

CLAREMORE RAILROAD OVERPASS FEASIBILITY STUDY



Claremore!

City of Claremore, OK

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EXECUTIVE SUMMARY

The citizens of the City of Claremore and the surrounding area have been inconvenienced and at times had their personal safety jeopardized by at-grade railroad crossings for many years. The purpose of this feasibility study is to investigate and analyze potential sites for grade separated railroad crossings in Claremore between Country Club Drive and Blue Starr Drive.

An initial investigation of five potential sites was conducted at the following locations; Blue Starr Drive, Will Rogers Blvd., Dupont Ave., Archer Drive, and Holiday Lane Extension. Conceptual designs for three alternatives were evaluated further and developed to a level of detail appropriate to convey the design intent, the alternatives were reviewed for possible environmental constraints, and cost estimates were prepared for each alternative. The cost of the Blue Starr Drive alternative is estimated to be \$4,300,000, Archer Drive is estimated to be \$9,900,000, and the Holiday Lane Extension alternative is estimated to be \$8,200,000.

Based upon the conceptual designs developed and the operational, cost, traffic and environmental information assembled for this study, the Blue Starr Drive option appears to be the most appropriate solution. This report recommends the Blue Starr Drive option as the technically preferred alternative. The estimated cost of this option is significantly less than the other alternatives, and the location near the central business district and the ability to span both the UP and the BNSF railroads offer significant safety benefits.

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1.0 PURPOSE OF STUDY

The City of Claremore has for many years been forced to deal with the traffic delays brought about by the convergence of three major highways in the downtown area with no grade separated crossings of two active railroads. The three state highways converging in downtown Claremore are SH 66, SH 20 and SH 88. Increased vehicular traffic and increased train traffic, on both the Burlington Northern and Santa Fe Railroad and the Union Pacific Railroad tracks, cause long delays and prevent emergency vehicles from reliable access to certain areas of the City. Several railroad overpass studies have been conducted at various locations within the City over the past twenty years; however, no overpass plan has ever been approved.

The purpose of this report is to present the findings of a feasibility study of grade separated vehicular crossings at various locations along the Burlington Northern and Santa Fe Railroad between Blue Starr Dr. and W. Country Club Road. The study analyzes in detail the feasibility of a crossing at three locations. This report describes the study process, the advantages, disadvantages and budgetary cost estimates for design and construction of each alternative. Recommendations for a technically preferred alternative are presented in Section 8.0 of this report.

2.0 NEED FOR ACTION

2.1 Existing Transportation Facilities

The major traffic artery through Claremore is SH 66, which runs through the heart of the business district south to north at a diagonal, splitting the City into essentially an east half and a west half. The Burlington Northern and Santa Fe Railroad parallels SH 66 just west of the highway. The Union Pacific Railroad runs south to north through the center of the City at a slight diagonal, crossing the BNSF Railroad at approximately 11th St. just west of J.M. Davis Blvd. State Highway 88 bisects the City from the west along Will Rogers Blvd., jogs through the business district, and continues southeast under Interstate 44. State Highway 20 enters the City from the west along Archer Dr., jogs through the business district, and continues east along Will Rogers Blvd.. J.M. Davis Blvd., a heavily traveled city street, parallels SH 66, one block west of the highway, for about 20 blocks through the business district. Blue Starr Dr., another heavily traveled city street, runs east and west across the northern edge of the city.

2.2 Description of Study Area

This feasibility study is limited to a corridor along the Burlington Northern and Santa Fe Railroad from Blue Starr Dr. on the north to W. Country Club Road on the south. The limits were extended south from the original southern limit at Archer Drive (See Figure 2-1).

2.3 Existing Traffic Patterns

The majority of the north-south traffic through Claremore travels SH 66 through the center of the business district. Major east-west movement travels Will Rogers Blvd. through the City center. Heavy concentrations of commercial and retail activity have developed along both of these routes. Blue Starr Dr. offers a convenient connection between the eastern and western portions of the City, without having to travel through the central business district. Blue Starr Dr. also provides access to a major industrial area to the north. There are currently five at grade crossings of the BNSF Railroad within the study corridor. These crossings are located at Blue Starr Dr., 6th Street, Will Rogers Blvd., 1st Street and Archer Drive. Vehicular traffic counts were conducted at these five crossings as a part of this study and the raw data are presented in Table 2-1. The most heavily traveled crossing is at Will Rogers Blvd., with nearly 24,000 vehicles crossing during an average day. Traffic crossing at Blue Starr Dr. averaged over 15,000 vehicles per day. Train traffic counts were conducted on

March 26, 2003 from 6:45 A.M. to 7:00 P.M. for both the Union Pacific and Burlington Northern Railroads through Claremore. Results of this count, which represents a typical day, are as follows:

- Seven UP trains and seven BNSF trains observed
- BNSF – longest train took 2 min., 32 sec. to pass; shortest train took 1 min., 33 sec. to pass; average 2 min., 10 sec.
- UP – longest train took 4 min., 4 sec. to pass; shortest train took 1 min., 54 sec. to pass; average 2 min., 58 sec.
- Total train traffic – longest interval between trains was 2 hours, 55 min.; shortest was 9 min.; average was 56 min.
- The one long interval, 2 hours, 55 min., occurred between approximately 9:30 A.M. and 12:30 P.M.
- No other interval was longer than 1 hour, 27 min.

Primary departure and destination points for vehicular traffic are scattered across the City, with three areas of concentration: the central business district, the far west and the far northeast areas of the City. The central business district, in addition to major retail/commercial destinations, includes police and fire stations and City and County offices. The far west side includes Rogers State University, tourist attractions, Claremore Indian Hospital, and the new Claremore Expo Center. The northeast area includes destination/departure points such as Claremore Regional Hospital, Will Rogers Library, a Fire Dept. Substation, and several schools.

The primary east-west routes for emergency vehicles are Blue Starr Dr., Will Rogers Blvd. and Archer Drive; all currently have at-grade crossings of the BNSF Railroad.

2.4 Specific Transportation Problems

A major traffic concern is that fire, police and ambulances cannot respond adequately to emergencies in west Claremore from east Claremore (and visa versa) if trains are blocking the east-west emergency routes. This situation is not a rare occurrence. The City has fire stations on both sides of the tracks. However, the major hospital is on the east side.

Another major traffic concern is the existing intersection of Archer Drive, J.M. Davis Blvd. and SH 66. The geometric configuration, indirect east-west connection, turning movements, and heavy traffic combined with backups due to passing trains, creates a very dangerous as well as inconvenient condition.

**TABLE 2-1
TRAFFIC COUNTS AT EXISTING BNSF RAILROAD CROSSINGS***

LOCATION	MON	TUES	WED	THURS	FRI	SAT	SUN	M-F AVG.
Blue Starr Dr.	15,173	14,723	15,329	15,201	14,792	11,166	9,779	15,043
6th St.	3,158	3,064	3,220	3,091	3,396	2,895	1,129	3,186
Will Rogers Blvd.	23,412	22,969	23,393	24,038	25,515	22,353	16,552	23,865
1st St.	4,826	4,702	4,698	4,565	5,992	3,806	2,583	4,698
Archer Dr.	6,826	6,614	6,944	6,896	5,750	6,622	5,485	6,820
TOTALS	53,395	52,072	53,584	53,791	55,445	46,842	35,528	53,657

* March, 2003

2.5 Future SH 20 Bypass

The planned SH 20 Bypass around the southwest side of Claremore will provide an overpass over the BNSF Railroad in the far south portion of the City as part of the SH 20 / SH 66 interchange. This interchange will be located approximately three-quarters of a mile south of Country Club Rd. The SH 20 overpass will serve highway traffic that is passing through the City, but it will also more importantly serve traffic from areas west of Claremore that is enroute to or from the south on SH 66 or I-44. It will also serve some traffic destined for shopping opportunities in far south Claremore.

