159TH STREET

PFLUMM ROAD TO ANTIOCH ROAD

PRELIMINARY ENGINEERING STUDY

PREPARED FOR

The City of Overland Park KANSAS

DECEMBER 2001

HNTB

ARCHITECTS ENGINEERS PLANNERS

INDEX

TABLES

EXHIBITS

EXECUTIVE SUMMARY

This preliminary engineering study presents the results to establish preliminary horizontal/vertical alignments for 159th Street from Pflumm Road to Antioch Road and for the 159th Street / Pflumm Road intersection. The purpose of this study was to perform a preliminary design to minimize impacts to existing development and to serve as a planning tool for future development. The findings of the study were coordinated with Johnson County, Olathe, Johnson County Parks and Recreation, and the Johnson County Executive Airport.

More specifically, the major objectives of this study were as follows:

- **Establish Design Criteria** – Establish design guidelines, typical roadway sections, and right-of-way widths for 159th Street and Pflumm Road.
- **Develop Preliminary Horizontal/Vertical Alignment** – Develop preliminary horizontal and vertical alignments for 159th Street and Pflumm Road.
- **Determine Total Project Cost** – Estimate the total project cost including construction, utility relocation, right-of-way, administration, legal and engineering costs.

The comprehensive solution to meet the objectives set forth is summarized in subsequent pages in this report:

159th Street

Overland Park's standard divided thoroughfare street section, centered on the section line, with the following revisions was used. To minimize the impact to the Johnson County Executive Airport and to comply with airspace regulations for vertical clearance in the Runway Protection Zone (RPZ), an offset of 12.192 meters (40 feet) south of the section line is recommended. To minimize the impact to the Pleasant Valley Cemetery located on 159th Street between Switzer Road and Antioch Road, an offset of 15.24 meters (50 feet) north of the section line in the vicinity of the cemetery is recommended.

Pflumm Road

Overland Park's standard divided thoroughfare street section, centered on the section line, was used.

INTRODUCTION

The study presented herein was authorized in an agreement between the City of Overland Park and HNTB Corporation on March 22, 2001. The agreement calls for the preparation of a preliminary engineering study and report together with preliminary scaled plans and drawings.

The study will establish recommended horizontal/vertical alignments for 159th Street (from Pflumm Road to Antioch Road) and the intersection of 159th Street and Pflumm Road. Specifically, the study will include the following:

- Recommended typical sections.
- Required right-of-way widths.
- Plan sheets showing existing right-of-way, ownership, utilities, and topographic features, in addition to locations for retaining walls, construction limits, and locations of major drainage crossings.
- Proposed horizontal/vertical roadway alignments.
- Preliminary cost estimates.

Each of these items is discussed in the following sections. In addition, plan and profile drawings are part of the report appendix to illustrate the recommended roadway improvements.

This Preliminary Engineering Study has been prepared by HNTB Corporation at the direction of the Public Works Department and represents the best information available to the City Engineer.

BASIC INFORMATION AND PROCEDURES

In the development of the preliminary design study, the following information and procedures were utilized:

