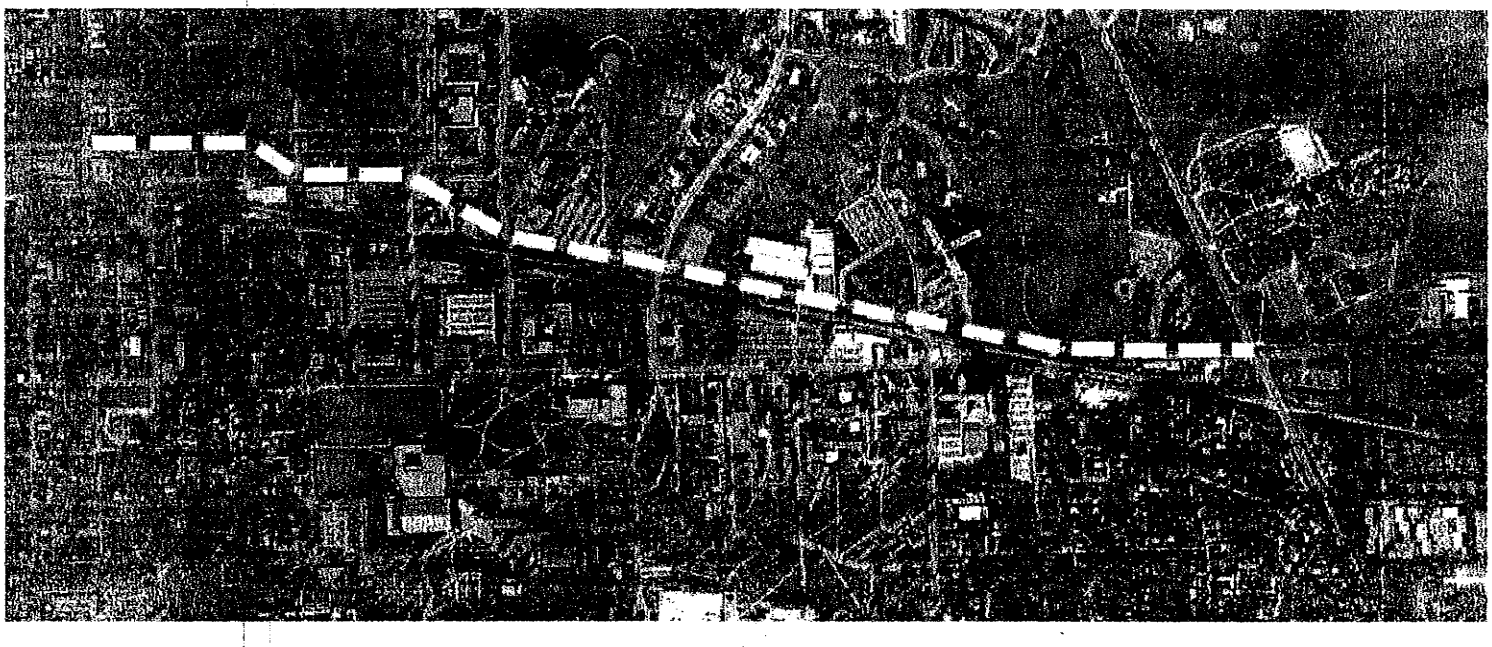
13TH STREET CORRIDOR STUDY

FOR INDIANA UNIVERSITY
ARCHITECTS OFFICE



PREPARED BY:
SMITH NEUBECKER & ASSOCIATES, INC.

13th STREET CORRIDOR STUDY

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EXECUTIVE SUMMARY

Six roadway alignment alternatives for a new one-way west roadway north of the railroad tracks were studied. Of the six options presented, OPTION 2 was selected as the basis for the detailed study and cost analysis. It was determined that the 10th Street/13th Street one-way pair can be constructed for approximately $2,250,000. When complete, 10th Street will be a one-way east roadway from Indiana Avenue to the railroad bridge on 10th Street and 13th Street will be a one-way west roadway from Dunn Street to the railroad bridge on 10th Street. Upgrading and modifying existing Law Lane and 13th Street and a minimal amount of new roadway construction will be necessary. No construction modifications to 10th Street will be necessary other than modification of the traffic signals to function on a one-way roadway and new pavement markings. By creating the 10th Street/13th Street one-way pair, traffic signal level of service (LOS) will be improved as follows:

	EXISTING	ONE-WAY PAIR
10th and Woodlawn	F	B
10th and Fee	D	B
10th and Jordan	D	B
10th and Union	E	B
13th and Woodlawn	-	B
13th and Fee	-	B
13th and Jordan	-	B
13th and Union	-	B

INTRODUCTION

Traffic volumes on 10th Street are currently large enough to warrant a 4-lane roadway. With planned construction of the new Business School and the location of other existing campus buildings in the area, the 10th Street corridor is also becoming more pedestrian oriented. Increased traffic volumes and increased pedestrian traffic along 10th Street cannot coexist. The construction of a one-way pair using 10th Street for eastbound traffic and utilizing existing roadways and new construction to create a westbound corridor would help to reduce the traffic volume though an increasingly pedestrian area of campus. This new westbound corridor has been designated as 13th Street. The methodology of this study is to examine the existing traffic volumes at the intersections along 10th Street and project what effect the creation of a one-way pair would have on the intersections. The effect that newly generated traffic volumes would have upon the intersections of 13th Street was also examined. Full sized schematic plans were then generated for the 13th Street alignment and a construction cost estimated.

ALIGNMENT OPTIONS

There are several possible alignments that could be utilized to create the 13th Street corridor. Each option utilizes portions of existing roadways and new construction to create a roadway from Dunn Street on the west side of campus to the SR 45/46 Bypass on the east side of campus.

One alignment option was reviewed for the roadway from the SR 45/46 Bypass to Fee Lane. Given the existing alignment of Law Lane, it makes sense to upgrade this roadway in lieu of creating a new roadway that would follow along the same alignment.

Exhibits number 1 and 1A illustrate the roadway alignment from the SR 45/46 Bypass to Fee Lane that was used as the eastern leg for all other road alignment options discussed below.

Five alignment options were initially reviewed for the roadway between Fee Lane and Dunn Street and one was selected for the purpose of this study. The option selected is not the only alternative. It does however rely on minimal new construction and at the same time defines blocks for future development in the area north and west of the existing 13th Street and Walnut Grove intersection. The pros and cons of each alignment are discussed below. A portion of this study was also devoted to the extension of Woodlawn Avenue north over the existing railroad tracks and connecting Woodlawn Avenue to 13th Street.

OPTION 1

Exhibit 2 illustrates the alignment and road connections west of Fee Lane. Exhibits number 1 and 1A illustrate the eastern portion.

Connection to 10th Street would be made near the existing railroad bridge. Thirteenth Street should be constructed as a 2-lane section. The configuration of the connection to 10th Street would allow for eastbound vehicles on 10th Street to turn left onto 13th Street.

A new roadway would be constructed from the intersection described above to the Campus View Apartments parking lot. The parking lot would then be reconfigured for construction of a road to Union Street.

The intersection of Union Street and 13th Street should be reconstructed to form an intersection near 90 degrees. Reconstruction of Union Street both north and south of the intersection would be necessary.

Thirteenth Street would then follow the existing alignment of Law Lane towards the intersection of Law Lane and Jordan Avenue. At Law Lane and Jordan Avenue, the alignment of the road would be shifted south of its current location so that it would align with Law Lane west of the intersection. All of the existing back out parking along Law Lane near the intersection would be removed.

(See exhibit 2)

Thirteenth Street would continue to follow the existing alignment of Law Lane between Jordan Avenue and Fee Lane. The parking area east of the Grisham Dining Hall would be reconfigured so that it had only two access points to 13th Street.

From Fee Lane, west to Woodlawn Avenue, 13th Street would be constructed along a new alignment. Thirteenth Street would traverse through a set of reverse curves across the

newly constructed parking area. Connections would be made at Walnut Grove and 13th Street. The other streets in the area would not be connected.

From Woodlawn Avenue to Indiana Avenue, 13th Street would follow along the existing alignment of 14th Street. Fourteenth Street in its current condition is too narrow and widening along the roadway would need to occur. This widening would probably necessitate the removal of the existing homes in the area between Fess Avenue and Indiana Avenue.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane
- Removes on street parking
- Limits access points from parking areas
- Sets up defined blocks for future construction between Walnut Grove and Indiana Avenue

CONS
- If Woodlawn Avenue is extended north over the railroad tracks, access back southbound along Walnut Grove is more indirect
- Bisects the newly constructed Walnut Grove parking lot creating a parcel south of the roadway that is probably to small for parking lot use
- Several intersecting roadway connections and additional new construction are necessary

This option was not chosen due to the amount of new construction necessary and the disruption to the undeveloped area north and west of the 13th Street and walnut Grove intersection.