It is expected that this facility could divert up to 60% of the current daily traffic from the Archer crossing, up to 20% from the 1st Street crossing, and up to 10% from the Will Rogers Blvd. crossing. North of Will Rogers Blvd. no reduction is expected. This amounts to a possible reduction of up to 15% in the total daily traffic currently crossing the at-grade railroad crossings in the study area. While this expected reduction is significant, it alone will not adequately reduce Claremore's problem with congestion, delay and emergency vehicle service in the heart of town. Over 45,000 vehicles per day will continue to cross the BNSF tracks at-grade in the study area.

3.0 DESIGN CRITERIA

3.1 Roadway

The geometric design criteria for this study are in accordance with the current standards and practices of the Oklahoma Department of Transportation and the American Association of State Highway and Transportation Officials. Specifically, they are in compliance with:

- “A Policy on Geometric Design of Highways and Streets” (Green Book) by the American Association of State Highway and Transportation Officials (AASHTO), 2001.
- “Roadway Design Manual” by the Oklahoma Department of Transportation, July 1992.
- “Designing Sidewalks and Trails for Access”, U.S. Department of Transportation, Federal Highway Administration, Publication No. FHWA-EP-01-027, HEPH/8-01 (10M)E.

Careful attention to ADA requirements and pedestrian access will need to be a part of final design of any alternative.

Table 3-1 is a summary of some of the roadway design criteria used in this study.

3.2 Structures

Based on economic considerations, bridges with spans up to 130 feet will typically have concrete deck supported by pre-stressed concrete beams and concrete substructures. For bridges with span lengths between 125 feet and 250 feet, steel beams are proposed in place of pre-stressed concrete beams. Bridge span lengths have been estimated for each conceptual design based on these considerations.

Conceptual bridge design is in accordance with AASHTO LRFD Bridge Design Specifications, 1998 Second Edition and the latest edition of ODOT's "Standard Specifications for Highway Construction."

3.3 Typical Sections

The typical roadway section proposed includes four 12' traffic lanes, curb and gutter, an adjacent 4' sidewalk, a 5' grassed shoulder and 3:1 cut or fill side slopes. Sidewalks are ADA compliant. A typical paving section would be 9.5 inches of concrete paving on 8 inches of aggregate base, on separator fabric, on 8 inches of subgrade compacted to 95% Standard Proctor Density.

The typical bridge section would include four 12' traffic lanes, curb and gutter, an adjacent 4' sidewalk, parapet walls and railing.

See Figure 3-1 for depictions of both roadway and bridge typical sections.

4.0 RAILROAD REQUIREMENTS

4.1 BNSF Railroad

The conceptual designs of the overpass alternatives were based on strict requirements of the Burlington Northern and Santa Fe Railroad. Minimum vertical clearance required is 23'-6" from top-of-rail to the low chord of the bridge. Horizontal clearance required is 25 feet from the track centerline. Space is to be provided for one or more future tracks as required for railroad operations. Pier collision protection is required for piers with less than 25 feet clearance to the centerline of track. All drainage from the overpass is to be diverted off of BNSF right-of-way.

Refer to Appendix A, "Clearances for Highway and Pedestrian Overpass".

4.2 UP Railroad

The conceptual designs of the overpass alternatives were also based on strict requirements of the Union Pacific Railroad Company. Minimum vertical clearance required is 23'0" from top-of-rail to the low chord of the bridge. Horizontal clearance required is 25 feet from the track centerline or 18 feet if crash protection walls are provided and there is no access road present. Again, space is to be provided for one or more future tracks as required for railroad operations. All drainage from the overpass is to be diverted off of UPRR right-of-way.

Refer to Appendix A, "Barriers and Clearances to be Provided at Highway, Street, and Pedestrian Overpasses – Revised March 31, 1998".

5.0 INITIAL INVESTIGATION OF ALTERNATIVES

5.1 Selection of Five Potential Sites

During the initial investigation several potential sites for a grade separated railroad crossing were considered within the corridor of study. Factors evaluated in the initial siting investigation included proximity to the central business district, available right-of-way, impacts to existing businesses, emergency vehicle routes, and existing and future traffic patterns. The list of potential crossing sites was narrowed to five sites for further evaluation and analysis. The five sites selected were:

- 1) Blue Starr Dr.
- 2) Will Rogers Blvd.
- 3) Dupont Ave.
- 4) Archer Drive
- 5) Holiday Lane Extension

Refer to Figure 5-1.

5.1.1 Blue Starr Dr.

The Blue Starr Dr. site offers the major advantage of being the only location where a single structure would pass over both the Union Pacific and the Burlington Northern Railroad tracks. Since Blue Starr Dr. is a primary route for emergency vehicles, an overpass would greatly reduce delays in emergency response. The primary difficulty of this location involves the constraints imposed by Jay Street on the west and Lynn Riggs Blvd. on the east. The horizontal distance available to bring the roadway up and over the tracks with the required clearances and safe, practical grades is severely limited.

The functional classification of Blue Starr Dr. is minor arterial. A design exception to ODOT criteria to accommodate minor adjustments in maximum grade and vertical curves would be needed in order to make this site feasible. With maximum grades of 10% and relatively short vertical curves, an overpass structure could fit the site. The Jay St. intersection would need to be raised several feet to accommodate the new overpass embankment. Access to Industrial Blvd. and several businesses along the north side would need to be maintained. Additional right-of-way would be required, and several businesses would be impacted. A future bike trail along this route would also need to be accommodated as part of the "Claremore Lake Trail and Bikeway" project. This trail is included in the comprehensive trail master plan for the area. See Figure 5-2 for a conceptual layout of a possible overpass structure.

A potential underpass at the Blue Starr Dr. site was also investigated. An underpass could be made to fit the site with maximum grades of 8% and short vertical curves. Expensive retaining walls in excess of 25 feet in height would be required. Neither Lynn Riggs Blvd. nor Jay St. would be greatly impacted. However, a bridge would be required at J.M. Davis Blvd. to cross the depressed Blue Starr Dr. Two railroad bridges would be required. Access to Industrial Blvd. would be eliminated. Access to businesses on the north would be impacted. Drainage of the underpass would present a major problem since gravity flow out of the structure would not be possible. A stormwater pumping system would have to be installed and maintained to provide adequate drainage. Refer to Figure 5-3.

5.1.2 Will Rogers Blvd.

This location presented some of the same challenges as Blue Starr Dr., with more severe constraints. An overpass structure could be made to fit the site only if a design exception to ODOT criteria is granted. Grade modifications to the Lynn Riggs Blvd. intersection would be required. The structure would pass over J.M. Davis Blvd. and Owalla Ave. 10% grades and short vertical curves would be required. Impacts to local commercial businesses would be severe. The historic main street improvement program would be negatively impacted. Significant new right-of-way would need to be acquired. Refer to Figure 5-4.

An underpass at this site would also present significant challenges. Again, drainage of the structure could not be by gravity flow, and would require a stormwater pumping system. Bridge structures would be required at Owalla Ave. and J.M. Davis Blvd. to cross the depressed Will Rogers Blvd. Two railroad bridges would be required due to the double trackage at this location. Retaining walls in excess of 30 feet in height would be necessary. Refer to Figure 5-5.

