CIVIL ENGINEERING / SURVEYING / UTILITIES

Traffic Impact Study

East Village

Lee's Summit, Missouri

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1.0 INTRODUCTION

This traffic impact study is for the East Village development in the southeast quadrant of the US-50 Highway (US-50) and M-291 Highway (M-291) interchange in Lee's Summit, Missouri. It is bounded on the west by M-291, a railroad on the east, and 16th Street to the south. The location of the development is shown in **Figure 1** in the **Appendix**.

The purpose of this study is to identify and address traffic and transportation impacts of the proposed development on the surrounding streets and intersections. The study has been prepared based on the City of Lee's Summit *Access Management Code* and the Missouri Department of Transportation (MoDOT) *Engineering Policy Guide*. The study consists of:

- Existing Conditions. Review of existing roadway characteristics and traffic volumes from July 2025
- Base Conditions. Incorporation of the full development traffic approved for the Oldham Village "West" Traffic Impact Study dated August 2024 as prepared by Kimley Horn.
- Trip generations based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition* for the proposed development by development phases. With a supplemental trip generation recommendation provided by Kittelson and Associates for a Warehouse Retailer. Kittelson has evaluated more than 40 of this particular Warehouse Retailer locations to provide a more accurate number than ITE.
- Trip distributions and assignments by project phases including:
    - Phase 1 Oldham Parkway North
    - Phase 2 Bailey Road North
    - Phase 3 16th Street North = Full Development
- Analysis of impacts of the traffic generated by the proposed development on the street network, including peak period levels of service (LOS), delay times, and 95% queue lengths
- Review of site access points relative to the City's access management guidelines.
- Discussion of potential improvements and traffic management measures identified to mitigate operational concerns.
- Signal warrant analysis for Oldham Parkway and Intersection Node 6 which serves as the main access to the Warehouse Retailer and the development to the south
- Development of future year (2045) traffic volume projections.

2.0 EXISTING CONDITIONS

2.1 STUDY AREA

East Village is situated in the southeast quadrant of the US-50 Highway and M-291 Highway interchange in Lee's Summit, Missouri. The site is approximately 108 acres. The site is predominantly greenfield with the existence of the Zoetis Inc. building situated along Bailey Road at Pfizer Way. The existing parcels along the north side of 16th Street are not included in the development.

The site is bounded on the north by US-50. By the railroad to the east, SE 16th Street on the south, and M-291 on the west. The study area is shown in **Figure 1** in the **Appendix**.

Through discussion with City and MoDOT staff, the following intersections were included in the study for traffic analysis.

- M-291 & Oldham Parkway (Signalized) Study Node #1
- M-291 & Persels Road/Bailey Road (Signalized) Study Node #2
- M-291 & 16th Street (RIRO) Study Node #3
- M-291 & Scherer Road (Signalized) Study Node #4
- Bailey Road & Hamblen Road (Signalized) Study Node #5

MoDOT analyzed the US-50 & M-291 interchange in 2015. That analysis included the M-291 corridor with assumptions for major commercial developments to the east and west of the Highway along Oldham Parkway.

2.2 SURROUNDING STREET NETWORK

The existing street network within the study area includes US-50, M-291, Oldham Parkway, Bailey Road, 16th Street, and a new north-south collector street through the development. The following provides a summary of the existing street network within the study area.

US-50 is a four-lane divided east-west freeway with a posted speed limit of 60mph. The US-50 and M-291 interchange was reconstructed in 2018 as a diverging diamond. The crossover on the north side of US-50 is a roundabout intersection with the crossover on the south side being signalized.

M-291 is a north-south expressway that connects Lee's Summit to Harrisonville to the south with a posted speed of 45mph. M-291 is a six-lane divided roadway north of Persels/Bailey Road and a four-lane divided highway south of Persels/Bailey Road. M-291 has 12-foot travel lanes and 10-foot paved shoulders. Access is controlled along M-291 adjacent to the study area. There is a shared use path along the west side of M-291 extending south of the interchange to Oldham Parkway.

Oldham Parkway is a 35mph commercial collector that runs northwest-southeast that functions as a frontage road along the south side of US-50. Oldham Parkway is a two-lane undivided roadway with paved shoulders. At Jefferson Street, Oldham Parkway follows an east-west alignment to M-291 with two lanes in the westbound direction, a raised median, and four lanes in the eastbound direction with curbs and gutters and a shared use path along the south side.

Bailey Road is generally a two-lane east-west minor arterial street with a posted speed of 35mph that widens to three-lanes approximately 700' east of Pfizer Way. As Bailey Road approaches the signalized intersection of M-291, it widens to four-lanes. Bailey Road east of M-291 has an existing sidewalk along the south side of the road that continues over the railroad overpass to Hamblen Road.

16th Street is a two-lane east-west local street with a posted speed of 25mph. Within the study area, 16th Street has stop-controlled right-in right-out (RIRO) access control to northbound M-291.There are no existing sidewalks along 16th Street.

The new **north-south collector** between Oldham Parkway and Bailey Road is proposed as a median divided two-lane roadway with additional left-turn lanes at intersection approaches and sidewalks on each side. Between Bailey Road and 16th Street it is proposed with a 3-lane section with a center two-way left turn lane with sidewalks on each side.

2.3 DATA COLLECTION

Peak hour traffic counts were collected at the study intersections on Thursday July 10th, Saturday July 19th, and Tuesday July 22nd of 2025. The data collected is included in the **Appendix**. The AM peak hour occurred between 7:45 AM and 8:45 AM, the PM peak hour occurred between 4:30 PM and 5:30 PM, and the Saturday peak hour occurred between 12:00 PM and 1:00 PM. The existing conditions peak hour volumes are shown in **Figure 2**.

3.0 BASE CONDITIONS

A base condition was established for this study which consists of adding the existing traffic volumes to the full development traffic established for the Oldham Village “West” Traffic Impact Study.

3.1 OLDHAM VILLAGE “WEST” SITE PLAN

The Oldham Village “West” Traffic Impact Study dated August 2024 was prepared by Kimley Horn and includes approximately 45 acres of development area in the southwest corner of US-50 and M-291. The Oldham Village “West” study area can be seen in **Figure 3**.

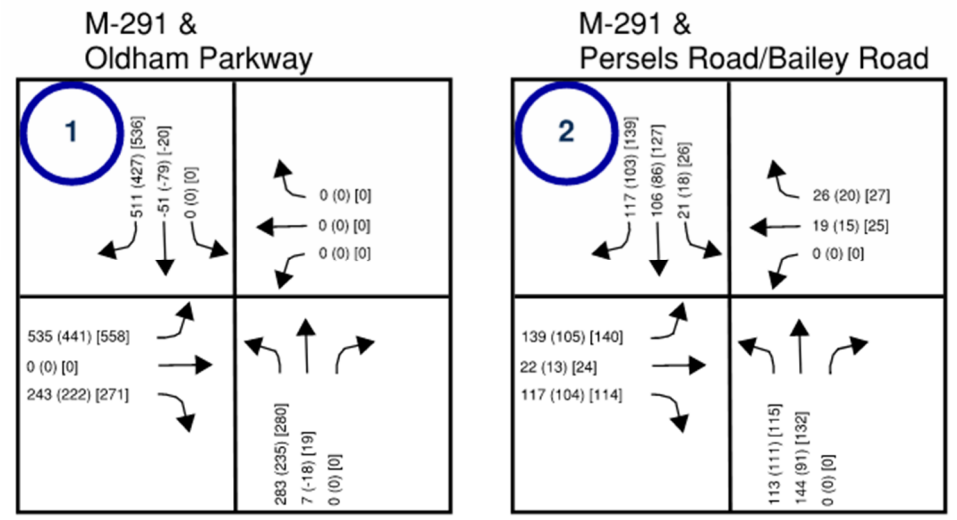
The estimated trips generated by that development were assigned to the street network based on the trip distribution summarized in **Table 1**. That distribution was based on existing traffic patterns, the surrounding street network, population density, and engineering judgement. The distributions were reported to generally follow what was used for MoDOT’s analysis for the US-50 & M-291 interchange.

TABLE 1: OLDHAM VILLAGE “WEST” TRIP DISTRIBUTION

Direction To/From	Percentage
North on M-291	50%
South on M-291	20%
East on Bailey Road	5%
West on Persels Road	10%
South on Ward Road	5%
South on Jefferson Street	5%
North on Ward Road	5%
Total	**100%**

3.2 OLDHAM VILLAGE "WEST" TRIP ASSIGNMENT

The proposed full development trip generation from the Oldham Village "West" study were reduced for pass-by trips and assigned to the street network based on the trip distribution in **Table 1**. The results from that study can be viewed in Exhibit 16 of that report (Existing + Full Development Peak Hour Traffic Volumes. When Exhibit 2 (Existing Conditions Peak Hour Traffic Volumes) from that study is subtracted from Exhibit 16 we are left with the resulting Oldham Village "West" new trip assignments for two of the East Village study intersections: Node 1: M-291 & Oldham Parkway and Node 2: M-291 & Persels/Bailey Road below:



These numbers represent the "Base" trip assignments added by the Oldham Village "West" development.

3.3 BASE CONDITIONS

For this traffic study, base conditions included the existing traffic counts conducted in July 2025 plus the Oldham Village "West" new trip assignments.

The resulting base condition peak hour volumes can be seen in **Figure 4**. The remainder of the traffic volume exhibits and analyses will be based on these volumes.

Figure 5 illustrates the base condition geometry lane uses and intersection control. **Figure 6** represents base condition 95% queue lengths.

4.0 PROPOSED CONDITIONS

4.1 EAST VILLAGE: OVERALL SITE PLAN

The proposed East Village development is proposed to have 20 individual lots and can be seen in **Figure 7**. The project is planned to be developed in three phases which are illustrated in **Figure 8**.

Phase 1 provides access to Lot 1 which consists of a Warehouse Retailer with fueling stations. Phase 1 includes the extension of a median divided and curbed Oldham Parkway east of M-291 with sidewalk along the south side. There are three proposed intersections on the Oldham Parkway extension, with the first being an eastbound right-in right-out (RIRO) approximately 300' east of M-291.

The second intersection is proposed to have signalized access for Oldham Parkway and a new north/south collector street (Warehouse Retailer entrance) to service the development area. With Phase 1, the intersection would be built to final configuration and signalized, with the south leg of the intersection to be constructed with Phase 2. The west leg of the intersection would be 4-lanes (2 EBL, 1 EBT, 1 EBR). The east leg of the intersection would be 3-lanes (1 WBL, 1 WBT, 1 WBR). The north leg of the intersection would also be 3-lanes. (1 SBL, 1 SBT, 1 SBR).

Approximately 430' east of the second intersection is the third intersection intended to provide access to fueling stations for the Warehouse Retailer. Oldham Parkway remains median divided through this section.

Phase 2 provides access for Lots 2-13 which include: two multifamily housing units totaling 540-units, units, six fine dining restaurants, two fast-food restaurants with drive-through windows, a 17,000 square foot strip retail plaza, and a 3.4-acre public park.

Phase 2 constructs a new north/south collector street between Oldham Parkway and Bailey Road. This collector street will be median divided with curb and sidewalks on both sides. It provides 1-lane in each direction with additional dedicated left-turn lanes at each intersection. There are three proposed intersections between Oldham Parkway and Bailey Road for internal circulation to the various lots. Phase 2 also includes two new east-west median divided internal streets with curb and sidewalk on both sides. These streets provide internal access from the new north/south collector street to Lots 2-3, and Lot 12-13.

With Phase 2, the new north/south collector will initially form a T-intersection with Bailey Road approximately 560' east of M-291. The south leg of the T-intersection would be constructed in Phase 3. The west leg of the intersection would be 3-lanes (1 EBL, 1 EBT, 1 EBR). The east leg of the intersection would be 2-lanes (1 WBLT, 1 WBR). The north leg of the intersection would also be 2-lanes (1 SBL, 1 SBTR).

A second intersection with Bailey Road would also occur with Phase 2, approximately 430' east of the new north/south collector. This intersection will initially form a T-intersection with Bailey Road with the south leg to be constructed in Phase 3. The west leg of the intersection would be 1-lanes (1 EBLTR).

The east leg of the intersection would be 2-lanes (1 WBL, 1 WBTR). The north leg of the intersection would be 2-lanes. (1 SBL, 1 SBTR).

Baley Road would be improved with Phase 2 from M-291 to the eastern project limit with an additional eastbound though lane between M-291 and the north/south collector. The existing sidewalk on the south side of Bailey Road would continue to be provided.

Phase 3 provides access for Lots 14-20 which include: four fast-food restaurants with drive-through windows, one fine dining restaurant, a 120,000 square foot shopping plaza, and 100-units of single family attached housing.

Phase 3 constructs a new north/south collector street between Bailey Road and 16th Street. There are three proposed intersections between Bailey Road and 16th Street for internal circulation to the various lots. This collector street will be median divided with curb and sidewalks on both sides. It provides 1-lane in each direction and is median divided between Bailey Road and the first intersection to the south. Between the first intersection and 16th Street, the north/south collector transitions to a 3-lane section with a center two-way left-turn lane.

With Phase 3, the new north/south collector will form a T-intersection with 16th Street approximately 290' east of M-291. The west leg of the intersection would be 1-lane (1 EBLTR). The east leg of the intersection would be 1-lane (1 WBLTR). The north leg of the intersection would be 2-lanes. (1 SBL, 1 SBR).

4.2 PHASE 1: OLDHAM PARKWAY NORTH

4.2.1 PHASE 1 SITE ACCESS

Phase 1 of the site will be accessed from 3-intersections on Oldham Parkway, see **Figure 9.** Three intersection nodes, summarized below, are included with Phase 1. All access spacing distances are measured between the centerline of streets or driveways.

- Node 9: Oldham Parkway & Eastbound RIRO
  This access is approximately 300' east of M-291.
- Node 6: Oldham Parkway & North/South Collector
  This access is proposed to be signalized as it functions as the primary entrance to the Warehouse Retailer to the north and to the future Oldham Village East development to the south. This access point is approximately 580' east of M-291.
- Node 10: Oldham Parkway & Fueling Stations
  This access is approximately 430' east of Node 6.

4.2.2 PHASE 1 TRIP GENERATION

Table 2 represents the trip generation estimate for Phase 1: Oldham Parkway North which consists of a single lot for a warehouse retailer.

As opposed to using the Institute of Transportation Engineers (ITE) land use code of 857 – Discount Club for the trip generation, the warehouse retailer provided a Trip Generation Technical Memorandum prepared by Kittelson Associates dated July 9, 2025. Kittelson maintains a transportation database for the warehouse retailer which is continually updated and was asked to provide a trip generation estimate for this proposed site. Their estimate, based on data from more than 40 similar sites, is included in **Table 2**.

TABLE 2: PHASE 1 PROPOSED TRIP GENERATION (OLDHAM PARKWAY NORTH)

#	ITE Land Use	ITE Code	Value/ Variable	Daily	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
	Phase 1 – Oldham Parkway North												
1	Warehouse Retailer	***	161k SF	11,074	322	179	143	1094	526	568	1527	758	769
	Phase 1 Trips (unreduced)			11,704	322	179	143	1094	526	568	1527	758	769
	Phase 1 Internal Capture			0	0	0	0	0	0	0	0	0	0
	Phase 1 Pass-By Trips			0	0	0	0	318	153	165	320	159	161
	Phase 1 Primary Trips			**11,704**	**322**	**179**	**143**	**776**	**373**	**404**	**1207**	**599**	**608**

***Note: Trip generation provided from Kittelson Associates. Their technical memorandum may be found in the Appendix.

ITE provided internal capture and pass-by rates were applied to the values in **Table 2**.

For trip generation comparison to ITE values, ITE Land Use 857 – Discount Club is provided below.

#	ITE Land Use	ITE Code	Value/ Variable	Daily	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
	Phase 1 – Oldham Parkway North												
1	Discount Club	857	161k SF	6,836	129	79	50	675	337	338	1026	503	523

The values in **Table 3** generate 4,868 more daily trips, 193 more AM peak hour trips, 101 more PM peak hour trips, and 181 more Saturday peak hour trips than estimated by ITE. The ITE values were not used for this Trip Generation.

4.2.3 PHASE 1 TRIP DISTRIBUTION AND ASSIGNMENT

For Phase 1, the estimated trips generated by the warehouse retailer were assigned to the street network based on the trip distribution summarized in **Table 3**. A review of existing patterns, the available surrounding street network, the previous study, and warehouse retailer market data were used for this distribution.

TABLE 3: PHASE 1 TRIP DISTRIBUTION

Direction To/From	Percentage
North on M-291	70%
South on M-291 south of Persels/Bailey	15%
South on M-291 and west on Persels	5%
South on M-291 and east on Bailey	10%
Total	**100%**

The Phase 1 street network, study intersections, and primary trip distribution may be seen in **Figure 9**.

The Phase 1 pass-by trip volumes from **Table 2** were applied to the Phase 1 intersections in **Figure 10**.

Figure 11 represents the total site trips generated and distributed with pass-by by Phase 1.

Figure 12 illustrates the Base Conditions plus Phase 1 peak hour traffic volumes. Figure 12 is the result of adding Figure 4 to Figure 11. The peak hour volumes in Figure 12 were used for all Base + Phase 1 analyses.

4.2.4 PHASE 1 LANE GEOMETRY AND QUEUES

The lane geometry and intersection controls for the Base + Phase 1 condition can be viewed in **Figure 13**.

The 95th percentile queue lengths by lane group, from the analyses performed later in this study, can be viewed for the Base + Phase 1 condition in **Figure 14**.

4.2.5 PHASE 1 SIGNAL WARRANT ANALYSIS

A peak hour traffic signal warrant analysis was performed for the new intersection of Oldham Parkway & N/S Collector. This intersection is referenced as Node #6 in the Figures. The peak hour volumes for Node #6 for the Base + Phase 1 condition may be seen in **Figure 12**. These traffic volumes were plotted on *Figure 4C-3, Warrant 3, Peak Hour* from the *Manual of Uniform Traffic Control Devices* (MUTCD) for the AM, PM, and Saturday peak hours. The plotted results may be seen on **Figure 15**.

Figure 15 illustrates that the Peak Hour Traffic Signal Warrant is met at Node 6 during the Base + Phase 1 condition.

4.3 PHASE 2 BAILEY ROAD NORTH

4.3.1 PHASE 2 SITE ACCESS

Phase 2 of the site will be accessed from Node 6 on Oldham Parkway, as well as Nodes 7 and 20 on Bailey Road, see **Figure 16**.

- Node 7: Bailey Road & North/South Collector
  This access is approximately 540’ east of M-291.
- Node 20: Bailey Road & Drive 8
  This access is approximately 430’ east of Node 7.
- Node 11: North/South Collector & Drive 1
  This access is approximately 340’ south of Node 6.
- Node 12: North/South Collector & North E/W Drive
  This access is approximately 310’ south of Node 11.
- Node 13: North E/W Drive & Drive 2
  This access is approximately 335’ east of Node 12.
- Node 14: North E/W Drive & Drive 3
  This access is approximately 300’ east of Node 13.
- Node 15: North E/W Drive & Drive 4
  This access is approximately 120’ east of Node 14, and is only access to parking lots.
- Node 16: North/South Collector & South E/W Drive
  This access is approximately 460’ south of Node 12.
- Node 17: South E/W Drive & Drive 5
  This access is approximately 240’ east of Node 16.
- Node 18: South E/W Drive & Drive 6
  This access is approximately 220’ east of Node 17.
- Node 19: Drive 7
  This access is approximately 270’ south of Node 18.

4.3.2 PHASE 2 TRIP GENERATION

Table 4 represents the trip generation estimate for Phase 2: Bailey Road North which consists of twelve lots. Appropriate ITE land use codes, average trip generation rates, internal capture and pass-by rates were utilized selected.

TABLE 4: PHASE 2 PROPOSED TRIP GENERATION (BAILEY ROAD NORTH)

#	ITE Land Use	ITE #	Units	Daily	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
	Phase 2 – Bailey Road North												
2	Multifamily Housing (Low-Rise)	220	300 Units	2022	120	29	91	153	96	57	123	62	61
3	Multifamily Housing (Low-Rise)	220	240 Units	1618	96	23	73	122	7	45	98	49	49
4 &5	Fine Dining Restaurant	931	14,040 SF	1177	10	5	5	110	73	37	150	88	62
6	Fine Dining Restaurant	931	8380 SF	703	6	3	3	65	44	21	89	53	36
7	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
8	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
9	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
10	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
11	Strip Retail Plaza (<40k)	822	17,000 SF	926	40	24	16	112	56	56	112	57	55
12	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
13	Public Park	411	3.42 Acres	3	0	0	0	0	0	0	1	1	0
	Phase 2 Trips (unreduced)			10,896	530	215	315	920	558	362	1117	606	511
	Phase 2 Internal Capture Reduce			0	66	34	32	130	83	47	0	0	0
	Phase 2 Pass-By Trips Reduce			0	122	62	60	255	155	100	0	0	0
	Phase 2 Primary Trips			**10,896**	342	119	223	535	320	215	1117	606	511

4.3.3 PHASE 2 TRIP DISTRIBUTION AND ASSIGNEMENT

For Phase 2, the trips generated were assigned to the street network based on the trip distribution summarized in **Table 5**. This distribution is based on a review of existing patterns, previous studies, and the availability of additional access to the site provided by the construction of a new N/S collector street between Oldham Parkway and Bailey Avenue.

The new N/S Collector provides access to Phase 2 of the site from both Oldham Parkway and Bailey Road. Which justifies the lowering of the traffic coming to/from M-291 from the north from 70% in Phase 1 to 55% in Phases 2 and 3.

TABLE 5: PHASE 2 TRIP DISTRIBUTION

Direction To/From	Percentage
North on M-291	55%
South on M-291 south of Persels/Bailey	30%
South on M-291 and west on Persels	5%
South on M-291 and east on Bailey	10%
Total	**100%**

The Phase 2 street network, study intersections, and primary trip distribution may be seen in **Figure 16**.

The Phase 2 pass-by trip volumes from **Table 4** were applied to the study intersections in **Figure 17**.

Figure 18 represents the total site trips generated and distributed with pass-by by Phase 2.

Figure 19 illustrates the Base Conditions plus Phase 1 and 2 peak hour traffic volumes. Figure 19 is the result of adding Figure 11 to Figure 18. The peak hour volumes in Figure 19 were used for all Base + Phase 2 analyses.

4.3.4 PHASE 2 LANE GEOMETRY AND QUEUES

The lane geometry and intersection controls for the Base + Phase 2 condition can be viewed in **Figure 20**.

The 95th percentile queue lengths by lane group, from the analyses performed later in this study, can be viewed for the Base + Phase 2 condition in **Figure 21**.

4.4 PHASE 3 16TH STREET NORTH

4.4.1 PHASE 3 SITE ACCESS

Phase 3 of the site will be accessed from Nodes 7 and 20 on Bailey Road, and Node 8 on 16th Street, see **Figure 22**.

- Node 21: North/South Collector & Drive 9
  This access is approximately 340' south of Node 7.
- Node 22: North/South Collector & Drive 10
  This access is approximately 290' south of Node 21.
- Node 23: North/South Collector & Drive 11
  This access is approximately 275' south of Node 22.
- Node 8: North/South Collector & 16th Street
  This access is approximately 420' south of Node 23.
- Node 24: 16th Street and Park Driveway
  This access is approximately 1170' east of Node 8.

4.4.2 PHASE 3 TRIP GENERATION

Table 6 represents the trip generation estimate for Phase 3: 16th Street North which consists of seven lots. Appropriate ITE land use codes, average trip generation rates, internal capture and pass-by rates were utilized selected.

TABLE 6: PHASE 3 PROPOSED TRIP GENERATION (16th STREET NORTH)

#	ITE Land Use	ITE #	Units	Daily	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
	Phase 3 – 16th Street North												
14	Fast-Food with DTW	934	3000 SF	1402	134	68	66	99	52	47	166	85	81
15	Fast-Food with DTW	934	3000 SF	1402	134	68	66	99	52	47	166	85	81
16	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
17	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
18	Fast-Food with DTW	934	2700 SF	1262	120	61	69	89	46	43	149	76	73
19	Shopping Plaza (40-150k)	821	120,000 SF	8102	208	129	79	623	305	318	746	388	358
20	Single Family Attached Housing	215	100 Units	720	48	12	36	57	34	23	57	27	30
	Phase 3 Trips (unreduced)			14,791	770	402	368	1116	575	541	1515	785	730
	Phase 3 Internal Capture Reduce			0	140	72	68	229	118	111	164	85	79
	Phase 3 Pass-By Trips Reduce			0	256	130	126	484	248	236	231	120	111
	Phase 3 Primary Trips			**14,791**	**374**	**200**	**174**	**403**	**209**	**194**	**1120**	**580**	**540**

4.4.3 PHASE 3 TRIP DISTRIBUTION AND ASSIGNMENT

For Phase 3, the trips generated were assigned to the street network based on the same trip distribution used for Phase 2 from **Table 5**.

The extension of the new N/S Collector in Phase 2 will continue from Bailey Road to 16th Street. After discussion with the developer a decision was made to change the proposed shared access for Lots 14-16, to just shared access to Lots 14-15. Lot 16 will have shared access with Lot 17 – this is not yet reflected in the Overall Site Plan, but has been modeled for this study.

The Phase 3 street network, study intersections, and primary trip distribution may be seen in **Figure 22**.

The Phase 3 pass-by trip volumes from **Table 6** were applied to the study intersections in **Figure 23**.

Figure 24 represents the total site trips generated and distributed with pass-by by Phase 3.

Figure 25 illustrates the Base Conditions plus Phase 1-3 peak hour traffic volumes and represents the East Village Full Development traffic. Figure 25 is the result of adding Figure 19 to Figure 24. The peak hour volumes in Figure 25 were used for all Base + Full Development analyses.

4.4.4 PHASE 3 LANE GEOMETRY AND QUEUES

The lane geometry and intersection controls for the Base + East Village Full Development condition can be viewed in **Figure 26**.

The 95th percentile queue lengths by lane group, from the analyses performed later in this study, can be viewed for the Base + East Village Full Development condition in **Figure 27**.

4.5 VILLAGE EAST: FULL DEVELOPMENT

4.5.1 TRIP GENERATION

TABLE 7: VILLAGE EAST: FULL DEVELOPMENT TRIP GENERATION

#	ITE Land Use	ITE #	Units	Daily	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
					Total	In	Out	Total	In	Out	Total	In	Out
	Phase 1-3 Full Development												
1	Warehouse Retailer	***	155k SF	11,074	322	179	143	1094	526	568	1527	758	769
2	Multifamily Housing (Low-Rise)	220	300 Units	2022	120	29	91	153	96	57	123	62	61
3	Multifamily Housing (Low-Rise)	220	240 Units	1618	96	23	73	122	77	45	98	49	49
4 &5	Fine Dining Restaurant	931	14,040 SF	1177	10	5	5	110	73	37	150	88	62
6	Fine Dining Restaurant	931	8380 SF	703	6	3	3	65	44	21	89	53	36
7	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
8	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
9	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
10	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
11	Strip Retail Plaza (<40k)	822	17,000 SF	926	40	24	16	112	56	56	112	57	55
12	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
13	Public Park	411	3.42 Acres	3	0	0	0	0	0	0	1	1	0
14	Fast-Food with DTW	934	3000 SF	1402	134	68	66	99	52	47	166	85	81
15	Fast-Food with DTW	934	3000 SF	1402	134	68	66	99	52	47	166	85	81
16	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
17	Fine Dining Restaurant	931	7640 SF	641	6	3	3	60	40	20	82	48	34
18	Fast-Food with DTW	934	2700 SF	1262	120	61	59	89	46	43	149	76	73
19	Shopping Plaza (40-150k)	821	120,000 SF	8102	208	129	79	623	305	318	746	388	358
20	Single Family Attached Housing	215	100 Units	720	48	12	36	57	34	23	57	27	30
	Phase 1-3 Trips (unreduced)			37,391	1622	796	826	3130	1659	1471	4159	2149	2010
	Phase 1-3 Internal Capture Reduce			0	206	106	100	359	201	158	164	85	79
	Phase 1-3 Pass-By Trips Reduce			0	378	192	186	1057	556	501	551	279	272
	Phase 1-3 Primary Trips			**37,391**	**1038**	**498**	**540**	**1714**	**902**	**812**	**3444**	**1785**	**1659**

Table 7 represents the Village East Full Development trip generation. It is the compilation of **Tables 2,4, and 6**. With all ITE land use codes, average trip generation rates, internal capture and pass-by rates applied.

5.0 ACCESS MANAGEMENT

5.1 ACCESS SPACING

The City of Lee's Summit Access Management Code (AMC) provides criteria for minimum spacing between intersections depending upon street classification and the type of access. Along commercial collector streets such as Oldham Parkway and the new N/S Collector, the minimum spacing for full access is 300 feet, measured between centerlines.

The spacing criteria is met along Oldham Parkway from M-291 to the east, and for the N/S Collector from Oldham Parkway to Bailey Road.

The Oldham Parkway & RIRO driveway (Node 9) is located 300 feet east from M-291, which is in the functional area of the intersection.

Along the N/S Collector from Bailey Road to 16th Street, there are spacings that do not meet the 300' criteria. Efforts have been made to share access between the small lot sizes of the proposed development wherever possible. These lots do not have access from other directions. The City and Developer may want to consider classifying this segment to a private collector street.

Figure 29 illustrates collector street intersection spacing distances.

For driveways along Bailey Road, a minor arterial street, the minimum spacing is 400 feet. Node 20 is 430 feet from the intersection of Bailey Road and N/S Collector.

5.2 THROAT LENGTHS

The throat length requirements in the AMC are based on the number of trips generated by a development and the amount of stacking that will occur at the access drive. The provided and required throat lengths at each access point for the Ful Development condition are shown in **Table 8**.

TABLE 8: DRIVEWAY THROAT LENGTHS

Site Driveway		Approach	Peak Hour Trips			Provided Throat Length	Required Throat Length
			AM	PM	Sat		
9	Oldham Parkway & RIRO	SB	43	216	279	200’	100’
10	Oldham Parkway & Fuel Sta	NB	33	20	22	50’	50’
		SB	29	145	186	200’	100’
11	N/S Collector & Drive 1	EB	77	94	109	75’	100’
		WB	6	59	62	50’	75’
12	N/S Collector & North EW Drive	EB	80	130	141	100’	100’
13	North EW Drive & Drive 2	NB	0	0	0	50’	50’
		SB	4	2	2	70’	50’
14	North EW Drive & Drive 3	WB	35	21	22	70’	50’
15	North EW Drive & Drive 4	SB	4	2	2	55’	50’
16	N/S Collector & South EW Drive	EB	16	56	55	100’	75’
17	South EW Drive & Drive 5	NB	3	34	34	75’	50’
		SB	0	0	0	50’	50’
18	South EW Drive & Drive 6	WB	30	19	20	50’	50’
19	Drive 7	WB	30	19	20	195’	50’
20	Bailey Road & Drive 8	NB	62	188	205	100’	100’
21	N/S Collector & Drive 9	EB	164	134	162	50’	100’
		WB	18	55	63	90’	75’
22	N/S Collector & Drive 10	EB	68	81	107	50’	100’
		WB	18	55	63	75’	75’
23	N/S Collector & Drive 11	EB	74	61	73	50’	75’
		WB	18	92	99	150’	75’

Table 8 identifies five intersection approaches where the proposed site plan does not currently meet the AMC throat distance requirements. They are identified below:

N/S Collector & Drive 1 (Node 11): Both east and west throat distances are 25’ short of AMC

N/S Collector & Drive 9 (Node 21): The eastbound throat distance is 50’ short of AMC

N/S Collector & Drive 10 (Node 22): The eastbound throat distance is 50’ short of AMC

N/S Collector & Drive 11 (Node 23): The eastbound throat distance is 25’ short of AMC

5.3 TURN LANE ANALYSIS

Left-Turn Lanes

Per the City AMC, left-turn lanes are to be provided on collector streets at connections where the left-turn volume is at least 30 vehicles in an hour. The proposed plan provides left-turn lanes of at least 150 feet in length at all locations along N/S Collector.

N/S Collector has a median from Oldham Parkway to the first intersection (Node 21) south of Bailey Road, it then transitions to a TWLT from Node 21 to 16th Street.

Right Turn Lanes

Per the AMC, right-turn lanes are required on collector streets where the right-turn volume is at least 100 vehicles an hour, with a minimum length of 100 feet plus taper.

There are two intersections on N/S Collector that meet the volume criteria:

1) The southbound right-turn volume at N/S Collector & Drive 1 = 129 vph (Node 11)
2) The southbound right-turn volume at N/S Collector & Drive 9 = 170 vph (Node 21)

The proposed site plan does not currently provide right-turn lanes at these intersections. It is recommended that the development revisit their site plan to accommodate the AMC requirement based on the assigned traffic volumes.

Per the AMC, right-turn lanes are required on minor arterial streets where the right-turn volume is at least 60 vehicles per hour. The minimum right-turn length for an arterial at the intersection of a collector or other location is 150 feet plus taper.

There are three intersections on Bailey Road that meet the volume criteria:

1) The eastbound right-turn volume at Bailey Road & N/S Collector = 366 vph (Node 7)
2) The eastbound right-turn volume at Bailey Road & Drive 8 = 107 vph (Node 20)
3) The westbound right-turn volume at Bailey Road & N/S Collector = 109 vph (Node 7)

The proposed site plan accommodates right-turn lanes for eastbound and westbound Bailey Road & N/S Collector, but does not currently for eastbound Bailey Road & Drive 8. It is recommended that the development revisit their the site plan to accommodate the AMC requirement based on the assigned traffic volumes.

6.0 INTERSECTION CAPACITY ANALYSIS

6.1 LEVEL OF SERVICE OVERVIEW

Intersection capacity analyses were performed using the Highway Capacity Manual (HCM) 10th Edition Methodology provided in Synchro v11. The amount of delay is equated to a Level of Service (LOS) based on defined thresholds. A grade of A through F is assigned, with LOS A representing the best intersection operation. Error! Reference source not found. shows the LOS associated with intersection approach delays, in seconds per vehicle (sec/veh), for signalized and unsignalized intersection cases.

TABLE 9: LEVEL OF SERVICE

Level of Service (LOS)	Stop Control Approach Delay (sec/veh)	Signal Control Approach Delay (sec/veh)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

Existing traffic signal timings were provided by MoDOT and the City of Lee's Summit. The timings were entered into the Synchro v11 program for the signalized intersection analyses.

Intersection capacity analyses were performed at the study intersections for the following scenarios:

- Base Conditions (existing traffic volumes + Oldham Village "West" assignment)
- Base + Phase 1 Conditions
- Base + Phase 1-2 Conditions
- Base + Full Development Conditions
- Future Year 2045 Conditions

The City of Lee's Summit has adopted LOS C as the minimum desirable LOS. However, LOS D and E may be considered acceptable for low to moderate traffic volumes, the availability of alternate routes, and the duration of activity resulting in lower LOS.

