

MEMORANDUM

Date: November 12, 2008

To: Blair Horst, Sustainability Coordinator

From: Ryan McClain

Subject: LBNL On-Site Parking Management Study

WC08-2572

This memorandum summarizes the results of a parking supply and demand study at Lawrence Berkeley National Laboratory (LBNL) conducted by Fehr & Peers. The purpose of this study is to evaluate changes in parking supply and demand due to ongoing construction projects over the next 5 years as well as to identify possible locations for additional parking.

For the purposes of this study, LBNL was divided into 9 parking zones (see Figure 1). The parking facilities included in each zone are listed in Table 1. These zones were developed based on information provided by LBNL regarding where people using various buildings tend to park. Parking supply and demand data is reported based on these zones. Data for individual lots is provided in Appendix B.

Zone #	Parking Lots Included in Zone
1	A, E, F
2	D, G1, G2, G3, H1, H2, I, K1
3	AL1, B, C, CH1
4	CH2, M1, M2
5	K2, L, MM1, N1, N3, N4, X, Y, Z
6	P, Q
7	GL1, LR1, R
8	LR2, S, T1, T2, V, W
9	U1, U2, U3, U4, U5

PARKING SUPPLY

Fehr & Peers conducted a parking supply and demand study in September 2007 that verified the existing number of parking stalls at LBNL. The supply determined in the September 2007 study was used as the base for this current study. Changes to parking supply since September 2007 were noted during a site visit conducted in September 2008 and the numbers were updated.

LBNL staff provided graphics and descriptions of work areas for the following construction projects at LBNL:

- Building 71
- Building 77 Rehab
- Guest House
- Building 66
- Building 6 Seismic Upgrade
- Building 77 Roof
- User Support Building (USB)
- Helios
- Computational Research and Theory (CRT) Facility
- Building 51 & Bevatron
- Seismic Upgrades Phase 1
 - Building 50
 - Building 74
- Seismic Upgrades Phase 2
 - Building 74
 - 71 Trailer Demo
 - General Purpose Lab
 - Building 85 Stabilization
 - Building 25 Demo
 - Building 55 Demo

Using this data and CAD drawings of LBNL, Fehr & Peers determined the location and number of parking stalls eliminated by each construction project. Figures showing the parking impacts for each project are provided in Appendix A.

Construction personnel for these various projects are expected to either park in a designated off-site lot or within the construction boundaries shown in Appendix A. Therefore they are not expected to increase parking demand.

Parking supply for each of the 9 zones by month from June 2008 through December 2013 is presented in Table 2. Color coding is shown based on the project that is reducing the supply during the given period of time. In cases where multiple projects reduce parking in a single zone, color coding for the project with the greatest impact on parking supply is shown. Overall, construction of various projects would reduce parking supply at LBNL by between 30 and 330 stalls.

The only construction project increasing the parking supply is the Helios project, which is increasing the parking supply by 50 stalls. This additional supply was added to Table 2, after the completion of the Helios project.

PARKING DEMAND

The base parking demand is based on the September 2007 Fehr & Peers study. The occupancy of each parking stall was recorded during both morning and afternoon peak periods on Wednesday, September 12, 2007. The morning occupancy survey was started at 10:45 AM and ended at approximately noon. The afternoon occupancy survey started at 2:00 PM and ended at approximately 3:15 PM. Because demand was higher in the PM period, the PM demand is used as a basis for this study.

The following three projects will increase parking demand at LBNL over the next 5 years:

- Building 937 Move
- Helios
- CRT Building

The other construction projects identified as part of this study will be occupied by current employees or are demolition projects and therefore will not increase parking demand.

The Building 937 move from off-site to on-site includes the relocation of 185 employees to various buildings at LBNL. LBNL staff have stated that this move would increase parking demand by 117 vehicles by January 2009.

The Helios and CRT Projects include construction of two new buildings at LBNL. According to the EIR for each project, Helios is estimated to increase parking demand by 287 vehicles and CRT is estimated to increase demand by 174 vehicles if existing parking demand ratios were maintained for the new employees. This estimated demand is added into the nearest parking zones in which the buildings are being constructed. Parking demand by month over the next 5 years is shown in Table 3.

Percentage parking occupancy for each zone and the overall site by month is shown in Table 4. This is based on supply in Table 2 and demand in Table 3. Monthly percentages highlighted in yellow indicate zones nearing practical capacity¹, where demand is between 85% and 90% of supply. Percentages highlighted in orange indicate zones where demand would be greater than the practical supply (i.e., 90% of total supply). Percentages highlighted in red indicate zones when demand would be greater than supply.

Demand would exceed supply in zones 2, 3, 6 and 9 for a majority of the 5 years presented. Demand would exceed supply in zone 1 after the CRT Building is occupied in February of 2012. Zone 4 would be over capacity during construction periods at Building 71. Zones 7 and 8 would meet or exceed capacity after the Helios building is occupied in December of 2012.

Figure 2 graphs parking supply versus demand for the entire LBNL site over the 5 year period as well as the parking supply that would be required to maintain a 90% occupancy. For the entire LBNL site, demand would be greater than 95% of capacity starting in January 2009. With completion of the Helios building in October of 2013, parking demand would exceed the current parking supply for the entire LBNL site.

In order to maintain a 90% parking occupancy, an additional 180 parking stalls would be needed by July 2010. This number fluctuates until the occupancy of Helios in October of 2013, which would require 320 additional parking stalls over the existing supply. Please note that these parking demand estimates are based on the employment projections provided by LBNL and assume that current parking demand rates would continue in the next five years.

¹ Since LBNL provides parking lots of varying sizes scattered throughout the site, spaces can be difficult to locate. Thus, the practical capacity of the site is considered to be 90% of the total parking supply.

POSSIBLE ADDITIONAL PARKING SUPPLY LOCATIONS

Figures 3 through 6 identify locations where additional parking may be provided by using various strategies including valet parking, stacked parking and one-way streets.

Valet parking may be an effective way to increase the capacity of some larger lots as cars can be parked behind existing stalls. Valet parking has the benefit of an on-site attendant who can move vehicles without the need to track down car owners as required with stacked parking. Figures 3 and 5 show examples of how additional cars may be parked in Lots D and K1 using valets.

Stacked parking is currently used throughout LBNL. Stacked parking provides additional capacity in existing facilities without the cost of an attendant. Figure 4 shows an example of stacked parking in Lot H1 during construction at building 50. Figure 5 shows stacked parking in lot K2, replacing the existing one way street with at least 8 stalls.

As presented on Figure 6, a portion of McMillan Road can be converted to one-way westbound only operations to yield 23 additional parallel parking stalls. Eastbound traffic on McMillan Road could be diverted into the Lot N3 area which is parallel to McMillan Road and connects directly into either side.

These strategies could be implemented permanently or temporarily at times where parking demand is reaching supply due to construction projects. However, the combination of these strategies would increase overall parking supply by about 70 stalls. Although these additional stalls would help in alleviating the expected parking shortage, the entire LBNL site would still operate well above its practical parking capacity (i.e., 90% parking occupancy).

The expected parking shortage can be lessened by either reducing parking demand or increasing parking supply. Parking supply may be increased by constructing new surface parking lots and/or parking structures. However, the cost and environmental impact of potential parking facilities would require additional studies.

Potential locations for additional surface parking lots include the Building 51/Bevatron site and the Building 25 site, both of which are scheduled to be demolished. Demolition of the Bevatron building is scheduled to be completed in April 2011 and could potentially provide about 250 new parking stalls on the existing building footprint; however, environmental mitigations may be needed at this site as well as improvements to site accessibility. Demolition of Building 25 is scheduled to be completed in October 2012 and could potentially provide about 70 new parking stalls. The demolition of Building 25 may potentially be moved up in schedule to provide the additional parking sooner. Surface lots can range in construction cost from \$2,000 to \$5,000 per stall.

Multi-level parking structures cost more than surface parking, with costs ranging from \$25,000 to \$30,000 per space for above ground structures and \$45,000 to \$55,000 per space for below ground structures. Several factors affect construction costs including soil type, construction access, whether the structure is pre-cast or cast-in-place, and architectural features. Additional details on parking structure feasibility will be provided as part of Task 5 of the Fehr & Peers Traffic Engineering Services Contract.

STRATEGIES TO REDUCE PARKING DEMAND

Reducing parking demand is as effective as increasing supply on improving occupancy rates with the added benefits of decreased vehicle trips to LBNL and reduced congestion on LBNL roads. Since all parking stalls at LBNL require parking permits, LBNL can directly control parking demand by limiting the number of parking permits distributed to employees. Charging a fee for parking may also encourage employees to shift to other transportation modes; however, current Department of Energy policy is to provide free employee parking.

As required by the LBNL Long Range Development Plan Environmental Impact Report (LRDP EIR), LBNL is committed to enhancing the current Transportation Demand Management (TDM) program by expanding existing measures and developing new measures that would discourage the use of single occupant vehicles and encourage the use of other commute modes, thus reducing parking demand. Existing measures include the Guaranteed Ride Home program open to Lab employees, contractors and visitors. This program provides free rides home by taxi or rental car up to 3 times per month. The Lab also takes part in the Wageworks program which allows employees to purchase BART tickets pre-tax. The Lab is currently working on a similar program for AC Transit tickets. Additionally, the 511 Vanpool program provides free vanpools for Lab employees.

Another strategy to reduce on-site parking demand is to lease off-site parking stalls. Currently, LBNL leases 120 parking stalls off-site at the Building 937 location in Downtown Berkeley for \$18,000/month (\$150 per stall per month). For comparison, unreserved monthly parking rates in downtown Berkeley parking garages range from \$145 to \$170. Reserved parking can be as much as \$195/month. These rates are for individual parking stalls and discounted rates can be negotiated for large numbers of stalls. Although these leased stalls would no longer be needed to specifically provide parking for these employees, LBNL could continue to lease these off-site parking stalls. LBNL employees could utilize them and use the shuttle to travel between the off-site parking and the LBNL site.

It is expected that a combination of implementing new TDM measures to reduce parking demand and providing additional on-site and off-site parking supply would be needed to accommodate the forecasted increase in employment at LBNL.

Please contact us with questions or comments.