5.1.3 Dupont Ave.

The Dupont Ave. site offers the advantage of relatively open land on the west end and the proximity to the central business district. An extension to Dupont Ave. from the west has been designed and will be under construction shortly. An overpass in conjunction with this extension would be a significant improvement to traffic flow. Although little impact to businesses would be involved on the west side, significant impacts would occur on the east side between J.M. Davis and Lynn Riggs Blvd. Additional right-of-way acquisition would be required. Under urban local

roadway design criteria, an overpass would be feasible with 10% maximum grades and short vertical curves. A bridge structure across Cat Creek would also be required. Street improvements east of Lynn Riggs Blvd. along Claremore Street would be necessary for the additional volume of traffic expected and for proper connections to the local street system. Refer to Figure 5-6.

5.1.4 Archer Drive

The existing intersection of Archer Drive, J.M. Davis Blvd. and SH 66 is at best inadequate and unsafe even without the additional complication of an at grade railroad crossing. The possibility of a major improvement to the layout of this intersection while providing a grade separated railroad crossing, make this site extremely favorable for consideration. A looped configuration is proposed to bring eastbound traffic on Archer Drive up and over the BNSF Railroad, over J.M. Davis Blvd., over SH 66 and Cat Creek, then down to a modified signalized intersection with J.M. Davis Blvd. and SH 66 at the current grade. See Figure 5-7. Under urban arterial design criteria, an overpass could be feasible using relatively gentle grades (6% maximum) and long gentle vertical curves. Access to the existing east and west frontage roads would be maintained. Direct access to and from State Highway 20 and SH 66 would be a significant advantage. Significant impacts to several businesses east of SH 66 and to one business on the west side would be involved. Relatively long and, in some locations, curved bridge structures at this site would add significantly to the construction cost of this alternative. Substantial amounts of right-of-way would need to be acquired.

5.1.5 Holiday Lane Extension

Although the original southern limits of this study were Archer Drive, the limits were extended south to include a possible extension of Holiday Lane to a potential railroad crossing approximately one-third of a mile north of Country Club Road. A very large, undeveloped tract of land is located west of this site. If Holiday Lane could be extended south from its existing terminus, through the middle of the undeveloped tract, cross the railroad and connect with the SH 66 frontage road on the east side, then the potential for development of the tract would be greatly improved. Another important advantage would be a direct connection for northbound traffic (from Tulsa) to the Archer St./Highway 20 intersection and on to the Expo Center, Rogers State College and tourist areas on the west side of Claremore. The potential configuration investigated included a 180° loop up from a SH 66 frontage road intersection, over SH 66, over the BNSF

railroad tracks and tying into the proposed Holiday Lane extension, which would run along the eastern edge of a steep hillside. Refer to Figure 5-8. Significant impacts to several businesses east of SH 66 would be involved. Substantial right-of-way would need to be acquired.

5.2 Initial Evaluation of Alternatives

Conceptual drawings of possible grade separated crossings at each of the five initial sites were presented to both ODOT staff and City of Claremore representatives on April 3, 2003. Advantages and disadvantages of the possible alternatives were discussed. A similar presentation was made to the Claremore City Council on April 14, 2003. The council chose three alternatives for further consideration. The following actions took place at the council meeting:

1. The Blue Starr Dr. site was approved for either an overpass or underpass. Access to local businesses and maintaining access to Industrial Blvd. must be part of the project, as well as room for a future bike trail which is currently under design.
2. Will Rogers Blvd. was not approved due to tremendous negative impact on commercial businesses and the historic main street program.
3. Dupont St. was not approved, although many aspects of the site were attractive as to the minimum commercial impact, open land on the west, and the future Dupont extension which is ready for construction.
4. Archer Dr. was approved although major commercial areas must be considered on the SH 66 corridor.
5. Holiday Lane Extension was approved for southern access. A request was made to estimate the cost of the Holiday Lane Extension across the raw commercial property to the west, and the cost of a signalized intersection at SH 66.
6. A request was made to include possible feeder street improvements which might be necessary at each location.

6.0 ENVIRONMENTAL CONSTRAINTS ASSESSMENT

6.1 Introduction

This Environmental Constraints Assessment (ECA) addresses the potential impacts associated with the existing and historic environmental issues in the vicinity of the potential railroad overpass and/or underpass structures at three locations along the BNSF railroad corridor in Claremore, Rogers County, Oklahoma. The three possible sites investigated for an overpass/underpass structure were (see Figure 6-1):

- West of the intersection of SH 66 and Blue Starr Drive
- Near the intersection of SH 66 and Archer Drive
- Southwest of the US 66 and Reavis Road intersection (Holiday Lane Extension)

Based upon recommendations of the Oklahoma Department of Transportation (ODOT), it was determined this review would consider the following potential environmental constraints:

- Industrial, hazardous material and hazardous waste activity
- Emergency response episodes involving spills of industrial and hazardous material/wastes
- Underground and above ground storage tank activity
- Wetlands
- Flood Zones
- Wild and Scenic Rivers
- Threatened and Endangered Species
- Historic and Cultural Resources

This study was limited to a review of existing information only. This ECA is **not** an assessment to comply with the National Environmental Policy Act (NEPA) requirements, but is a preliminary study developed only to provide basic screening data regarding the feasibility of the alternatives under consideration.

6.2 Site Description

Blue Starr Drive is the northern most proposed site. The west terminus of this proposed overpass facility is Jay Street and the east terminus is Lynn Riggs Boulevard/SH 66. This facility would traverse two existing railroads,

the Union Pacific (UP) Railroad and the Burlington Northern Santa Fe (BNSF) Railroad and J.M. Davis Boulevard.

Archer Drive is the middle or center site. This facility would involve an exchange of overpass and underpass facilities linking SH 66, J.M. Davis Boulevard, South Mortez Avenue, and Archer Drive. This facility would traverse the BNSF Railroad, J.M. Davis Boulevard, and SH 66.

The Holiday Lane Extension is the southernmost proposed site. This facility would link with the SH 66 frontage road, pass over SH 66 and the BNSF Railroad, and connect with a proposed extension of Holiday Lane.

According to the aerial photographs, various maps, the environmental database, and historical records that were reviewed, the area surrounding the proposed sites can be characterized as heavy commercial and industrial.

6.3 Study Methodology & Limitations

The ECA has been developed as a component of the Claremore Railroad Overpass Feasibility Study. Paragraphs B.1.5. and B.2.4. Scope of Work requires that the engineer perform “all necessary surveys and investigations and gather information on designated historical and cultural sites and environmentally sensitive areas that should be avoided.”

This ECA presents the findings of a “**desk-top**” study (no fieldwork was required or recommended by ODOT) and emphasizes the conclusions and recommendations relative to potential impacts that might be imposed by the proposed construction. **No site visits were conducted by environmental professionals for this effort.** Data and information acquired from the City of Claremore and from third party data sources were reviewed to assist in developing the study findings and developing the conclusions and recommendations.

To address ECA requirements, the methodology utilized consisted of the following components:

- A. Review of available data of public record to determine current and prior use of the subject sites. This review included the examination of aerial photographs, topographic maps, city directories, and Sanborn Maps.

- B. Review of public records, regarding facilities associated with the Resource Conservation and Recovery Act (RCRA), Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the EPA Emergency Response Notification System (ERNS), Petroleum Bulk Storage (AST), Underground Storage Tanks (USTs), Leaking Underground Storage Tanks (LUSTs), RCRA Corrective Action (CORRACTS), permitted solid waste disposal and processing facilities, and other county, state, and federal records.
- C. Solicitation of comments/information from government/agencies/stakeholders. Letters were sent to the following entities:
- U.S. Fish & Wildlife Service – Tulsa Office
 - U.S. Fish & Wildlife Service – Arlington, Virginia Office
 - Oklahoma Department of Environmental Quality – Air Quality
 - Oklahoma Department of Environmental Quality – Land Protection
 - Oklahoma Historical Society
 - Oklahoma Natural Heritage Inventory
 - Oklahoma Geological Survey
 - Oklahoma Water Resources Board
- D. Review of records that are a matter of public record regarding sites of historical and cultural value near the project sites.
- E. Preparation of a comprehensive constraints map to identify potential environmental issues that could impact each of the three sites.
- F. Preparation and submission of the ECA report.

