

CHAPTER FIVE: DEVELOPMENT ALTERNATIVES



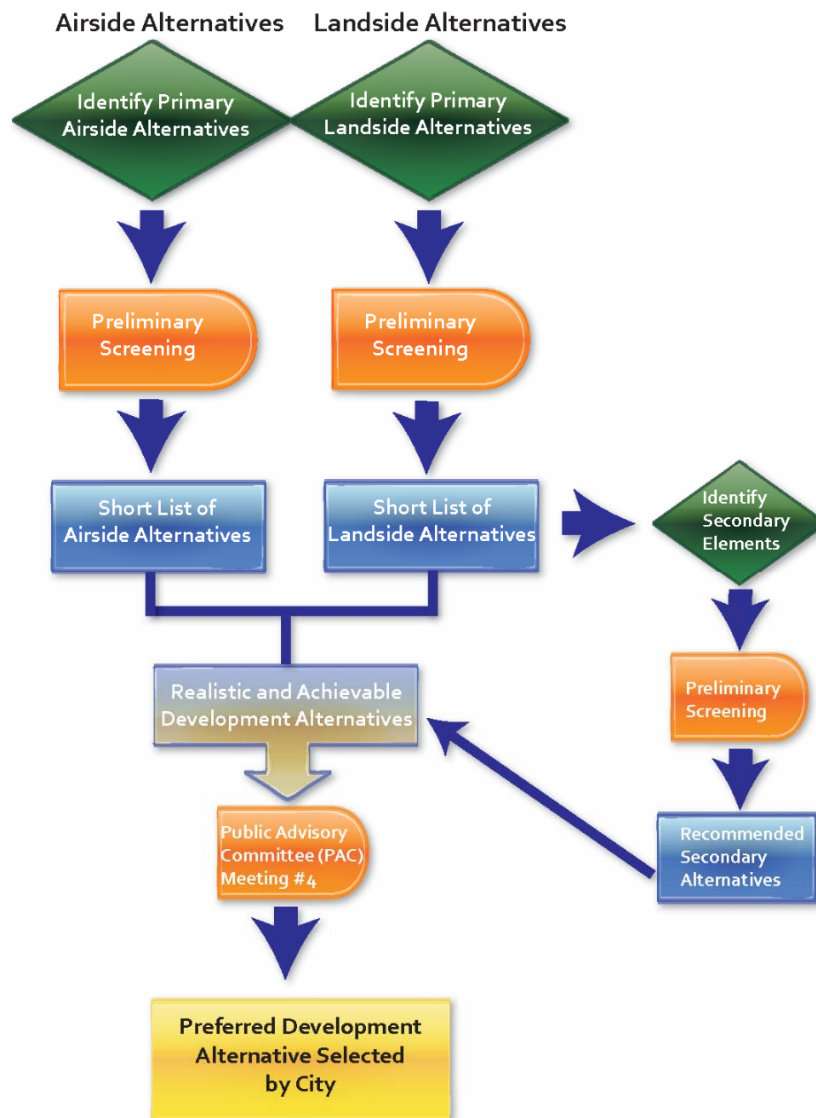
NEWPORT MUNICIPAL AIRPORT

**AIRPORT MASTER PLAN UPDATE
FINAL REPORT – FEBRUARY 2018**

INTRODUCTION

Chapter Four identified facility requirements the City of Newport Municipal Airport (Airport) needs to satisfy existing and anticipated aeronautical demand consistent with current Federal Aviation Administration (FAA) design standards and State of Oregon development guidelines. Chapter 5 presents development alternatives that focus on meeting the Airport’s facility needs for the long-term.

The process of creating and analyzing development scenarios to satisfy demand over the planning period is iterative and ongoing throughout the completion of the alternatives chapter. The first step in generating development alternatives is to gauge the community’s tolerance for different ways to meet forecast demand and requisite facility requirements. To do this, the planning team prepared four display boards with a series of themes and guiding statements. The team then used the boards to facilitate a group exercise that provided the Planning Advisory Committee (PAC) and interested community members an opportunity to identify their priorities for development on and around the airport. The information



gleaned was vital to the development of the alternatives presented in this chapter. This information, along with the Master Plan Goals and Issues identified in Chapter One, will be used to evaluate the alternatives.

The final goal of the development alternatives process is to provide the community with several potential “build alternatives” to evaluate and discuss locally. The City of Newport – with input from the FAA, PAC, and public – will select a Preferred Alternative from the alternative layouts presented. The Preferred Alternative selected will serve as the foundation for the Airport Layout Plan (Chapter Eight). The Preferred Alternative will likely be a combination of elements from the alternatives discussed at PAC meetings and presented here within.

SUMMARY OF FACILITY REQUIREMENTS

The following section summarizes the development recommendations presented in Chapter Four, Facility Requirements, and several additional requirements which came to light in discussions with FAA personnel after completion of the Facility Requirements Chapter. The requirements identified below are requisite to accommodate forecasted aeronautical activity as well as to correct existing nonstandard conditions.

Airside Requirements

Airside requirements identified in Chapter Four, and summarized below, are facility improvements that directly support aircraft operations. The “airside” consists of runways, taxiways, airport visual aids, airport lighting, radio navigations aids, instrument approach procedures, airspace surrounding the airport and FAA design criteria necessary to implement each of these aspects.

Runway 16-34	Upgrade Runway 16-34 Runway Design Code (RDC) from B-II to C-II to accommodate corporate jets. Requires upgraded RSA, OFA, and longitudinal grade to meet C-II standards.
Runway 2-20*	Maintain existing Runway 2-20. Correct the non-standard inline taxiway on the Runway 2 end.
Non-Standard Geometry	Correct Non-standard geometry for intersection of TW A/TW D/RW 2 and non-standard tie-down apron.
Taxiway A	Relocate taxiway 10 feet away from Runway 16-34 to meet the RDC B-II and C-II standard.
Runway End Identifier Lights (REILS)	Install on Runways 2 and 20 to provide pilots a tool to easily identify runway ends.
Automatic Dependent Surveillance – Broadcast (ADS–B) transmitter	Investigate the feasibility of installing an ADS–B transmitter for integration with the US Next Generation Air Transportation System (NextGen).
Wind Indicators	Install supplemental wind indicators to provide pilots with additional methods of determining wind direction and velocity.
Automated Weather Observing System (AWOS)	Replace the existing AWOS with an AWOS-III or Automated Surface Observing System (ASOS) to provide enhanced precipitation reporting.

Landside Requirements

Landside facilities support airside operations and include the facilities necessary for handling aircraft and passengers while on the ground. Landside facilities consist of hangars, parking apron, aircraft tiedown spaces, access roads, and the General Aviation terminal facilities.

Hangars	Construct one additional T-hangar with six units and eight additional box hangars.
Apron	Expand or redesign the current apron to meet the demand for tiedown spaces outside of the Runway 20 RPZ.
Cargo Apron	Expand the current cargo apron to accommodate three cargo aircraft and construct a modestly-sized cargo facility with an apron area for the exclusive use of cargo aircraft.
Fixed Base Operator (FBO)	Locate an area for potential future development of a second FBO facility.
Coast Guard	Reserve an additional one acre site for potential future expansion Coast Guard facilities.
National Guard	Identify ideal property for potential Oregon Army National Guard location.

Support Facility Requirements

Support facilities assist airside and landside operations. Support facilities include ARFF and airport maintenance services, airport security, fuel storage tanks, and the utility infrastructure necessary to support existing and new development.

Aircraft Rescue and Fire Fighting (ARFF)	Keep and maintain current ARFF facilities and vehicles.
Airport Security	Consider integrating and enforcing community watch and passenger identification.
Utilities	Upgrade and expand utilities, particularly water, and sanitary sewer to replace septic, as development occurs.
Fuel Tanks	Replace and move Fuel Tanks to an area of easier access, such as near the FBO building or a new maintenance building.

SUMMARY OF THE DEVELOPMENT ALTERNATIVES ANALYSIS PROCESS

The alternatives analysis process begins with a broad group of facility requirements that are subsequently focused into project elements required to satisfy the facility requirements and then analyzed for further consideration. After they have been analyzed and considered internally amongst the planning team, project elements may then be narrowed down even further into primary and secondary elements. Primary elements are the potential improvements that present particularly complex and challenging issues (they may require large contiguous land areas or unique engineering solutions). Secondary elements are planned improvements that have greater planning flexibility and typically fill-in around and/or support primary elements. Determining the list of primary and secondary elements that construct the concepts presented later in Chapter Five is an important early step in the process of analyzing and selecting a preferred development alternative.

Once the primary and secondary elements have been determined, analyzed, and depicted within a series of development alternatives, they are collectively examined against a set of measuring criteria which include: Environmental Considerations, Fiscal Factors, Planning Principles, and Operational Considerations. The measuring criteria are used to screen and select the best alternative that provides a realistic and achievable development scenario based on the concept's technical feasibility, economic and fiscal soundness, aeronautical utility, and overall environmental impact.

Once the final elements have been screened and depicted within a series of development alternatives and then analyzed against the measuring criteria, the iterative process of vetting the concepts with the PAC, FAA, public and City will result in the selection of a single preferred development alternative for the Airport. The City will ultimately determine the final layout of the airport by selecting the preferred alternative for each of the major components of the airfield (Runway 16-34, Runway 2-20, and GA Development Expansion Areas) depicted in the preferred alternative. The FAA will either choose to participate and fund the preferred alternative or refrain from participating. If it is the latter, the City will be responsible for funding those elements of the preferred alternative in which the FAA is not willing to participate.

Primary Elements

The primary elements identified and considered within each of the development alternatives include:

- Runway 16-34
 - Runway Safety Area (RSA)
 - Runway threshold locations and runway length
 - Runway longitudinal gradients
- Runway 2-20 and Taxiway System
 - RPZ/apron and aircraft parking tie-downs
 - Non-standard inline portion of Taxiway E beyond the southwest end of Runway 2-20
 - Non-standard geometry of Taxiway A, Taxiway D, and Runway 2 intersection

Secondary Elements

The secondary elements, which have been sub-categorized as secondary airside and secondary landside elements, for the Airport are listed below and analyzed as appropriate throughout the chapter. The secondary elements considered within the development alternatives include:

Secondary Airside Elements

- Land acquisition
- NAVAIDs
- Approach lighting
- Visual landing aids
- Taxiway “A”

Secondary Landside Elements

- Existing and new hangar development
- Expanded aircraft parking apron and tiedowns
- Cargo apron and cargo processing facilities
- Second Fixed Base Operator (FBO) facility and Oregon Army National Guard development site
- One-acre expansion area for United States Coast Guard facilities
- Utility extensions to support development
- Vehicle Parking

Development Alternatives

The development alternatives produced to present the primary and secondary elements in the alternatives process were categorized around two major components of the airport, the (MR) Main Runway (Runway 16-34) and the (CR) Crosswind Runway (Runway 2-20) alternatives. The resulting eight development alternatives presented later in this chapter depict potential scenarios for the long-term future use of the airport. In summary, the four main runway alternatives are:

(MR) Main Runway 16-34

- MR1 – Declared Distances
- MR2A – 1000’ Extension of RSA
- MR2B – 600’ Extension of RSA with EMAS
- MR3– Shift Runway South 600’ Feet

