Appendix

Appendix

One. Master Drainage Report
Two. Master Utility Report
Three. FAA Forecast Approval Letter
Four. Study Committee Notes

MASTER PLAN UPDATE
GRAND JUNCTION
REGIONAL AIRPORT

Appendix One

MASTER DRAINAGE REPORT

MASTER DRAINAGE REPORT

Grand Junction Regional Airport

Grand Junction, Colorado

Sponsored By:

Grand Junction Regional Airport Authority

Federal Aviation Administration

March 9, 2009

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ENGINEER'S CERTIFICATION

I hereby certify that this *Master Drainage Report* (plan) for the design of the Master Plan for the Grand Junction Regional Airport was prepared by me (or under my direct supervision) in accordance with the provisions of the *Stormwater Management Manual* for the owners thereof. I understand that the City of Grand Junction does not and will not assume liability for drainage facilities designed by others.

_____

Mark J. Lovato, P.E.
State of Colorado No. 35184
(Affix Seal)

OWNER'S CERTIFICATION

The Grand Junction Regional Airport Authority hereby certifies that the drainage facilities for the Grand Junction Regional Airport shall be constructed according to the design presented in this report. We understand that the City of Grand Junction does not and will not assume liability for the drainage facilities designed and/or certified by our engineer. We understand that the City of Grand Junction reviews drainage plans but cannot, on behalf of the Grand Junction Regional Airport, guarantee that final drainage design review will absolve the Grand Junction Regional Airport Authority and/or their successors and/or assigns of future liability for improper design. We further understand that approval of the Master Plan does not imply approval of our engineer's drainage design.

Grand Junction Regional Airport Authority

_____

Authorized Signature Date

TABLE OF CONTENTS

APPENDIX A

Vicinity Map
Flood Insurance Rate Map
Excerpts from Stormwater Management Manual
NRCS Web Soil Survey Data
Excerpt from AC 150/5200-33B
SCS Method Reference Data

APPENDIX B

HEC-1 Input Data Current Conditions
HEC-1 Input Data Proposed Conditions
Graphical HEC-1 Connectivity Diagrams
ICON/C&B Connectivity Excerpts
ICON HEC-1 Model 10-yr Current Conditions
ICON HEC-1 Model 100-yr Current Conditions
C&B HEC-1 Model 10-yr Current Conditions
C&B HEC-1 Model 100-yr Current Conditions
Jviation HEC-1 Model 10-yr Current Conditions
Jviation HEC-1 Model 100-yr Current Conditions
Jviation HEC-1 Model 10-yr Proposed Conditions
Jviation HEC-1 Model 100-yr Proposed Conditions

APPENDIX C

Hydraulic Calculations
Detention Pond Summaries

APPENDIX D

Existing and Proposed Conditions Basin Map

I. INTRODUCTION

A. Background

The Grand Junction Regional Airport is in the process of updating their Airport Master Plan for the Federal Aviation Administration (FAA). As part of the Airport Master Plan Update, improvements to various roadways are proposed to provide improved circulation and connectivity around the airport, including improvements to Landing View Lane, 27 ¼ Road, and I Road, among others. In addition, various development areas will be added, expanded, or relocated. The improved roadways and development areas will have an effect on existing drainage patterns, basins, and peak flow rates. Traffic circulation patterns and counts will also be affected. Utilities will need to be relocated and/or added as a result of the proposed improvements, as shown on the Conceptual Airport Development Plan.

B. Project Location

This project is located at the Grand Junction Regional Airport (see Vicinity Map in Appendix A). The airport is located northeast of the City of Grand Junction, CO in Mesa County, north of Interstate Highway I-70 approximately one mile along Horizon Drive. The airport is bordered by Bureau of Land Management (BLM) property to the north and east, I-70 and the Government Highline Canal to the south and Road 27 ¼ to the west.

The area studied in this report includes land in Sections 12, 13, 24, 25 and 36 of Township 1 North, Range 1 West of the UTE Meridian and in Sections 3-10, 15-21 and 29-32 of Township 1 North, Range 1 East of the UTE Meridian.

C. Property Description

The property is made up of Commercial and General Aviation areas that utilize the airport for business. The land consists of runways, taxiways, aprons, parking lots, buildings, roadway network and utility infrastructure to serve the operations at the airport.

D. Previous Investigations

There have been two recent drainage reports generated for the areas on and near the airport prior to this report. The first was a Conditional Letter of Map Revision (CLOMR) created by ICON Engineering, Inc. (ref. 2) that analyzed the Corcoran Wash, Indian Wash, Ranchman's Ditch and Leach Creek. This report created sub-basins for the entire area for use with HEC-1 software. The purpose of this report was to request a Conditional Letter of Map Revision (CLOMR) to the Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for the City of Grand Junction, Mesa

County, CO. The report proposed modifications to the flood hazard information along the Horizon Drive Channel (referred to as Ranchman's Ditch), Leach Creek, and North Leach Creek.

The second report was prepared by Carter & Burgess, Inc. (ref. 3) for the development of a new parking lot and access road system for the airport (Landside Improvements Project). The report used the ICON Engineering, Inc. HEC-1 model with a few modifications for the impervious areas created by the proposed facilities. Additional detention and water quality ponds were included into the new model and areas outside the core (Ranchman's Ditch/Landside Improvements Project) were eliminated from the model.

II. DRAINAGE SYSTEM DESCRIPTION

A. Existing Drainage Conditions

The existing basins which convey drainage through the airport are Corcoran Wash, Indian Wash, Ranchman's Ditch and Leach Creek. These basins are mostly undeveloped north of the airport.

There is an existing large dam in the Leach Creek basin that detains approximately 167 acre-feet of water and reduces the amount of flow that is conveyed around the west side of the airport. An additional detention pond was designed with the ICON Engineering, Inc. report along the southern edge of the basin to detain an additional 13 acre feet of runoff. This detention pond has not been constructed at the time of this report.

Ranchman's Ditch is an existing basin that conveys flows through the airport in a system of channels along the north side of the runway and into a new detention pond (WF_PD1) built with the Landside Improvements Project. This detention pond then conveys flows through a system of storm sewer pipes south under the Runway 11/29, aprons and parking lot to another new detention pond (WF_PD2) installed with the Landside Improvements Project south of the airport. This pond then conveys flows to the existing city system to the south.

There is a large dam in the Indian Wash basin that detains 128 acre-feet of water and reduces the amount of flow that is conveyed around the east side of the airport. Several stock dams are also located in the Indian Wash basin and reduce existing flows.

The Corcoran Wash basin is an existing basin that conveys flows through airport property on the west end of the airport that is planned to be acquired in the future. At this time, the area will not be developed with the Master Plan. The property is only being acquired to ensure airport safety and protections zones are accounted for.

B. Master Drainage Plan

The Master Drainage plan for the airport is to develop several new detention facilities to account for areas of development and new roadway systems. These detention ponds are shown on the Grand Junction Airport Master Drainage Existing/Proposed Basin Map (Appendix D). The basins for the Master Drainage study have been associated to the areas that were determined in the ICON report.

C. Offsite Tributary Area

Leach Creek is a large, mostly undeveloped basin that conveys about 8,000 acres of BLM land around the west side of the airport. The Master Plan shows some development in the southern portions of this basin near the west end of the airport.