The ECA does not include any subsurface investigations, collection of media samples, and/or laboratory analysis of any samples.

6.4 Findings

6.4.1 Topography

The project area is located in the Osage Plains natural physiographic area #33, which covers the majority of the state. Topography in the general area of the project sites is level to gently sloping according to the 1990 Claremore Quad Map.

The project area incorporates one major waterway, Cat Creek. This creek traverses and flows near the US 66 and Archer Street site. See Sections 6.4.5, 6.4.6, and 6.4.7 of this ECA for further discussion on the water resources in the general vicinity.

The topography at each location under consideration is essentially the same, relatively flat terrain, with the exception of a steep slope at the west end of the Holiday Lane overpass.

6.4.2 Soil Characteristics

The proposed project sites are all located in areas having soils described as the Dennis-Choteau Association. This association is characterized as nearly level and moderately sloping soils formed under prairie grasses, on the uplands. These soils are deep, dark-colored, loamy soils on the prairies.

The Blue Starr Dr. site is located in an area having soils belonging to the Dennis silt loam series and the Parsons silt loam series. The Dennis series soils are generally fair for road construction with good surface drainage. The Parsons series soils are highly plastic and are generally not well suited for road construction. The Archer Dr. site is located in soils of the Parsons silt loam series and the Verdigris series. The Verdigris series soils are generally good for road construction. The Holiday Lane Extension site is located in a area having soils of the Okemah silty clay loam series. This series is highly plastic with poor drainage and is fair to poor for road construction.

6.4.3 Records Review

6.4.3.1 Standard Environmental Record Sources

An environmental database search, provided by Environmental Data Resources (EDR) Inc., queried the State of Oklahoma and EPA databases to obtain Federal and state environmental records. The database search was focused along the BNSF Railroad between the north and south termini including a radius that extended 1,000 feet from the centerline of the railroad. Because of this large search area, several sites were identified in the database report. For the purpose of the following discussions, the areas in close proximity to the structures proposed are addressed as a possible concern. The sites considered for the proposed overpass/underpass are collectively identified as the "Subject Areas."

The EPA Facility Index System (FINDS) represents an inventory of facilities regulated by the EPA. The FINDS database was researched for information pertaining to the area. Environmental records were reviewed to ascertain facilities included on the National Priorities List (NPL); State Hazardous Waste Sites (SHWS); Comprehensive Environmental Response Compensation and Liability Act (CERCLA); Resource Conservation and Recovery Act (RCRA); Environmental Protection Agency (EPA) Emergency Response Notification System (ERNS); RCRA Corrective Action Report (CORRACTS); Underground Storage Tanks (USTs); and Leaking Underground Storage Tanks (LUSTs).

6.4.3.2 National Priorities List (NPL)

The NPL under the EPA CERCLIS database, dated March 4, 2003, was reviewed. The NPL is the EPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial action under the Superfund Program. The database did not reveal the presence of any NPL sites near the Subject Areas.

6.4.3.3 Comprehensive Environmental Response, Compensation, Liability Information System (CERCLIS)

The CERCLIS database identifies sites that are under investigation for suspected release of hazardous substances into the environment. CERCLIS information updated April 8, 2003 was reviewed. The database did not reveal the presence of any CERCLIS sites near the Subject Areas.

6.4.3.4 RCRA Treatment, Storage, and Disposal (TSD) Facilities

The EPA Resource Conservation and Recovery Information System (RCRIS) is a national program that tracks events and activities related to facilities associated with the generation, transportation, and treatment, storage, and disposal (TSD) of hazardous waste. The information pertaining to the Subject Area was obtained from EPA RCRA Hazardous Waste Registrations Listing Report dated October 28, 2002. The database was reviewed and did not reveal the presence of any RCRIS sites near the Subject Areas.

6.4.3.5 RCRA Generators

A review of the RCRA Small Quantity Generator (SQG) database dated October 28, 2002 has revealed there are 17 RCRA-SQG sites near the

Subject Areas. The following list identifies the RCRA-SQGs and their addresses.

The facilities that are highlighted are located in close proximity to the Subject Area.

- Escort Trailer Corp, 1500 Industrial Blvd
- Bobs Auto Body Inc., 1707 N Lynn Riggs Blvd
- **Hydorhoist International Inc., 915 W Blue Starr Dr**
- **Parham Industries, 1300 N Industrial Blvd**
- **National Hydro-Hoist Company Inc., 820 W 10th Street**
- **Speedy Lube, 706 N Lynn Riggs Blvd**
- Spiffy's Cleaners, 1331 Will Rogers Blvd
- **Hughes Auto Electric, 201-1/2 N Lynn Riggs**
- Melton Pontiac, 205 N Missouri
- Archer Cleaners, 422 W 4th H
- Ann's Cleaners, 401 W Will Rogers Blvd
- Claremore Daily Progress, 315 W Will Rogers Blvd
- **Transwestern Mining Company, between Highway 88 and 66**
- **Eason Collision Specialist Inc., 731 S Moretz**
- **Walmart Riggs/Claremore, 680 S Lynn Riggs**
- **Glover Harrison Pontiac-Buick-GMC, 1340 S Lynn Riggs**
- **Suburban Chevrolet, 1300 S Lynn Riggs**

6.4.3.6 Emergency Response Notification System (ERNS)

The EPA ERNS provides information on the release of oil and hazardous substances. Releases are recorded in ERNS when they are initially reported to the federal government by any party. ERNS combines data from the National Response Center and the Marine Safety Information System. The ERNS database dated July 15, 2002 does not indicate a release of oil or hazardous substances on or near the Subject areas.

6.4.3.7 State Landfills

The records of the State of Oklahoma Permitted Solid Waste Disposal and Processing Facilities database, dated March 26, 2003, was researched for information pertaining to permitted solid waste disposal and processing facilities. The record did not indicate the presence of any permitted solid waste disposal or processing facilities located on or near the Subject Areas.

6.4.3.8 Underground Storage Tanks (USTs)

The database of the Oklahoma Corporation Commission (OCC) dated February 24, 2003, was reviewed. The database tracks registered USTs within the state that store petroleum or hazardous materials. The records indicate there are 29 registered USTs near the Subject Area. A list of the registered USTs with addresses follows:

The facilities that are highlighted are located in close proximity to the Subject Area.

- Smax Corp DBA/Smitty's, 1699 N Lynn Riggs
- Oklahoma Department of Transportation, 2850 N 66 RT 4
- Columbia Claremore Regional Hospital, 1202 N Muskogee PI
- **Git N Go #14, 1100 N Lynn Riggs**
- **Fastop, 600 W Blue Starr Ave**
- **Day-Nite Doughnuts and Deli, 680 N Lynn Riggs Blvd**
- **City of Claremore Park and Recreation, 512 N Owalla**
- **Pure Gold #126, 516 N Lynn Riggs**
- Git N Go #22, 1310 W Will Rogers
- Obie's Service Station, 1130 W Will Rogers
- H.B.H. Rentals, 1227 W Will Rogers Blvd
- **Lincoln Building, 325 N Owalla**
- **Pemco #206, 812 W Will Rogers**
- **Melton Sales, Inc., 200 N Lynn Riggs**
- **Former Munson Service Station, 601 Will Rogers Blvd**
- **Charles Boone (Sinclair), 625 W Will Rogers**
- **Phillips 66 Company #013874, 119 N Lynn Rigg**
- **Jack Marshall Chevrolet, 323 S Lynn Riggs**
- **Anderson Texaco, 301 S Lynn Riggs Blvd**
- Former Service Station, 107 E Will Rogers Blvd
- EZ Mart #675, 211 W First Street
- **Jiffy Jon's #4, 509 S Lynn Riggs Blvd**
- **Quiktrip #20, 520 S JM Davis Blvd**
- **Thermogas, 1800 S Highway 66**
- **Food Mart Citgo, 657 Ram Road**
- **Walmart Store #12, 680 S Lynn Riggs Road**
- Public Works Building, 724 Ramm Road
- Claremore Vehicle Maintenance Facility, 801 Ramm Road
- Murphy USA #6605, 1550 S Lynn Riggs Blvd

6.4.3.9 Leaking Underground Storage Tanks(LUSTs)

The LUST database of the OCC, dated February 26, 2003, was reviewed. The database tracks registered LUSTs within the State of Oklahoma. The records indicate there are eight registered LUSTs near the Subject Area. These registered LUSTs are listed below.