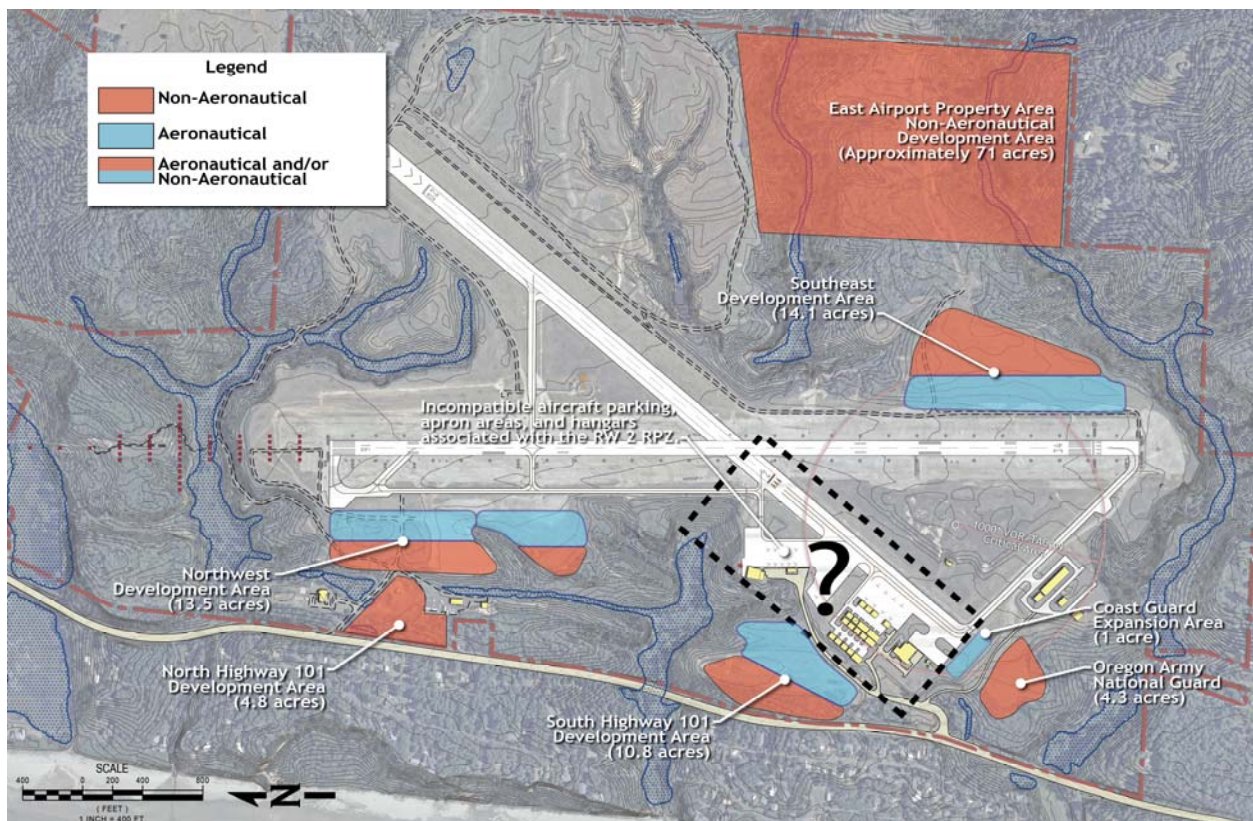
The Main Runway (MR) alternatives presented in this chapter depict a variety of engineered solutions required to upgrade Runway 16-34 to category C-I or C-II. The alternatives for Runway 16-34, as significant as they are, do not have a direct impact on the crosswind runway alternatives or the landside development requirements and can therefore be examined independently.

The Crosswind Runway (CR) alternatives presented address multiple issues related to the non-standard geometry of taxiways as well as the RPZ/apron incompatibility which ultimately dictates the space available for GA development to satisfy the landside facility requirements. Therefore, once the CR alternative is selected, the landside development scenario and remaining secondary elements can fill-in around Runway 16-34 and Runway 2-20. The four crosswind runway alternatives are:

- CR1 – No Change to Runway 2-20
- CR2 – Shift Runway 1,100 Feet to Northeast
- CR3 – Downgrade Runway to B-I (small) and Shift 200 Feet Southwest
- CR4– Close Runway 2-20

The preferred “CR” alternative will dictate the space available to satisfy landside facility requirements and thereby will direct when and where expansion will need to occur. It should be noted that the “development areas” depicted below are generally compatible with any of the “CR” alternatives. The location and topography of each area allows for multiple scenarios or combinations possible by designating individual areas as 1) aeronautical, 2) non-aeronautical, or 3) both aeronautical and non-aeronautical that will allow the Airport to satisfy future landside facility requirements.

Figure 1: Potential Landside Development Scenarios



Determining the on-airport land-use of each development area as either aeronautical, non-aeronautical, or both aeronautical/non-aeronautical should occur secondary to the preferred crosswind runway 2-20 concepts. The sites identified for GA Development Areas and Aeronautical/Non-Aeronautical Development Areas are:

General Aviation Development Expansion Areas

- **Northwest Development Area** – The NW Development Area consists of approximately 13.5 acres. The site is relatively flat and provides direct access to the airfield. There is also existing access off of Highway 101. The Northwest Development Area was formerly the site of an FBO facility.

- **Southeast Development Area** – The Southeast Development Area consists of approximately 14.1 acres. This site was identified as the preferred area for long-term aeronautical expansion in the 2004 Airport Master Plan Update. Obtaining access to this site could be difficult and will require additional planning and coordination locally.
- **South Highway 101 Development Area** – The South Highway 101 Development Area consists of approximately 10.8 acres. This site was previously identified as a non-aeronautical development area in the 2004 Airport Master Plan Update. This site is relatively flat; with the relocation of the access road the area could serve as either an aeronautical or non-aeronautical expansion area.

Aeronautical and/or Non-Aeronautical Development Areas

- **North Highway 101 Development Area** – The North Highway 101 Development Area consists of approximately 4.8 acres. This site was previously identified as a non-aeronautical development area in the 2004 Airport Master Plan Update. With additional planning and coordination this site could be extended farther north along Highway 101 to create additional opportunities for non-aeronautical development.
- **South Highway 101 Development Area** – The South Highway 101 Development Area consists of approximately 10.8 acres. This site was previously identified as a non-aeronautical development area in the 2004 Airport Master Plan Update. This site is relatively flat and with the relocation of the access road could serve as either an aeronautical expansion area or non-aeronautical development area.
- **Northwest Development Area** – The NW Development Area consists of approximately 13.5 acres. The site is relatively flat and provides direct access to the airfield. There is also existing access off of Highway 101. This area formerly included the first FBO and early airport hangars.
- **Southeast Development Area** – The Southeast Development Area consists of approximately 14.1 acres. This site was identified as the preferred area for long-term aeronautical expansion in the 2004 Airport Master Plan Update. Obtaining access to this site could be difficult and will require additional planning and coordination locally.
- **East Airport Property Area** – Due to access constraints and topography, this area is ideally suited to be a Non-Aeronautical Development Area consisting of approximately 71 acres available for future development.
- **Oregon Army National Guard Site** – The site identified for the Oregon Army National Guard consists of approximately 4.3 acres of relatively flat ground accessible from the hangar access road. The site is limited to non-aeronautical uses, however the site identified does not need to be reserved solely for the National Guard.
- **Coast Guard Expansion Area** – The 1-acre aeronautical land adjacent to existing Coast Guard Facilities was reserved for future Coast Guard expansion.

Elements depicted and analyzed in the development alternatives that follow are necessary components within the larger system of the airport. The identification of individual features is intended to provide a supporting framework within the development alternatives. Calling out the secondary airport system components is intended to simplify the process of selecting a preferred alternative by showing potential options for field development.

Criteria Analysis Discussion

The criteria used in the analysis of development alternatives draws from FAA Advisory Circular 150/5070-6B, *Airport Master Plans*. These criteria provide a way to view strengths and weaknesses of alternative concepts while maintaining concise and consistent evaluation among them. Four main criteria were chosen from the FAA guidance circular and adapted to serve the needs of this airport master planning process. These criteria are discussed and presented in greater detail at the end of each development alternative, but for purposes of this evaluation are generally defined below.

Planning Principles

Best Planning Principles aim to identify concept elements that best conform to FAA guidance on safety, security, feasibility, and flexibility. Planning principles also pertain to conformance with the City of Newport Master Plan process, recommendations listed in the City of Newport Regional Airport Review Task Force Report, other relevant local (and state) planning documents (and requirements), and the Airport's strategic vision determined in the early part of the planning process.

Operational Considerations

Operational Considerations reviews the performance of the airport as a system relative to resulting capacity, capability, and efficiency. The goal should be to develop concepts that when individual elements are combined, capacity, capability, and efficiency can be evaluated to identify the best performing alternative.

Fiscal Factors

Fiscal Factors consider the overall costs to implement each alternative concept. Rough order of magnitude (ROM) cost estimates have been prepared specifically for the primary airside elements. The cost estimates will be the primary method for comparison of primary airside elements. For the landside elements general assumptions related to construction difficulty or fiscal factors were used in the alternatives analysis. Further fiscal review considered the amount of funding potentially available to implement each alternative. The goal is to eliminate or modify alternatives that are beyond the practical funding capacity of the airport.

The fiscal analysis became critical during assessment of the Runway 16-34 alternatives. City Staff worked to balance the needs of the airport with the fiscal capability of the City. The required fiscal investment became not a cause for rejection of presented alternatives, but rather an issue of feasibility. When this occurred, the City worked with the PAC, the airport committee, the FAA and the planners to determine a course of action that would be the most beneficial for the master plan and the funding capability of the City.

Environmental Considerations

Environmental Considerations assess the potential environmental effects resulting from each alternative. The methodology for this level of study differs from the more in-depth level of analysis performed in full environmental documentation. For this analysis, key environmental components will be highlighted for alternatives assessment only. A more rigorous environmental analysis will be required prior to design and construction of any future projects.

RUNWAY 2-20 ALTERNATIVES (CR)

Current issues facing the Newport Municipal Airport with respect to Runway 2-20 and the adjacent taxiway system are the apparent result of relocating the Runway 2 threshold at some point in the past as well as the continuously evolving and updating FAA design standards and requirements. Issues with the existing taxiway network layout and the Runway 2 threshold had not been identified in previous master planning efforts. However, due to updated design standards, the increasing amount of larger business class aircraft using the Airport, and a sponsor lead effort to address the situation, the non-conforming layout has been identified during the master planning process and reviewed in the alternatives chapter. Four potential concepts were developed to resolve the unusual layout and limitations at the center of the airport.

The four concepts presented for Runway 2-20 each depict a unique way to address the non-standard issues and irregular geometry. The Crosswind Runway 2-20 (CR) alternatives were developed specifically to address the following elements:

- RPZ/apron and aircraft parking tie-downs
- Non-standard inline portion of Taxiway E beyond the southwest end of Runway 2-20
- Non-standard geometry of Taxiway A, Taxiway D, and Runway 2 intersection

CR1 – No Change to Runway 2-20 (Exhibit 5A)

This Runway 2-20 alternative is the “do-nothing” scenario and is depicted to demonstrate the current limitations associated with the RPZ and apron/aircraft parking as they relate to aircraft movements through the apron. In this alternative the runway thresholds remain in their existing location and existing runway pavements remain as they are currently.

To fully implement this alternative, and also meet FAA design standards, several non-standard issues and important features necessary for the facility to satisfy existing and future demand will need to be addressed, redesigned, or relocated. Most notably, the non-standard portions of Taxiway A, D, E, and Runway 2 threshold where the intersecting taxiways create an inefficient operating environment for aircraft and a unique geometry not supported by FAA design requirements.

Runway 2-20 – Maintain B-II status and implement no changes to thresholds in order to maintain the existing runway length and runway operating characteristics.

Taxiway Intersection – The first step to correct the non-standard issues and satisfy FAA design standards is to remove the inline portion of Taxiway E. Once the non-standard pavement portion of Taxiway E is removed, traffic repositioning to Runway 16 (from the southwest side of the airport) will be required to taxi directly through the apron area to connect into the redesigned portion of Taxiway D, Taxiway A, and Runway 2.

RPZ – Existing B-II RPZ will remain in its current location preventing future GA development and apron expansion within the existing GA development area. Additionally, the remaining RPZ is incompatible with some of the existing hangars and aircraft tie-downs. A plan to remove hangar units and tie-downs within the RPZ during the planning period will need to be included in the master plan if this alternative is selected.

Landside Development Scenarios Compatible with Alternative CR1

In addition to the elements identified above, there are other improvements that must be considered to satisfy the landside facility requirements for the airport over the planning period. The landside elements previously identified and addressed in this concept include:

- Existing and new hangar development
- Expanded aircraft parking apron and tiedowns
- Cargo apron and cargo processing facilities
- Second Fixed Base Operator (FBO) facility
- Oregon Army National Guard development site
- One-acre expansion area for United States Coast Guard facilities
- Utility extensions to support development

To satisfy the landside facility requirements within the CR1 alternative and address each of the landside elements identified above, alternative development areas on the airport must be considered. These include:

Infill Existing GA Areas – In the CR1 alternative, there is some space available for expansion within the existing terminal area. However, due to the Runway 2 approach RPZ remaining over much of the apron area, the CR1 alternative will not allow for a significant amount of infill development in the immediate vicinity. Therefore, the CR1 alternative alone will not meet the mid- to long-range facility requirements of the airport. Furthermore, to address the existing incompatible aircraft parking, apron areas, and hangars within the RPZ, new areas on the airport must be considered for development to satisfy facility requirements.

South Highway 101 Development Area – With additional planning, plus the reconstruction and relocation of the access road, the South Highway 101 Development Area could be reserved as an aeronautical development area and constructed to connect to the existing terminal area. The development of this site would satisfy the remaining landside facility requirements beyond the long-term.

