



HEXAGON TRANSPORTATION CONSULTANTS, INC.

December 12, 2017

Ms. Lillian Tsang
City of Sunnyvale
465 W. Olive Avenue, PO Box 3707
Sunnyvale, CA 94088

Re: *Proposal to Prepare a Transportation Impact Analysis for the Proposed Fortinet Precise Plan in Sunnyvale, CA*

Dear Ms. Tsang:

Hexagon Transportation Consultants, Inc. is pleased to submit this proposal to prepare a Transportation Impact Analysis for the proposed Fortinet Precise Plan (FTPP) in Sunnyvale, California. At the time of this proposal, it is our understanding that the FTPP area has not been finalized. There are currently two identified plan area options:

- **Option A:** The proposed plan area under Option A is bounded by Central Expressway to the north, Kifer Road to the south, Wolfe Road to the west and a private park to the east (see Figure 1). This area consists of 39 parcels and is approximately 35 acres.
- **Option B:** The proposed plan area under Option B is bounded by Central Expressway to the north, Kifer Road to the south, Commercial Street to the east and generally, by San Lazaro Avenue to the west (see Figure 1).

Scope of Services

Both proposed plan area options would require a General Plan Amendment (GPA) traffic study. Therefore, this scope of services is written to conduct a GPA traffic study for the proposed FTPP, regardless of the plan area options. A near-term project-level traffic study for the proposed Fortinet campus expansion project is also included in this scope of service.

The purpose of the traffic analysis is to determine the traffic impacts of the proposed FTPP on the key intersections and freeway segments in the study area during the weekday AM (7-9 AM) and PM (4-6 PM) peak commute hours. The traffic analysis will satisfy the requirements of the California Environmental Quality Act (CEQA), City of Sunnyvale, and the Santa Clara Valley Transportation Authority (VTA) Congestion Management Program (CMP). The traffic analysis proposes to study 57 intersections and up to eight freeway segments. The proposed study intersections are listed below and shown on Figure 2.



Study Intersections

1. Mary Avenue & Central Expressway
2. Fair Oaks Avenue & Tasman Drive
3. Fair Oaks Avenue & US 101 Northbound Ramps
4. Fair Oaks Avenue & Ahwanee Avenue
5. Fair Oaks Avenue & Duane Avenue
6. Fair Oaks Avenue & Wolfe Road
7. Fair Oaks Avenue & E Arques Avenue
8. Fair Oaks Avenue & California Avenue
9. Fair Oaks Avenue & Kifer Road
10. Fair Oaks Avenue & Evelyn Avenue
11. Fair Oaks Avenue & Reed Avenue / Old San Francisco Road
12. Fair Oaks Avenue & El Camino Real
13. Sunnyvale-Saratoga Road & Remington Drive
14. Wolfe Road & Maude Avenue (unsignalized)
15. Wolfe Road & Stewart Drive
16. Wolfe Road & Arques Avenue
17. Wolfe Road & Central Expressway Ramps
18. Wolfe Road & Kifer Road
19. Wolfe Road & Evelyn Avenue
20. Wolfe Road & Reed Avenue
21. Wolfe Road & El Camino Real
22. Wolfe Road & Fremont Avenue
23. Wolfe Road & Homestead Road
24. Wolfe Road & I-280 Northbound Ramps
25. Wolfe Road & I-280 Southbound Ramps
26. Commercial Street & Arques Avenue
27. Commercial Street & Kifer Road (unsignalized)
28. Evelyn Avenue & Reed Avenue
29. Lawrence Expressway & Tasman Drive
30. Lawrence Expressway & Lakehaven Drive
31. Lawrence Expressway & US 101 Northbound Ramps
32. Lawrence Expressway & US 101 Southbound Ramps
33. Lawrence Expressway & Oakmead Parkway
34. Lawrence Expressway & Arques Avenue
35. Lawrence Expressway & Kifer Road
36. Lawrence Expressway & Monroe Street
37. Lawrence Expressway & Cabrillo Avenue
38. Lawrence Expressway & El Camino Real Ramps
39. Lawrence Expressway & Benton Street
40. Lawrence Expressway & Homestead Road
41. Lawrence Expressway & Pruneridge Avenue
42. I-280 Southbound Off-Ramp & Stevens Creek Boulevard
43. Lawrence Expressway Southbound Ramps & Stevens Creek Boulevard
44. Lawrence Expressway Northbound Ramps & Stevens Creek Boulevard
45. Lawrence Expressway & Calvert Drive / I-280 Southbound On-Ramp
46. Oakmead Parkway & Arques Avenue / Scott Boulevard
47. Oakmead Parkway & Central Expressway