The facilities that are highlighted are located in close proximity to the Subject Area.

- **Git & Go #14, 1100 N Lynn Riggs**
 - Three tanks installed, 1/1/89 and some still in-use, no indication of how many
 - LUST status, CLOSED as of 7/8/99
- **Day-Nite Doughnuts & Deli, 680 N Lynn Riggs Blvd**
 - Four tanks installed, all PERMANENTLY OUT OF USE.
 - LUST status, CLOSED as of 10/1/01
- **Pure Gold #126, 516 N Lynn Riggs**
 - Three tanks installed, all PERMANENTLY OUT OF USE.
 - LUST status, CLOSED as of 8/1/97
- A-1 Cleaners, 1227 W Will Rogers Blvd
- **Pemco #206, 812 W Will Rogers**
 - Three tanks installed, all PERMANENTLY OUT OF USE.
 - LUST status, CLOSED as of 3/93
- EZ Mart #675, 211 W First Street
- **Thermogas, 1800 S Highway 66**
 - Four tanks installed, 12/1/85 and some still in-use.
 - LUST status, CLOSED as of 3/11/97
- **Food Mart Citgo, 657 Ram Road**
 - Three tanks installed, 12/10/84, two in-use and one temporarily out of use
 - LUST status, CLOSED as of 12/28/01

6.4.3.10 Aboveground Storage Tanks (ASTs)

The AST database of the OCC, dated April 28, 2003, was reviewed. The database tracks ASTs registered within the State. These tanks store petroleum products or hazardous materials. The records indicate there is one registered AST near the Subject Area. The one registered AST is listed below.

- SWBT-R66109, 313 W Patti Page

6.4.3.11 Corrective Action Report (CORRACTS)

CORRACTS is a report that identifies hazardous waste handlers with RCRA corrective action activity. This database, dated March 4, 2003, was reviewed. The database did not indicate the presence of any CORRACTS sites near the Subject Areas.

6.4.3.12 Sanborn Maps

Sanborn Fire Insurance Maps for the years 1940 and 1951, depicting the Subject Areas and adjacent properties, were reviewed. These maps were reviewed for information pertaining to the historical uses of the area and the possible presence of USTs on or near the Subject Area. According to these maps there were numerous filling/service stations, auto repair shops, and restaurants along the S. Wichita corridor now known as Lynn Riggs Boulevard. The maps were not focused on the Subject Areas, but the S. Wichita corridor should be considered representative of the Subject Areas during the years 1940 and 1951.

It should also be noted that these maps did not extend to the north and south termini. However, the information gleaned from these maps should also be considered as representative of the possible industrial and commercial activity in the general vicinity.

6.4.4 Wetlands

According to the Fish and Wildlife Service National Wetland Inventory (NWI), no wetlands were identified in the Subject Areas.

6.4.5 Flood Insurance Rate Maps

Flood insurance rate information for the Subject Property was researched. The Subject Areas are situated in an area identified as Zone X. This area is described as outside the 500-year floodplain.

6.4.6 Wild and Scenic Rivers

No designated wild and scenic rivers are located in the Subject Areas. The only body of water in the vicinity is Cat Creek, a tributary of Dog Creek, a tributary of the Verdigris River, and ultimately tributary to the Arkansas River.

6.4.7 Threatened and Endangered Species Impacts

The EPA Endangered Species Protection Program Database reveals two endangered species and three threatened species located in Rogers County. These species include:

- Interior Least Tern (*Sterna Antillarum*, Endangered)
- Whooping Crane (*Grus Americana*, Endangered)
- Bald Eagle (*Haliaeetus leucophalus*, Threatened)
- Piping Plover (*Chadradrius melodus*, Threatened)
- Western Prairie Fringed Orchid (*Habenaria leucophaea*, Threatened)

The locations of these species in relation to the potential project sites are south and southeast, closer to the Verdigris and Arkansas Rivers.

In response to a solicitation for information, the Oklahoma Natural Heritage Inventory (ONHI) reported that the Prairie Mole Cricket (*Gryllotalpa Major*) is classified by the State of Oklahoma as “Imperiled in Oklahoma Because of Extreme Rarity.” The Prairie Mole Cricket is known to burrow in native grasslands; therefore it is not anticipated that construction activity in the project area will affect the species. This information was identified by a search conducted for Rogers County and area legal descriptions. A biological survey was not conducted to identify the presence of any threatened and endangered species.

6.4.8 Historical and Cultural Resources

The study corridor was surveyed for the presence of historical and archaeological resources. The survey revealed four properties listed in the National Register for Historic Places (NRHP). These four properties, along with three others, are listed as Oklahoma Historic Sites (OHS).

The properties, and their respective distances from the closest subject area, are as follows:

- Claremore Auto Dealership (NRHP & OHS) – 2,200 feet from the Archer Drive / SH 66 intersection
- Will Rogers Hotel (NRHP & OHS) – 2,400 feet from the Archer Drive / SH 66 intersection

- The Belvedere (NRHP & OHS) – 3,400 feet from the Archer Drive / SH 66 intersection
- Mendenhall's Bath House (NRHP & OHS) – 5,300 feet from the Blue Starr Drive / SH 66 intersection
- Eastern University Preparatory School (OHS) – 4,600 feet from the Blue Starr Drive / SH 66 intersection
- Meyer, Maurice Barracks (OHS) – 4,600 feet from the Blue Starr Drive / SH 66 intersection
- Mason Hotel (OHS) – No longer exists

6.4.9 Comments and Coordination

Solicitation letters were forwarded to eight governmental agencies and other involved/concerned groups. Two responses were received. Discussions of those responses follow:

- ***The Oklahoma Department of Environmental Quality (ODEQ)*** stated that Rogers County has excellent air quality conditions and is currently classified as an attainment area. The ODEQ expected no obvious negative impacts on air quality relative to the proposed construction.
- ***Oklahoma Natural Heritage Inventory (ONHI)*** stated that there was one record of a federally/state species identified for the area according to the legal description of the sites. The ONHI also stated the Prairie Mole Cricket (*Gryllotalpa Major*) is classified by the State of Oklahoma as "Imperiled in Oklahoma Because of Extreme Rarity." The Prairie Mole Cricket is known to burrow in native grasslands; therefore it is not anticipated that construction activity in the project area will affect the species.

6.5 Conclusions

6.5.1 Areas Of Environmental Concern

This ECA was prepared in conformance with the scope of work paragraphs B.1.5. and B.2.4, the study methodology and limitations presented in Section 6.3 of this report. Recognized environmental conditions in connection with the subject areas are as follows:

- There are generators of RCRA regulated wastes near each of the subject areas. However, the records search did not indicate any

issues of non-compliance with the proper handling or disposal required by the generator.