OPTION 2 *(Option for which detailed analysis and costing has been done)*
Exhibit number 3 illustrates the alignment and road connections west of Fee Lane.

This option follows along the same alignment and makes the same connections and re-constructions as shown on Exhibit 1 and 1A until the intersection of Fee Lane and Law Lane.

From Fee Lane, the alignment would traverse through two reverse curves and cross the newly constructed Walnut Grove parking lot. Thirteenth Street would then follow along the existing alignment of 13th Street from the intersection of Walnut Grove and 13th Street to the alley between Fess Avenue and Woodlawn Avenue.

The roadway would then turn northwesterly through another set of reverse curves and follow along the existing alignment of 14th Street from Fess Avenue to Indiana Avenue.

Intersecting connections would be made at Walnut Grove and Woodlawn Avenue. Connecting Fess Avenue to 13th Street is not proposed. As with OPTION 1, homes along

14th Street between Fess Avenue and Indiana Avenue would probably need to be removed.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane
- Removes on street parking
- Limits access points from parking areas
- Sets up defined blocks for future construction between Walnut Grove and Indiana Avenue
- Circular access from Woodlawn Avenue and Walnut Grove is possible

CONS
- Bisects the newly constructed Walnut Grove parking lot, however the bisection is nearly centered
- Requires the acquisition of the property at Dunn Street and 14th Street

This option was chosen for the study and more detailed analysis as it utilized existing roadways and required minimal new construction.

OPTION 2A
Exhibit number 4 illustrates this variation of OPTION 2

This option follows the same alignment as OPTION 2 from Fee Lane to Woodlawn Avenue. Rather than follow a new roadway alignment to Indiana Avenue, this option would continue the roadway west towards Indiana Avenue along the existing alignment of 13th Street. At Indiana Avenue, the roadway would follow a new alignment northwesterly to the intersection of Dunn Street and 14th Street.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane
- Removes on street parking
- Limits access points from parking areas
- Sets up defined blocks for future construction between Walnut Grove and Indiana Avenue
- Circular access from Woodlawn Avenue and Walnut Grove is possible
- Does not require the demolition of homes at 14th Street and Indiana Avenue
- Minimal new construction is necessary

CONS
- Bisects the newly constructed Walnut Grove parking lot, however the bisection is nearly centered
- Requires the acquisition of the property at Dunn Street and 14th Street

OPTION 3
Exhibit number 5 illustrates the alignment and road connections west of Fee Lane.

This option follows along the same alignment and makes the same connections and re-constructions as shown on Exhibits 1 and 1A until the intersection of Fee Lane and Law Lane.

From Fee Lane, the alignment would continue northwesterly towards the intersection of 14th Street and Fess Avenue. Connections would be made at Walnut Grove and Woodlawn Avenue. From Fess Avenue west to Indiana Avenue, 13th Street would follow along the existing alignment of 14th Street.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane
- Removes on street parking
- Limits access points from parking areas
- Sets up defined blocks for future construction between Walnut Grove and Indiana Avenue
- Circular access from Woodlawn Avenue and Walnut Grove is possible
- More direct alignment from Fee Lane to Indiana Avenue

CONS
- Bisects the newly constructed Walnut Grove parking lot, however the bisection is along the southern portion of the lot. The majority of the parking in the lot could probably be salvaged.
- Several homes and structures between Walnut Grove and Indiana Avenue would need to be removed
- It is perceived that the straightness of the roadway would encourage higher travel speeds
- Requires the acquisition of the property at Dunn Street and 14th Street

This option was not chosen because of its straight alignment and the possibility of higher travel speeds along the roadway though a pedestrian area.

OPTION 4
Exhibit number 6 illustrates the alignment and road connections west of Fee Lane.

This alignment option is similar to option 3. The major difference between this alignment and option 3 is how the roadway traverses across the newly constructed parking lot and the undeveloped areas north and west of the 13th Street and Walnut Grove intersection. Roadway connections would be made at Walnut Grove and Woodlawn Avenue.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane

- Removes on street parking
- Limits access points from parking areas
- Circular access from Woodlawn Avenue and Walnut Grove is possible
- More direct alignment from Fee Lane to Indiana Avenue

CONS
- Bisects the newly constructed Walnut Grove parking lot, however the bisection is nearly centered
- Bisects the undeveloped areas north and west of the Walnut Grove and 13th Street intersection
- Requires removal of the buildings in the northeast quadrant of the Woodlawn Avenue and 13th Street intersection
- Does not utilize existing roadways west of Fee Lane

This option was not chosen due to the amount of new roadway construction necessary. The straightness of the alignment was also a deterrent, as it would encourage increased travel speeds.

OPTION 5
Exhibit number 7 illustrates this alignment and the road connections west of Fee Lane.

This alignment is similar to the other options presented for the area between Fee Lane and 10th Street as shown on Exhibits 1 and 1A. The difference in this option is how the alignment crosses the newly constructed parking lot and connects to Indiana Avenue. Road connections would be made at Walnut Grove and Woodlawn Avenue.

PROS
- Reduces traffic on 10th Street
- Improves intersection geometry at Jordan Avenue and Law Lane
- Removes on street parking
- Limits access points from parking areas
- Establishes defined blocks for future use in the undeveloped area north and west of the Walnut Grove and 13th Street intersection
- Alignment salvages most of the newly constructed parking lot

CONS
- Requires removal of the power station building
- Proximity of the roadway to the railroad tracks at Walnut Grove will probably necessitate close of Walnut Grove north of the railroad tracks
- Bisects the undeveloped area in the southwest quadrant of the Walnut Grove and 13th Street intersection.
- Requires the acquisition of the property at Dunn Street and 14th Street

This option was not chosen due to the disruption to the power station.

WOODLAWN AVENUE EXTENSION
Exhibit number 8 illustrates the extension of Woodlawn Avenue over the existing railroad line.

In addition to the road alignment options for creating a 13th Street corridor, this study also reviewed the extension of Woodlawn Avenue north over the existing railroad tracks. An extension of Woodlawn Avenue north over the existing railroad tracks would help to improve traffic circulation. Bus service to the area could also be improved if Woodlawn Avenue could be used for northbound busses.

The difficulty in extending Woodlawn Avenue over the tracks is the limited length available on the south side of the tracks to achieve the vertical difference necessary at the crossing. A minimum of 14' of vertical difference would be necessary. The proximity of the drive to the existing fire station on the south approach of Woodlawn Avenue to the tracks presents a problem. It does not appear that the drive could be reoriented to connect directly to 10th Street. The point where the drive connects to Woodlawn Avenue could be raised by approximately 2'.

By raising the grade of Woodlawn Avenue in front of the fire station, a vertical profile yielding a 14'clearance is possible. The intersecting roads north of the fire station may need to be closed. It is possible that the existing structure at the intersection of Woodlawn Avenue and 12th Street would need to be demolished, depending upon the length of the bridge for the crossing and the possibility of installing a retaining wall adjacent to the roadway.

It also appears that an at-grade crossing of the railroad tracks may be possible. The existing grade north and south of the railroad tracks would need to be lowered. A cut of approximately 3' would be required south of the tracks and a cut of approximately 10' would be required north of the tracks. The cut north of the tracks may necessitate excavation of rock. It is likely that an existing intersection will need to be closed in order to get approval for a new at-grade crossing. If this proves to be the case, the most likely road closure would be the Walnut Grove crossing.

TRAFFIC STUDY

To determine the existing peak hour volumes of traffic along 10th Street, traffic counts were taken at the 10th Street intersections with Indiana Avenue, Woodlawn Avenue, Fee Lane, Jordan Avenue, Sunrise Street and Union Street. Counts also noted the turning movements of vehicles at each intersection and the number of busses and trucks. The data was then utilized to determine the existing 'Level of Service" at each intersection.

Level of Service or LOS is a measurement of the effectiveness of the signal in moving traffic though the intersection. A grading scale of A thru F is used to rate the way that each signal functions in relationship to the traffic volumes at the intersection. A grade of LOS 'A" indicates that that a vehicle will experience less than 10 seconds of control delay. A grade LOS "F" indicates that a vehicle will experience more than 80 seconds of

control delay. A grade of LOS "A" thru "C" indicates that the signal is functioning reasonably well in relationship to the traffic volume. A grade of LOS "D" thru 'F" indicates that there are problems at the intersection. These problems could be due to traffic volume or the number of lanes and their configuration at the intersection.

The intersections were modeled using the SYNCHRO analysis software. The LOS of each intersection under existing conditions is as follows:

Indiana Avenue ---------- E

Woodlawn Avenue ---------- F

Fee Lane ---------- D

Jordan Avenue ---------- D

Sunrise Street ---------- B

Union Street ---------- E

The analysis generated by the SYNCHRO program is shown in Appendix A of the report.

