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MEMORANDUM

TO: Shelly Pederson, PE, City Engineer
Chad Smith, PE, PTOE, City Traffic Engineer
City of Bloomington

FROM: Marie Cote, PE, Principal
Joshua Maus, PE, PTOE, Senior Engineer

DATE: June 25, 2008

SUBJECT: PENN AVENUE AND 90TH STREET TRAFFIC STUDY

INTRODUCTION

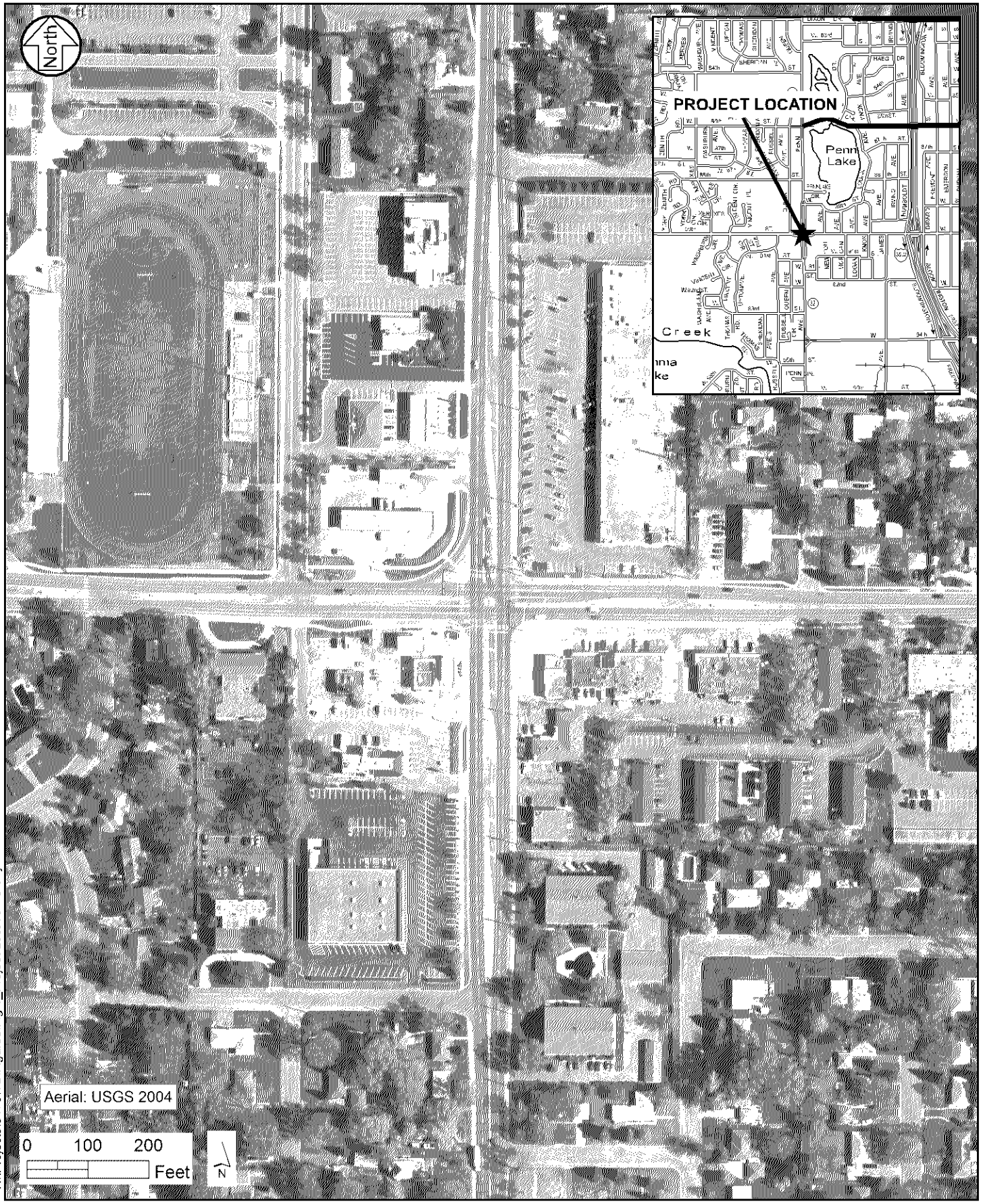
The purpose of this study is to analyze the existing and future traffic operations for the Penn Avenue/ 90th Street intersection (see Figure 1 – Project Location/Study Area) and recommend improvements to meet future needs. In order to plan for future redevelopment, intersection operations, proposed improvements, access management and right-of-way impacts need to be considered. Identifying the roadway and intersection improvements will define the additional right-of-way that needs to be acquired. This will be useful information to discuss with developers early in the process.

