

## **1.0 Introduction**

### **1.1 Scope of Study**

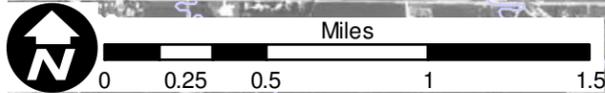
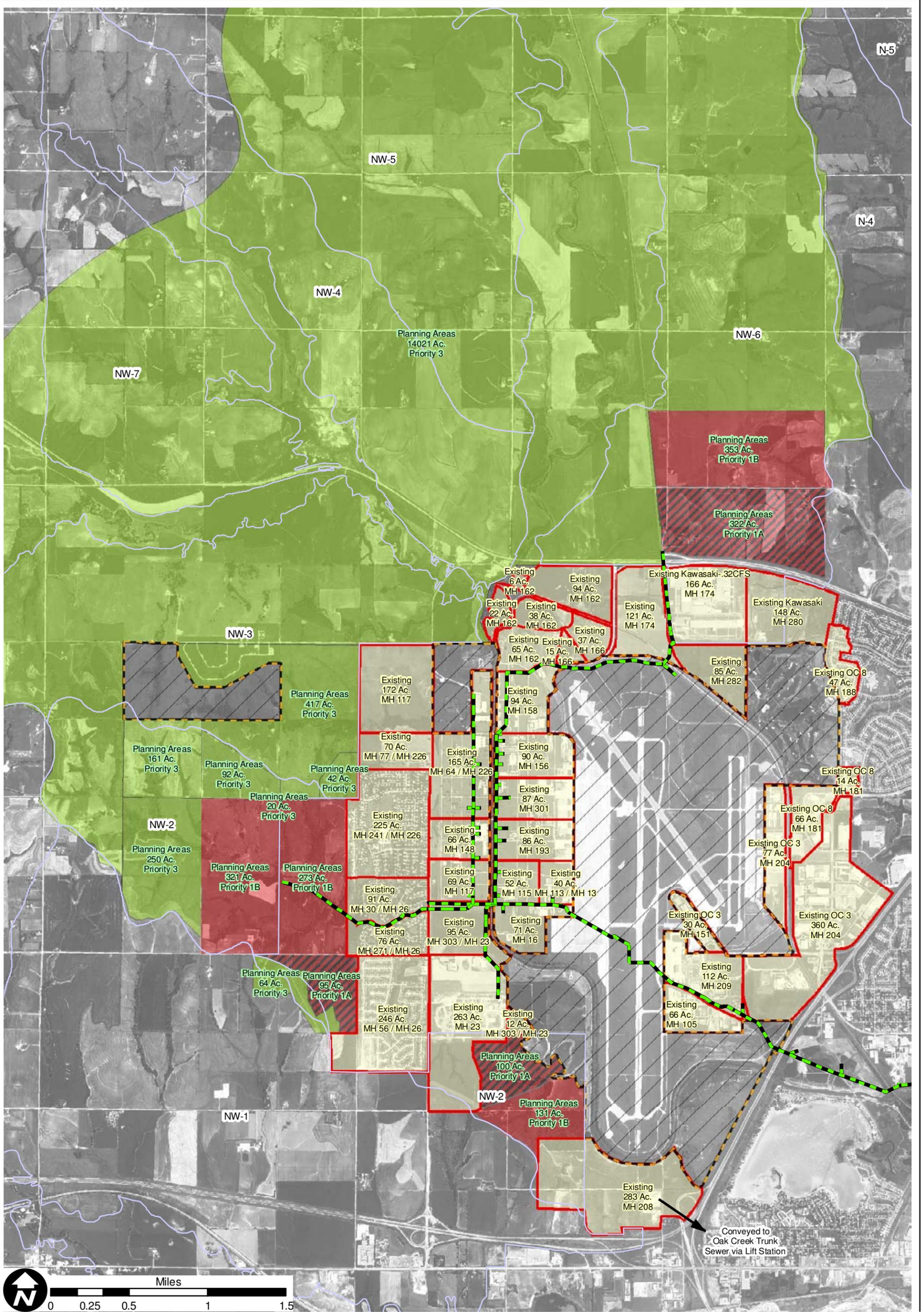
The objective of the project is to develop and evaluate existing system capacities and identify the need for various system improvements in the Oak Creek Basin to increase the level of service and provide capacity for the growth anticipated by the City of Lincoln Comprehensive Plan and the new Airport West Subarea Plan. The project includes a summary of trunk sewer evaluations and alignment studies, findings and evaluations of investigations in the project area, improvement plan for 5,950 acres, improvement plan for 4,450 acres, opinion of probable project costs for the 5,950 acres and 4,450 acres improvement plans, and investigations into staged improvements of Segment E-2. The conclusions and recommendation section identifies the recommended implementation plan.