- Topographic information along the 159th Street and Pflumm corridors was obtained from AIMS maps in English units and was regenerated and incorporated into 1:500 Plan and Profile sheets. The City of Overland Park supplied the AIMS maps.
- City ownership and plat maps were utilized to determine property owners and to plot existing R/W and property lines.
- Utility companies were contacted to determine the location of utility lines and easements in the corridor area. The utility information shown in the plan sheets was taken from utility plan sheets supplied to HNTB by each of the utility companies and does not represent field-verified locations.
- The following future development plans for the corridor were obtained from the City of Overland Park and were considered in the layout of proposed roadways:
  - "Morse Village Estates, Fourth Plat" prepared by Phelps Engineering, Inc, submitted March 2001.
  - "Stonebridge Village, Preliminary Plat" prepared by Schlagel & Associates, P.A., submitted July 2001.
  - "Tu' Lakes Street Improvements" prepared by Green Engineering Services, Inc. submitted December 1978.
- The City of Overland Park provided turn bay locations and storage length requirements, as well as traffic counts and projections.
- Design criteria is in accordance with current ordinances for the City of Overland Park, the Kansas Department of Transportation, and the American Association of State Highway and Transportation Officials' publication, "A Policy on Geometric Design of Highways and Streets."
- Estimates of construction costs are based on 2001 dollar values.
- Field surveys were performed to establish flowlines of existing major drainage facilities and to assist in the validation of the elevations shown on the AIMS maps.
- "151st Street – Quivira Road to Antioch Road, Quivira Road – 151st Street to 159th Street, Switzer Road – 151st Street to 159th Street Preliminary Design Study," prepared by George Butler Associates, Inc, submitted March 2001.
- "159th Street (Antioch Road to Metcalf Avenue), Antioch Road (151st Street to 159th Street) Preliminary Engineering Studies," prepared by HNTB Corporation, submitted September 1999.
- "Public Storm Sewer Plans for 1990 Bridge Replacement Program" prepared by the City of Overland Park Department of Public Works.
- "Airport Layout Plan" prepared by the Johnson County Airport Commission, February 1996.

EXISTING CONDITIONS

Roadways

159th Street is an east/west thoroughfare and Pflumm Road is a north/south thoroughfare serving Overland Park, Olathe, and Johnson County residents. 159th Street and Pflumm Road are both two-lane paved roadways with no shoulders and open ditches. 159th Street is bordered on the north side entirely by Overland Park except at the intersection with Pflumm Road in which portions of 159th Street are bordered by Olathe and Johnson County. Portions of the south side of 159th Street are bordered by Overland Park, Olathe, and Johnson County. North of 159th Street, Pflumm Road is bordered on the west side by Olathe and portions of the east side of Pflumm Road are bordered by Olathe and Johnson County. South of 159th Street, Pflumm Road is bordered on the west side by Johnson County and on the east side by Overland Park.

159th Street has four intersecting thoroughfares – Pflumm Road, Quivira Road, Switzer Road, and Antioch Road. There are also three intersecting residential side streets (future Parkhill Street, future Bluejacket, and future Eby) and six commercial entrances on 159th Street.

Existing Right-of-Way

The existing right-of-way is generally 6.096 meters (20 feet) to 12.192 meters (40 feet) either side of the section line through undeveloped tracts of land, and 18.288 meters (60 feet) either side of the section line where subdivisions have been platted. The existing right-of-way is shown on the plan drawings in the Appendix.

Traffic Counts

Traffic counts indicate 2,800 Average Daily Traffic (ADT) along 159th Street from Pflumm Road to Antioch Road and for Pflumm Road at the intersection of 159th Street. Projected counts of 16,000 ADT are anticipated for the year 2020. The roadways are currently signed for 70 kph (45 mph).

Land Use

The properties adjacent to the two roadways include small subdivisions and small/large tracts of land. The current planned zoning for the majority of the study corridor is for residential use. There is a small area zoned for commercial use in the northeast quadrant of the intersection of 159th Street and Pflumm Road and at Warren's Christmas Tree Farm. A portion of the south side of 159th Street, between Switzer Road and Antioch Road, has been zoned for public use. The southwest quadrant of the intersection of 159th Street and Pflumm Road is zoned for parks and recreation.

Johnson County Executive Airport is located east of Pflumm Road on both the north and south sides of 159th Street. The airport has lighting and signal equipment on both sides of 159th Street. The airport localizer is located approximately 20 meters (65') north of the

section line. All fencing or handrails located within 50' of the localizer must be made of a non-metallic material. The Runway Protection Zone (RPZ) is an area associated with the flight path for the airport which restricts all obstacles from the ground. The RPZ begins 200 feet south of the runway at an elevation of 1050 and proceeds south at a ratio of 1:34 upward for 1700 feet.

The Pleasant Valley Cemetery is located between Switzer Road and Antioch Road on the south side of 159th Street. This cemetery contains approximately 1500 graves, some of which are only 10.668 meters (35 feet) south of the section line.

A private lake is located between Pflumm Road and Quivira Road on the north side of 159th Street. The toe of the dam is located approximately 13.5 meters (45 feet) north of the section line and the dam is approximately 3 meters (10 feet) in height.