Indian Wash is a large, mostly undeveloped basin that conveys about 6,000 acres of BLM land around the east side of the airport. The Master Plan shows some development in the southern portions of this basin near the southeast edge of the airport.

Corcoran Wash is a large offsite basin that conveys flows through a small area of land that is planned to be acquired by the airport for runway safety areas/protection zones. Future development is not planned for this area and the existing drainage conveyance will not change.

D. Proposed Drainage System Description

The Grand Junction Regional Airport Master drainage study is divided into four major basins;
1. Ranchman's Ditch, 2. Leach Creek, 3. Corcoran Wash and 4. Indian Wash.

Ranchman's Creek is subdivided into nineteen subbasins and is the main basin that conveys flows through the airport. Subbasin DB21 is north of Runway 11/29 and is comprised of 97.2 acres that conveys flows to an existing detention pond (PD A). Subbasin DB21a is comprised of 217.8 acres that conveys flows to an existing detention pond (WF_PD1) built with the Landside Improvements Project. Subbasin DB23b is comprised of 37.4 acres of runway, taxiway and apron area and coveys flow to an existing 3 foot diameter pipe. Subbasin DB23c is comprises of 50.1 acres of runway, taxiway and apron area that conveys flow to an existing detention pond (WF_PD2). Subbasin DB23d is comprised of 11.1 acres of parking lot and also conveys flows to detention pond (WF_PD2). Subbasin DB23e is comprised of 45.5 acres and conveys flows to an existing detention pond (R_PDU). Subbasin DB23a is comprised of 12.5 acres of area that is planned to be developed and conveys flow to an existing 4 foot diameter pipe. Subbasin DB22 is comprised of 142.5 acres of undeveloped land north of Runway 11/29 and conveys flow to an existing 4 foot diameter pipe. Subbasin DB24a is comprised of 13.6 acres of land adjacent to Runway 4/22 and conveys flows to an existing 4.5 foot diameter pipe. Subbasin DB24 is comprised of 148.4 acres of land that is planned to be developed and conveys flow to an existing detention pond (R_PDL). Subbasin

DB25a is comprised of 20.2 acres of mostly undeveloped land that conveys flows to detention pond (R_PDL). Subbasin DB25 is comprised of 15.6 acres of land adjacent to Runway 4/22. Subbasin R16 is comprised of 99.2 acres that conveys flow to a trapezoidal channel and then off-site. Subbasin R14a is comprised of 25.2 acres of land adjacent to Runway 4/22 and also conveys flow to detention pond (R_PDL). Subbasin R17 is comprised of 103.9 acres of undeveloped land north of Runway 11/29 and conveys flows to a proposed detention pond (R17). This pond is planned to detain approximately 2.0 acre-feet of water to help reduce the amount of flow through the airport after development. Subbasin R15 is comprised of 191.6 acres of runway, taxiway, apron, and parking lot uses that conveys flow offsite. Subbasin R13 is an off-site basin comprised of 27.2 acres of mostly undeveloped land. Subbasin R14 is comprised of 38.5 acres of mostly developed land that conveys flow to a trapezoidal channel off-site. Subbasin R5 is an individual basin on the south end of Runway 4/22 that conveys flow off-site.

Leach Creek is subdivided into eight subbasins and conveys flows around the west side of Runway 11/29. Subbasin L11b is comprised of 4785.0 acres of mostly undeveloped land and conveys flow to an existing major detention pond (RL11bU). Subbasin L11au is comprised of 645.8 acres of mostly undeveloped land and conveys flows to a proposed detention pond (RLOWER). Subbasin L11ad is comprised of 11.1 acres of land and conveys flow off-site. Subbasin L10u is a new split basin comprised of 236.4 acres of undeveloped land that conveys flow to a proposed detention pond (R_L10u). Subbasin L10d is a new split basin comprised of 393.0 acres of land planned to have some development in the future. Subbasin L9.1u is a new spilt basin comprised of 1523.6 acres of undeveloped land that conveys flow to a new storm drainage system south a proposed detention pond (R_L9.1). Subbasin L9.1d is a new spilt basin comprised of 217.8 acres of land planned to have some development in the future. Subbasin L9.1d also conveys flows to a proposed detention pond (R_L9.1). Subbasin L9 is comprised of 131.3 acres of mostly undeveloped land that conveys flows off-site.

Indian Wash is subdivided into nine subbasins and conveys flows around the east side of Runway 11/29. Subbasin I5 is comprised of 511.6 acres of undeveloped land that conveys flows to an existing stock dam (R_I5). Subbasin I4 is comprised of 776.3 acres of undeveloped land that conveys flows along with I3, which is made up of 2051.6 acres of undeveloped land, to an existing trapezoidal channel then onto an existing dam (R_I2). Subbasin I2 is comprised of 622.6 acres of mostly undeveloped land that conveys flow to the existing dam (R_I2). Subbasin I1 is comprised of 484.0 acres of mostly undeveloped land that conveys flows to a proposed detention pond (R_I1). Subbasin I7 is comprised of 656.5 acres of undeveloped land that conveys flows to an existing stock dam (R_I7). Subbasin I6 is comprised of 288.8 acres of land that is planned to be developed in the future and will convey flow to a proposed detention pond (R_I6). Subbasin I8 is comprised of 265.4 acres of mostly undeveloped land that will convey flow off-site. Subbasin I9 is comprised of 435.7 acres of undeveloped land that will not be modified with future development of the airport.

E. Drainage Facility Maintenance

Drainage facility maintenance for all detention ponds on the property of the Grand Junction Regional Airport will be the responsibility of the airport. After final development areas are determined and detention ponds are designed, a maintenance plan shall be created by the airport.

III. DRAINAGE ANALYSIS AND DESIGN CRITERIA

A. Regulations

The regulation for analysis for this study was the City of Grand Junction Stormwater Management Manual (ref. 4). Additional guidance was provided by the Urban Storm Drainage – Criteria Manual (ref. 1).

There are several methods used to determine the values used with HEC-1 for the characteristic of each basin, the SCS Curve Number Method, the Green and Ampt Method and the Snyder Method. These methods were computed in the analysis of this report. According to the City of Grand Junction Stormwater Management Manual "Typical values for Green-Ampt parameters were obtained from the *Drainage Manual for Maricopa County Hydrology* (Maricopa County 2003 (draft))", this procedure was also calculated with this report. The Green-Ampt values produced with the Maricopa method were significantly different than those produced by the ICON analysis. In discussions with the City of Grand Junction Development Engineer, Rick Dorris, PE, CFM, it was determined to use the Green-Ampt and SCS Method similar to how ICON Engineering, Inc. used in their prior study. It was decided that these values used in conjunction with HEC-1 would produce basin characteristics that are compatible to this region.

After reviewing the ICON/C&B HEC-1 models it was determined that the Curve Numbers (CN) and Imperviousness (I) for each subbasin were slightly different than what was generated within Jviation's report for the same areas. These differences can be seen in the SOIL DATA INPUT – CURRENT CONDITIONS, SCS Runoff Curve Number Method spreadsheet located in Appendix B.

The final procedure used to determine the input values for HEC-1 was as follows:
Each subbasin was divided into separate areas by soil type (see web soil survey in Appendix A). A Curve Number (CN) is then derived based on the soil type and imperviousness of each basin. The Initial Loss (IA) is then determined using the SCS Method.