Attachments:

Figure 1 - LBNL Parking Zones

Figure 2 – LBNL Parking Supply and Demand

Figure 3 – Lot D Valet Parking

Figure 4 – Lot H1 Stacked Parking

Figure 5 – Lot K1 Valet Parking and K2 Stacked Parking

Figure 6 – McMillan Road Parallel Parking

Appendix A – Project Location Figures

Appendix B – Supply and Demand by Lot

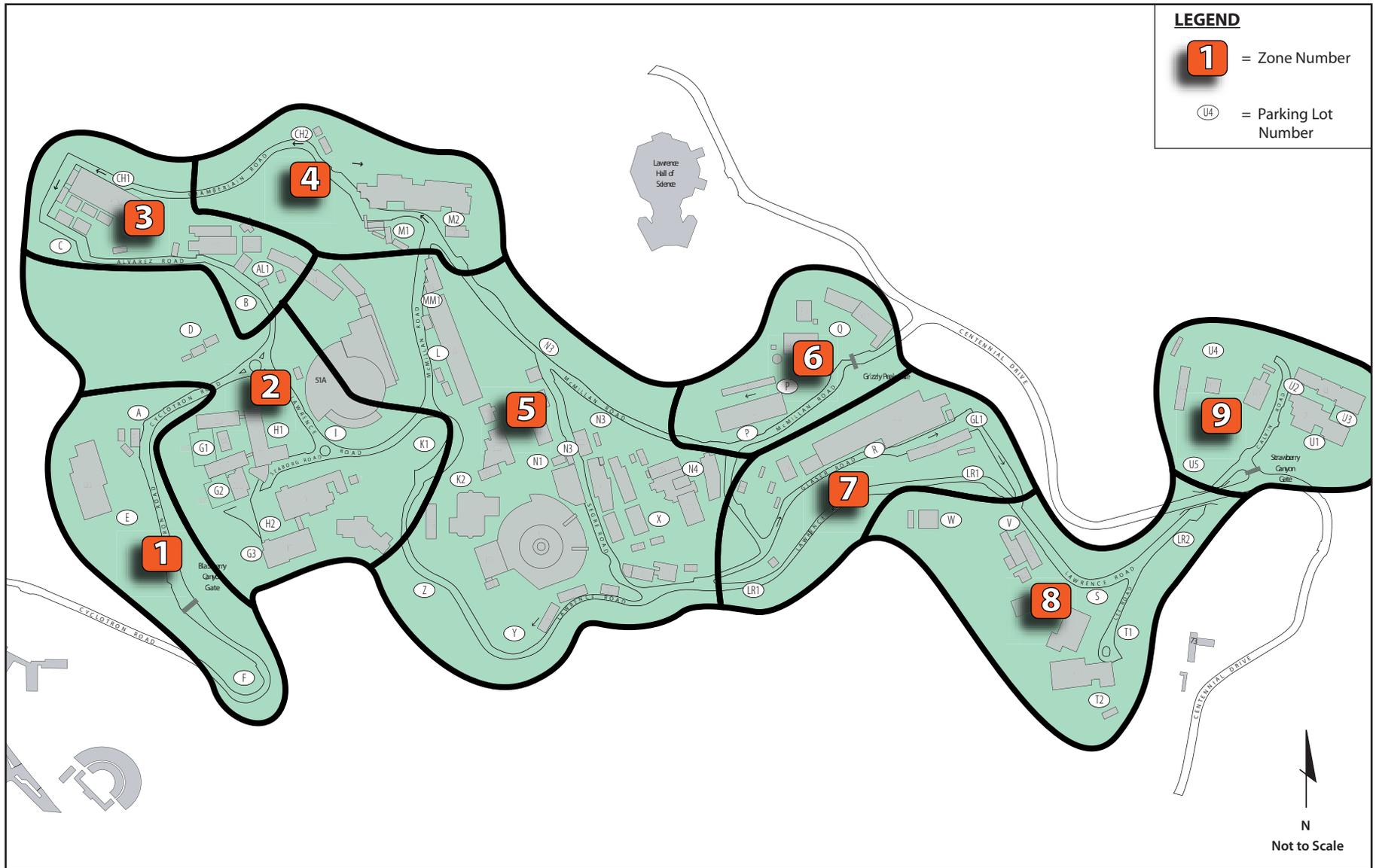
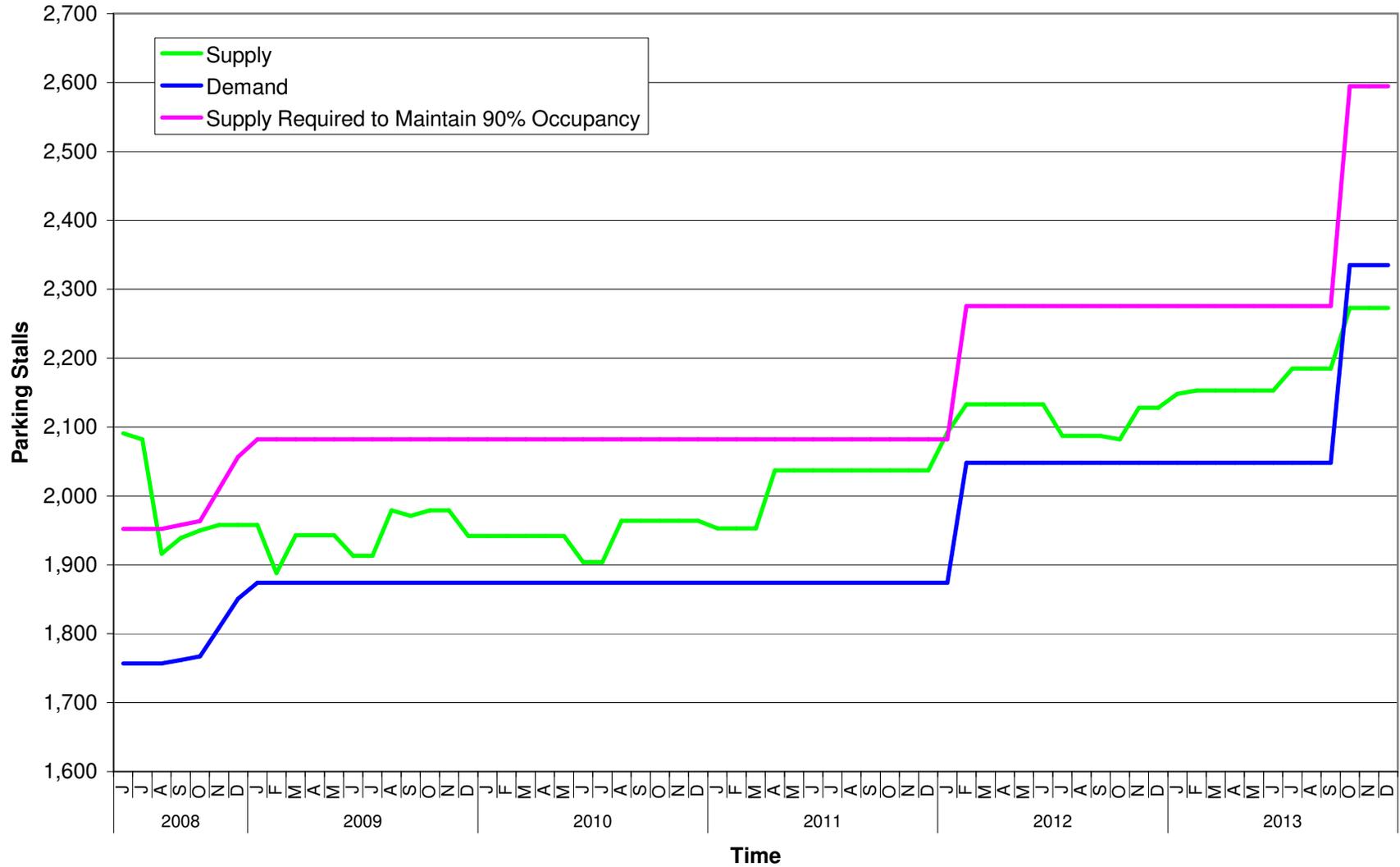
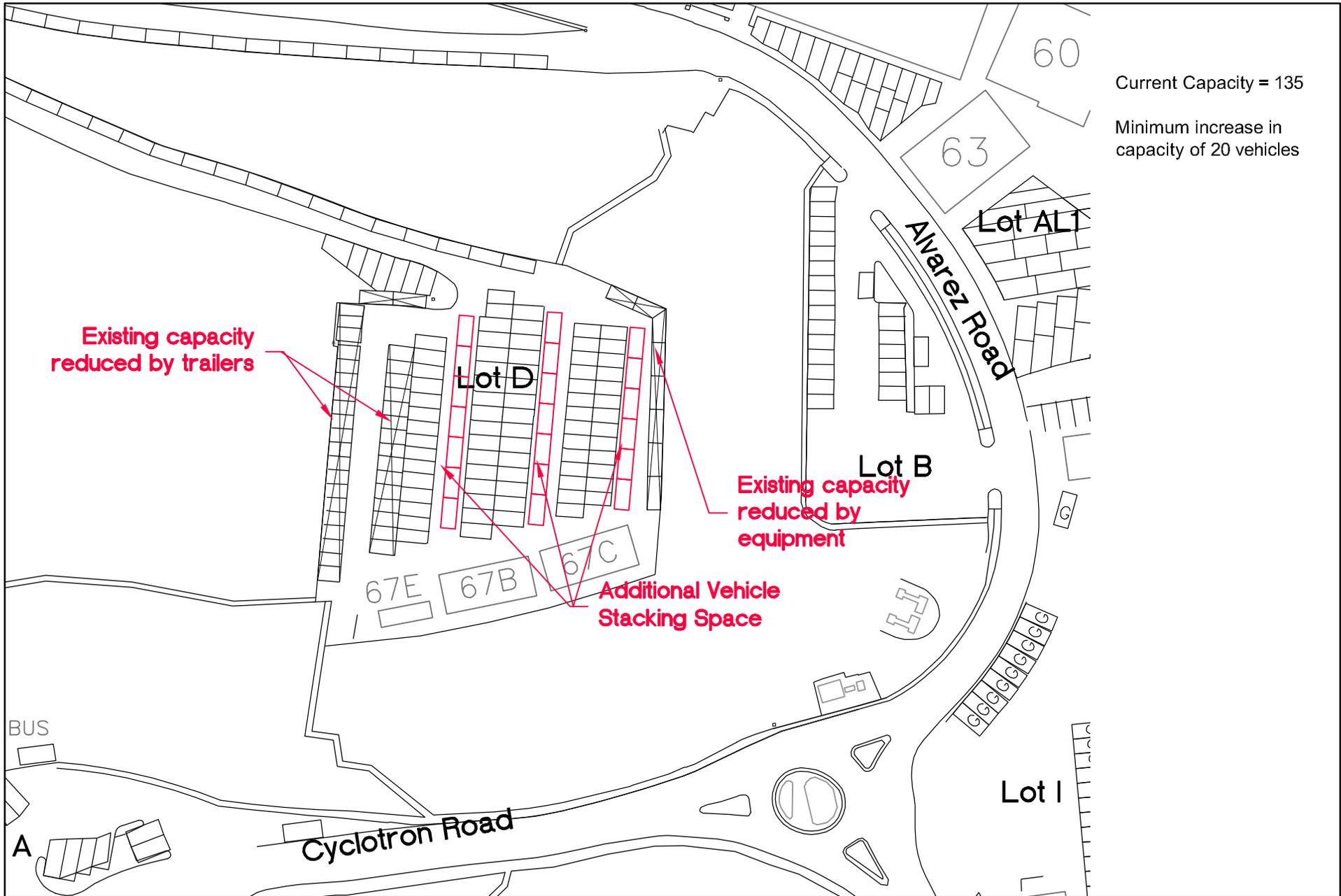