Existing Vertical Alignments

Adequate stopping sight distance is not available at several locations along the existing 159th Street profile. Specifically, the main entrance to Warren's Christmas Tree Farm (located east of Quivira Road), the intersection of future Bluejacket (west of Switzer Road) and the entrances to the Pleasant Valley Cemetery (located between Switzer Road and Antioch Road) all have limited sight distance.

Drainage

There are currently open ditches adjacent to both 159th Street and Pflumm Road. There are eight existing drainage structures crossing 159th Street and one existing drainage structure crossing Pflumm Road north of 159th Street. One of the existing structures beneath 159th Street is a reinforced concrete box and the remaining seven crossing structures are corrugated metal pipes. The existing structure on Pflumm Road is a reinforced concrete box. The majority of these structures do not meet Overland Park's criteria of 7" of street overtopping for a 100-year event. None of the structures are long enough to accommodate the proposed typical section with adequate clear zone.

EXISTING UTILITIES

The major underground utilities in the study area are telephone, water, power, gas, sanitary sewers, telecable and fiber optic. There are also major petroleum and high pressure gas lines in the study area. These utility lines and their respective sizes are shown on the plan drawings in the Appendix and are described as follows:

Southwestern Bell Telephone

159th Street
SWBT has buried facilities along 159th Street in the following locations: the south side of 159th Street, west of Pflumm Road; the north side of 159th Street between Pflumm Road and Quivira Road; the south side of 159th Street between Quivira Road and Switzer Road; both sides of 159th Street between Switzer Road and Antioch Road.
Pflumm Road
SWBT has buried facilities along the east side of Pflumm Road south of 159th Street.

Johnson County Wastewater District

159th Street
The Wastewater District has five sewer crossings beneath 159th Street. Two crossings are located between Pflumm Road and Quivira Road. Two crossings are located between Switzer Road and Antioch Road. A force main crosses 159th Street just west of Pflumm Road.
Pflumm Road
One sanitary sewer crosses Pflumm Road at the north end of the study. A force main running parallel to the section line and Pflumm Road is located approximately 19.812 meters (65 feet) to the west of the section line.

Water District No. 1 of Johnson County

159th Street
The Water District has a 16" line along the north side of 159th Street west of Pflumm Road and along the south side of 159th Street from west of Pflumm Road to Quivira Road. A 12" water line is located along the south side of 159th Street and an 8" line is located along the north side of 159th Street between Quivira Road and Switzer Road. An 8" water line is located along the north side of 159th Street and a 1½" water line is located along the south side of 159th Street between Switzer Road and Antioch Road. The lines are in private easement and assumed to be relocated at the City's expense.
Pflumm Road
The Water District has an 8" line along the east side of Pflumm Road north of 159th Street and a 1½" line along the east side of Pflumm Road south of 159th Street. The line is in private easement and assumed to be relocated at the City's expense.

Williams Petroleum Company

159th Street
Williams Petroleum Company has two 12" petroleum lines and an 8" petroleum line crossing 159th Street on the west side of Pflumm Road.

Williams Communications Company

159th Street
Williams Communications Company has a fiber optic line crossing 159th Street on the west side of Pflumm Road.

Greeley Gas

159th Street
Greeley Gas has an 8" line crossing 159th Street on the west side of Pflumm Road as well as an 8" line along the south side of 159th Street west of Pflumm Road. Greeley Gas also has a 3" and an 8" line along the south side of 159th Street between Pflumm Road and Quivira Road. At the southwest quadrant of 159th Street and Quivira Road, Greeley Gas has a natural gas regulator station. Between Quivira Road and Switzer Road, 2" and 4 " gas lines are located along the north and south sides of 159th Street, respectively. Greeley Gas has a 2" line located along both the north and south sides of 159th Street between Switzer Road and Antioch Road. The lines are in private easement and assumed to be relocated at the City's expense.
Pflumm Road
Greeley Gas has a 3" line along the west side of Pflumm Road north of 159th Street. The lines are in private easement and assumed to be relocated at the City's expense.