Traffic 95th percentile queues were also evaluated with the analyses and have been presented graphically within Figures throughout the study. These queues have been reviewed to ensure the analyses are reflective of the physical constraints of the study intersections and to identify if additional storage is needed for turn lanes.

6.2 BASE CONDITIONS ANALYSIS

Capacity analyses were conducted for existing traffic volumes plus the trip assignments from the full build out of the Oldham Village "West" study. The combination of these volumes represents the Base Condition. The analysis was performed for the weekday AM, PM, and Saturday peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown on **Figures 4** and **5**. The 95th percentile queues for each movement are shown in **Figure 6**. The Synchro reports are provided in **Appendix D**.

Table 10 provides a summary of the analysis at the study intersections applicable to this condition.

TABLE 10: BASE CONDITION (LOS)

Intersection		Movement	Operational Analysis Results					
			AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	M-291 & Oldham Parkway	Signalized	30.7	C	18.1	B	26.2	C
2	M-291 & Persels/Bailey	Signalized	25.8	C	44.2	D	32.7	C
3	M-291 & 16th Street	WB	18.5	C	17.1	C	14.0	B
4	M-291 & Scherer	Signalized	21.5	C	41.3	D	13.8	B
5	Bailey Road & Hamblen Road	Signalized	13.7	B	14.2	B	14.3	B

The Base Condition delays and LOS for the M-291 intersections with Oldham and Persels/Bailey in **Table 10** are slightly different than the Existing + Full Development Peak Hour Conditions in the previous study. This is for two primary reasons. First, the existing traffic volumes were collected three years apart. Second, the long-term car storage land use west of Jefferson Street is now vacant. Some signal timing adjustments were made to optimize the intersections with the primary one being an adjustment to the Saturday cycle length from 100-seconds to 120-seconds along M-291.

The results in **Table 10** indicate that most of the study intersections are projected to operate at acceptable levels of service.

Intersections of interest:

M-291 & Oldham Parkway (Node 1)

This intersection is expected to operate at LOS C or better for all peak hours under Base Conditions.

M-291 & Persels/Bailey (Node 2)

During the PM peak hour, the intersection of M-291 & Persels/Bailey is projected to operate at LOS D. It is not uncommon for intersections on high volume roadways to operate at LOS D during peak periods. Highways. In the PM peak hour, the eastbound left turn movement at the intersection has a 95% queue length of 210' which will be less than the newly constructed eastbound left turn storage provided with the Oldham Village improvements. The southbound thru movement has a 95% queue length of 878', which is long, but space is available, and it clears within one cycle of the signal.

M-291 & Scherer (Node 4)

During the PM peak hour, the intersection of M-291 & Scherer is projected to operate at LOS D. The southbound thru movement has a 95% queue length of 974', which is long, but space is available, and the queue clears within one cycle length.

6.3 BASE + PHASE 1 CONDITIONS ANALYSIS

Capacity analyses were conducted for Base plus Phase 1 development conditions at the study intersections to determine the impact of the site generated traffic from Phase 1 of the proposed development. The cycle lengths were optimized for the study intersections for the analysis. The analysis was performed for the weekday AM, PM, and Saturday peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown on **Figures 12** and **13**. The 95th percentile queues for each movement are shown in **Figure 14**. The Synchro reports are provided in **Appendix D**.

Table 11 provides a summary of the analysis at the study intersections applicable to this condition.

TABLE 11: BASE + PHASE 1 (LOS)

Intersection		Movement	Operational Analysis Results					
			AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	M-291 & Oldham Parkway	Signalized	25.3	C	46.5	D	39.6	D
2	M-291 & Persels/Bailey	Signalized	27.6	C	51.3	D	35.0	C
3	M-291 & 16th Street	WB	18.8	C	17.7	C	14.7	B
4	M-291 & Scherer	Signalized	22.1	C	48.0	D	14.6	B
5	Bailey Road & Hamblen Road	Signalized	13.9	B	24.2	C	15.9	B
6	Oldham Pkwy & N/S Collector	Signalized	10.1	B	15.1	B	18.8	B
9	Oldham Pkwy & RIRO	SB	8.8	A	12.4	B	15.5	C
10	Oldham Pkwy & Fuel Station	SB	0.0	A	0.0	A	0.0	A

The results in **Table 11** indicate that most of the intersections are projected to operate acceptably with the additional trips assigned by Phase 1 of the development.

Intersections of interest:

M-291 & Oldham Parkway (Node 1)

With Phase 1 added to this intersection, the PM peak hour increases to LOS D. The longest 95% queues identified in **Figure 14** for critical movements are as follows:

-	Northbound Left	171’	SAT peak	250’ of storage provided
-	Northbound Thru	403’	PM peak	1500’ of storage available
-	Southbound Left	315’	SAT peak	310’ of storage provided
-	Southbound Thru	424’	PM peak	500’ of storage available
-	Eastbound Left	332’	SAT peak	300’ of storage available
-	Westbound Left	183’	SAT peak	250’ of storage provided

The southbound left turn lane 95% queue is 5’ beyond the storage provided in the Base + Phase Condition. This condition will need evaluated in future phases.

M-291 & Persels/Bailey (Node 2)

As in the Base Conditions scenario, M-291 & Persels/Bailey is projected to operate at LOS D during the PM peak hour.

In the PM peak hour, the eastbound left turn movement at the intersection has a 95% queue length of 226’ which will be less than the newly constructed eastbound left turn storage provided with the Oldham Village improvements. Only the SAT The southbound thru movement has a 95% queue length of 911’, which is long, but space is available, and it clears within one cycle of the signal. Improvements to this intersection, potentially the addition of a third southbound thru lane, should be evaluated in future phases.

M-291 & Scherer (Node 4)

During the PM peak hour, the intersection of M-291 & Scherer is projected to operate at LOS D. The southbound thru movement has a 95% queue length of 1014’, which is long, but space is available, and the queue clears within one cycle length.

Oldham Parkway and N/S Collector (Node 6)

The new proposed signalized intersection of Oldham Parkway and N/S Collector met the MUTCD Peak Hour Warrant and is expected to operate at LOS B or better. A review of 95% queues for the T-intersection connected with this phase identifies that all approaches fit within the proposed storage lengths with the longest queue being eastbound left in the Saturday peak at 71 feet.

6.4 BASE + PHASE 1-2 CONDITIONS ANALYSIS

Capacity analyses were conducted for Base plus Phase 1-2 development conditions at the study intersections to determine the impact of the site generated traffic from Phase 2 of the proposed development. The cycle lengths were optimized for the study intersections for the analysis. The analysis was performed for the weekday AM, PM, and Saturday peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown on **Figures 19** and **20**. The 95th percentile queues for each movement are shown in **Figure 21**. The Synchro reports are provided in **Appendix D**.

Table 12 provides a summary of the analysis at the study intersections applicable to this condition.

TABLE 12: BASE + PHASE 1-2 (LOS)

Intersection		Movement	Operational Analysis Results					
			AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	M-291 & Oldham Parkway	Signalized	41.4	D	49.1	D	51.8	D
2	M-291 & Persels/Bailey	Signalized	27.9	C	34.0	C	34.5	C
3	M-291 & 16th Street	WB	19.7	C	19.6	C	17.1	C
4	M-291 & Scherer	Signalized	23.8	C	46.9	D	17.6	B
5	Bailey Road & Hamblen Road	Signalized	13.9	B	27.7	C	18.4	B
6	Oldham Pkwy & N/S Collector	Signalized	12.4	B	17.3	B	24.1	C
7	Bailey Road & N/S Collector	SB	14.1	B	40.8	E	23.5	C
9	Oldham Pkwy & RIRO	SB	9.6	A	15.4	C	21.9	C
10	Oldham Pkwy & Fuel Station	NB	9.8	A	13.3	B	15.6	C
		SB	8.6	A	9.0	A	9.2	A
11	N/S Collector & Drive 1	EB	10.9	B	19.0	C	33.4	D
		WB	9.1	A	10.4	B	11.1	B
12	N/S Collector & North EW Drive	EB	9.7	A	12.4	B	14.2	B
		WB	8.5	A	8.8	A	8.9	A
13	North EW Drive & Drive 2	SB	8.7	A	8.7	A	8.7	A
14	North EW Drive & Drive 3	NB	8.5	A	8.6	A	8.5	A
15	North EW Drive & Drive 4	SB	0.0	A	0.0	A	0.0	A
16	N/S Collector & South EW Drive	EB	8.8	A	10.0	A	10.5	B
		WB	9.1	A	10.8	B	11.6	B
17	South EW Drive & Drive 5	NB	0.0	A	0.0	A	0.0	A
		WB	8.8	A	7.3	A	7.3	A
18	South EW Drive & Drive 6	EB	0.0	A	8.4	A	8.4	A
		WB	8.8	A	9.0	A	8.9	A
19	Drive 7	WB	9.0	A	9.2	A	9.1	A
20	Bailey Road & Drive 8	SB	11.6	B	18.9	C	14.4	B

There are several new internal site intersections to evaluate with the addition of Phase 2. The results in **Table 12** indicate that most of the intersections are projected to operate acceptably with the additional trips assigned by Phase 2 of the development.

Intersections of interest:

M-291 & Oldham Parkway (Node 1)

All three peak hours meet LOS D at this intersection with the additional trips associated with Phase 2. The longest 95% queues identified in **Figure 21** for critical movements are as follows:

-	Northbound Left	168’	AM peak	250’ of storage provided
-	Northbound Thru	417’	AM peak	1500’ of storage available
-	Southbound Left	426’	SAT peak	310’ of storage provided
-	Southbound Thru	413’	PM peak	500’ of storage available
-	Eastbound Left	358’	SAT peak	300’ of storage available
-	Westbound Left	290’	SAT peak	250’ of storage provided

With the 95% queue for the southbound left turn lanes exceeding its storage capacity, it is recommended that the double left-turn lane in this direction be lengthened to at least 430’ or as long as feasible by the constraints of M-291 Highway between the US-50 Interchange and Oldham Road.

The 95% queue for the westbound left turn lanes also exceeds its storage capacity by 40’. Consideration should be given to lengthening this storage length; however the estimated westbound thru 95% queues are notably low and below 100’.

M-291 & Persels/Bailey (Node 2)

With the additional Phase 2 traffic this intersection experienced noteworthy overall delays and queue problems under the lane geometrics in Phase 1. This was predominantly driven by the fact that the intersection currently only has two southbound-thru lanes, with three northbound-thru lanes. To improve this situation, it is recommended that a new third southbound lane be added to M-291 with Phase 2. fine. For the capacity analyses that follow, this additional thru-lane was added to the model.

With the additional third southbound-thru lane improves in Phase 2 to an overall LOS C for all three peak hours. There were notable improvements to the PM peak 95% queue length for the southbound thru movement from 911’ at Phase 1 to 323’ at Phase 2.

M-291 & Scherer (Node 4)

As identified in Phase 1, the intersection of M-291 & Scherer is projected to operate at LOS D during the PM peak. The southbound thru movement has a 95% queue of 1127’, which is long and approaching what can reasonably be cleared in a single traffic signal cycle.

Oldham Parkway and N/S Collector (Node 6)

With Phase 2, the proposed signalized intersection of Oldham Parkway and N/S Collector will have its southern approach opened to traffic and become a four-legged intersection. The eastbound right-turn volume in the Saturday peak hour is projected to be 404 vehicles, with a corresponding northbound left-turn peak hour projection of 334 vehicles. The capacity analysis indicates that the intersection will function well with an overall LOS C or better and that 95% queues will fit within the provided storage.

6.5 BASE + FULL DEVELOPMENT CONDITIONS ANALYSIS

Capacity analyses were conducted for Base plus Full Development conditions at the study intersections to determine the impact of the site generated traffic from Phase 3 of the proposed development. The cycle lengths were optimized for the study intersections for the analysis. The analysis was performed for the weekday AM, PM, and Saturday peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown on **Figures 25** and **26**. The 95th percentile queues for each movement are shown in **Figure 27**. The Synchro reports are provided in **Appendix D**.

Table 13 provides a summary of the analysis at the study intersections applicable to this condition.

TABLE 13: BASE + FULL DEVELOPMENT (LOS)

Intersection		Movement	Operational Analysis Results					
			AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	M-291 & Oldham Parkway	Signalized	41.6	D	49.7	D	54.8	D
2	M-291 & Persels/Bailey	Signalized	29.7	C	34.9	C	39.2	D
3	M-291 & 16th Street	WB	22.5	C	25.5	D	24.5	C
4	M-291 & Scherer	Signalized	26.3	C	47.3	D	20.9	C
5	Bailey Road & Hamblen Road	Signalized	14.2	B	30.8	C	22.0	C
6	Oldham Pkwy & N/S Collector	Signalized	12.4	B	17.3	B	25.9	C
7	Bailey Road & N/S Collector	Signalized	19.6	B	29.2	C	26.7	C
8	N/S Collector & 16th Street	SB	8.7	A	9.0	A	8.9	A
9	Oldham Pkwy & RIRO	SB	9.6	A	15.4	C	21.9	C
10	Oldham Pkwy & Fuel Station	NB	9.8	A	13.2	B	15.6	C
		SB	8.6	A	9.0	A	9.2	A
11	N/S Collector & Drive 1	EB	10.9	B	19.0	C	33.4	D
		WB	9.1	A	10.4	B	11.1	B
12	N/S Collector & North EW Drive	EB	9.7	A	12.4	B	14.2	B
		WB	8.5	A	8.8	A	8.9	A
13	North EW Drive & Drive 2	SB	8.7	A	8.7	A	8.7	A
14	North EW Drive & Drive 3	NB	8.5	A	8.6	A	8.5	A
15	North EW Drive & Drive 4	SB	0.0	A	0.0	A	0.0	A
16	N/S Collector & South EW Drive	EB	8.8	A	10.0	A	10.5	B
		WB	9.1	A	10.8	B	11.6	B
17	South EW Drive & Drive 5	NB	8.5	A	0.0	A	0.0	A
18	South EW Drive & Drive 6	EB	0.0	A	8.4	A	8.4	A
		WB	8.8	A	9.0	A	9.0	A
19	Drive 7	WB	9.0	A	9.2	A	9.1	A
20	Bailey Road & Drive 8	NB	22.7	C	216.2	F	94.0	F
		SB	12.4	B	25.5	D	18.5	C
21	N/S Collector & Drive 9	EB	14.2	B	18.1	C	33.3	D
		WB	9.1	A	9.6	A	9.9	A
22	N/S Collector & Drive 10	EB	9.8	A	10.5	B	12.2	B
		WB	8.6	A	8.8	A	8.8	A
23	N/S Collector & Drive 11	EB	9.1	A	9.2	A	9.4	A
		WB	9.1	A	9.9	A	10.5	B
24	16th Street & Park Driveway	NB	8.8	A	8.8	A	8.7	A

There are several four new site intersections to evaluate with the addition of Phase 3. The results in **Table 13** indicate that most of the intersections are projected to operate acceptably with the additional trips assigned by Phase 2 of the development.

Intersections of interest:

M-291 & Oldham Parkway (Node 1)

All three peak hours meet or exceed LOS D at this intersection with the additional trips associated with Phase 3. The longest 95% queues identified in **Figure 27** for critical movements are as follows:

- Northbound Left 164' AM peak 250' of storage provided
- Northbound Thru 554' SAT peak 1500' of storage available
- Southbound Left 426' SAT peak 430' of storage provided by Phase 2
- Southbound Thru 459' PM peak 500' of storage available
- Eastbound Left 358' SAT peak 300' of storage available
- Westbound Left 290' SAT peak 250' of storage provided

As with Phase 2, the 95% queue for the southbound left-turn lanes is longer that what is provided in the base condition; however, it was previously recommended that the lanes be widened to a minimum of 430' length so that value is shown in the information above.

Also as with Phase 2, the 95% queue for the westbound left turn lanes also exceeds its storage capacity by 40'.

M-291 & Persels/Bailey (Node 2)

With the additional Phase 3 traffic, this intersection again experiences noteworthy challenges even after the addition of the 3rd southbound thru lane in Phase 2. The primary contributors to the challenges are the projected 381 new southbound left-turn vehicles and corresponding 289 new westbound right-turn vehicles during the Saturday peak hour. To improve this situation and for the capacity analyses that follow, two geometric improvement recommendations were made to the intersection: first, a second southbound left-turn lane was added, second, the westbound right-turn should be channelized with a more yield oriented free-flow movement.

With the improvements, the intersection maintains a LOS D or better in all peak hours. The PM Peak 95% queue length for the southbound thru movement was calculated at 584' which remains better than the Base Conditions.

M-291 & Scherer (Node 4)

As identified in Phases 1 and 2, the intersection of M-291 & Scherer is projected to operate at LOS D during the PM peak. With Phase 3 The southbound thru movement has a 95% queue of 1187', which is long and approaching what can reasonably be cleared in a single traffic signal cycle. This is not a significant increase from what was identified with Phase 2, and it is clear that Improvements to this intersection, likely consisting of widening M-291 to three lanes in both directions will be necessary at some point in the future.

Oldham Parkway and N/S Collector (Node 6)

With Phase 3, there were no additional trips assigned to this intersection, it will be expected to operate in a similar manner to Phase 2.

Bailey Road & N/S Collector (Node 7)

While not an issue as a southbound stop controlled, T-intersection in Phase 2, this intersection experienced significant two-way unsignalized delays (LOS F) and queues with the traffic assigned to it in Phase 3. A peak hour traffic signal warrant analysis was performed for the 4-legged intersection with the volumes assigned in Phase 3 (see **Figure 25**). These traffic volumes were plotted on *Figure 4C-3, Warrant 3, Peak Hour* from the *Manual of Uniform Traffic Control Devices* (MUTCD) for the AM, PM, and Saturday peak hours. The plotted results may be seen on **Figure 28**.

Figure 28 illustrates that the Peak Hour Traffic Signal Warrant is met at Node 7 during the Base + Full Development condition.

This intersection was reevaluated as a signalized intersection for the data provided in **Table 13**. The overall LOS for the signalized intersection was LOS C or better for all peak hours. It is recommended that the intersection become signalized and some point during the development of lots in Phase 3.

Bailey Road & Drive 8 (Node 20)

As with Node 7 above, this intersection had no issues as a southbound stop-controlled, T-intersection in Phase 2. With the addition of the south leg serving Lot 19 and the associated assigned trips found in **Figure 25**, (107 eastbound right-turns during Saturday peak and a corresponding 103 northbound right-turns) it is estimated to have LOS F in the PM and Saturday peak hour. Approximately 100’ of northbound throat distance is provided on the submitted site plans.

N/S Collector & Drive 9 (Node 21)

The first driveway south of Bailey Avenue with the new N/S Collector street provides shared access to Lots 14-15 to the west and Lot 19 to the east. During the Saturday peak hour the projected eastbound left-turn exiting volume is 162 vehicles with only a 50’ throat lane provided. Consideration should be given to increasing the throat length at this driveway to better accommodate potential peak hour queues at full build out.

N/S Collector & Drive 10 (Node 22)

The second driveway south of Bailey Avenue with the new N/S Collector street provides shared access to Lots 16-17 to the west and Lot 19 to the east. During the Saturday peak hour the projected eastbound left-turn exiting volume is 107 vehicles with only a 50’ throat lane provided. Consideration should be given to increasing the throat length at this driveway to better accommodate potential peak hour queues at full build out.

6.6 FUTURE YEAR 2045 CONDITIONS ANALYSIS

Capacity analyses were conducted for Future Year 2045 Base conditions at the study intersections to determine the impact of the site generated traffic in Year 2045. To estimate background traffic growth for this study, the existing through volumes on M-291 were assumed to increase at a rate of 1% per year to estimate conditions in 2045. The cycle lengths were optimized for the study intersections for the analysis. The analysis was performed for the weekday AM, PM, and Saturday peak hours and is based on the traffic volumes, lane configurations, and traffic controls shown on **Figures 30 and 31**. The 95th percentile queues for each movement are shown in **Figure 32**. The Synchro reports are provided in **Appendix D**.

Table 14 provides a summary of the analysis at the study intersections applicable to this condition.

TABLE 14: FUTURE YEAR 2045 (LOS)

Intersection		Movement	Operational Analysis Results					
			AM Peak Hour		PM Peak Hour		Sat Peak Hour	
			Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
1	M-291 & Oldham Parkway	Signalized	48.2	D	60.8	E	76.9	E
2	M-291 & Persels/Bailey	Signalized	29.1	C	40.8	D	44.5	D
3	M-291 & 16th Street	WB	31.5	D	37.8	E	33.4	D
4	M-291 & Scherer	Signalized	60.1	E	100.6	F	35.4	D

The results of the analysis in **Table 14** indicate that the signalized intersections along M-291 are projected to operate at LOS D-F in the future, with the intersection of M-291 and Scherer having the worst overall LOS.

Should these volumes be realized, the intersection of M-291 and Bailey would benefit from an additional eastbound and westbound lane, and an additional northbound left-turn lane. These improvements would be in addition to the improvements recommended in this study and would provide double-left turns in all directions, three north-south thru lanes and two east-west through lanes.

Should these volumes be realized, the intersection of M-291 and Scherer would also benefit from improvements. Particularly the extension of three north-sound thru lanes, and consideration for double-left turns.

7.0 CONCLUSIONS AND RECOMMENDATIONS

This traffic impact study for Village East has covered many items. It has collected existing traffic volumes and created a trip generation and distribution for 20 proposed lots of the development to be constructed over three development phases. It has performed analyses at 24 study intersections for the following conditions:

- Base Conditions
- Base + Phase 1 Conditions
- Base + Phase 1-2 Conditions
- Base + Phase 1-3 (Full Development Conditions)
- Future Year 2045 Conditions

The proposed development is projected to develop 37,391 trips daily trips, 1,622 AM peak hour trips , 3,130 PM peak hour trips, and 4,159 Saturday peak hour trips. These trips represent primary trips generated by the site, and do not include pass-by trips.

Several street or intersection improvement recommendations/considerations have been identified in this study to mitigate the additional traffic introduced by the development of Village East during its three Phases. The recommendations are as follows by Phase and intersection name and node number:

Base + Phase 1 Conditions

- M-291 & Oldham Parkway (Node 1)
  - Consider extending the existing southbound M-291 double left-turn lane from its current 310' length to a minimum length of 430' or as long as feasible with the existing M-291 geometrics. This improvement will be recommended in Phase 2.
- M-291 & Persels/Bailey (Node 2)
  - Prepare for the addition of a third southbound M-291 thru-lane from Oldham Parkway through this intersection. It is not required with Phase 1, but will become necessary as Phase 2 develops.
- Oldham Parkway & N/S Collector (Node 6)
  - ***Recommended:*** Installation of a new T-intersection traffic signal which will meet the Peak Hour Warrant at Phase 1. Build the south leg of the intersection to provide the sidewalk/crosswalk area and end at the curb radii.

Base Plus Phase 1-2 Conditions

- M-291 & Oldham Parkway (Node 1)
  - ***Recommended:*** Prior to any additional lots in Phase 2, extend the existing southbound M-291 double left-turn lane from its current 310' length to a minimum length of 430' or as long as feasible with the existing M-291 geometrics.
  - Consider lengthening the westbound left turn storage bay by 50' feet to meet anticipated 95% queues. With projected WB thru 95% queues of 98', this may not be necessary.

- M-291 & Persels/Bailey (Node 2)
  - Recommended: Construct an additional dedicated southbound M-291 thru-lane through this intersection. This M-291 widening would occur south of Oldham Parkway and be carried through the intersection of Persels/Bailey and terminate south of Persels in the southbound right-turn lane at 16th Street.
- M-291 & Scherer (Node 4)
  - Monitor growth rates along M-291 in addition to traffic generated by the Oldham Village "West" and Village East developments.
- NS Collector & Drive 1 (Node 11)
  - *Recommended*: With a projected southbound peak hour right-turn volume of 129vph a southbound right-tun lane (100 min plus taper) should be added to NS Collector.
  - *Recommended*: Developer reevaluate the configuration of the lot 4-5 and 6-7 layouts so that the eastbound and westbound intersection throat distances can better accommodate projected peak hour vehicle queues at this driveway.

Base Plus Phase 3 (Full Development) Conditions

- M-291 & Persels/Bailey (Node 2)
  - *Recommended:* Prior to any additional lots in Phase 3, construct an additional southbound left-turn lane with associated intersection improvements and road widening improvements along the south side of Bailey Avenue to accommodate the second left-turn lane.
  - *Recommended:* Prior to any additional lots in Phase 3, upgrade the existing westbound right-turn lane configuration to a better channelized right-turn lane design.
- M-291 & Scherer (Node 4)
  - Monitor growth rates along M-291 in addition to traffic generated by the Oldham Village "West" and Village East developments. The extension of the additional third southbound M-291 thru-lane as well as a third northbound lane could be in the Highway's future but not at the responsibility of this development.
- Bailey Road & N/S Collector (Node 7)
  - *Recommended:* Installation of a new four-leg intersection traffic signal which meets the Peak Hour Warrant sometime during Phase 3. City and developer may negotiate what the criteria trigger (number of lots or a certain trip distribution northbound left-turn volume at the intersection). A westbound right-turn lane should be constructed with these improvements.
- Bailey Road & Drive 8 (Node 20)
  - *Recommended*: Construct a westbound right-turn lane at this intersection.
- Phase 3: The City and Developer may be able to agree that the NS Collector from Bailey Road to 16th Street could be classified as a Private Street which could alleviate the noncompliance with the AMC for the intersections along this portion of the development.
- NS Collector & Drive 9 (Node 21)
  - *Recommended*: With a projected southbound peak hour right-turn volume of 170vph a southbound right-tun lane (100 min plus taper) should be added to NS Collector.
  - *Recommended*: Developer reevaluate the configuration of the lot 14-15 layout so that the eastbound intersection throat distance can better accommodate projected peak hour vehicle queues at this driveway.
- NS Collector & Drive 10 (Node 22)

- *Recommended*: Developer to update site plan with shared access to Lots 16 and 17. Also, reevaluate the configuration of the lot 16-17 layout so that the eastbound intersection throat distance can better accommodate projected peak hour vehicle queues at this driveway.

- N/S Collector & Drive 11 (Node 23)
  - *Recommended*: Developer reevaluate the configuration of the lot 18 layout so that the eastbound intersection throat distance can better accommodate projected peak hour vehicle queues at this driveway.

Future Year 2045 Conditions

Future conditions were also reviewed to identify the need for capacity improvements on M-291. The primary recommendation would be to provide for three northbound and southbound M-291 lanes from Scherer to US-50. At Bailey Road, the construction of an additional northbound left-turn lane and two eastbound/westbound thru lanes should be anticipated.

If realignment of Scherer to M-291 is planned, the intersection should evaluate the need for double-left turns as well as two eastbound/westbound thru lanes.

If there are any questions regarding this study, please contact me at your convenience at 816-898-0669 or mark.sherfy@ibhc.com.

Sincerely,
Mark Sherfy, PE, PTOE
Vice-President │ Development Group Director
BHC

APPENDICES

APPENDIX A - FIGURES

APPENDIX B – TRAFFIC COUNT DATA

APPENDIX C - ITE TRIP GENERATION REPORTS

APPENDIX D - CAPACITY AND QUEUING ANALYSES

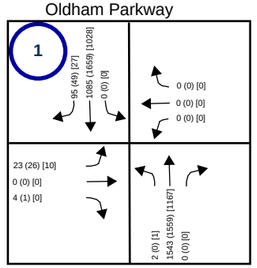
APPENDIX E – KITTELSON and ASSOCIATES TRAFFIC MEMO

APPENDIX F – OLDHAM VILLAGE "WEST" TRAFFIC IMPACT STUDY

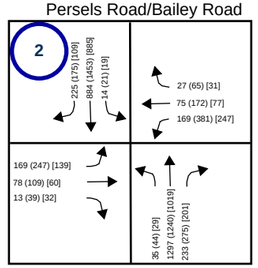
APPENDIX A
FIGURES

PROJECT LOCATION AND STUDY AREA

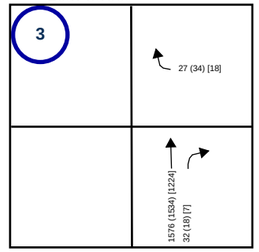
M-291 &
Oldham Parkway



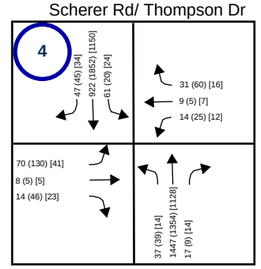
M-291 &
Persels Road/Bailey Road



M-291 &
16th Street



M-291 &
Scherer Rd/ Thompson Dr



Bailey Road &
Hamblen Road

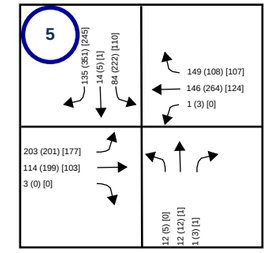
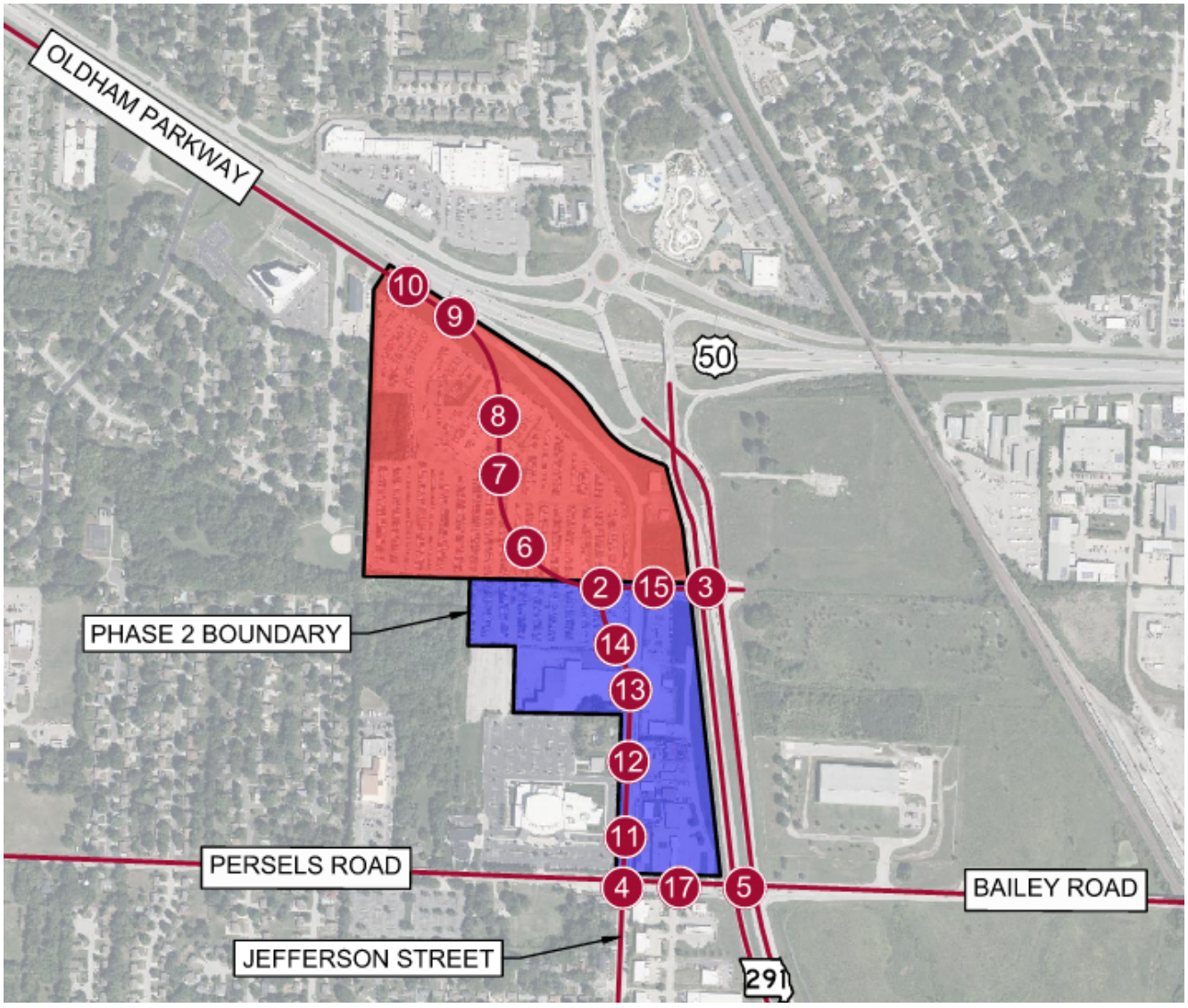
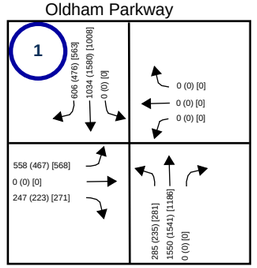


FIGURE 2

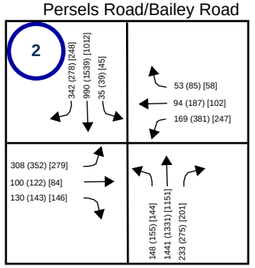
OLDHAM VILLAGE "WEST" STUDY AREA



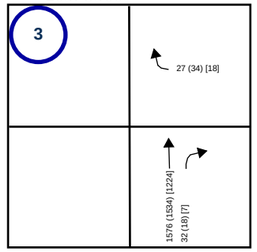
M-291 &
Oldham Parkway



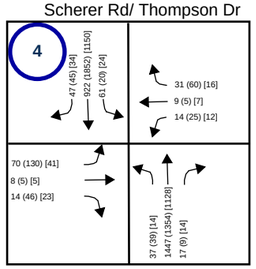
M-291 &
Persels Road/Bailey Road



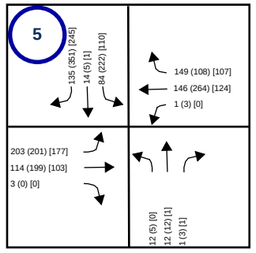
M-291 &
16th Street



M-291 &
Scherer Rd/ Thompson Dr



Bailey Road &
Hamblen Road

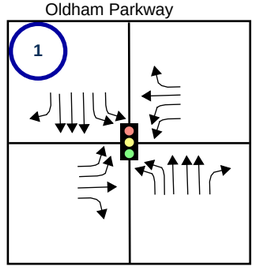


BASE CONDITION PEAK HOUR VOLUMES
EXISTING VOLUMES + OLDHAM VILLAGE "WEST" FULL DEVELOPMENT

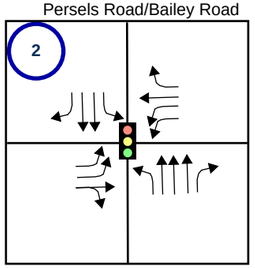
AM Peak = 7:45-8:45
(PM) Peak = 4:30-5:30
[SAT] Peak = 12:00-1:00