- USTs are located near each of the subject areas and some are currently in-service. Three of the USTs located near the subject area are also listed as LUSTs. These UST/LUSTs are identified as follows
 - **Git & Go #14, 1100 N Lynn Riggs**
 - **Thermogas, 1800 S Highway 66**
 - **Food Mart Citgo, 657 Ram Road**
- LUSTs are located near each of the subject areas. These LUSTs are identified above. None appear to be close enough to a potential site to jeopardize the project. However, exact limits of possible contamination need further study. The Git and Go #14 LUST could potentially affect the Blue Starr Dr. alternative. The Thermogas and Food Mart Citgo LUST's could potentially affect the Archer Dr. alternative.
- Sanborn Maps that were reviewed identified automobile sales, repair, and servicing activity along the Wichita Avenue that is now Lynn Riggs Boulevard. The historic maps presented an area that is not in close proximity to the subject areas. However, the dense activity could indicate similar activity along this corridor in other areas.
- The Threatened and Endangered Species of Rogers County and the areas near the proposed sites, according to the legal descriptions, were identified. However, the habitat of these species is not believed to be near the subject areas.
- Historical and cultural resources were identified in the database search. Of the sites identified, none are located within one-quarter mile of the subject areas.

6.5.2 Environmental Constraints Analysis

To assist in identifying the locations of possible impacts associated with the subject areas, an Environmental Constraints Map (ECM) has been developed (See Figure 6-1). This ECM provides a “snap shot” of the site locations presented in Section 6.5.1. The sites identified on the ECM are only those believed to pose significant impacts to the subject areas. Based on this approach, only LUSTs were identified on the ECM, as these were the sites that could pose significant impacts and are located near the subject areas. General UST sites and other possible impacts presented as general characteristics of Rogers County are not a part of the ECM.

6.6 Recommendations

Based on the preliminary review of environmental constraints presented in this ECA, the following recommendations are provided:

- The issue of greatest concern is with the condition of the surrounding property near the listed LUSTs. Because of the historical information presented and the current status of underground storage tanks in-service and those confirmed as leaking, a study should be performed to determine the extent of possible contamination. An Initial Site Assessment (ISA) and potentially a Preliminary Site Investigation (PSI) should be performed to specifically address hazardous waste conditions in the subject areas.
- As an urban/industrial location, the study area may contain historic resources other than those identified in this preliminary constraints review. A detailed field and/or archival review of the subject areas will be necessary to determine what impact, if any, the different alternatives will have on resources eligible for inclusion in the National Register of Historic Places (NRHP).
- Before a final decision regarding the preferred location of the railroad overpass is made, a formal Environmental Assessment (EA) or the equivalent should be undertaken in compliance with the National Environmental Policy Act (NEPA) and applicable FHWA and ODOT procedures.

7.0 FINAL EVALUATION OF ALTERNATIVES

7.1 Screening and Selection Process

Conceptual designs of the three alternatives selected for further evaluation were developed to a higher level of detail than during the initial evaluation. They were developed to a level adequate for cost estimating purposes. Roadway connections, bridge approaches and bridge structures were conceptually designed and drawings prepared to portray the proposed alternative in plan and profile. Right-of-way drawings were prepared to indicate impacts on existing property and acquisitions that would be necessary to construct the overpass alternatives. Environmental Constraints Assessments were performed for each alternative location as described in Section 6.0. Conceptual cost estimates were developed for both right-of-way acquisition and for construction of the proposed facilities.

All of this information was used with additional data and considerations in a screening process to logically and systematically evaluate and compare the three alternatives and arrive at a recommended plan. The screening process involved evaluations of the following factors, both tangible and intangible:

1. Emergency access and safety
2. Environmental impacts
3. Impacts on existing businesses or residences.
4. Social impacts (i.e. relocations)
5. Right-of-way acquisitions required
6. Construction costs (2003 dollars)
7. Impacts to feeder street traffic
8. Legal issues
9. Improvements to existing traffic patterns
10. Other benefits (i.e. land development potential)

Comparisons were made of the three alternatives evaluating each of the factors above, with some factors weighted more heavily than others depending on relative importance (Refer to Figure 7-1).

7.2 Blue Starr Dr.

The Blue Starr Dr. location for an overpass offers several distinct advantages, but presents significant challenges as well. The opportunity to cross both the BNSF and the UP railroads with one structure is unique

to this site. This is a prime route for emergency vehicles and an overpass would be a very significant improvement to emergency response and public safety. With an average of over 15,000 vehicles per day crossing the railroad tracks at Blue Starr Dr., an overpass would reduce frustration and inconvenience and improve safety for a large number of travelers.

Conceptual design of a potential overpass at Blue Starr Dr. incorporates a bridge structure approximately 675 ft. in length. The bridge would consist of a 58-foot wide concrete bridge deck, supported upon AASHTO Type III pre-stressed concrete beams, and bents founded upon 36-inch diameter drilled shafts. Maximum span between bents is approximately 100-feet. Earth embankments with “wrap-around” concrete retaining walls would form the bridge approaches at the east and west ends. The eastern approach would begin at Lynn Riggs Blvd. and transition to a maximum 10% slope upward over J.M. Davis Blvd., over the BNSF railroad, flatten in grade, pass over the UP railroad, transition to a maximum 10% slope down to the western terminus at Jay St. The Jay St. intersection would need to be raised a few feet to accommodate the overpass. The functional classification of Blue Starr Dr. is a minor arterial street. In order to fit an overpass within the physical constraints of the site, design exceptions to ODOT criteria would need to be requested for minor adjustments to maximum grades and vertical curve lengths. See Figures 7-2 and 7-3 for a conceptual design of the overpass facility. Refer to Figure 7-4 for a conceptual bridge plan and elevation.

Several traffic control improvements would be required for the safe and efficient operation of this alternative:

1. Intersection and traffic signal modifications would be required at Lynn Riggs and Blue Starr.
 - The eastbound approach to the intersection from the overpass must be three lanes wide in order to provide one eastbound left turn lane, one eastbound through lane, and one eastbound right turn lane. Two westbound lanes are also required.
 - A southbound right turn lane should be added on the west side of Lynn Riggs approaching the intersection. This is a capacity increasing measure needed because of the additional traffic that will be attracted to the overpass.
 - The northbound left turn lane on Lynn Riggs should be lengthened to the maximum amount that can be accommodated within the existing block length by carving additional left turn storage out of the existing median. This

is a capacity increasing measure needed because of the additional traffic that will be attracted to the overpass.

- An additional westbound traffic lane should be added on the north side of Blue Starr approaching the intersection from the east. This lane would serve through and right turn traffic and would supplement the existing left turn lane and single through lane on this approach. The existing single lane for through traffic in the eastbound direction east of Lynn Riggs is expected to be sufficient. This is a capacity increasing measure needed because of the additional traffic that will be attracted to the overpass.
2. The approach to the intersection at Jay Street from the overpass should be widened to three lanes in order to provide a left turn lane and two through lanes. There should also be two eastbound lanes. This would be compatible with the existing three lanes on Blue Starr west of Jay Street and would also be compatible with future widening to the west if needed. The westbound curb lane coming off the overpass could be designated for “right turn only” at Jay Street or a taper could be constructed on the north side of Blue Starr west of Jay Street to provide for a merge into a single lane. Stop sign control on Jay Street is expected to be sufficient for the traffic that is anticipated.
 3. A new at-grade railroad crossing and railroad signal would be required at the new Industrial Blvd. crossing of the BNSF railroad.
 4. The new alignment of Industrial Blvd. would intersect J.M. Davis directly opposite 12th Street. Stop sign control on Industrial Blvd. and on 12th Street is expected to be sufficient for the traffic that is anticipated.
 5. The northbound approach to 12th Street on Lynn Riggs should have a left turn storage lane carved out of the existing median in order to serve the additional traffic that will turn left at this location to access Industrial Blvd.