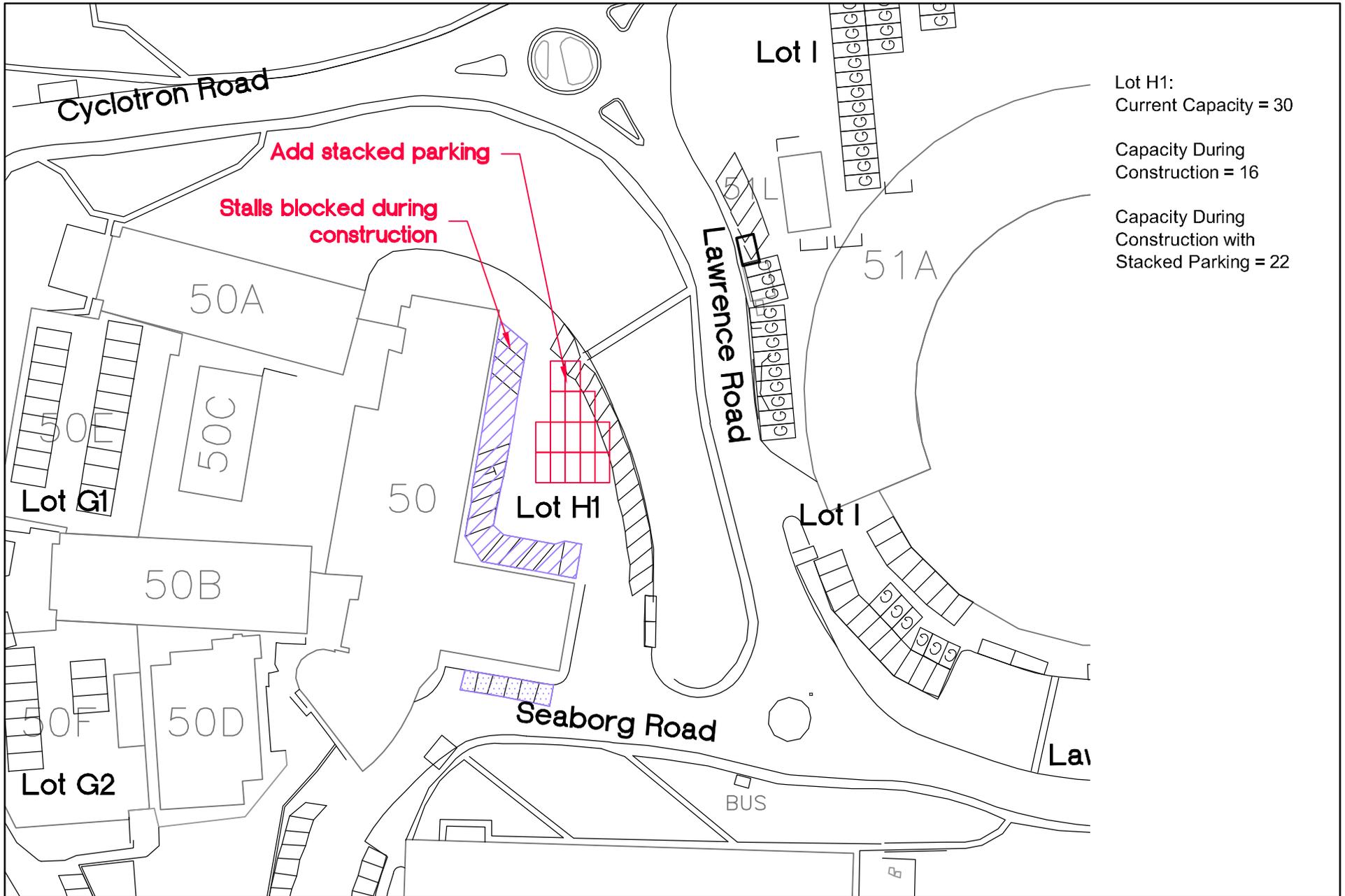
FIGURE 2: LBNL PARKING SUPPLY AND DEMAND





Lot D Valet Parking

Figure 3



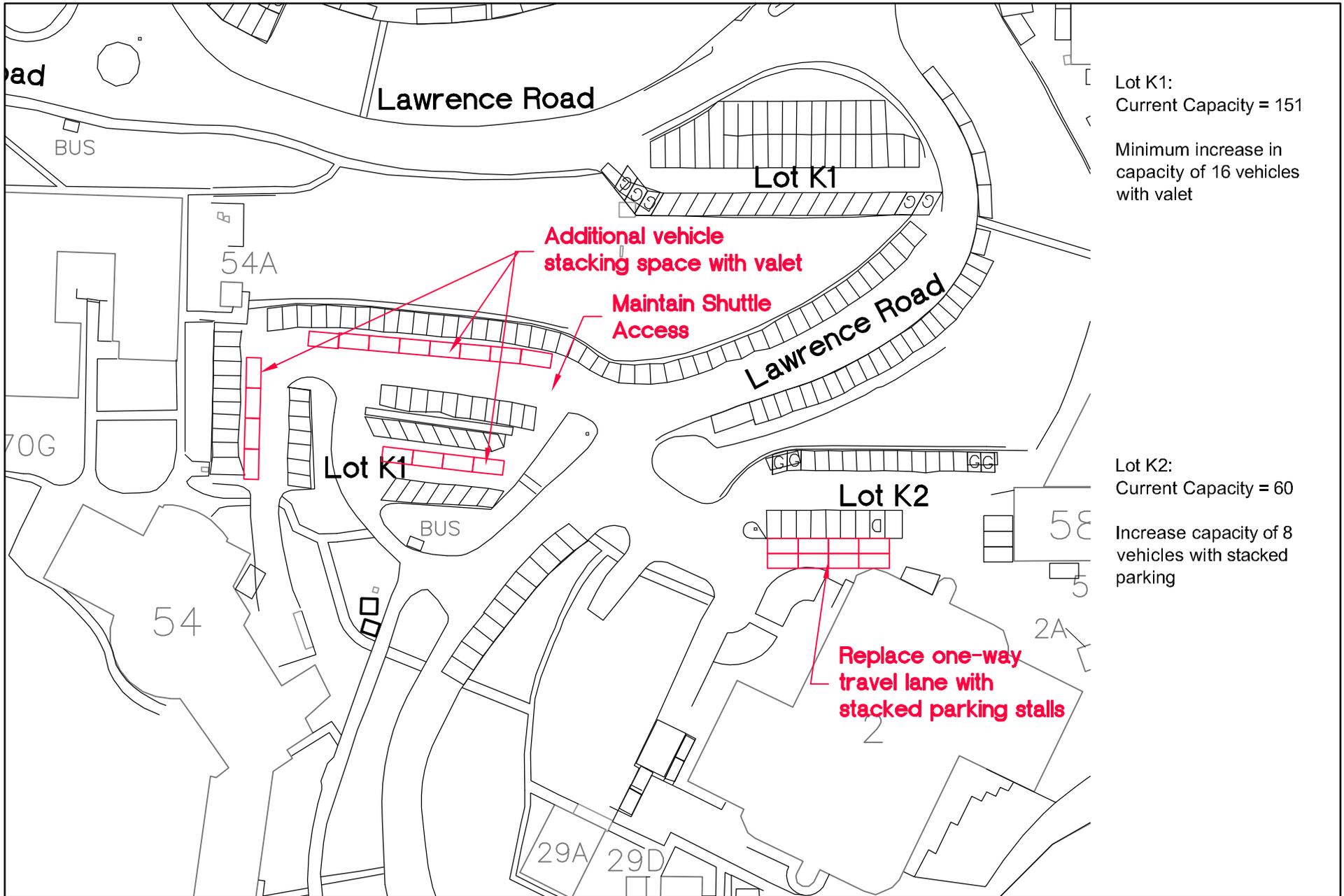
Lot H1:
Current Capacity = 30

Capacity During
Construction = 16

Capacity During
Construction with
Stacked Parking = 22

Lot H1 Stacked Parking

Figure 4



Lot K1:
Current Capacity = 151

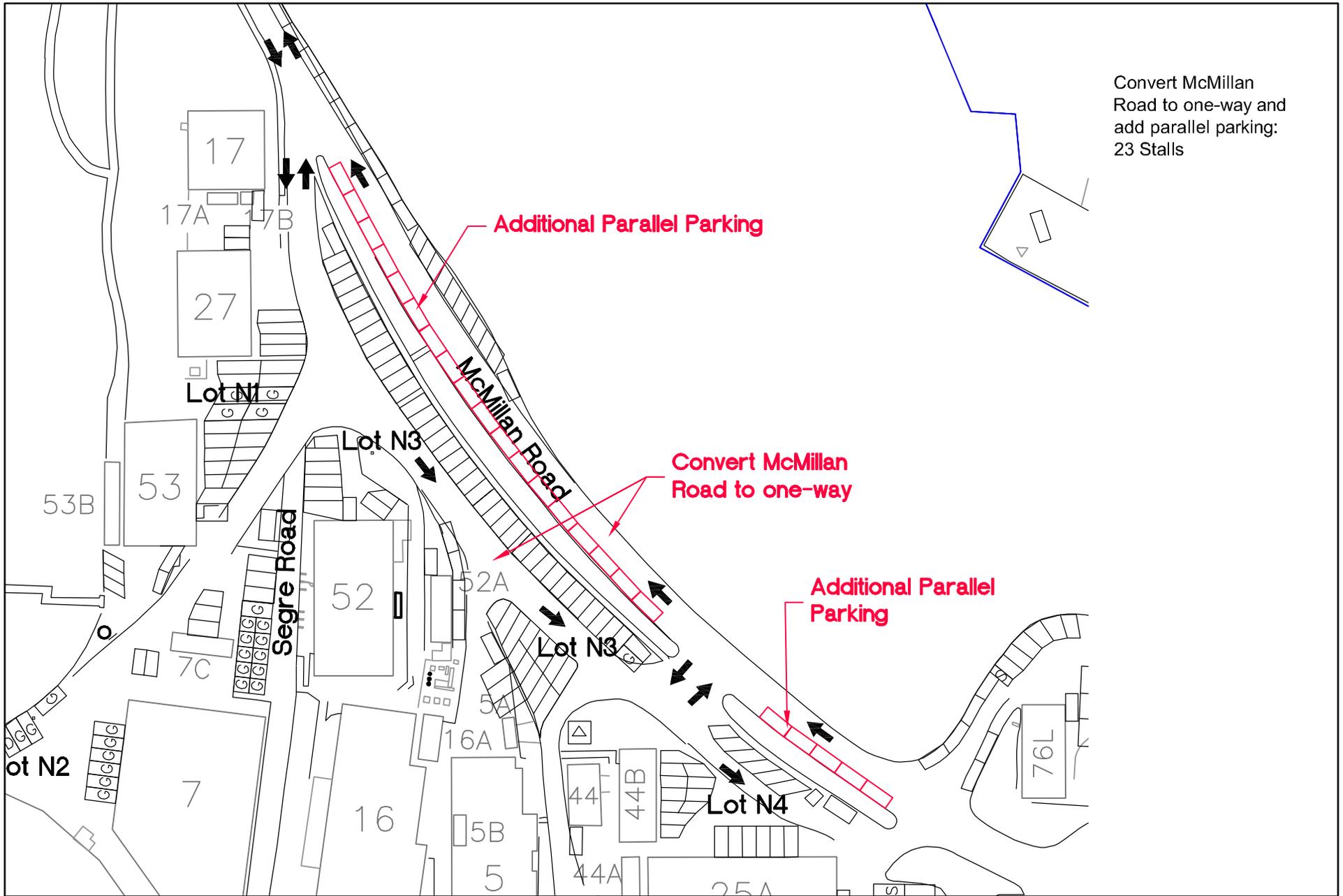
Minimum increase in capacity of 16 vehicles with valet