Traffic volume was then adjusted by moving all of the westbound 10th Street traffic to 13th Street. An additional 20% of the total volume from 10th Street was added to represent the existing traffic along the 13th Street corridor. The 13th Street intersections were then modeled for LOS. The LOS for the *10th Street* intersections with corresponding 13th Street intersections is as follows:

Woodlawn Avenue ---------- B

Fee Lane ---------- B

Jordan Avenue ---------- B

Union Street ---------- B

The LOS for the new *13th Street* intersections is as follows:

Woodlawn Avenue ---------- B

Fee Lane ---------- B

Jordan Avenue ---------- B

Union Street ---------- B

The SYNCHRO analysis for the 10th Street/13th Street one-way pair is shown in Appendix B of the report.

By creating the 13th Street corridor, the LOS at the 10th Street intersections was improved to a grade of "B". All of the 13th Street intersections were also functioning at an LOS grade of "B".

To determine the long-range effects of growth on the 10th Street/13th Street one-way pair a 20 year projection was made assuming 2% of growth per year. When this condition was analyzed, the LOS grade of all intersections returned to grades of "C", "D", "E" and "F". Additional lanes could be added on the intersecting roadways to improve the LOS grade. A more detailed analysis of the projected traffic volumes and turning movements at each intersection will be necessary to determine what additional lane construction would be required.

The SYNCHRO analysis for the 20 year projection effect of the 10th Street/13th Street one-way pair is shown in Appendix C of the report.

Analysis of the 10th Street/13th Street one-way pair indicates that the LOS of the 10th Street intersections will be improved with the creation of the 13th Street corridor. The goal of making 10th Street a more pedestrian friendly crossing appears to be attainable.

CONSTRUCTION SUMMARY

The total estimated construction cost for constructing a one way roadway designated as 13th Street from Dunn Street on the west side of the campus to 10th Street on the east side of the campus is approximately $2,250,000. The following summary describes the construction necessary. The summary has been broken into roadway sections along 13th Street between intersecting north/south roadways. The cost was then estimated for each roadway section individually.

DUNN STREET TO INDIANA AVENUE

The roadway begins at the Dunn Street and 14th Street intersection and continues east with a typical cross section consisting of two 13.5' travel lanes, concrete curb and gutters and a 5' concrete sidewalk along the north side of the roadway.

The existing 14th Street intersection with Dunn Street is offset. The east leg of 14th Street is approximately 50' north of the west leg of 14th Street. To align the intersection, construction will require the acquisition of the property located at the southeast quadrant of the Dunn Street and 14th Street intersection. The existing home located on that property would need to be removed.

The roadway will continue east towards Indiana Avenue where it will traverse through a reverse curve to avoid encroachment on the existing apartments located in the southwest

quadrant of the 14th Street and Indiana Avenue intersection. The entrance drive to the parking area for the apartments will need to be reconstructed.

The estimated construction cost of this section of roadway including purchase and demolition of the home at the 14th Street and Dunn Street intersection is $215,500.

The detailed construction cost estimate is shown in Appendix D of the report.

INDIANA AVENUE TO WOODLAWN AVENUE

The roadway will begin at Indiana Avenue with a typical cross section consisting of two 13.5' wide travel lanes, concrete curb and gutters and 5' concrete sidewalks on either side. Construction will require the demolition of the homes on the south side of existing 14th Street between Indiana Avenue and Fess Avenue. The home on the north side of existing 14th Street will also require removal. Approximately 300' of water main and sanitary sewer will need to be lowered within this area.

The first 900' of the roadway will be constructed along a new horizontal and vertical alignment. All existing pavement, curbs and sidewalks along 14th Street between Indiana Avenue and Fess Avenue will be removed.

The roadway will continue southeasterly across the undeveloped property between 13th Street and 14th Street to a point approximately 200' west of Woodlawn Avenue. At this point, the vertical alignment will tie back into the existing grade of 13th Street. Some trees will need to be removed in this area as well as an existing power pole.

Construction of the remainder of the roadway up to the Woodlawn Avenue intersection will consist of installing new concrete curb along the pavement edges. The existing pavement of 13th Street would need to be surface- milled and resurfaced.

A new storm sewer system will be installed along the entire length of the roadway. The outlet for this system will be at the low point in the roadway located near where the roadway crosses Fess Avenue. The system will outlet to an open ditch that will flow north towards 17th Street. Some improvements will need to be made to the existing channel located between 14th Street and 17th Street. There are no existing underground storm sewer systems in the area that a connection can be made to.

Reconnecting Fess Avenue to the new roadway is not proposed. Connections with 14th Street and 13th Street are not proposed either.

The estimated construction cost of this section of roadway is $300,000.

The detailed construction cost estimate is shown in Appendix E of the report.

WOODLAWN AVENUE TO WALNUT GROVE

This section of roadway will follow along the existing horizontal and vertical alignment of 13th Street between Woodlawn Avenue and Walnut Grove. The roadway will consist of two 13.5' travel lanes, concrete curb and gutters and 5' concrete sidewalks on either side.

The existing pavement of 13th Street would need to be surface-milled and resurfaced. The existing curb along the south side of 13th Street would be removed. Though there is some sidewalk in the area now, it is generally in poor shape and should be removed and reconstructed with the roadway.

It does not appear that any utility relocation will be necessary within this section of roadway. Some trees along the north side of the roadway at the Walnut Grove intersection will need to be removed to improve the intersection radii and give adequate intersection sight distance.

A new storm sewer system will be constructed along this section of roadway, as currently none exists in the area.

The estimated construction cost of this section of roadway is $80,000.

The detailed construction cost estimate is shown in Appendix F of the report.

WALNUT GROVE TO FEE LANE

This section of roadway will follow a new horizontal and vertical alignment across the existing parking lot. The roadway will consist of two 13.5' travel lanes, concrete curb and gutter and 5' sidewalks. The road crosses the northern portion of the lot follows close to existing grade. As the roadway transitions from the northern portion of the lot to the southern portion of the lot, it will pass through the area of trees between the two lots. The road will be built approximately 3' above the grade of the southern portion of the lot.

Trees between the north and south portion of the lot will need to be removed. Three of the parking lot lights will also require removal. It does not appear that other existing utilities in the area will be affected.

The road will connect to Fee Lane at the southeast corner of the parking lot. A cut through the existing hillside will be necessary to match the grade on Fee Lane. There is exposed rock in this area. The cut will most likely necessitate the removal of approximately 400 CYS. The stairway and sidewalks leading from the parking lot to Fee Lane will need to be removed. Chilled water lines in the area will need to be lowered.

The existing trees on the west side of Fee Lane near the intersection will also need to be removed.

A new storm sewer system will be constructed along this section of roadway. The existing storm sewer system for the parking lot will connect to the roadway system.

The estimated construction cost of this section of roadway is $410,000.

The detailed construction cost estimate is shown in Appendix G of the report.

FEE LANE TO JORDAN AVENUE

This section of roadway will consist of two 13.5' travel lanes and concrete curb and gutters. Sidewalks will be constructed along the north side of the roadway. The horizontal and vertical alignment of the roadway will follow along the existing profile of Law Lane. New curbs will be installed along both sides of the roadway and the existing pavement will be surface-milled and resurfaced.

The existing parking lot located along the north side of Law Lane between the Gresham Dining Hall and the Campus Safety building will need to be reconfigured. The drive into the lot immediately east of the Gresham Dining Hall will remain. All of the drive aisles connecting to Law Lane within the lot will need to be closed. Removing 20 spaces and constructing a new curb line along the south side of the lot can accomplish this. A 24' drive aisle along the end of the lot will provide for internal circulation. New curbed islands at the ends of the parking aisles would also be constructed. Reconstruction of the lot will necessitate the removal of some of the trees located along the south end of the lot. The sidewalks along the north side of Law Lane adjacent to the parking lot would be 6' in width and would be constructed against the curb line.

The existing drive to the lot immediately west of the Campus Safety building would remain. This drive would provide a second entry and exit point from the parking lot onto Law Lane

The existing loading ramp access to the Campus Safety building would also remain. However, the perpendicular parking off of Law Lane immediately south of the building would need to be removed. The sidewalk in this area would be 6' in width and would be constructed against the curb. The sidewalk would continue east towards Jordan Avenue where it would connect to the existing sidewalk.

All of the existing perpendicular parking along the south side of Law Lane will need to be removed as well as the existing curb. If desired, there will be adequate room remaining to construct a new sidewalk along the entire south side of the roadway.

It does not appear that utility relocation will be necessary along this section of the roadway except for a few light poles near the parking lot and the loading dock.

A new storm sewer system will need to be constructed along this section of roadway. The existing storm sewer system within the parking area between Gresham Dining Hall and the Campus Safety building would connect to the roadway system.