48. Great America Parkway & Tasman Drive
49. Great America Parkway & US 101 Northbound Ramps
50. Bowers Avenue & US 101 Southbound Ramps
51. Bowers Avenue & Scott Boulevard
52. Bowers Avenue & Central Expressway
53. Bowers Avenue & Kifer Road / Walsh Avenue
54. Semiconductor Drive & Kifer Road
55. Corvin Drive & Kifer Road
56. Calabazas Boulevard & Monroe Street
57. Bowers Avenue & Monroe Street

The tasks to be included in this work scope are discussed below. First presented are tasks required to complete the near-term project-level portion of the traffic analysis. Then presented are tasks required to complete the General Plan Amendment (GPA) portion of the traffic analysis.

1. **Data Collection and Field Observations.** Intersection data collection as well as field observations for all intersections (except Intersection #54) were done in November and December 2017 as part of separate contracts with the City's Planning Department. These services are thus excluded from this work scope. New weekday AM (7-9 AM) and PM (4-6 PM) peak hour turning movement counts will be collected at the intersection of Semiconductor Drive and Kifer Road. The counts will include pedestrians and bicycles. Existing traffic conditions at this intersection will be observed in the field in order to identify any operational deficiencies and to confirm the accuracy of calculated levels of service. Existing traffic data will be submitted for City staff review.
2. **Evaluation of Existing Conditions.** Existing traffic conditions will be evaluated based on existing traffic volumes at the study intersections. The existing traffic conditions at the study intersections will be evaluated using the TRAFFIX software, which employs the *2000 Highway Capacity Manual (HCM)* methodology for intersection analyses, and is the designated level of service methodology for the City of Sunnyvale. Existing transit services as well as bicycle and pedestrian facilities in the vicinity of the proposed plan area will be described.
3. **Near-Term Study: Project Trip Generation, Distribution, and Assignment.** Estimates of trips to be added to the surrounding roadway network by the proposed project will be based on trip generation rates recommended by the Institute of Transportation Engineers' *Trip Generation Manual, 10th Edition*. Trip reductions will be applied per the VTA TIA guidelines. Trips generated by the existing use on the project site will be credited using trip generation rates published by ITE. The directional distribution of site-generated traffic will be forecast based on existing travel patterns, relative locations of complementary land uses, and information obtained from previous traffic studies conducted for projects in the area, as available. The site-generated traffic will be assigned to the roadway network based on the trip generation and distribution. The trip generation, distribution, and assignment assumptions will be reviewed by Sunnyvale staff before proceeding with the intersection analysis.