FIGURE 4

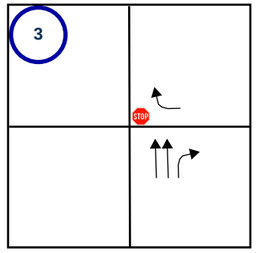
M-291 &
Oldham Parkway



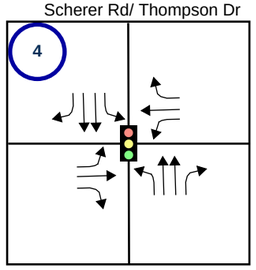
M-291 &
Persels Road/Bailey Road



M-291 &
16th Street



M-291 &
Scherer Rd/ Thompson Dr



Bailey Road &
Hamblen Road

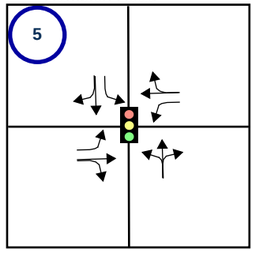
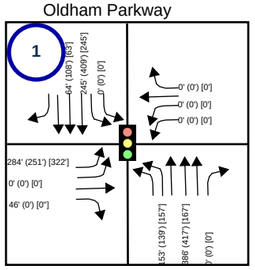
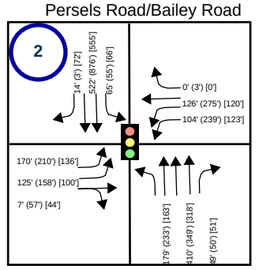


FIGURE 5

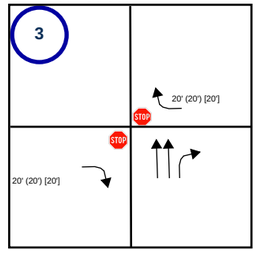
M-291 &
Oldham Parkway



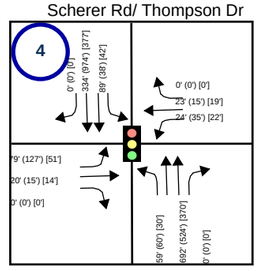
M-291 &
Persels Road/Bailey Road



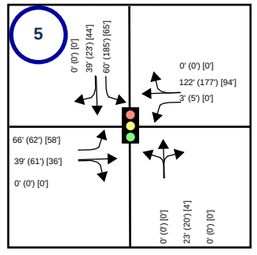
M-291 &
16th Street



M-291 &
Scherer Rd/ Thompson Dr



Bailey Road &
Hamblen Road

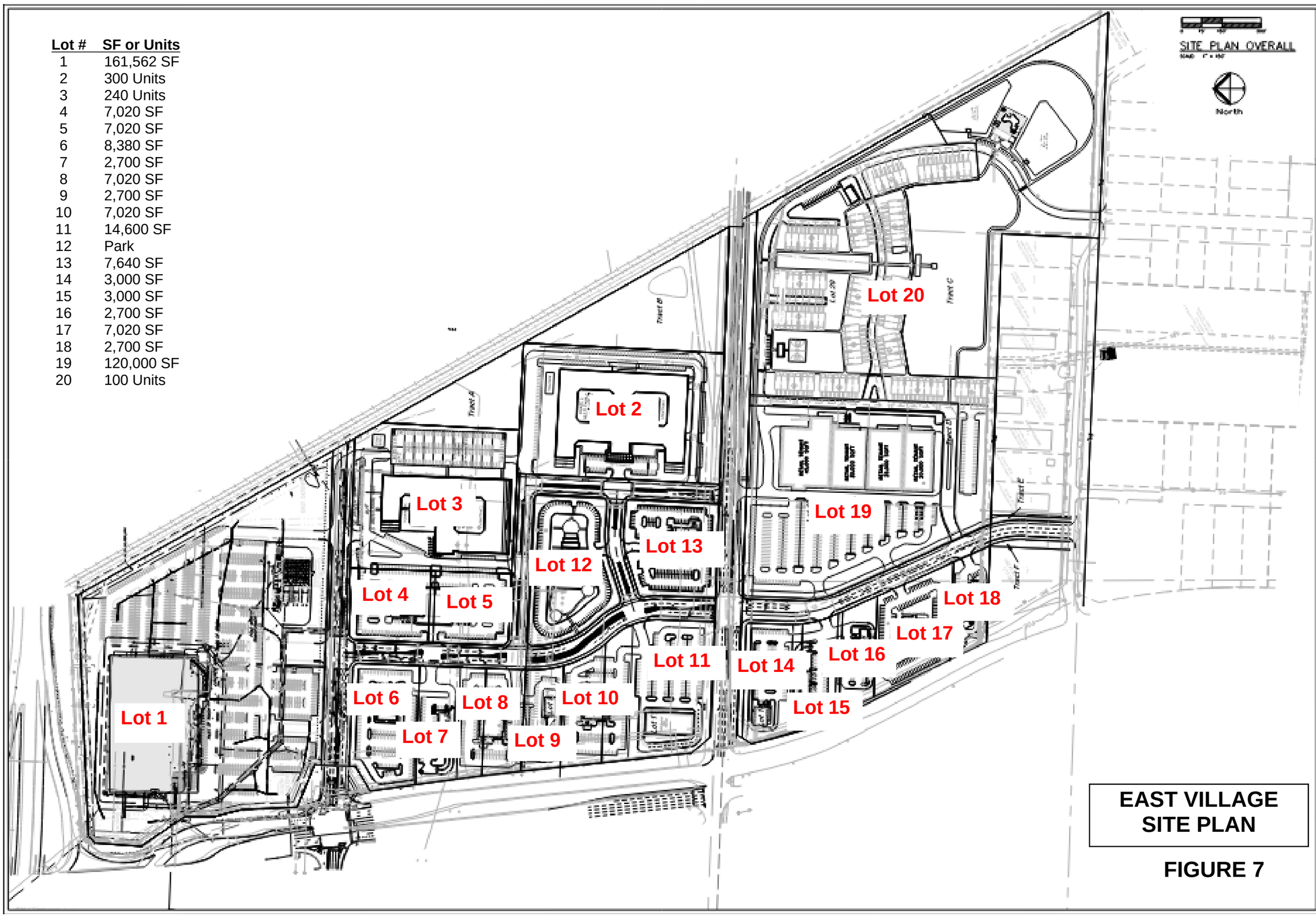


BASE CONDITIONS 95% QUEUE LENGTHS

AM(PM)[SAT] = 95% Queues in feet

FIGURE 6

Lot #	SF or Units
1	161,562 SF
2	300 Units
3	240 Units
4	7,020 SF
5	7,020 SF
6	8,380 SF
7	2,700 SF
8	7,020 SF
9	2,700 SF
10	7,020 SF
11	14,600 SF
12	Park
13	7,640 SF
14	3,000 SF
15	3,000 SF
16	2,700 SF
17	7,020 SF
18	2,700 SF
19	120,000 SF
20	100 Units



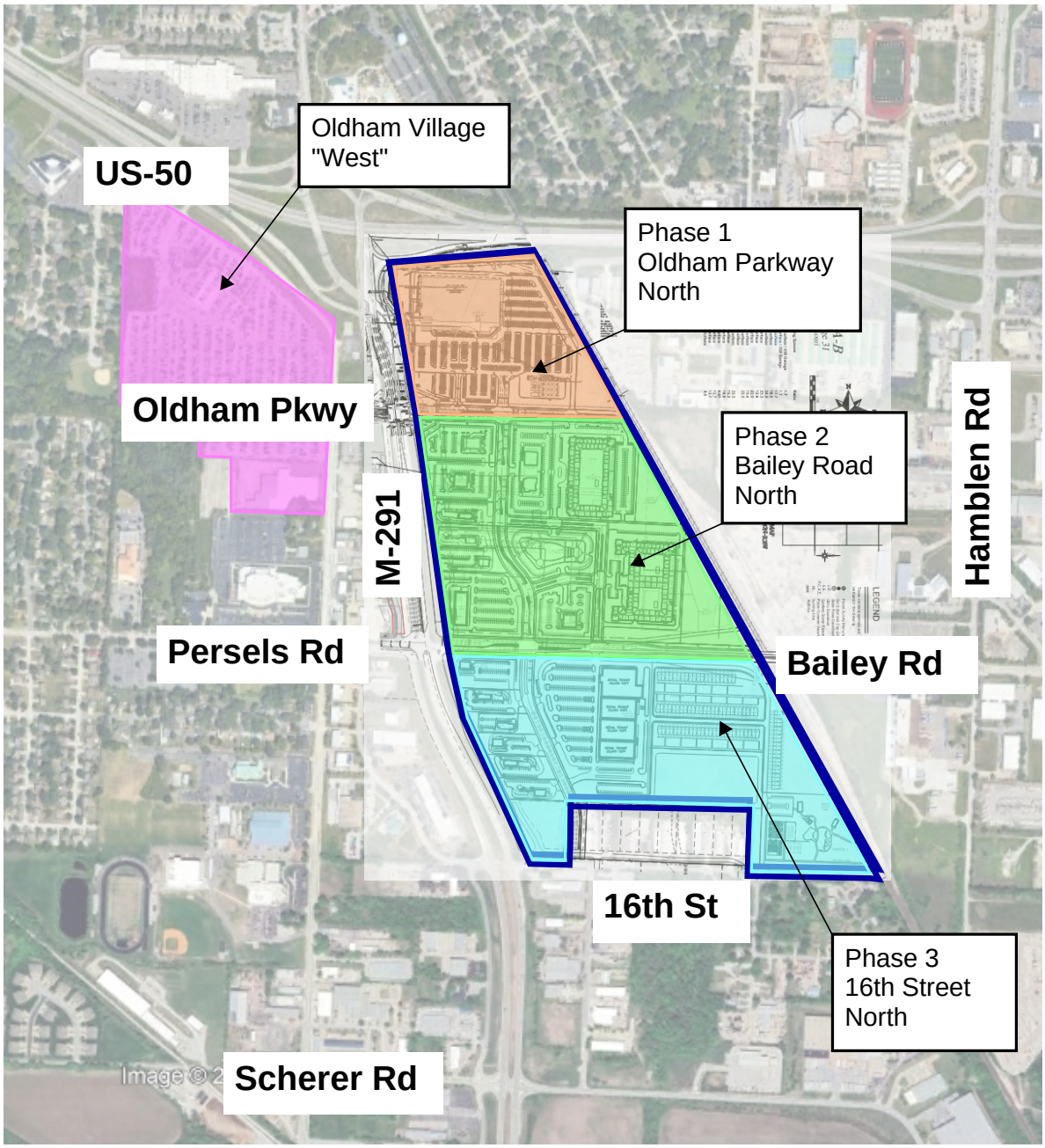
EAST VILLAGE SITE PLAN

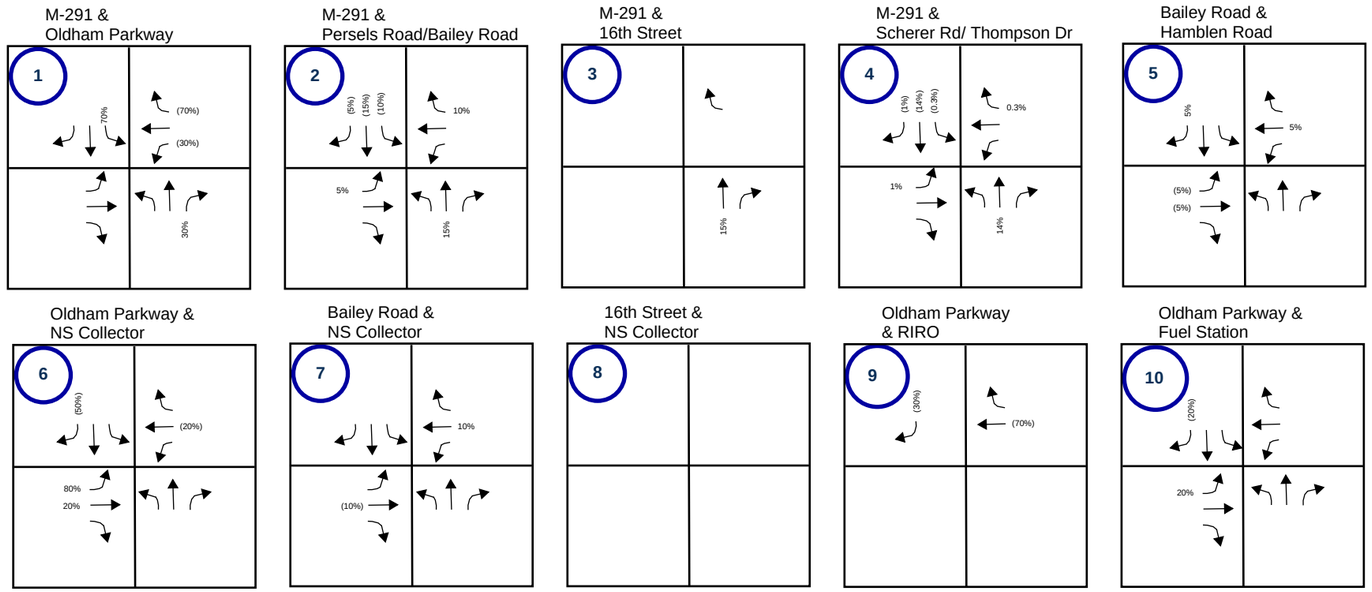
FIGURE 7

ENGINEERING SOLUTIONS

SITE PLAN
Preliminary Development Plans for:
East Village
Lee's Summit, Jackson County, Missouri

EAST VILLAGE PHASING





PHASE 1 OLDHAM PARKWAY NORTH PRIMARY TRIP DISTRIBUTION

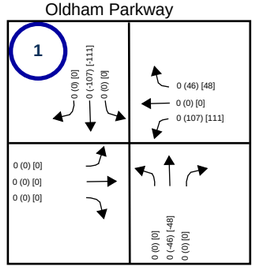
x% = Inbound Site Traffic
(x%) = Outbound Site Traffic

FIGURE 9

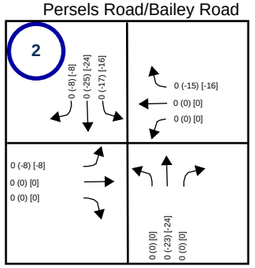
PHASE 1 OLDHAM PARKWAY NORTH PASS-BY TRIP VOLUMES

AM(PM)[SAT] Traffic Volumes

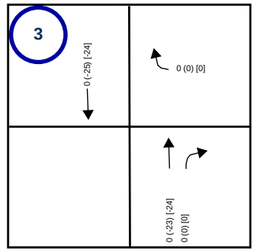
M-291 & Oldham Parkway



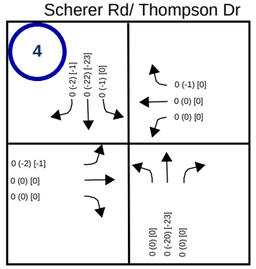
M-291 & Persels Road/Bailey Road



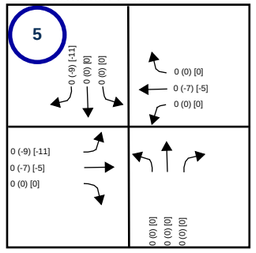
M-291 & 16th Street



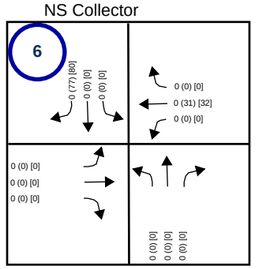
M-291 & Scherer Rd/ Thompson Dr



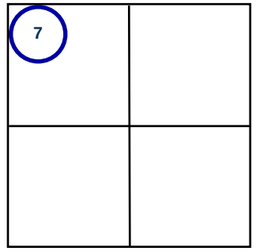
Bailey Road & Hamblen Road



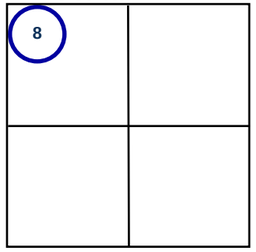
Oldham Parkway & NS Collector



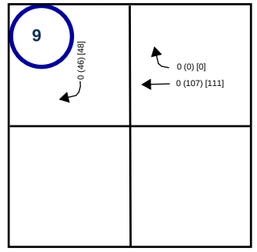
Bailey Road & NS Collector



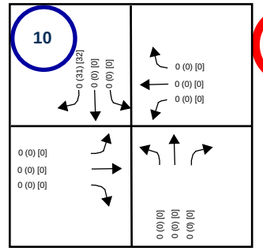
16th Street & NS Collector



Oldham Parkway & RIRO



Oldham Parkway & Fuel Station



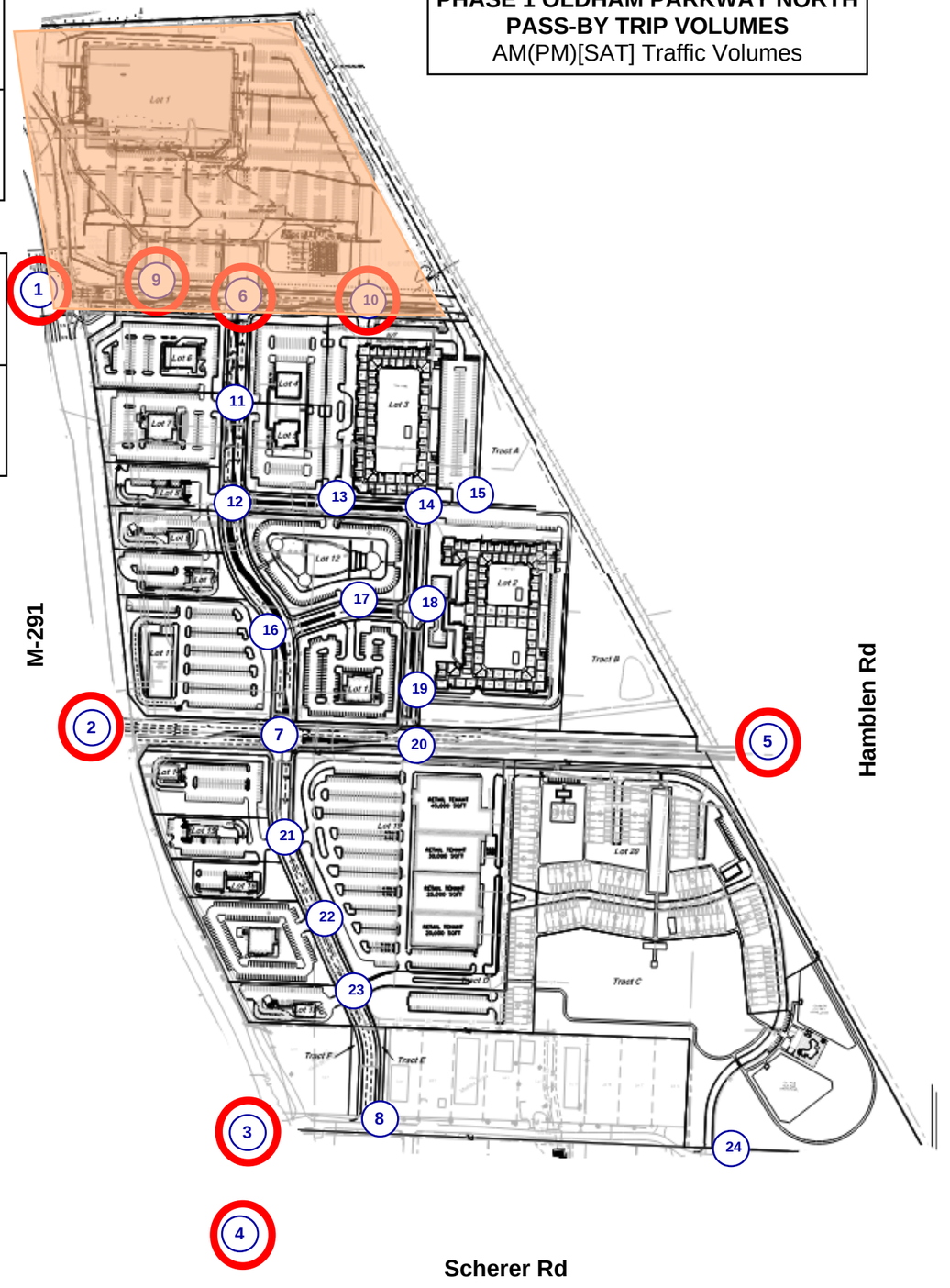
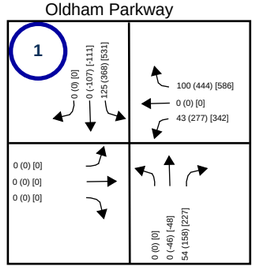


FIGURE 10

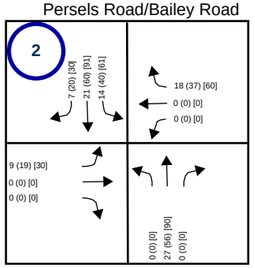
PHASE 1 OLDHAM PARKWAY NORTH TOTAL SITE TRIPS

AM(PM)[SAT] Traffic Volumes

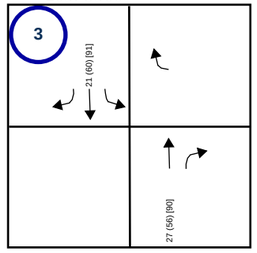
M-291 & Oldham Parkway



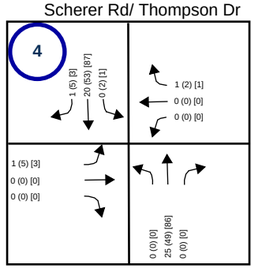
M-291 & Persels Road/Bailey Road



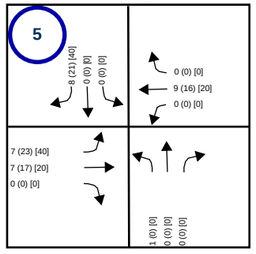
M-291 & 16th Street



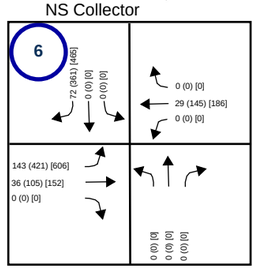
M-291 & Scherer Rd/ Thompson Dr



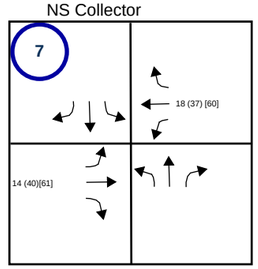
Bailey Road & Hamblen Road



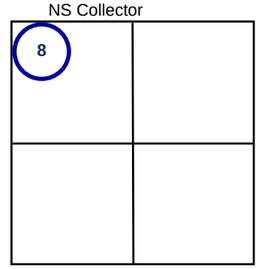
Oldham Parkway & NS Collector



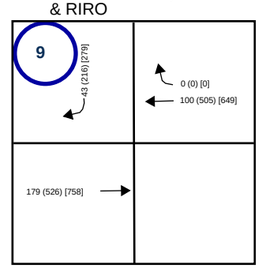
Bailey Road & NS Collector



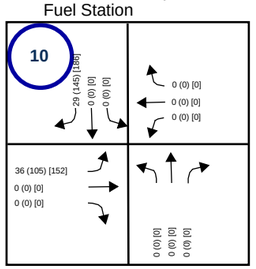
16th Street & NS Collector



Oldham Parkway & RIRO



Oldham Parkway & Fuel Station



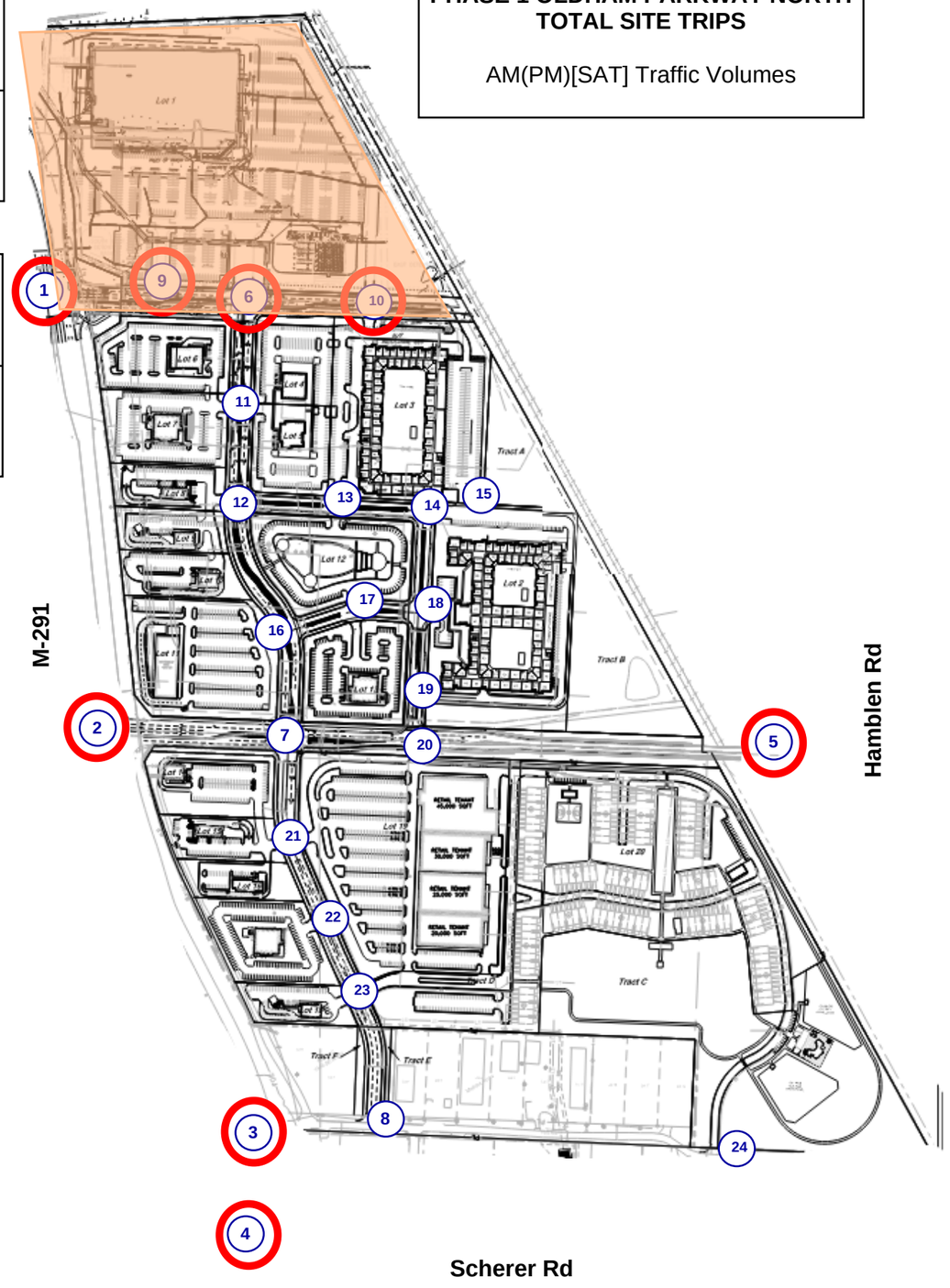
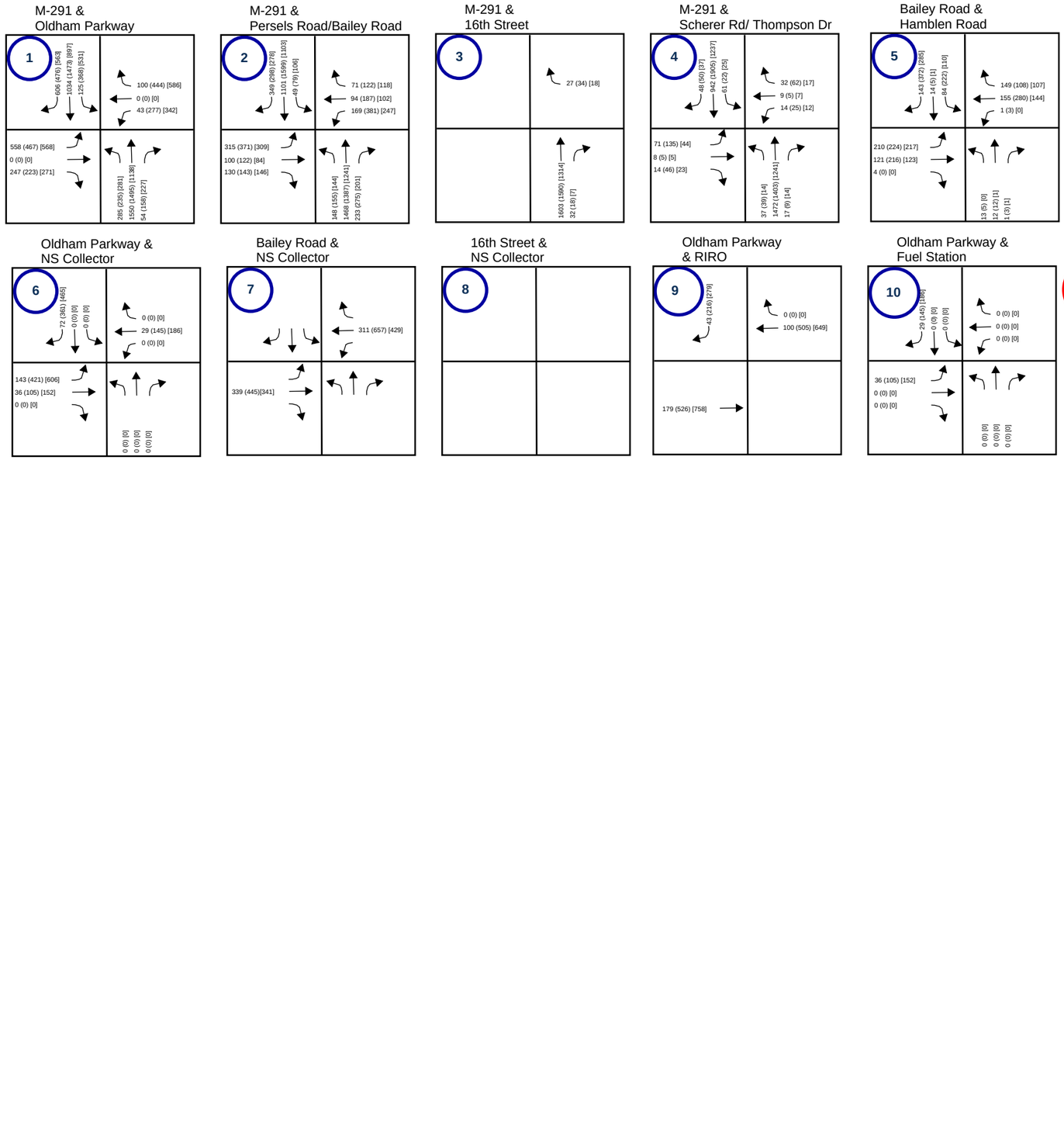
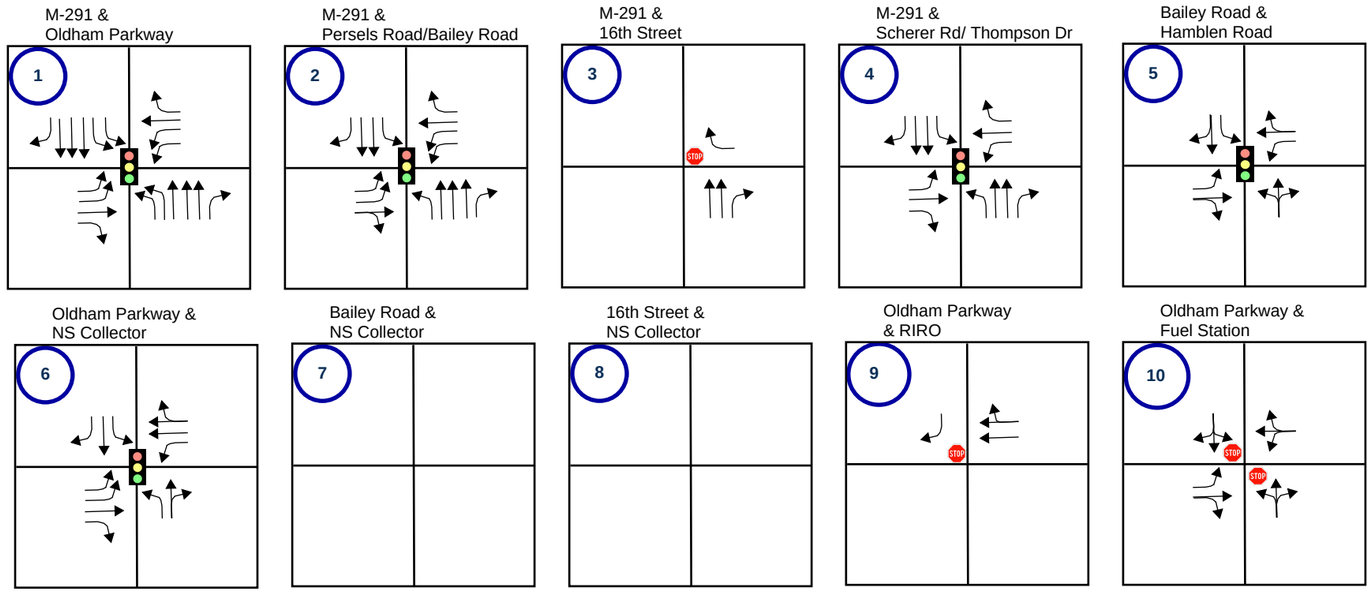


FIGURE 11


M-291 &
Oldham Parkway
1
606 (470) [554]
1034 (1473) [897]
125 (368) [531]
100 (444) [586]
0 (0) [0]
43 (277) [342]
558 (467) [568]
0 (0) [0]
247 (223) [271]
285 (235) [281]
1550 (1495) [1138]
54 (158) [227]
M-291 &
Persels Road/Bailey Road
2
349 (298) [278]
1101 (1599) [1103]
49 (79) [106]
71 (122) [118]
94 (187) [102]
169 (381) [247]
315 (371) [309]
100 (122) [84]
130 (143) [146]
148 (155) [144]
1469 (1387) [1241]
233 (275) [201]
M-291 &
16th Street
3
27 (34) [18]
1609 (1590) [1314]
32 (18) [7]
M-291 &
Scherer Rd/ Thompson Dr
4
48 (50) [37]
942 (1905) [1237]
61 (23) [25]
32 (62) [17]
9 (5) [7]
14 (25) [12]
71 (135) [44]
8 (5) [5]
14 (46) [23]
37 (39) [14]
1472 (1483) [1241]
17 (9) [14]
Bailey Road &
Hamblen Road
5
143 (372) [285]
14 (5) [1]
84 (222) [110]
149 (108) [107]
155 (280) [144]
1 (3) [0]
210 (224) [217]
121 (216) [123]
4 (0) [0]
13 (6) [0]
12 (12) [1]
1 (3) [1]
Oldham Parkway &
NS Collector
6
72 (361) [465]
0 (0) [0]
0 (0) [0]
0 (0) [0]
29 (145) [186]
0 (0) [0]
143 (421) [606]
36 (105) [152]
0 (0) [0]
0 (0) [0]
0 (0) [0]
0 (0) [0]
Bailey Road &
NS Collector
7
311 (657) [429]
339 (445)[341]
16th Street &
NS Collector
8
Oldham Parkway
& RIRO
9
43 (216) [279]
0 (0) [0]
100 (505) [649]
179 (526) [758]
Oldham Parkway &
Fuel Station
10
29 (145) [186]
0 (0) [0]
0 (0) [0]
0 (0) [0]
0 (0) [0]
0 (0) [0]
36 (105) [152]
0 (0) [0]
0 (0) [0]
0 (0) [0]
0 (0) [0]
0 (0) [0]
BASE + PHASE 1
PEAK HOUR VOLUMES
AM(PM)[SAT] Traffic Volumes
M-291
Hamblen Rd
Scherer Rd
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6
Lot 7
Lot 8
Lot 9
Lot 10
Lot 11
Lot 12
Lot 13
Lot 14
Lot 15
Lot 16
Lot 17
Lot 18
Lot 19
Lot 20
Tract A
Tract B
Tract C
Tract D
Tract E
Tract F