This study includes a weekday a.m. and p.m. peak hour operations analysis under existing and year 2030 conditions. The study limits consist of Penn Avenue from 91st Street to 89th Street and 90th Street from Queen Avenue to Newton Avenue.

EXISTING CONDITIONS

Peak period traffic counts were collected at the Penn Avenue/90th Street intersection in April 2008, as part of a traffic study for a proposed Metro Transit park-and-ride facility at 82nd Street and I-35W. Both 30-minute and 15-minute peak period traffic counts were collected at the nearby secondary intersections and access driveways, respectively, in May 2008.

Current traffic control includes signalization at the Penn Avenue/90th Street intersection and side-street stop control at the nearby secondary intersections and access driveways. An operations analysis was conducted for the weekday a.m. and p.m. peak hours to determine how traffic currently operates within the project area, using the Synchro/SimTraffic software. Existing geometrics, traffic control and peak hour traffic volumes for the intersection are shown in Figure 2.



H:\Projects\64781TS\Figures\Fig 1_Project Location-Study Area.cdr

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Project Location/Study Area

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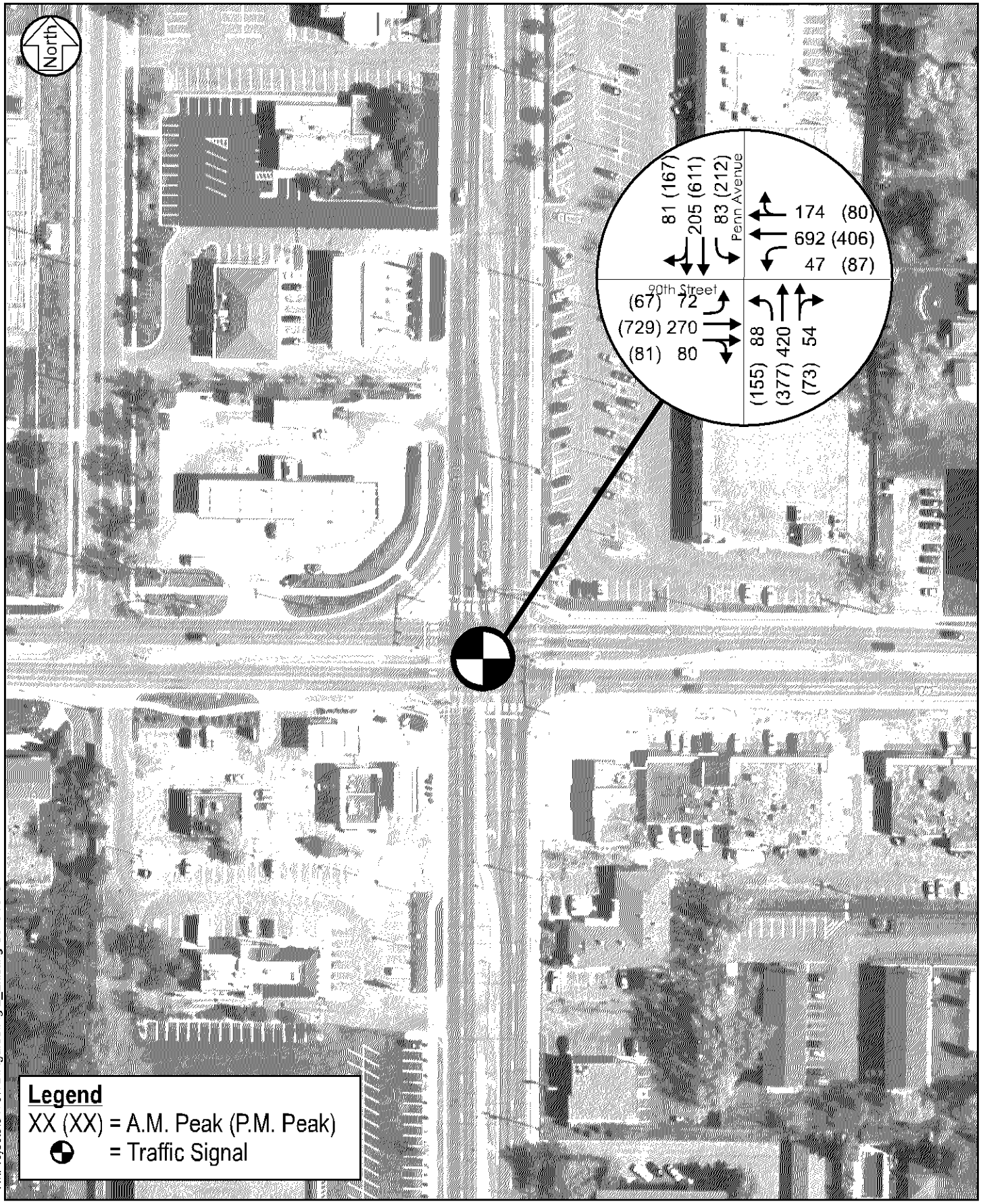
Figure 1