4. **Near-Term Study: Evaluation of Background Conditions.** Background traffic volumes represent the existing volumes plus the projected volumes from approved developments that have not yet been constructed and occupied. Approved project trips and/or approved project information will be obtained from the City of Sunnyvale. In addition, roadway improvements associated with approved developments will be assumed as directed by City staff. Intersection levels of service under background conditions will be evaluated using the City methodology.
5. **Near-Term Study: Evaluation of Existing Plus Project Conditions.** Project-generated traffic will be added to the existing traffic volumes. Intersection levels of service under existing plus project conditions will be evaluated using the TRAFFIX software. Intersection level of service calculations will be conducted to estimate existing plus project traffic conditions during the AM and PM peak hours after the completion of the proposed project.
6. **Near-Term Study: Evaluation of Background Plus Project Conditions.** Project-generated traffic will be added to the background condition traffic volumes. Intersection levels of service under project conditions will be evaluated using the TRAFFIX software. Intersection level of service calculations will be conducted to estimate project traffic conditions during the AM and PM peak hours after the completion of the proposed office complex. Intersection impacts associated with the development of the project will be evaluated relative to background conditions.
7. **Near-Term Study: Freeway Segment Analysis.** Based on the project trip assignment, Hexagon will select up to 8 study freeway segments for the near-term study. Hexagon will submit the proposed study freeway segments for City approval. Existing freeway segment volumes will be obtained from Caltrans. Existing freeway segment levels of service information will be obtained from the most recent VTA CMP Monitoring Report. The number of trips on nearby freeway segments will be compared to the CMP's threshold for determining the need for freeway level of service analysis. Freeway segments that require a level of service analysis will be analyzed for the AM and PM peak hours as required by the CMP guidelines under existing plus project conditions. The results of this task will be documented in the near-term traffic study.
8. **Near-Term Study: Freeway Ramp Analysis.** Based on the project trip assignment, the number of project trips on freeway ramps within the study area will be determined. Hexagon will select up to four freeway ramps for evaluation. Hexagon will submit the proposed study freeway ramps for City approval. Existing ramp volumes will be obtained from Caltrans. Field observations will indicate whether the study freeway on-ramp is metered during the AM or PM peak periods. For all off-ramps and non-metered on-ramps, a volume-to-capacity ratio will be used to evaluate potential project impacts on the freeway ramps. For metered on-ramps, a queuing analysis will be conducted to determine project impacts on the freeway ramps under existing plus project and background plus project conditions.



- 9. Near-Term Study: Bicycle, Pedestrian, and Transit Facilities.** The traffic analysis will include a discussion of existing transit services in the area, as well as bicycle and pedestrian facilities. An analysis of the project's effect on transit service in the area and on bicycle and pedestrian circulation in the study area will be included in the traffic report. This will include a quantitative analysis of transit delay in compliance with VTA traffic study guidelines. The project's proposed bicycle and pedestrian facilities will also be checked for conformance with City's adopted Bicycle Plan. Any recommended improvements to nearby bicycle, pedestrian, or transit facilities will be identified.
- 10. Near-Term Study: Signal Warrant Analysis.** The need for future signalization of all unsignalized study intersections will be evaluated on the basis of the Peak Hour Warrant (Warrant 3 – Part B) in the *California Manual on Uniform Traffic Control Devices*. The warrant will be evaluated using the AM and PM peak hour volumes for all study scenarios (existing, existing plus project, background, and background plus project conditions).
- 11. Near-Term Study: Site Access, On-Site Circulation and Parking.** A review of the project site plan, if available, will be performed to determine the overall adequacy of the site access and on-site circulation in accordance with generally accepted traffic engineering standards and to identify any access or circulation issues that should be improved. Parking will be evaluated relative to the Sunnyvale Parking Requirements.
- 12. Near-Term Study: Evaluation of Vehicle Queuing.** For selected locations where the project would add a significant number of left-turning vehicles, the adequacy of existing/planned storage at turn pockets will be assessed by means of comparison with expected maximum vehicle queues. Vehicle queues will be estimated using a Poisson probability distribution.
- 13. Near-Term Study: Description of Impacts and Recommendations.** Based on the results of the level of service calculations, impacts of the site-generated traffic will be identified and described. Recommendations will be formulated that identify the locations and types of improvements or modifications necessary to mitigate significant project impacts. Cost estimates will be provided for any recommended improvements. Also, any secondary impacts of the improvements, such as on pedestrian, bicycles, or transit will be described. Project impacts and recommendations will be submitted for City staff review prior to submitting the Administrative Draft report.
- 14. General Plan Amendment Study: Area Traffic Model.** Hexagon will utilize the Sunnyvale travel demand forecasting model (STFM) to prepare the traffic analysis. The City's model was updated within the last 2 years and was validated against 2013-2015 count data. Hexagon will review the STFM to ensure that the trip generation rates of the Fortinet Precise Plan's Traffic Analysis Zone (TAZ) is consistent with that used in the near-term project-level traffic analysis.
- 15. General Plan Amendment Study: Project Trip Generation, Distribution and Assignment.** Hexagon will estimate the amount of project-generated traffic, distribute and assign the project-generated traffic onto the local and regional roadway network using the STFM.