Northwest Development Area – The Northwest Development Area can also serve as an aeronautical development area to accommodate future landside facility requirements. The site has direct access to airside facilities but would require some additional planning and coordination to provide access from Highway 101.

Southeast Development Area – The Southeast Development Area previously identified in the 2004 Airport Master Plan can also serve as an aeronautical development area to accommodate future landside facility requirements. Access to this site will require additional planning locally to address construction of an access road and more.

Remaining Development Areas – The remaining development areas which include the Oregon Army National Guard Site, Coast Guard Expansion Area, and North Highway 101 Development Area are all compatible with the CR1 alternative.

CR1 – Criteria Analysis

The CR1 alternative addresses many of the non-standard issues currently identified on the Airport. However, when considered against the other crosswind alternatives and the issues facing the Airport in the future, the CR1 alternative may create new challenges and issues that would need to be addressed in the mid- to long-term planning period. The factors that weighed most heavily in the criteria analysis of the CR1 alternative are specifically related to the operational considerations and planning principles discussed in more detail below.

Planning Principles

The CR1 Alternative was developed to demonstrate the Airport's ability to meet the FAA design standards without having to undertake major construction or relocate Runway 2-20. This crosswind concept aims to mitigate only the most necessary design standard issues with less concern for operational considerations. While this alternative does correct the inline taxiway and non-standard geometry associated with Taxiway A, D and Runway 2 not meeting FAA Design Standards, it does not address the RPZ incompatibility with landside operations and aircraft hangars and thereby does not allow for future growth within the existing terminal areas or provide the highest and best use of on-airport land. This alternative would require the Airport to locate any new mid- to long-term development to another site which would require additional local planning and coordination. CR1 is also incompatible with the City of Newport's strategic vision to accommodate the growing fleet of jet aircraft used for business.

In terms of best planning practices among the crosswind alternatives, this alternative reflects the least amount of planning preparation for future aviation demand.

Operational Considerations

The CR1 Alternative results in an airport as a system that does not perform well compared to other alternatives. Capacity is decreased due to lost tie-downs and lost apron space resulting from the RPZ remaining in its current location. With the loss of the TW E connection to RW 2, the overall capability of the Airport is decreased due to taxi routes through the apron area to access Runway 16. To move the occasional C-130 and other larger business aircraft around the airport, coupled with the existing Runway 2 RPZ alignment, this alternative greatly reduces the space available for aircraft tiedown and parking apron. Furthermore, the inefficient taxi routes that involve taxiing aircraft through the apron area to reposition from Runway 16 to Runway 34 or vice versa greatly decreases operational efficiency. Leaving Runway 2-20 in the existing configuration greatly reduces the capabilities of the airport as a system.

In terms of operational consideration among the crosswind alternatives, this alternative reflects the least capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

CR1 provides the lowest possible cost to implement with respect to the crosswind runway requirements. The singular advantage of the CR1 Alternative is the very small hard dollar costs associated with implementation. However, choosing the CR1 alternative will require other landside elements be relocated to another site on the airport and existing hangar, apron, and tie down space will remain incompatible with the RPZ and need to be mitigated. The CR1 alternative may also have a missed opportunity cost, which, considering the economic impact the airport provides to the region, could be significant. It is

important to consider potential lost revenue due to the loss of space for existing apron area and apron expansion and the cost to expand GA Development in another location, *which are not factored into the hard dollar cost*. The Estimated project cost for CR1 is \$750,000 - \$1,000,000.

In terms of hard dollar costs, this alternative is the least expensive crosswind alternative.

Environmental Considerations

CR1 Alternative does not present a significant change with respect to land use compatibility concerns, noise concerns, changes to the social environment, or direct threats to plant and animal communities in relation to FAA levels of significance. Notwithstanding, Runway 2-20 would require construction to remove inline Taxiway E, correct the non-standard geometry of Taxiway A, D, and Runway 2, and ultimately a new development area for landside expansion. Construction impacts could include temporary noise, dust or traffic impacts, as well as the potential for erosion and water quality impacts associated with material spills, associated with construction.

In terms of overall environmental consideration among the crosswind alternatives, this alternative has the second least amount of impact to the existing natural and built environments.

CR2 – Shift Runway 1,100 Feet to NE (Exhibit 5B)

This alternative addresses the insufficiencies associated with Runway 2-20 by shifting the runway 1,100 feet to the northeast. A shift to the northeast will allow Runway 2-20 to maintain B-II status while also mitigating RPZ and taxiway intersection issues.

To meet FAA design standards, the non-standard inline portion of Taxiway E will be removed and the geometry of Taxiway A, D, and Runway 2 will be corrected by relocating the Runway 2 threshold. As a result, the operational capability and capacity of the taxiway system and apron area is greatly increased. This alternative allows for the construction of a full parallel Taxiway A if required beyond the planning period. Shifting Runway 2-20 will also remove the Runway 2 RPZ from the apron and hangar area. This allows the existing hangars to remain and provides room for future GA development within the existing terminal area.

Runway 2-20 – The runway threshold is shifted 1,100' NE. The runway will maintain B-II status. The runway extension on the Northeast end will require approximately 18 acres of land acquisition and new construction of runway pavements. In addition to runway pavement, this alternative will require construction of embankments, installation of drainage facilities, relocating necessary road access, and mitigating environmental impacts such as wetlands to satisfy RSA grading and overrun requirements.

Taxiway Intersection - Non-standard taxiway issues are resolved by removing the inline portion of Taxiway E and constructing a new entrance taxiway to Runway 2. The new, more efficient taxi routes created by relocating the Runway 2-20 thresholds, indirectly corrects the non-standard geometry of Taxiway D, E, and the relocated Runway 2 threshold.

RPZ - Runway 2 RPZ is relocated and apron/aircraft parking issues are mitigated.

Landside Development Scenarios Compatible with Alternative CR2

In addition to the elements identified above, there are other improvements that must also be considered concurrently within this concept to satisfy the landside facility requirements of the airport over the planning period. The landside elements previously identified addressed in this concept include:

- Existing and new hangar development
- Expanded aircraft parking apron and tiedowns
- Cargo apron and cargo processing facilities
- Second Fixed Base Operator (FBO) facility
- Oregon Army National Guard development site
- One-acre expansion area for United States Coast Guard facilities
- Utility extensions to support development

While the relocation of the Runway 2 RPZ greatly expands the capability of the existing terminal area to satisfy many of the landside facility requirements over the long-term planning period, it is prudent planning to identify alternative development areas on the airport. These include:

Infill Existing GA Areas – In the CR2 alternative there is significant space available for infill expansion within the existing terminal area to meet long-range facility requirements for aircraft parking and tiedown areas, existing and new hangar development, cargo apron and cargo processing facilities, and potentially a second FBO. However, to satisfy the remaining landside requirements identified in the facility requirements chapter additional sites need to be identified for development and expansion on the Airport.

South Highway 101 Development Area – The South Highway 101 Development Area could be reserved for non-aeronautical development as identified in the 2004 Airport Master Plan or be re-categorized as an aeronautical expansion area to accommodate unforeseen aeronautical landside development needs beyond the forecast planning period. Classifying this area for aeronautical development would require the relocation and reconstruction of the existing access road and also require additional planning and coordination to fully implement the aeronautical landside development.

Northwest Development Area – The Northwest Development Area can be reserved for either non-aeronautical or aeronautical development or a combination of both aeronautical and non-aeronautical in this concept. Due to the relocation of the Runway 2 RPZ over the existing terminal area and increased space available for infill development, it is less imperative in the short- to mid-term range to begin searching for different sites to development landside facilities.

Southeast Development Area – The Southeast Development Area, previously identified in the 2004 Airport Master Plan, can also serve as an aeronautical development area to accommodate future landside facility requirements. Access to this site will require additional planning locally to address construction of access road and more.

Remaining Development Areas –The remaining development areas which include the Oregon Army National Guard Site, Coast Guard Expansion Area, and North Highway 101 Development Area are all compatible with the CR2 alternative.

CR2 – Criteria Analysis

The CR2 alternative addresses many of the issues associated with Runway 2-20 and the taxiway system by relocating Runway 2-20. Operationally this alternative provides many advantages with respect to capacity, capability, and efficiency. From a planning stand point. Alternative CR2 will also present new challenges with the relocation of Runway 2-20. Environmentally this alternative would likely have the greatest impact of the crosswind alternatives presented due to the major construction required to extend the runway. Furthermore, the cost associated with the construction of the earthwork and embankments to support the relocation of Runway 2-20 are significant.

Planning Principles

This alternative addresses existing safety issues and non-standard design criteria by relocating Runway 2-20 and correcting existing insufficiencies in the taxiway system. Alternative CR2 provides the highest and best uses of Airport land by relocating the incompatible RPZ over the existing terminal area apron thus allowing the existing terminal area to expand and accommodate future growth in landside operations. The relocation of the RPZ also provides growth beyond the planning horizon and flexibility to adjust to unforeseen changes beyond the planning horizon. Keeping RW 2-20 satisfies airport user needs for a crosswind runway and the sponsor's strategic vision for long-term growth of business jets.

In terms of best planning practices among the crosswind alternatives, this alternative reflects the second best alternative of planning preparation for long-term aviation demand.

Operational Considerations

The CR2 alternative meets capacity, capability, and efficiency objectives for the airport as a system. By keeping Runway 2-20 open and at B-II status, the Runway satisfies current and future activity levels. Moving the Runway 2 RPZ northeast of the apron, hangar, and terminal area allows sufficient capability for future expansion. The construction of a full parallel Taxiway A and corrected taxiway geometry of TW A, D, and Runway 2 creates an efficient and effective taxiway system beyond the long-term planning period. From an operational standpoint, alternative CR2 corrects many of the issues identified.

In terms of operational consideration among the crosswind alternatives, this alternative reflects the most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

Of the crosswind alternatives presented, CR2 is the most expensive hard dollar cost option. 18 acres of land would need to be acquired off the northeast end in order to fully encompass Runway 20 RPZ. Earth work and drainage mitigation would also be required on the Runway 20 end. At the Runway 2 end, pavement removal would be required along with the construction of a new entrance taxiway for Runway 2. Unlike alternative CR1, there would be no cost to relocate GA development due to mitigated RPZ compatibility issues related to the apron and terminal building area. The total estimated project cost of CR2 Alternative is \$4.5 - \$6 Million. Similar to the other crosswind alternatives presented, *FAA participation is uncertain* due to current FAA constraints on secondary runways.

Similar to other crosswind alternatives, it is important to consider lost revenue due to loss of space for apron expansion and the cost to expand landside facilities in another location, *which are not factored into the hard dollar cost*. While the hard dollar cost of this alternative is expensive, it reduces any immediate

requirements to expand landside facilities to another location on the airport.

In terms of hard dollar costs, this alternative is the most expensive crosswind alternative.

Environmental Considerations

In CR2 the shift of Runway 2-20 would involve removing pavement from the Runway 2 end and adding pavement at the Runway 20 end. This would involve buying land, building embankments, rerouting drainage, extensive cut and fill at the northeast end of the Airport and rerouting the access road currently crossing the RW 20 safety area. Wetland areas would require mitigation and drainage consideration at the Runway 20 end. Air and water quality could be affected temporarily by construction. Other temporary construction impacts could include noise, dust or traffic impacts, as well as the potential for erosion and other environmental impacts associated with material spills due to construction. Removal of solid waste from construction would need to be considered.

In terms of overall environmental consideration among the crosswind alternatives, this alternative has the most impact to the existing natural and built environments.

CR3 – Downgrade to B-I (small) and Extend 200’ (Exhibit 5C)

Alternative CR3 addresses the insufficiencies associated with Runway 2-20 and non-standard taxiway geometry by downgrading Runway 2-20 to B-I (small) and extending the Runway 200’ southwest to a location where the Runway 2 threshold is more compatible with the proposed taxiway system solutions. Downgrading the crosswind runway to B-I (small) and extending to the southwest will mitigate much of the RPZ and taxiway intersection issues and ultimately create a more efficient taxiway system while also maintaining the crosswind runway. Typical aircraft accommodated by a B-I (small) crosswind runway include the Beech Baron, Cessna 402, Piper Navajo, Metroliner, and the Cessna Caravan (FEDEX).

To satisfy FAA design standards, the non-standard inline portion of Taxiway E will also be removed along with the correction of the non-standard geometry associated with Taxiway A, D, and Runway 2. These corrections, paired with the extension of Runway 2, create a more efficient and effective taxiway system that satisfies FAA Design Standards.