The estimated construction cost of this section of roadway and the modifications to the parking lot is $130,000.

The detailed construction cost estimate is shown in Appendix H of the report.

JORDAN AVENUE TO UNION STREET

This section of roadway will consist of two 13.5' travel lanes and concrete curb and gutters. Sidewalks would be constructed along the north side of the roadway where none currently exist. Curb would only be constructed along the north side of the roadway where none currently exists. Curb would be constructed along the south side of the roadway over the entire length of the section.

The horizontal and vertical alignment of the roadway for the first 400' east of the Jordan Avenue intersection should be reconstructed to allow for better sight distance as the roadway nears the intersection. Changes in the horizontal alignment of the roadway will allow for better intersection geometry at Jordan Avenue.

The existing perpendicular parking along the north and south sides of Law Lane near the intersection will need to be removed. Realignment of the roadway in this area will also necessitate the removal of the existing trees along the south side of the roadway. It also appears that and underground electric line and television line will need to be lowered.

The sidewalk adjacent to the tennis courts could remain in its present location. Lawn areas could be created in the areas where parking is removed.

Once beyond the area of horizontal and vertical realignment, the roadway would follow along the existing horizontal and vertical alignment of Law Lane. The existing pavement would be surface-milled and resurfaced.

The existing curb in front of the Student Recreation Center has been newly constructed and would remain in place. The existing sidewalk in this area would also remain.

New curb and sidewalk would be constructed from the east end of the Student Recreation Center to Union Street. The sidewalk could be installed away from the curb to provide for a tree plot. If desired, a sidewalk could be constructed along the south side of the roadway over the entire length of the section.
A new storm sewer system will need to be installed along this section of the roadway. The system would outlet to the existing ditch that runs parallel to the railroad tracks.

The estimated construction cost of this section of roadway is $215,000.

The detailed construction cost estimate is shown in Appendix I of the report.

UNION STREET TO 10TH STREET

This section of roadway will consist of two 13.5' travel lanes, concrete curb and gutters and 5' sidewalks. The horizontal and vertical alignment of 13th Street would follow along the existing alignment of the parking lot access road for approximately 250' east. From the eastern end of the access road, the roadway would be constructed along a new horizontal and vertical alignment across the field between the Campus View and Tulip Tree Apartments. The vertical alignment of the roadway follows closely along the existing grade, minimal excavation or filling will be necessary.

Sidewalk would be constructed along the north side of the roadway. There is adequate room along the alignment to allow for a tree plot between the curb and the sidewalk.

An existing storm sewer culvert that crosses under the existing pedestrian path would need to be replaced. A steam vent along the existing lines in the area would need to be covered. Steam lines in the area may also need to be lowered or relocated. Approximately 200' of an existing gas line may need to be lowered.

The connection of 13th Street with 10th Street will occur immediately north of the railroad bridge on 10th street. The roadway will be configured to provide for a left turn from eastbound 10th Street onto 13th Street. Construction of 13th Street will continue east to the point at which the planned reconstruction of 10th Street with the SR 45/46 By-pass project is terminated. The SR 45/46 By-pass project as it is currently proposed only plans for one westbound lane along 10th Street. If the one-way pair concept of 10th Street and 13th Street is to function properly, a second westbound lane should be added to 10th Street.

A new storm sewer system will be constructed along this section of roadway and will outlet to an existing culvert that crosses beneath the railroad tracks.

The estimated construction cost of a roadway from Union Street to 10th Street is $365,000.

The detailed construction cost estimate is shown in Appendix J of the report.

WOODLAWN AVENUE RECONSTRUCTION AND EXTENSION

The purpose of the extension of Woodlawn Drive north over the railroad tracks is to provide better north and south circulation through campus. The typical cross section of this roadway would consist of two 12' travel lanes with concrete curb and gutters. Sidewalk would be constructed from the 10th Street intersection to the Fire Station only. After crossing the tracks, the roadway would continue north to the existing intersection of 13th Street and Woodlawn Avenue

A bridge will need to be constructed over the existing railroad tracks. This will require raising the grade of Woodlawn Avenue by approximately 14' at the point where the roadway crosses the tracks. The existing drive to the Fire Station will need to be reconstructed. A retaining wall along the west side of the roadway will need to be constructed from the alley between 10th and 12th Street to 12th Street. Twelfth Street would then be closed. A small retaining wall will also be necessary north of the drive to the Fire Station. The drive to the parking lot north of the Fire Station will also need to be reconfigured.

Additional right-of-way will need to be purchased to allow for construction of the retaining walls. The driveway to the existing home on the west side of Woodlawn Avenue, north of the alley will need to be eliminated. Purchase of the aforementioned home and its demolition may be necessary if removal of the drive is not acceptable.

Several existing utility lines in the area will need to be relocated. An existing chilled water line that runs along the length of the alignment from the Chilled Water Plant may need to be moved completely out of the roadway. Overhead electric and telephone lines near the tracks will need to be raised. An existing gas line along 12th Street may need to be relocated.

The estimated construction cost of the road extension is $340,000.

The detailed construction cost estimate is shown in Appendix K of the report.

WALNUT GROVE RECONSTRUCTION

Walnut Grove will need to be reconstructed from its intersection with 13th Street north for approximately 200'. The typical cross section for the reconstruction will consist of (2) 12' travel lanes only. The reconstruction is necessary to connect the revised profile grade of 13th Street to the existing profile grade of Walnut Grove.

Tree removal near the intersection as well as relocation of street lighting will be necessary. It does not appear that relocation of the existing gas and water mains and fiber optic line in Walnut Grove will be necessary.

This reconstruction is minimal in nature and is incidental to construction of 13th Street. The estimated construction cost of the work is $24,500.

The detailed construction cost estimate is shown in Appendix L of the report.

UNION STREET RECONSTRUCTION

The intersection of Union Street and Law Lane should be reconstructed to provide better intersection geometry. Reconstruction would consist of two 12' travel lanes and concrete curb and gutters.

Reconstruction would require modifications to the existing railroad crossing on Union Street south of Law Lane. The reconstruction north of the railroad crossing will require relocation of existing light poles and tree removal.

Reconstruction of Union Street north of the Law Lane intersection will require modifications to the existing Campus View parking lot located east of the intersection. Modification of the lot will result in the loss of approximately 50 parking spaces. The entrance to the lot immediately north of the intersection would be closed. A 24' loop drive aisle would be created with the construction of a new curb line. Islands would be constructed within the parking lot at the ends of the parking aisles. Tree removal within the lot will be necessary. Reconstruction of Union Street would end near the south loop drive off of Union Street to the Campus View building.

There are no existing sidewalks along Union Drive south of the Law lane intersection. Sidewalks should be constructed along the east side of Union Drive adjacent to the existing parking lot to allow for pedestrian access from the Campus View building.

The estimated construction cost of the Union drive and the modifications to the parking lot is $136,500.

The detailed construction cost estimate is shown in Appendix M of the report.