M-291 &
Oldham Parkway
1
M-291 &
Persels Road/Bailey Road
2
M-291 &
16th Street
3
M-291 &
Scherer Rd/ Thompson Dr
4
Bailey Road &
Hamblen Road
5
Oldham Parkway &
NS Collector
6
Bailey Road &
NS Collector
7
16th Street &
NS Collector
8
Oldham Parkway
& RIRO
9
Oldham Parkway &
Fuel Station
10

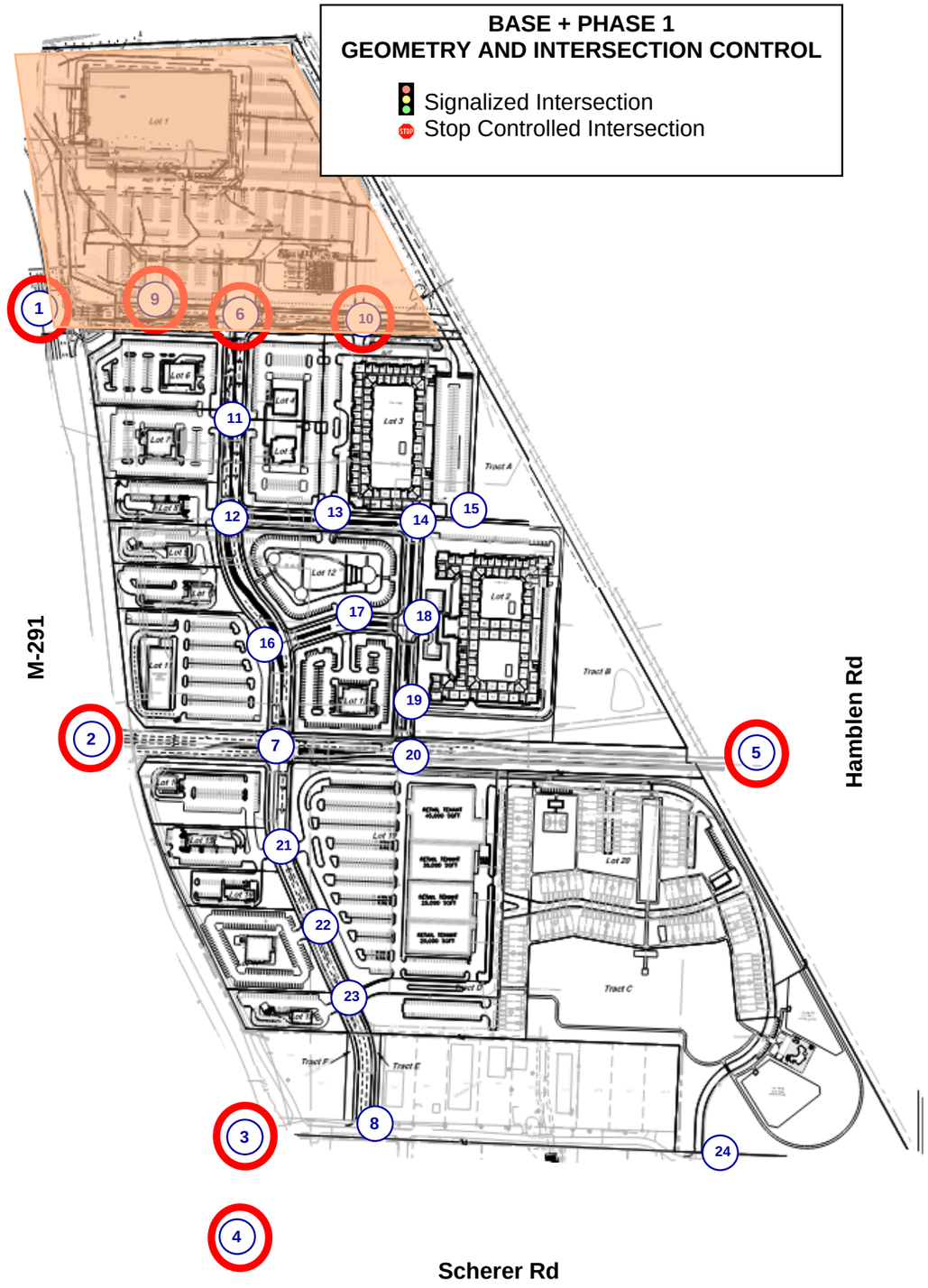
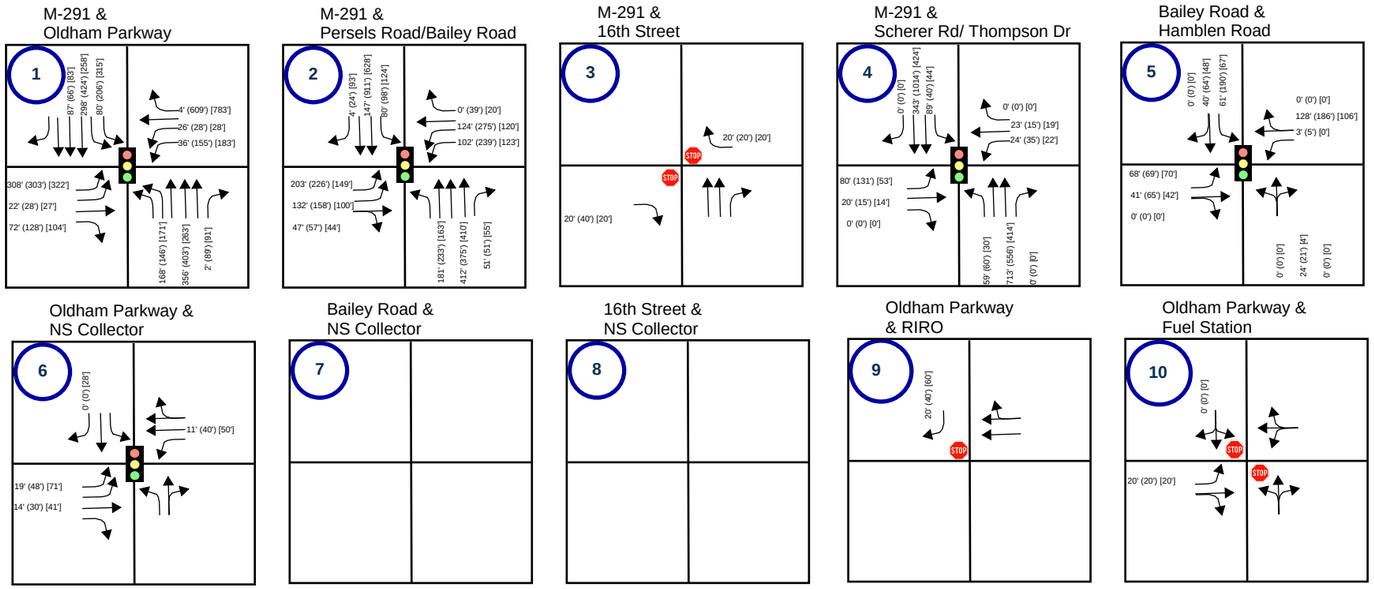

BASE + PHASE 1
GEOMETRY AND INTERSECTION CONTROL
Signalized Intersection
Stop Controlled Intersection
M-291
Hamblen Rd
Scherer Rd
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6
Lot 7
Lot 8
Lot 9
Lot 10
Lot 11
Lot 12
Lot 13
Lot 14
Lot 15
Lot 16
Lot 17
Lot 18
Lot 19
Lot 20
Tract A
Tract B
Tract C
Tract D
Tract E
Tract F

FIGURE 13


M-291 &
Oldham Parkway
1
87' (66') [83']
298' (424') [258']
80' (206') [315']
4' (609') [783']
26' (28') [28]
36' (155') [183']
308' (303') [322']
22' (28') [27']
72' (128') [104']
168' (146') [171']
356' (403') [263']
2' (89') [91']
M-291 &
Persels Road/Bailey Road
2
4' (24') [93']
147' (811') [628']
80' (98') [124']
0' (39') [20']
124' (275') [120']
102' (239') [123']
203' (226') [149']
132' (158') [100']
47' (57') [44']
181' (233') [183']
412' (375') [410']
51' (51') [55']
M-291 &
16th Street
3
20' (20') [20']
STOP
20' (40') [20']
M-291 &
Scherer Rd/ Thompson Dr
4
0' (0') [0']
343' (1034') [424']
89' (40') [41']
0' (0') [0']
23' (15') [19']
24' (35') [22']
80' (131') [53']
20' (15') [14']
0' (0') [0']
59' (60') [30']
713' (556') [414']
0' (0') [0']
Bailey Road &
Hamblen Road
5
0' (0') [0']
40' (64') [48']
19' (190') [67']
0' (0') [0']
128' (186') [106']
3' (5') [0']
68' (69') [70']
41' (65') [42']
0' (0') [0']
0' (0') [0']
24' (21') [4']
0' (0') [0']
Oldham Parkway &
NS Collector
6
0' (0') [28']
11' (40') [50']
19' (48') [71']
14' (30') [41']
Bailey Road &
NS Collector
7
16th Street &
NS Collector
8
Oldham Parkway
& RIRO
9
20' (40') [60']
STOP
Oldham Parkway &
Fuel Station
10
0' (0') [0']
STOP
20' (20') [20']
STOP

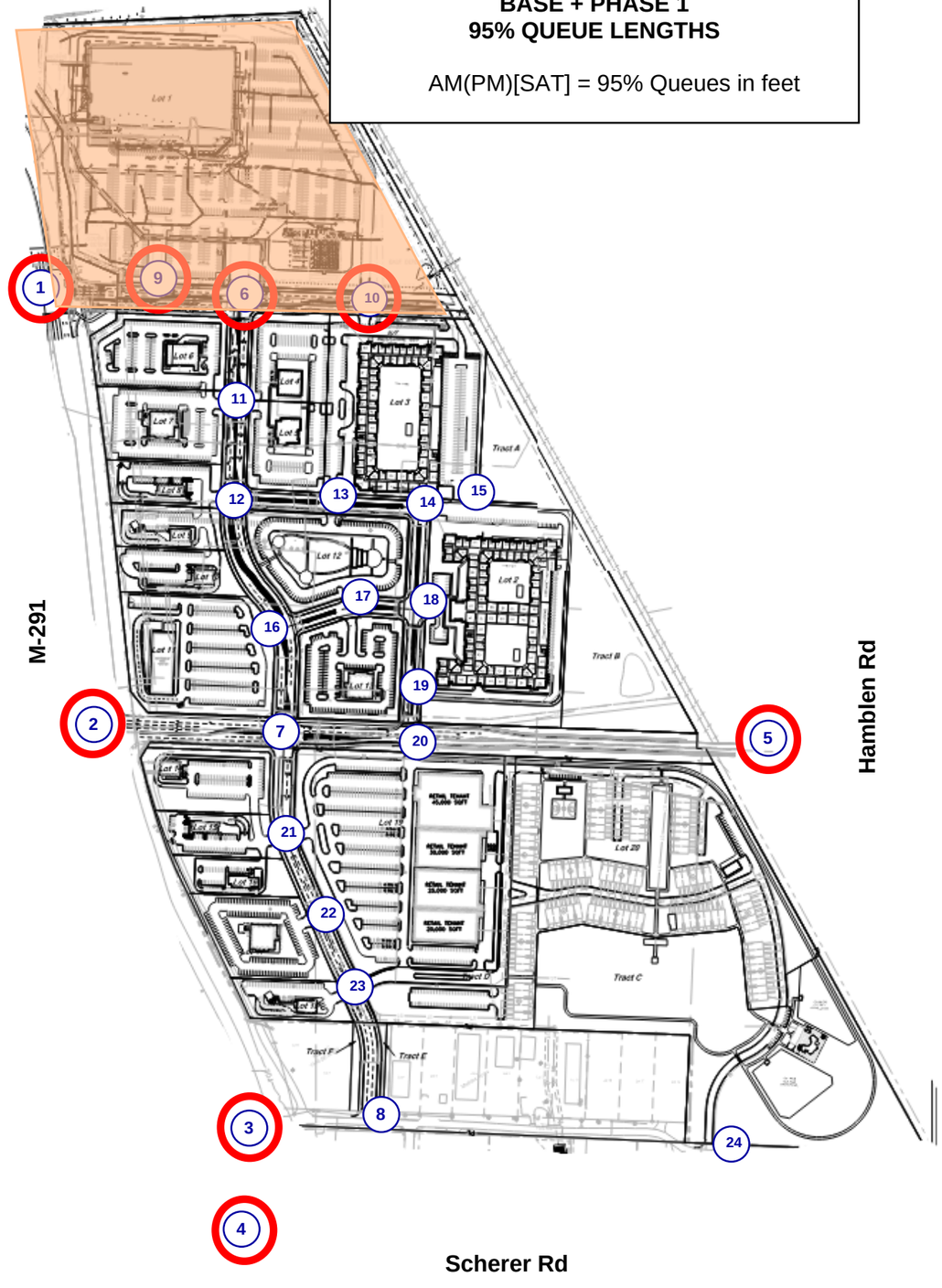
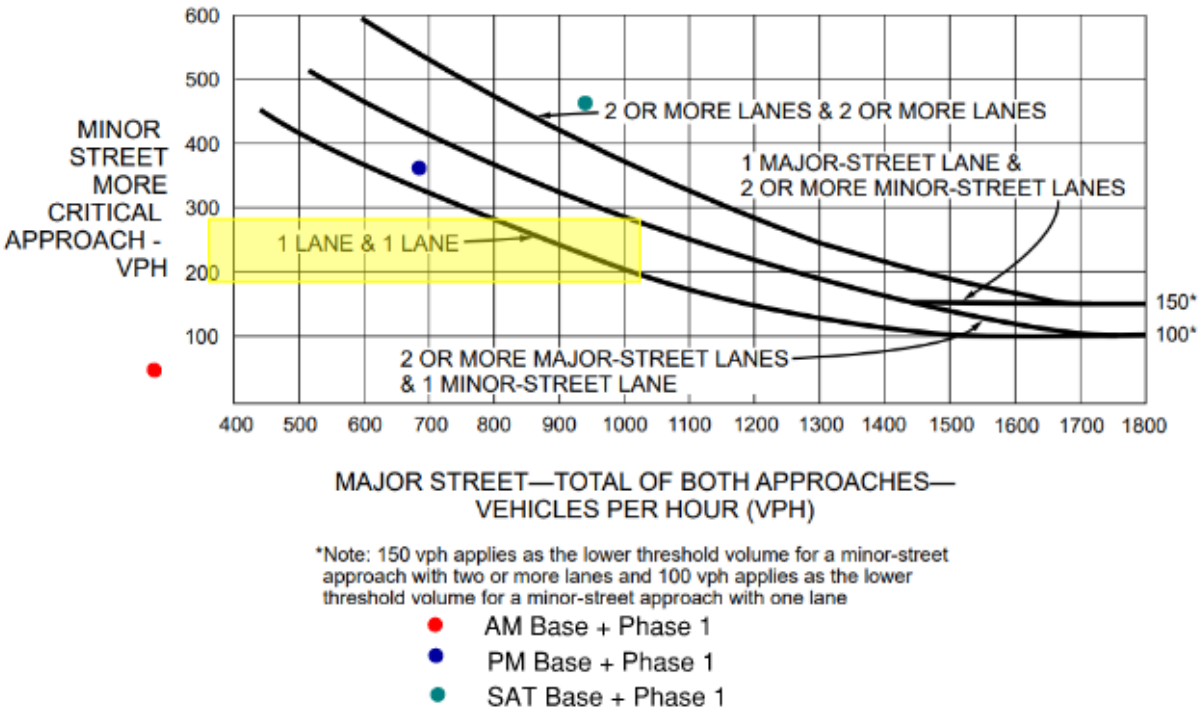

BASE + PHASE 1
95% QUEUE LENGTHS
AM(PM)[SAT] = 95% Queues in feet
M-291
Hamblen Rd
Scherer Rd
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
Lot 1
Lot 2
Lot 3
Lot 4
Lot 5
Lot 6
Lot 7
Lot 8
Lot 9
Lot 10
Lot 11
Lot 12
Lot 13
Lot 14
Lot 15
Lot 16
Lot 17
Lot 18
Lot 19
Lot 20
Tract A
Tract B
Tract C
Tract D
Tract E
Tract F
RETAIL TENANT
40,000 SQFT
RETAIL TENANT
20,000 SQFT
RETAIL TENANT
20,000 SQFT
RETAIL TENANT
20,000 SQFT

FIGURE 14

TRAFFIC SIGNAL WARRANT ANALYSIS
NODE #6: OLDHAM PAKWAY AND NS COLLECTOR

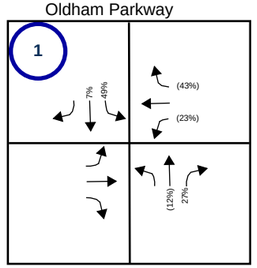
Figure 4C-3. Warrant 3, Peak Hour



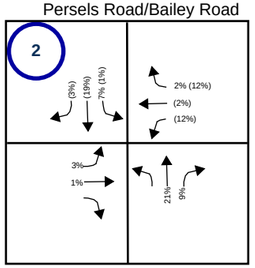
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane

- AM Base + Phase 1
- PM Base + Phase 1
- SAT Base + Phase 1

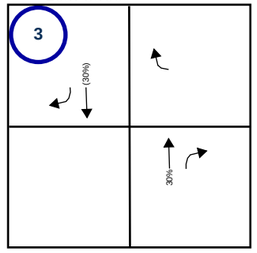
M-291 &
Oldham Parkway



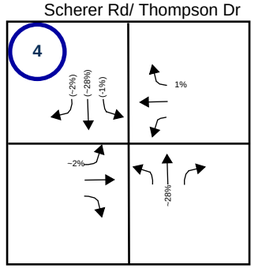
M-291 &
Persels Road/Bailey Road



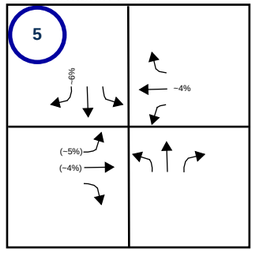
M-291 &
16th Street



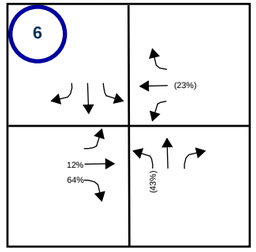
M-291 &
Scherer Rd/ Thompson Dr



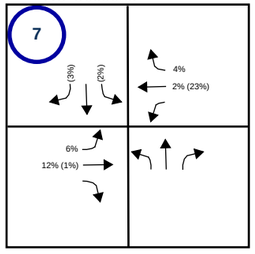
Bailey Road &
Hamblen Road



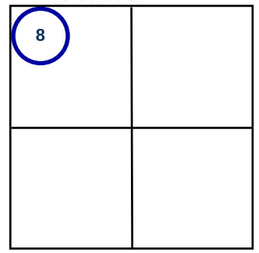
Oldham Parkway &
NS Collector



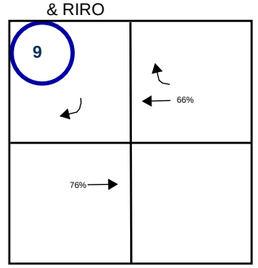
Bailey Road &
NS Collector



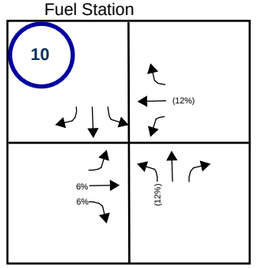
16th Street &
NS Collector



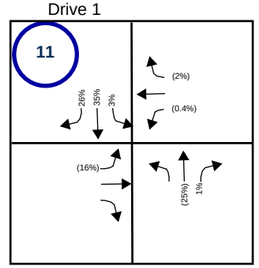
Oldham Parkway
& RIRO



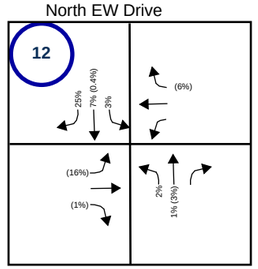
Oldham Parkway &
Fuel Station



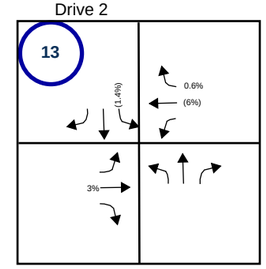
NS Collector &
Drive 1



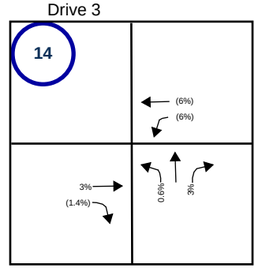
NS Collector &
North EW Drive



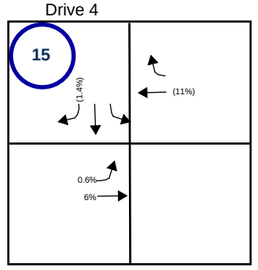
North EW Drive &
Drive 2



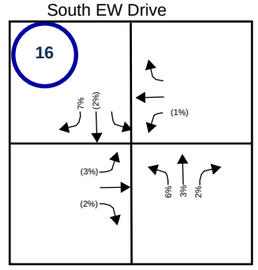
North EW Drive &
Drive 3



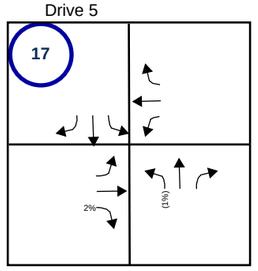
North EW Drive &
Drive 4



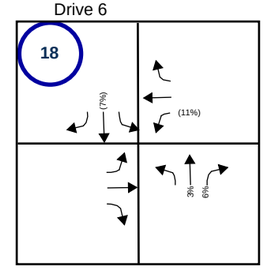
NS Collector &
South EW Drive



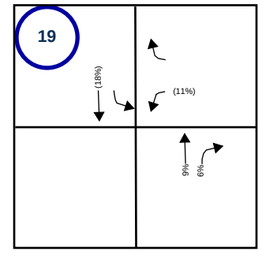
South EW Drive &
Drive 5



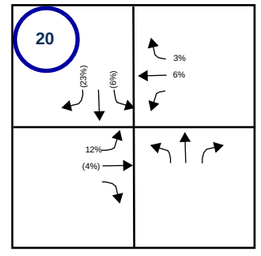
South EW Drive &
Drive 6



Drive 7



Bailey Road &
Drive 8



PHASE 2 BAILEY ROAD NORTH
PRIMARY TRIP DISTRIBUTION

x% = Inbound Site Traffic
(x%) = Outbound Site Traffic

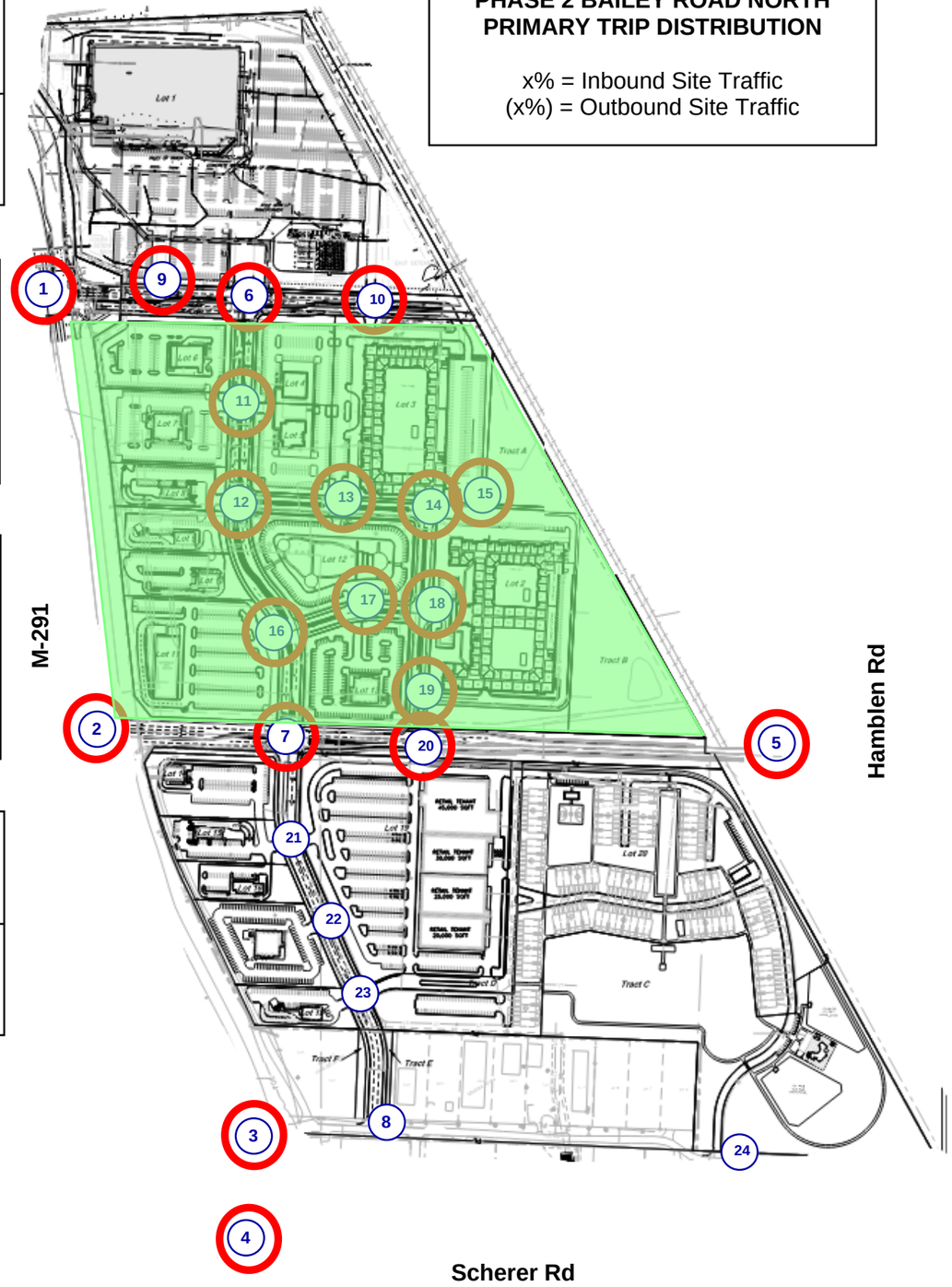
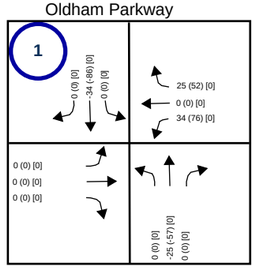