The Environmental Constraints Assessment conducted and discussed in Section 6 of this report identified a leaking underground storage tank at the northwest corner of the Blue Starr Dr./Lynn Riggs Blvd. intersection. Depending upon the size of the contaminated area, this could possibly be a deterrent to construction of an overpass. However, without further study,

it is assumed that the tank is a sufficient distance away from the overpass site to cause no impact.

Several businesses and one residential property would be impacted by construction of an overpass at this location (See Figure 7-5 for a right-of-way map of the proposed project). In order to minimize the impact upon the industrial park to the north and to maintain access from the south, we recommend extending Industrial Blvd. to the south under the bridge structure, and southeast to a connection with J.M. Davis Blvd. at 12th St. A new at grade crossing of the BNSF railroad would be required. The Texaco service station at the northwest corner of Lynn Riggs Blvd. and Blue Starr Dr. would lose the two existing access drives off Blue Starr and right-of-way would need to be acquired from the Texaco property. At the west end of the site several businesses would have access severely impacted. In order to maintain access to the pool supply business and the self-storage facility, the conceptual design incorporates a cul-de-sac, extending to the north off Owalla Ave., under the bridge structure. The commercial business at the southeast corner of Jay St. and Blue Starr Dr. would lose the driveway access off Blue Starr, but would still have access off Jay St. A residential property on Owalla Ave., south of Blue Starr Dr., would need to be acquired. It is proposed that the future bike/pedestrian trail along Blue Starr Dr. be routed around the base of the overpass embankments; continue under the bridge and across the railroad at the current grade. The trail is to be part of the "Claremore Lake Trail and Bikeway" project and will be fully ADA compliant.

It is anticipated that land acquisition would cost approximately \$345,000 including one residential (Refer to Figure 7-5 and Appendix B). The estimated construction cost of the bridge structure is \$1,600,000. The estimated construction cost of the bridge approaches, off-site roadway work, and appurtenances is \$1,600,000. Refer to Table 8-1 for a summary of construction costs. The total estimated cost of the Blue Starr Dr. alternative is \$4,250,000, including right-of-way.

7.3 Archer Drive

The Archer Drive alternative offers the opportunity to improve a very ineffective and dangerous existing intersection as well as provide a grade separated railroad crossing. Although emergency routes would not be as direct as on Blue Starr Dr., an Archer Drive emergency route via an overpass would be of very significant value. Improvements to normal traffic flow for the general public would be of great benefit. Although average daily traffic crossing the railroad at Archer is about 7,000 vehicles

per day (less than half the Blue Starr traffic), the public would be well served by proposed improvements in this area.

Conceptual design of this alternative incorporates a very long bridge structure, approximately 1200 ft. in length, spanning the BNSF Railroad, J.M. Davis Blvd., SH 66 and Cat Creek in a continuous span. The bridge would consist of a 58-foot wide concrete bridge deck; supported upon AASHTO Type III prestressed concrete beams, and bents founded upon 36-inch diameter drilled shafts. The maximum span between bents would be approximately 95 feet. The western approach would begin at the Chambers Ave. intersection, transition upward on earth embankment at a maximum grade of 6%, transition downward across the bridge through a long vertical curve to a maximum downgrade of 6%, to meet existing grade at the intersection of SH 66. The south end of J.M. Davis Blvd. would be realigned to meet the new overpass approach/SH 66 intersection, which would be signalized. The portion of the SH 66 east frontage road north of Ramm Rd. would be closed. Access to the west frontage road would be maintained by constructing a loop off Archer, just east of Chambers Ave., north and back under the bridge structure to connect with S. Mortez Ave. The conceptual design of the Archer Drive alternative meets ODOT design criteria for minor arterial streets. See Figures 7-6 and 7-7 for conceptual design of an overpass facility at this location. Refer to Figure 7-8 for a conceptual bridge plan and elevation.

Several traffic control improvements would be required for the safe and efficient operation of this alternative:

1. Intersection modifications and a traffic signal would be required at Lynn Riggs and Archer/J.M. Davis.
 - The westbound approach to the intersection from the overpass must be three lanes wide in order to provide a westbound left turn lane, a combined westbound left turn and/or through lane, and a westbound right turn lane. Two eastbound lanes are also needed.
 - A northbound right turn lane should be added on the east side of Lynn Riggs approaching the new intersection to adequately serve the right turn movement to go west on Archer.
 - The J.M. Davis approach to the new intersection should be three lanes wide to provide one eastbound left turn lane and two eastbound through lanes. One westbound lane to go north on J.M. Davis is expected to be sufficient.

- A new southbound lane should be extended southward along the existing J.M. Davis alignment from the curve south of Cat Creek to Highway 66. This lane would bypass the signalized intersection and would allow the southbound J.M. Davis traffic to merge into Highway 66 south of the signal with less delay and congestion.
2. Archer should transition from four lanes to two lanes at Chambers. The westbound curb lane on Archer should end at Chambers as a “right turn only” lane. The eastbound approach on Archer at Chambers should be widened on the south in order to allow eastbound through traffic to pass any waiting eastbound left turning vehicles that are in the process of turning north on Chambers.
 3. Chambers between Archer and Dupont should be widened and culverts extended to provide a standard width 2-lane roadway to serve the additional traffic that would be attracted to the overpass.
 4. Intersection modifications and a traffic signal would be required at Archer and Brady/Holiday Lane. At least three lanes would be required on each leg of the intersection in order to provide left turn lanes in all directions. The exact configuration of the intersection will be affected by whether or not State Highway 20 has been relocated to its new bypass alignment.

The Environmental Constraints Assessment identified two leaking underground storage tanks in the vicinity of the project site. However, without further study, it is assumed that the tanks are a sufficient distance away from the overpass site to cause no impact.

There are three commercial businesses that would be impacted by the construction of an overpass at this location (See Figure 7-13 for a right-of-way map of the project site). A Pizza Hut restaurant east of SH 66 would be entirely encircled within the overpass loop. A more detailed assessment of the site might reveal design alternatives that can salvage the restaurant, but this study assumes that the restaurant and the land it occupies will need to be acquired in its entirety. The strip shopping center east of SH 66 and north of Ramm Road would be severely impacted. The alignment of the overpass would pass through the northern end of the building and parking area. A major portion or all of the building and land would need to be acquired. A tavern west of the BNSF Railroad and north of Archer

Drive also falls squarely within the proposed overpass alignment and would need to be acquired for right-of-way. Access to the self-storage facility west of the railroad and south of Archer Drive would be affected. Both northern driveways could remain open, but direct access to Archer would be lost at the northeast driveway.

Right-of-way acquisition will be a significant issue and a substantial part of the total project cost at this location. Assuming total acquisition of the Pizza Hut, the strip shopping center property and the tavern, it is anticipated that building acquisition would total approximately \$1,210,000 and land costs would be approximately \$2,000,000. Refer to Figure 7-9 and Appendix B. The estimated construction cost of the bridge is \$2,460,000. The estimated construction cost of the bridge approaches, off-site roadway work and appurtenances is \$2,580,000. Refer to Table 8-1 for a summary of construction costs. The total estimated cost of the Archer Drive alternative is \$9,900,000 including right-of-way.

7.4 Holiday Lane Extension

Due to its far southern location the Holiday Lane Extension alternative offers the least benefit to emergency vehicle routing. Although south Claremore would be well served, central and northern Claremore would see less benefit. The proposed SH 20 Bypass intersects SH 66 approximately one mile south of this location. While the two overpasses would have no direct construction impact on one another, they could cause some traffic impact on each other.