Runway 2-20 – Runway downgraded to B-I (small) and extended 200’ southwest. The runway pavement width for B-II is currently 75’ and could remain at its current width once downgraded to B-I (small), however, funding from the FAA (if they will participate in this alternative) may only fund up to a 60’ runway width which is standard for B-I (small) runways. The extension of Runway 2 by 200’ to the southwest is implemented to create a parallel Taxiway A and Runway 2-20 crossing that would satisfy FAA Design Standards. Finally, the extension of Runway 2-20 does not involve significant construction and would likely consist of remarking existing airfield pavements extending beyond the existing runway threshold, unless the FAA call for the 60’ smaller width, which will require relocating the MIRL lights and upgrading the drainage system.

Taxiway Intersection – Remove non-standard inline portion of Taxiway E and correct other non-standard taxiway geometry by extending Taxiway A approximately 1000’ to the south where it will intersect with a newly constructed extension of Taxiway E.

RPZ – Downgrading Runway 2-20 to B-I (small) reduces the size of Runway 2 RPZ over the apron and terminal area by approximately 5 acres. While many of the existing facilities can remain, near the end of the planning period future apron expansion will still be limited.

Landside Development Scenarios Compatible with Alternative CR3

In addition to the elements identified above, there are other improvements that must be considered within this concept to satisfy the landside facility requirements of the airport over the planning period. The landside elements previously identified and addressed in this concept include:

- Existing and new hangar development
- Expanded aircraft parking apron and tiedowns
- Cargo apron and cargo processing facilities
- Second Fixed Base Operator (FBO) facility
- Oregon Army National Guard development site
- One-acre expansion area for United States Coast Guard facilities
- Utility extensions to support development

Alternative development sites must be considered for landside facilities expansion. The landside development alternatives compatible with CR3 include:

Infill Existing GA Areas – In the CR3 alternative there is space available for infill expansion within the existing terminal area once the Runway has been downgraded to B-I (small). There is likely enough space in the existing terminal area to meet the long-range facility requirements for new hangar development, aircraft parking and tiedowns, cargo apron and cargo processing facilities, and potentially a second FBO. However, to satisfy the remaining landside requirements identified in the facility requirements additional sites need to be identified for development and expansion on the Airport.

South Highway 101 Development Area – The South Highway 101 Development Area could be reserved for non-aeronautical development as identified in the 2004 Airport Master Plan or be re-categorized as an aeronautical expansion area to accommodate any unforeseen aeronautical landside development needs beyond the forecast planning period similar to the previous alternatives. However, classifying this area for aeronautical development would require the relocation and reconstruction of the existing access road and would also require additional planning and coordination to fully implement the aeronautical landside development.

Northwest Development Area – The Northwest Development Area can also be reserved for either non-aeronautical or aeronautical development or a combination of both aeronautical and non-aeronautical in this concept. Due to the decreased size of the Runway 2 RPZ over the existing terminal area and increased space available for infill development, it is less imperative to begin preparing sites that would accommodate future long-term landside facilities within the 20-year planning period.

Southeast Development Area – The Southeast Development Area previously identified in the 2004 Airport Master Plan can also serve as an aeronautical development area to accommodate future landside facility requirements or non-aeronautical large parcel development. Access to this site will require

additional planning locally to address access easements, land acquisition, construction of access roads and more.

Remaining Development Areas –The remaining development areas which include the Oregon Army National Guard Site, Coast Guard Expansion Area, and North Highway 101 Development Area are all compatible with the CR2 alternative

CR3 – Criteria Analysis

The CR3 alternative addresses the issues associated with Runway 2-20 and the taxiway system by downgrading Runway 2-20 to B-I (small) and redesigning a more effective and efficient taxiway system around the reduced requirements associated with the B-I (small) runway. The new layout conforms to best planning principles and provides flexibility to unforeseen changes. Operationally, the CR3 alternative is more effective due to better taxi routes that accommodate the repositioning of the occasional larger aircraft while also separating taxiing aircraft from the aircraft parking apron. From a cost standpoint, this alternative is the second most expensive crosswind alternative. The CR3 alternative minimizes environmental impacts primarily to the temporary impact from construction.

Planning Principles

The CR3 Alternative was developed to demonstrate how a downgrade of runway reference code and appurtenant facilities could potentially help the airport’s taxiway system meet FAA design standards without having to undertake major construction or relocation of Runway 2-20. In doing so, the CR3 alternative’s taxiway layout conforms to FAA design standards while simultaneously satisfying user needs identified in the Facility Requirements chapter to keep the crosswind runway. The reduction in size of the RPZ also allows for the highest and best uses of on-airport land use over the long-term. Focused attention on maintaining the existing apron and aircraft parking area and concentrating infill development to the existing terminal area will better serve existing users and position the Airport to meet the long-term strategic vision of the City to accommodate business class aircraft.

In terms of best planning practices among the crosswind alternatives, this alternative reflects the highest amount of planning preparation for future aviation demand.

Operational Considerations

The CR3 alternative results in the airport as a system that performs well when compared to the other alternatives. In this alternative, landside operational capacity is slightly increased due to the reduced size of the RPZ encompassing less apron area. This alternative will likely satisfy long-term demand for hangars within the existing terminal development area; although additional space will still be required for apron area near the end of the 20-year planning period. Airside capacity remains satisfactory even as a B-I (small) runway which can accommodate a variety of aircraft including the Cessna Caravan used by FEDEX as a freight aircraft. Most important, in this alternative, the efficiency and operational capability of the taxiway system is improved by correcting non-standard geometry, removing inline Taxiway E, and planning for taxi routes that separate aircraft repositioning on the airfield from aircraft parked on the apron.

In terms of operational consideration among the crosswind alternatives, this alternative reflects the second most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

CR3 provides the second most expensive crosswind alternative to implement with an estimated project cost of \$2 - \$3.5 million dollars. The Runway 2 extension of 200' consists primarily of remarking, updating signage, relocating runway lights, and the necessary FAA coordination to relocate the Runway 2 endpoint 200' to the southwest. Additionally, the cost estimates associated with alternative CR3 include the closure/removal of the existing non-standard portion of Taxiway E and the construction of the approximately 1000' extension of Taxiway A as well as the extension/relocation of the closed portion of Taxiway E.

Similar to other crosswind alternatives, it is important to consider lost revenue due to loss of space for apron expansion and the cost to expand landside facilities in another location, *which are not factored into the hard dollar cost*. While the hard dollar cost of this alternative is expensive, it reduces any immediate requirements to expand landside facilities to another location on the airport.

In terms of hard dollar costs, this alternative is the second most expensive crosswind alternative.

Environmental Considerations

This alternative does not present off-airport land use compatibility concerns, noise concerns, changes to the social environment, or direct threats to plant and animal communities in relation to FAA levels of significance. Construction projects would involve building a portion of parallel Taxiway A, removing the inline portion of Taxiway E and constructing the new extension of Taxiway E. Construction impacts could include temporary noise, dust or traffic impacts, as well as the potential for erosion and water quality impacts associated with material spills, connected with construction. This alternative does not require land acquisition or extensive earthwork. Temporary environmental impacts from construction can be assumed.

In terms of overall environmental consideration among the crosswind alternatives, this alternative has the third most amount of impact to the existing natural and built environments.

CR4 – Close Runway 2-20 (Exhibit 5D)

Alternative CR4 is the least complex crosswind runway alternative. CR4 solves the airport insufficiencies associated with Runway 2-20 by eliminating the runway entirely. Closing Runway 2-20 will allow for the correction of non-standard geometry of Taxiway A, D, and Runway 2 while also mitigating RPZ/apron incompatibility issues and satisfying the requirements to accommodate future landside expansion and growth at the airport. However, closing Runway 2-20 does not satisfy user needs for a crosswind runway, meet PAC objectives, or conform to the Sponsor's long-term strategic vision. It does however allow the airport as a system to meet FAA design standards.

Runway 2-20 - Runway 2-20 will be closed and pavement will be removed or remarked accordingly.

Taxiway Intersection – Existing non-standard taxiway issues such as the inline portion of Taxiway E and non-standard taxiway geometry of Taxiway A, D, and Runway 2 are mitigated upon closure of Runway 2-20.

RPZ - Runway 2 RPZ issues are mitigated upon the removal of the RPZ for Runway 2.

Landside Development Scenarios Compatible with Alternative CR4

In addition to the elements identified above, there are other improvements to consider to satisfy the landside facility requirements of the airport over the planning period. The landside elements previously identified and planned for include:

- Existing and new hangar development
- Expanded aircraft parking apron and tiedowns
- Cargo apron and cargo processing facilities
- Second Fixed Base Operator (FBO) facility
- Oregon Army National Guard development site
- One-acre expansion area for United States Coast Guard facilities
- Utility extensions to support development

Alternative development sites must be considered for landside facilities expansion. The landside development alternatives compatible with CR4 include:

Infill Existing GA Areas – In the CR4 alternative there is significant space available for infill expansion within the existing terminal area after the closure of Runway 2-20. With the removal of the Runway 2 RPZ there is ample space in the existing terminal area to meet the long-range facility requirements for existing and new hangar development, aircraft parking and tiedowns, cargo apron and cargo processing facilities, and a second FBO.

Closed Runway 2-20 East Development Area – Area within the closed portion of Runway 2-20 could serve as an additional development area. Additional planning and local consideration would be required to address access requirements and necessary easements to the east side of the airport.

South Highway 101 Development Area – The South Highway 101 Development Area could be reserved for non-aeronautical development as identified in the 2004 Airport Master Plan or be re-categorized as an aeronautical expansion area to accommodate any unforeseen aeronautical landside development needs beyond the forecast planning period. However, classifying this area for aeronautical development would require the relocation and reconstruction of the existing access road and would also require additional planning and coordination to realize the aeronautical landside development.

Northwest Development Area – The Northwest Development Area can also be reserved for either non-aeronautical or aeronautical development or a combination of both aeronautical and non-aeronautical in this concept. Due to the removal of the Runway 2 RPZ over the existing terminal area and the increased space available for infill development, it is less imperative to begin preparing sites that would accommodate future long-term landside facilities.

Southeast Development Area – The Southeast Development Area previously identified in the 2004 Airport Master Plan can also serve as an aeronautical development area to accommodate future landside facility requirements. Access to this site will also require additional planning locally to address access easements, land acquisition, construction of an access road and more. With the closure of Runway 2-20 the southeast development area might make more sense to increase the potential for vehicle access to the east side of the airport.

Remaining Development Areas – The remaining development areas which include the Oregon Army National Guard Site, Coast Guard Expansion Area, and North Highway 101 Development Area are all compatible with the CR4 alternative

CR4 – Criteria Analysis

The CR4 alternative is a relatively simple approach to solving the issues associated with Runway 2-20. There are several disadvantages associated with the CR4 alternative from a planning standpoint. Closing the runway is not consistent with local user needs or the long-term strategic vision of the sponsor. Operationally, closing the runway increases landside capabilities but results in a significant shortcoming with respect to airside capabilities during winter months when the winds prevail out of the southwest. The CR4 alternative comes with a very small price tag when compared to the other alternatives. However, the cost of not having the crosswind runway is not factored in to the cost estimates. Environmentally this alternative does not present any new or significant land use compatibility or noise impacts to areas off of the airport.

Planning Principles

CR4 represents the most straightforward approach to meeting the FAA design standards for existing non-standard taxiway geometry and incompatible RPZ/apron issues. Closing crosswind Runway 2-20 allows for the Airport to meet forecast growth while also providing greater flexibility for unseen changes. However, closing the crosswind runway clearly fails to satisfy user needs, meet the sponsor’s strategic vision for the future of the Airport, or provide for the highest and best use of airport land.

In terms of best planning practices among the crosswind alternatives, this alternative reflects the third most capable alternative for planning preparation for long-term aviation demand

Operational Considerations

This alternative allows for an efficient taxiway system and meets capacity objectives with the removal of the RPZ and the correction of the non-standard geometry associated with the Taxiway A, D, and Runway 2 intersection. However, airside capability is decreased significantly due to the loss of the crosswind runway. Landside capability and operational efficiency is improved when considering the space available for future development and expansion.

In terms of operational consideration among the crosswind alternatives, this alternative reflects the third most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

The estimated rough order of magnitude (ROM) costs to implement the CR4 alternative for Runway 2-20 is a range of approximately is \$1 - \$2 Million. Costs associated with this project are minimal with respect to the closure and remarking of the Runway 2-20 pavement. The bulk of the cost included in the cost estimate comes from the cost to construct a parallel Taxiway A extension.

In terms of hard dollar costs, this alternative is the third most expensive crosswind alternative.

Environmental Considerations

CR4 Alternative does not present land use compatibility concerns, noise concerns, changes to the social environment, or direct threats to plant and animal communities in relation to FAA levels of significance.