The SCS Method uses a CN value calculated directly from the Imperviousness and soil type:

$S = (1{,}000/CN)-10$
$IA = 0.2*S$
$Q = (P - IA)^2/((P-IA)+S$

The values for precipitation losses, Volume Moisture Deficit (DTHETA), Wetting Front Suction (PSIF) and Hydraulic Conductivity (XKSAT) are selected from Table A1 – Table of Correspondence (see Appendix A) based on the Curve Number (CN).

The Snyder Method is then used to determine lag time (T_{lag}) and the coefficient related to peak rate of runoff (C_P):

$$T_{lag} = Ct\ (LxL_{ca}/S^{0.5})^{0.48}$$
$$C_p = PC_tA^{0.15}$$

A table with the final input values used with the HEC-1 model can be found in Appendix B.

B. Development Criteria

The development of the Grand Junction Regional Airport will be based on the Master Plan created for the FAA and the City of Grand Junction. An airport master plan is a comprehensive study of an airport and usually describes the short-, medium-, and long-term development plans to meet future aviation demand. The goal of a master plan is to provide the framework needed to guide future airport development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts.

C. Hydrologic Criteria

The two design storms analyzed in this study are the 10-year and 100-year design storms. Both storms are compared to the existing flow data provided by the ICON Engineering, Inc. and Carter & Burgess, Inc. reports. The existing HEC-1 model is compared to each study and the data is presented in Appendix B.

Rainfall intensities are obtained from the City of Grand Junction Stormwater Management Manual, Table 602 – Point Rainfall Values for the Leach Creek/Horizon Drive Watershed. The Depth Area Curves (Figure 614, Appendix A) where utilized with 24-Hour Storm, NRCS Type II Rainfall Distribution to generate rainfall depths and runoff.

The routing of the HEC-1 models was compared with the ICON Engineering, Inc. and Carter & Burgess, Inc. routing maps using the software Graphical HEC-1 (see Appendix B). The output shows the routing of the HEC-1 input data. Additional information was added to these routing maps for clarification.

The soil types for the airport and the off-site tributary areas are made up of Type B, Type C and Type D soils (see web soil survey in Appendix A).

This report reviews the flows and detention requirements developed with the ICON Engineering, Inc. and Carter & Burgess, Inc. drainage reports and compares them to the flows generated by the HEC-1 model prepared by Jviation, Inc. The analysis found that the flows for the undeveloped land were 10-20% higher and the flows on the developed land were 10-20% lower. After developing the model for the current and proposed conditions per the soil types and imperviousness of each subbasin all the models were compared to ensure that the flows off-site did not increase. The critical design points that convey flow off-site are as follows:

Comparison Table of Critical Design Points

Design Point	**ICON/C&B-Current Conditions**		**Jviation-Current Conditions**		**Jviation-Proposed Conditions**	
	10-Year	**100-Year**	**10-Year**	**100-Year**	**10-Year**	**100-Year**
L9	260 cfs	645 cfs	193 cfs	604 cfs	148 cfs	446 cfs
C14a	83 cfs	177 cfs	126 cfs	226 cfs	127 cfs	227 cfs
C_1	50 cfs	165 cfs	76 cfs	241 cfs	84 cfs	207 cfs
R13	51 cfs	175 cfs	80 cfs	258 cfs	88 cfs	228 cfs
I1	N/A	N/A	24 cfs	75 cfs	21 cfs	64 cfs
I6	N/A	N/A	41 cfs	206 cfs	40 cfs	173 cfs
C3	N/A	N/A	31 cfs	196 cfs	31 cfs	196 cfs
R5	N/A	N/A	3 cfs	13 cfs	3 cfs	13 cfs
I8	N/A	N/A	5 cfs	116 cfs	21 cfs	141 cfs
I9	N/A	N/A	30 cfs	140 cfs	30 cfs	140 cfs

As the above table represents the allowable release rates for the detention ponds are based on comparing Jviation, Inc. current conditions to proposed conditions. This is done to ensure that the detention ponds are sized to detain the difference between current flows and proposed flows for similar models. The ICON Engineering, Inc. model is used for reference and order of magnitude for the major basins. Due to the differences in the Curve Numbers (CN) used in the different models the flows are higher in the Jviation, Inc. model. Again, to provide similar size detention ponds as in the ICON Engineering, Inc. report, the volume of water that is required to be detained is based on similar models.

As shown, the new detention pond for the Leach Creek Basin (R_L9.1) may be able to be reduced after final development areas and exact routing is determined.

Also, subbasin I8 may require a detention pond to reduce proposed developed flows, after a final development plan is completed for that area.

D. Hydraulic Criteria

The existing storm sewer system was verified using AutoCAD Civil 3D Land Desktop. Pipe flow calculations were calculated using the Manning Formula shown below:

$$V = (1/n)*R^{2/3}*S^{1/2}$$

Where:
V = mean flow rate (ft/s)
R = hydraulic radius (ft)
S = slope of hydraulic gradeline (ft/ft)
n = Manning's roughness coefficient

E. Variance from Criteria

In discussions with the City of Grand Junction Development Engineer, Rick Dorris, PE, CFM it was determined to use the Green-Ampt and SCS Method similar to how ICON Engineering, Inc. used in their prior study. This is a variance from the Maricopa Method as stated in the Stormwater Management Manual.

IV. CONCLUSION

A. Compliance with Manual

This report is prepared in accordance with the procedures and concepts outlined in the City of Grand Junction Stormwater Management Manual (ref. 4) as well as the Urban Storm Drainage – Criteria Manual (ref. 1). Hydraulic Criteria as defined in the Stormwater Management Manual is adhered to and only the variance described above is requested.

B. Design Effectiveness

The design in the report allows the airport to develop portions of the property as required by future aviation demands. Detention ponds will be required in subbasins that are developed for roadway, apron or other aviation related improvements. These detention ponds will have to be designed for construction once the ultimate development is determined for each subbasin. This report gives the airport the guidelines of location and potential size of new detention facilities. Final design of outlet structures and storm system conveyance from subbasin to subbasin will be completed in the future with each construction project.

C. Areas in Flood Hazard Zone

From the Flood Insurance Rate Map, Community Panel Number 080117 0001 0009, revised July 15, 1992, the entire airport lies in Zone X. Zone X is determined to be areas outside the 500-year flood plain.

REFERENCES

1. *Urban Storm Drainage - Criteria Manual*, (revised June 2002) – Prepared by the Urban Drainage and Flood Control District, Denver CO
2. *Ranchman's Ditch (Horizon Drive Channel), Leach Creek, & North Leach Creek Conditional Letter of Map Revision (CLOMR),* (October 2004, revised February 2005) – Prepared by ICON Engineering, Inc.
3. *Land-Side Improvements to Walker Field – Final Drainage Design Report:,* (January 2007) – Prepared by Carter & Burgess
4. *City of Grand Junction Stormwater Management Manual,* (December 31, 2007) – Prepared by WRC Engineering, Inc.
5. *FAA AC 150/5320-5C Surface Drainage Design,* (August 01, 2006) – Prepared by U.S. Department of Transportation, Federal Aviation Administration
6. *FAA AC 150/5200-33B Hazardous Wildlife Attractants on or Near Airports,* (August 28, 2007) – Prepared by U.S. Department of Transportation, Federal Aviation Administration

Appendix Two

MASTER UTILITY REPORT

MASTER UTILITY REPORT

Grand Junction Regional Airport

Grand Junction, Colorado

Sponsored By:

Grand Junction Regional Airport Authority

Federal Aviation Administration

March 9, 2009

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ENGINEER'S CERTIFICATION

I hereby certify that this *Master Utility Report* (Plan) for the design of the Master Plan for the Grand Junction Regional Airport was prepared by me (or under my direct supervision) in accordance with the provisions of the *utility agencies* for the owners thereof. I understand that the City of Grand Junction does not and will not assume liability for utility facilities designed by others.

