA will provide the beginning of a grade break dividing Sub-basin 12 into 12 and 12A. In order to develop the remaining parcel along NE 10th Street (designated F), the plan includes additional grading in basin 12 to excavate the dry pond and further extend the RSA to block the shallow channel. This provides a decrease in runoff to the discharge points even though Parcel F may add as much as 4 acres of new pavement. It should also be noted that the grading improvements discussed should include provisions to protect the slopes and ground surface crossing the shallow channel to prevent erosion and re-establishment of the channel.

Basin 12A

This should include grading in the RSA supplemental to that described in the previous section and as indicated on Figure 4.2.2.

Basins 15, 18, 57, 21 and 23

Refer to Attached Figure 4.2.3 (At the end of this Section)

All the sub basins on the west side of the air field (between the AOA and NE 5th Street) are part of the City of Pompano Beach's water supply system. The basins listed are within these limits or the AOA infield. The current grading of these areas provides surficial storage ranging from shallow depressions to channelized infield catchments. There are no connections between sub basins other than non-structural overflow weirs.

Improvements in this area in the short term are limited to water management facilities in support of development in Basins 1A, 2A, and 3A. Culverts under the RSA's are necessary but otherwise, storage areas may consist of open dry ponds, an example of which would be to extend S-2 as far as Basin 15 if needed for development in any of the referenced basins. As additional parcels are developed, runoff would be routed from storage area S-2 under the Runway 28 RSA (adjacent to Runway 6 edge of pavement) to open storage in Basin 57. This sequence would continue from Basin 57 to 65 then to 23, etc.

Basin 50

Refer to Attached Figure 4.2.4 (At the end of this Section)

This sub basin is largely undeveloped at this time, with the exception of an equestrian facility and the well field. It is also forested over a large percentage and site grading decreases from west to east. The Airport Master Plan indicates Parcel YY is available for aviation related development. Water Management for this location is proposed for storage area S-50, a dry ditch in the Taxiway Bravo clear zone. This location is outside of parcel YY but extends from it to the Taxiway Delta extension dry ditch.

4.6 Permitting

The conceptual permit encompasses the entire airport and future permitting work will involve updating of the existing SWMM model developed for this study and incorporated into any future

impact studies. The modeling for the master plan considered specific amounts of new impervious area. If these areas are increased above the amount evaluated in the modeling for future conditions, additional analysis may be required.

The permitting approach for future development at the Air Park should allow for evaluation of development of individual projects and parcels within the Air Park considering the overall Stormwater Master Plan.

4.7 Implementation

The improvements recommended in the Master Plan may be phased to meet the development needs of the airport. Projects which are envisioned to occur in the near future include the Runway 13-33 Rehabilitation, Relocation of Taxiway Kilo and the development of Parcel X, BB and 4A. Other near term projects could include the development of Parcel F, east of the current FBO site. The general intent is to globally view stormwater issues for the entire airport and not restrict evaluation of individual parcels based on a glass wall analysis of the individual parcel.

The Runway 13-33 Rehabilitation Project has already been evaluated based on a glass wall analysis of the project area and has received an ERP permit. The construction phase of this project is currently out for bid.

The relocation of Taxiway Kilo is currently in the design phase. The tentative plan is to connect the various basins by means drainage structures under the taxiways and runways and convey excess stormwater to an area north and east of the intersection of Runway 13-33 and Runway 10-28. This project will not substantially increase the impervious area over that existing prior to the relocation of the taxiway. Historically the rainfall was contained in the pervious areas bounded by taxiway and runway pavements and did not include drainage structures. Based on the modeling it does not appear that the drainage structures are needed to prevent stormwater from ponding and encroaching on the existing or proposed pavements. The connecting pipes will tend to equalize the stage levels in the connected basins. Stormwater from this area should be directed to the north and discharges to the south should be minimized to prevent increasing flow to the southeast corner of the property. The proposed Taxiway Kilo Improvements were considered in the proposed future development model.

The development of Parcels X, BB and 4A will require the excess stormwater from large storm events to be directed toward the north and then the east. This infrastructure may be added in a phased approach as the parcels are developed. The total amount of impervious pavement in each parcel will determine the size and timing of these improvements. It is recommended that a conveyance be added under the existing Parcel 4A Taxiway prior to any substantial additional development of Parcel BB or 4A. The stormwater flows from the development of Parcel X should be directed away from the wellhead and to the north as depicted on Figure 4.2.1.