FIGURE 16

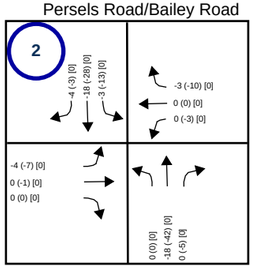
PHASE 2 BAILEY ROAD NORTH PASS-BY TRIP VOLUMES

AM(PM)[SAT] Traffic Volumes

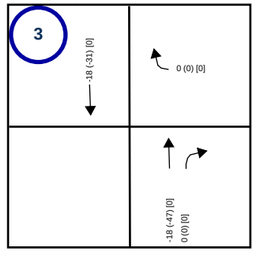
M-291 & Oldham Parkway



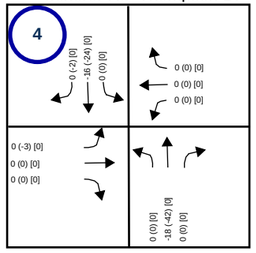
M-291 & Persels Road/Bailey Road



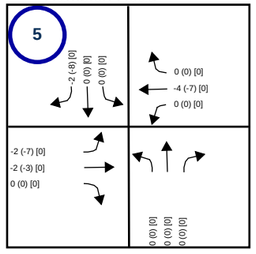
M-291 & 16th Street



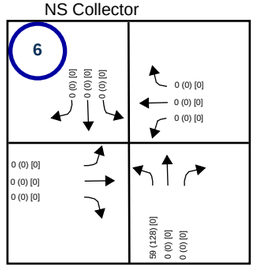
M-291 & Scherer Rd/ Thompson Dr



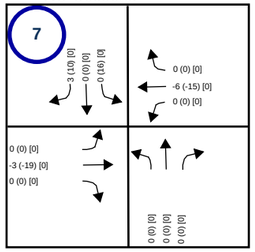
Bailey Road & Hamblen Road



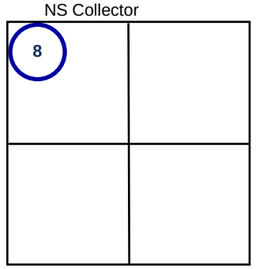
Oldham Parkway & NS Collector



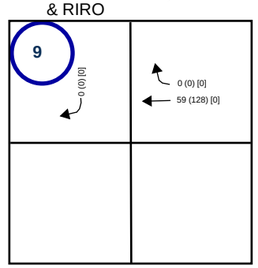
Bailey Road & NS Collector



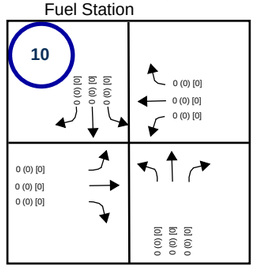
16th Street & NS Collector



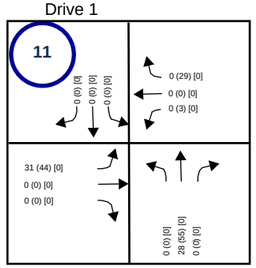
Oldham Parkway & RIRO



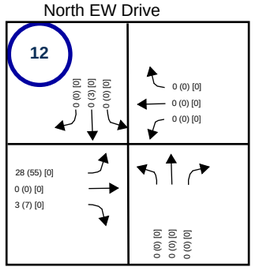
Oldham Parkway & Fuel Station



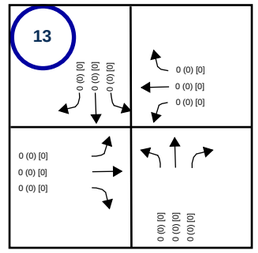
NS Collector & Drive 1



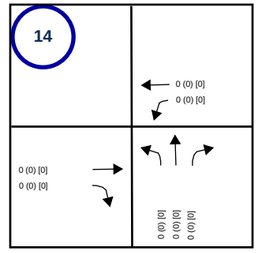
NS Collector & North EW Drive



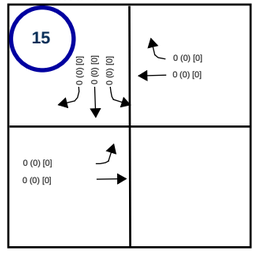
North EW Drive & Drive 2



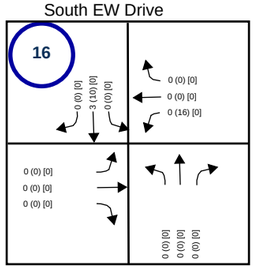
North EW Drive & Drive 3



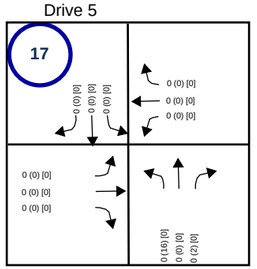
North EW Drive & Drive 4



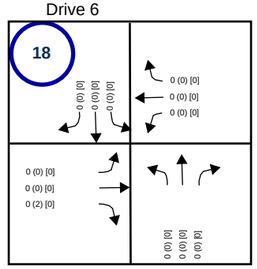
NS Collector & South EW Drive



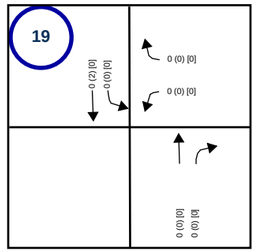
South EW Drive & Drive 5



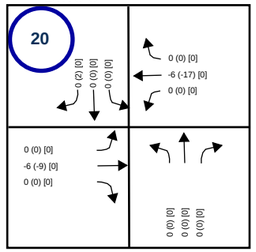
South EW Drive & Drive 6



Drive 7



Bailey Road & Drive 8



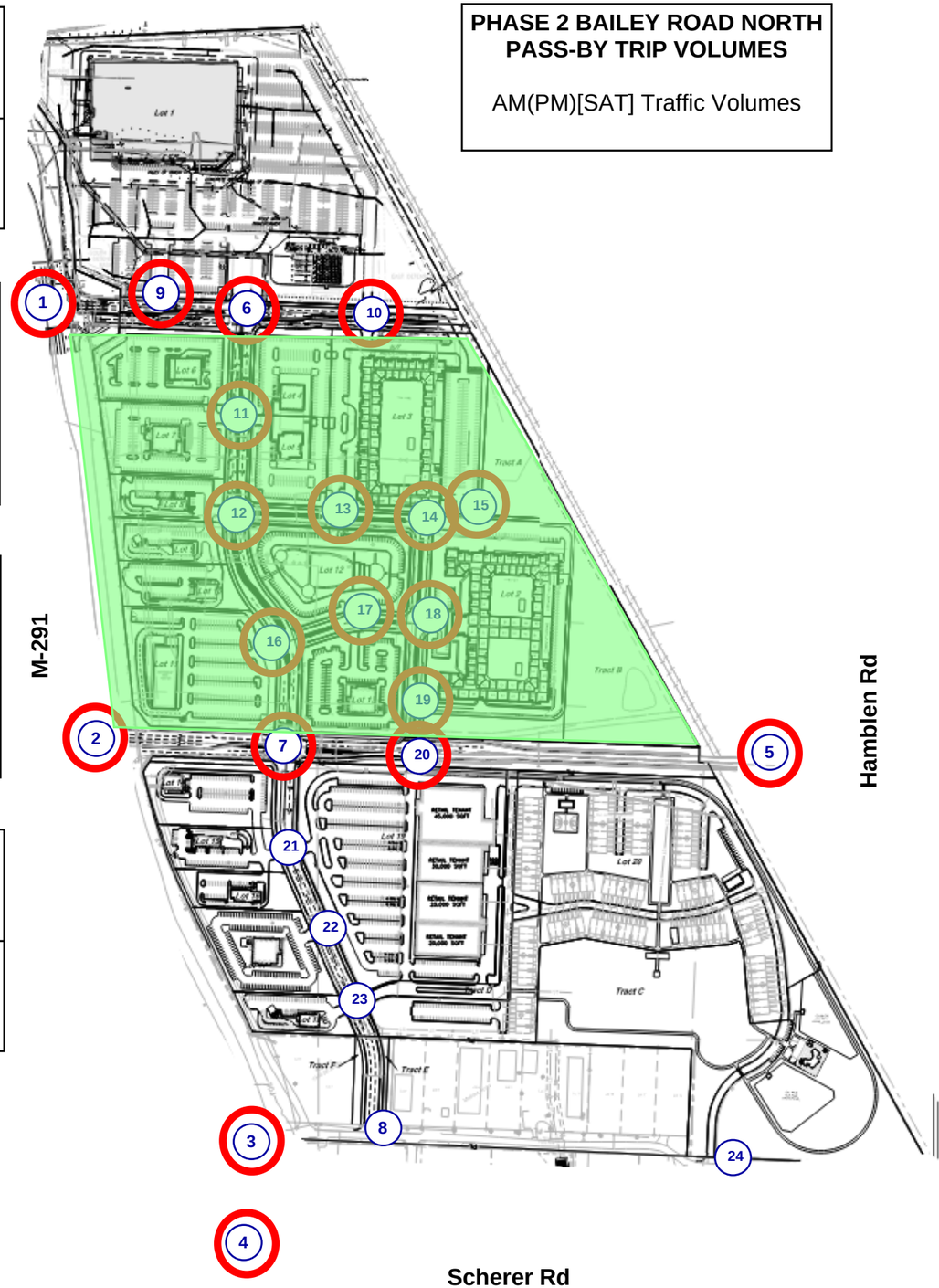
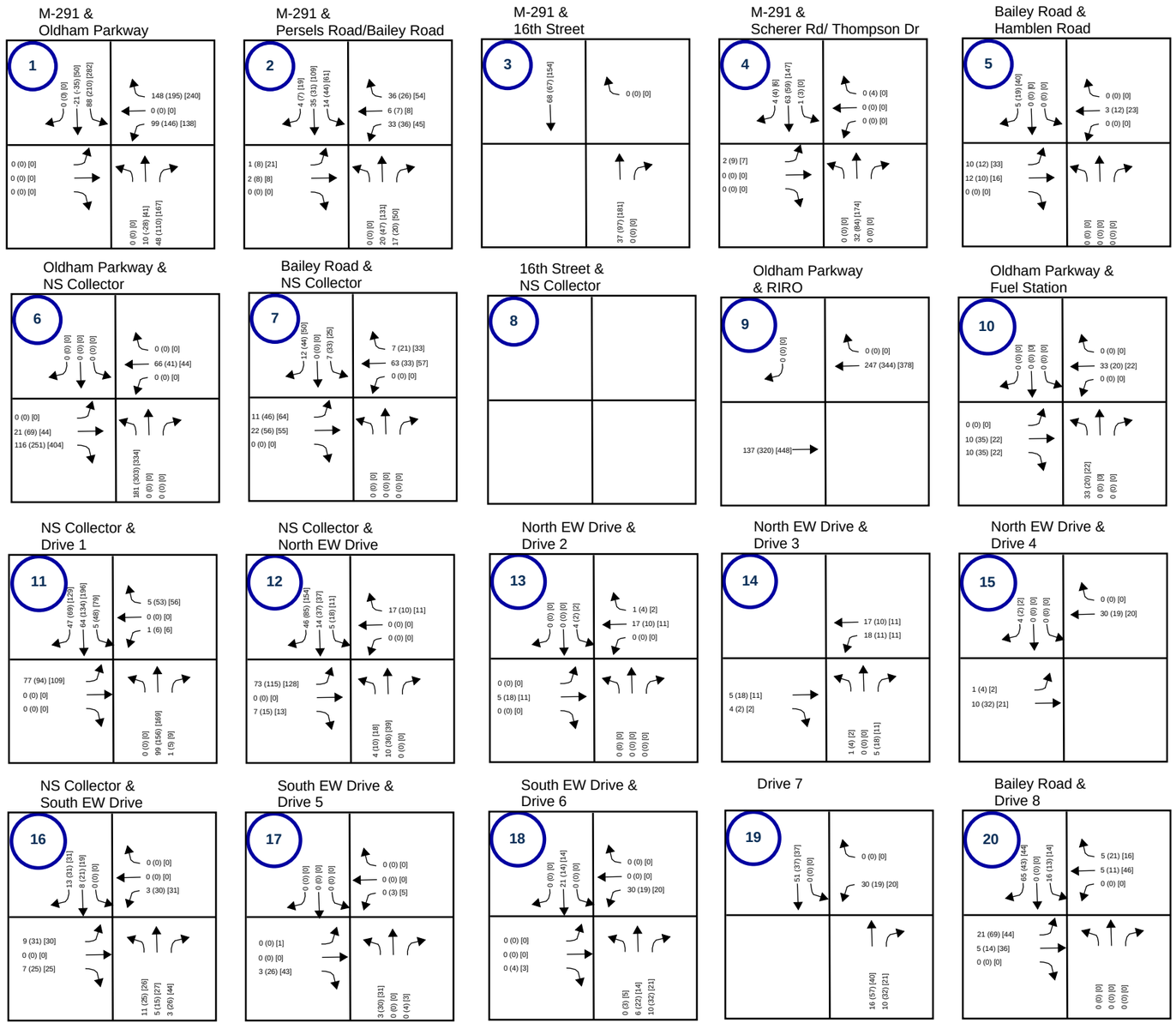


FIGURE 17

EAST VILLAGE TIS

CIVIL ENGINEERING / SURVEYING / UTILITIES



PHASE 2 BAILEY ROAD NORTH
TOTAL SITE TRIPS

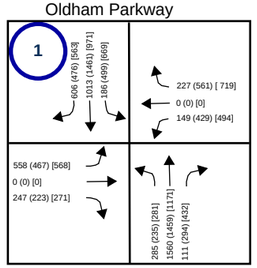
AM(PM)[SAT] Traffic Volumes

FIGURE 18

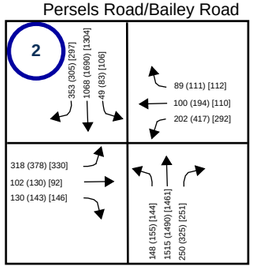
BASE + PHASE 1-2
PEAK HOUR VOLUMES

AM(PM)[SAT] Traffic Volumes

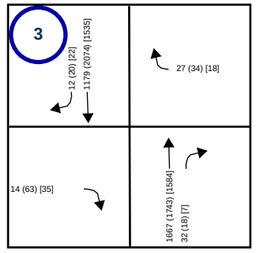
M-291 &
Oldham Parkway



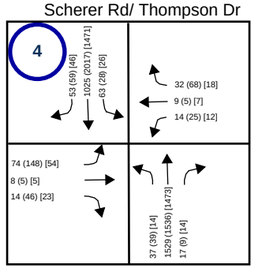
M-291 &
Persels Road/Bailey Road



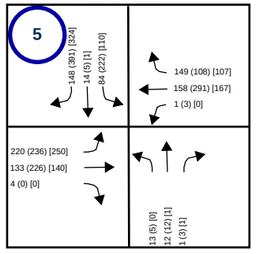
M-291 &
16th Street



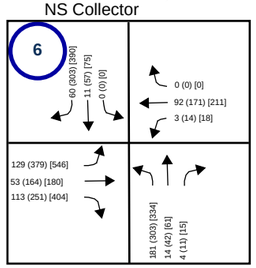
M-291 &
Scherer Rd/ Thompson Dr



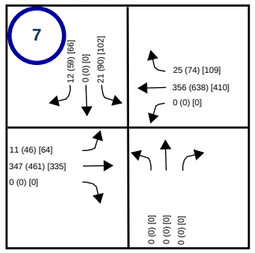
Bailey Road &
Hamblen Road



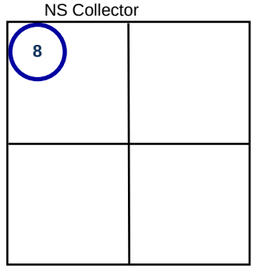
Oldham Parkway &
NS Collector



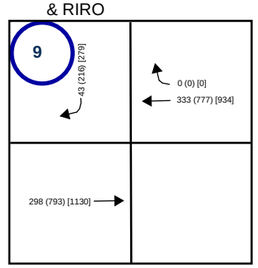
Bailey Road &
NS Collector



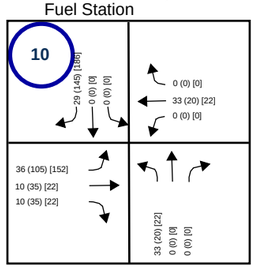
16th Street &
NS Collector



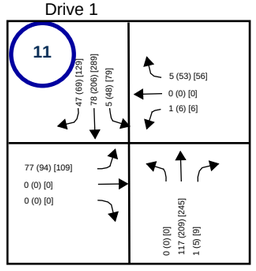
Oldham Parkway
& RIRO



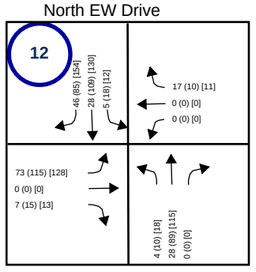
Oldham Parkway &
Fuel Station



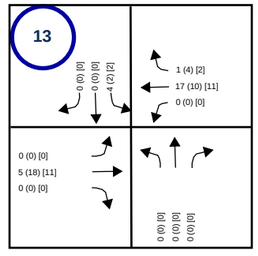
NS Collector &
Drive 1



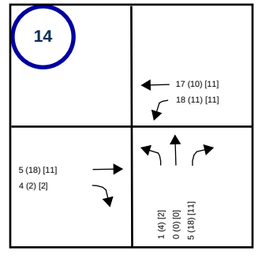
NS Collector &
North EW Drive



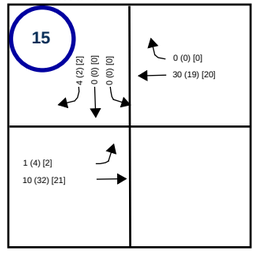
North EW Drive &
Drive 2



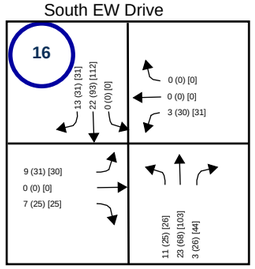
North EW Drive &
Drive 3



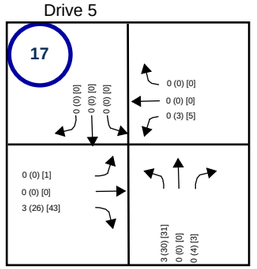
North EW Drive &
Drive 4



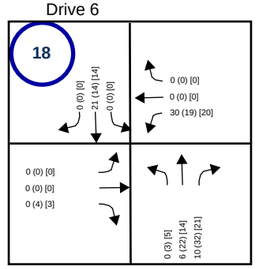
NS Collector &
South EW Drive



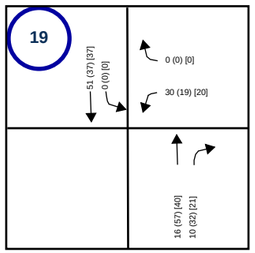
South EW Drive &
Drive 5



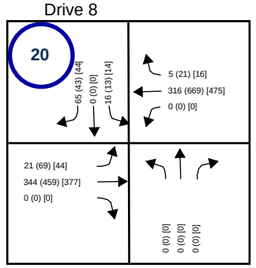
South EW Drive &
Drive 6



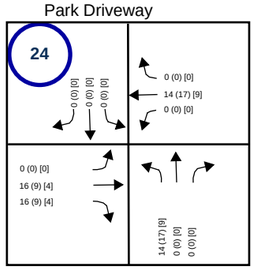
Drive 7



Bailey Road &
Drive 8



16th Street &
Park Driveway



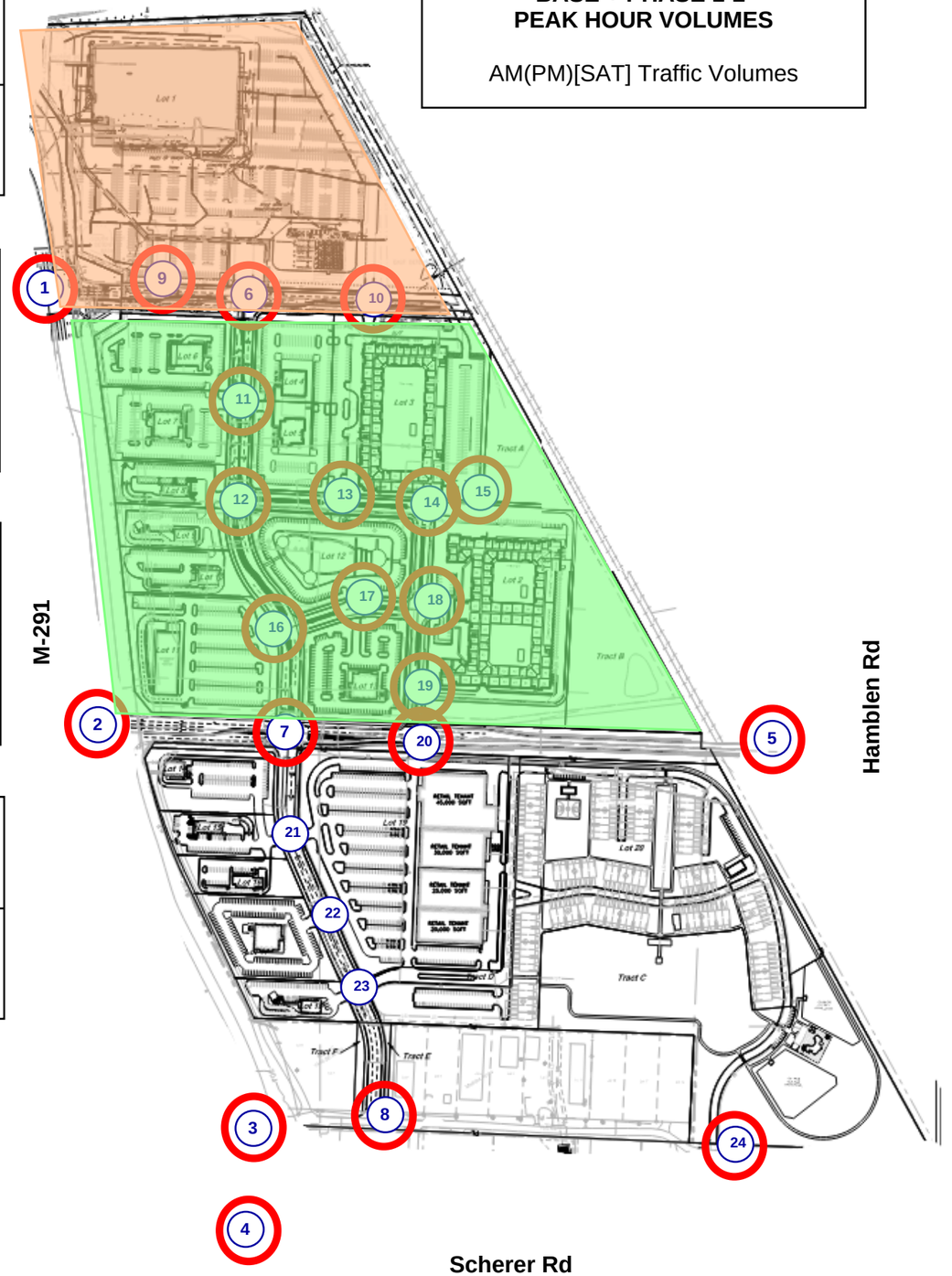
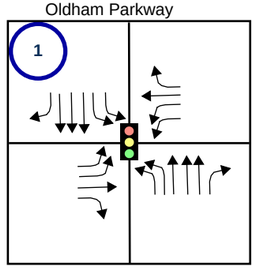


FIGURE 19

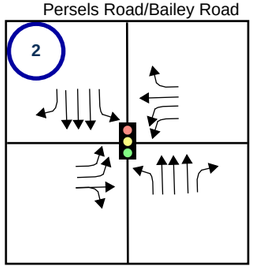
EAST VILLAGE TIS

CIVIL ENGINEERING / SURVEYING / UTILITIES

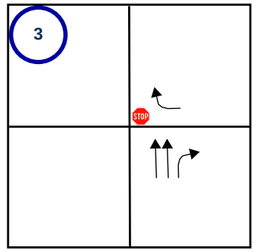
M-291 &
Oldham Parkway



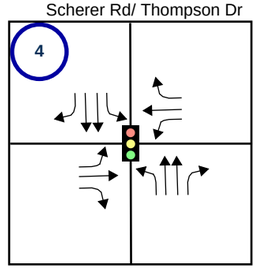
M-291 &
Persels Road/Bailey Road



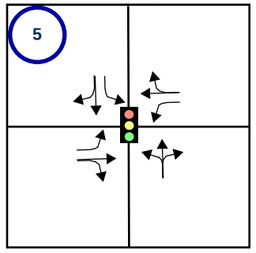
M-291 &
16th Street



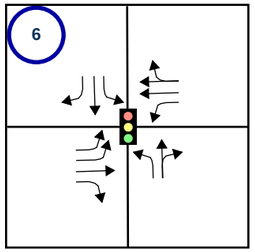
M-291 &
Scherer Rd/ Thompson Dr



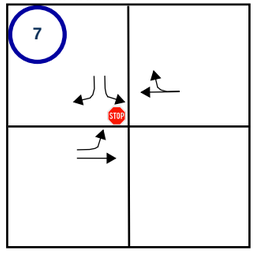
Bailey Road &
Hamblen Road



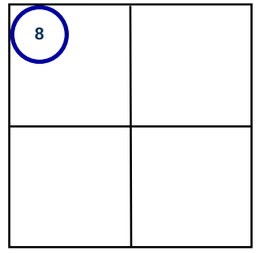
Oldham Parkway &
NS Collector



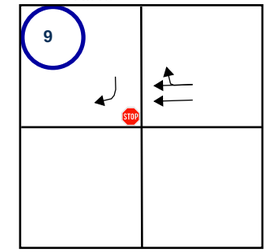
Bailey Road &
NS Collector



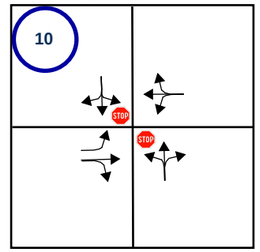
16th Street &
NS Collector



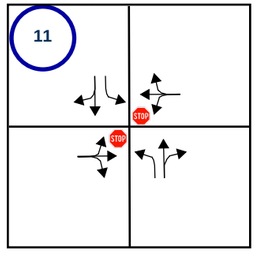
Oldham Parkway
& RIRO



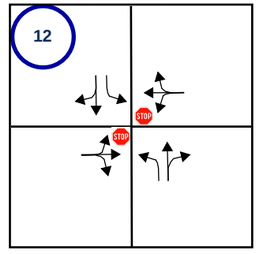
Oldham Parkway &
Fuel Station



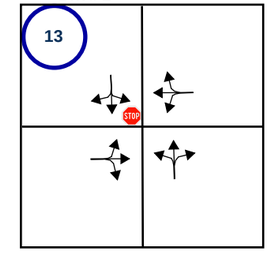
NS Collector &
Drive 1



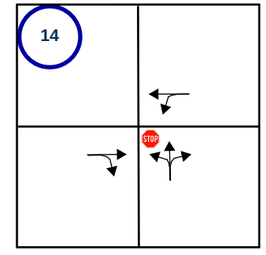
NS Collector &
North EW Drive



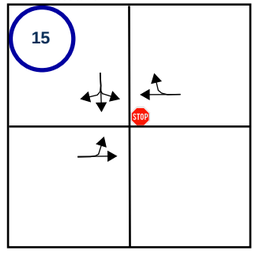
North EW Drive &
Drive 2



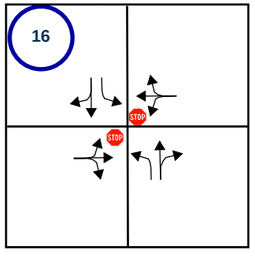
North EW Drive &
Drive 3



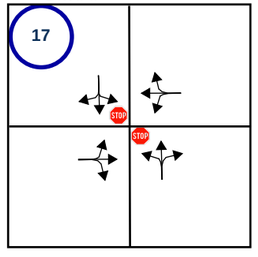
North EW Drive &
Drive 4



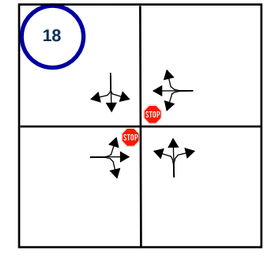
NS Collector &
South EW Drive



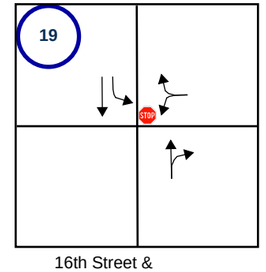
South EW Drive &
Drive 5



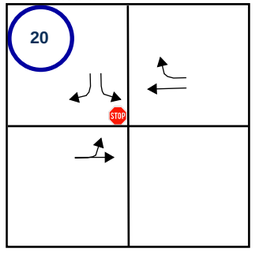
South EW Drive &
Drive 6



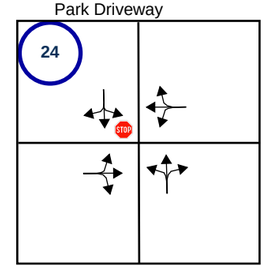
Drive 7



Bailey Road &
Drive 8



16th Street &
Park Driveway



BASE + PHASE 1-2
GEOMETRY AND INTERSECTION CONTROL

Signalized Intersection
Stop Controlled Intersection

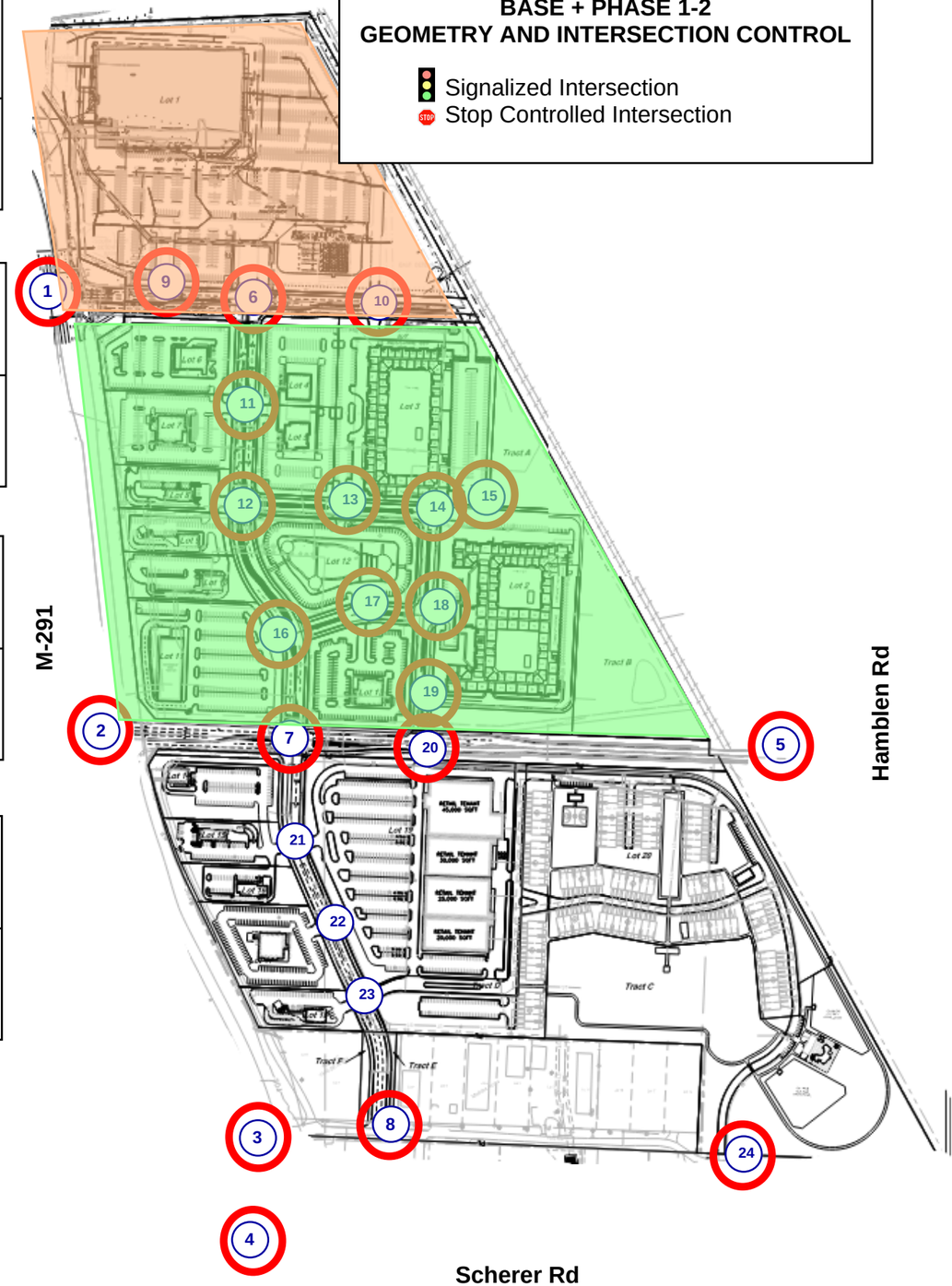
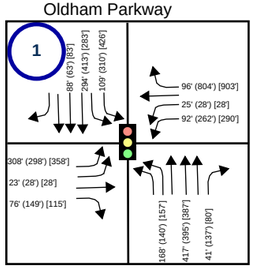


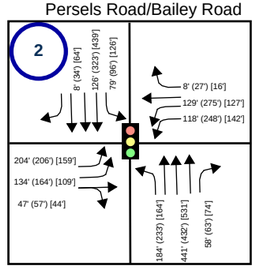
FIGURE 20

EAST VILLAGE TIS

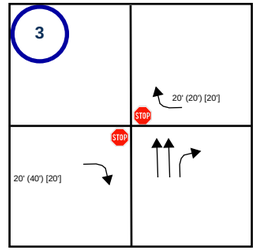
M-291 &
Oldham Parkway



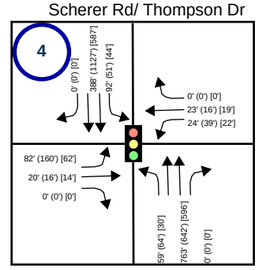
M-291 &
Persels Road/Bailey Road



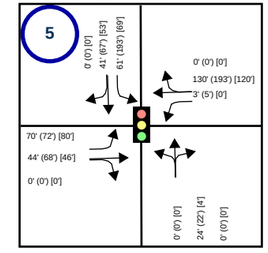
M-291 &
16th Street



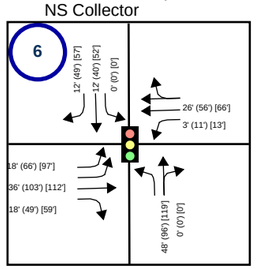
M-291 &
Scherer Rd/ Thompson Dr



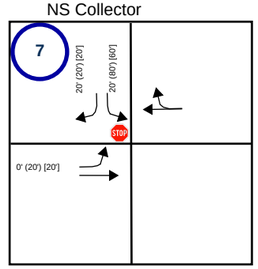
Bailey Road &
Hamblen Road



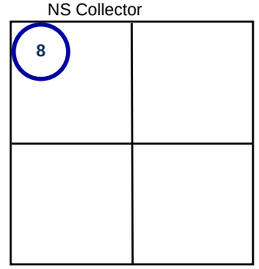
Oldham Parkway &
NS Collector



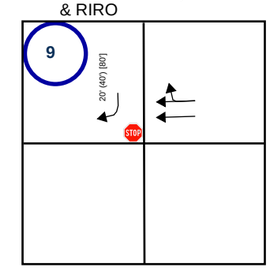
Bailey Road &
NS Collector



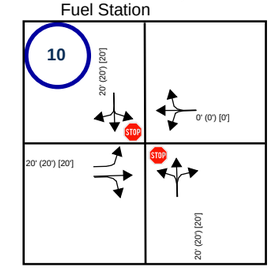
16th Street &
NS Collector



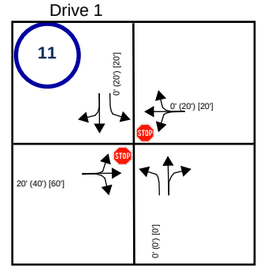
Oldham Parkway
& RIRO



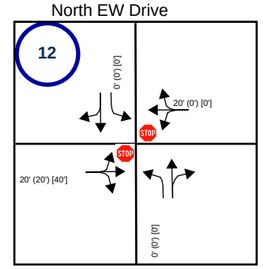
Oldham Parkway &
Fuel Station



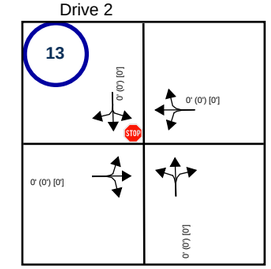
NS Collector &
Drive 1



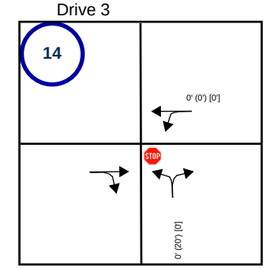
NS Collector &
North EW Drive



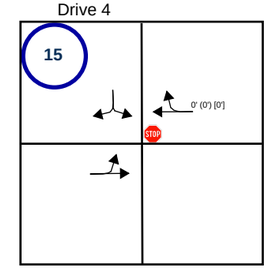
North EW Drive &
Drive 2



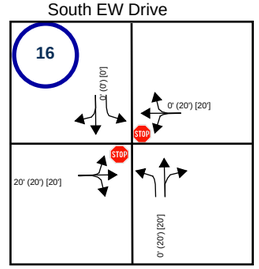
North EW Drive &
Drive 3



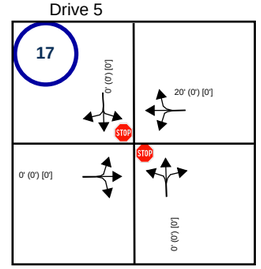
North EW Drive &
Drive 4



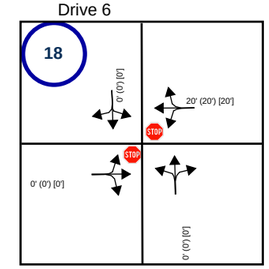
NS Collector &
South EW Drive



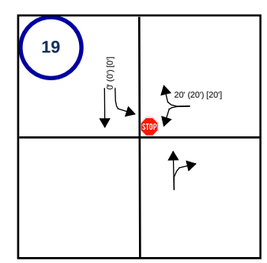
South EW Drive &
Drive 5



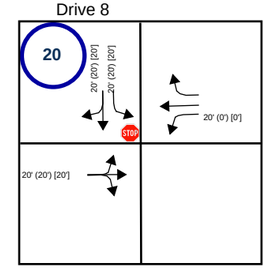
South EW Drive &
Drive 6



Drive 7



Bailey Road &
Drive 8



BASE + PHASE 1-2
95% QUEUE LENGTHS

AM(PM)[SAT] = 95% Queues in feet

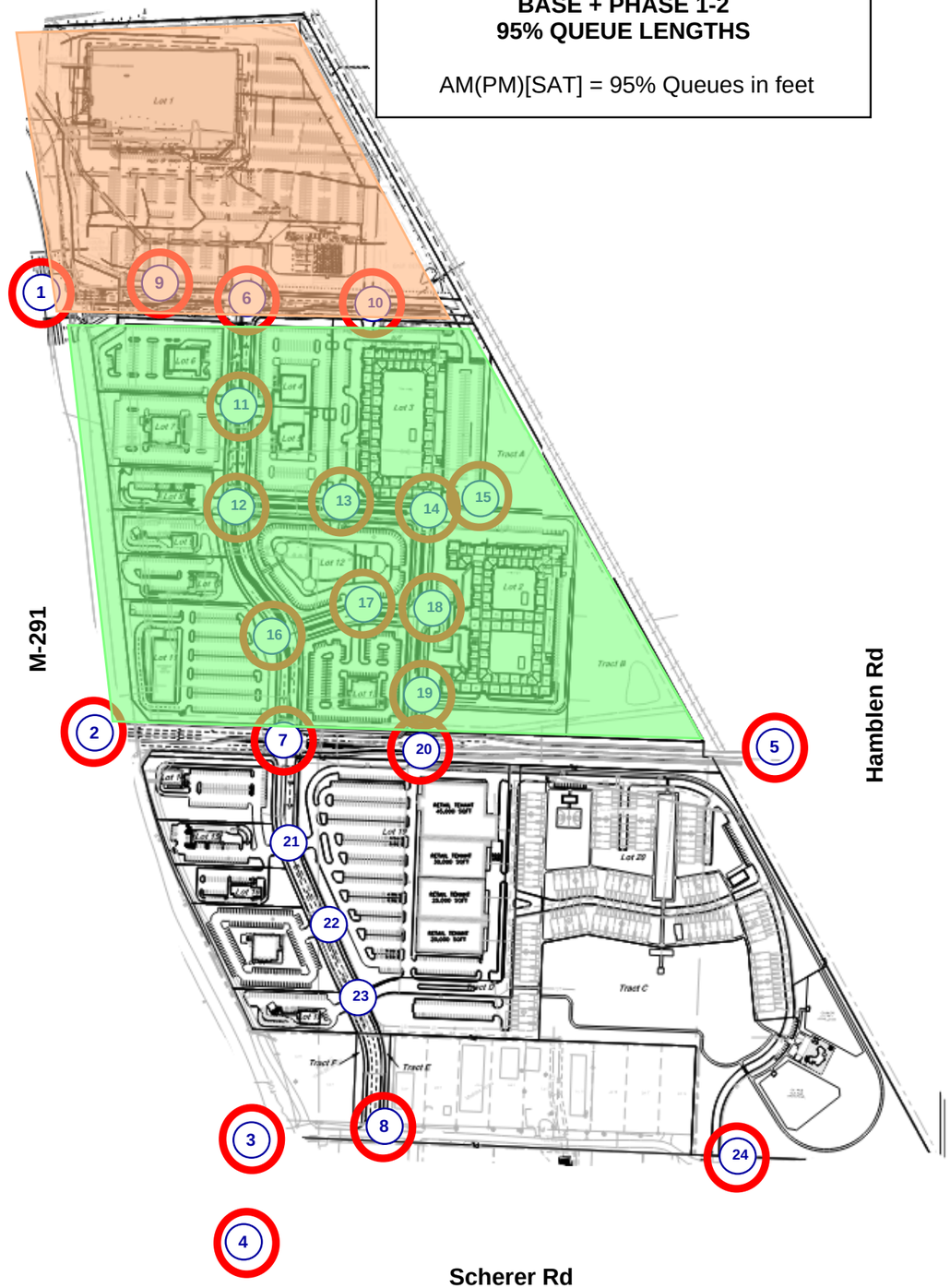
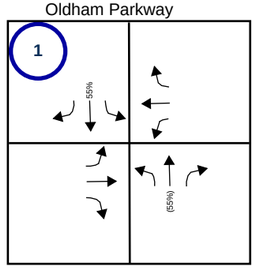