- 16. General Plan Amendment Study: Evaluation of General Plan Conditions.** Hexagon will obtain from City staff the most recent TAZ-level land use inputs into the STFM for the General Plan (Year 2035) conditions. Land-use inputs for areas outside of Sunnyvale will be obtained from VTA. Roadway network improvements will be coded into the model as directed by City staff. General Plan conditions traffic volumes will be adjusted based on the General Plan model run results and existing conditions. General Plan traffic conditions at the study intersections will be evaluated using the TRAFFIX software. Intersection improvements will be assumed as directed by City staff. It is envisioned that the General Plan conditions represent a scenario/alternative for the Fortinet Precise Plan (FTPP).
- 17. General Plan Amendment Study: Evaluation of General Plan Amendment Without Project Conditions.** Hexagon will obtain from City staff the TAZ-level land use inputs into the STFM for the proposed General Plan Amendment (GPA) Without Project conditions. It is our understanding that the City is currently working on several other projects that would require GPAs. Therefore, this scope assumes that City staff would provide TAZ-level land use inputs encompassing all proposed projects that would require a GPA. Potential GPAs outside of Sunnyvale will be included as directed by City staff. Hexagon will coordinate with the corresponding agencies to obtain TAZ-level land use inputs for potential GPAs outside of Sunnyvale. The GPA Without Project conditions will not include the proposed Fortinet Precise Plan. Roadway network improvements will be coded into the model as directed by City staff. The proposed GPA conditions traffic volumes will be adjusted based on the GPA model run results and existing traffic volumes. GPA traffic conditions at the study intersections will be evaluated using the TRAFFIX software. Intersection improvements will be assumed as directed by City staff.
- 18. General Plan Amendment Study: Evaluation of General Plan Amendment (GPA) With Project Conditions.** The GPA With Project conditions will include the proposed Fortinet Precise Plan. Roadway network improvements will be coded into the model as directed by City staff. The proposed GPA conditions traffic volumes will be adjusted based on the GPA model run results and existing traffic volumes. GPA traffic conditions at the study intersections will be evaluated using the TRAFFIX software. Intersection improvements will be assumed as directed by City staff.
- 19. General Plan Amendment Study: Determination of Project-Generated Intersection Impacts.** The GPA With Project conditions will be compared to both the General Plan conditions and the GPA Without Project conditions to determine potential project impacts.
- 20. General Plan Amendment Study: Evaluation of Freeway Segments.** Hexagon will select up to eight freeway segments for evaluation under General Plan conditions, GPA Without Project conditions, and GPA With Project conditions. Hexagon will submit the proposed study freeway segments for City approval. Freeway segment volumes under all study scenarios will be adjusted based on model forecasts and existing volumes. Freeway segment levels of service results will be evaluated per VTA guidelines. Freeway segment impacts will be identified in accordance with VTA guidelines.