The only construction project involved with this alternative would involve building a parallel extension of Taxiway A. Construction impacts could include temporary noise, dust or traffic impacts, as well as the potential for erosion and water quality impacts associated with material spills, associated with construction.

In terms of overall environmental consideration among the crosswind alternatives, this alternative has the least amount of impact to the existing natural and built environments.

RUNWAY 16-34 ALTERNATIVES (MR)

Chapter Three, *Aviation Forecasts*, quantitatively identified the increasing trend of business class aircraft and Chapter Four, *Facility Requirements* identified the facility requirements to upgrade the Runway 16-34 Runway Design Code (RDC) from B-II to C-I or C-II to accommodate the growing class of corporate and business jet aircraft. The project elements that must be considered to realize the upgrade of Runway 16-34 to Category “C” include:

- Runway Safety Area (RSA)
- Runway threshold locations and runway length
- Runway longitudinal gradients

First and foremost, the existing runway length must be maintained. There are a variety of ways to maintain the necessary runway lengths in concurrence with extending and widening the Runway Safety Area (RSA) to the necessary C-I standards which are for all intents and purposes identical to C-II standards. However, expanded RSA requirements for the Category “C” upgrade is arguably the most thought-provoking element associated with the Runway 16-34 alternatives. Lastly, runway 16-34 must be reconstructed to remove the dip in the center of the runway to meet the stricter Category “C” runway longitudinal grade requirements.

As previously discussed, there are four development alternatives presented for Main Runway 16-34 (MR) to provide stakeholders with the tools to evaluate the potential developments that could be implemented to upgrade Runway 16-34 to the larger “C” category.

MR1 – Declared Distances (Exhibit 5E)

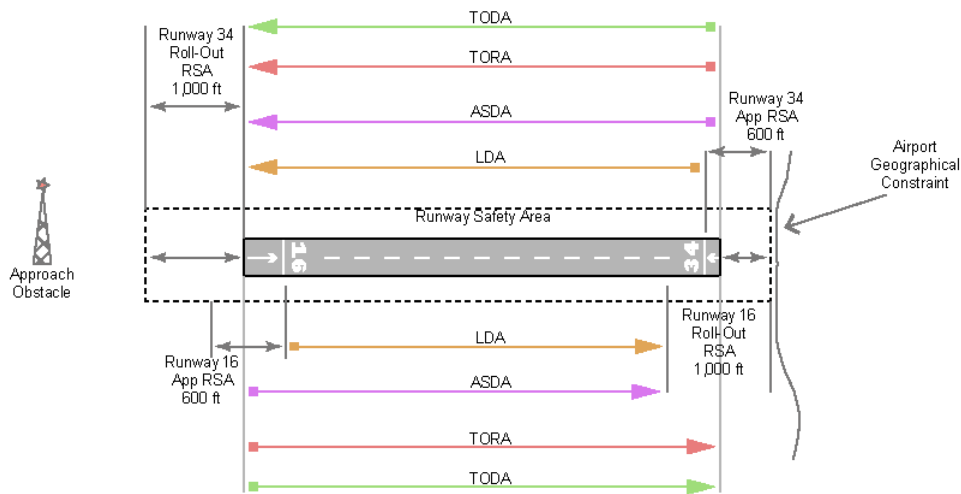
The Declared Distances Alternative (MR1) for Runway 16-34 is the least intensive development vision presented. The utilization of declared distances is essentially a new paint job on the existing runway pavements in an effort to maximize the existing runway pavement lengths available while still satisfying the future facility upgrade to C-II standards. The use of declared distances is typically limited to cases where existing site constraints make providing the necessary safety areas and runway protection zones required to satisfy design standards impractical.

Alternative MR1 is comprised of two primary elements. The first, and perhaps most demanding element considered in this alternative for Runway 16-34, is the upgrade of the RSA from B-II to C-II through the use of declared distances. Second is the reconstruction of the runway ends on Runway 16-34 to meet longitudinal grade change requirements.

RSA – Extend and widen the RSA to C-I or C-II standards (600’ length beyond approach end by 500’ wide) and limit the full extent of the RSA to the limits of the existing plateau where the airport is currently situated. Utilize available runway pavement facilities within existing site constraints of the RSA and apply the Runway 16-34 declared distances.

Runway 16-34 (Thresholds and Gradient) – The use of declared distances represents the maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distance performance requirements for turbine powered aircraft. The declared takeoff distances are Takeoff Run Available (TORA) and Takeoff Distance Available (TODA), which apply to; Accelerate Stop Distance Available (ASDA); and Landing Distance Available (LDA).

- **Takeoff Run Available (TORA)** – the runway length declared available and suitable for satisfying takeoff run requirements.
- **Takeoff Distance Available (TODA)** – this distance comprises the TORA plus the length of any remaining runway or clearway beyond the far end of the TORA.
- **Accelerate-Stop Distance Available (ASDA)** – the runway plus stop way length declared available and suitable for the acceleration and deceleration of an aircraft that must abort its takeoff. A stop way is an area beyond the takeoff runway able to support the airplane during an aborted takeoff, without causing structural damage to the airplane.
- **Landing Distance Available (LDA)** – the runway length that is declared available and suitable for satisfying aircraft landing distance requirements.



To meet the upgraded RSA for C-I, this alternative includes an additional 100’ to the existing 300’ displaced threshold on Runway 34 end and also includes a new 57’ displaced threshold on Runway 16. After applying the more demanding C-I RSAs, the declared distances achieved in this development alternative are as follows:

Existing Declared Distances

Proposed Declared Distances

Runway 16	Runway 34	Runway 16	Runway 34
TODA – 5,398’	TODA – 5,398’	TODA – 5,398’	TODA – 5,398’
TORA – 5,398’	TORA – 5,398’	TORA – 5,398’	TORA – 5,398’
ASDA – 5,398’	ASDA – 5,398’	ASDA – 4,594’	ASDA – 4,941’
LDA – 5,398’	LDA – 5,098’	LDA – 4,536’	LDA – 4,536’

In addition to applying a new paint job and implementing the declared distances to the existing runway facility, the longitudinal grade for class “C” runways must be considered. Design standards dictate that a class “C” runway shall not have a maximum overall running slope of greater than 1.5%. Furthermore, design standards require that the first and last quarter of the runway length shall not have a maximum grade change of more than 0.8%. It is expected that approximately 1,500 feet of the runway’s south end and 400 feet of the north end would need to be reconstructed (lowered) in concurrence with the corresponding entry/exit taxiways (Taxiway A and Taxiway E) to meet stricter longitudinal grade requirements.

The runway facility improvements discussed in this alternative are the minimum required improvements and upgrades required to implement the upgrade to a Category “C” runway. There are, however, several other improvements that must also occur to implement this declared distances alternative and they include:

- **Land Acquisition** – Land acquisition (16.5 acres) of the Runway 34 RPZ. Much of this property had been identified for acquisition to meet RPZ standards in previous studies.
- **Instrument Approaches** – ILS equipment will need to be relocated and approach procedures will need to be redesigned and reissued.
- **Approach Lighting (MALSR)** – Approach Lights need to be shifted 57’ south to account for the displaced Runway 16 threshold.
- **Visual Approach** – PAPIs for Runway 34 will be relocated 100’ north upon relocation of the displaced threshold. The relocation of the displaced threshold and PAPIs may resolve the existing condition of obstructions south of the airport off of airport property. Additional analysis will be required.

MR1 - Criteria Analysis

The MR1 alternative prepares the Airport for C-I or C-II RDC standards through the use of declared distances. While it is a valid method to meet FAA design standards, it is typically viewed as a last resort option. While still safe, declared distances can be confusing to even the most experienced pilots. Operationally, MR1 falls short of the other main runway alternatives due to reduced landing distances. Financially, this option has the lowest cost associated with implementation due to the minimal construction involved with implementation. Environmentally this alternative has the least amount of impact on the surrounding environment.

Planning Principles

The declared distances alternative was developed to demonstrate the ability to meet the C-I or C-II RDC without having to undertake major construction off of the runway ends and provide the lowest possible cost to implement. It is typical for a plan to consider a “no-action” alternative and this will fill that role. The purpose of the no-action alternative is to have a baseline for comparison when looking at potential environmental impacts. While the declared distances method is a valid approach to meeting FAA design standards, the declared distances approach is less preferable than establishing a runway that is fully usable for its entire length for takeoffs and landings in each direction. Normally, the application of declared distances is a fallback or last resort when no other feasible alternative exists. Some airfield construction activity would still be involved to implement this alternative. Most significant is the reconstruction of the south 1,500 feet and northern 400 feet of Runway 16-34 to meet longitudinal grade requirements, but there are also numerous changes to lighting and marking on the airfield, as well as changes to instrument approach procedures associated with changed runway threshold locations.

When considering best planning principles, the top consideration for this alternative is whether using declared distances offers an equivalent level of safety. While still safe, an airfield where there are displaced thresholds requires pilots to consider more variables in their flight planning, which could lead to errors not associated with a normal runway design.

In keeping with the “no-action” type of alternative, minimal construction projects would be proposed in this alternative beyond the normal maintenance to protect the investment in existing infrastructure. As such, the airport and community would over time fail to invest in the airport and keep up with expected demand for aviation facilities that would meet user needs. There would be much less positive economic impact to the community and the Airport may become more and more of an operational burden to the City. This would be especially true if even the minimum construction to meet RDC C-I or C-II were deferred beyond the anticipated 15 year growth period mentioned in previous chapters and larger business jets make regular use of ONP.

In terms of best planning practices among the main runway alternatives, this alternative reflects the least amount of planning preparation for future aviation demand.

Operational Considerations

Alternative MR1 results in a runway that does not perform well compared to other alternatives. Capability is reduced substantially due to shorter LDA and ASDA. The reduction in takeoff and landing lengths to below FAA recommendations reduces the capability of the airfield and limits the payload and/or range of aircraft operating at ONP.

In terms of operational consideration among the main runway alternatives, this alternative reflects the least capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

The singular advantage of the declared distances alternative is the relatively small hard dollar costs associated with implementation. There will be a temptation, or pressure, to fall back on this alternative because of limited funds. This may be a fair choice initially while new declared distances offer flexibility during which another alternative is phased in over time. However, forgoing other development elements

may have a missed opportunity cost, which, considering the economic impact the airport provides to the region, could be significant. Further, the relatively small cost associated with this choice should be weighed with the public perception of rebuilding a runway that was reconstructed only two years ago.

The estimated rough order of magnitude (ROM) costs to implement the declared distances alternative for Runway 16-34 is a range of approximately \$5M - \$6M dollars, most of which is for the runway reconstruction. Construction associated with this alternative is limited to reconstruction of the south 1,500 feet and north 400 feet of Runway 16-34 and associated entry/exit taxiways; reconfiguring marking, lighting and signage of the runway's displaced thresholds; and the relocation of navigational and landing aids associated with the south end of the runway being reconstructed. *The actual cost of land acquisition is not included in this analysis.*

In terms of hard dollar costs, this alternative is the least expensive main runway alternative.

Environmental Considerations

Alternative MR1 does not propose any new use designations on the airport. It includes only maintenance for the next 20 years. The implementation of declared distances does not present land use compatibility concerns, noise concerns, changes to the social environment, or direct threats to plant and animal communities in relation to FAA levels of significance. Notwithstanding, Runway 16-34 would require construction to lower the runway's southern and northern ends to meet longitudinal grade. Construction impacts could include temporary noise, dust or traffic impacts, as well as the potential for erosion and water quality impacts associated with material spills, associated with construction.

In terms of overall environmental consideration among the main runway alternatives, this alternative has the least impact to the existing natural and built environments.

MR2A and MR2B – Extending the Runway Safety Area (RSA)

Alternatives MR2A and MR2B are very similar in their approach to providing the expanded RSA for the upgraded C category on Runway 16-34 and have therefore been grouped together. In alternative MR2A the RSA is extended out from the end of the runway pavement to the standard 1000' distance required for the category C RSA beyond runway ends. Alternative MR2B, on the other hand, extends the RSA out only 600' from the end of the runway pavement and includes Engineered Material Arrestor Systems (EMAS) to allow for the reduced RSA distances beyond runway ends. Alternatives MR2A and MR2B are depicted respectively on **Exhibit 5F and Exhibit 5G**.

MR2A – 1000' Extension of RSA (Exhibit 5F)

The first element considered in this alternative is the upgrade of the RSA from B-II to C-I or C-II and the relevant construction of the safety areas required to meet the upgraded standards. Second, reconstruction of the southern and northern ends of Runway 16-34 in concurrence with the associated taxiway entrance to satisfy longitudinal grade requirements is also considered.