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Existing Conditions - Geometrics and Peak Hour Volumes

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Figure 2

The operations analysis identifies a Level of Service (LOS) which indicates the quality of traffic flow through an intersection. Intersections are given a ranking from LOS A through LOS F. LOS A indicates the best traffic operation, with vehicles experiencing minimal delays. LOS F indicates an intersection where demand exceeds capacity, or a breakdown of traffic flow. LOS A through D are generally considered acceptable by drivers. LOS E indicates that an intersection is operating at, or very near its capacity, and that vehicles experience substantial delays.

Results of the analysis shown in Table 1 indicate that the Penn Avenue/90th Street intersection operates at an acceptable overall LOS D or better during the existing peak hours, with the existing traffic control and geometric layout. Note that the level of service is followed by the average delay per vehicle at the intersection.

Table 1
Existing Peak Hour Capacity Analysis
Level of Service Results

Intersection	Level of Service	
	A.M. Peak Hour	P.M. Peak Hour
Penn Avenue and 90th Street	C (31 sec)	D (37 sec)

Although the Penn Avenue/90th Street intersection operates at an acceptable level of service, queues develop on the north (average queue is 225 feet, 95th percentile queue is 350 feet) and west (average queue is 275 feet, 95th percentile queue is 400 feet) approaches during the p.m. peak hour.

PROPOSED REDEVELOPMENT PLANS

The City of Bloomington staff provided the proposed redevelopment assumptions for year 2030 conditions within the study area. Under this scenario, the northwest, northeast and southeast quadrants were assumed to redevelop at similar densities and land use types as the existing land use.

There are current plans to redevelop the southwest quadrant of this intersection. A redevelopment plan (see Figure 3 – Proposed Development) includes downsizing the existing retail (5-Day Furniture) building, replacing the existing fast food (Burger King) restaurant with a new fast food restaurant in a new location and adding a new pharmacy with a drive-through window. The existing specialty fast food (Gyropolis) restaurant will remain at its current location. The existing (vacant) gas station will be removed and replaced with on-site parking. The two existing access driveways on 90th Street and one existing access driveway on Penn Avenue serving the gas station will be closed.

YEAR 2030 CONDITIONS

Based on discussions with the City of Bloomington and Hennepin County Transportation staff, as well as considering the historic traffic growth on Penn Avenue and 90th Street, a one percent annual growth rate was applied to the existing peak hour traffic volumes in order to develop the year 2030 peak hour traffic forecasts. The traffic generated by the proposed and future redevelopment in the immediate vicinity of the Penn Avenue/90th Street intersection was assumed to be included in these year 2030 traffic forecasts.