HDR proposes to begin the study by looking at the overall needs of the system for ultimate build-out and the required capacity for the trunk system. This information will provide an appropriate long-range understanding that will be factored into the analysis of the current and near-term needs for the system. In developing the recommendations for improvements, opportunities will be identified to leverage cost of construction for capacities of proposed and existing systems needed in the near-term versus the additional cost of improvements in the future. HDR proposes to develop a project that will minimize the overall disruption of the area, create a cost-effective solution to meet near-term needs that is easily adaptable to long-term growth, and identify an overall plan that meets the needs of the system.

### **1.2 Background**

As Lincoln grows, the Lincoln Wastewater System (LWWS) continues to implement the projects identified in its Facility Master Plan to meet the needs of the community. Lincoln's Comprehensive Plan has identified approximately 2,961 acres of new drainage area within the Oak Creek basin, north and west of the Lincoln Airport growth areas. This will bring the total projected service area to 6,622 acres. This area is contiguous to, and north of the areas served by the West 'O' Street Trunk Sewer, and includes areas already served by the existing Oak Creek Trunk Sewer as indicated in Figure 1-1: Basin Area Map. This study evaluates the existing system capacities and identifies the need for various system improvements to improve the level of service and provide capacity for the growth anticipated by the City's Comprehensive Plan and new Airport West Subarea Plan.

Similar to the West 'O' Street Trunk Sewer, this project is the next step in further opening to development, areas of west Lincoln that will not only become commercial and industrial clusters, but residential opportunities as well. The potential economic impact to Lincoln with current and anticipated projects in this area is significant.



**Legend**

- Planning Area Priority
  - Tier 1 Priority A
  - Tier 1 Priority B
  - Tier 2 Priority A
  - Tier 2 Priority B
  - Tier 3
- Drainage Basin Limits
- Existing Oak Creek service Area
- Areas NOT Included in Service areas
- Existing Sewer



**Basin Area Map**

Oak Creek Basin and Trunk Sewer

DATE	5/12/06
FIGURE	1-1

### **1.3 Previous Studies**

HDR has been actively engaged and working with the Lincoln Airport Authority, the City, and the Lincoln Partnership for Economic Development, and is keenly aware of the opportunities presented. As a result of HDR's work, the Lincoln-Lancaster County Planning Department developed a new Subarea Plan for areas west of the airport.

#### **1.3.1 Lincoln Wastewater Facilities Plan Update**

The Lincoln Wastewater Facilities Plan Update (April 2003, by Brown and Caldwell) has identified Tier I improvements for the Oak Creek Basin. This document was used as the initial basis to identify service areas for preliminary evaluations. The conditions and recommendations identified in the Facilities Plan Update are as follows:

**“Tier I Condition.** As Oak Creek Basin continues to grow, future development in sub-basin NW-2 will generate flow from the west (into OC-7) and sub-basins NW-3 and NW-6 will generate flows from the north (into OC-5 and the West Highlands Trunk Sewer). The Future 25-year Condition depicts about 1,100 and 1,865 acres of development respectively in these sub-basins with corresponding wastewater flows of 8.7 and 12.7 cfs. The current overloading conditions in the 27- and 30-inch lines will be exacerbated by the anticipated future growth.

**Tier I Recommendations.** The portions of NW-3 and NW-6 sub-basins that will contribute 12.7 cfs from the north can be handled in the existing 30-inch West Highlands Trunk Sewer. This assumes that its slope is at least 0.001 ft/ft. Once information has been provided for this line, the West Highlands Trunk Sewer can be properly analyzed for both present and future conditions.

The 27-inch and 30-inch pipes need to be paralleled to relieve the existing overloaded condition and to prepare for 21.4 cfs of future flows. Recommended new construction included 2,196 LF of 24-inch line from MH#AA7-21 to 10 (along West Mathis Street from NW 41<sup>st</sup> Street to NW 36<sup>th</sup> Street), and 2,817LF of 36-inch pipe between MH#AA7-10 to 298 (beneath the airport tarmac). The slope on these pipes is assumed to be the same as the slope of the lines they parallel.