RSA – Extend and widen the RSA to C-I or C-II standards (1000' length beyond pavement end by 500' wide) by constructing embankment, installing drainage facilities, relocating necessary access roads, and mitigating environmental impacts such as wetlands beyond both ends of Runway 16-34. No retaining walls are assumed.

Runway 16-34 (Thresholds and Gradient) – No changes to the thresholds in order to maintain the present runway length of 5,398 feet. In addition to providing expanded RSAs beyond the runway ends to satisfy the upgrade to Category “C”, the longitudinal grade for “C” runways must also be considered. As previously mentioned, design standards dictate that a “C” runway shall not have a maximum overall grade of greater than 1.5% and the first and last quarter of the runway length shall not have a maximum grade change of more than 0.8%. Like the declared distances alternative MR1, it is expected that approximately 1,500 feet of the runway’s south end and 400 feet of the north end would need to be reconstructed (lowered) in concurrence with the corresponding entry/exit taxiways (Taxiway A and Taxiway E) to meet stricter longitudinal grade requirements. The existing displaced Runway 34 threshold would be corrected, by relocating the 34 threshold 300’ farther south, following the clearing of obstructions in the RPZ and construction of embankments and land built to expand the RSA.

The facility improvements discussed in this alternative are the minimum required to implement the upgrade to a C-I or C-II runway. There are, however, several other less demanding improvements that must also occur to fully implement this alternative, and they include:

- **Land Acquisition** – Land acquisition (19 acres) of the Runway 34 RPZ and additional land to allow for construction and placement of embankment. Much of this property had been identified for acquisition to meet RPZ standards in previous studies.
- **Instrument Approaches** – No changes to existing instrument approach procedures are required. The localizer and critical area on the south end of the airport will be relocated 710’ south due to the longer RSA.
- **Approach Lighting (MALSR)** – No change to the locations of approach lights, however the height of several stanchion bases will need to be readjusted.
- **Visual Approach** – PAPIs for Runway 34 will be relocated 300’ south upon removal of the displaced threshold. The relocation is dependent on the removal of approach obstructions.

MR2A - Criteria Analysis

MR2A depicts a straight-forward approach to meeting FAA Design Standards. The planning principles for this alternative ranks highest among the four main runway options. The operational considerations for MR2A are satisfactory and Runway 16-34 facilities remain essentially unchanged. There is a large financial cost with this alternative due to land acquisition and extensive cut and fill at both runway ends. Earthwork and drainage mitigation on both runway ends make this the main runway alternative with the most environmental impact.

Planning Principles

MR2A represents the most straightforward approach to meeting the increased airfield design standards for light business jet aircraft. There are very specific gradient tolerances that must be met and this alternative meets them by simply changing the grades from what exists to what is required. Since the FAA standards/recommendations for runway dimensions, and associated criteria, are all met, the airfield would be providing full safety characteristics for a Category C airfield. Based on existing information, Development MR2A would present challenges that would be technically, socially, and politically feasible

to resolve.

The key advantage of this approach is that the resulting airfield has no restrictions or calculated distances available for takeoff and landing that may complicate the flight planning process when compared to other alternatives. MR2A in its entirety conforms to FAA Design Standards, existing plans and strategic vision of the airport and community, as well as guidance provided by the Planning Advisory Committee.

In terms of best planning practices among the main runway alternatives, this alternative reflects the best alternative at planning preparation for future aviation demand.

Operational Considerations

When considering the capability and capacity of the airfield as shown in alternative MR2A, the concept works very well. Capacity is not a planning consideration at the current low volume of operations and the airfield remains essentially unchanged from its present condition.

In terms of operational consideration among the main runway alternatives, this alternative reflects the third most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

The costs associated with implementing MR2A are significant and arguably presents the single largest disadvantage among the selection criteria. There are huge volumes of embankment required to create the standard RSA beyond each runway end. One of the fiscal factors to consider is the availability of funding as a test for financial feasibility. Because of the complexity and high implementation cost, the RSA project would need to be broken up over multiple years. Funding could be a challenge. The FAA may or may not agree to immediately program such a costly solution until the project becomes fully justified by actual jet activity in the C-I (and higher) Aircraft Reference Code. Once the C-I aircraft operations reach the threshold for regular use, the FAA would work with ONP to identify the best way to meet the funding challenges and confirm which option is the best approach to meeting the Category "C" standards.

In terms of hard dollar costs, MR2A is the second most expensive cost option. At an estimated Rough Order Magnitude (ROM) of \$28M - \$30M, MR2A will require a significant amount of funding. However, there are many different criteria to consider and FAA planning methodology is clear that the lowest cost option is not always preferable when it comes to meeting standards.

In terms of hard dollar costs, this alternative is the second most expensive main runway alternative and potentially infeasible due to cost of project and City funding capabilities at this time.

Environmental Analysis

MR2A and the change to the RSA would involve building an embankment, reconstructing drainage facilities, and relocating a road. Cut and fill at both runway ends would affect wetland areas. Henderson Creek on the north end and Moore Creek on the south end would be impacted and mitigation could be necessary.

Air and water quality could be affected temporarily by construction. Other temporary construction impacts could include noise, dust or traffic impacts, as well as the potential for erosion and environmental impacts associated with material spills associated with construction. Removal of solid waste from construction would need to be considered.

In terms of overall environmental consideration among the main runway alternatives, this alternative has the most impact to the existing natural and built environments.

MR2B – 600’ Extension of RSA with EMAS (Exhibit 5G)

Similar to Alternative MR2A, Alternative MR2B is focused on the expansion of the RSA from B-II to C-I or C-II and the relevant construction of the RSA required to meet the upgraded standards. However, the notable difference between this alternative and the previous MR2A alternative is the inclusion of Engineered Material Arrestor Systems (EMAS). This alternative similarly depicts the reconstruction of the southern and northern end of Runway 16-34 in concurrence with the associated taxiway entrances to satisfy runway longitudinal grade requirements.

RSA – Extend and widen the RSA on the north and south ends of the runway to reduced C-I or C-II standards (600’ length beyond pavement end by 500’ wide) for EMAS by constructing embankment, installing drainage facilities, relocating necessary road access, and mitigating environmental impacts such as wetlands beyond both ends of Runway 16-34. No retaining walls are assumed.

EMAS – Alternative MR2B includes the installation of EMAS beyond both runway ends. EMAS technology provides the benefits of the runway safety area where land is not available and would be very expensive for the airport sponsor to construct the full extents of the land required for the safety area off the end of the runway.

Runway 16-34 (Thresholds and Gradient) – No changes to the thresholds in order to maintain the present runway length of 5,398 feet. In addition to providing expanded RSAs beyond the runway ends and EMAS to satisfy the upgrade to C-I, the longitudinal grade for “C” runways must also be considered. Like the other alternatives discussed, design standards dictate that a “C” runway shall not have a maximum overall grade of greater than 1.5% and the first and last quarter of the runway length shall not have a maximum grade change of more than 0.8%. It is expected that approximately 1,500 feet of the runway’s south end and 400 feet of the north end would need to be reconstructed (lowered) to meet stricter longitudinal grade requirements. The existing displaced Runway 34 threshold would be corrected, by relocating the 34 threshold farther south, following reconstruction and placement of EMAS to expand the RSA.

The facility improvements discussed in this alternative are the minimum required to implement the upgrade to a C-I runway. There are, however, still several other less demanding improvements that must also occur to implement this alternative and they include:

- **Land Acquisition** – Land acquisition (19 acres) of the Runway 34 RPZ and additional land to allow for construction and placement of embankment. Much of this property had been identified for acquisition to meet RPZ standards in previous studies.
- **Instrument Approaches** – No changes to existing instrument approach procedures are required. The localizer and critical area on the south end of the airport will be relocated 310’ south due to the longer RSA.

- **Approach Lighting (MALSR)** – No change to the locations of approach lights, however the height of several stanchion bases will need to be readjusted on new RSA grade.
- **Visual Approach** – PAPIs for Runway 34 will be relocated 300’ south upon removal of the displaced threshold. The relocation is dependent on the removal of approach obstructions.

MR2B - Criteria Analysis

Similar to MR2A, MR2B demonstrates strong planning principles and a high level of operational capacity. The airfield has no restrictions or calculated distances available for takeoff and landing, providing the highest level of safety. Runway utilization would be improved with the use of EMAS. MR2B has significant financial factors. The use of EMAS makes this alternative the most expensive option of those presented. The environmental impact is relatively low when compared to the other alternatives.

Planning Principles

MR2B represents the most unique approach to meeting the increased airfield design standards for light business jet aircraft. This alternative meets very specific gradient tolerances by simply changing the grades from what exists to what is required. Since the FAA standards/recommendations for runway dimensions, and associated criteria are all met, the airfield would provide full safety characteristics. Based on existing information, the project would present challenges that would be technically, socially, and politically feasible to resolve.

Similar to alternatives MR2A and MR3, the key advantage from this approach is that the resulting airfield has no restrictions or calculated distances available for takeoff and landing that would complicate the flight planning process when compared to other options. MR2B in its entirety also conforms to existing plans and strategic vision of the airport and community, as well as guidance provided by the Planning Advisory Committee.

In terms of best planning practices among the main runway alternatives, this alternative reflects the second best for planning preparation for future aviation demand.

Operational Considerations

When considering the capability and capacity of the airfield as shown in Alternative MR2B, the concept is sufficient. Operational capacity will further benefit from the use of EMAS which allows for both a safer operating environment and better runway utilization.

In terms of operational consideration among the main runway alternatives, this alternative reflects the second most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

The costs associated with implementing Alternative MR2B are significant. There are still large volumes of embankment required to create the reduced RSA beyond each end. However, this alternative presents the least amount of earthwork among the three build alternatives. The cost of installing EMAS on both runway ends would also be substantial. Furthermore, the EMAS beds require periodic maintenance and/or replacement and are easily destroyed should aircraft or vehicles inadvertently contact them. So in addition to the highest initial cost to implement Alternative MR2B, life cycle costs are also a significant factor.

One of the fiscal factors to consider is the availability of funding as a test for financial feasibility. At \$30M - \$32M, the RSA project would need to be broken over multiple years and could be difficult for the FAA to agree to participate in such a costly solution. The amount of funding could be a challenge for the FAA to program and/or agree to participate in such a costly solution until the project becomes fully justified by actual jet activity in the C-I (and higher) Aircraft Reference Code. Once the C-I aircraft operations reach the threshold for regular use, the FAA would work with ONP to identify the best way to meet the funding challenges and confirm which option is the best approach to meeting the C-I or C-II standards.

That said, the range of alternatives in this plan includes options that can be implemented at a lower cost. There are many different criteria to consider, and FAA planning methodology is clear that the lowest cost option is not always preferable when it comes to meeting standards. Furthermore, cost is never a reason to defer projects that meet FAA standards for safety.

In terms of hard dollar costs, this alternative is the most expensive main runway alternative and potentially infeasible due to cost of project and City funding capabilities at this time.

Environmental Considerations

Similar to other build alternatives, Alternative MR2B also includes property acquisition. EMAS would be installed on both Runway 16-34 ends to meet RSA standards.

The change to the RSA would involve building an embankment, reconstructing drainage facilities, and relocating a road. The use of EMAS would allow for shorter RSAs and less extensive work off of both runway ends; however, cut and fill at both runway ends would still affect wetland areas.

Air and water quality could be affected temporarily by construction. Other temporary construction impacts could include noise, dust or traffic impacts, as well as the potential for erosion and environmental impacts associated with material spills due to construction. Removal of solid waste from construction would need to be considered.

In terms of overall environmental consideration among the main runway alternatives, this alternative has the third least impact to the existing natural and built environments.

MR3 – 600 Foot Shift of Runway Threshold (Exhibit 5H)

Alternative MR3 shifts Runway 16-34 south 600' and requires construction of embankments, installation of drainage facilities, and mitigating environmental impacts such as wetlands on the south end to meet dimensional criteria for the larger Runway Design Code Category "C" Runway Safety Area (RSA).

The 600' shift to the south was selected in this alternative for two reasons. First, 200' increments were selected to ensure existing infrastructure in place on the approach lights (MALSR) could easily be relocated and/or reused in its current site when construction occurs. The 200' increment would also allow for the removal of all existing towers and lights currently sited off of airport property without easement. Existing MALSR towers can be adjusted vertically by their stanchion base to meet a new RSA grade. Second, the 600' shift south contains the required 1,000' RSA on the north end to fit within existing site constraints. This option alleviates the need for additional construction of embankments on the north end and maintains the existing access roads.