_____

Mark J. Lovato, P.E. Date
State of Colorado No. 35184
(Affix Seal)

OWNER'S CERTIFICATION

The Grand Junction Regional Airport Authority hereby certifies that the utility facilities for the Grand Junction Regional Airport shall be constructed according to the design presented in this report. We understand that the City of Grand Junction does not and will not assume liability for the utility facilities designed and/or certified by our engineer. We understand that the City of Grand Junction reviews utility plans but cannot, on behalf of the Grand Junction Regional Airport, guarantee that final utility design review will absolve the Grand Junction Regional Airport Authority and/or their successors and/or assigns of future liability for improper design. We further understand that approval of the Master Plan does not imply approval of our engineer's utility design.

Grand Junction Regional Airport Authority

_____

Authorized Signature Date

TABLE OF CONTENTS Page

INTRODUCTION

A. Project Location

This project is located at the Grand Junction Regional Airport (see Vicinity Map in Appendix A). The airport is located northeast of the City of Grand Junction, CO in Mesa County, north of Interstate Highway I-70 approximately one mile, along Horizon Drive. The airport is bordered by Bureau of Land Management (BLM) property to the north and east, I-70 and the Highline Canal to the south and Road 27 ¼ to the west.

The project is in the south portion of Section 24, in the east half of a portion of Section 25, a portion of Section 30, a portion of Section 31, and a portion of the north west quarter of Section 32, Township 1 North, Ranges 1 East and West of the Ute Principal Meridian. The site is approximately 2,334 acres.

B. Site Description

The Grand Junction Regional Airport consists of commercial and general aviation buildings. The infrastructure consists of runways, taxiways, aprons, parking lots, buildings, roadway network and utility infrastructure to serve the operations at the airport.

I. EXISTING UTILITY SYSTEM

A. Existing Infrastructure

1. Water

Existing utility as-built/record drawings were first used to get an idea of the existing water system infrastructure. This existing system was then further verified by the Ute Water Conservancy District. In addtion, field verification was used to further help identify the existing water infrastructure.

An existing 36-inch steel Ute Water Conservancy District supply pipeline runs from the southeast to the northwest across Runway 4/22. It is reduced down to a 30-inch steel pipeline to the south of the roundabout at Walker Field Drive and Eagle Drive. This 30-inch steel pipeline continues to the northwest beyond the end of Landing View Lane. Three airport water elevation Zones of infrastructure are created from this supply pipeline. One water system to the southeast, one to the northeast and another water system to the northwest supply water to the buildings on airport property. Each of these systems contains 8-inch to 12-inch pipeline mains to supply water to the buildings on the property. In addtion, another non-airport system to the west, off of current airport property is

supplied by an 18-inch water main that branches from the water supply pipeline. A map of the existing water infrastructure can be found in Appendix B.

2. Sanitary

The sanitary sewer system servicing the Grand Junction Regional Airport is a gravity system of 8-inch and 12-inch pipelines that exit off airport property to the southwest of the main entrance roundabout at Walker Field Drive and Horizon Drive. An existing sanitary sewer infrastructure map was created from existing utility as-built/record drawings which were verified by the City of Grand Junction and later field verified by Jviation personnel. One note, during field verification, is that the manhole on the southeast end of Aviators Way was not found and may be covered by asphalt millings. The manhole just to the north does show a pipe heading in that direction and the as-built/record drawings show a manhole in that location. The map of the existing sanitary sewer infrastructure can be found in Appendix C.

3. **Communications**

A map of each of the fiber optic and phone utilities was created from existing utility as-built/record drawings. This map was then sent to Chris Johnson at Qwest Communications for further verification. This map is located in Appendix D.

4. **Gas and Electrical**

Using existing utility as-built/record drawings, a map of the existing electrical utilities and a map of the existing gas utilities were created. John Price from Xcel Energy sent gas and electrical drawings that were used to create the Xcel Energy utilities in the existing gas and electrical utility maps. In addition, Steve Don at Grand Valley Power was contacted to verify Grand Valley Power utilities. Steve Don sent drawings showing Grand Valley Power's utility lines on the north side of 27 ¼ Road. The existing electrical utility map and existing gas utility map are located in Appendix D.

5. **Cable TV.**

A map of existing Cable TV utilities was created from existing utility as-built/record drawings. Contact with Jeff at Bresnan Communication was made for verification of existing Cable TV utilities. Jeff stated that Bresnan does not have any active facilities but that there was pipe put in when there was an open trench for future services. The Bresnan Contractor has not made an as-built drawing of where the pipes were placed. A map of the existing Cable TV utilities from as-built/record drawings is located in Appendix D.

B. Existing Distribution Analysis

1. Existing Water Model Design

Water distribution system analysis is based on standards received from District Engineer Edward Tolen, P.E. of the Ute Water Conservancy District. The Grand Junction Regional Airport consists of many commercial and general aviation buildings. A map of the existing water model can be seen in Appendix B. Several scenarios were used in the analysis of the water distribution system including; static, average day, maximum day, maximum day + fire flow, and peak hour flows.

To depict the current conditions of the site, a static water model was created using pressures received from the Ute Water conservancy District and setting the pipeline elevations at an assumed depth of 5 feet below the existing grade. This static scenario means that the water in the pipelines is not moving, but pressurized. Two Zones were identified by Ute Water at two connections to the steel water supply pipeline going through the site. Pressure reducing valves (PRV) locations and their settings were given by Ute Water at connections to the supply pipeline for each Zone. Reservoirs were then placed at each end of the steel water supply pipeline. Water elevations in the reservoirs were adjusted to achieve 140 to 145 psi (pounds per square inch), given by Ute Water in the 30-inch steel water supply pipeline. The PRV connection at Zone 1 to the northwest was given an 80 psi setting by the Ute Water Conservancy District. Due to pipeline variances and the model being set at a constant 5 feet below grade, this PRV was adjusted to 87 psi to get the required static 75 psi at node J-17, given by Ute Water. For this same reason, the Zone 2 PRV was adjusted from the given 105 psi to 98 psi, to achieve the required static 85 psi at node J-42.

Average day demands were then calculated using the 2008 Colorado Department of Transportation's Economic Impact Study of the Grand Junction Regional Airport. There are 6,125 jobs generated by the airport according to the study. This seems to be a conservative number, because some of these jobs may not be located on airport property. The Ute Water Conservancy District standard for demands is 15 gallons per day per employee (gpd/employee). Converting this demand to gallons per minute (gpm) gives 0.01 gpm/employee. This number was multiplied by the 6,125 jobs and was distributed at 1.8 gpm over 34 nodes that were adjacent to buildings within the water model of the site. In addition, using current enplanement forecasts, a high estimated passenger enplanement forecast of 405,990 passengers in the year 2027, was used, to be conservative for the analysis of the system. Dividing the 405,990 passengers by 365 days resulted in 1,112 passengers per day. This number was multiplied by the .01 gpm and distributed at an additional 5.56 gpm over node J-13 and also 5.56 gpm over node J-14, which is adjacent to the terminal.