The 48-inch reinforced concrete pipe (RCP) system starting one manhole further downstream (MH AA6-68) has two problem areas. The first segment between MH#A6-209 and 208 is 98 LF and has a capacity 20.7cfs short of that required to meet future needs. This flow can be handled by installing a parallel 54-inch pipe at the same low slope – 0.0001. The second problem segment is 687 LF with a slope of 0.000029 and does not have adequate capacity for the 25-year flow condition. If the 1,888 LF segment

between MH#A6-199 and 196 could be unearthed and re-laid with a uniform slope, it would have the capacity needed (39.1cfs). A concern with this scenario is that the pipe may have been originally installed with an inconsistent slope due to utility conflicts.

The existing 54-inch RCP segment of the line also needs a minor improvement to convey the future flows. From MH#B6-321 to B6-319, 6.5 cfs of capacity is needed to accommodate future flows. A 27-inch parallel line is recommended to provide the future capacity required for this 438 LF segment of line.

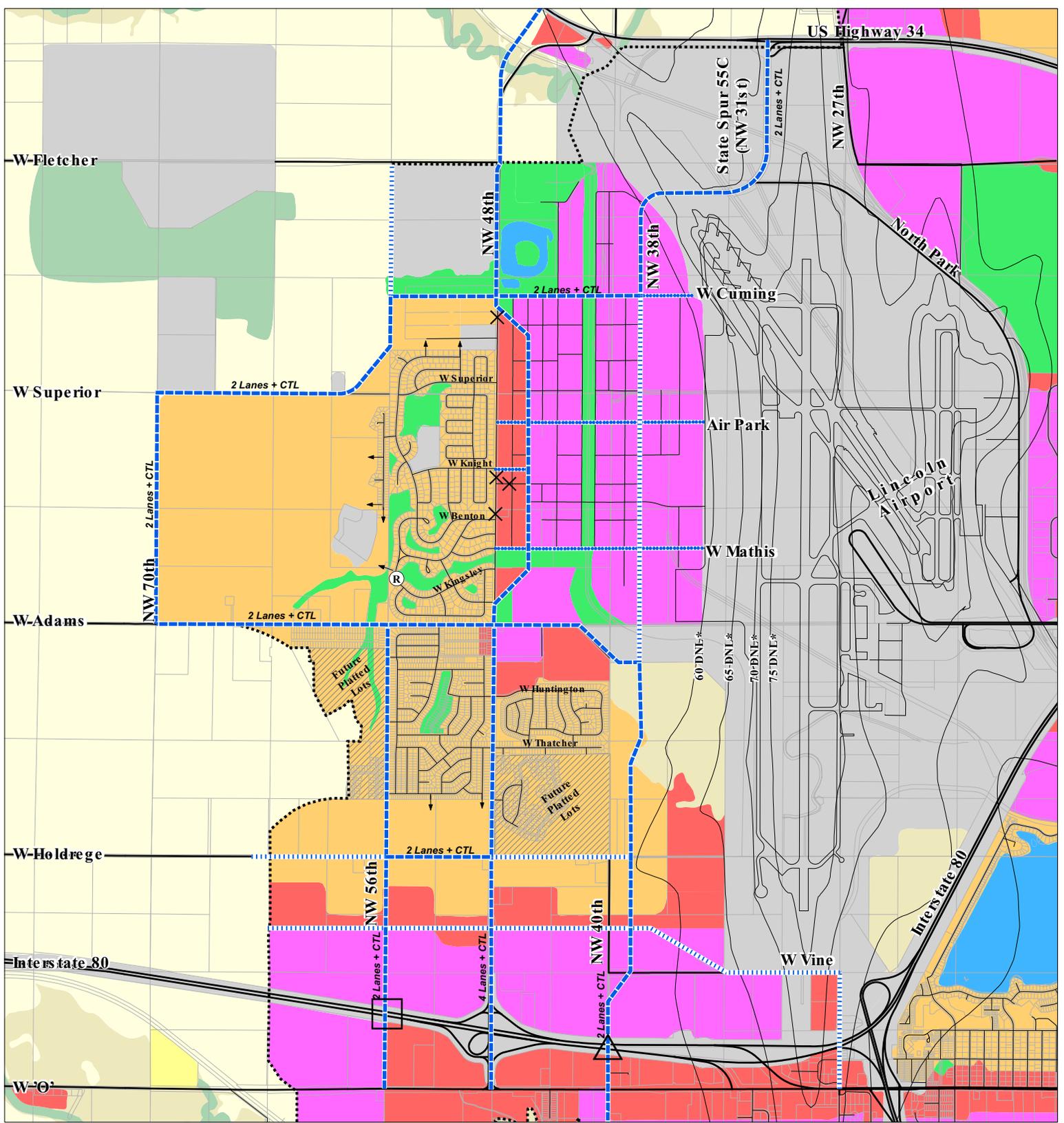
**Tier II Condition and Recommendations.** Same as Tier I above.”