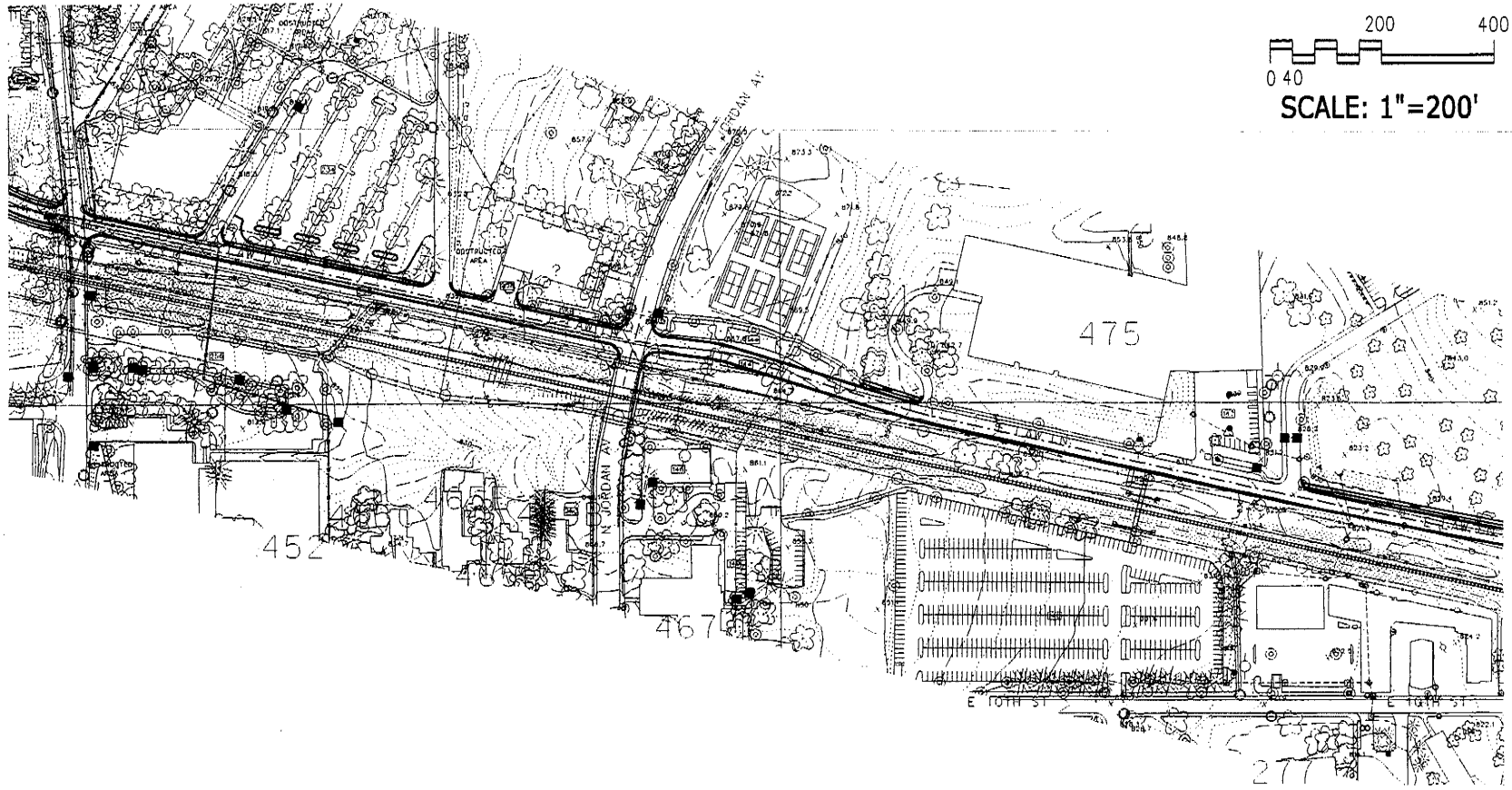

EXHIBIT 1

13TH STREET
FEE LANE TO
SRC BUILDING

2953

SHEET

OF

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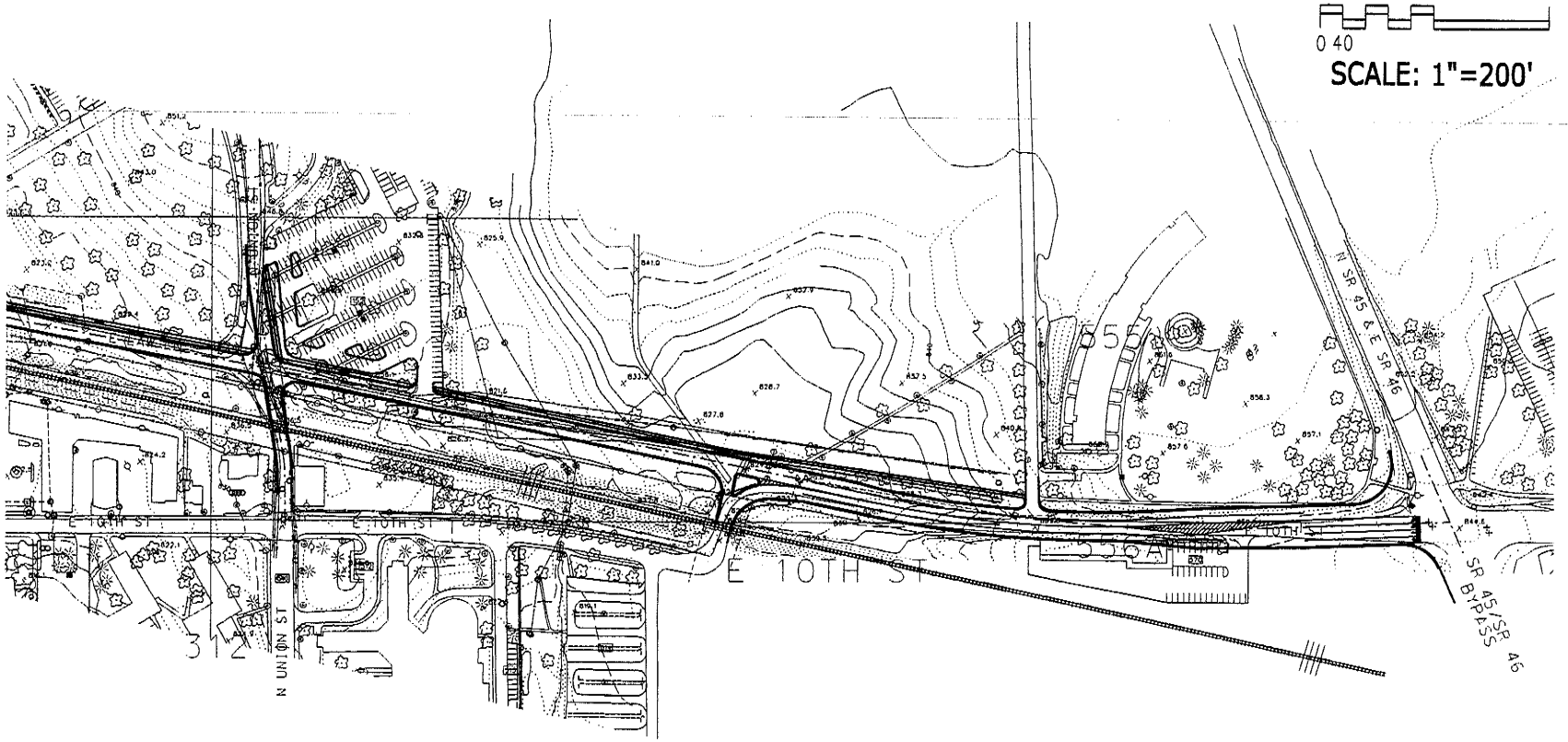

EXHIBIT 1A

JOB TITLE
13TH STREET
SRC BUILDING TO
SR 45/46 BYPASS

REVISIONS

BY | DATE

DRAWN BAB
CHECKED RGB
APPROVED

JOB NUMBER 2953
SHEET
OF

DATE 12/14/99

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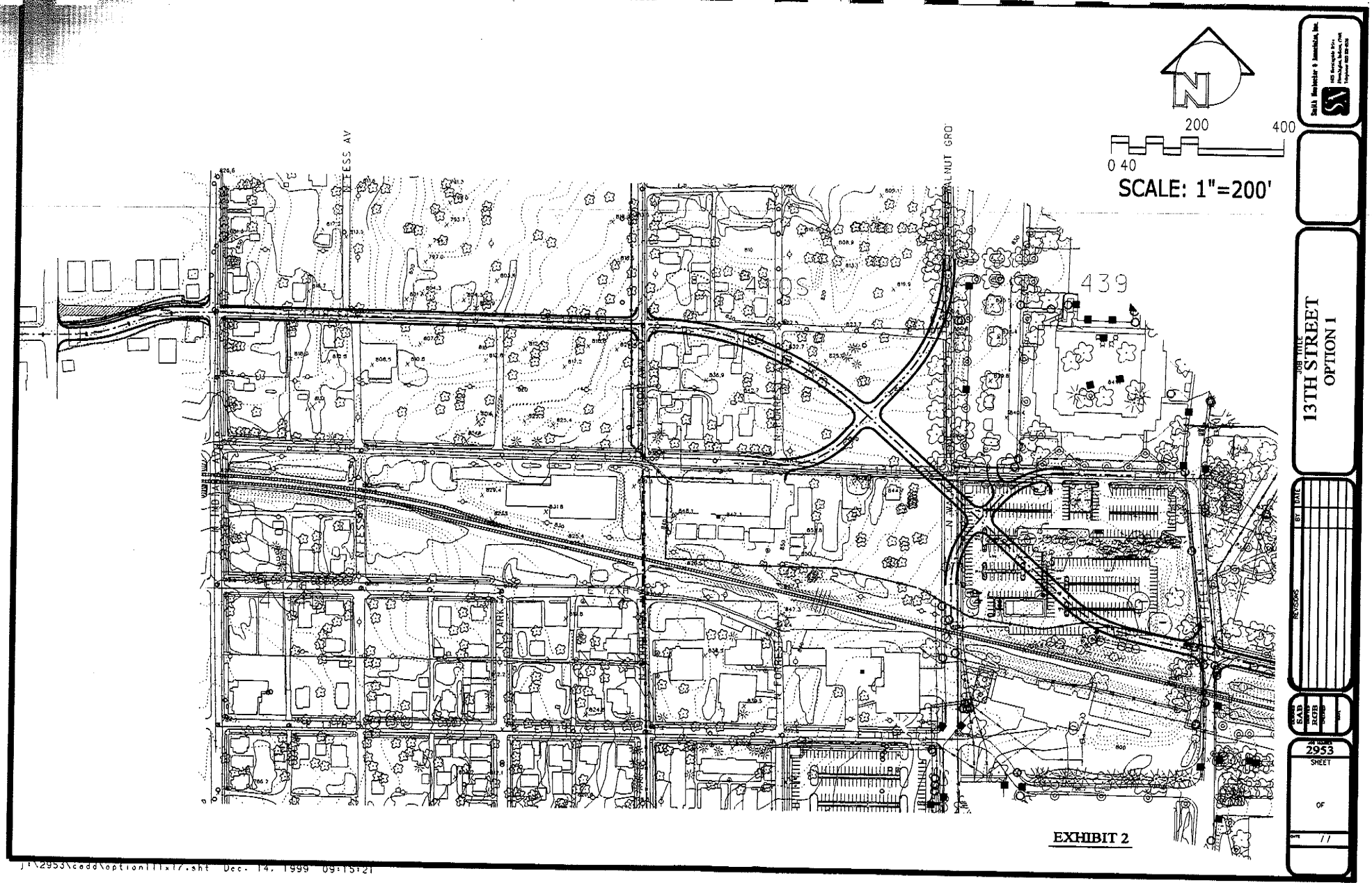