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Figure 3

Proposed Development

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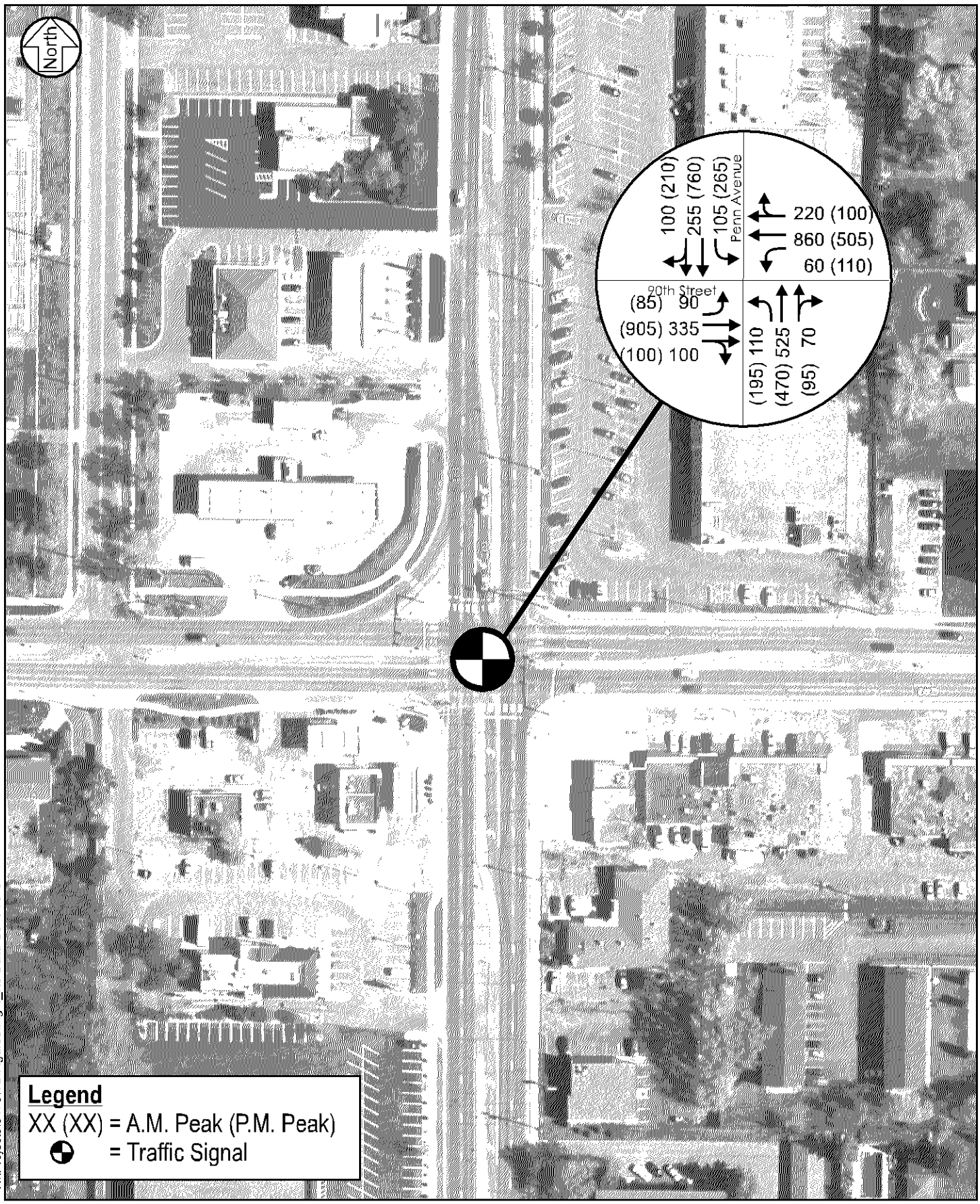
To determine how well the existing roadway system will accommodate year 2030 traffic forecasts (see Figure 4 – 2030 No Build Conditions), an operations analysis was conducted for the weekday a.m. and p.m. peak hours. Results of the analysis shown in Table 2 indicate that the Penn Avenue/90th Street intersection is expected to operate at unacceptable levels of service during the p.m. peak hour under year 2030 no build conditions. In addition, significant queues will continue to develop on the north (average queue is 450 feet, 95th percentile queue is 700 feet) and west (average queue is 525 feet, 95th percentile queue is 850 feet) approaches during the p.m. peak hour. Based on discussions with the City staff, three intersection improvement alternatives where identified. Results of the alternatives analysis is shown in Table 2. Note that the level of service is followed by the average delay per vehicle at the intersection for comparison purposes.