Lot K2:
Current Capacity = 60

Increase capacity of 8 vehicles with stacked parking

Lot K1 Valet Parking and K2 Stacked Parking

Figure 5



Convert McMillan Road to one-way and add parallel parking: 23 Stalls

Additional Parallel Parking

Convert McMillan Road to one-way

Additional Parallel Parking

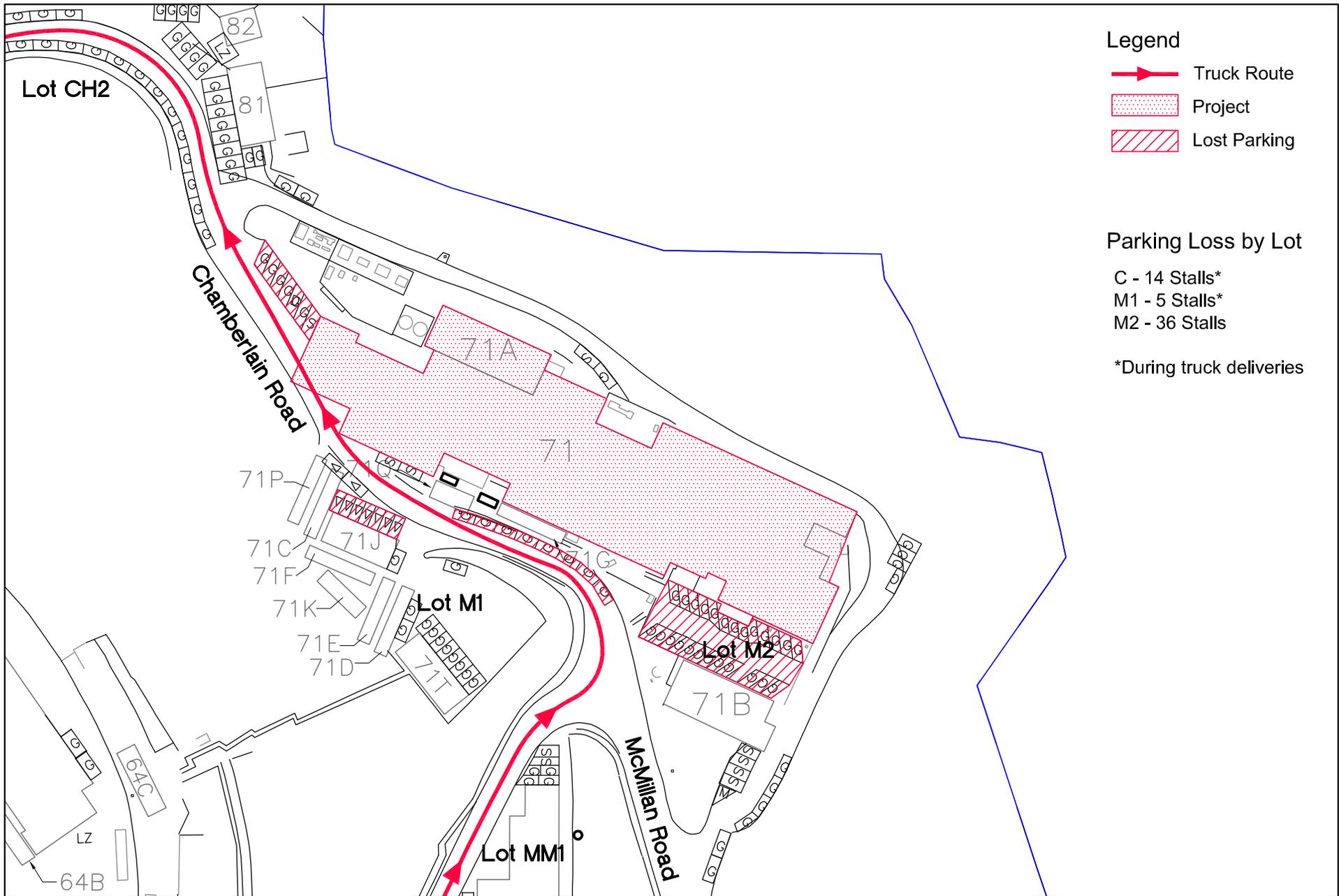
McMillan Road Parallel Parking

Figure 6

APPENDIX A:

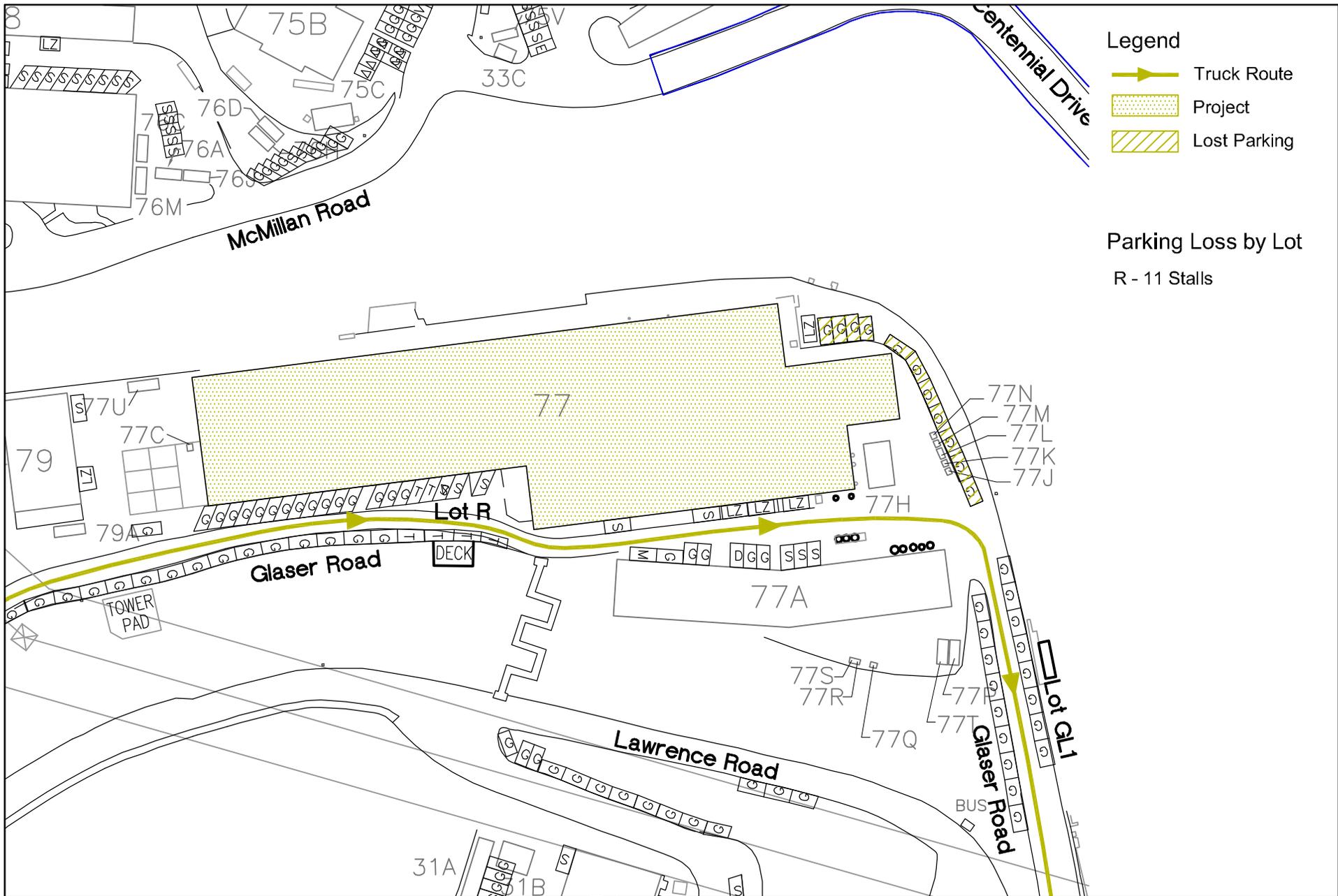
PROJECT LOCATION FIGURES

- Figure A-1 – Building 71 HILAC Removal/Room 146/BELLA
- Figure A-2 – Building 77 Rehab
- Figure A-3 – Guest House
- Figure A-4 – Building 66
- Figure A-5 – Building 6 Seismic Upgrade
- Figure A-6 – USB
- Figure A-7 – Helios
- Figure A-8 – CRT
- Figure A-9 – Building 51/Bevatron
- Figure A-10 – Seismic Upgrade Phase 1: Building 50
- Figure A-11 – Seismic Upgrade Phases 1/2: Building 74/General Purpose Lab
- Figure A-12 – Seismic Upgrade Phase 2: Building 85 Slide Stabilization
- Figure A-13 – Seismic Upgrade Phase 2: Building 25 Demo
- Figure A-14 – Seismic Upgrade Phase 2: Building 55 Demo



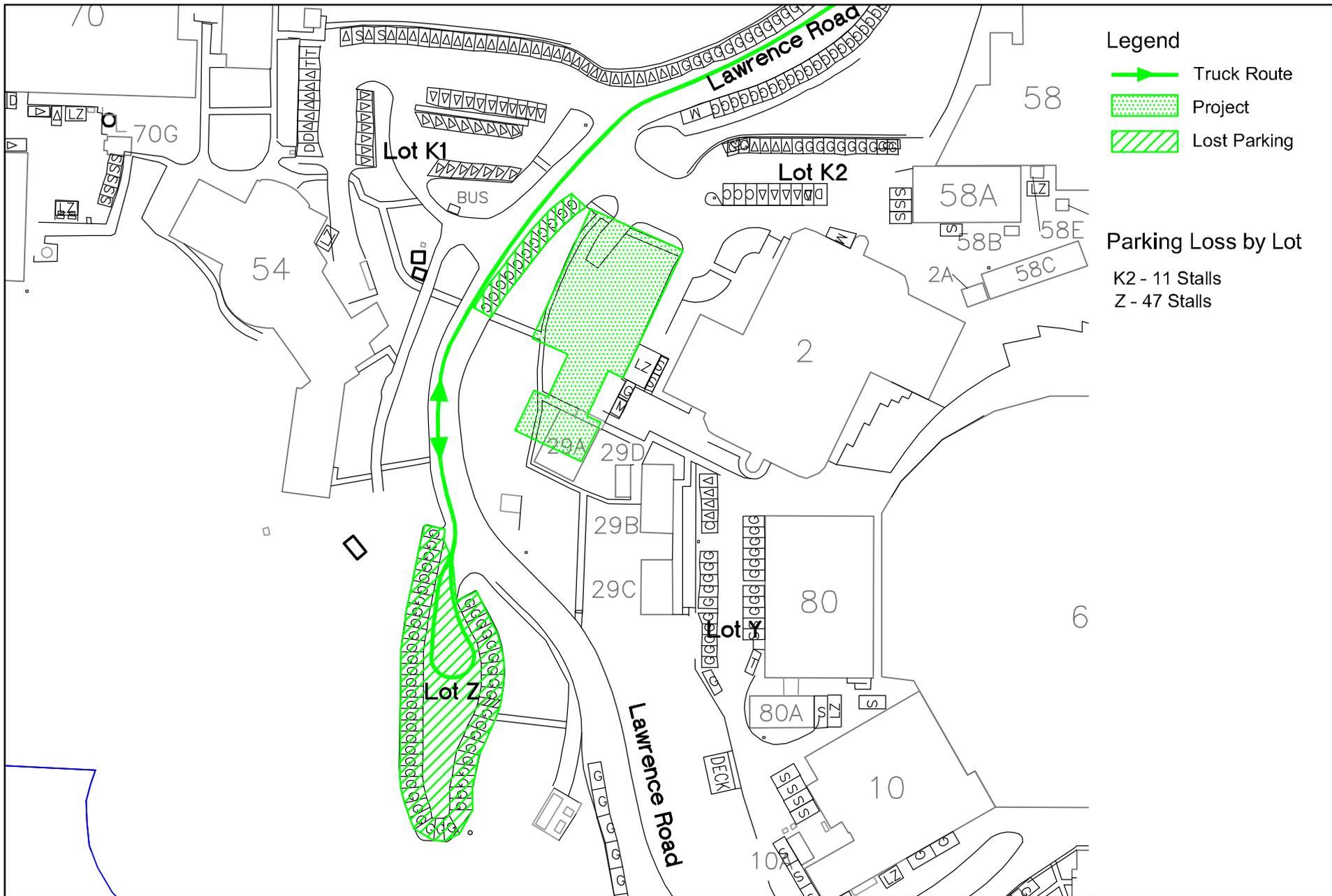
Building 71 HILAC Removal/Rm 146/BELLA
 Figure A-1