FIGURE 21

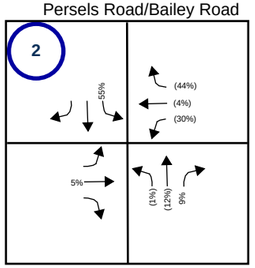
CIVIL ENGINEERING / SURVEYING / UTILITIES

EAST VILLAGE TIS

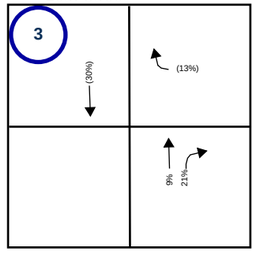
M-291 &
Oldham Parkway



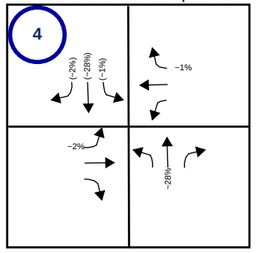
M-291 &
Persels Road/Bailey Road



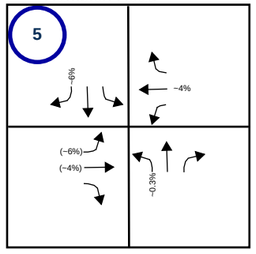
M-291 &
16th Street



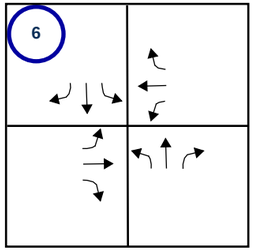
M-291 &
Scherer Rd/ Thompson Dr



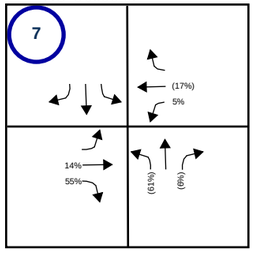
Bailey Road &
Hamblen Road



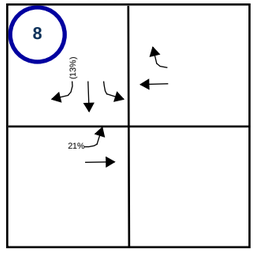
Oldham Parkway &
NS Collector



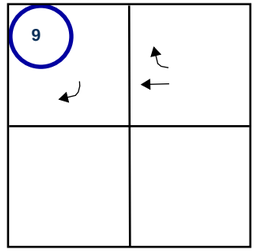
Bailey Road &
NS Collector



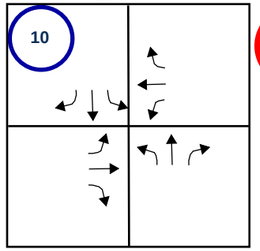
16th Street &
NS Collector



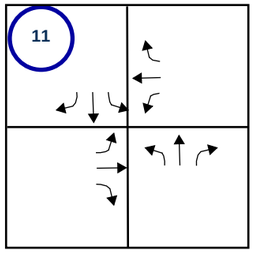
Oldham Parkway
& RIRO



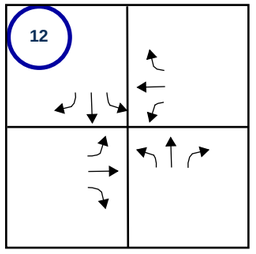
Oldham Parkway &
Fuel Station



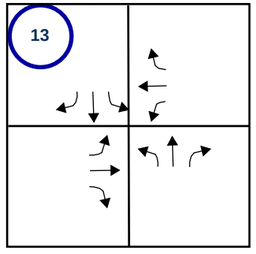
NS Collector &
Drive 1



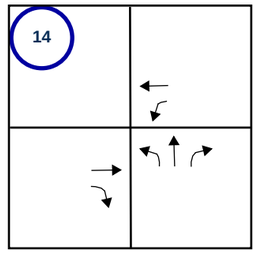
NS Collector &
North EW Drive



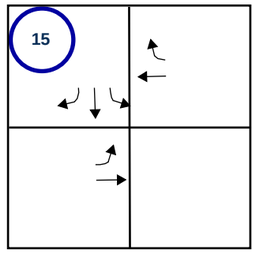
North EW Drive &
Drive 2



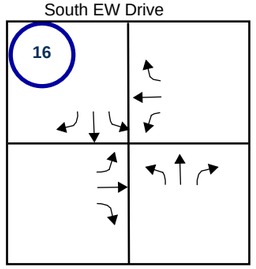
North EW Drive &
Drive 3



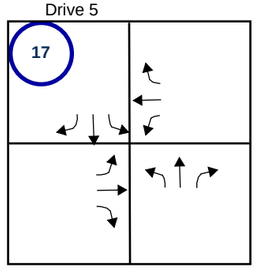
North EW Drive &
Drive 4



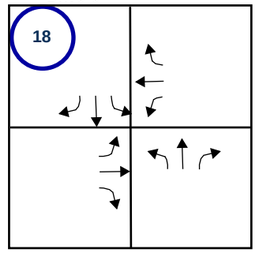
NS Collector &
South EW Drive



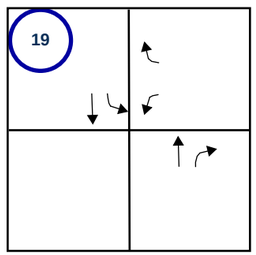
South EW Drive &
Drive 5



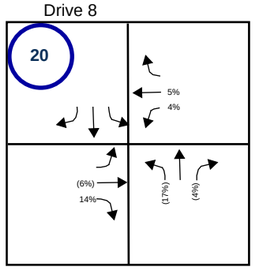
South EW Drive &
Drive 6



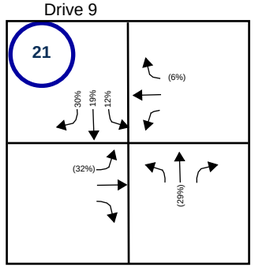
Drive 7



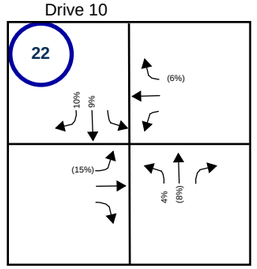
Bailey Road &
Drive 8



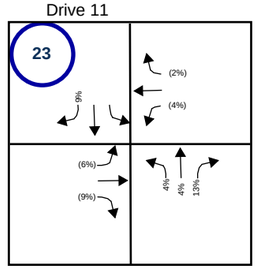
NS Collector &
Drive 9



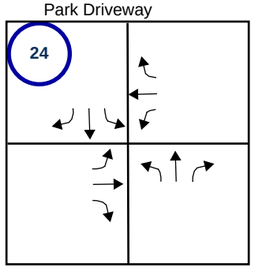
NS Collector &
Drive 10



NS Collector &
Drive 11



16th Street &
Park Driveway



PHASE 3 16th STREET NORTH
PRIMARY TRIP DISTRIBUTION

x% = Inbound Site Traffic
(x%) = Outbound Site Traffic

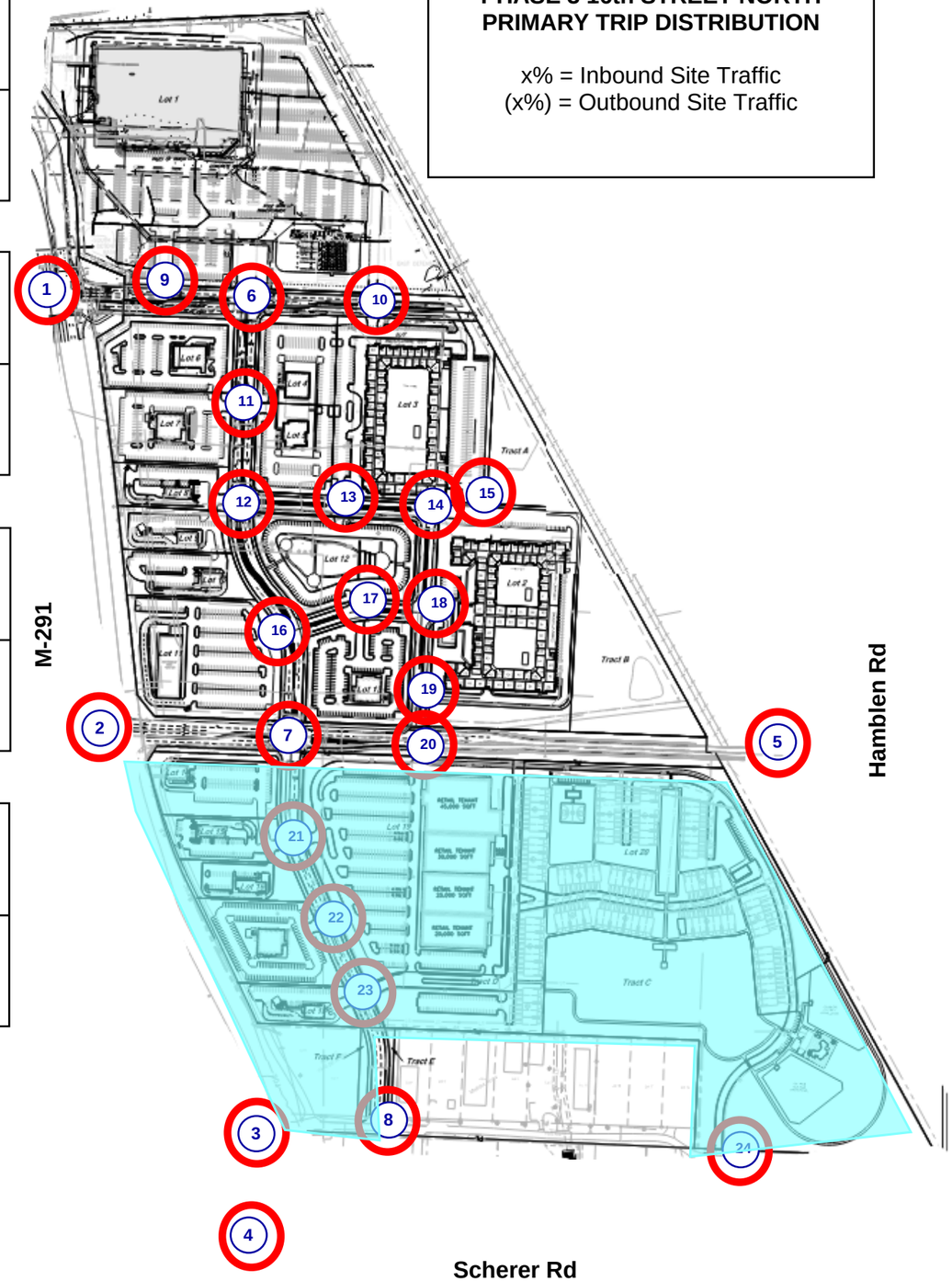


FIGURE 22

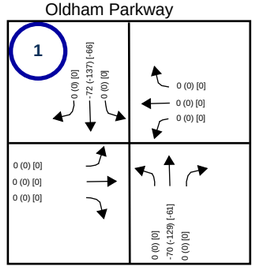
PHC
CIVIL ENGINEERING / SURVEYING / UTILITIES

EAST VILLAGE TIS

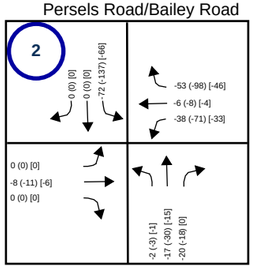
PHASE 3 16th STREET NORTH PASS-BY TRIP VOLUMES

AM(PM)[SAT] Traffic Volumes

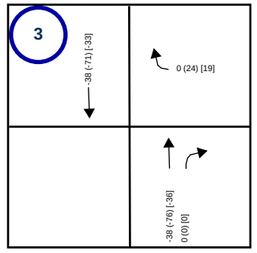
M-291 & Oldham Parkway



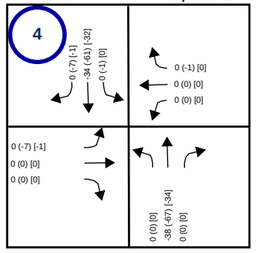
M-291 & Persels Road/Bailey Road



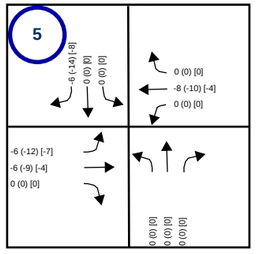
M-291 & 16th Street



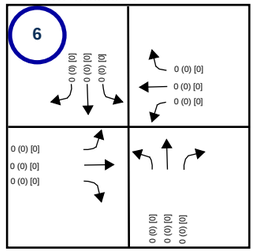
M-291 & Scherer Rd/ Thompson Dr



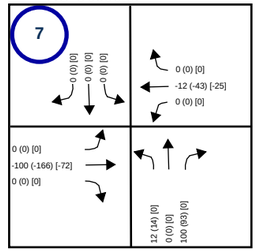
Bailey Road & Hamblen Road



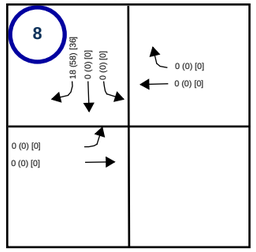
Oldham Parkway & NS Collector



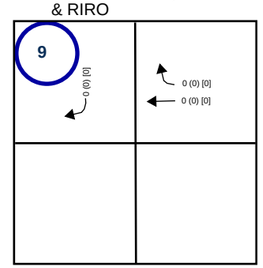
Bailey Road & NS Collector



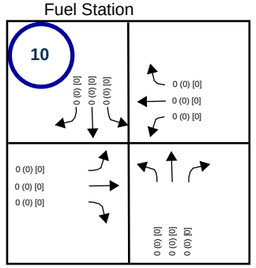
16th Street & NS Collector



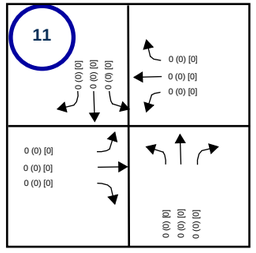
Oldham Parkway & RIRO



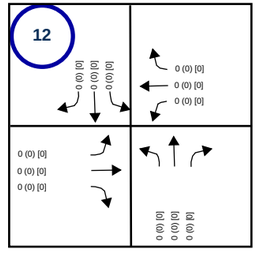
Oldham Parkway & Fuel Station



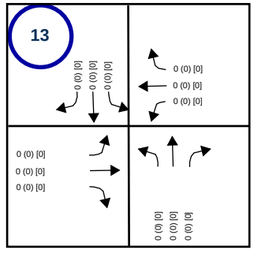
NS Collector & Drive 1



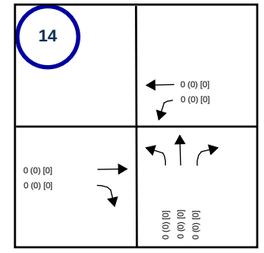
NS Collector & North EW Drive



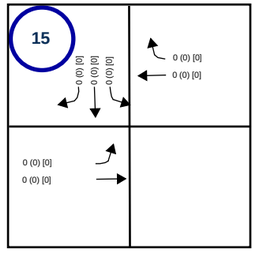
North EW Drive & Drive 2



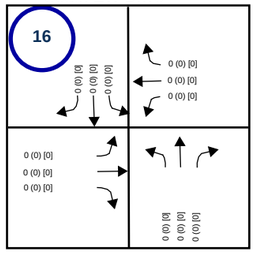
North EW Drive & Drive 3



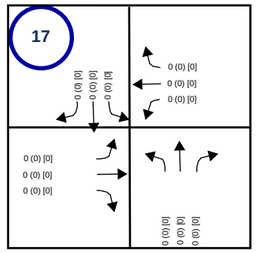
North EW Drive & Drive 4



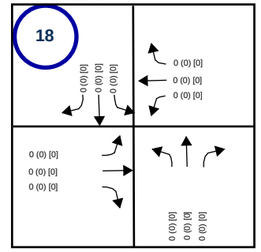
NS Collector & South EW Drive



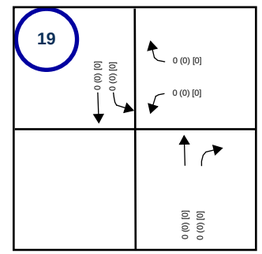
South EW Drive & Drive 5



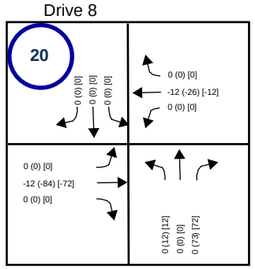
South EW Drive & Drive 6



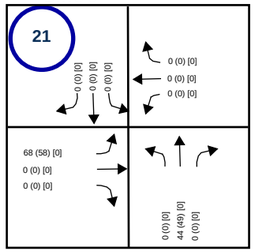
Drive 7



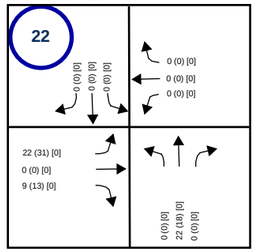
Bailey Road & Drive 8



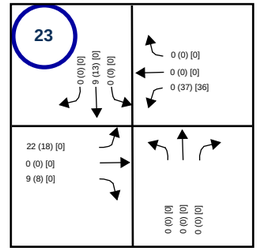
NS Collector & Drive 9



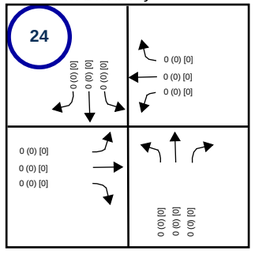
NS Collector & Drive 10



NS Collector & Drive 11



16th Street & Park Driveway



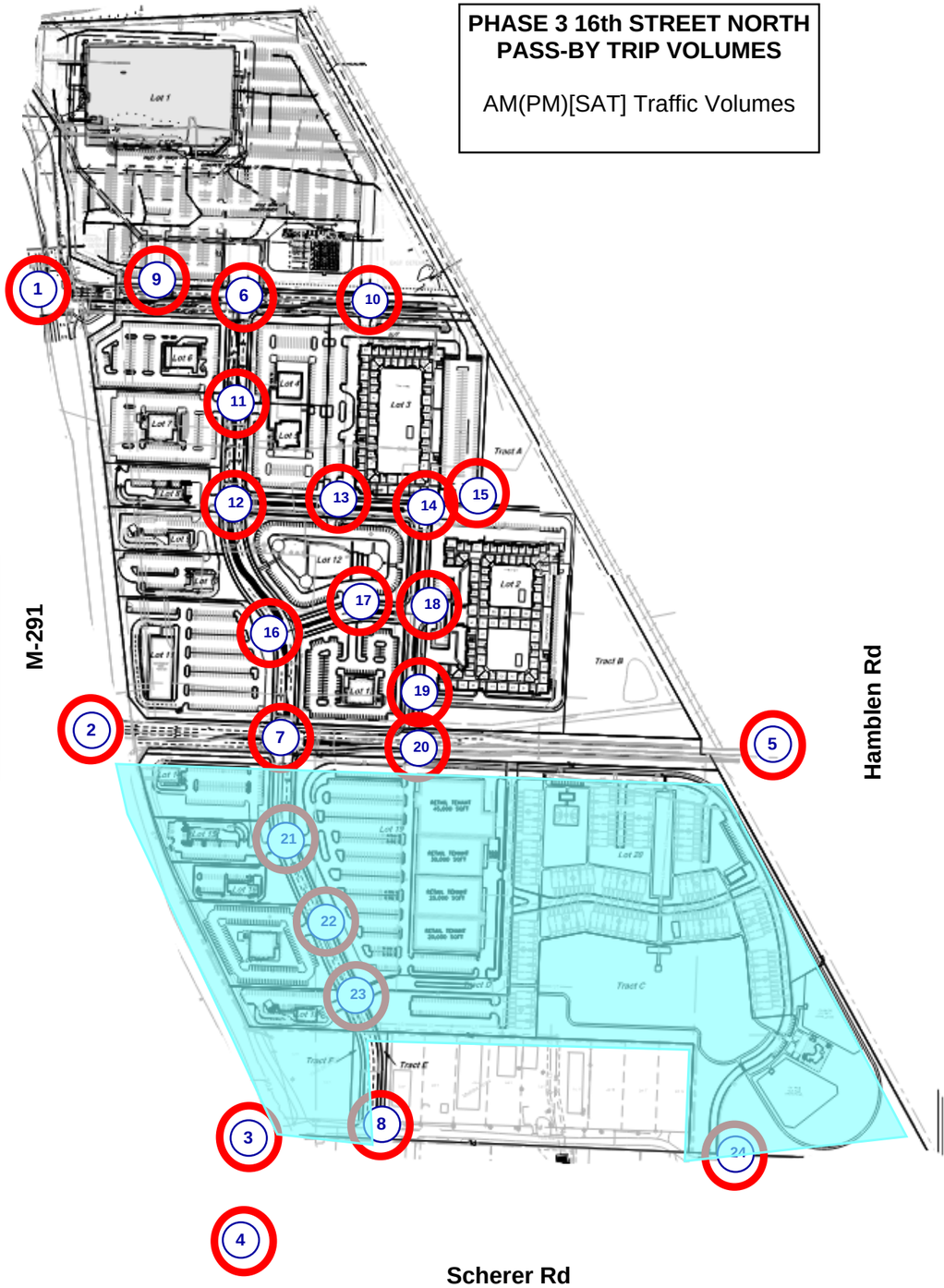
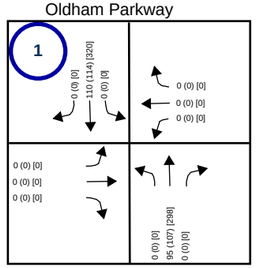


FIGURE 23

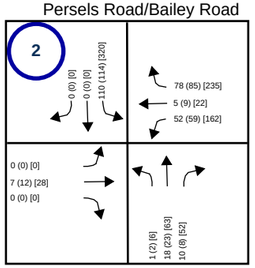
EAST VILLAGE TIS

CIVIL ENGINEERING / SURVEYING / UTILITIES

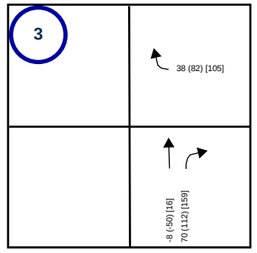
M-291 &
Oldham Parkway



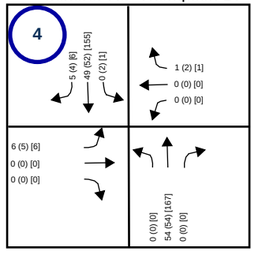
M-291 &
Persels Road/Bailey Road



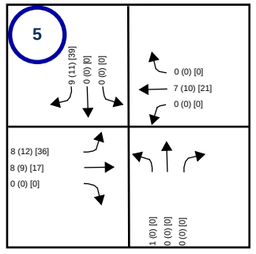
M-291 &
16th Street



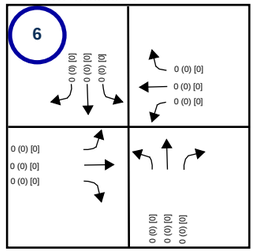
M-291 &
Scherer Rd/ Thompson Dr



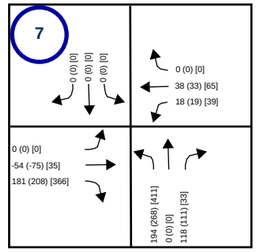
Bailey Road &
Hamblen Road



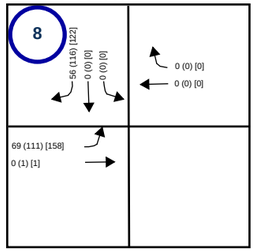
Oldham Parkway &
NS Collector



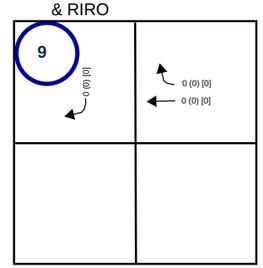
Bailey Road &
NS Collector



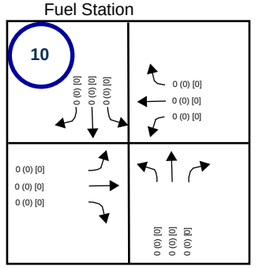
16th Street &
NS Collector



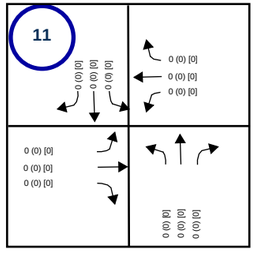
Oldham Parkway
& RIRO



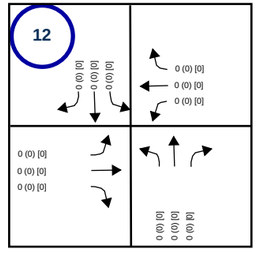
Oldham Parkway &
Fuel Station



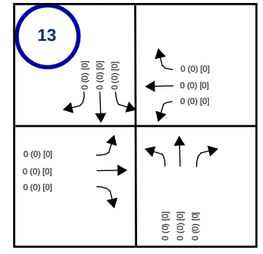
NS Collector &
Drive 1



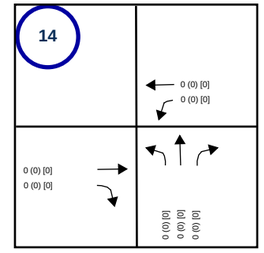
NS Collector &
North EW Drive



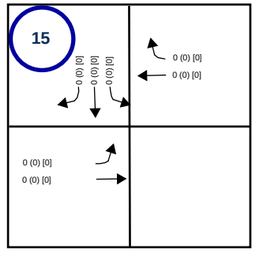
North EW Drive &
Drive 2



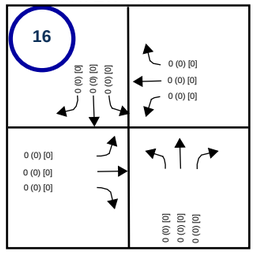
North EW Drive &
Drive 3



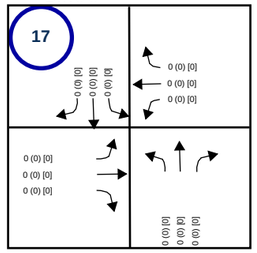
North EW Drive &
Drive 4



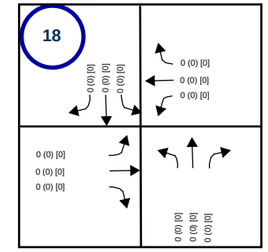
NS Collector &
South EW Drive



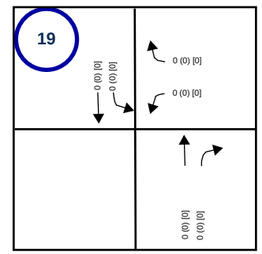
South EW Drive &
Drive 5



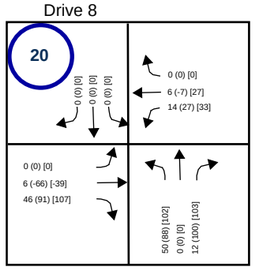
South EW Drive &
Drive 6



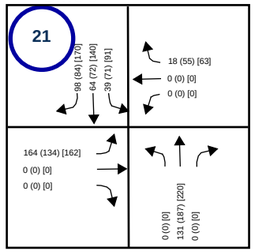
Drive 7



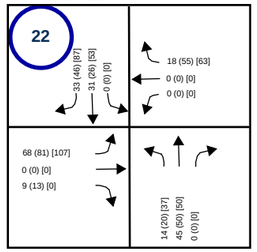
Bailey Road &
Drive 8



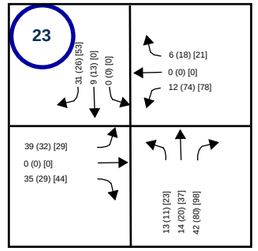
NS Collector &
Drive 9



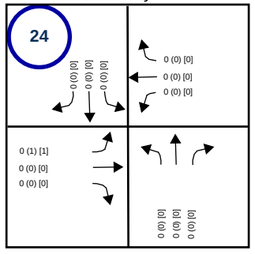
NS Collector &
Drive 10



NS Collector &
Drive 11



16th Street &
Park Driveway



PHASE 3 16th STREET NORTH
TOTAL SITE TRIPS

AM(PM)[SAT] Traffic Volumes

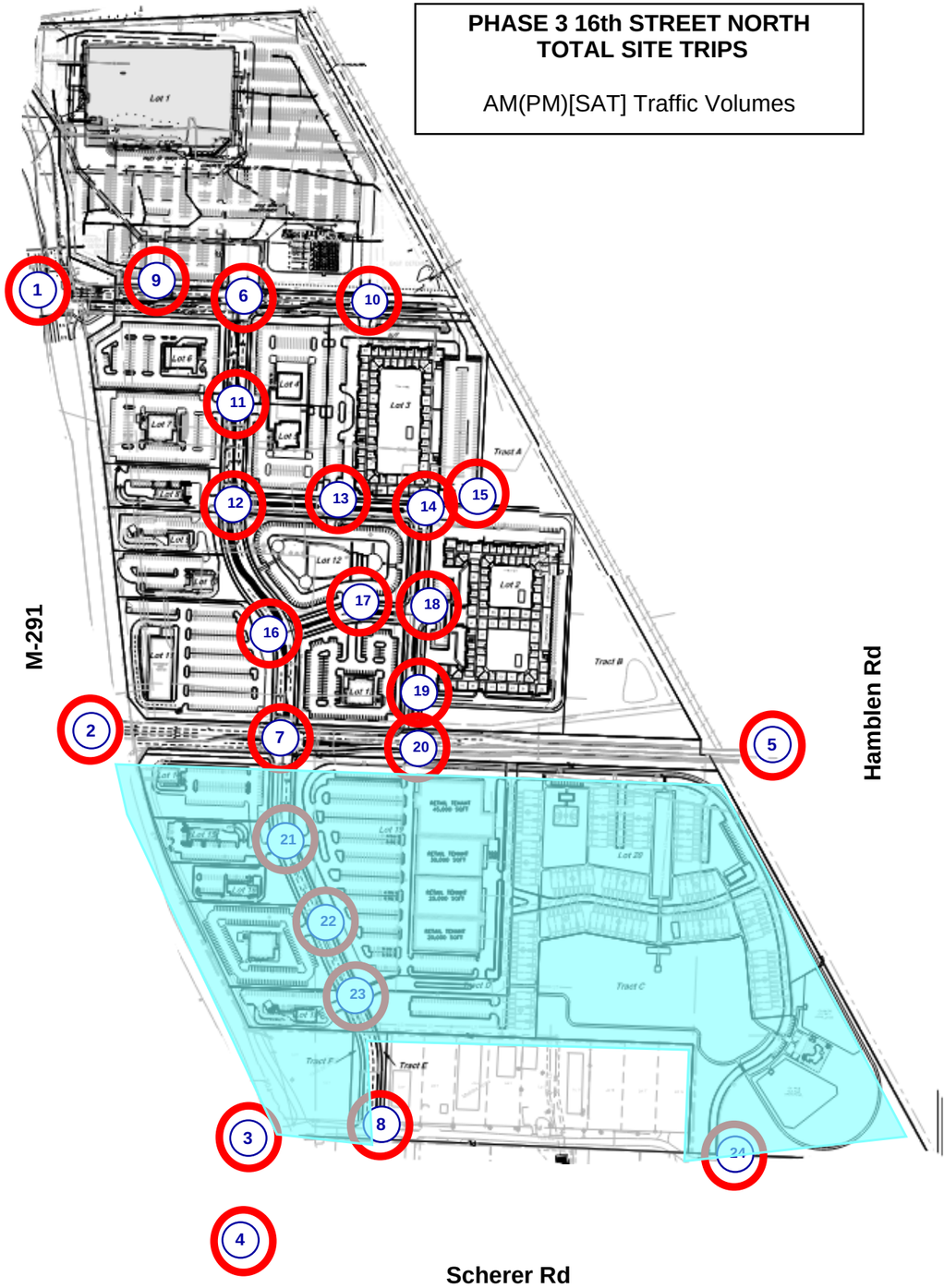
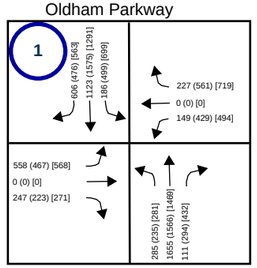


FIGURE 24

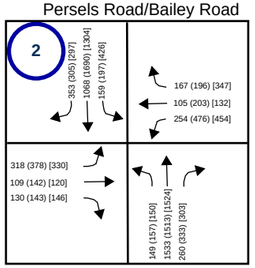
CIVIL ENGINEERING / SURVEYING / UTILITIES