Table 2
Year 2030 Conditions Peak Hour Capacity Analysis
Level of Service Results

Penn Avenue and 90th Street Intersection Improvement Alternatives	Level of Service	
	A.M. Peak Hour	P.M. Peak Hour
No Build [1]	D (37 sec)	**E (60 sec)**
Alt. 1 – Add eastbound, westbound and southbound right-turn lanes [2]	C (29 sec)	D (47 sec)
Alt. 2 – Add northbound and southbound dual left-turn lanes [3]	C (32 sec)	D (52 sec)
Alt. 3 – Lengthen northbound and southbound left-turn lanes [4]	D (36 sec)	**E (58 sec)**

[1] Assumes no geometric improvements with minor signal timing adjustments.
[2] Minimal ROW impact in NW quadrant and moderate ROW impact in NE and SW quadrants.
[3] Significant ROW impact east side of Penn Avenue north and south of 90th Street.
[4] No ROW impact. Requires mid-block full-access driveways on Penn Avenue to be restricted to right-in/right-out only.

Although the Penn Avenue/90th Street intersection is expected to operate at an acceptable level of service under Alternative 1, queues will continue to develop on the north (average queue is 300 feet, 95th percentile queue is 500 feet) and west (average queue is 400 feet, 95th percentile queue is 650 feet) approaches during the p.m. peak hour. For Alternative 2, queues will continue to develop on the north (average queue is 375 feet, 95th percentile is 600 feet) and west (average queue is 475 feet, 95th percentile is 775 feet) approaches during the p.m. peak hour.



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Year 2030 No Build Conditions

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Figure 4

STUDY CONCLUSIONS AND RECOMMENDATIONS

1. The Penn Avenue/90th Street intersection currently operates at an acceptable level of service with queues developing on the north (average queue 225 feet, 95th percentile queue 350 feet) and west (average queue 275 feet, 95th percentile queue 400 feet) approaches during the p.m. peak hour.

2. The Penn Avenue/90th Street intersection is expected to operate at Level of Service E (60 seconds delay per vehicle) during the p.m. peak hour under year 2030 no build conditions with no geometric improvements. Level of Service E indicates that this intersection is operating at, or very near its capacity, and that vehicles experience substantial delays. Significant queues continue to develop under this scenario on the north (average queue is 450 feet, 95th percentile queue is 700 feet) and west (average queue is 525 feet, 95th percentile queue is 850 feet) approaches during the p.m. peak hour.