April 2008 - February 2009,
 December 2009 - December 2011



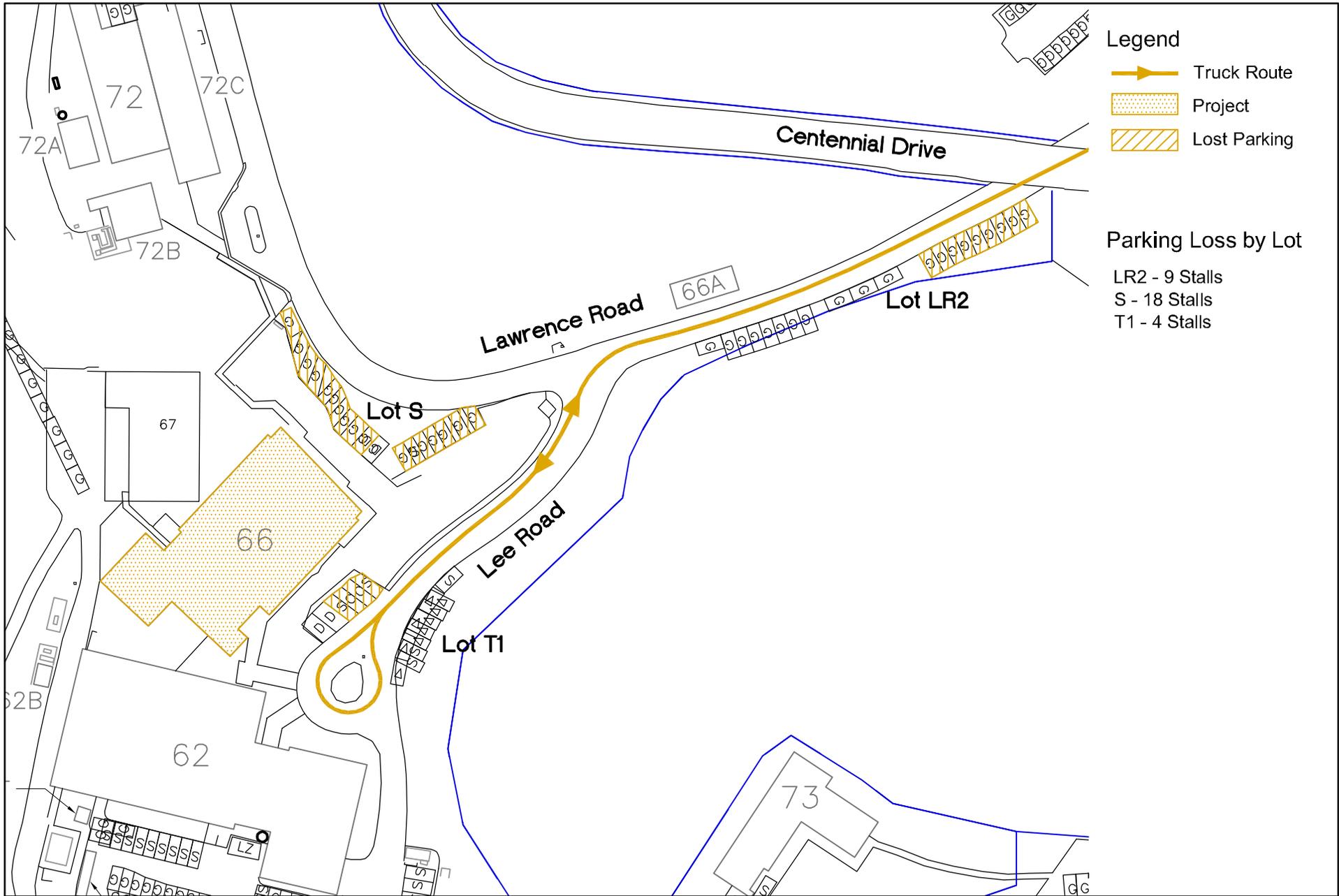
Building 77 Rehab
Figure A-2

June 2008 - September 2008,
February 2009 - May 2009



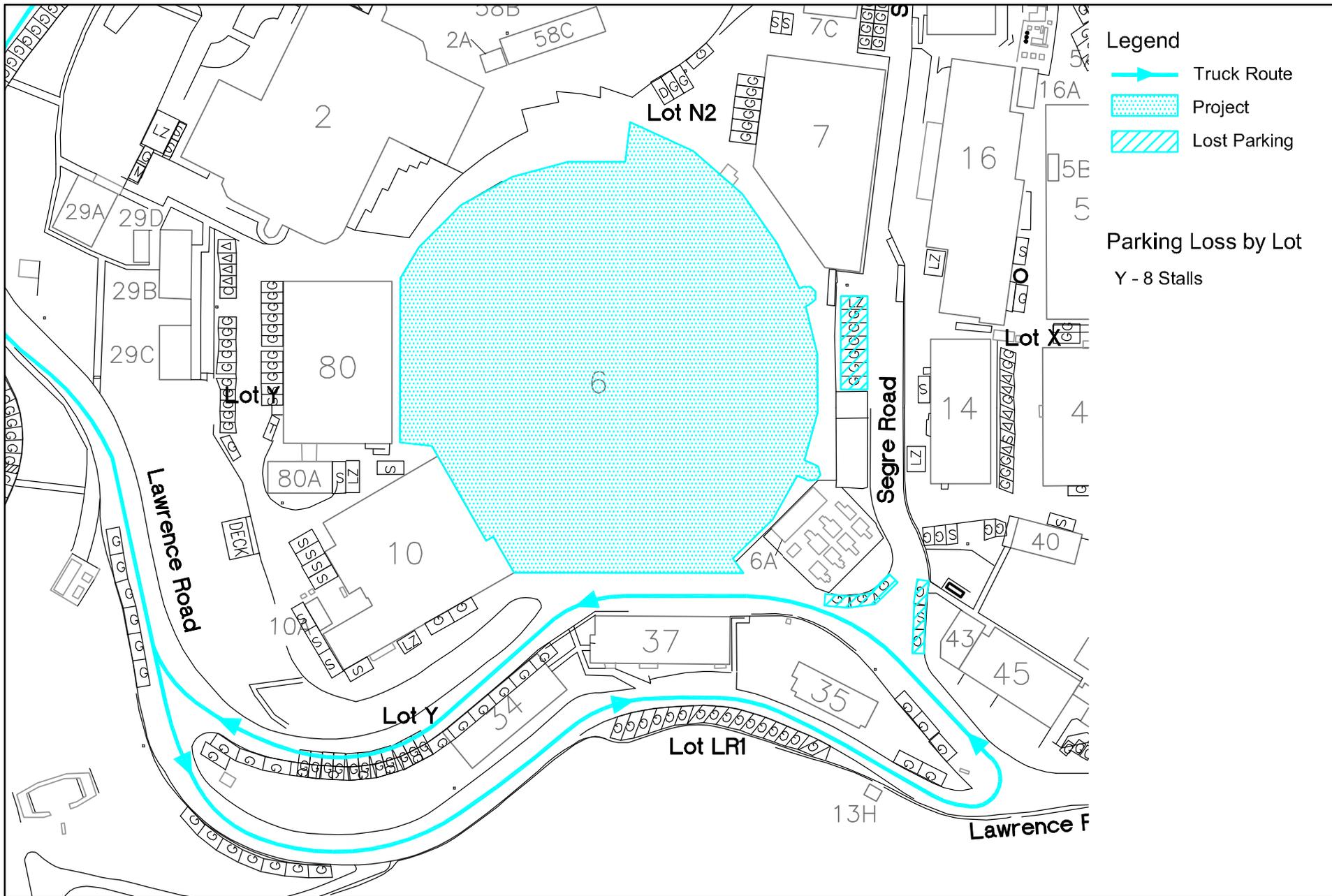
Guest House
Figure A-3

March 2008 - July 2009



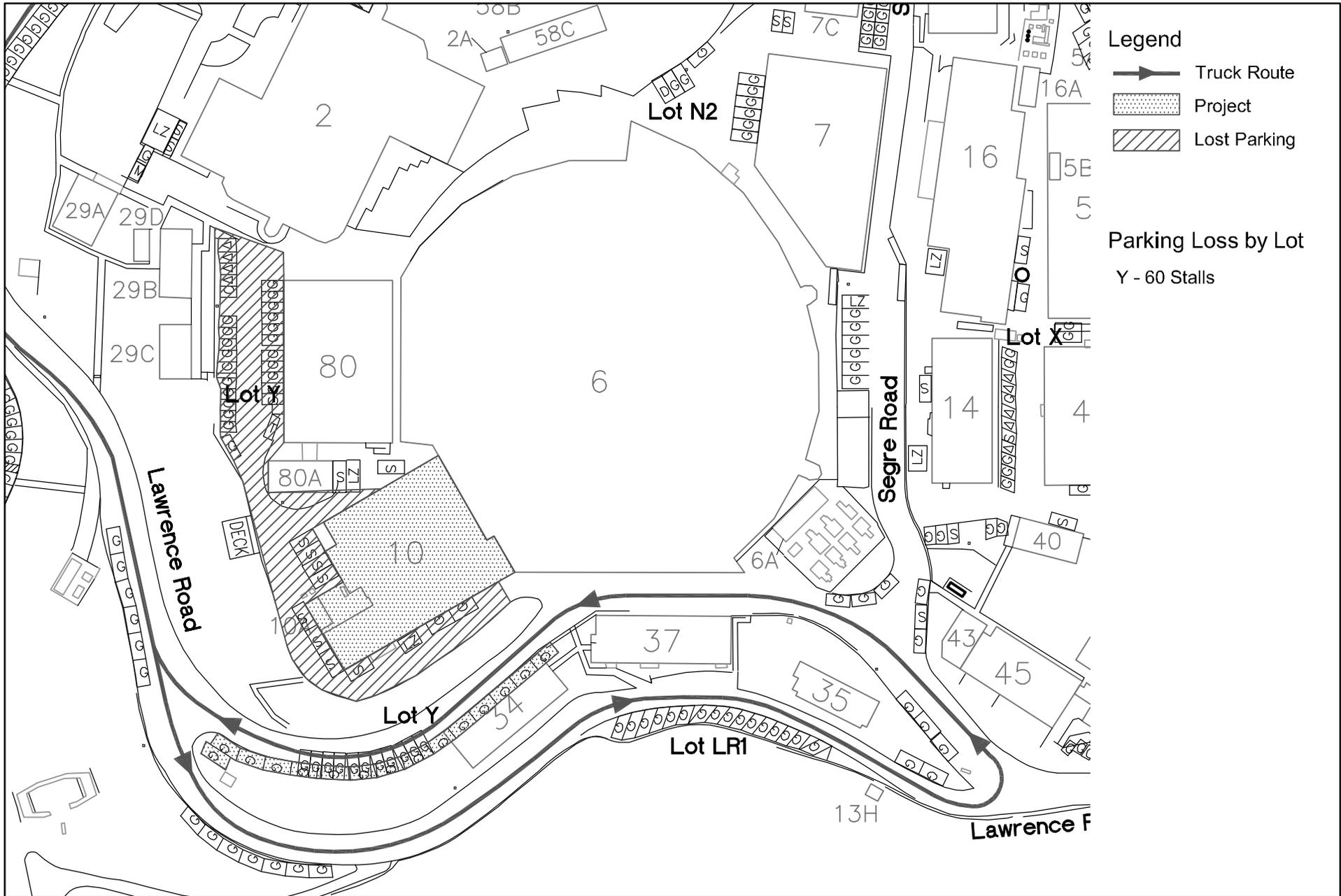
Building 66
Figure A-4

July 2008 - August 2008