- 21. General Plan Amendment Study: Evaluation of Freeway Ramps.** Hexagon will select up to four freeway ramps for evaluation under General Plan conditions, the GPA Without Project conditions, and GPA With Project conditions. Hexagon will submit the proposed study freeway ramps for City approval. Freeway ramp volumes under all study scenarios will be adjusted based on model forecasts and existing volumes. Hexagon will conduct a volume-to-capacity evaluation at the study freeway ramps. For ramps that would not have sufficient capacity, Hexagon will determine whether the proposed Fortinet Precise Plan would generate traffic greater than 1% of the ramp capacity.
- 22. General Plan Amendment Study: VMT Analysis.** Hexagon will evaluate vehicle miles traveled (VMT) consistent with the provisions of SB 743. VMT analysis will be done using the STFM.
- 23. General Plan Amendment Study: Transit, Pedestrian and Bicycle Traffic Review.** The traffic analysis will include a discussion of existing and planned transit services in the area, as well as bicycle and pedestrian facilities. This task will include a quantitative analysis of transit delay in compliance with VTA traffic study guidelines. Any deficiencies will be identified and improvements will be recommended.
- 24. General Plan Amendment Study: Evaluation of Vehicle Queuing.** For selected locations where the proposed Fortinet Precise Plan would add a significant number of left-turning vehicles, the adequacy of existing/planned storage at turn pockets will be assessed by means of comparison with expected maximum vehicle queues. Vehicle queues will be estimated using a Poisson probability distribution.
- 25. General Plan Amendment Study: Signal Warrant Analysis.** The need for future signalization of all unsignalized study intersections will be evaluated on the basis of the Peak Hour Warrant (Warrant 3 – Part B) in the *California Manual on Uniform Traffic Control Devices*. The warrant will be evaluated using the AM and PM peak hour volumes for all study scenarios.
- 26. General Plan Amendment Study: Description of Impacts and Recommendations.** Hexagon will identify and describe the impacts created by the proposed project. Hexagon will identify the locations and types of improvements or modifications necessary to mitigate the project impacts. If the recommended improvements are already captured in the City's Deficiency Plan, that will be acknowledged. Project impacts and recommendations will be submitted for City staff review prior to submitting the Administrative Draft report.
- 27. TIA Reports and Response to Comments.** Hexagon will summarize its methods, findings, and recommendations in an Administrative Draft TIA report including text, tables, and graphics. Hexagon will submit three hard copies of the Administrative Draft report and two hard copies of the report appendices to City staff for review. Hexagon will respond to editorial comments from City staff and prepare a Draft TIA. Hexagon will submit two hard copies of the Draft report and appendices to City staff for review. Hexagon will respond to comments on the Draft TIA report and prepare a Final TIA report. Hexagon will submit two hard copies of the Final report and appendices to City staff. Hexagon will also respond to comments on the ADEIR and DEIR.



Ms. Lillian Tsang
December 12, 2017
Page 8 of 11

28. Meetings. The fee estimate includes staff attendance at two public hearings and five project meetings with City staff related to the proposed project.

Optional Task

29. Alternative Analysis. As an optional task, Hexagon will qualitatively evaluate one study alternative. This task includes developing trip generation estimates and qualitatively discussing whether the alternative scenario would generate more or less impacts than the preferred alternative. This task would require an additional \$3,000 in budget and would require an additional two weeks to complete.

Additional Services

Any work not specifically referenced in the above Scope of Work – for example analyzing additional project alternatives, analyzing additional study intersections, analyzing study intersections using alternative software – shall be considered additional services. Additional services will require additional budget and additional time and will be conducted upon receipt of authorization to proceed.

Schedule and Budget

Billings for the project will be conducted monthly on a time and expenses basis, not to exceed \$81,000 for work items 1 through 28, as outlined in our Scope of Services. A breakdown of the budget by task is shown in Table 1. As discussed above, since both the plan area options would require a GPA traffic study, and the study intersections have already been approved at the time of this proposal, the scope of services for both plan area options are thus the same and would require the same amount of budget. This price quote is good for 30 days. This price quote assumes all project-related activities will be completed within one year. Extended project schedules will require additional budget for project administration.

Barring any unforeseen delays, the Administrative Draft report will be submitted 10 weeks after (1) a contractual agreement has been reached, and (2) the required information – such as TAZ-level land use data and approved project information – has been received. Upon receiving comments on the Administrative Draft report, the Draft report will be submitted within two weeks. The Final report will be delivered one week after receipt of all comments on the Draft report. Cognizant of your desired schedule, we are ready to start work immediately upon authorization.