Kansas Gas Service

159th Street
Kansas Gas Service has a 6" line crossing 159th Street on the west side of Pflumm Road and a 2" line along the south side of 159th Street west of Antioch Road.

Phillips Petroleum

159th Street
Phillips Petroleum has a 10" petroleum line and an 8" petroleum line crossing 159th Street on the west side of Pflumm Road.

KCP&L

159th Street
KCP&L has overhead facilities along the north side of 159th Street from the west side of Pflumm Road to Antioch Road. Large overhead power transmission line power poles cross 159th Street east of Switzer Road. Miscellaneous underground crossings exist throughout the project.
Pflumm Road
KCP&L has overhead facilities along the east side of Pflumm Road. Miscellaneous underground crossings exist throughout the project.

Time Warner Cable

159th Street
Time Warner has fiber optic line on the south side of 159th Street from west of Pflumm Road to Antioch Road. Time Warner also has multiple underground crossings throughout the project. Time Warner has facilities on the north side of 159th Street from Pflumm Road to Switzer Road. Most of these facilities are hanging from KCP&L's poles.

Blue Valley School District

159th Street

Blue Valley School District has buried fiber optic line on the south side of 159th Street from Switzer Road to Antioch Road.

MEDIAN BREAKS AND TURN LANE STORAGE REQUIREMENTS

The City provided the following recommendations for proposed median break locations and full-width turn lane storage requirements (excluding tapers):

159th Street

Location	Northbound	Southbound	Eastbound	Westbound
Pflumm Road	300 feet	300 feet	300 feet	300 feet
Parkhill			200 feet	
Quivira Road	300 feet	300 feet	300 feet	300 feet
Bluejacket			150 feet	200 feet
Switzer Road	300 feet	300 feet	300 feet	300 feet
Private Road 2200' West of Antioch			200 feet	150 feet
Eby			150 feet	150 feet
Antioch Road	250 feet	300 feet	250 feet	300 feet (dual)

PRELIMINARY DESIGN

The following design criteria was utilized when developing the preliminary design:

Design Criteria

CROSS SECTIONS

Lane Width	3.7 m (12' - inside lane) 4.0 m (13' - outside lane) 3.35 m (11' - left turn bay)
Median Width	7.3 m (24')
Parking Lane	None
Shoulder	
Median	Type D
Outside	Type B
Normal Crown	2.0%

SIDE SLOPES

Maximum	1:4
Desirable	1:6

GEOMETRICS

Design Speed	80km/h (50mph)
Posted Speed	70km/h (45mph)
Minimum Curve	426.720 m (1400')
Desirable Curve	1164.251 m (1°30')
Vertical Alignment	
Maximum Grade	6%
Minimum Grade	1%
Stopping Sight Distance	122 m (400')
K Value	27-32 for sag curves and 37-51 for crest curves

Superelevation Runoff 1:200

DRAINAGE

Storm Sewer	5 years
Ditches	5 years (2% Min. Grade)
Drainage Structures (Culverts)	25 Year (design)
Drainage Structures (Culverts)	100 year (7" roadway overtopping maximum)

Typical Sections

The typical sections for the proposed roadways are shown on Exhibit 1. All thoroughfare sections have 255 mm (10") thick asphaltic concrete pavement.

159th Street/Pflumm Road

Exhibit 1 shows the standard four-lane divided thoroughfare section recommended for both 159th Street and Pflumm Road. This section includes a 7.3 meter (24') raised median to accommodate a 3.35 meter (11') single left turn and a 1.5 meter (5') sidewalk located 300 mm (1') inside the right-of-way line. The roadway width consists of a 4.0 meter (13') outside lane and 3.7 meter (12') inside lane. The typical section will be modified in the area of the Pleasant Valley Cemetery.

Right-of-Way

Right-of way requirements are indicated on the plan drawings in the Appendix and on Exhibit 1. All thoroughfare sections will include a 36.576 meter (120') right-of-way corridor. Permanent drainage easements will be necessary at the ends of the crossroad drainage structures. Temporary construction easements will be necessary along most properties adjacent to construction. Permanent utility easements are present in most of the sub-divided properties. There are, however, locations where additional utility easements will be necessary to accommodate utility relocations. The final locations of the proposed utility easements should be determined during the project design phase when more accurate utility information is available.