RSA – Extend and widen the RSA to relevant Category “C” standards (1000’ length beyond pavement end by 500’ wide) by constructing embankment, installing drainage facilities, and mitigating environmental impacts such as wetlands on the south end of the airport to accommodate the 600’ runway shift to the south. No retaining walls are assumed.

Runway 16-34 (Thresholds and Gradient) – Thresholds are shifted 600’ south and the present runway length of 5,398 feet is maintained. In addition to providing the necessary RSA, the longitudinal grade for “C” runways must also be considered. Design standards require that the first and last quarter of the runway length shall not have a maximum grade change of more than 0.8%. It is expected that approximately 1,500 feet of the runway’s south end would need to be reconstructed (lowered) at the time of the runway relocation to meet stricter longitudinal grade requirements. The existing displaced Runway 34 threshold would be corrected following reconstruction.

The facility improvements discussed in this alternative are the minimum required to implement the upgrade to a Category “C” runway. There are, however, several other less demanding improvements that must also occur to implement this alternative and they include:

- **Land Acquisition** – 39 acre land acquisition south of the airport which includes much of the Runway 34 RPZ as well as the additional land necessary to construct embankments. Much of this property had been identified for acquisition to meet RPZ standards in previous studies.
- **98th Street and RPZ** – The existing 98th Street and 98th CT alignment south of the airport will need to be relocated prior to the relocation of Runway 16-34 due to the incompatible use of the road in the RPZ.
- **Instrument Approaches** – ILS equipment will need to be relocated and approach procedures will need to be redesigned and reissued.
- **Approach Lighting (MALSR)** – Approach Lights will be shifted 600’ south. This concept will also eliminate an existing condition where the northernmost towers are not on airport property.
- **Visual Approach** – PAPIs for Runway 34 will be relocated 900’ south upon relocation of threshold. The relocation is dependent on the removal of approach obstructions.

MR3 - Criteria Analysis

MR3 reflects full safety characteristics without the use of declared distances. The land acquisition to the south of the Airport must be considered when examining the planning principles of this alternative. Operationally this option is the most capable for current and future demand. The earthwork and land acquisition involved with this alternative result in substantial fiscal factors. Limiting the construction to one runway end helps to make this option a lower impact choice when considering the environment.

Planning Principles

Alternative MR3 represents the most complex approach to meeting the increased airfield design standards for light business jet aircraft. Since the FAA standards, recommendations for runway dimensions, and associated criteria are all met, the airfield would provide full safety characteristics. Based on existing information, the project would present challenges that would be technically, socially, and

politically feasible to resolve.

Similar to alternatives MR2A and MR2B, the key advantage from this approach is that the airfield will have no restrictions or calculated distances available for takeoff and landing that would complicate the flight planning process when compared to other alternatives.

Another planning principle to consider in this alternative is the acquisition of approximately 39 acres of privately owned land on the south end of the airport for the RPZ. The land to be acquired is currently zoned as “Destination Resort” and would need to be rezoned. Furthermore, 98th St. and 98th Ct, which currently switchbacks down the side of the ravine, will need to be relocated out of the expanded RPZ.

Alternative MR3 in its entirety also conforms to existing plans and strategic vision of the airport and community, as well as guidance provided by the Planning Advisory Committee.

In terms of best planning practices among the main runway alternatives, this alternative reflects the third best at planning preparation for future aviation demand.

Operational Considerations

When considering the capability and capacity of the airfield as shown in alternative MR3, the concept is capable of meeting the needs of the airfield. Similar to the other MR alternatives, capacity is not an issue and MR3 meets the capability requirements by accommodating “C” aircraft.

In terms of operational consideration among the main runway alternatives, this alternative is the most capable to accommodate future demand in operational capacity, capability, and efficiency.

Fiscal Factors

Similar to the other MR alternatives, the costs associated with implementing the elements of the MR3 alternative are significant. The extensive earth work, wetland and drainage mitigation, and road relocation make this alternative the third most expensive. The 600 foot shift of Runway 16-34 will require several large changes to the airfield. Unlike alternatives 1 and 2, pavement will be added to the Runway 34 end and removed from the Runway 16 end resulting in additional costs. The adjustment and relocation of several approach lights will be costly. Alternative MR3 also has the most extensive land acquisition of the three alternatives. Because of the 600 foot shift in the runway, the longitudinal grade issues will no longer be a concern to be measured independently as the issue will be corrected during the reconstruction/shift of the runway.

Another fiscal factor to consider is the availability of funding as a test for financial feasibility. At \$19M - \$21M, the RSA project would need to be broken over multiple years and could be difficult for the FAA to agree to participate in such a costly solution. The amount of funding could be a challenge for the FAA to program and/or agree to participate in once the project becomes fully justified by actual jet activity in the C-I (and higher) Aircraft Reference Code. Once the expected C-I aircraft operations reach the threshold for regular use, the FAA would work with ONP to identify the best way to meet the funding challenges and confirm which option is the best approach to meeting the “C” standards.

In terms of hard dollar costs this alternative is the third most expensive main runway alternative and potentially infeasible due to cost of project and City funding capabilities at this time.

Environmental Considerations

In MR3, the change to the RSA would involve removing pavement from the Runway 16 end and adding pavement at the Runway 34 end. This would involve building embankments, rerouting drainage, and extensive construction at the southern end of the Airport. Wetland areas and Moore Creek would require mitigation and drainage consideration at the Runway 34 end. Additionally, the social and land-use impacts associated with the acquisition of land and relocation of 98th St and 98th Ct on the south end of the airport must also be considered.

Among the alternatives that involve major construction, Alternative MR3 has the advantage of only placing embankment in one site instead of two. This would reduce the complexity of the project and reduce the potential environmental impacts significantly.

Air and water quality could be affected temporarily by construction. Other temporary construction impacts could include noise, dust or traffic impacts, as well as the potential for erosion and environmental impacts associated with material spills due to construction. Removal of solid waste from construction would need to be considered.

In terms of overall environmental consideration among the main runway alternatives, this alternative has the second least amount of impact to the existing natural and built environments.

A SYNTHESIS OF THE ALTERNATIVES

The concepts addressing the Main Runway 16-34 (MR), Crosswind Runway 2-20 (CR), and associated landside development scenarios analyzed in this chapter were presented to the PAC and public at a meeting held on August 17, 2016 in the Newport City Council Chambers. The different concepts depict alternative methods for meeting the demand levels projected to occur by 2036. The discussion considered each of the concepts presented.

As the review process continued the PAC was free to choose a preferred development alternative from the concepts shown or synthesize a new alternative from two or more concepts in order to arrive at the best solution. After listening to the PAC and Open House comments, City staff further reviewed the alternative designs, sought additional information from the planning team and then focused in on a final decision. A composite preferred alternative development concept has been identified and is described in more detail below.

Main Runway (MR) Alternatives

The MR series of alternatives (Runway 16-34) provides alternatives to upgrade the main runway to accommodate business jet traffic. The airport can safely handle this occasional traffic now, however FAA criteria specifies larger Runway Safety Areas for airports designed to accommodate regular use by jets. There are only a few airports along the Oregon Coast that are currently designed to handle jets or that could be feasibly upgraded to handle jet traffic. Establishing a facility developed to foster business jet capability will represent a sound investment in the future economic stimulus and emergency response roles the City and PAC have expressed through this study's goals and objectives.

Four alternative concepts were prepared that represent the range of ways to upgrade Runway 16-34 from B-II to C-I or C-II. (For a description of the Runway Design Code system, please refer to Chapter 4, Facility

Requirements). The PAC identified MR3 as having the best potential to reduce costs and environmental impacts while meeting the facility requirements at the August 17th meeting. However, in response to the questions posed by the PAC and the City, additional analysis was requested to clarify the impacts from MR3 as well as the effect, if any, on instrument approach capability and neighboring land owners.

Consideration of Instrument Procedures – MR3

Planners looked closer at the criteria for Operational Considerations, and specifically at the impacts to future instrument approach procedure capabilities. Runway 16-34 is equipped to allow aircraft to approach the runway using only reference to navigation instrumentation in the cockpit. The minimum distance from the airfield that aircraft can approach before having visual contact to the runway end will dictate the size of RPZ's. This minimum distance is often shortened in discussions to “minimums”. The Runway Design Code also has a bearing on RPZ size. Currently, the lowest minimums are to Runway 16, which is equipped with an Instrument Landing System (ILS) and allows for approaches down to $\frac{3}{4}$ of a mile. Prior plans have included lowering the minimums to $\frac{1}{2}$ mile, which gets the best capability out of the ILS. Achieving these minimums for the current B-II RDC requires Taxiway A to be moved away from the runway by 15 feet, which is already planned in the near term. Achieving these minimums for the C-I or C-II RDC would require the taxiway to be an additional 100 feet away from the runway, which is a much larger and more costly effort.

To assist with the visualization of the instrument approach and land-use impacts, a series of graphics were prepared and presented to the City and the PAC through a White Paper. The Plan View drawings show the proposed runway end location along with largest RPZ and lowest obstacle identification surface, one for each instrument approach scenario. All scenarios specifically accommodate business jets in the C-I or C-II Runway Design Group, such as the Lear 35 operated by Pacific Seafood. Results of this analysis will be interspersed through the remainder of the alternatives discussion with visibility minimum exhibits at the end of the chapter.

Runway 34 also has an instrument approach using satellite signals with minimums to 1 Mile. Lower minimums could potentially be achieved and so additional analysis depicting the RPZ and lowest obstacle identification surface (OIS) scenarios for lower minimums on each runway end in the eventuality they are implemented was conducted.

The City, as well as the property owners of the long-planned destination resort property immediately south of the Airport (sometimes referred to by its former name Wolf Tree Resort), are concerned about impacts from MR3 and associated compatibility consequences on the viability of the resort area.

The RPZ associated with MR3 would be reshaped. The longer, larger RPZ would impact the allowable uses on a portion of the destination resort zoned property. The FAA recommends Sponsors purchase the impacted land under the RPZ in fee simple – although any means (easements, zoning, etc.) by which the City can control land uses and limit the height of obstacles would suffice. Regardless of landownership or easement, overflights and obstacle clearance requirements would be between 20 to 40 feet lower to the ground for MR3 depending on approach minimums, conflicting with the needs of current zoning use and resort intent.

Besides the impact on existing zoning, the site of SE 98th CT and SE 98th ST needed to be evaluated.

Considering the road locations, benefits of shifting Runway 16-34 in order to consolidate construction to one major project area became more difficult to capture than first thought. The shift would require relocating 98th Court as the larger RPZ would extend further south. Relocating 98th Court would be a costly challenge and would impact residents who rely on the road. And, while it may be possible to pursue a waiver from FAA to allow the road to operate in the RPZ, our past experience is that those waivers are granted for existing roads in existing RPZ's where there are no viable alternatives. In this case, avoidance is possible and thus the FAA would likely decline to issue a waiver. If necessary, this is still a possible course of action, but at this time the benefits do not outweigh the detriments.

On the Runway 16 end, Alternative MR3 has minimal impact on present operations if the current minimums are maintained. Overflights are higher because the threshold moves further south. If minimums for Runway 16 are lowered to ½ mile, the RPZ would remain within Airport property and south of 62nd Avenue.

MR2C – Reduce Runway Length and Shift South (Exhibit 5I)

Part of the process in the analysis of alternatives is the refinement or synthesis of concepts to incorporate the best elements and minimize the impacts where achievable. During this process, a new concept emerged that shifts the runway to the south, but limits the shift such that the RPZ ends on the north side of 98th Court. As mentioned in Chapter Four, Facility Requirements, if the current runway length is not feasible to maintain, FAA design criteria recommends the minimum length of 5,290 feet with no displaced thresholds. The runway relocation in the MR2C alternative meets dimensional criteria for the larger Runway Design Code of C-II Runway Safety Area (RSA) while causing minimal impact to land use at the south end of the airport.

RSA – Extend and widen the RSA to C-II standards (1000' length beyond pavement end by 500' wide) by constructing embankment, installing drainage facilities, relocating necessary access roads, and mitigating environmental impacts such as wetlands beyond both ends of Runway 16-34. No retaining walls are assumed.

Runway 16-34 (Thresholds and Gradient) – The Runway 16 threshold is shifted 178' to the south and the Runway 34 threshold is shifted 70' south to an ultimate runway length of 5,290 feet. In addition to providing expanded RSAs beyond the runway ends to satisfy the upgrade to Category "C", the longitudinal grade for "C" runways must also be considered. As previously mentioned, design standards dictate that a "C" runway shall not have a maximum overall grade of greater than 1.5% and the first and last quarter of the runway length shall not have a maximum grade change of more than 0.8%. It is expected that approximately 1,500 feet of the runway's south end and 300 feet of the north end would need to be reconstructed (lowered) in concurrence with the corresponding entry/exit taxiways to meet stricter longitudinal grade requirements.