The Facilities Plan Update indicates an existing acreage served of 3,661 areas with an additional 2,961 of Tier I acres for a total area of 6,622 acres. No additional Tier II areas have been identified for the Oak Creek basin.

### **1.3.2 Airpark West Subarea Plan**

The Airport West Subarea Plan amended the 2025 Lincoln/Lancaster County Comprehensive Plan and was adopted by the City Council on January 31, 2005 and Lancaster County Board on February 1, 2005. The Subarea Plan identifies a number of transportation, infrastructure, and land use changes as well as identifying potential partnerships for public service agencies. Figure 1-2 identifies the Airport West Subarea Plan that was approved in early 2005. Figure 1-3 represents draft revisions by the Lincoln Airport Authority for the Airpark West Master Plan indicating the proposed parks/open space, utility corridor, transmodal/intermodal areas, and planned thoroughfares. The thrust of the Airpark West Master Plan includes the following:

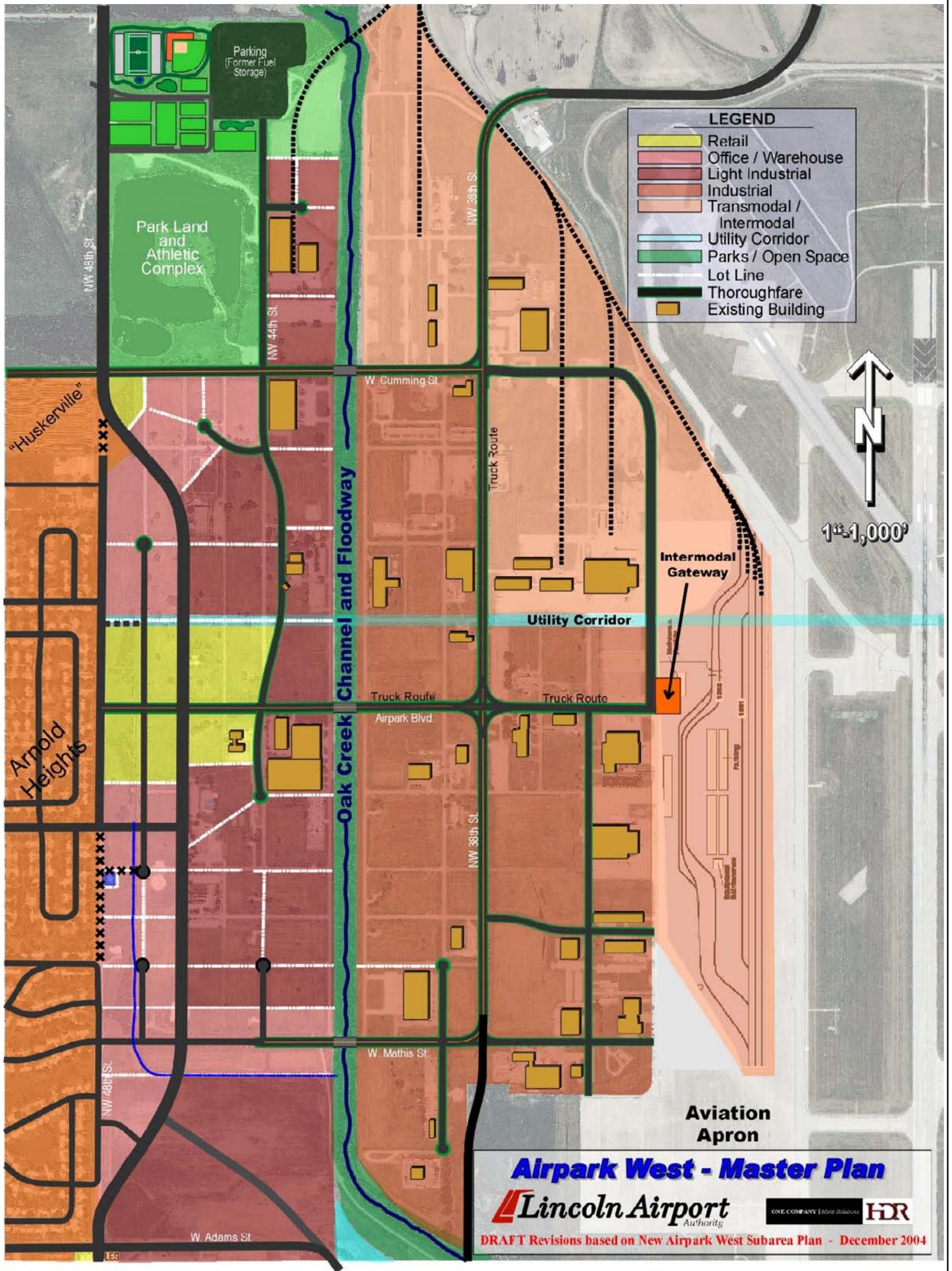
- Continued development of the Air Park West Industrial Park, including potential new roadways and road alignments to better serve and facilitate development of this land by the Lincoln Airport Authority.
- A new minor arterial street, NW 40<sup>th</sup>/38<sup>th</sup> Street, from West ‘O’ Street to US Highway 34, to provide better access and a potential route for truck traffic and service to Air Park West.
- A new Grade Separation Crossing of Interstate 80 at NW 40<sup>th</sup> Street in order to provide additional access and movement within the subarea.
- An inter-modal freight center will be located north of West Cumming Street and east of Oak Creek.