Proposed Horizontal Alignments

159th Street

The proposed alignment for 159th Street is shown in the Appendix.

An offset alignment was used to minimize the impact to the Johnson County Executive Airport. The proposed centerline follows the section line to a point approximately 155 meters (500') east of the Pflumm Road intersection where it transitions to an offset 12.192 meters (40') south of the section line. The alignment transitions back to the section line just east of the Runway Protection Zone (RPZ).

To avoid impact to the Pleasant Valley Cemetery an offset alignment and special thoroughfare section were used. The proposed centerline follows the section line to a point approximately 270 meters (885') west of the cemetery where it transitions to an offset 15.24 meters (50') north of the section line. The roadway section will have a retaining wall located 2.1 meters (7') behind the back of curb. A frontage road, connecting the three western most entrances to the cemetery, is proposed between the retaining wall and the existing right-of-way. A 1.5 meter (5') sidewalk with a 2.7 m (9') sidewalk easement may be located outside of the existing right-of-way between the proposed frontage road and the existing cemetery monuments. The alignment transitions

back to a typical section centered on the section line just east of the Pleasant Valley Cemetery.

Pflumm Road
The proposed alignment for Pflumm Road follows the section line as shown in the Appendix.

Proposed Vertical Alignments

The minimum design criteria for thoroughfare type roadways is established in the City of Overland Park Municipal Code and the current edition of "A Policy on Geometric Design of Highways and Streets" published by the American Association of State Highway and Transportation Officials. The two main design issues when developing the vertical alignments for these roadways are Stopping Sight Distance (S.S.D.) of a crest vertical curve and the "K" value of a sag vertical curve. The requirements for this project are shown in the Design Criteria section of this report.

In addition, special consideration was given to the vertical alignment of 159th Street through the Runway Protection Zone. The Federal Aviation Administration strictly regulates this zone to make sure obstacles on the ground do not block the path of an aircraft during takeoff or landing. Critical in this design was insuring that the roadway alignment was low enough to prevent light standards from infringing upon this air space.

Drainage

New drainage structures beneath 159th Street will be reinforced concrete boxes. Temporary interceptor ditches should be utilized in order to keep large areas of off-site drainage from entering the roadway. The temporary interceptor ditches will only be used where development has not yet occurred. However, it is not recommended that ditches be used on the west side of Pflumm Road or at the west end of 159th Street where coverage for underground utilities must not be jeopardized. The major culvert crossings were sized for 25-year storm with a 7-inch overtopping check for the 100-year storm. Locations of structures are shown on the plan and profile sheets in the Appendix.

159th Street
There are eight culvert crossings on 159th Street. The data used in analyzing the storm drainage flowing from the adjacent drainage areas is shown in the table below:

Structure Location	Size ft (mm)	Area Acres	C Value	Time of Concentration Min	i_{25} in/hr	i_{100} in/hr	Q_{25} cfs	Q_{100} cfs
Sta. 1+991	12x7 (3660x2130)	217	0.68	24.0	4.9	6.0	805.9	1171.7
Sta. 2+383	Dbl. 7x6 (2130x1830)	242	0.63	29.5	4.5	5.5	755.3	1102.8

Structure Location	Size ft (mm)	Area Acres	C Value	Time of Concentration Min	i_{25} in/hr	i_{100} in/hr	Q_{25} cfs	Q_{100} cfs
*Sta. 2+972	Dbl. 6x3 (1830x910)	96	0.55	18.1	5.6	6.9	329.5	477.0
Sta. 3+643	Trpl. 6x4 (1830x1220)	131	0.55	19.3	5.5	6.7	437.4	633.1
Sta. 4+252	7x5 (2130x1520)	114	0.55	18.5	5.6	6.9	388.6	562.6
Sta. 4+802	10x4 (3050x1220)	82	0.55	13.8	6.4	7.8	320.6	461.3
Sta. 5+443	Trpl. 10x5 (3050x1520)	171	0.55	19.3	5.5	6.7	569.4	824.3
Sta. 6+106	8x4 (2440x1220)	27	0.55	10.1	7.1	8.6	117.8	169.5

*The culvert at Sta. 2+972, overtops the roadway during the 100-year storm. The City requires that the 100-year storm does not overtop the roadway in excess of 0.18m (7"). It overtopped the road by less than the maximum of 0.18m (7").