EAST VILLAGE TIS

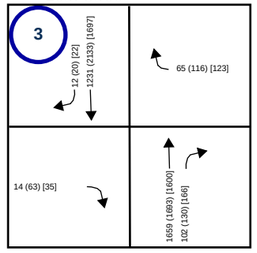
M-291 &
Oldham Parkway



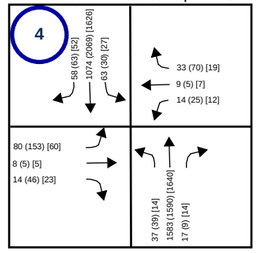
M-291 &
Persels Road/Bailey Road



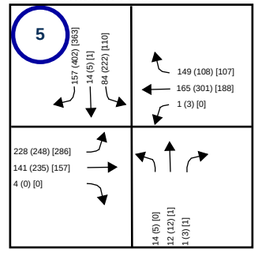
M-291 &
16th Street



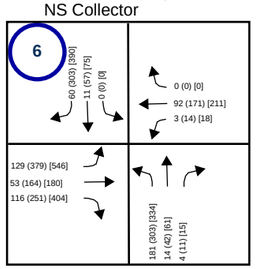
M-291 &
Scherer Rd/ Thompson Dr



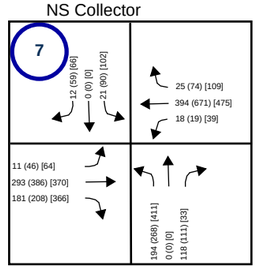
Bailey Road &
Hamblen Road



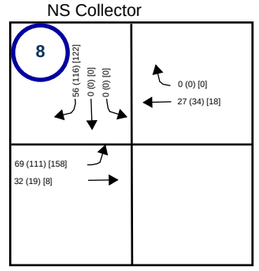
Oldham Parkway &
NS Collector



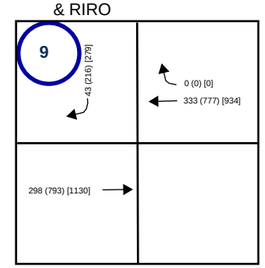
Bailey Road &
NS Collector



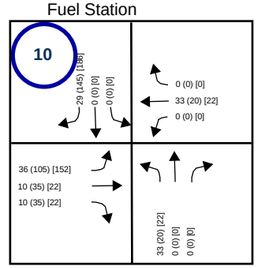
16th Street &
NS Collector



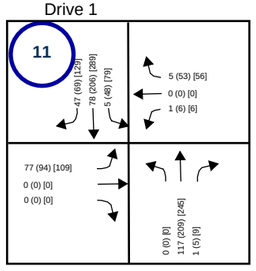
Oldham Parkway
& RIRO



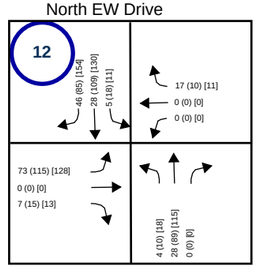
Oldham Parkway &
Fuel Station



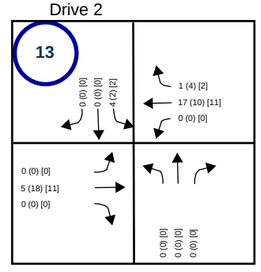
NS Collector &
Drive 1



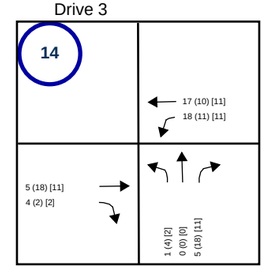
NS Collector &
North EW Drive



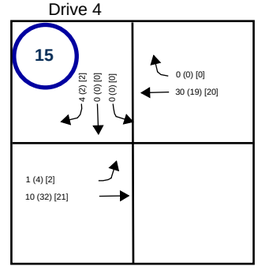
North EW Drive &
Drive 2



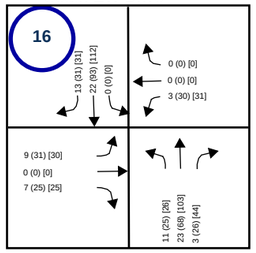
North EW Drive &
Drive 3



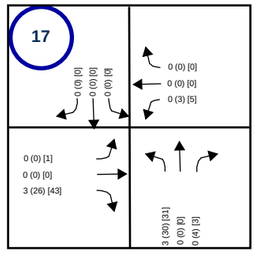
North EW Drive &
Drive 4



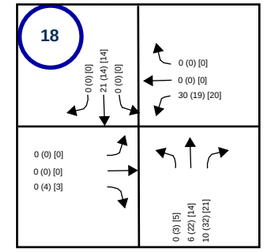
NS Collector &
South EW Drive



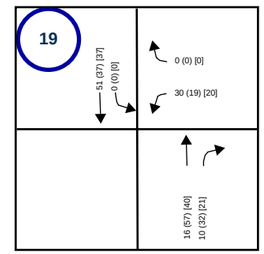
South EW Drive &
Drive 5



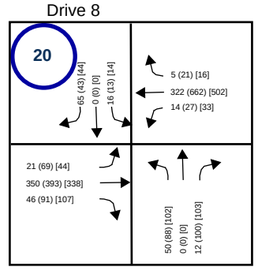
South EW Drive &
Drive 6



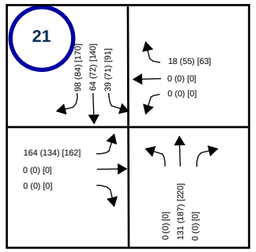
Drive 7



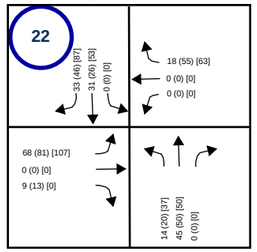
Bailey Road &
Drive 8



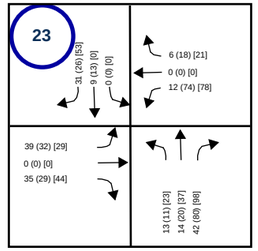
NS Collector &
Drive 9



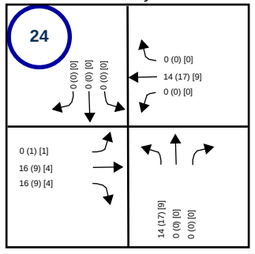
NS Collector &
Drive 10



NS Collector &
Drive 11



16th Street &
Park Driveway



BASE + FULL DEVELOPMENT
PEAK HOUR VOLUMES

AM(PM)[SAT] Traffic Volumes

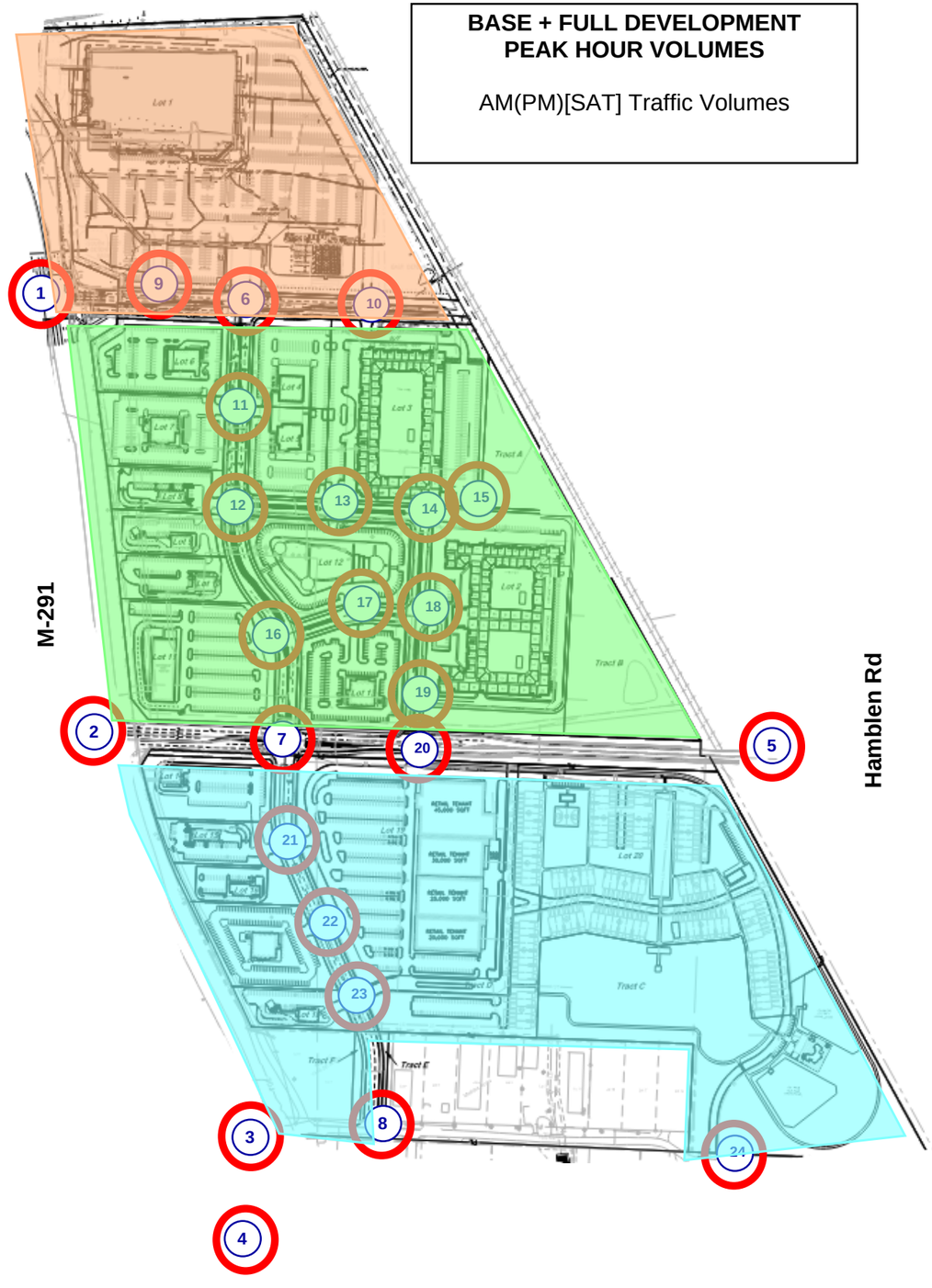
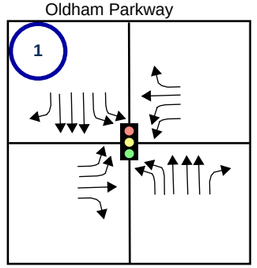


FIGURE 25

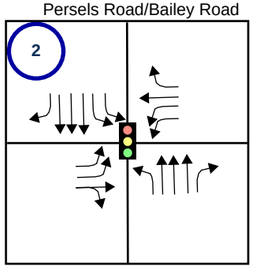
EAST VILLAGE TIS

CIVIL ENGINEERING / SURVEYING / UTILITIES

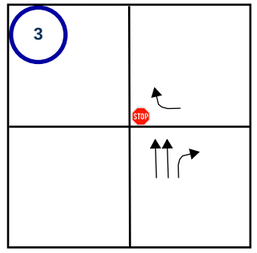
M-291 &
Oldham Parkway



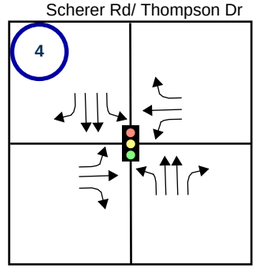
M-291 &
Persels Road/Bailey Road



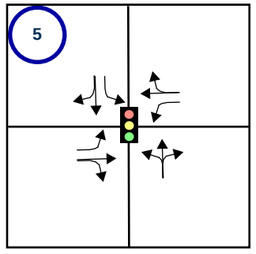
M-291 &
16th Street



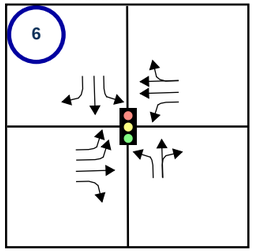
M-291 &
Scherer Rd/ Thompson Dr



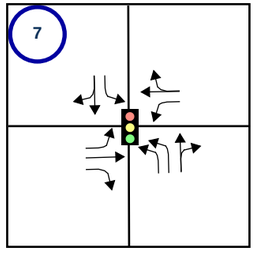
Bailey Road &
Hamblen Road



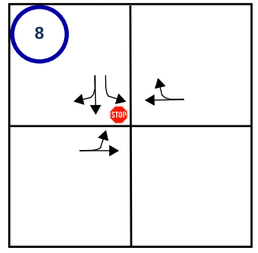
Oldham Parkway &
NS Collector



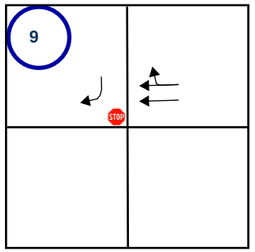
Bailey Road &
NS Collector



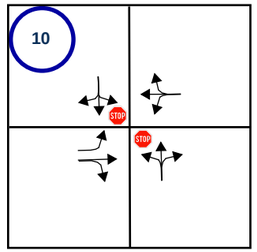
16th Street &
NS Collector



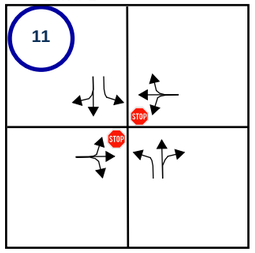
Oldham Parkway
& RIRO



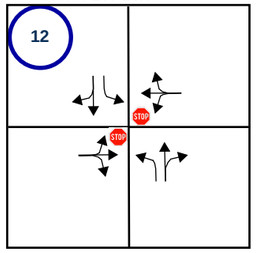
Oldham Parkway &
Fuel Station



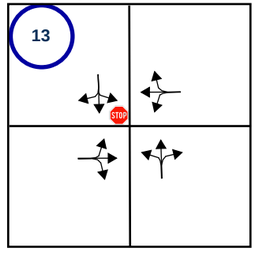
NS Collector &
Drive 1



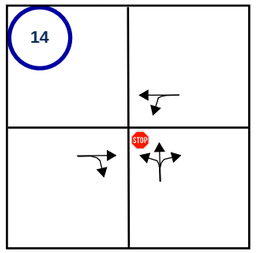
NS Collector &
North EW Drive



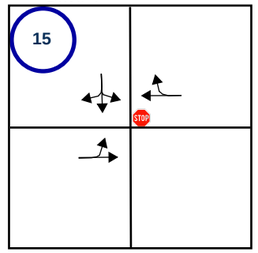
North EW Drive &
Drive 2



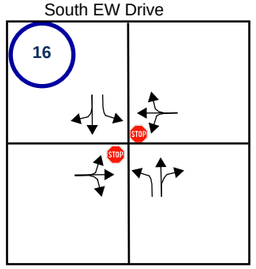
North EW Drive &
Drive 3



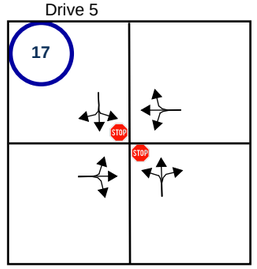
North EW Drive &
Drive 4



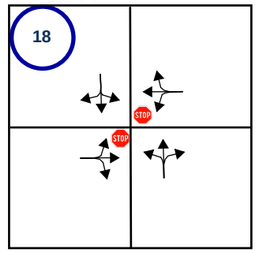
NS Collector &
South EW Drive



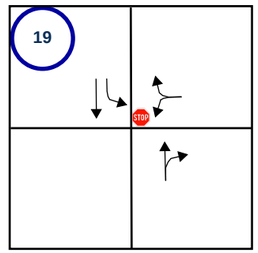
South EW Drive &
Drive 5



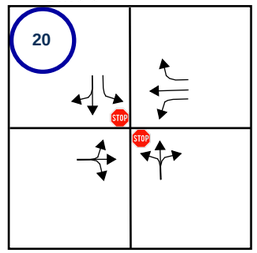
South EW Drive &
Drive 6



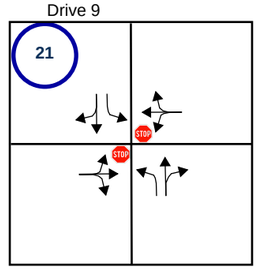
Drive 7



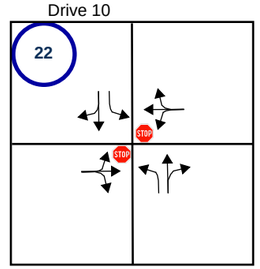
Bailey Road &
Drive 8



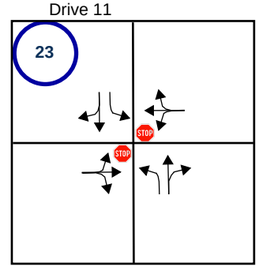
NS Collector &
Drive 9



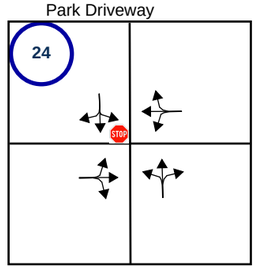
NS Collector &
Drive 10



NS Collector &
Drive 11

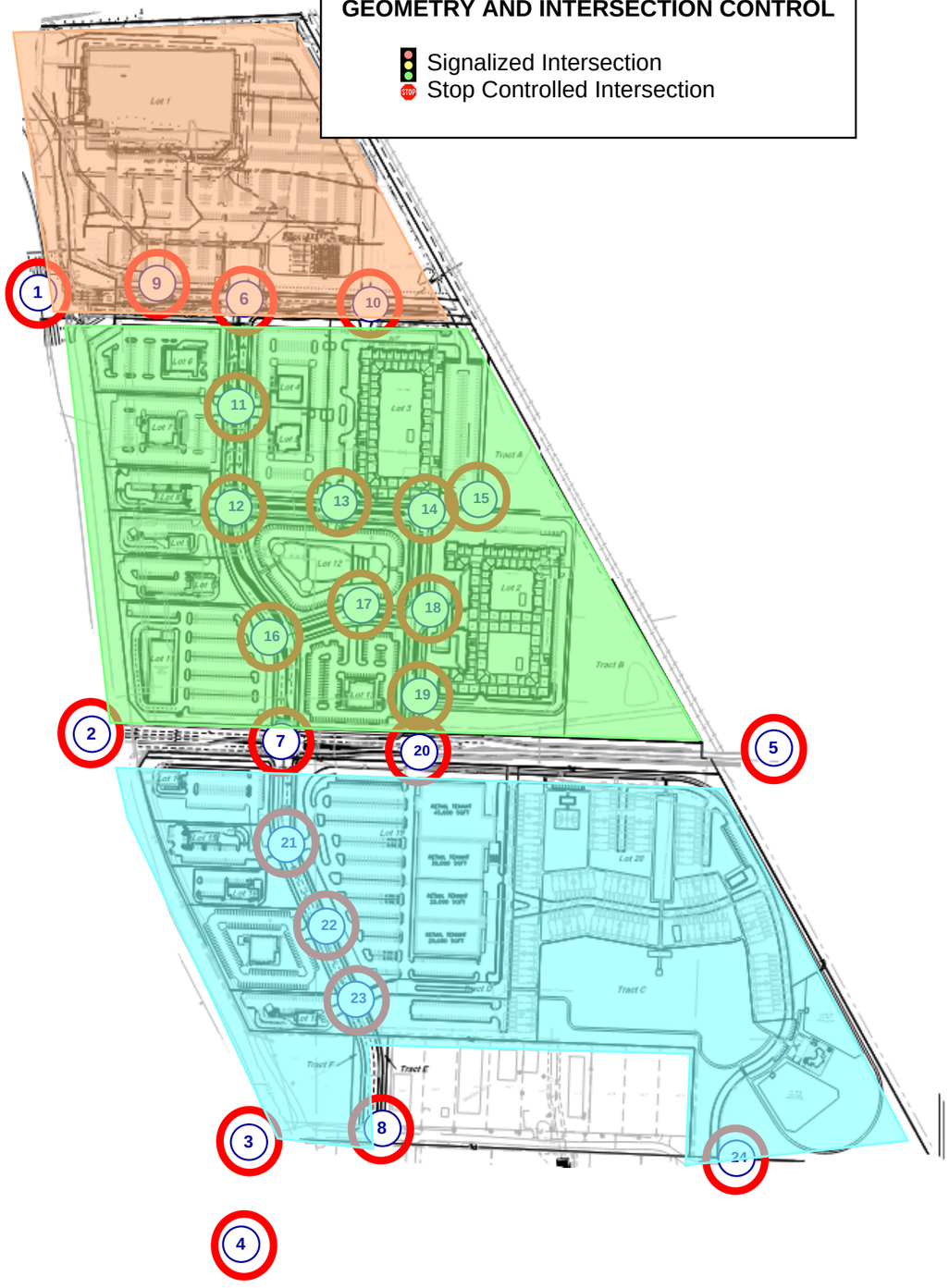


16th Street &
Park Driveway



BASE + FULL DEVELOPMENT GEOMETRY AND INTERSECTION CONTROL

Signalized Intersection
Stop Controlled Intersection

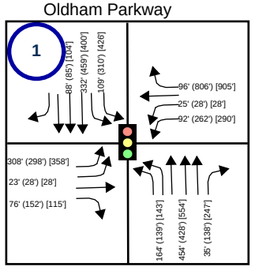


CIVIL ENGINEERING / SURVEYING / UTILITIES

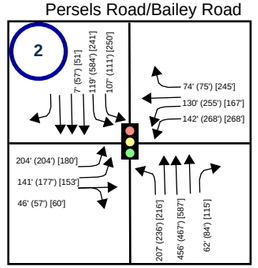
EAST VILLAGE TIS

FIGURE 26

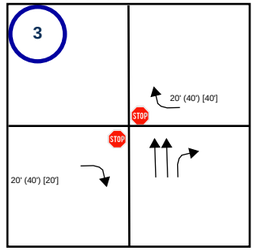
M-291 &
Oldham Parkway



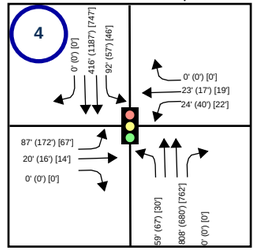
M-291 &
Persels Road/Bailey Road



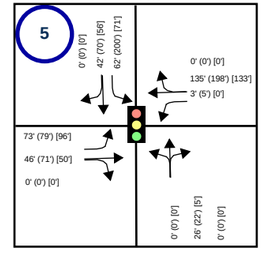
M-291 &
16th Street



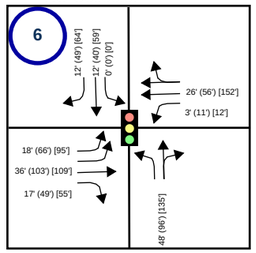
M-291 &
Scherer Rd/ Thompson Dr



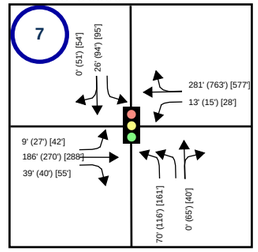
Bailey Road &
Hamblen Road



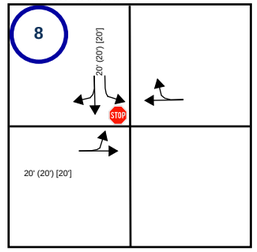
Oldham Parkway &
NS Collector



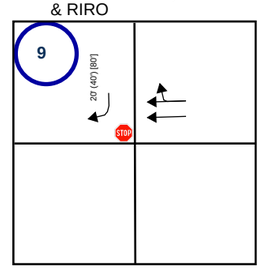
Bailey Road &
NS Collector



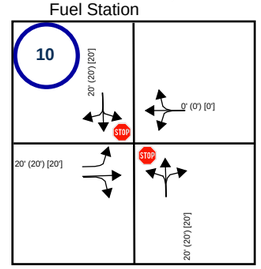
16th Street &
NS Collector



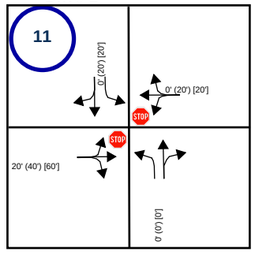
Oldham Parkway
& RIRO



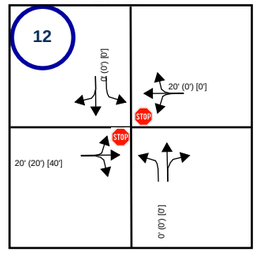
Oldham Parkway &
Fuel Station



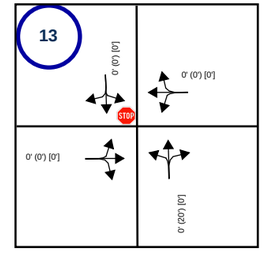
NS Collector &
Drive 1



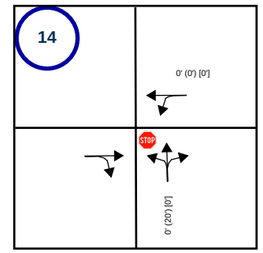
NS Collector &
North EW Drive



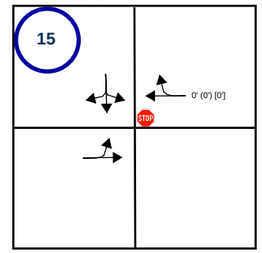
North EW Drive &
Drive 2



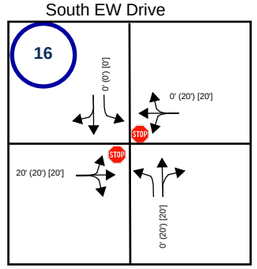
North EW Drive &
Drive 3



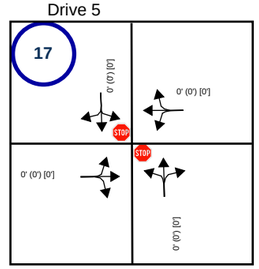
North EW Drive &
Drive 4



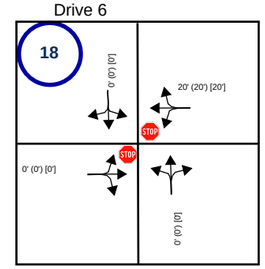
NS Collector &
South EW Drive



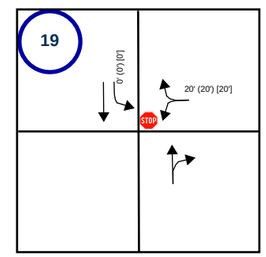
South EW Drive &
Drive 5



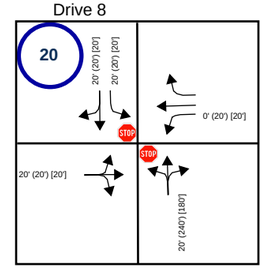
South EW Drive &
Drive 6



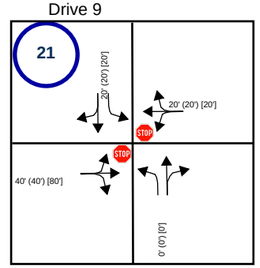
Drive 7



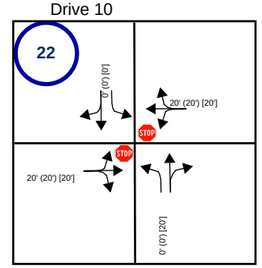
Bailey Road &
Drive 8



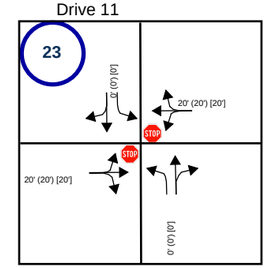
NS Collector &
Drive 9



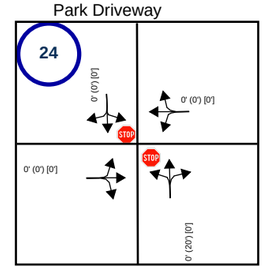
NS Collector &
Drive 10



NS Collector &
Drive 11



16th Street &
Park Driveway



BASE + FULL DEVELOPMENT 95% QUEUE LENGTHS

AM(PM)[SAT] = 95% Queues in feet

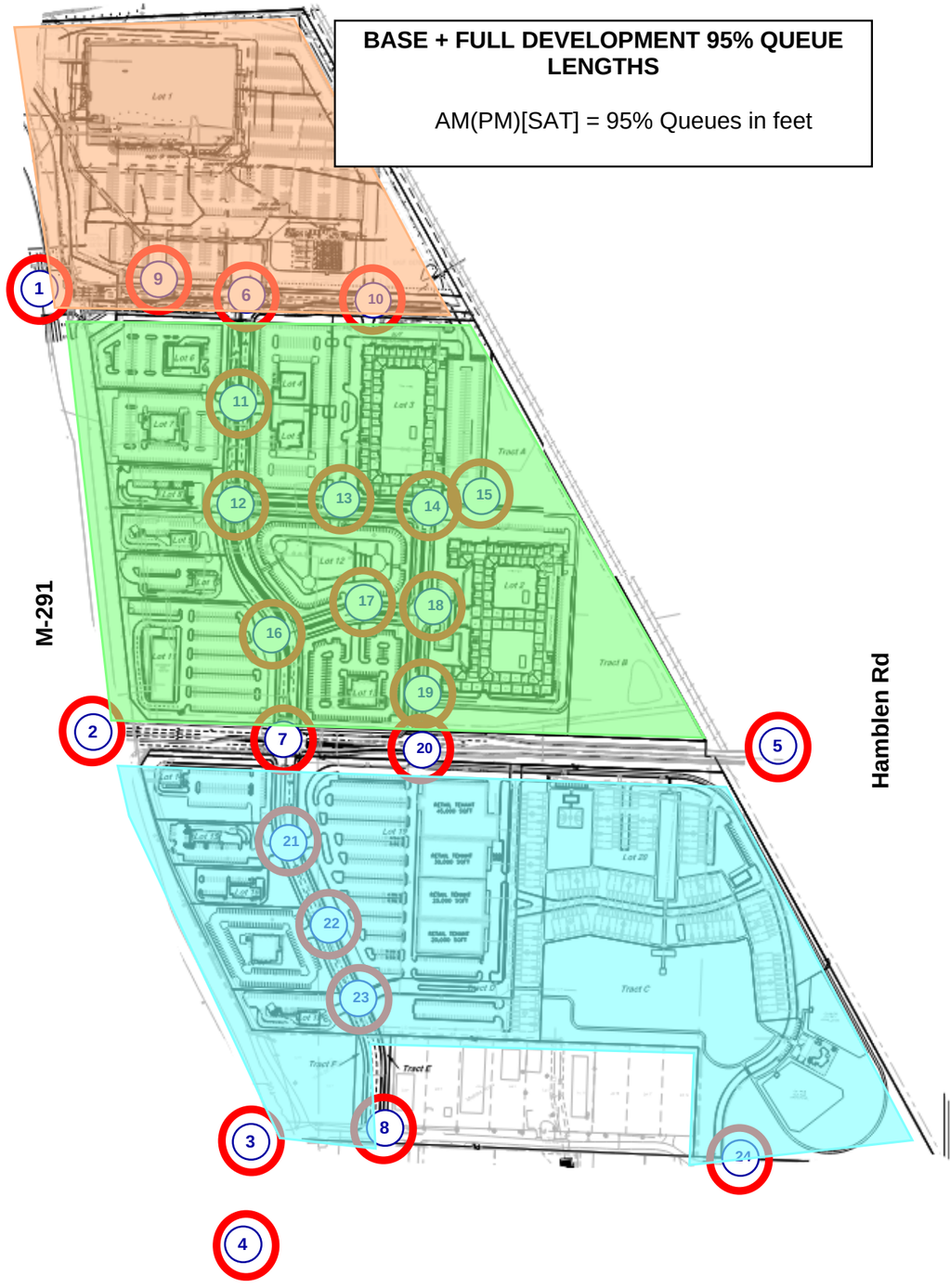


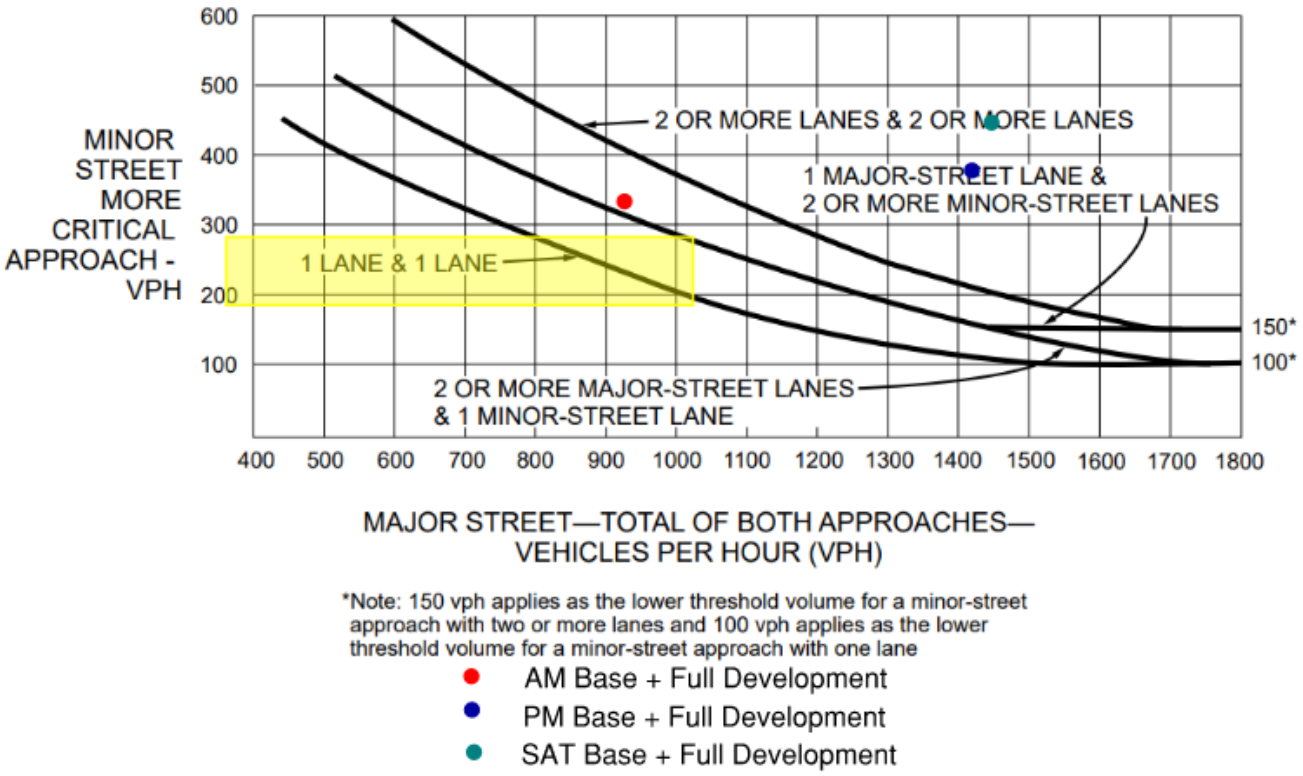
FIGURE 27

CIVIL ENGINEERING / SURVEYING / UTILITIES

OLDHAM VILLAGE EAST TIS

TRAFFIC SIGNAL WARRANT ANALYSIS
NODE #7: BAILEY ROAD AND NS COLLECTOR

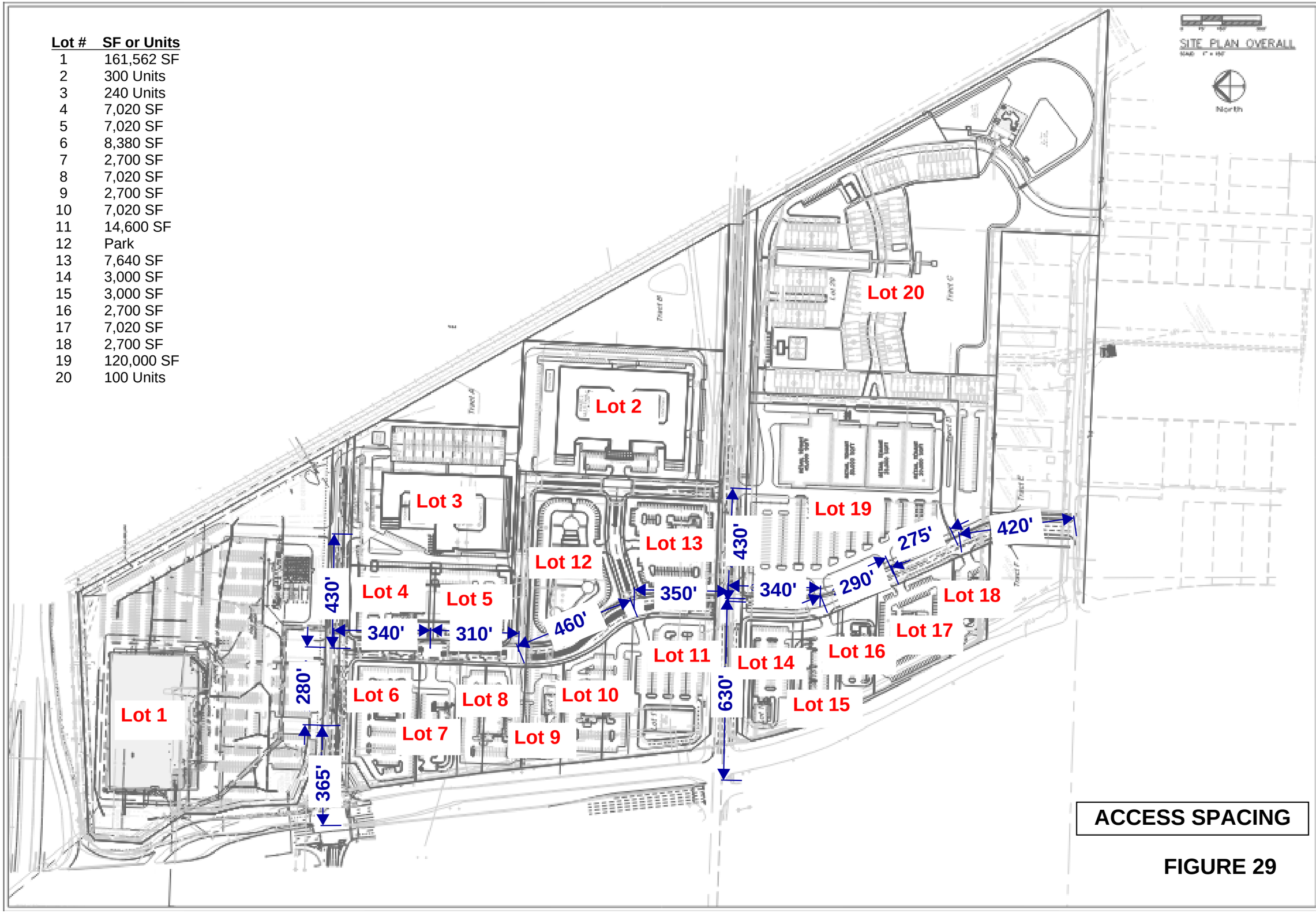
Figure 4C-3. Warrant 3, Peak Hour



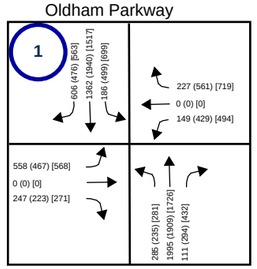
*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane

- AM Base + Full Development
- PM Base + Full Development
- SAT Base + Full Development

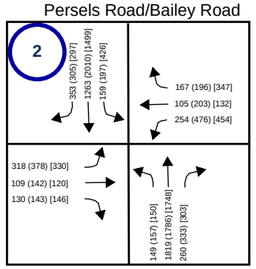
Lot #	SF or Units
1	161,562 SF
2	300 Units
3	240 Units
4	7,020 SF
5	7,020 SF
6	8,380 SF
7	2,700 SF
8	7,020 SF
9	2,700 SF
10	7,020 SF
11	14,600 SF
12	Park
13	7,640 SF
14	3,000 SF
15	3,000 SF
16	2,700 SF
17	7,020 SF
18	2,700 SF
19	120,000 SF
20	100 Units



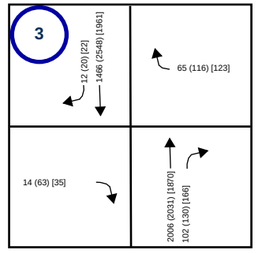
M-291 &
Oldham Parkway



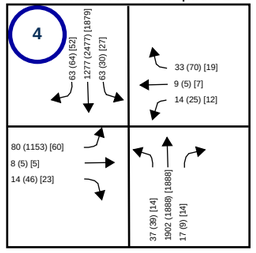
M-291 &
Persels Road/Bailey Road



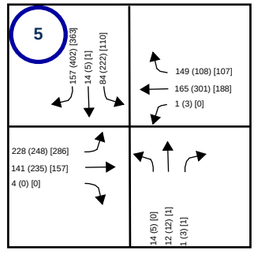
M-291 &
16th Street



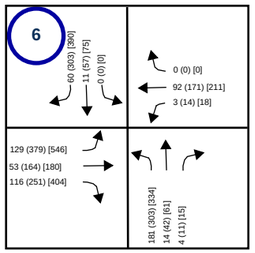
M-291 &
Scherer Rd/ Thompson Dr



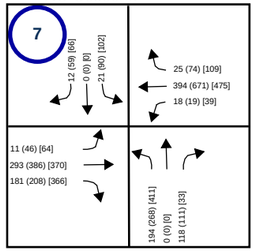
Bailey Road &
Hamblen Road



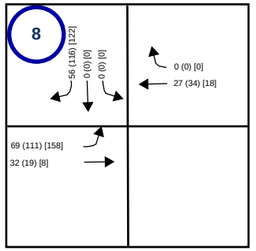
Oldham Parkway &
NS Collector



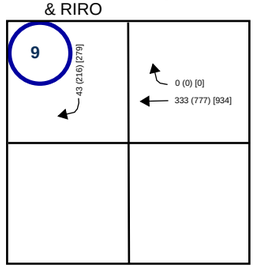
Bailey Road &
NS Collector



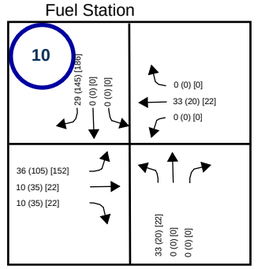
16th Street &
NS Collector



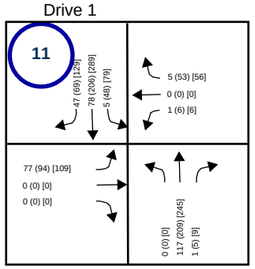
Oldham Parkway
& RIRO



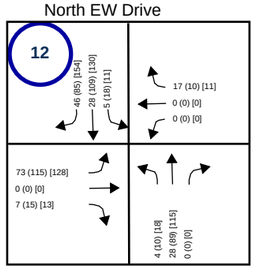
Oldham Parkway &
Fuel Station



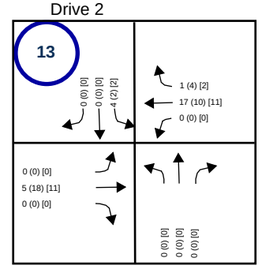
NS Collector &
Drive 1



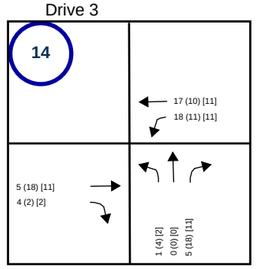
NS Collector &
North EW Drive



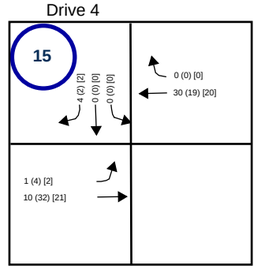
North EW Drive &
Drive 2



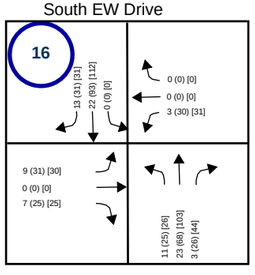
North EW Drive &
Drive 3



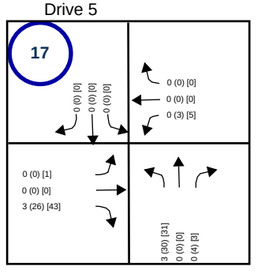
North EW Drive &
Drive 4



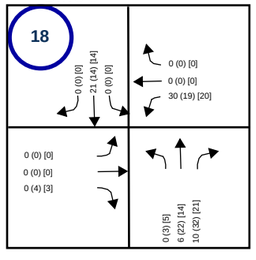
NS Collector &
South EW Drive



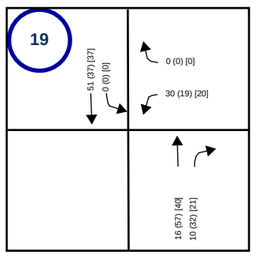
South EW Drive &
Drive 5



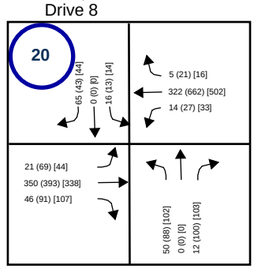
South EW Drive &
Drive 6



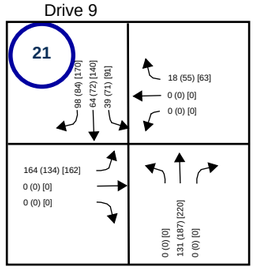
Drive 7



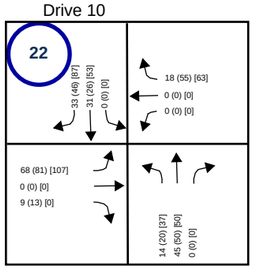
Bailey Road &
Drive 8



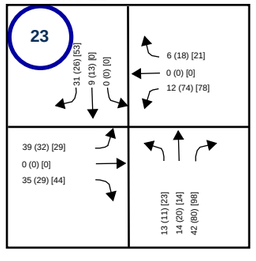
NS Collector &
Drive 9



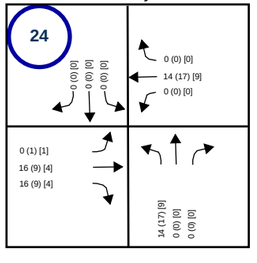
NS Collector &
Drive 10

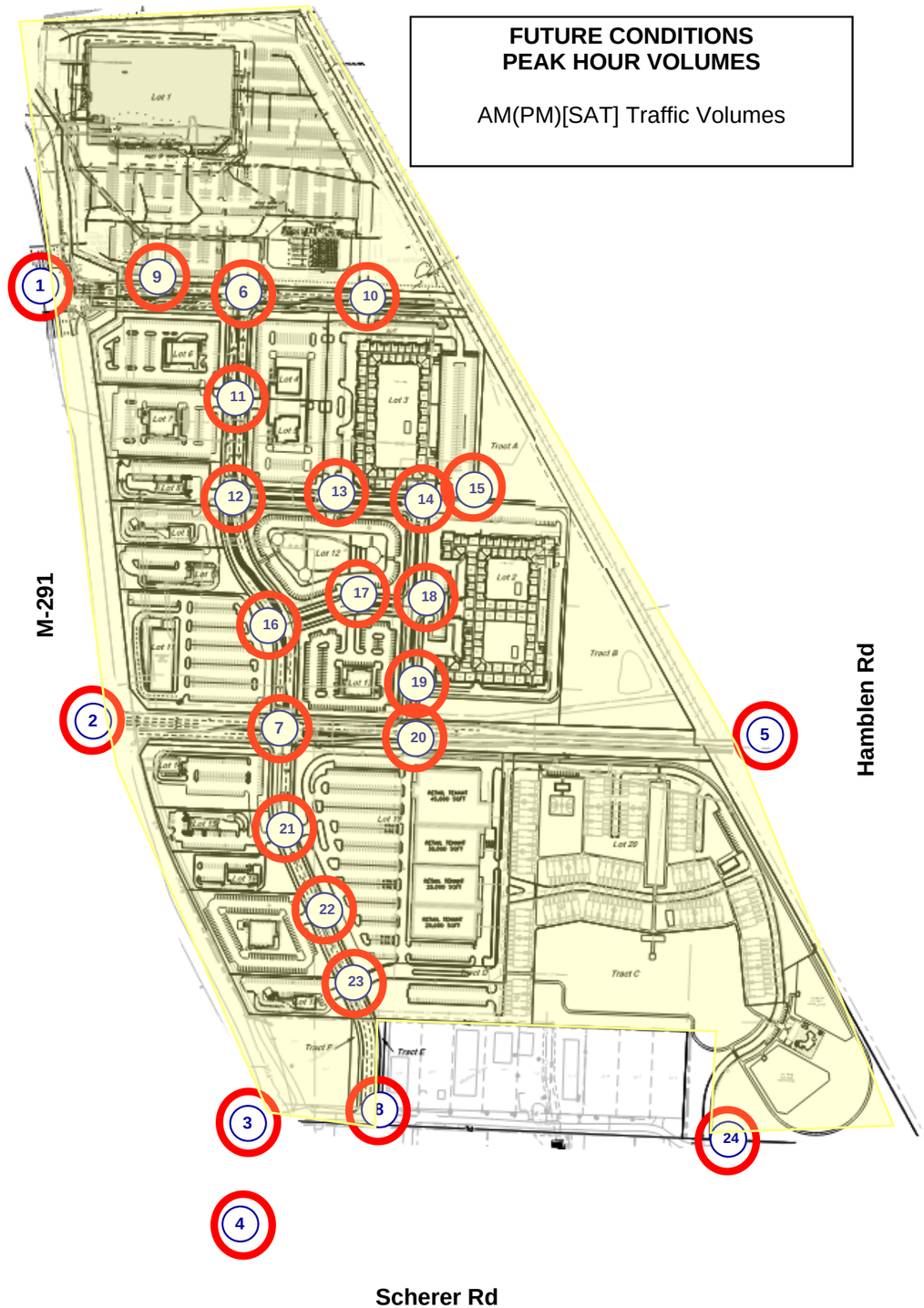


NS Collector &
Drive 11



16th Street &
Park Driveway





FUTURE CONDITIONS
PEAK HOUR VOLUMES

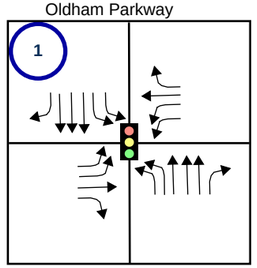
AM(PM)[SAT] Traffic Volumes

CIVIL ENGINEERING / SURVEYING / UTILITIES

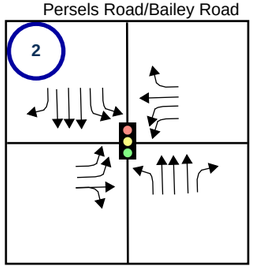
EAST VILLAGE TIS

FIGURE 30

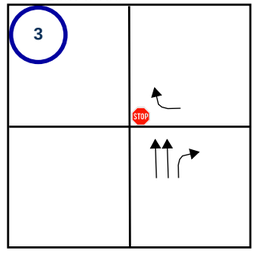
M-291 &
Oldham Parkway



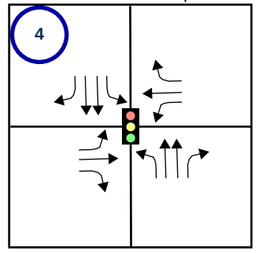
M-291 &
Persels Road/Bailey Road



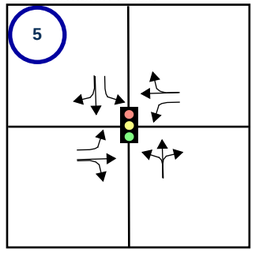
M-291 &
16th Street



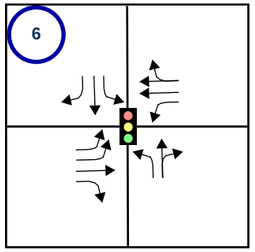
M-291 &
Scherer Rd/ Thompson Dr



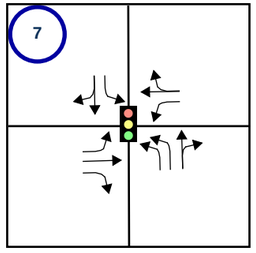
Bailey Road &
Hamblen Road



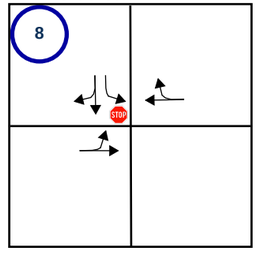
Oldham Parkway &
NS Collector



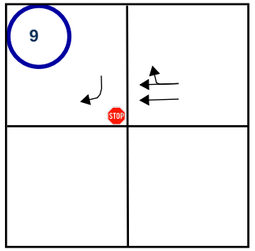
Bailey Road &
NS Collector



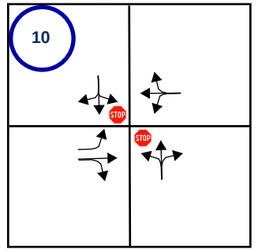
16th Street &
NS Collector



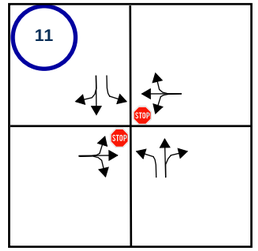
Oldham Parkway
& RIRO



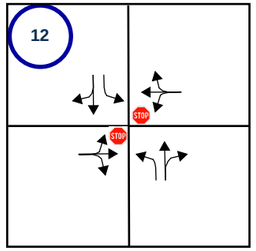
Oldham Parkway &
Fuel Station



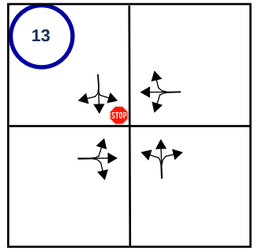
NS Collector &
Drive 1



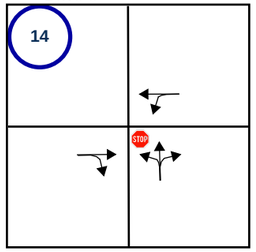
NS Collector &
North EW Drive



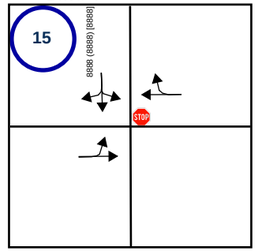
North EW Drive &
Drive 2



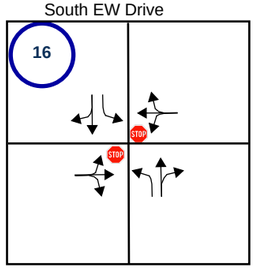
North EW Drive &
Drive 3



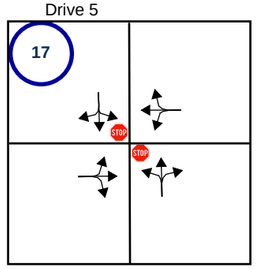
North EW Drive &
Drive 4



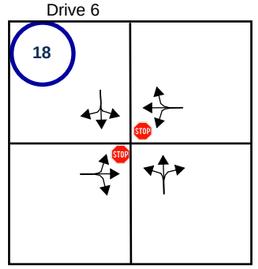
NS Collector &
South EW Drive



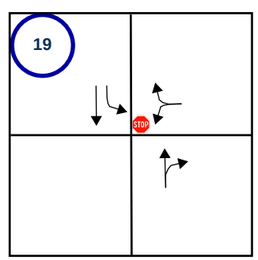
South EW Drive &
Drive 5



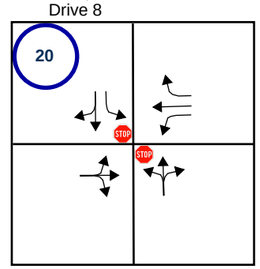
South EW Drive &
Drive 6



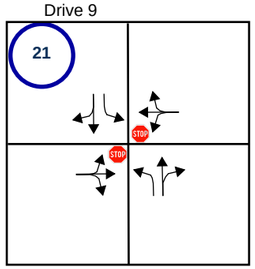
Drive 7



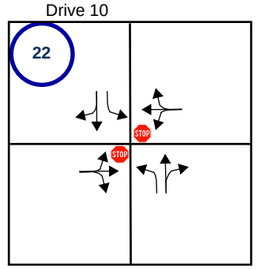
Bailey Road &
Drive 8



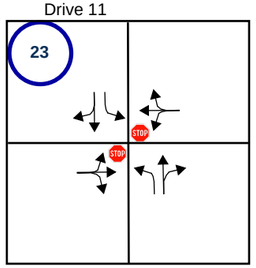
NS Collector &
Drive 9



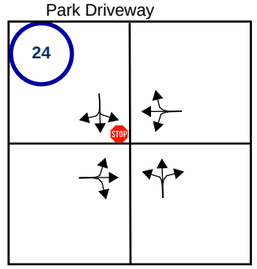
NS Collector &
Drive 10



NS Collector &
Drive 11

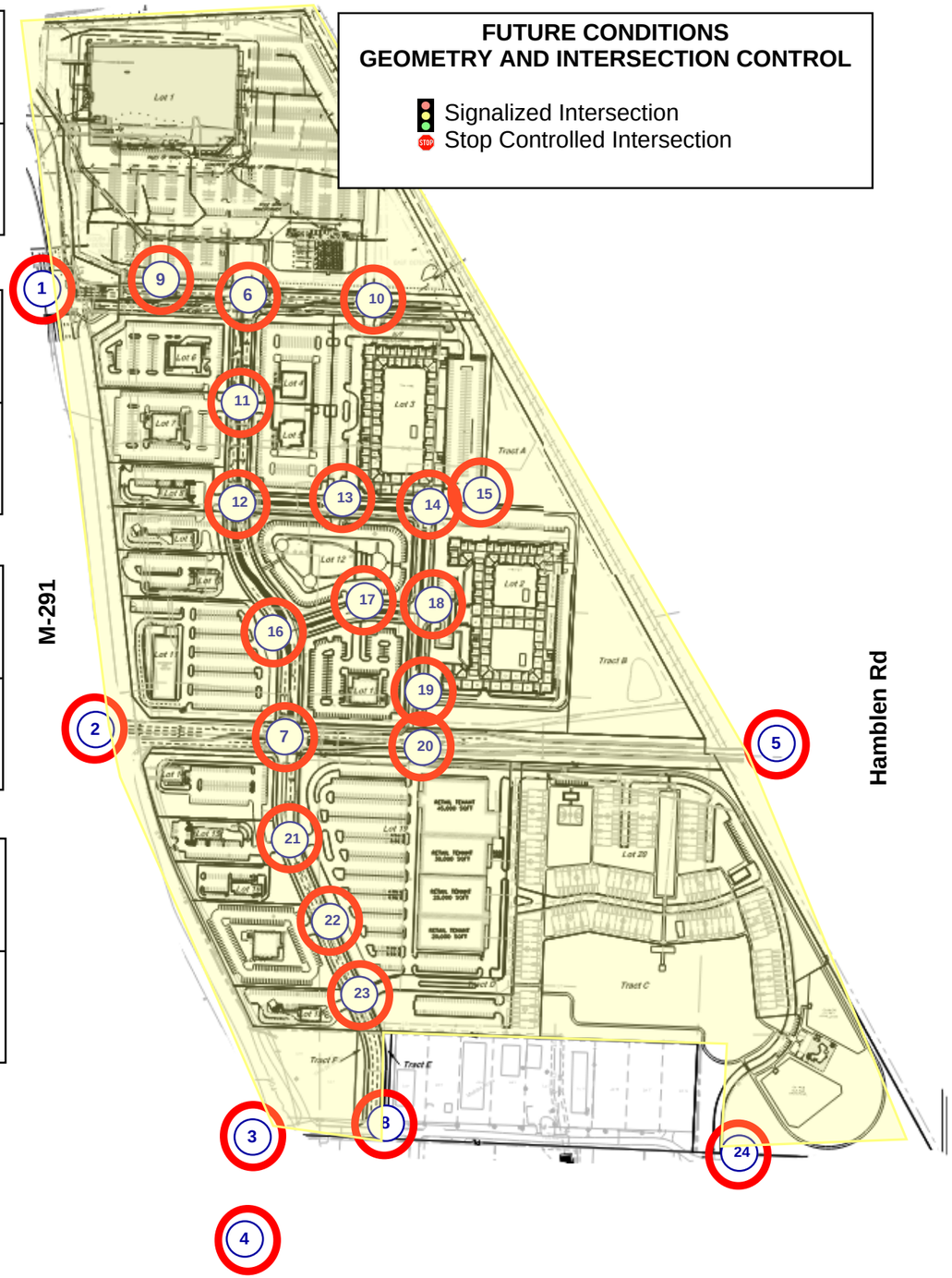


16th Street &
Park Driveway



FUTURE CONDITIONS
GEOMETRY AND INTERSECTION CONTROL

Signalized Intersection
Stop Controlled Intersection

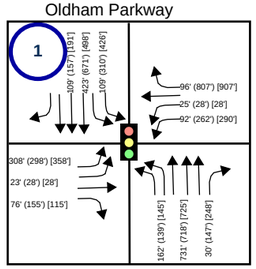


CIVIL ENGINEERING / SURVEYING / UTILITIES

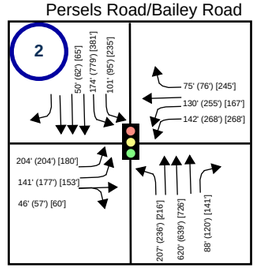
EAST VILLAGE TIS

FIGURE 31

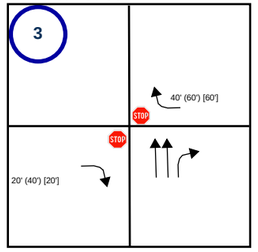
M-291 & Oldham Parkway



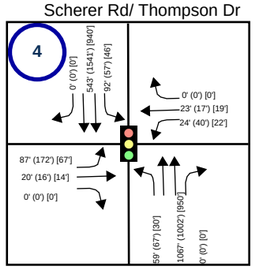
M-291 & Persels Road/Bailey Road



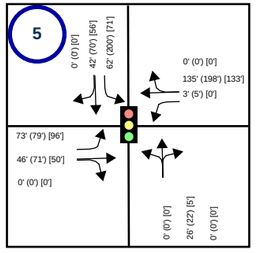
M-291 & 16th Street



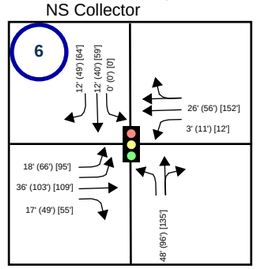
M-291 & Scherer Rd/ Thompson Dr



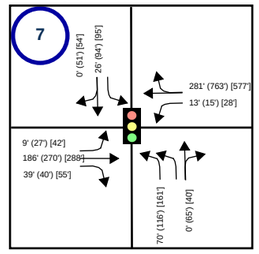
Bailey Road & Hamblen Road



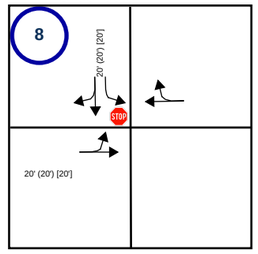
Oldham Parkway & NS Collector



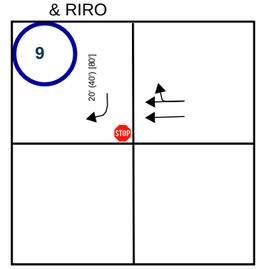
Bailey Road & NS Collector



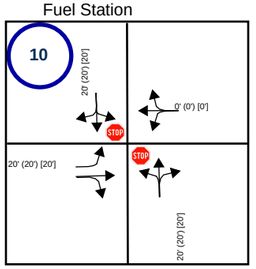
16th Street & NS Collector



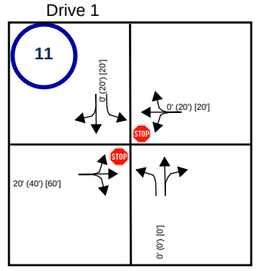
Oldham Parkway & RIRO



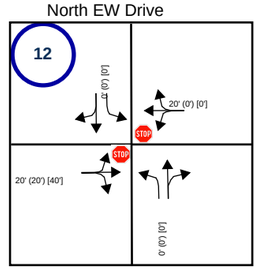
Oldham Parkway & Fuel Station



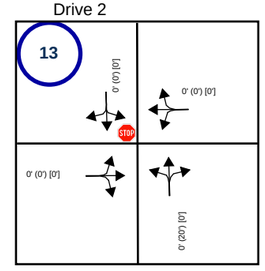
NS Collector & Drive 1



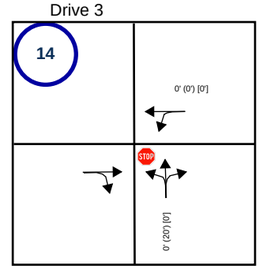
NS Collector & North EW Drive



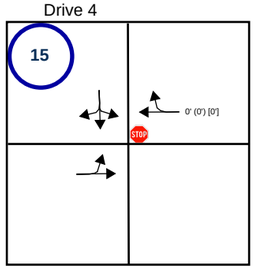
North EW Drive & Drive 2



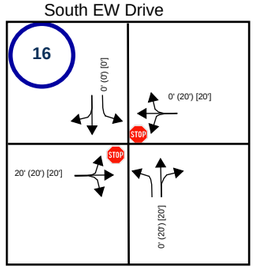
North EW Drive & Drive 3



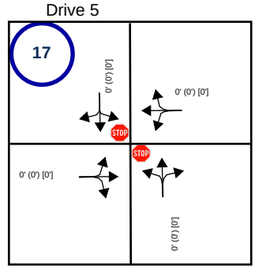
North EW Drive & Drive 4



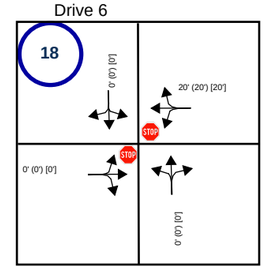
NS Collector & South EW Drive



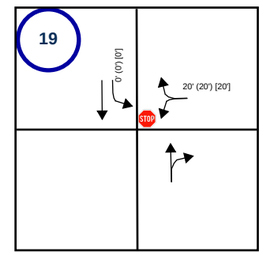
South EW Drive & Drive 5



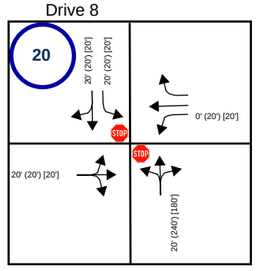
South EW Drive & Drive 6



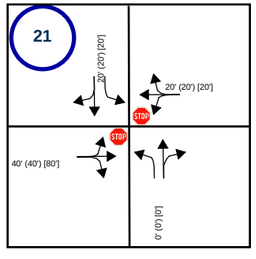
Drive 7



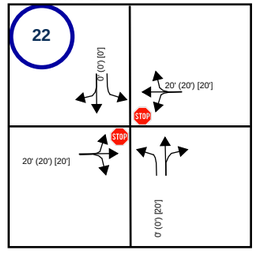
Bailey Road & Drive 8



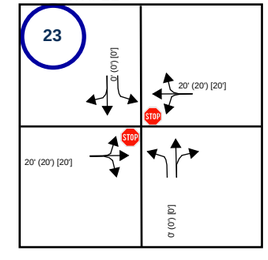
NS Collector & Drive 9



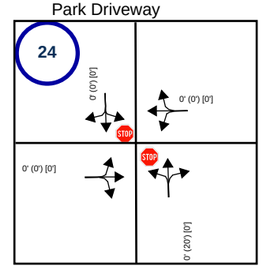
NS Collector & Drive 10



NS Collector & Drive 11



16th Street & Park Driveway



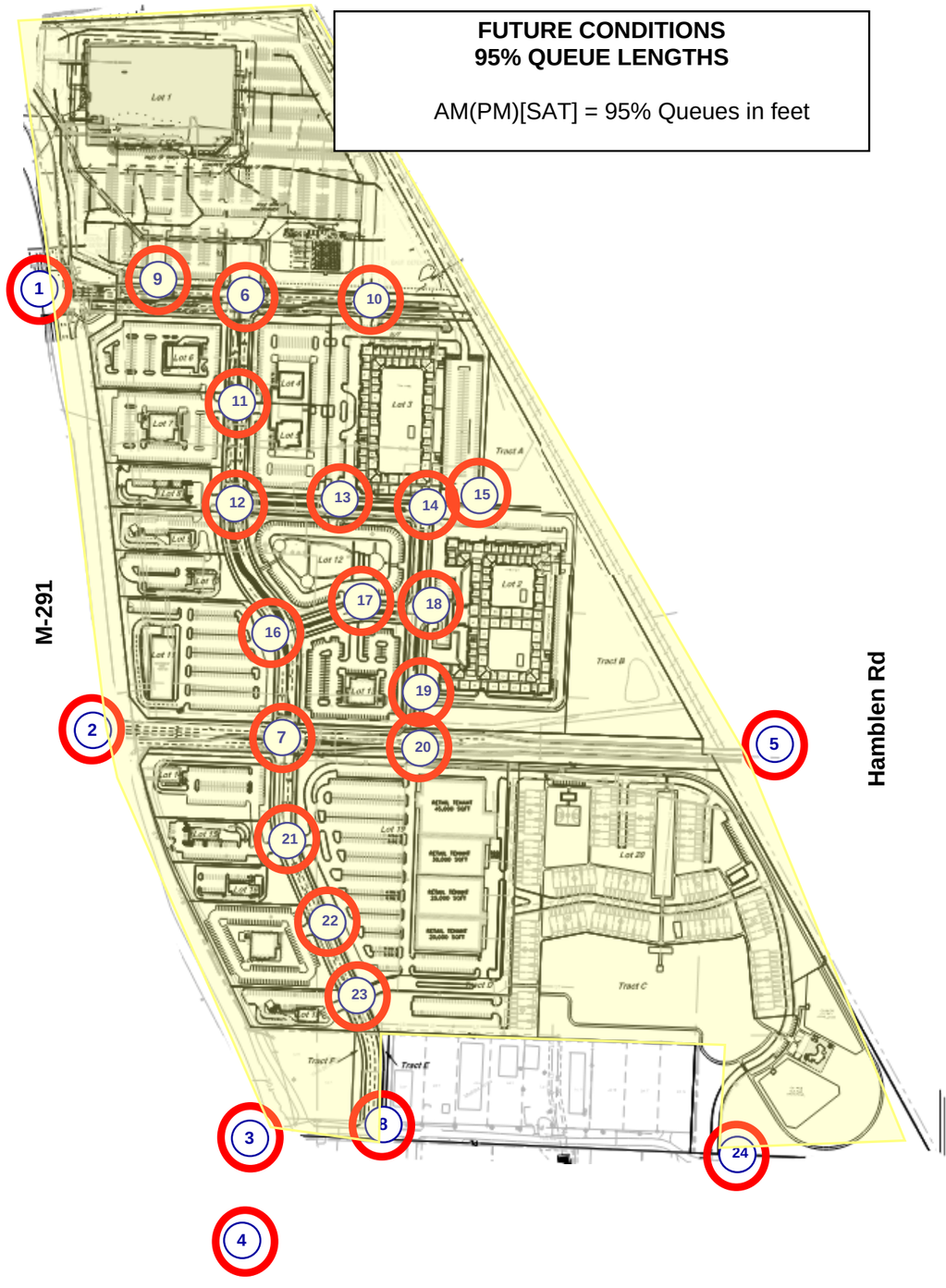


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FIGURE 32