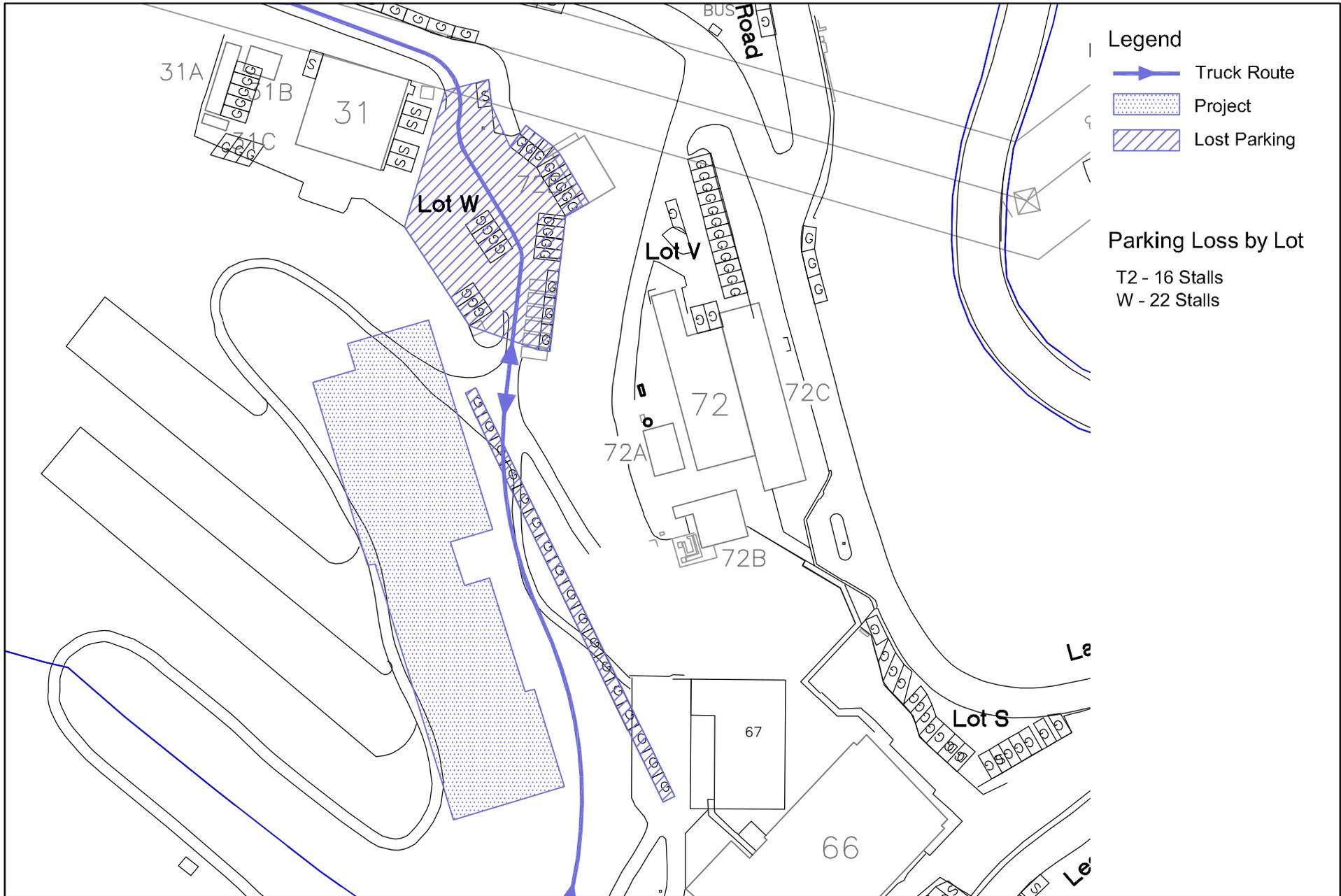
Building 6 Seismic Upgrade
Figure A-5

September 2008 - October 2008,
September 2009



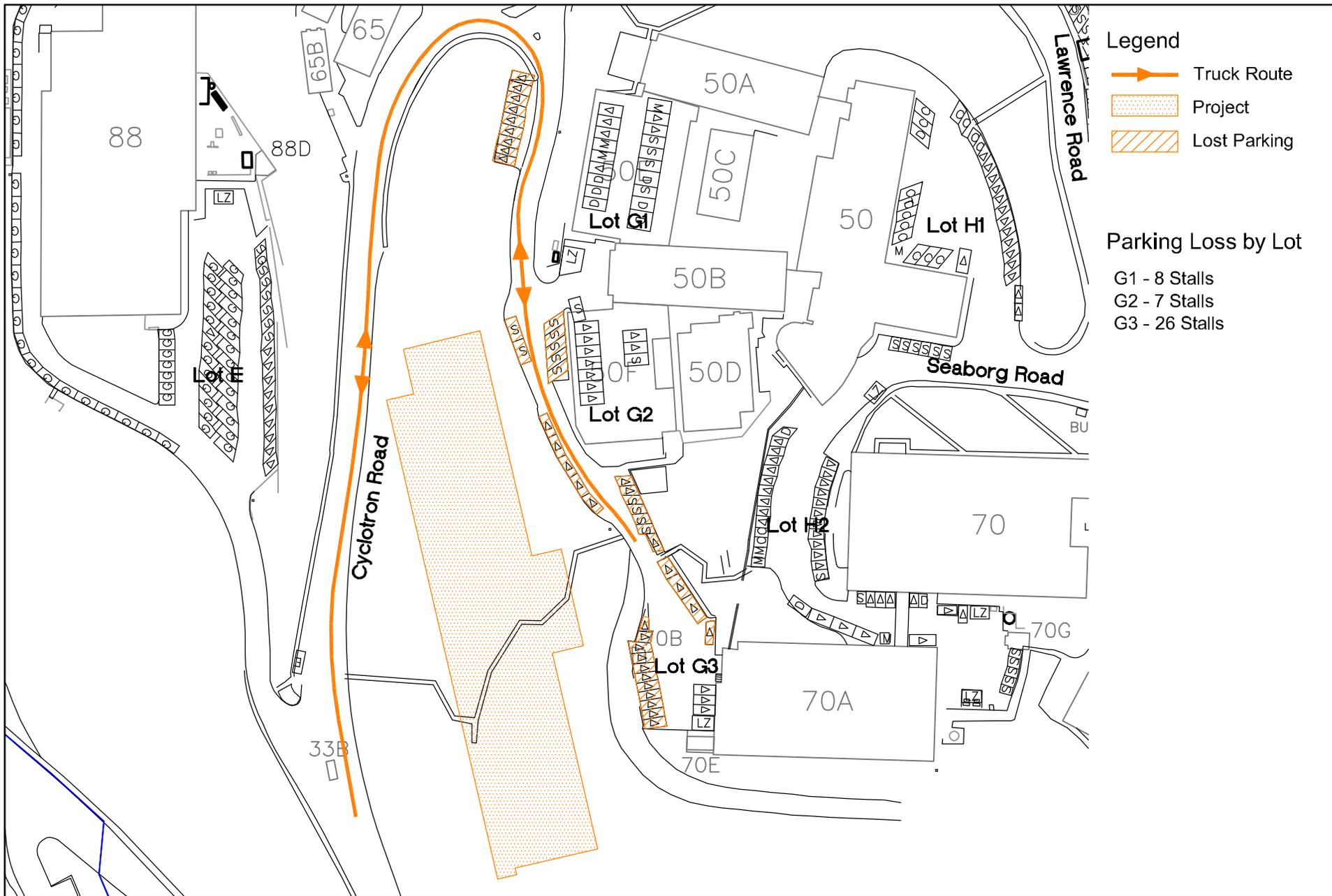
USB
Figure A-6

August 2008 - July 2010



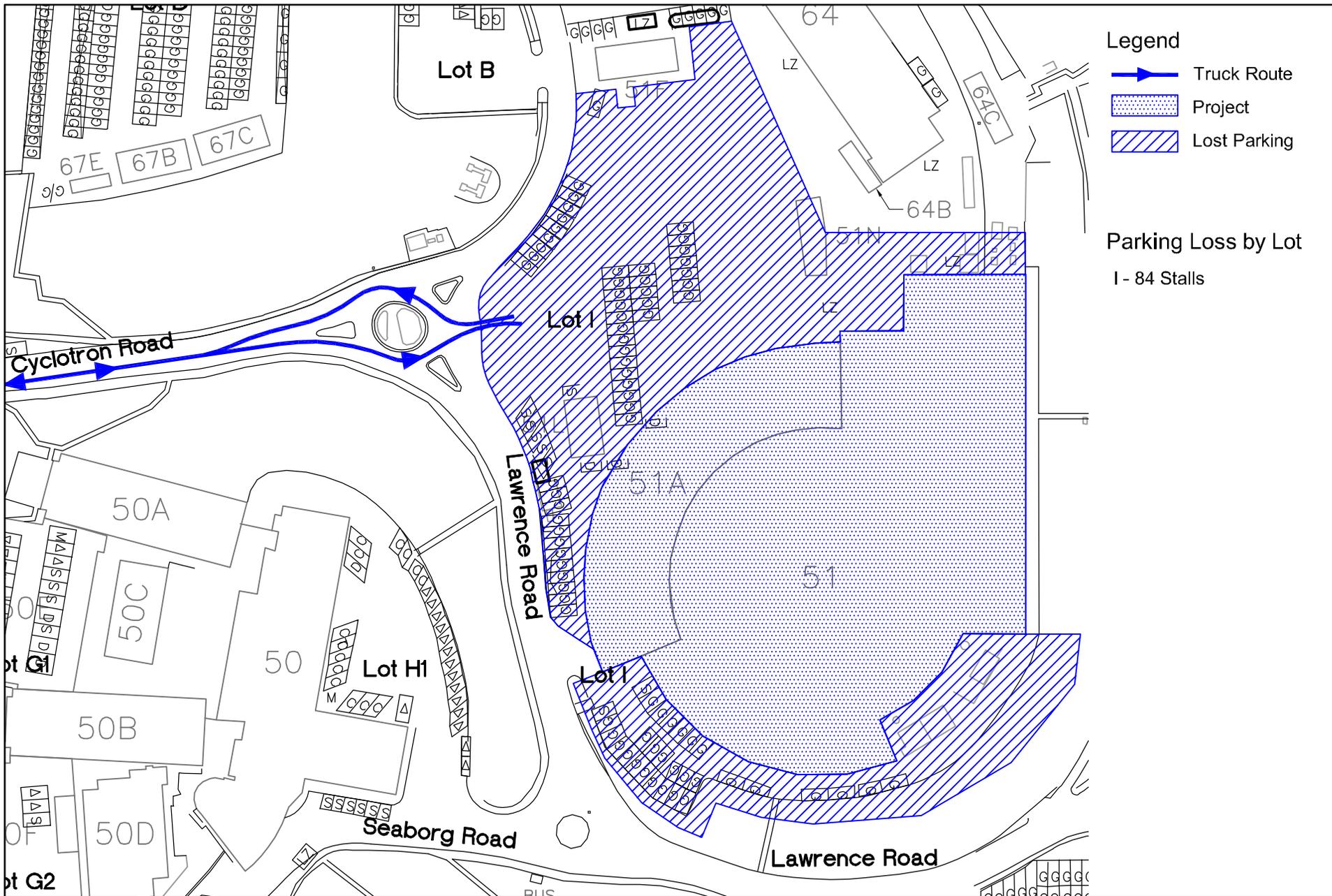
Helios
Figure A-7

June 2010 - September 2013



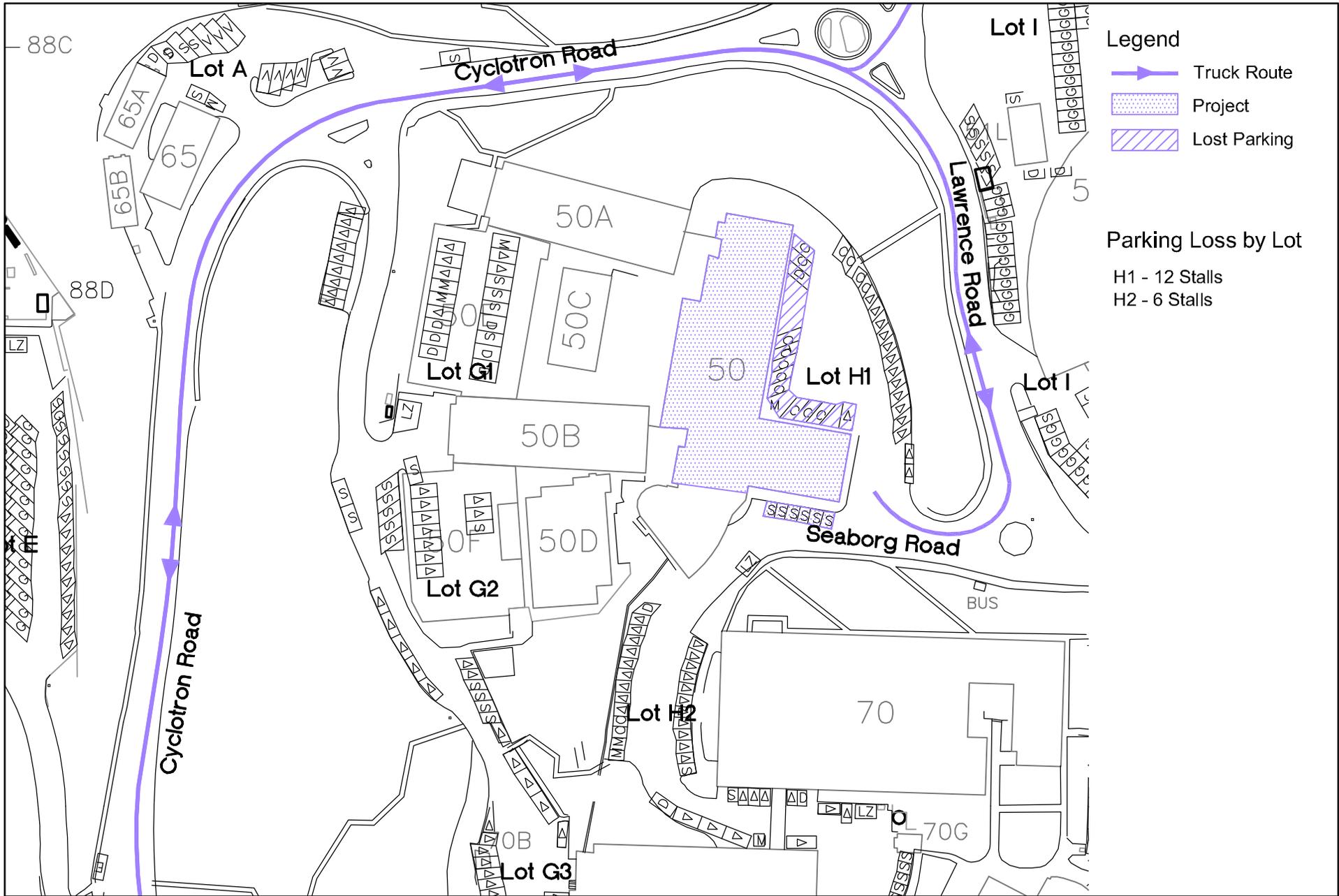
CRT
Figure A-8

June 2009 - January 2012