Pflumm Road

There is one existing culvert beneath Pflumm Road. The existing 2.13m x 1.83m (7' x 6') RCB located at Sta. 5+246 has a drainage area of 74 acres. The 25-year discharge is 331cfs, and the 100-year discharge is 478cfs. At the location of this culvert, the proposed roadway is being adjusted vertically, but not horizontally. In order to meet drainage criteria, a double 7'x4' RCB would need to be used. To make this culvert fit, the vertical tie-in on the north side of Pflumm Road would be over 600' further north. The proposed study profile will allow a future ultimate profile to provide enough clearance for this culvert to fit without removing any of the permanent section of Pflumm Road. Therefore, the existing culvert is not proposed to be modified by this study.

Retaining Walls

Retaining walls will be required at a number of locations where the extension of the roadway sideslopes would adversely effect adjacent landowners. The recommended retaining wall locations are shown on the plans in the Appendix. Specifically, form liner retaining walls are recommended to minimize the impact at the Pleasant Valley Cemetery, to avoid relocation of equipment at the Johnson County Executive Airport, and to minimize the impact on the house on tract number 53. Further investigation may be needed during the preliminary project design to determine the practicality of using retaining walls shown on the preliminary plans.

Existing Lakes and Ponds

A man-made private lake exists on the north side of 159th Street west of Quivira Road. This lake will be affected by the wider proposed roadway section and the extension of the grading limits. In addition, the ground saturation near the lake could interfere with construction of the proposed roadway. It is recommended that the lake be drained during construction of the proposed roadway and that the south berm of the lake be moved to the north outside of proposed right-of-way. A 16" waterline is located in private easement on the south side of 159th Street through this area and it will be more cost effective for the city to move the lake than to relocated the waterline. Further investigation will be needed during the preliminary project design to determine whether the measures used in this study are practical or if there are other alternatives.

Permitting

Permits will be required before beginning construction activities on this project. Due to the continually changing nature of permitting requirements, it is recommended the engineer analyze permitting requirements during the project's preliminary design phase. The following permits may be required and should be investigated:

404 Permit

DWR Permit

National Pollution Discharge Elimination System (NPDES) Permit

6(f) or Environmental Permit – for Heritage Park property acquisition

Federal Aviation Administration Form 7460-1

Other

Construction

This report has been set up at the request of the City to show four (4) separate sections of roadway. The quantities for each section have been calculated separately as well as the estimate of cost for each section. These estimates, combined with the previous studies of this area, will assist the City in phasing of roadway construction. For instance, the previously studied intersection of 159th Street and Quivira Road could be constructed with the section of Quivira Road to the north, the section of 159th Street to the west, or the section of 159th Street to the east, depending on which section is built first.

At the request of the City, the project costs are also divided proportionally between Overland Park, Olathe, and Johnson County based on the percentage of frontage that each entity currently has along the section of proposed roadway. For example, the north side of 159th Street from Switzer Road to Antioch Road is bordered entirely by the City of