Maximum day demands for the Grand Junction Regional Airport were calculated by multiplying the average day demand by a peaking factor of 2.0, while peak hour demands were calculated by multiplying the average day demand by a peaking factor of 2.50.

Grand Junction Fire Department was contacted to determine the required fire flows to the airport. It was determined from Appendix B of the 2006 Edition of the International Fire Code that a 2,000 gpm fire flow can be used for buildings that have approved automatic fire sprinkler systems. There are a few buildings on the airport that have high expansion foam fire suppression systems. At these nearest adjacent nodes, J-42 and J-58, it was determined by the Grand Junction Fire Department that a 6,000 gpm fire flow would not be unreasonable. Therefore, a 2,000 gpm fire flow was placed on the entire system except at the two nodes where a 6,000 gpm fire flow was used.

Existing average day demand, maximum day demand, and peak hour demands for each node are shown in the WaterCAD report printout, located in Appendix B.

2. Existing Water Model Analysis

In all scenarios, the pressure in the water supply line was between 140 psi and 145 psi. This includes nodes J-7, J-8 and J-31. These junctions will not be reported in the analysis of each scenario for high pressure, because they will consistently be the high pressure nodes.

In the static scenario, the WaterCAD analysis calculated the lowest pressure to be 70.8 psi at node J-20 and the maximum pressure as 101.9 psi at node J-33. These pressures are within a reasonable pressure range, although pressures over 90 psi may need a pressure reducing valve (PRV) on the service to the existing buildings.

Next, with average day demands, the WaterCAD analysis calculated pressure ranges to be 70.8 psi at node J-20 to 101.9 psi at node J-33. The maximum velocity in the system was 0.12 fps. Once again, pressures seem to be within a reasonable pressure range and velocities were below the maximum 10 fps (feet per second).

The Maximum Day Demand of 2 times the average demand was applied at all nodes in the model. The WaterCAD analysis calculated a minimum pressure to be 70.8 psi at node J-20 and the maximum pressure as 101.9 psi at node J-33. Flow velocities were at a maximum 0.25 fps which is less than 10 fps per Ute Water Conservancy District requirements.

Also, a Maximum Day Demand plus fire flow demand was applied to the model. Only nodes J-23, J-24, J-26, J-27 and J-28 did not meet the fire flow, with a residual of 20 psi. The fire flow at these north junctions, with a required 20 psi residual pressure, ranged from 1,890.71 psi to 1,997.33 psi. It should be noted that WaterCAD systematically applies a designated fire flow to every node in the system. The pipe velocity is not reflected in the "WaterCAD Fire Flow report." In order to assure that the system met the maximum velocity requirements, a fire flow was manually entered at nodes in the systems, which are typically worst case scenarios. Specifically, nodes J-14, J-26, J-42, J-53, J-55 and J-58 were

tested. Pipe velocities for fire flows at 2,000 gpm were under 12.93 fps. At nodes J-42 and J-58 with 6,000 gpm fire flows there was one pipe, P-59, that had a 28.36 fps velocity and the rest of the pipes were under 17.27 fps. These were a little above the targeted 10 fps velocity requirements from the Ute Water Conservancy District. The Ute Water Conservancy District is aware that some existing fire flow velocities are above the targeted maximum 10.0 fps.

For the last scenario, the Peak Hour Demand, the WaterCAD analysis calculated pressures ranging from 70.8 psi at node J-20 to 101.9 psi at node J-33. Flow velocities were below 0.31 fps, which is less than the maximum of 10.0 fps allowed by the Ute Water Conservancy District.

3. Existing Sanitary Sewer Analysis

Sanitary sewer design is based on the City of Grand Junctions Sanitary Sewer Regulations, provided by Bret Guillory, PE, CM. Light commercial average day sanitary sewer flow rates at 175 gallons per acre per day (gpad) were used for analysis of the Grand Junction Regional Airport.

All sanitary sewer pipes were analyzed for peak flows. Peak flows are determined by multiplying the Average Day Flow (ADF) by a Peaking Factor (PF). The peaking factor for the City of Grand Junction is 2, except in areas of heavy flow, in which case a PF of 4 was used. For analysis of this existing system, a PF of 2 was used everywhere except Design Points 10, 13 and all points downstream, a PF of 4 was used. A PF of 4 was used at Point 10 for all of the people passing through the terminal every day. Similarly, a PF of 4 was placed on Point 13 because that is the location where the airlines drain their sanitary sewer plane capture systems into the existing system.

The average day flows and peak flows for the existing sanitary sewer system are summarized in Appendix C. The sanitary sewer system within the Grand Junction Regional Airport is serviced mostly with 8-inch, 10-inch and 12-inch sewer mains. It appears there are some existing pipes that are at less than the City of Grand Junction standard of 0.4% minimum slope in certain locations. The first location is between Design Points 4 and 5. There also appear to be some shallow slopes between Design Points 9 and 11. These slopes were calculated from information received from field measurements, City of Grand Junction Regional Airport GIS Sewer Map information, and some existing survey data. Minimum and maximum slopes were used for the analysis of some of the existing sanitary sewer system, for which data could not be obtained. Refer to Appendix C for a detailed analysis of the existing sanitary sewer system with a spreadsheet and data calculations for the Grand Junction Regional Airport. Pipes were less than the 80% full requirement by the City of Grand Junction. The maximum percent full calculated for the pipes is 30.5%. Maximum velocity was 4.20 fps (feet per second), which is well below the maximum 10 fps required.

Minimum velocities were at 0.41 fps which is below the targeted 2.0 fps. Pipes that are at the beginning of sanitary sewer pipe runs usually do not have enough flow to achieve the 2.0 fps velocity even with a maximum slope. Also, these velocities do not take into consideration the momentum of steeper slope velocities going into shallower slopes.

Refer to Appendix C for 2008 AutoCAD Civil 3D Land Desktop Companion, Hydrology Through Circular Pipe, Sanitary Sewer Calculation Data.

II. PROPOSED UTILITY SYSTEM

A. Proposed Infrastructure

1. Water

There are three areas defined for future development at the Grand Junction Regional Airport. Proposed 8-inch water loops were created in two of these development areas to the northwest and southeast. A 12-inch water main is proposed to loop from the south across Runway 11/29 to the northeast. This loop will then head northwest paralleling Runway 11/29 before crossing perpendicularly on the north side and heading west back to the 30-inch water supply pipeline. The area to the north of the runway created a third proposed Zone that is the same as the 30-inch supply pipeline. In addition, existing water lines in Landing View Lane over to Falcon Way were upsized from 8-inch to 12-inch to get the required fire flows in the Northwest Zone 1. All proposed mains are for analysis of the proposed development areas and are not exact locations of where the mains need to be placed. There is another possible connection for supply of Zone 1 at H Road and 27 ¼ Rd in the future, if needed. A map of the proposed system can be seen in Appendix E.