The facility improvements discussed in this alternative are the minimum required to implement the upgrade to a C-I or C-II runway. There are, however, several other less demanding improvements that must also occur to fully implement this alternative, and they include:

- **Land Acquisition** – Land acquisition (21 acres) of the Runway 34 RPZ and additional land to allow for construction and placement of embankment. Much of this property had been identified for acquisition to meet RPZ standards in previous studies.
- **Instrument Approaches** – ILS equipment will need to be relocated and approach procedures will need to be redesigned and reissued.
- **Approach Lighting (MALSR)** – Approach Lights will be shifted 178’ south.
- **Visual Approach** – PAPIs for Runway 34 will be relocated 70’ south upon relocation of threshold. The relocation is dependent on the removal of approach obstructions.

MR2C - Criteria Analysis

MR2C depicts a fairly straight-forward approach to meeting FAA Design Standards for Category “C” aircraft. The planning principles analyzed in the previous MR alternatives were a driving force in the creation of this alternative. The operational considerations for MR2C are satisfactory and Runway 16-34 facilities will meet the minimum facility requirement. There is still a large financial cost with this alternative due to land acquisition and extensive cut and fill at both runway ends in addition to the runway extension on the south. Earthwork and drainage mitigation on both runway ends make this runway alternative consistent with the previous alternatives discussed.

Planning Principles

MR2C represents a response to better understanding community goals outside of the airport while still meeting the increased airfield design standards for light business jet aircraft. There are very specific gradient tolerances that must be met and this alternative meets them by simply changing the grades from what exists to what is required. Since the FAA standards/recommendations for runway dimensions, and associated criteria, are all met, the airfield would be providing full safety characteristics for a C-II airfield. Based on existing information, Development MR2C would present challenges that would technically, socially, or politically be feasible to resolve. MR2C in its entirety conforms to FAA Design Standards, existing plans and strategic vision of the airport and community, as well as guidance provided by the Planning Advisory Committee.

Operational Considerations

When considering the capability, capacity, and efficiency of the airfield as shown in alternative MR2C, the concept meets the minimum requirements for a C-II airport. Capacity is not a planning consideration at the current low volume of operations and the airfield remains essentially unchanged from its present condition. However, by reducing the runway length to the minimum recommended runway length, capability of the airport may also be reduced slightly thus limiting access to a small portion of larger business class aircraft.

Fiscal Factors

The costs associated with implementing MR2C are significant and arguably presents the single largest disadvantage among the selection criteria. There are huge volumes of embankment required to create the standard RSA beyond each runway end. One of the fiscal factors to consider is the availability of funding as a test for financial feasibility. Because of the complexity and high implementation cost, the RSA

project would need to be broken up over multiple years. Funding could be a challenge. The FAA may or may not agree to immediately program such a costly solution until the project becomes fully justified by actual jet activity in the C-I (and higher) Aircraft Reference Code. Once the C-I aircraft operations reach the threshold for regular use, the FAA would work with ONP to identify the best way to meet the funding challenges and confirm which option is the best approach to meeting the Category “C” standards.

In terms of hard dollar costs, MR2C is slightly less expensive than the other MR2 (MR2A and MR2B) options. At an estimated Rough Order Magnitude (ROM) of \$25M - \$27M, MR2C will require a significant amount of funding. However, there are many different criteria to consider and FAA planning methodology is clear that the lowest cost option is not always preferable when it comes to meeting standards.

Environmental Analysis

MR2C and the change to the RSA would involve building an embankment, reconstructing drainage facilities, and relocating a road. Cut and fill at both runway ends would affect wetland areas. Henderson Creek on the north end and Moore Creek on the south end would be impacted and mitigation could be necessary.

Air and water quality could be affected temporarily by construction. Other temporary construction impacts could include noise, dust or traffic impacts, as well as the potential for erosion and environmental impacts from material spills associated with construction. Removal of solid waste from construction would need to be considered.

Consideration of Instrument Procedures – MR2C

With regard to future instrument approach capability, there are more hurdles to clear than land use controls. The fact remains that ONP is still a B-II airport and can pursue and likely achieve ½ Mile minimums to Runway 16 following the planned relocation of Taxiway A. However, the larger RPZ would impact 62nd Avenue and US HWY 101, which just like the MR3 runway shift could require costly mitigation.

For MR2C, overflights for Runway 16 are higher compared to current operations but lower than the MR3 alternative would provide. The RPZ for the ¾ Mile minimums (today’s capability) remains within Airport property and outside of any roads. But when the C-I or C-II minimums are lowered to ½ Mile, the larger RPZ would impact 62nd Avenue and US HWY 101, which could potentially require mitigation.

At the point when the upgrade to Category “C” is warranted, the next master plan can present another array of alternatives and analyze them according to the technology and regulatory constraints in place at that time. After reviewing meteorological data used by FAA to develop instrument approach procedures, the data shows that over 90 percent of the time that ONP is in Instrument Meteorological Conditions, the visibility conditions are above ¾ Mile or less than ½ Mile. While technically feasible, it may not be prudent for this master plan to include the pursuit or protection of land associated with ½ Mile approach minimums on either runway end.

To assist with the visualization of the instrument approach and land-use impacts, a series of graphics were prepared and presented to show the proposed runway end location along with largest RPZ and lowest obstacle identification surface, one for each instrument approach scenario. The resulting RPZ and obstacle identification surfaces for Alternative MR2C are shown in the following graphics.

Additional Analysis of CR3 and CR2 Alternatives

The CR series of alternatives (Runway 2-20) sought to identify the best way to meet new FAA guidance for the design of taxiways, and more specifically, the geometric layout and relationship between runways, taxiways, and parking aprons. During the presentation of the Alternatives at the August 17th PAC meeting, the PAC considered CR3 to be the best option. Consideration was also given to the CR2 alternative, but the alternative was eventually determined to be the most expensive CR alternative and cost prohibitive.

After City Staff selected the CR3 alternative as the preferred concept, and it was sent to the PAC for review, the planning team, along with City staff, the airport engineering consultant, the FAA, and the Oregon Department of Aviation staff participated in a Joint Planning Conference (JPC) to discuss the projects that were to be constructed over the next 5 years and thereby included into the Airport's 5-year Capital Improvement Plan (CIP). The JPC was seen as an opportunity to discuss with the FAA the ideas generated during the master planning process, and depicted in the preferred alternative, addressing the non-standard geometry at Runway 2, Taxiway D, and Taxiway A. It was proposed that some of the elements identified in CR3 developed to address non-standard geometry be assimilated with previously planned construction projects that included reconstructing parallel Taxiway A and meeting upgraded separation requirements. However, the FAA expressed reservations about including the project elements identified in the ongoing Master Plan effort into the CIP since the Master Plan was not complete. Additionally, the FAA informed the City and the Planning Team that the CR3 option did not conform to design standards and that due to the Airport's Part 139 certification, the design for a portion of the parallel Taxiway A presented in CR3 was not a viable option. The FAA requested changes to CR3 accordingly.

After the FAA rejected the CR3 alternative, the planning team and City staff worked to refine the CR3 alternative to satisfy FAA concerns. The refinement process resulted in additional concepts based closely on the CR3 alternative to address the non-standard geometry in the taxiway and apron area that intersects with the Runway 2 end. The planning team and City staff sent the refined CR3 concept drawings to the FAA for review.

Ultimately, after a lengthy review, the FAA determined the new concepts based on the CR3 alternative, did not satisfy FAA requirements outlining "right angle intersections [as] the standard for all runway/taxiway intersections". With a 90-degree taxiway entrance to Runway 2, the impacts to the terminal area apron were too great and impractical. Therefore, at the recommendation of the FAA, the planning team and City reevaluated the CR2 concept for further consideration.

The most obvious advantages of the CR2 alternative, which plans for the disconnection of the Runway 16-34 and Runway 2-20 runway safety areas, is the correction of non-standard geometry issues between runway/taxiway angle as well as the apron expansion opportunities resulting from shifting the runway approximately 1,100 feet to the northeast and mitigating the RPZ overlap. The most notable disadvantage of CR2, which is why the CR2 alternative was originally not selected by the PAC, is the cost associated with extending the runway and construction of embankments required to maintain a minimum runway length of 3,000'.

City staff presented the situation to the local Airport Committee and the Committee proposed that they would be willing to accept a scaled down version of the CR2 alternative that would result in potentially

shorter runway lengths. As such, the City asked the planning team to investigate the runway lengths that could be achieved with a B-I (small) runway without the construction of embankments on the northeast side of the airport.

The planning team identified additional concepts and presented the potential scenarios to the PAC at a special meeting. At this special PAC meeting the group determined that without any major construction of embankments, a runway length of approximately 2,166' could be achieved in the short term at a reasonable cost and would be acceptable by the PAC. The plan also presented moving the Runway 2 threshold in the near term, and planning for an extension to an ultimate length beyond 2,200' could be proposed separately once it becomes a top priority and funding is available.

At the special PAC meeting, the PAC selected the modified version of the CR2 alternative that results in a B-I (small) runway with a short-term length of approximately 2,166' as their preferred alternative in light of the information provided. Subsequently, City staff confirmed the selection and directed the planning team to incorporate the new material into the preferred alternative.

PREFERRED ALTERNATIVE

Exhibit 5J depicts the preferred alternative, which is a combination of MR2C and the modified CR2 alternatives. The preferred alternative represents the combination of the preferred Main Runway (MR) alternative, Crosswind Runway (CR) alternative, and the preferred landside development scenario determined by the City based on input from the planning team, PAC, FAA, and City Staff. As presented in PAC Meeting #4 there are multiple realistic and achievable alternatives and development scenarios for the airport that could be implemented during the 20-year planning period. However, MR2C and the modified CR2 alternative have collectively been selected as the preferred alternative to satisfy long-term facility requirements at the Newport Municipal Airport.

The downgraded version of alternative CR2 was selected as the best crosswind runway option presented to correct non-standard geometry on the airfield and also allow the airport to meet the long-range landside facility requirements. Furthermore, when paired with a plan to direct any additional long-range aeronautical expansion to the Northwest Development Area, the airport will be well positioned to accommodate new growth and adapt to the changing aviation environment.

In terms of meeting the long-range need for apron and hangars, the CR2 alternative will satisfy the majority of the landside facility requirements over the planning period. However, if an unexpected spike in growth at the airport occurs and requires additional land expansion for new hangars, a large parcel for aeronautical development, or any other type of GA expansion over the long-term, there is ample accessible space for GA development on existing airport property to satisfy the facility requirements. Also, due to rapidly advancing instrument approach technology, it is possible the VOR/TACAN could be decommissioned or relocated to a site off airport property during the planning period. When the VOR/TACAN has been removed or relocated, this area would be preferred for aeronautical development prior to development of the Northwest Development Area. Thus, it is recommended the City should infill development into the "triangle" infield area where the VOR/TACAN is presently located once the site becomes available.

Because the upgrades to meet the RDC C-II requirements are at least 10 years out, the recommendation is to choose MR2C and implement zoning and land use policies accordingly. The full concept for MR2C is provided in Exhibit 5I with a summary analysis of the selection criteria.

Although CR2 and MR2C meet all future development needs, bring the airfield into current design standards, are acceptable environmentally, and meet the objectives of the PAC, there remains disquiet about the total cost of these upgrades in both City Staff and members of the community. At a budget of approximately \$60 million dollars, the City has genuine concern about funding on both the FAA discretionary level (with a request of \$54 million dollars for such a small community airport) and the \$6 million match required from local budgeting. Further, community reaction to such a large investment in funding has indicated there may be a lack of political will to support such a large investment of municipal funds in the airport when there are many other community needs of equal importance. As a City of 10,000 people, the municipal budget is constrained by very real revenue limitations.

The City remains committed to maintaining and growing the airport. A fiscal analysis is conducted in Chapter Nine: *Implementation*.

SUMMARY

With the selection of the preferred alternative completed there are several steps remaining in the airport master planning process. The next phase is completion of a compliance review, which is a proactive approach to achieving compliance with FAA grant assurances through an examination and understanding of existing and potential compliance issues at the airport. Next, the development of a Recycling and Solid Waste Management Plan to help the community minimize generation of solid waste at the airport. Last, the completion of the Airport Layout Plan (ALP) drawing set, along with the development of a Capital Improvement and Financial Plan, will be produced to depict the 20-year development plan for the airport as well as to provide the cost estimates and phasing scenario over the planning period.