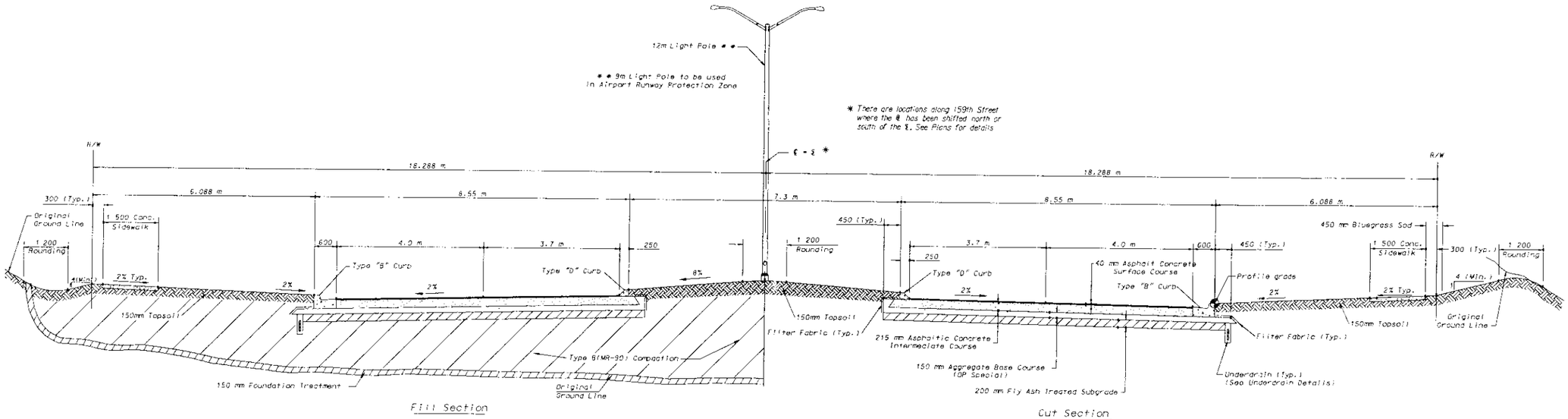
Overland Park, while the south side is outside of the city limits and therefore falls within Johnson County jurisdiction. On this section, the project costs were divided equally between the two entities. However, these costs are for budgeting purposes only, and the actual amount that each entity will be responsible for will be determined during the design phase.

Access to the school, church, cemetery, airport equipment, Christmas Tree Farm and Micro-com, as well as residential homes will need to be maintained during construction. Temporary surfacing will be necessary to maintain access. Recommendations for construction phasing and maintenance of traffic during construction will need to be evaluated during each preliminary project design.

The cost of earthwork should also be considered during the sequencing of construction. As shown from the table below, Section No. 2 could be considered a balanced project, while the other three sections will require borrow.

Unclassified Excavation*	Compaction	Waste/Borrow
Section No. 1 – Intersection at 159th Street and Pflumm Road		
11615 cu. m.	12570 cu. m.	8356 cu. m. Borrow
Section No. 2 – 159th Street from Pflumm Road to Quivira Road		
57568 cu. m.	34581 cu. m.	56 cu. m. Waste
Section No. 3 – 159th Street from Quivira Road to Switzer Road		
55075 cu. m.	47589 cu. m.	18209 cu. m. Borrow
Section No. 2 – 159th Street from Switzer Road to Antioch Road		
34775 cu. m.	40468 cu. m.	25606 cu. m. Borrow

* Includes Pavement Removal

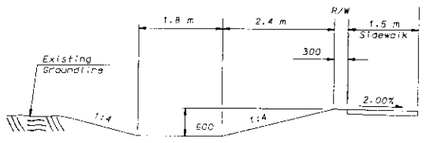


Fill Section

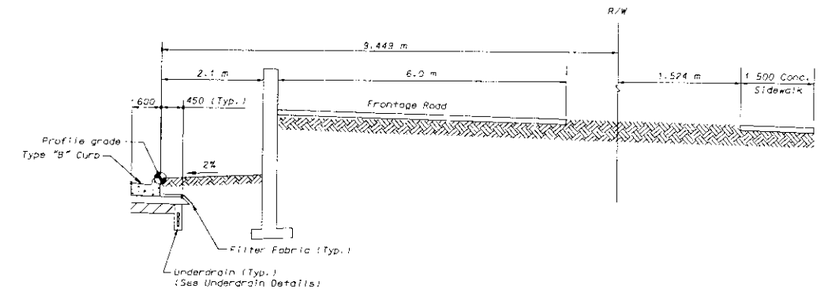
Cut Section

Typical 24.4 m Roadway Section

N.T.S.

