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Traffic Impact Assessment

5-13, 15 & 17 Maxwell Drive, Bridgewater
TAS 7030

August 2022

Type of Assessment: Traffic Impact Assessment

Site Location: 5-13, 15 & 17 Maxwell Drive, Bridgewater TAS 7030

Prepared for: Michael Ta

Prepared by: APEX Engineers

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1. INTRODUCTION

APEX Engineers were engaged by Michael Ta to provide a traffic impact assessment as a part of the development application for the proposed multi-unit residential development, located at 5-13, 15 & 17 Maxwell Drive, Bridgewater TAS 7030 ('subject site').

This report has been structured into the following sections:

- Section 2 Describes the existing transport conditions in the locality and provides an overview of the proposed development;
- Section 3 Assesses the relevant statutory parking provision requirements applicable to the subject development;
- Section 4 Provides a review of the proposed car park design under the relevant Australian Standards;
- Section 5 Provides an estimate of the traffic impact anticipated to be generated by the proposed development on the surrounding local road network; and
- Section 6 Provides the summary and conclusions of the study.

2. BACKGROUND AND EXISTING CONDITIONS

2.1 Site Description and Local Road Network

The subject site is located across multiple lots at 5-13, 15 & 17 Maxwell Drive in Bridgewater. The overall site area is 6,911 square metres. The site vicinity is predominantly characterised by low-density residential dwellings. At the site frontage, Maxwell Drive is an undivided local road (with a paved width of approx. 9m).

Figure 1 below highlights the site location.