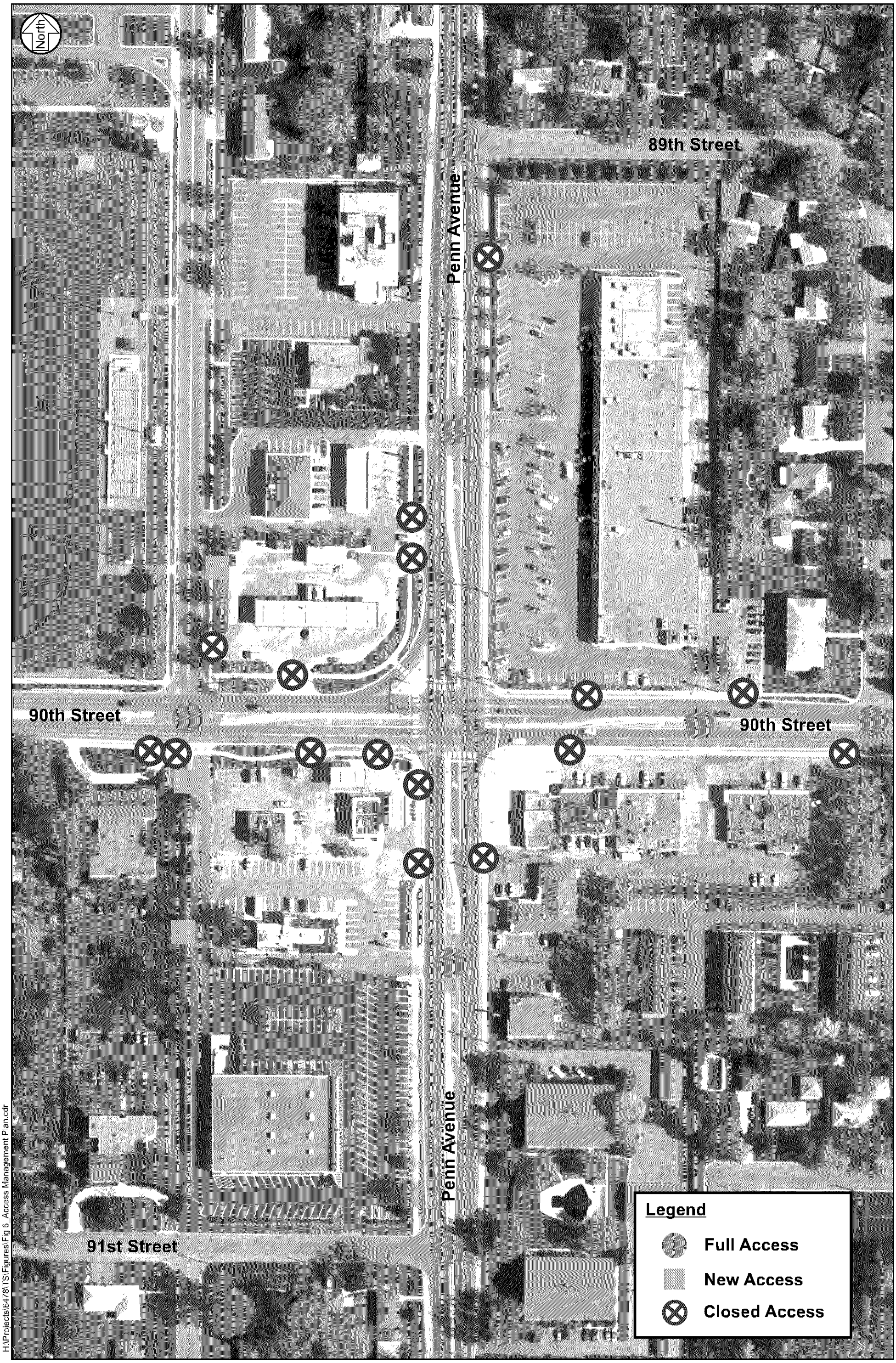
3. Based on the 2030 alternatives analysis, Alternative 1 is expected to operate at acceptable levels of service during both peak hours. Queues continue to develop on the north (average queue is 300 feet, 95th percentile queue is 500 feet) and the west (average queue is 400 feet, 95th percentile queue is 650 feet) approaches during the p.m. peak hour.

4. After reviewing the traffic operations analysis results and discussions with City staff, it is recommended that the City consider future implementation of Alternative 1 – Add eastbound, westbound and southbound right-turn lanes. These right-turn lanes will require additional right-of-way be acquired or dedicated in the northwest, northeast and southwest corners of the Penn Avenue/90th Street intersection. However, based on a review of the physical conditions in these corners it appears that the impact to redevelopment of these parcels would be minimal.

5. Based on discussions with City staff and the results of the traffic operations analysis, an access management plan was developed for the study area (see Figure 5 – Access Management Plan). This access management plan includes access closures, full-access and new access locations, illustrating what both corridors within the study area should ultimately look like under future conditions. An access management plan should be developed and implemented when opportunity occurs, such as redevelopment of the parcels from its current use. This access management plan should be considered an ultimate long-range guide as redevelopment occurs and is not meant to be considered for immediate implementation.

6. The existing and future traffic volumes from the access locations shown to be closed in the access management plan were relocated to the appropriate access locations shown to remain open. A review of these consolidated traffic volumes indicates that there would be no locations where the additional traffic volume would be of concern.

7. In addition to the access management plan, a long range access/redevelopment concept of the study area was developed (see Figure 6 – Long Range Access/Redevelopment Concept). This long range access/redevelopment concept shows how each of the Penn Avenue/90th Street intersection quadrants may be redeveloped with suggested building relocations, parking, access, and circulation roadway layout. It also identifies the location of full, restricted and closed access, as well as the recommended right-turn lanes in the northwest, northeast and southwest corners of the Penn Avenue/90th Street intersection.



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Access Management Plan

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Figure 5

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Long Range Access/Redevelopment Concept

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Figure 6