2. Sanitary

Currently, there are proposed 8-inch sanitary sewer stubs into the proposed developed area, as seen on the proposed sanitary sewer map in Appendix F. Proposed sanitary sewer may need to drain into the neighboring system or require a pump if the proposed developed area grading does not permit gravity flow into the existing Grand Junction Regional Airport sanitary sewer system. The proposed Grand Junction Regional Airport future development area to the north of Runway 11/29 is elevated above the existing system and should be able to gravity feed into the existing sanitary sewer system.

3. Communications

A map of each of the fiber optic and phone utilities was created from existing utility as-built/record drawings. This map with future development areas was then sent to Chris Johnson at Qwest Communications to see if Qwest could supply these areas. His response was that Qwest would be able to supply these areas, but from where would depend on what exactly was being built in the areas. A map of these utilities can be found in Appendix D.

4. Gas and Electrical

Gary Lewis with Xcel Energy was sent maps showing existing utilities and showing the future development areas to see if Xcel Energy could supply gas and electricity into these areas. His response was that Xcel would be able to supply these areas, but there may need to be existing upgrades depending on what exactly was being built in the areas. He also stated that Xcel would only be able to provide electricity up to the boundary with Grand Valley Power. In addition, Steve Don at Grand Valley Power was contacted to see if they could supply electricity for the future development areas within their boundary. His response was that Grand Valley Power would be able to supply the future development areas within their boundary of service, but depending upon the size of the facilities, system upgrades to increase capacity may require a contribution in aid of construction from the customer. A map of these utilities can be found in Appendix D, along with an exhibit showing the boundaries.

5. Cable TV.

Jeff with Bresnan Communication was sent maps showing existing utilities and showing the future development areas to see if Bresnan Communication could supply utilities into these areas. Jeff said they do not have any active facilities on airport property yet, but that there was pipe put in when there was an open trench for future services and Bresnan can supply their utilities. A map of these utilities can be found in Appendix D.

B. Proposed Distribution Analysis

1. Proposed Water Model Design

Water distribution system analysis is based on standards received from District Engineer Edward Tolen, P.E. with th Ute Water Conservancy District. The Grand Junction Regional Airport consists of many commercial and general aviation buildings. A map of the proposed water model can be found in appendix E.

Proposed water mains were added to the existing water model for a proposed water model analysis. Average day demands were placed on the proposed nodes at the same rates as the existing node demands. The existing system already used a future forecasted enplanement total for demands at the terminal, to be conservative. Similar to the existing analysis the same 2.0 and 2.5 maximum day and peak hour peaking factors were multiplied to the average day demand.

The Grand Junction Fire Department was contacted to determine fire flows for the project. It should be noted that a 2,000 gpm fire flow was placed on the proposed system. This also means that new buildings will need to have approved fire sprinkler systems to get the reduced fire flow requirements. However, if a proposed building needs the high expansion

foam fire suppression system, then a new analysis will need to be completed in these areas to acquire a 6,000 gpm fire flow with a 20 psi residual pressure. This would require a larger supply line into and around the future development areas. Another possible option could require a new tap with a pressure reducing valve from the 30-inch water supply line.

Existing average day demand, maximum day demand, and peak hour demands for each node are shown in the WaterCAD report printouts located in Appendix E.

2. Proposed Water Model Analysis

Similar to the existing analysis, in all scenarios, the pressure in the 30-inch water supply line was between 140 psi and 145 psi. This includes nodes J-7, J-8, J-31 and J-122. These junctions will not be reported in the analysis of each scenario for high pressure.

In the average day demands, the WaterCAD analysis calculated pressure ranges to be 70.8 psi at node J-20 to 112.5 psi at node J-121. The maximum velocity in the system was 0.23 fps. Pressures seem to be within a reasonable pressure range and velocities were below the maximum 10 fps.

The Maximum Day Demand of 2.0 times the average demand was applied at all nodes in the model. The WaterCAD analysis calculated a minimum pressure to be 70.8 psi at node J-20 and the maximum pressure as 112.4 psi at node J-121. Flow velocities were at a maximum 0.37 fps which is less than 10.0 fps per the Ute Water Conservancy District requirements.

Also, a Maximum Day Demand plus fire flow demand was applied to the model. All nodes did meet the fire flow with a residual pressure of 20.0 psi. As with the existing analysis, in order to assure that the system met the maximum velocity requirements, a fire flow was manually entered at nodes in the systems, which are typically worst case scenarios. Specifically, nodes J-14, J-26, J-42, J-53, J-55, J-58, J-79, J-84, J-94, J-103 and J-121 were tested. Once again, node 58 with 6,000 gpm fire flow resulted in Pipe P-59 that had a 28.36 fps velocity. The rest of the fire flows were under 13.00 fps velocities for fire flows at 2,000 gpm. With existing pipe sizes, these were above the targeted 10.0 fps velocity from the Ute Water Conservancy District. It should be noted that an additional scenario was modeled but was not included, with P-175 upsized to a 30 -inch line and all nodes on the north side of the runway met the required 6,000 gpm fire flow with a 20.0 psi residual pressure in case a high expansion foam fire suppression system was needed.

For the last scenario, the Peak Hour Demand, the WaterCAD analysis calculated pressures ranging from 70.8 psi at node J-20 to 112.4 psi at node J-121. Flow velocities were below 0.45 fps, which is less than the maximum of 10.0 fps allowed by the Ute Water Conservancy District.

3. Proposed Sanitary Sewer Analysis

Sanitary sewer design is based on the City of Grand Junction Sanitary Sewer Regulations, provided by Bret Guillory, PE, CM. Light commercial average day sanitary sewer flow rates at 175 gallons per acre per day (gpad) were used for analysis of the Grand Junction Regional Airport.

The proposed sanitary sewer pipes were added to the existing sanitary sewer analysis by adding the demand from the proposed future development areas. The average day flows and peak flows for the existing sanitary sewer system are summarized in Appendix F. Proposed 8-inch sanitary sewer mains were connected to the existing sanitary sewer system. The City of Grand Junction minimum and maximum slopes were used for the analysis of the proposed sanitary sewer system. Refer to Appendix F for a detailed analysis of the proposed sanitary sewer system with a spreadsheet and data calculations for Grand Junction Regional Airport. Pipes were less than the 80% full requirement by the City of Grand Junction. The maximum percent full calculated for the pipes is 72.0%. Maximum velocity was 6.42 fps, which is well below the maximum 10.0 fps required. Minimum velocities were at 0.41 fps which is below the targeted 2.0 fps requirement. Pipes that are at the beginning of sanitary sewer pipe runs usually do not have enough flow to achieve the 2.0 fps velocity, even with maximum slopes. Also, these velocities do not take into consideration the momentum of steeper slope velocities going into shallower slopes.

Refer to Appendix F for 2008 AutoCAD Civil 3D Land Desktop Companion, Hydrology Through Circular Pipe, Sanitary Sewer Calculation Data.

III. CONCLUSIONS

The Grand Junction Regional Airport Preliminary Utility Report was prepared in compliance with local utility agency guidelines. Water and Sanitary systems were analyzed more extensively than the other utilities. These utilities will need to be designed and approved by local utility agencies in proposed development areas. These agencies have been contacted and do have adequate supply to develop the proposed areas.