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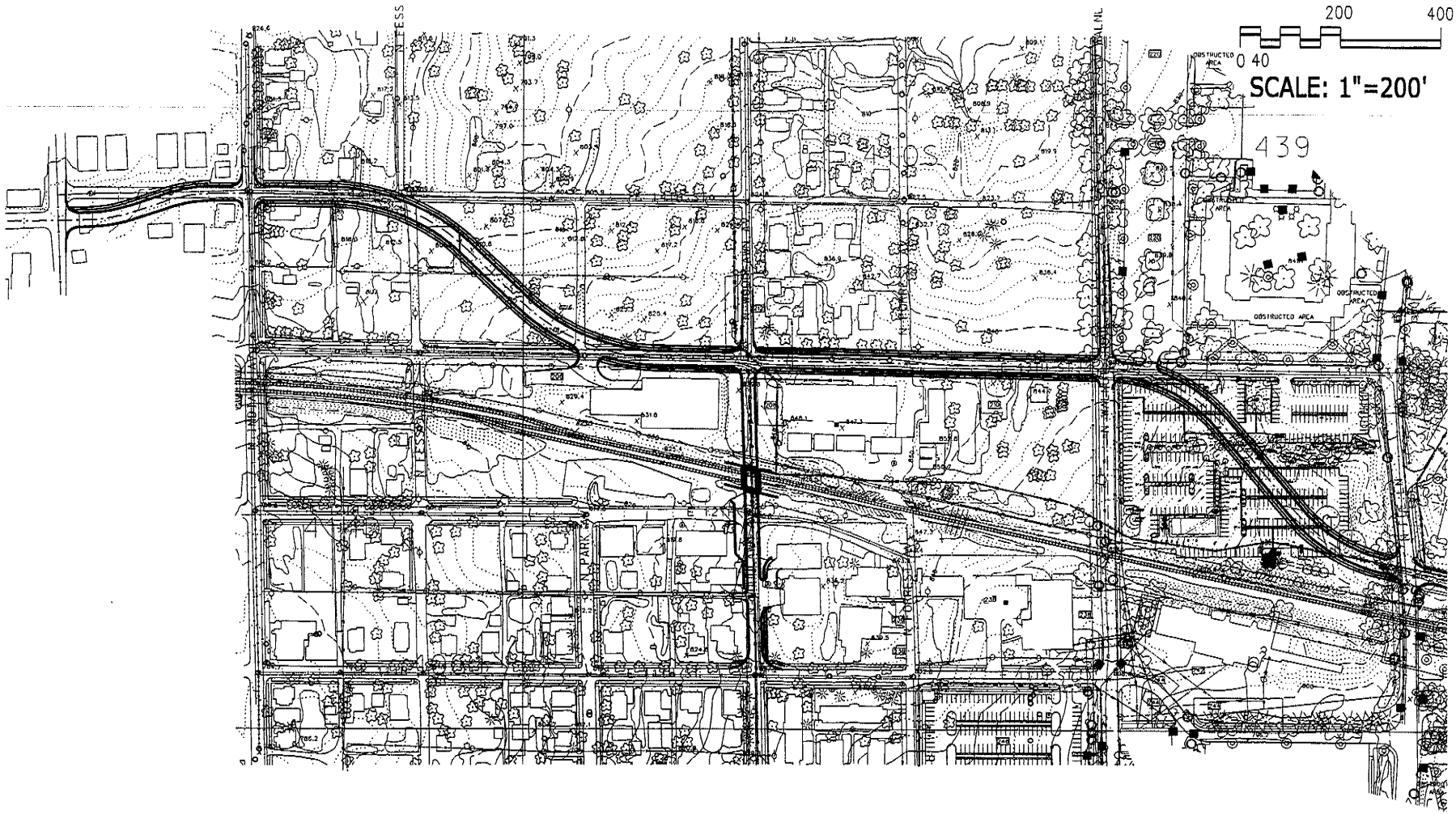

EXHIBIT 3

Skiki Hardwicker & Associates, Inc.

JOB TITLE
13TH STREET
OPTION 2

REVISIONS

BY | DATE

SAB
ROB

JOB NUMBER
2953

SHEET

OF

DATE
11

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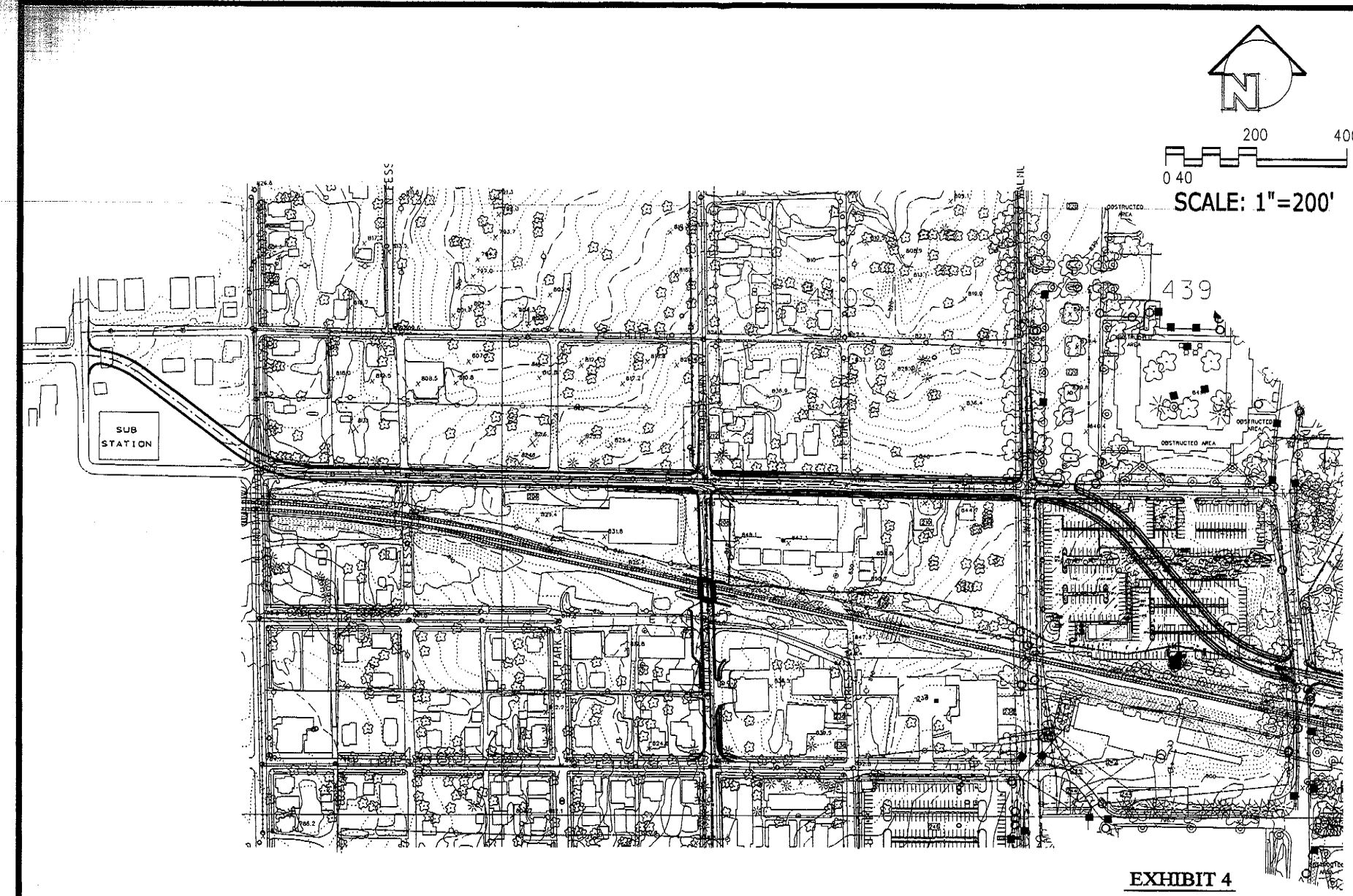