# Figure 2: Airport West Subarea Plan

Approved: 1/31/2005 & 2/1/2005

- ← Future Street Extension<sup>1</sup>
- (R) Future Road Connection to be Completed<sup>1</sup>
- X Future Road Closing<sup>1</sup>
- △ Potential Grade Separation<sup>1</sup>
- Potential Overpass Improvement<sup>1</sup>
- Arterial Street<sup>1</sup>
- ..... Collector Street<sup>1</sup>
- ..... New/Improved Local Road<sup>1</sup>
- ..... Future Service Limit<sup>1</sup>
- <sup>1</sup> See Subarea Plan Text
- Public & Semi-Public
- Lakes & Streams
- Environmental Resources
- Green Space
- Agricultural
- Residential, Low Density
- Residential, Urban
- Agricultural Stream Corridor
- Commercial
- Industrial
- \* DNL - Day Night Average Sound Level



**Airpark West Subarea Master Plan (Revised)**

Oak Creek Basin and Trunk Sewer

DATE	5/12/06
FIGURE	1-3

Wastewater service in the Airport West Subarea spans two different drainage basins. The Oak Creek drainage basin serves the developed parts of the subarea, west of the Airport and generally north of West Holdrege Street, where a ridge line exists and separates the two basins. The undeveloped part of the subarea, south of West Holdrege Street, is located in the West 'O' Street drainage basin. Wastewater service for the West 'O' Street drainage basin is currently identified in the City's Capital Improvement Program, and initial design work for portions of the West 'O' Street wastewater trunk line have been started.

- Several existing wastewater lines within the Air Park West Industrial Park have been identified for capacity, repair and replacement in the Capital Improvement Program. The location of new wastewater trunk lines will be determined by Lincoln Wastewater, in conjunction with the roadway alignments identified in the Subarea Plan, and in coordination with the Airport Authority's Air Park West development.
- In addition, the Lincoln Airport Authority is considering a new internal roadway system for the development of the Industrial Park. Minor variations in the wastewater collection system and roadway alignments may occur to address any site conditions not yet identified. Lincoln Wastewater System will continue to coordinate with the Airport Authority to finalize these plans.
- There are wastewater trunk collector line improvements that will need to be built in order to serve the subarea during the planning period. Some of these infrastructure improvement projects have been identified in the City's Capital Improvement Program and are identified below. Project schedules are not final and may change. The Subarea Plan acknowledges that a separate community-wide process exists to determine and approve capital improvements.