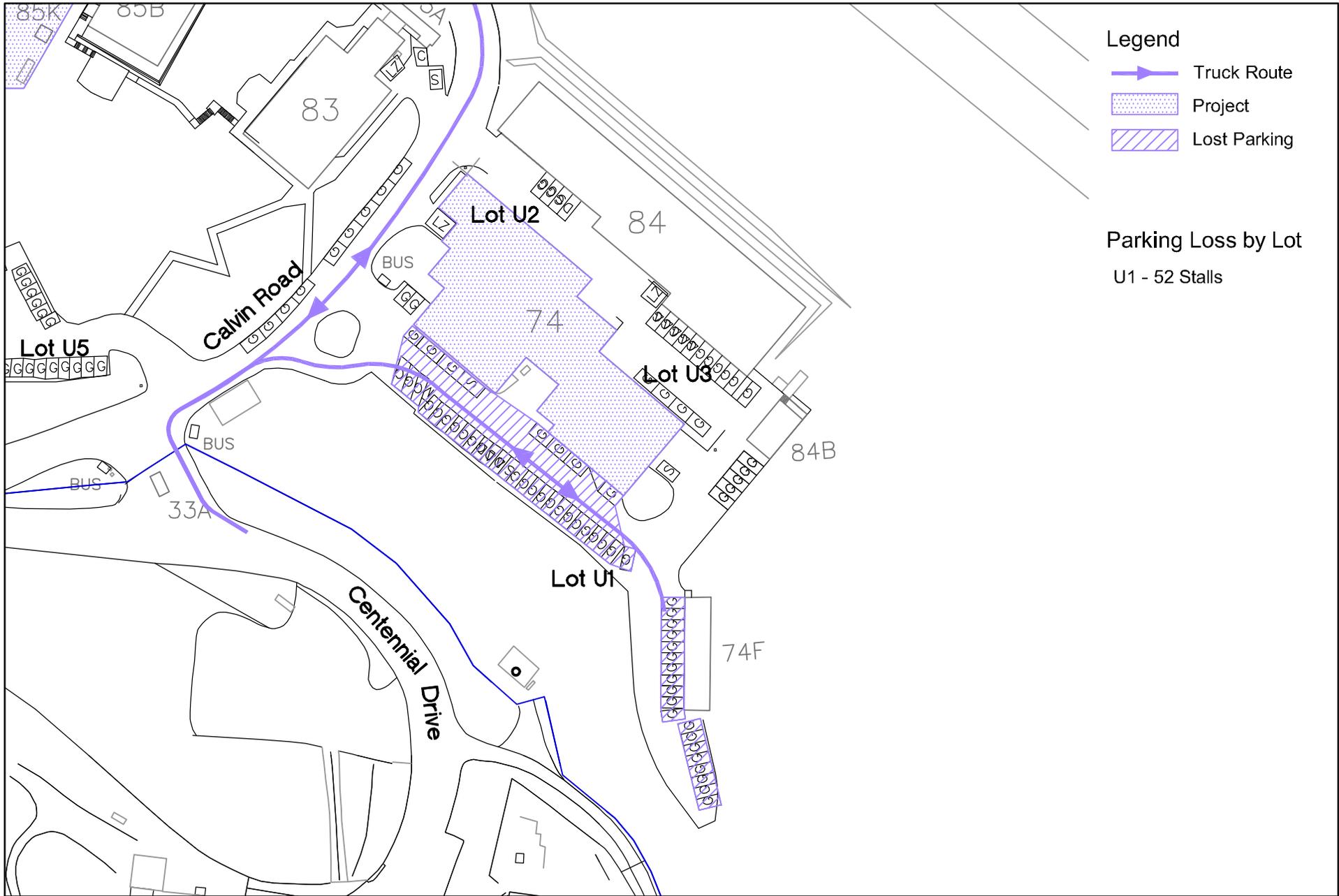
Building 51/Bevatron
Figure A-9

April 2008 - March 2011



Seismic Upgrade Ph 1: Building 50
 Figure A-10

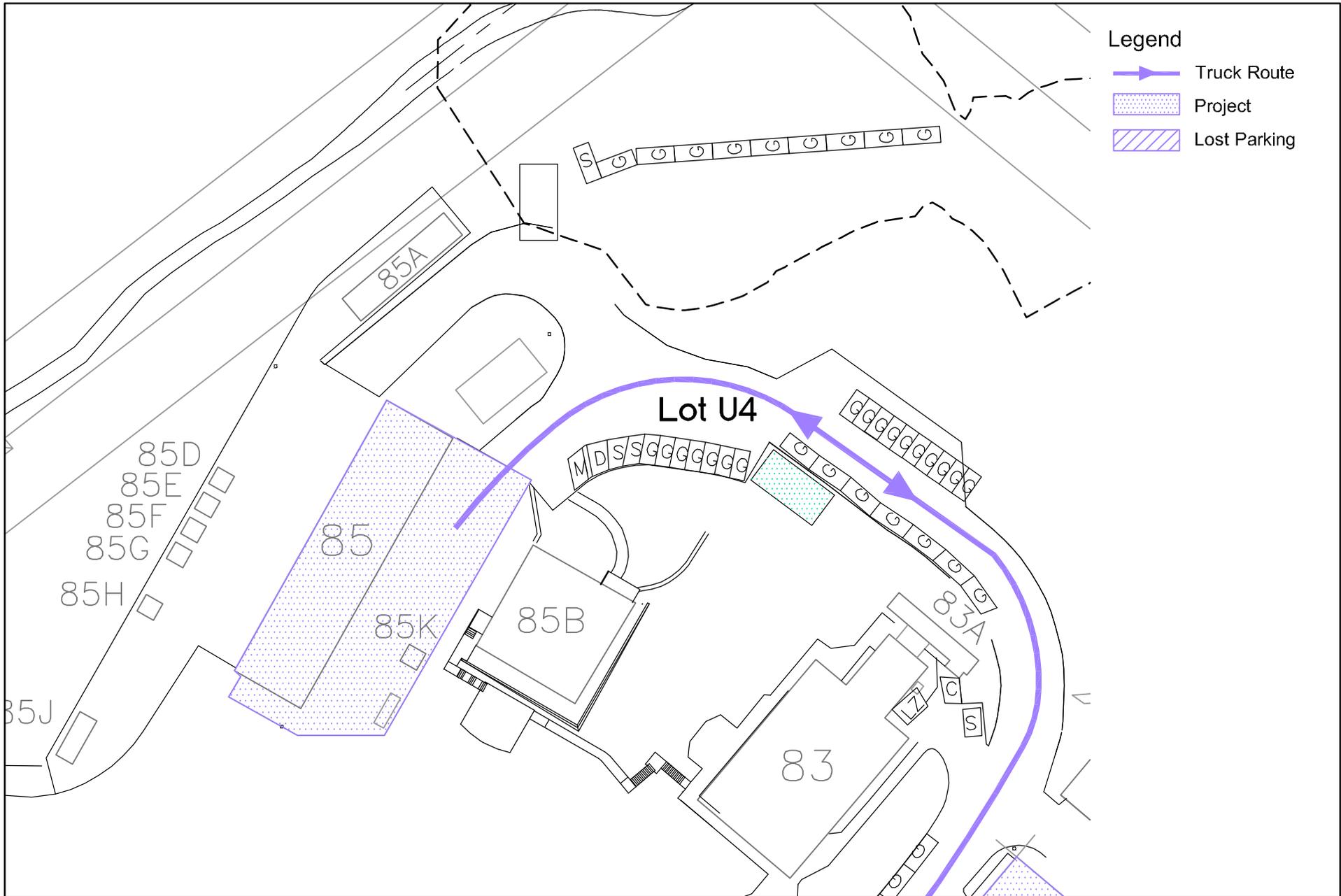
February 2009 - November 2009



Seismic Upgrade Ph 1/2: Building 74/General Purpose Lab

Figure A-11

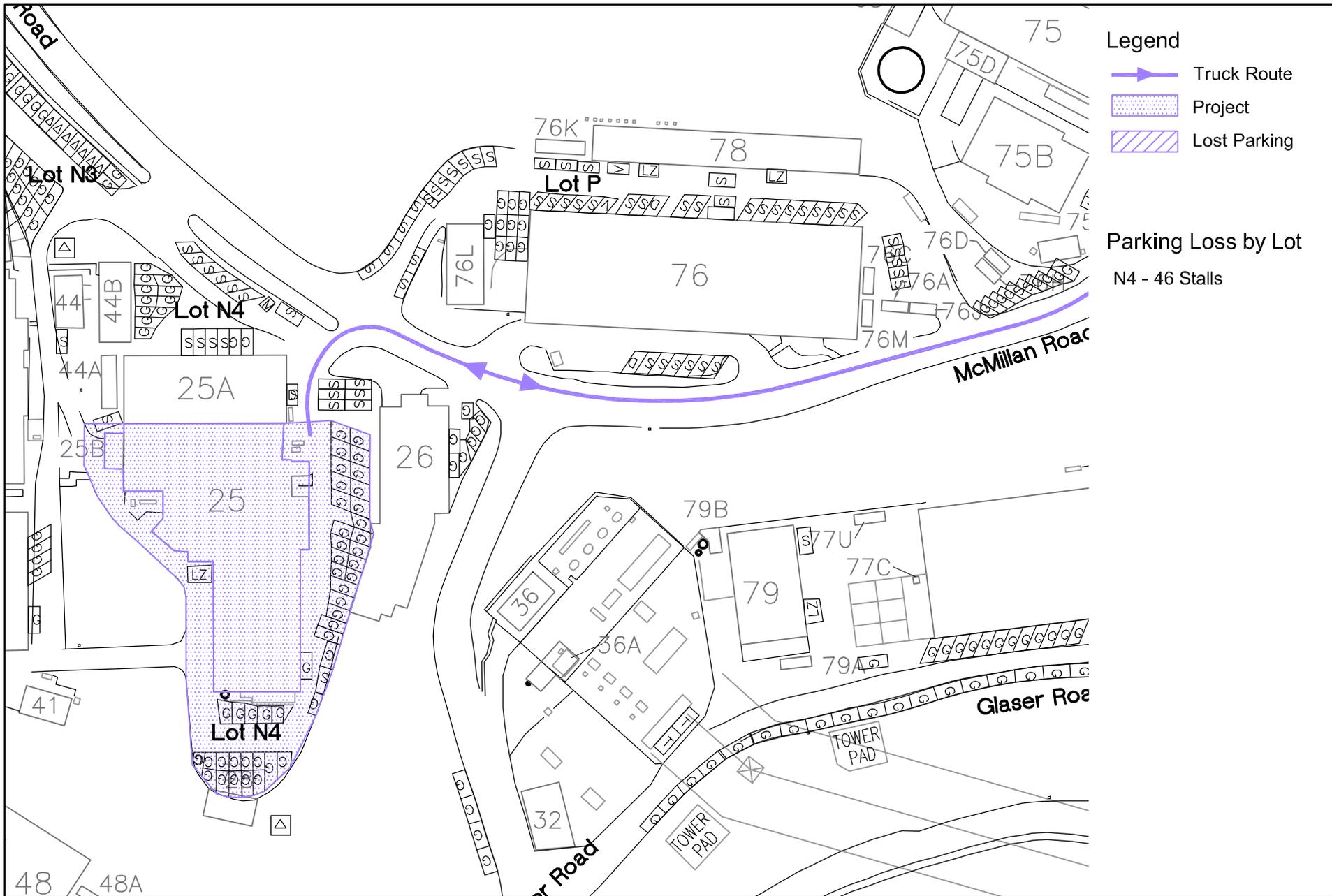
February 2009 - December 2012



Seismic Upgrade Ph 2: Building 85 Slide Stabilization