JOB TITLE
13TH STREET
OPTION 2A

REVISIONS
BY DATE

DESIGNED SAB
DRAWN RGB
CHECKED

JOB NUMBER
2953
SHEET
OF
DATE 11

j:\2953\cadd\exhibit4\11x17.sht Dec. 20, 1999 10:00:47

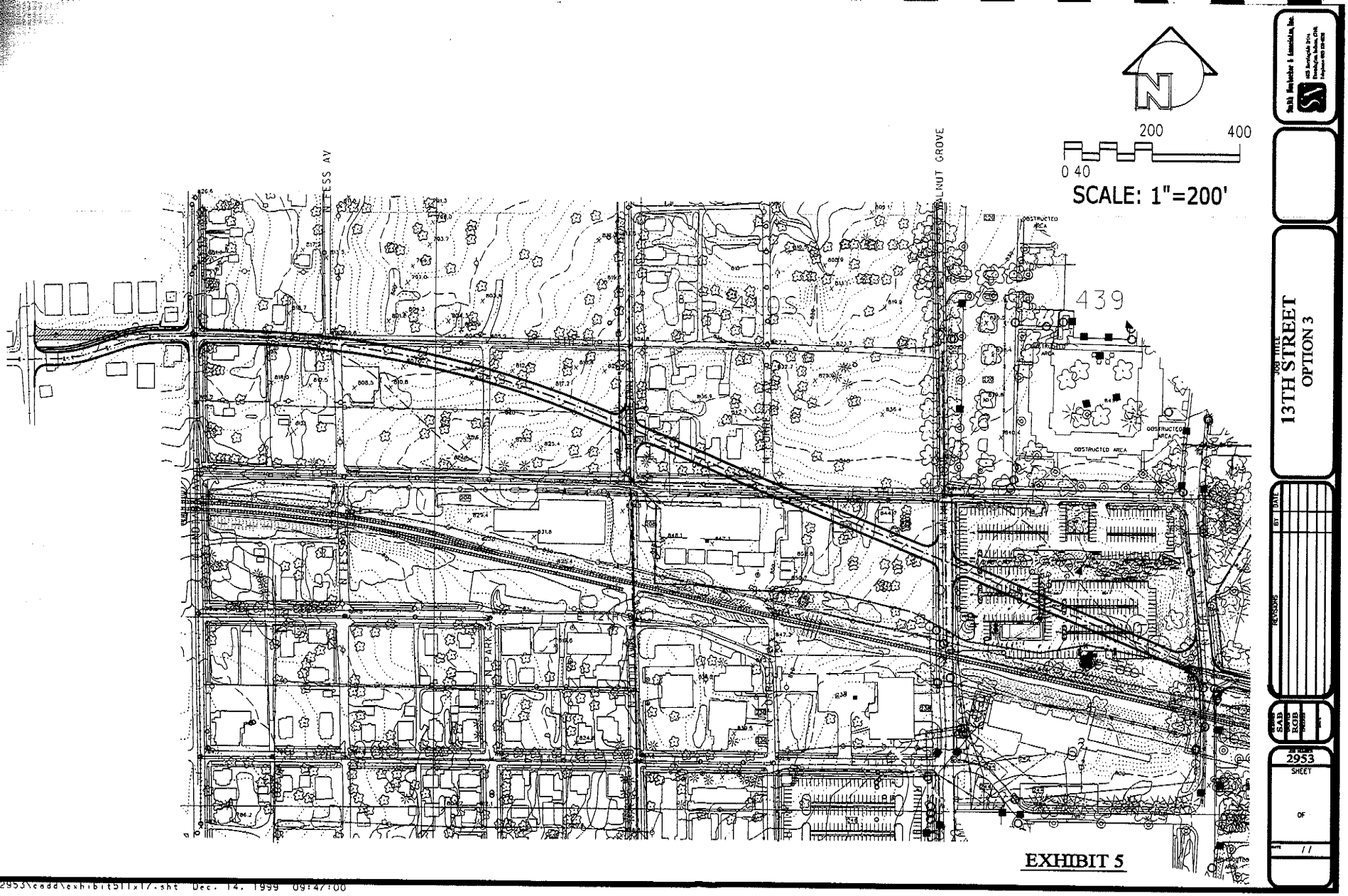


EXHIBIT 5

JOB TITLE
13TH STREET
OPTION 3

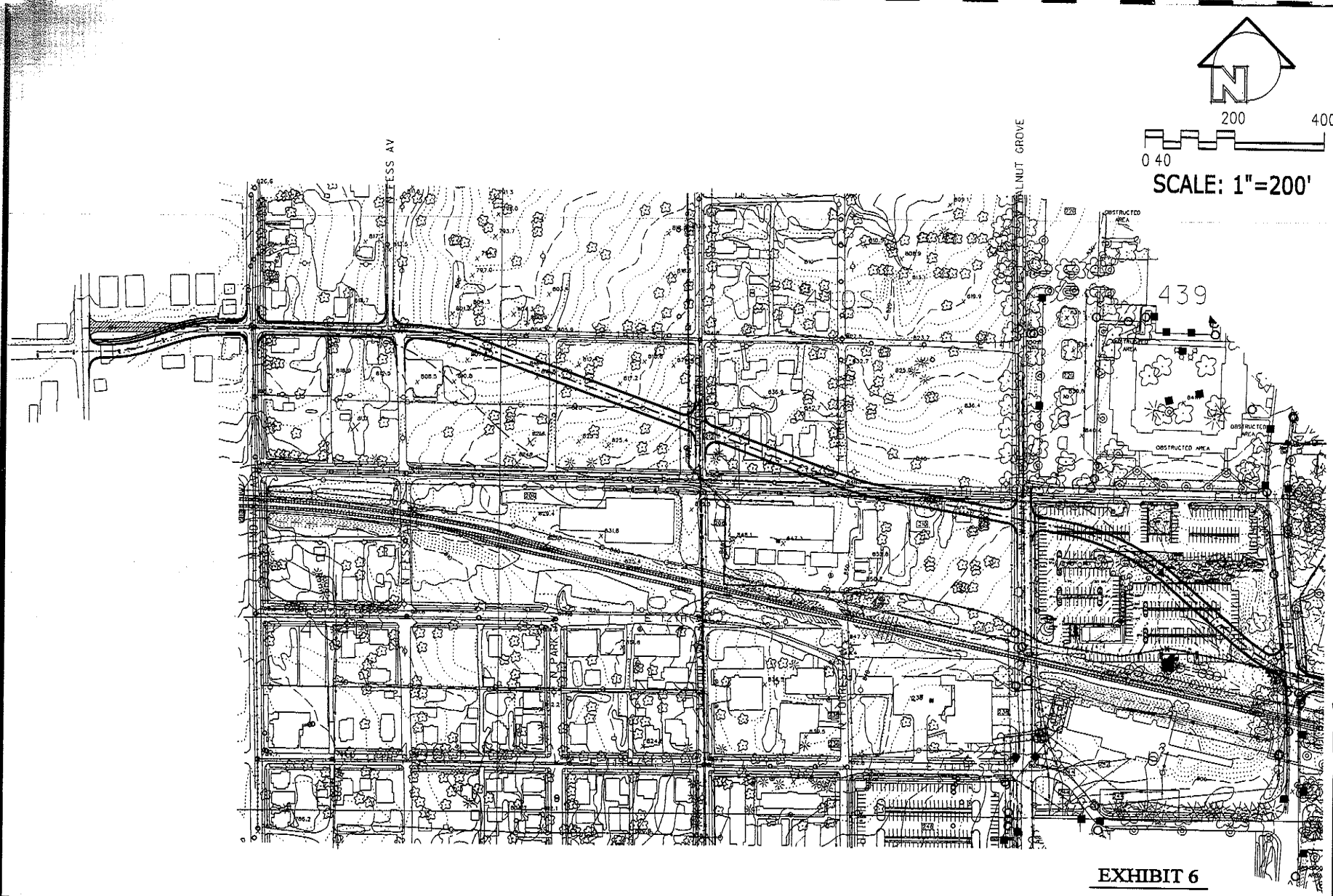
REVISIONS

BY DATE

DRAWN SAB
CHECKED ROB

JOB NUMBER 2953
SHEET
OF

j:\2953\cadd\exhibit5\11x17.sht Dec. 14, 1999 09:47:00



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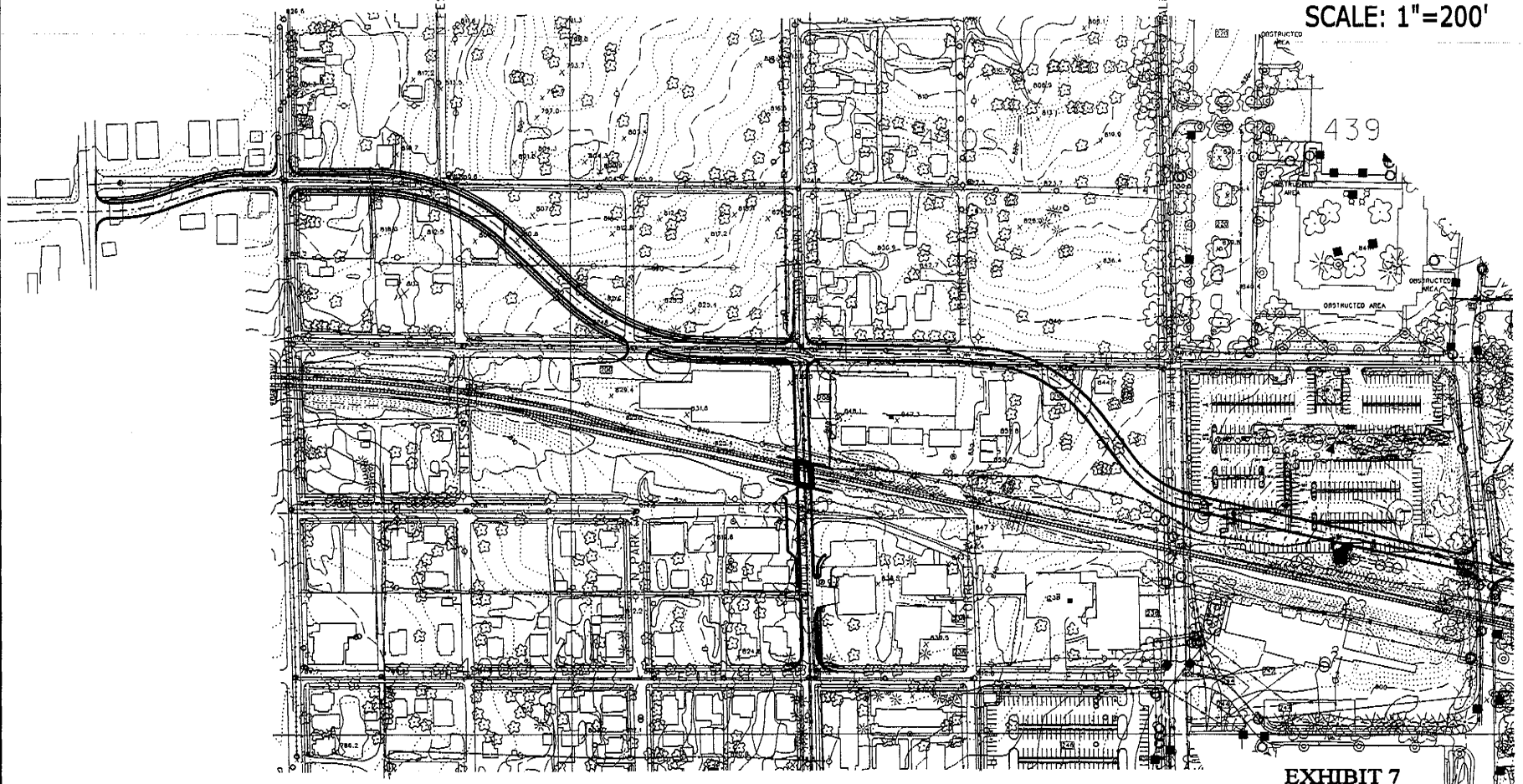