The existing water system does work, although additional looping of water mains might help with velocities and flows. In addition, when a pipe needs maintenance, valves can isolate the area and most of the system can still operate with the proper looping of water mains. The existing system is working and future development will have to be monitored. Future buildings will require approved sprinkler systems and possible upgrades to the existing system if the buildings will require high expansion foam fire suppression systems.

Existing sanitary sewer flows seem to be in working order. Future sanitary sewer mains will have to be monitored to make sure that the required minimum and maximum slopes are achieved. If velocities are between the 2.0 feet per second and 10.0 feet per second, then less maintenance and cleanouts will be needed for the system. There is available capacity in the existing system for future sanitary sewer development, however topography of the land will determine if it can gravity feed into the existing system. If not, then pumps can be installed or possibly other surrounding systems could convey the flow. In this case, an additional analysis would need to be completed.

REFERENCES

1) **City of Grand Junction – Technical Memo**, Page TM3-6, February 4, 1993.

2) **The Grand Junction Regional Airport Economic Impact Study**, by the Colorado Department of Transportation – Division of Aeronautics, 2008.

Appendix Three

STUDY COMMITTEE MEETING NOTES

Study Committee (SC) Meeting Notes

Grand Junction Regional Airport
Master Plan Update
January 15th, 2008

The meeting was held in the conference room at the Grand Junction Regional Airport. Meeting participants included Rex Tippetts and Amy Jordan (Airport), Mark McFarland, Ryk Dunkelberg and Ryan Hayes (BDC) and the Master Plan Study Committee Members.

Agenda

- Introduce Study Committee Members
- Present Master Plan Update Process Overview and Schedule
- Discuss Role and Purpose of Committee
- Airport Development Issues Discussion
- Comments and Questions from Study Committee
- Next Steps

Consultant Team

- It was explained to the committee that the consultant team for the AMP would include BDC, Leibowitz & Horton AMC and the selected engineering consultant for the Airport.

Planning Process

- The steps in the planning process were discussed.

Meetings/Presentations and Schedule

- A list of potential meetings and Airport Authority Board presentations was presented.
- A potential 12 to 18 month estimated schedule was presented.

Roles, Responsibilities and Expectations

- The roles of various groups were discussed including the Sponsor, the FAA, the Study Committee and the Consultant Team.

Issues Identification

- A preliminary list of issues to be studied in the Master Plan were presented and the Study Committee was asked to identify any additional issues to be considered.

Questions and Comments

- The City is updating its Comprehensive Plan in 2008, can we coordinate the plans? The Comp Plan is scheduled for completion in early 2009.
- The two primary concerns of the City are the planned land uses and traffic circulation in the vicinity of the Airport.
- Will the interior leaseable space in the terminal building be analyzed to determined highest/best use of space?

- Engine run-up areas or holding bays are needed at each end of Runway 11/29 for general aviation aircraft.
- Mesa County has several small air strips and helipads and an increased need for helipads due to the oil and gas industry, will the regional air transportation needs of the County be looked at in this Airport Master Plan?
- There is a need for additional commercial ramp space, particularly during Special Traffic Management Program (STMP) days when arrivals to other mountain airports like Aspen are diverted to GJT.
- The tentative date for the next SC meeting is April 15th, 2008. This meeting will be preceded by Working Paper 1.

Study Committee (SC) Meeting Notes

Grand Junction Regional Airport
Master Plan Update
April 15th, 2008

The meeting was held in the conference room at the Grand Junction Regional Airport. Meeting participants included Rex Tippetts, Amy Jordan and Lindsey Holman (Airport), Mark McFarland, and Ryan Hayes (BDC) and the following Master Plan Study Committee Members: Marisa Fay and Collin Fay (Colorado Flight Center), Teresa Gara (WestStar), Ann Driggers (Grand Junction Economic Partnership), Ereal Lewis Jr. (American Eagle), Phillip Smith (AVIS), Tim Hayashi and Linda Dannenberger (Mesa County), Lisa Cox (City of Grand Junction), PJ McGovern (P&L Properties).

Agenda

- Introductions
- Overview of the Master Plan Update Process
- Present Working Paper 1 (Inventory and Forecasts
- Comments and Questions from Study Committee
- Next Steps

Consultant Team

- It was explained to the committee that the consultant team for this planning study would include BDC, Leibowitz & Horton Airport Management Consultants and J3 Aviation Consultants.

Planning Process

- The planning process and where we are in that process was reviewed.

Meetings/Presentations and Schedule

- A list of potential meetings and Airport Authority Board presentations was presented.
- A potential 12 to 18 month estimated schedule was presented.

Inventory

- Inventory items including airport role, airport facilities, airspace and airport environs were discussed.

Forecasts

- The following forecast related items were presented and discussed
    - Regional Socioeconomic Conditions
    - Historical and Existing Airport Activity

- Passenger Enplanements Forecast
- Commercial Service Operations Forecast
- General Aviation Operations Forecast
- Air Cargo Activity Forecast
- Military Operations Forecast
- Based Aircraft Forecast
- Forecast Summary

Airport Reference Code (ARC)/Design Aircraft Analysis

- The design aircraft analysis for both runways was presented and explained.

Airport Planning Considerations

- An explanation of how the Inventory and Forecasts relate to the issues and goals for the Master plan Update was presented.

Questions and Comments

- Airport would like to provide the committee with copies of the existing Airport Layout Plan prior to the next meeting, potentially as a package with Working Paper 2.
- Mesa County is concerned with how roadway access would be provided to north side facilities and a relocated ATCT.
- Mesa County is interested in how projected airport improvements will impact transportation routes in the vicinity of the Airport including H Road, Horizon Drive, I-70, 29 Road, etc. and the potential demands placed on these routes with increased or relocated and expanded air cargo facilities.
- General aviation needs were expressed from several committee members.
  - GA numbers are constrained by lack of aircraft storage space. At least 6 aircraft owners wanting hangars right now.
  - A connection from east ramp to C1A is needed.
  - Small aircraft run-up areas at all runway ends are needed.
  - Improvements to the maintenance run-up area are needed.
- The FBO representatives indicated a need for increase heavy itinerant aircraft (over 100,000 pounds) parking space. The FBO is seeing a significant increase in diversion traffic and would like to be able to better accommodate these diversions.
- Airline representative also expressed concern about lack of heavy ramp space. American Airlines anticipates increase use of the Airport for diversions. Airline terminal needs include restaurant, better handicap terminal access and facilities and potentially a business center.
- Car rental representative stated that all rental car companies are forecasting significant growth in rental car activity for the next few years and their primary need is for increased space for parking cars. Potentially as much as four times the existing space will be needed.

- The City has many of the same interests and concerns as the County, including the transportation network, access to I-70 and the potential 29-Road interchange, etc. The City is also receiving development pressures northwest of the Airport and along 27 ¼ Road and want to be sure that it continues to help protect the Airport from incompatible development northwest of the Airport.
- FBO representatives reiterated that the maintenance and strengthening of the ramp is a very high priority short-term need.
- Discussion took place among the committee about the city property tax rule and the disincentive for long-term leases. The Airport indicated that most hangar lessee's pay more in property tax than they do in lease fees.
- Also discussion of the city sales tax on aircraft parts and its disincentive to aircraft parts manufacturing type business from relocating to GJT. (State and County exempt aircraft parts from sales tax).