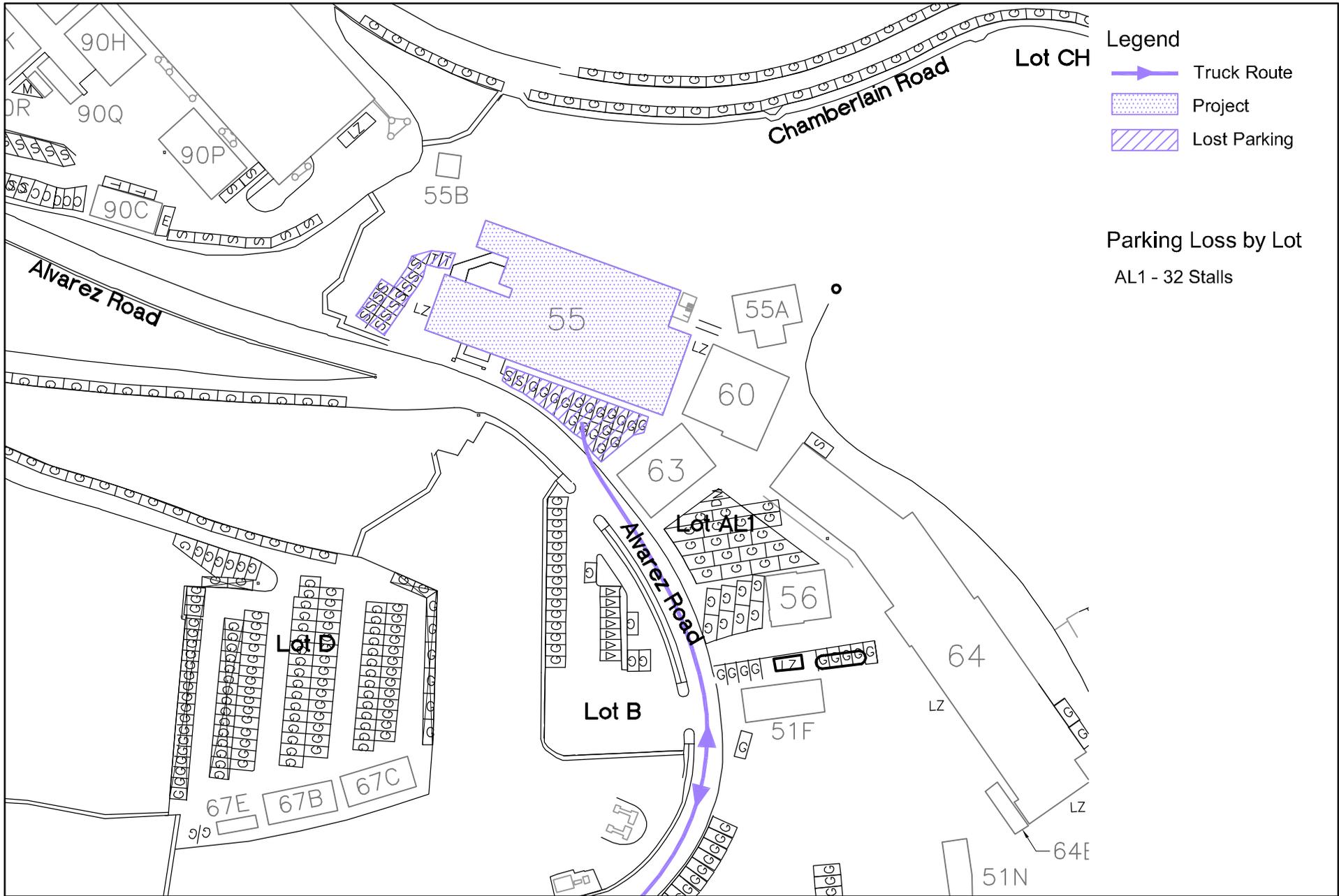
Figure A-12

January 2012 - October 2012



Seismic Upgrade Ph 2: Building 25 Demo
 Figure A-13

July 2012 - October 2012



Seismic Upgrade Ph 2: Building 55 Demo
Figure A-14

January 2013 - June 2013



APPENDIX B:

SUPPLY AND DEMAND BY LOT

Table B-1 – Parking Supply by Lot

Table B-2 – Demand by Lot

Table B-3 – % Occupied by Lot