***Oak Creek Basin - Capacity, Repair & Replacement***

- 1.) NW 44th Street, West Mathis to West Superior - Construction 2004/05
  - 2.) South Runway to NW 44th and West Mathis - Construction 2006/07
  - 3.) NW 27th Street, Fletcher to Highway 34 and Air Park Road - Construction not determined
  - 4.) NW 40th Street to Hwy 34 - Construction not identified
- An area located within the City's Future Service Limit, generally located south of W. Vine Street, north of Interstate 80, and between NW 40th and NW 27th Street, currently has no wastewater service. There are no improvements

identified to serve this area in the future. The **Oak Creek Drainage Basin Wastewater Study** will be initiated in the near term and will address provisions for wastewater services to this area.

- The **Teresa Street Wastewater Treatment Plant** is the terminating point for wastewater from the Oak Creek and West “O” drainage basins. Further development of the subarea needs to be coordinated with capacity improvements, both with the trunk sewer downstream and at the Treatment Plant.
- There is an existing lift station adjacent to Bowling Lake, and several collector lines that Lincoln Wastewater System have identified be to removed or abandoned in the planning period. However, these decisions on the removal or abandonment of existing facilities cannot happen until the roadway alignments, provisions to serve the existing customers, and ROW have been determined.
- Once the Subarea Plan is complete, Lincoln Wastewater System may need to make adjustments in their planning and construction plan for future infrastructure improvements.

### **1.3.3 Northwest Tier Study**

The City of Lincoln/Lancaster County is planning a Northwest Tier Study to evaluate Tier III areas. This study will address the expansion of the Future Service Limit in the Oak and Middles Creek basins. Several property owners have requested inclusion within the City’s urban growth area. While these areas are contiguous, they have been designed as Tier III growth areas in the Comprehensive Plan.

## **1.4 Other Documents**

The following data was used in the preparation of the Design Report and shall be used in the preparation of the Contract drawings and specifications.

- a. Lincoln Wastewater Facilities Plan Update – April 2003. Prepared by Brown and Caldwell.
- b. Oak Creek Channel Improvements – November 2004. Prepared by HDR.
- c. North Bank Trunk Sewer Extension Design Memoranda – March 1990. Prepared by HWS Engineering Inc.
- d. North Bank Trunk Sewer Extension, Air National Guard Sewer Service Connections – May 1992, Prepared by HWS Engineering Inc.
- e. West Highlands Interceptor Sewer, Preliminary Route Study – July 1993. Prepared by HWS Engineering Inc.
- f. City of Lincoln/Lancaster County Comprehensive Plan, May 2002.

- g. Airport West Subarea Plan, January 2005.
- h. Airpark West Master Plan, January 2004.
- i. West Highlands Sanitary Sewer Intercept – July 1993. Prepared by HWS Engineering Inc.
- j. North Bank Trunk Sewer Extension – I-180 to Center Avenue – March 1981. Prepared by HWS Engineering Inc.
- k. North Bank Trunk Sewer Extension – Theresa Street Plant to Highway I-180 – April 1977. Prepared by HWS Engineering Inc.
- l. North Bank Trunk Sewer Extension – Phase 1 – October 1990. Prepared by HWS Engineering Inc.

### **1.5 Study Area**

As indicated in Figure 1-1, the Oak Creek Basin Drainage has areas identified as Existing, Tier IA, Tier IB, and Future Areas. In addition to these areas, there are portions of the study area that are not included in the service areas such as the Oak Creek Channel, Nine-Mile Prairie, airport areas designated for aeronautical uses, and Bowling Lake and associated park areas. Tier III areas extend north and west from the main channel of Oak Creek and consist of approximately 14,021 acres.

### **1.6 Stakeholders**

The primary stakeholders that have participated in the study include the Lincoln Airport Authority (LAA), Lincoln Water System (LWS), Watershed Management, City of Lincoln Planning Department, Engineering Services, Park & Recreation, Public Works and Utilities, and other City Departments. Two stakeholder meetings were conducted relative to the project. A utility coordination meeting was held with utilities that were identified in the Study Area through the Nebraska One-Call system. A public meeting/open house was held on July 28, 2005 at the Loren Corey Eiseley Branch Library. The primary property owner for the selected improvement plan is the LAA. LAA participated in the alignment review meetings and was an integral partner in the Preliminary Design Report preparation.