JOB TITLE
13TH STREET
OPTION 5

REVISIONS

JOB NUMBER
2953

SHEET
OF

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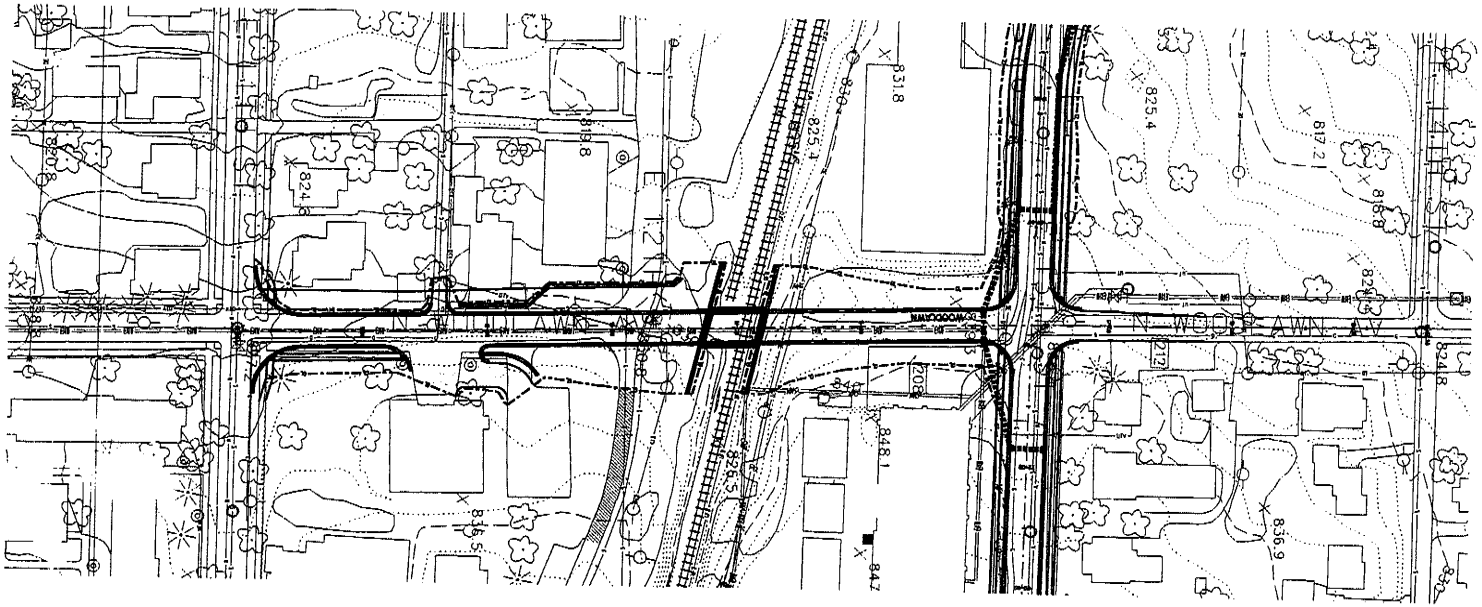


0 20 100 200

SCALE: 1"=100'

EXHIBIT 8

WOODLAWN
TO 13TH STREET

2953

SHEET

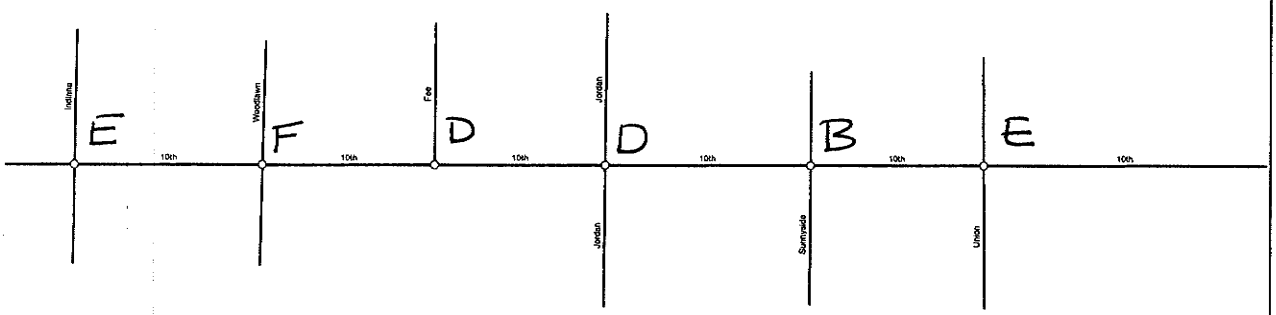
OF

J:\2953\cadd\exhibit8(11x17.sht Dec. 14, 1999 10:16:03

LOS Analysis
Of
Existing 10th Street
Traffic Signals

APPENDIX A

October 5, 1999



Baseline
Timing Plan: Default