Next Steps

- Demand/Capacity Analysis
- Facility Requirements Determination
- Prepare Preliminary Alternatives
- Prepare Recommended Development Plan
- Produce Working Paper 2
- Study Committee Meeting 3 (potentially July 15th, 2008)

Study Committee (SC) Meeting Notes

Grand Junction Regional Airport
Master Plan Update
August 5th, 2008

The meeting was held in the conference room at the Grand Junction Regional Airport. Meeting participants included Rex Tippetts, Amy Jordan (Airport), Mark McFarland, Ryan Hayes and Ryk Dunkelberg (BDC) and the following Master Plan Study Committee Members: Collin Fay (Colorado Flight Center), Ann Driggers (Grand Junction Economic Partnership), Owen Charrier (Mesa Air), Ereal Lewis Jr. (American Eagle), Phillip Smith (AVIS), Lisa Cox (City of Grand Junction).

Agenda

- Introductions
- Overview of the Master Plan Update Process
- Present Working Paper 2 (Revised Forecasts and Capacity Analysis and Facility Requirements)
- Planning Considerations and Alternatives Discussion
- Questions and Comments
- Next Steps

Planning Process

- The planning process and where we are in that process was reviewed.

Revised Forecasts

- The revised enplanement forecast scenario was explained.
- The revised forecast summary was explained.

Capacity Analysis

- The capacity analysis conclusions were discussed.

Facility Requirements

- The FAA dimensional requirements and non-standard conditions were discussed.
- Additional airside facility requirements were presented.
- Landside facility requirements were then presented.
- It was explained to the committee that the RVZ and gradient problems have not changed, but that the potential solution to the problem has changed.

Planning Considerations and Preliminary Alternatives

- The following planning considerations were discussed.
    - Maintenance and rehabilitation of Runway 11/29.
    - Correction of non-standard longitudinal and transverse gradients on Runway 11/29 and connector taxiways.
    - Correction of the non-standard Runway Visibility Zone (RVZ).
    - Potential ARC upgrade of Runway 4/22.
    - The continuation of efforts to acquire adjacent land.
    - Future relocation and siting of the ATCT.
    - Facilities to support Airport's evolving role (pax, cargo, GA).
    - Terminal and terminal area improvements.
    - Vehicular access to various airport development areas.
    - Regional ground transportation issues.
    - Areas programmed for future general aviation development.
    - Heavy ramp for itinerant & diverted traffic/run-up areas
    - Areas programmed for future non-aviation related development.
    - Instrument approach capabilities of both runways.
    - Off-airport land use compatibility and zoning.
- Two preliminary airside alternatives were presented to the committee and discussed.
    - Alternative One – Shift Runway 11/29 and upgrade Runway 4/22
    - Alternative Two – Relocate Runway 11/29 and do not upgrade Runway 4/22
- The study committee overwhelmingly supported Alterative Two.

Questions and Comments

- The City is considering early 2009 for completion of the Comprehensive plan and may have a preferred scenario as early as September. Lisa would like BDC to directly contact Winston Associates to facilitate the exchange of information about the 2 plans.
- The Mesa Air representative preferred Alternative two and does not want to have to operate on Runway 4/22 due to the fact that it is very rarely aligned with the winds. Additional concerns include the general layout of the terminal building and aircraft parking apron.
- The American Eagle representative is still concerned about a restaurant.
- The economic development representative is very concerned about having to shut down the airport to air carriers and likes alternative two due to its constructability while keeping the existing Runway 11/29 open. The landside development area opened up by Alternative 2 is also intriguing.
- The committee requested more aerial be shown to the east and west on the alternative graphics.

Next Steps

- Refine Airfield Development Alternatives

- Prepare Landside Development Alternatives
- Prepare Recommended Development Plan
- Produce Working Paper 3
- Study Committee Meeting 4
    - *Estimated meeting date: October 21st, 2008*

Study Committee (SC) Meeting Notes

Grand Junction Regional Airport
Master Plan Update
October 21st, 2008

The meeting was held in the conference room at the Grand Junction Regional Airport. Meeting participants included Ed Storer, Amy Jordan (Airport), Mark McFarland, Ryan Hayes and Ryk Dunkelberg (BDC), Linda Bruce (FAA) and the following Master Plan Study Committee Members: Collin Fay (Colorado Flight Center), Teresa Garner and Jesse Van Meter (West Star), Barb Bowman and Jennifer Grossheim Harris (Grand Junction Visitor and Convention Bureau), Linda Dannenberger (Mesa County), Ann Driggers (Grand Junction Economic Partnership), Phillip Smith (AVIS), Lisa Cox (City of Grand Junction).

Agenda

- Overview of the Master Plan Update Process
- Present Working Paper 3 (Development Concepts and Alternatives Analysis)
- Discussion of Next Steps
- Questions and Comments

Planning Process

- The planning process and where we are in that process was reviewed.

Development Assumptions

- One. The Airport will be developed and operated in a manner that is consistent with local federal and state regulations.
- Two. Accommodate commercial passenger service activity, along with general aviation activity and a small amount of military activity.
- Three. The size of aircraft is not expected to significantly change.
- Four. Accommodate aircraft operations with great reliability and safety.
- Five. Make most efficient use of the available area for aviation-related activities.
- Six. Enhance the compatibility of the operation of the Airport with the environs.
- Seven. Identify potential sites for future ATCT facilities.

Goals and Objectives for Development

- Provide effective direction for the future development.
- Help fulfill Airport mission to facilitate and enhance regional aviation services.
- Accommodate the forecast aviation activity levels in a safe and efficient manner.
- Accommodate a variety of general aviation activities.

- Plan and develop the Airport to be capable of accommodating the future regional needs and support regional economic development activity.
- Plan for potential property acquisition for approach protection and land use compatibility purposes.

Airside Alternatives

- Airside Alternative One – Runway Shift
- Airside Alternative Two – New Runway Minimum Separation
- Airside Alternative Three – New Runway Maximum Separation
- Engineer's opinion of probable costs for all three alternatives was discussed. From an order of magnitude perspective, the previous plan to shift Runway 11/29 and upgrade Runway 4/22 to air carrier standards (Alternative One) was only slightly less expensive than Alternative Two, Build New Runway. The committee was in agreement with the recommended preferred alternative (Airside Alternative Two). Both Airside Alternatives One and Two correct the non-standard Runway Visibility Zone (RVZ). However, only Airside Alternative Two corrects all the non-standard conditions associated with the longitudinal and transverse gradients on Runway 11/29 and its connector taxiways.
- The Airport's vision for Airside Alternative Two is to be able to phase the construction of the new runway over a number of years and keep the existing Runway 11/29 open to utilized by the passenger and cargo carriers during construction. This eliminates the need to upgrade Runway 4/22 to air carrier standards.
- The committee inquired about how the Airport would fund the construction of the new runway. Airport staff indicated that a combination of AIP entitlement and discretionary funding would be the most likely source and that discussions with FAA had already been initiated. More detail will be provided in the upcoming Implementation Program chapters.
- A discussion took place of the environmental documentation required to implement the preferred alternative.

Landside Development Concepts

- Landside Facilities, Conceptual Layout East
- Landside Facilities, Conceptual Layout West
- Conceptual General Aviation Facilities Layout
- Presentation of Conceptual Development Plan

Next Steps

- Prepare Detailed Airport Plans Set
- Prepare Environmental Review
- Prepare Implementation Program
- Prepare Draft Final Report