Development of Parcel F will require the creation of a dry detention area between the parcel and the runway safety area. This can be achieved by building up the runway safety area on the approach end of Runway 33, see Figure 4.2.2.

4.8 Conclusions and Recommendations

The intent of the Master Drainage Plan is to evaluate the current existing conditions and provide a coordinated approach for future individual stormwater management projects for the airport. This Stormwater Master Plan provides a “big picture” approach which can be used as a planning, permitting, and design guidance tool for proposed work at the airport. The plan

reduces the stormwater flows which have historically trended toward the southeast and southwest corners of the property. The stormwater flows which result from the creation of new impervious area will be directed toward the center of the airfield or, in the case of new development on the southeast quadrant of the airport, the flow will be detained and infiltrated prior to reaching the depressed area near NE 10th Street.

The proposed improvements, if implemented, will result in substantial decreases in the modeled maximum discharge flows and consummate reductions in offsite pollutant loads. Increasing the volume of stormwater contained on site serves multiple beneficial purposes including but not limited to slowing saltwater intrusion and recharging the aquifer.

Retaining water on site needs to be balanced with the need for safe air operations. The FAA does not permit ponding in the swale areas adjacent to runways and taxiways for the 5-year, 24 hour storm event per AC 150/5200-33 because the standing water is considered a wildlife attractant. Additionally no ponding on the runways is permitted during the 100-year, 72 hour event. Designs which result in new wildlife attractants or ponding on the runway should not be approved.

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Executive Summary

Planning and development projects at Pompano Beach Air Park (PMP) are conditioned on adequate stormwater management. This includes water quality and flood protection requirements more or less typical to all projects in the area. Additional provisions unique to the airport environment are needed to avoid or mitigate wildlife attractants and other safety hazards. The added safety provisions often dictate atypical water quality and flood protection solutions, technically referred to as "alternative design criteria" or "non-presumptive" design. Solutions of this type are used to obtain Environmental Resource Permits (ERP) from the South Florida Water Management District (SFWMD); local approvals from Broward County Department of Planning and Environmental Protection (DPEP); the City of Pompano Beach; and approvals from the Federal Aviation Administration (FAA).

This Master Drainage Plan outlines design criteria and structural controls for water management systems for the Air Park. It includes both an Existing Conditions Component and a Future Conditions Component. The Existing Conditions Component establishes the baseline water quality and flood impact conditions. The Future Conditions purpose is to identify methods to meet or improve baseline conditions as development occurs. The total document will be used to apply for a Conceptual Environmental Resource Permit from Broward County DPEP. This will establish the approach and criteria for up to a 20-year planning horizon. Broward County DPEP construction permits will still be required for new development and some re-development, but the water management approaches, and in some cases the actual facilities, will be pre-established. The water management systems and approaches will also be pre-approved by FAA when the plan is complete. Safety improvements, monetary savings and permitting time reductions are expected benefits.

Methodology

Updated information on the Air Park's planned developments over the next 20 years was obtained from the Pompano Beach Air Park Master Plan Update completed in July 2008 and conversations with the Air Park staff. Current conditions of the Air Park and adjacent properties were collected by review of the latest aerials and by on-site inspections. Other information reviewed included the following:

- Previous land use mapping / historical aerial photography
- Soils Information
- Wetland Information
- Permit information collected from SFWMD, Broward County, City of Pompano Beach, and other sources

Proposed Improvements

The study included an analysis of the entire Air Park water management system. Individual basins in which the future planned improvements are proposed in accordance with the Master Plan were conceptually designed and modeled to determine the effect of the proposed improvements on the basins and the airport as a whole. The specific recommendations and costs associated for each planned development are detailed in Section 4 with individual basin drawings included.

Summarized, airport airside water quality is currently very good to excellent, and overland flow provides needed water quality treatment for operational pavements. This mechanism of water quality management will continue. Enhanced use of the existing golf course on the east side of the airport is proposed to accommodate potential future improvements in the east quadrant.

Recommendations

It is recommended that the Air Park use guidelines as discussed in this report to permit and construct drainage improvements for each development project. If projects designed by Air Park Consultants are completed in accordance with recommendations of this report, the effort involved in permitting may be limited to the project's detailed site design and the identification of relevant design parameters (amount of new impervious surface, location of connection to existing system, etc).

Acknowledgement

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The Hanson Team consists of Hanson Professional Services Inc., Keith and Associates Inc., Tierra South Florida, and I.F. Rooks.