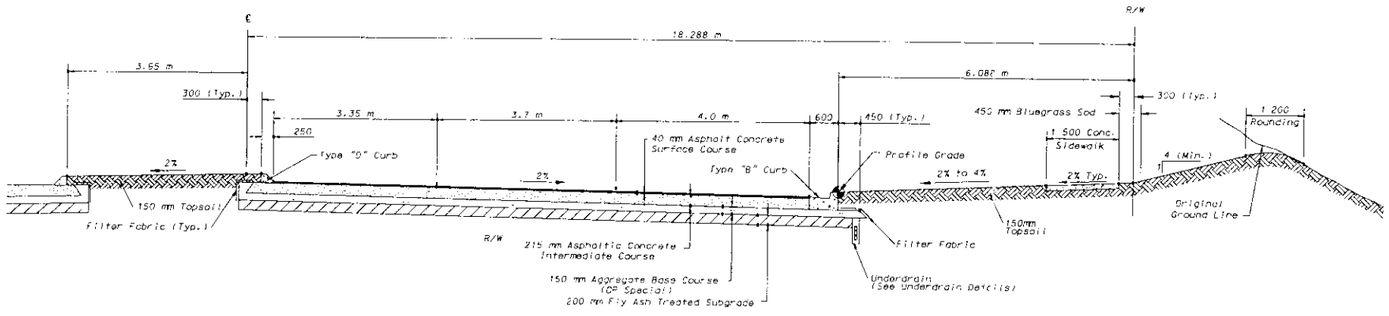


STANDARD DITCH



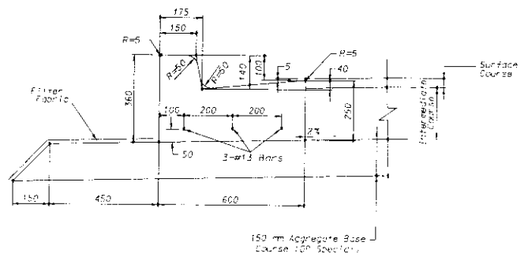
In Front of Pleasant Valley Cemetery

N.T.S.

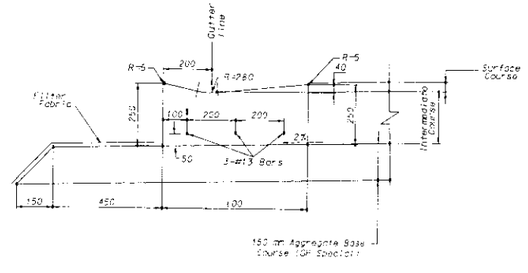


Left Turn Bay (Cut Section)

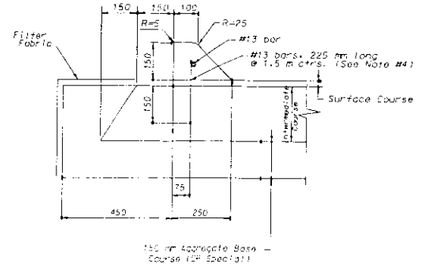
N.T.S.



Type "B" Curb with Aggregate Base Course



Type "C" Curb with Aggregate Base Course



Type "D" Median Curb with Aggregate Base Course

EXHIBIT #1

SHEET NO.	TOTAL SHEETS
2	87

7450 WEST 130TH STREET
OVERLAND PARK, KANSAS 66213
PHONE NO. (913) 491-9333
WWW.HNTB.COM

HNTB

CITY OF OVERLAND PARK, KANSAS

NO.	DATE	REVISIONS	BY	APP'D
4				
3				
2				

159TH STREET TYPICAL SECTION

APPROVED		
DESIGNED	DETAILED	
DESIGN CK.	DETAIL CK.	
QUANTITIES	TRACED	
QUAN.CK.	TRACE CK.	

Plotted on: 2nd-FEB-2002 Settings File: ********************SETFILE********************
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Design Filenames: J:\34274\CO\details\exhibit1.dgn Pen Tables: \\ovpw00\Jobs\34274\Highway\Library\plotpen\ei600.hp.pen