Conceptual design of a potential overpass at this location incorporates a bridge structure approximately 380 feet in length (See Figures 7-10 and 7-11). The bridge would consist of a 58-foot wide concrete bridge deck; supported upon AASHTO Type III prestressed concrete beams, and bents founded upon 36-inch diameter drilled shafts. Maximum span between bents would be approximately 90 feet (Refer to Figure 7-12 for a conceptual bridge plan and elevation). The alignment would begin at the frontage road/SH 66 intersection approximately one-quarter mile southwest of the Reavis Road/SH 66 intersection. The roadway embankment would rise and transition to a maximum 6% upgrade, bridge across SH 66 and the BNSF Railroad, level out and connect with a proposed extension to Holiday Lane. Conceptual design meets ODOT criteria for minor arterial roadways. The proposed extension of Holiday Lane south approximately one-half mile to the overpass would be funded and built separately from the overpass project. This extension, connection and overpass would open a large tract of undeveloped property for

development and could potentially spur economic growth in south Claremore.

Several traffic control improvements would be required for the safe and efficient operation of this alternative:

1. A traffic signal and new intersection would be required at Holiday Lane and SH 66.
 - The westbound approach to Highway 66 from the overpass must be three lanes wide in order to provide a double left turn lane and a right turn lane. Two eastbound lanes are also required. A raised median must be installed to block through traffic on the existing access road due to the very close spacing between the access road intersection and the new signalized intersection on Highway 66.
 - A southbound left turn lane and a northbound right turn lane on Highway 66 should be constructed to provide efficient operation and sufficient capacity at the signalized intersection.
2. Intersection modifications and a traffic signal would be required at Archer and Brady/Holiday Lane. At least three lanes would be required on each leg of the intersection in order to provide left turn lanes in all directions. The exact configuration of the intersection will be affected by whether or not State Highway 20 has been relocated to its new bypass alignment.

The Environmental Constraints Assessment identified no environmental issue that would significantly impact construction of an overpass at this location.

Four commercial businesses would be impacted by this alternative (See Figure 7-13 for a right-of-way map of the project site). The Chevrolet dealership, Dottie's Western Apparel Store, Ron's Hamburger's and a sod store would need to have both land and structures acquired for right-of-way. It is possible that a more detailed assessment of the Chevrolet dealership and sod store sites might reveal design alternatives that can salvage these businesses; but this study assumes total acquisition of these sites.

The outfall channel from a detention pond east of the site would need rerouting around the toe and east of the proposed overpass embankment, at a relatively minor expense.

Right-of-way acquisition will, as with the other alternatives, be a significant issue and cost with this alternative. It is anticipated that land acquisition would cost approximately \$2,150,000 and building acquisition would total approximately \$1,850,000. Refer to Figure 7-4 and Appendix B. The estimated construction cost of the bridge structure is \$820,000. The estimated cost of constructing the bridge approaches, embankments, retaining walls and appurtenances is \$2,020,000. Refer to Table 8-1 for a summary of construction costs. The construction of the Holiday Lane connection (from the end of the “overpass” as shown on Figure 7-10 to a connection at the current intersection of Holiday Lane and Archer Dr.), not included in this project, is estimated to be about \$2,450,000 for a four-lane concrete roadway (this is a construction estimate only and does not include costs associated with right-of-way acquisition along the alignment). The total estimated cost of the Holiday Lane Extension overpass alternative is approximately \$8,160,000 including right-of-way. If the cost of the off-site Holiday Lane connecting roadway is included, the total cost of this alternative would be \$10,610,000.

8.0 SUMMARY AND RECOMMENDATIONS

Planning and constructing a major transportation facility in a developed urban location is a complicated and expensive undertaking. Impacts to existing properties are difficult to avoid. Adapting a design to fit the physical constraints of a developed site is challenging. This feasibility study for a possible grade separated railroad crossing in Claremore has been developed in a logical, systematic manner. From an initial investigation of five possible sites, the focus was narrowed to three potential sites for detailed study. A conceptual design of a possible overpass was developed for each of the three sites. The conceptual design included the structural design of the bridge, approaches to the bridge and associated roadway improvements. Property research was conducted to determine right-of-way acquisitions required for each alternative. The conceptual designs were developed to a level of detail sufficient to prepare reliable estimates of probable construction costs. Right-of-way cost estimates were based on recent market analysis of comparable property sales, for both buildings and land. In every case regarding right-of-way acquisitions, the "worst-case" scenario was assumed. Total takes of property were assumed when a given parcel appeared to be substantially impacted by a proposed alternative.

An Environmental Constraints Assessment (ECA) was conducted to address potential impacts associated with historical or environmental issues in the vicinity of the three potential sites. The study was limited to a review of existing information only to provide basic screening data and was not an assessment to comply with NEPA requirements. Leaking underground storage tanks near the Blue Starr Dr. site and the Archer Dr. site were potential environmental issues identified. The tanks appear to be far enough away from each site to pose no threat. Areas of contamination should be further studied, however. The results of the historical and environmental investigations did not significantly impact the selection of the recommended alternative.

In evaluating the three alternatives, factors other than costs were considered. The relative benefits versus disadvantages of a particular alternative were systematically compared with the other options. The estimated cost of right-of-way acquisition for the Blue Starr Dr. alternative, including both land and building cost, is approximately \$345,000. Construction cost is estimated at approximately \$3,200,000. With a contingency of 20%, the total cost of the Blue Starr Dr. alternative is \$4,300,000. The estimated cost of right-of-way acquisition for the Archer Drive alternative, including land and buildings is approximately \$3,200,000.

Construction cost is estimated at approximately \$5,050,000. With a contingency of 20%, the total cost of the Archer Drive alternative is approximately \$9,900,000. The estimated cost of right-of-way acquisition for the Holiday Lane Extension alternative, including land and buildings, is approximately \$3,950,000. Construction cost is estimated at \$2,850,000, not including the cost of constructing the off-site portion of the Holiday Lane Extension. With a contingency of 20%, the total cost of the Holiday Lane Extension alternative is approximately \$8,200,000.

Based upon the conceptual designs developed and the operational, cost, traffic and environmental information assembled for this study, the Blue Starr Dr. option appears to be the most appropriate solution. It is our recommendation that the Blue Starr Dr. option be chosen as the technically preferred alternative. Not only is the cost for this alternative significantly less than the other two alternatives, there is several other significant advantages to the Blue Starr Dr. option. Blue Starr Dr. offers important safety benefits in regard to emergency response including the ability to cross both the BNSF and UP rail lines. Its location near the central business district affords relatively easy access for high traffic volumes. Impacts to existing businesses and other property are significant, but not nearly as severe as the other two alternatives. Assuming a new at-grade railroad crossing will be permitted, Industrial Blvd. could be extended to J.M. Davis Blvd. and maintain a southern access to the industrial park. Damages to other adjacent businesses could be mitigated through careful design.

The final determination of the preferred alternative will be made in a subsequent NEPA document incorporating the findings of this study as well as additional more detailed review, public involvement and agency coordination.

APPENDIX A
RAILROAD CRITERIA

APPENDIX B
COST DATA

Table 8-1

Summary of Probable Costs						
Alternate	Land Acquisition Cost	Building Acquisition Cost	Construction Cost		20% Contingency	Total Cost
			Bridge	Roadway		
Blue Starr	\$299,120	\$43,500	\$1,595,809	\$1,599,900	\$707,665	\$4,245,994
Archer	\$1,996,441	\$1,209,825	\$2,464,784	\$2,578,620	\$1,649,934	\$9,899,603
Holiday Lane Overpass*	\$2,141,971	\$1,825,035	\$816,160	\$2,017,100	\$1,360,053	\$8,160,319

*Does not include Holiday Lane Extension. Approximate construction cost \$2,450,000.

APPENDIX C
SCOPE OF WORK

APPENDIX D
MEETING MINUTES