We look forward to working with you and appreciate your consideration of Hexagon for this assignment. If you have any questions, please do not hesitate to call.

Sincerely,

HEXAGON TRANSPORTATION CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read "Gary K. Black", is written over a horizontal line.

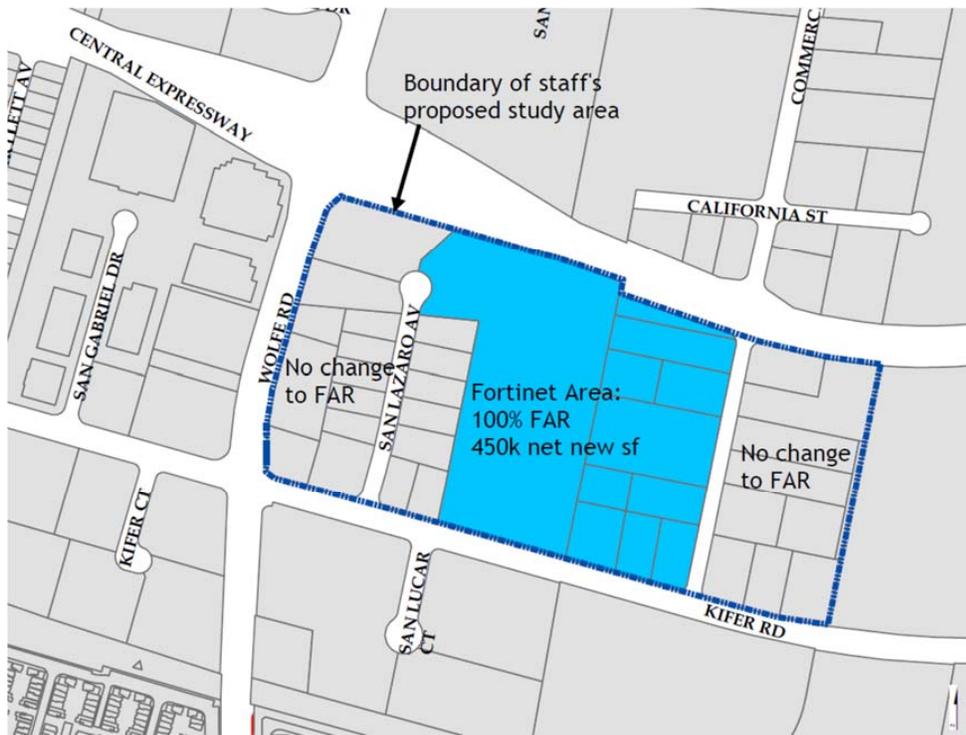
Gary K. Black
President



Table 1
Budget Breakdown

#	Task	Labor Hours			Cost	
		President	Associate	Admin	Labor	Expenses
1	Data Collection and Field Observations		4	1	\$ 795	\$ 280
2	Evaluation of Existing Conditions		16		\$ 2,720	
3	Near-Term Study: Project Trip Generation, Distribution and Assignment		8		\$ 1,360	
4	Near-Term Study: Evaluation of Background Conditions		32		\$ 5,440	
5	Near-Term Study: Evaluation of Existing Plus Project Conditions		8		\$ 1,360	
6	Near-Term Study: Evaluation of Background Plus Project Conditions		8		\$ 1,360	
7	Near-Term Study: Freeway Segment Analysis		4		\$ 680	
8	Near-Term Study: Freeway Ramp Analysis		8		\$ 1,360	
9	Near-Term Study: Bike, Ped and Transit Facilities		8		\$ 1,360	\$ 80
10	Near-Term Study: Signal Warrant Analysis		4		\$ 680	
11	Near-Term Study: Site Access, On-Site Circulation and Parking		16		\$ 2,720	
12	Near-Term Study: Evaluation of Vehicle Queuing		8		\$ 1,360	
13	Near-Term Study: Description of Impacts and Recommendations	2	8		\$ 1,920	\$ 40
14	GPA Study: Area Traffic Model		4		\$ 680	
15	GPA Study: Project Trip Generation, Distribution and Assignment		4		\$ 680	
16	GPA Study: Evaluation of General Plan Conditions		24		\$ 4,080	
17	GPA Study: Evaluation of GPA Without Project Conditions		8		\$ 1,360	
18	GPA Study: Evaluation of GPA With Project Conditions		16		\$ 2,720	
19	GPA Study: Determination of Project-Generated Intersection Impacts		24		\$ 4,080	
20	GPA Study: Evaluation of Freeway Segments		8		\$ 1,360	
21	GPA Study: Evaluation of Freeway Ramps		4		\$ 680	
22	GPA Study: VMT Analysis	2	16		\$ 3,280	
23	GPA Study: Bike, Ped and Transit Facilities	2	16		\$ 3,280	
24	GPA Study: Evaluation of Vehicle Queuing		8		\$ 1,360	
25	GPA Study: Signal Warrant Analysis		4		\$ 680	
26	GPA Study: Description of Impacts and Recommendations	2	16		\$ 3,280	
27	TIA Reports and Response to Comments	24	80	12	\$ 21,700	\$ 150
28	Meetings	25	4		\$ 7,680	\$ 140
Sub-Total:		57	368	13	\$ 80,015	\$ 690
Total Contract Cost:					\$	81,000

Option A



Option B

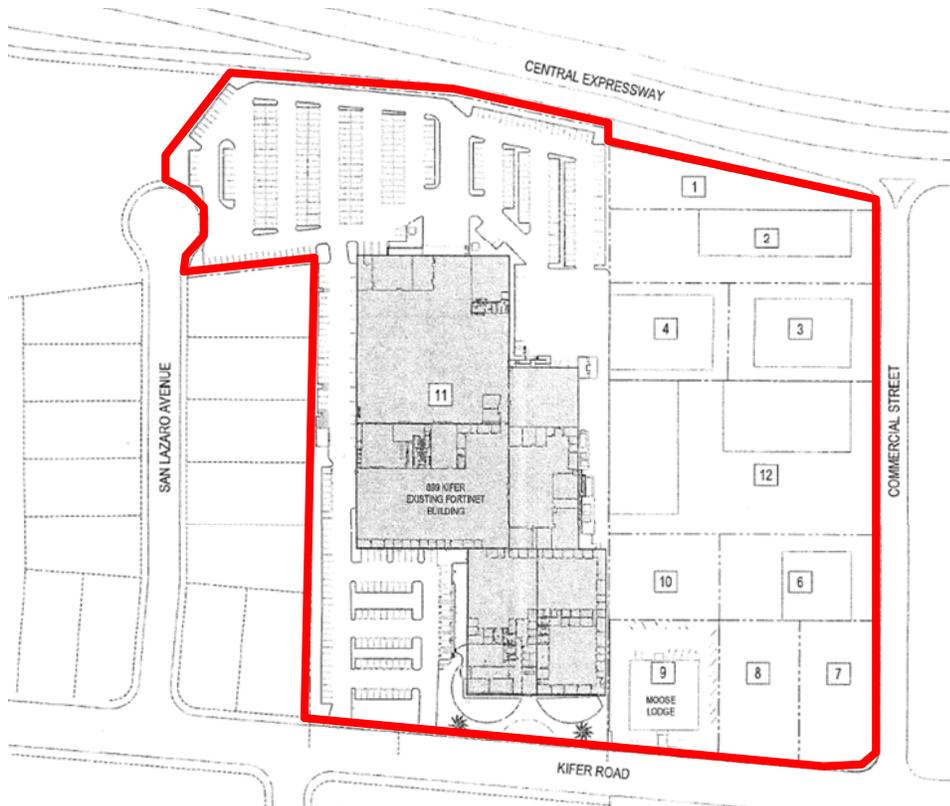


Figure 1
Proposed Fortinet Precise Plan - Plan Area Options