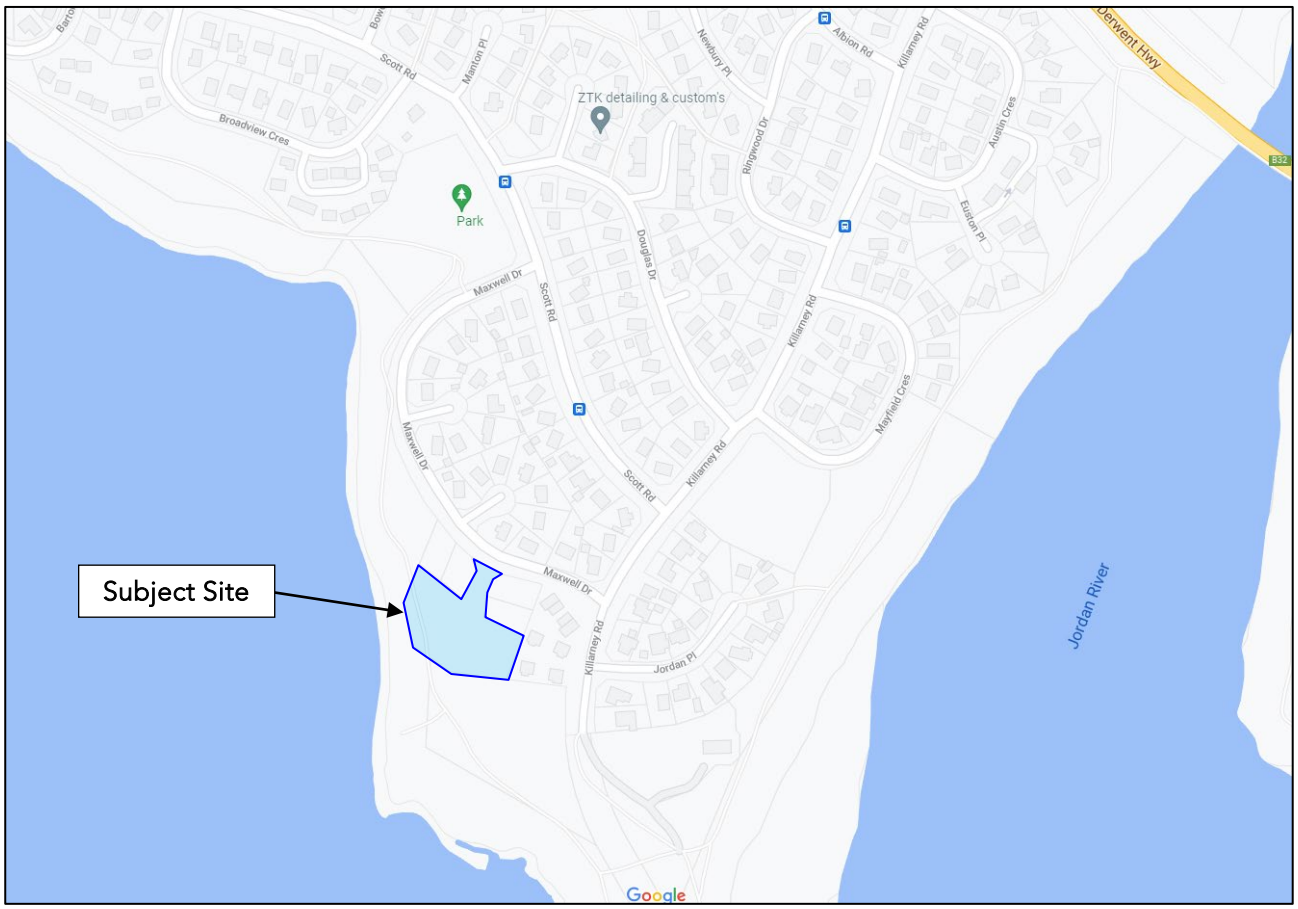


Figure 1: Location of the subject site

2.2 Details of the Proposed Development

The subject proposal involves construction of 25 residential dwellings (2 x 1 bedroom dwellings + 23 x 3 bedroom dwellings) within the subject site. Each dwelling (except dwellings 19 and 20) includes two car spaces as double garages. Dwellings 19 and 20 include one car space each in the form of single garages. A total of 7 visitor car spaces are also provided within the site. All car spaces (except for Dwellings 1 and 2) will access the site through the common driveway off Maxwell Drive. Dwellings 1 and 2 include double garage spaces with vehicle access directly off Maxwell Drive.

Figure 2 shows the proposed site layout plan.

Figure 2: Proposed site layout plan

2.3 Public Transport Service Accessibility

The subject site is located within <400m (5-minute walk) from bus stops on Scott Road that service bus routes 520 (Bridgewater to Hobart City), 522 (Gagebrook to Hobart City) and X20 (Bridgewater to Hobart City EXPRESS).

Figure 3 shows the local public transport network map for the subject site.

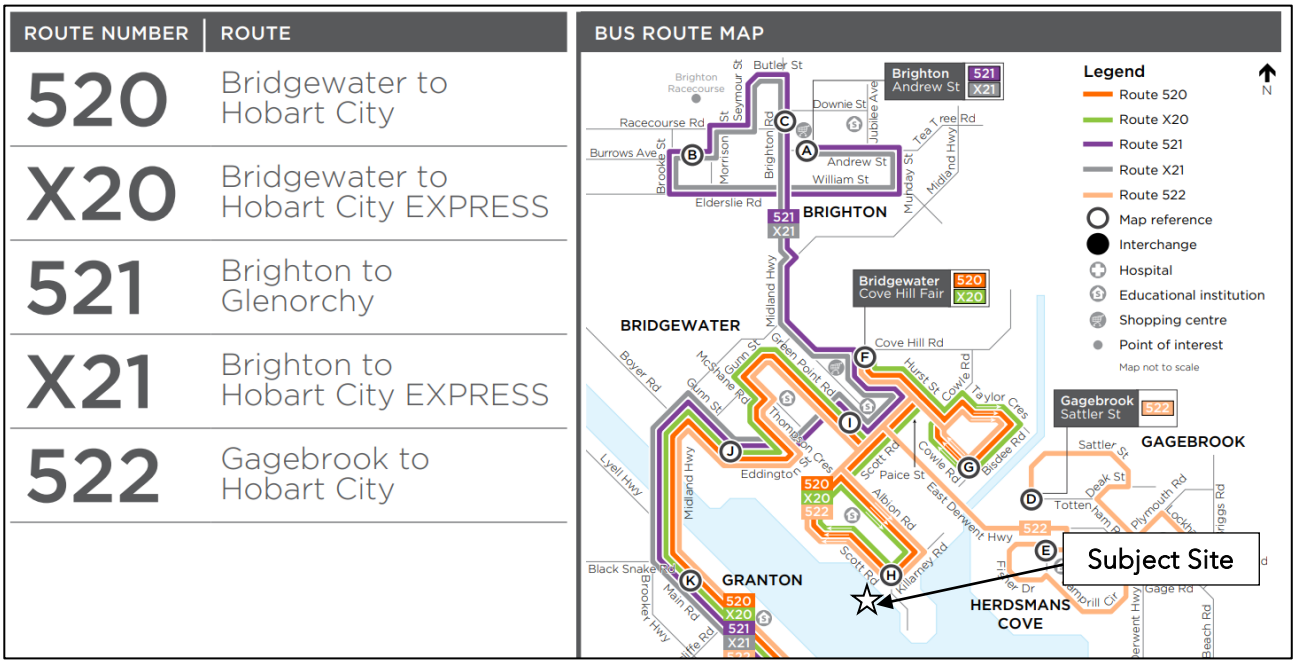


Figure 3: Local public transport services

3. PARKING PROVISION ASSESSMENT

The statutory parking provision requirement applicable for the proposal has been assessed with reference to Table C2.1 (Parking Space Requirements) of the Tasmanian Planning Scheme – State Planning Provisions. This assessment is summarised in Table 1.

Table 1: Statutory parking provision requirement

Component	Number proposed	Statutory parking requirement	Provision requirement
1 bedroom dwellings	2	1 space per dwelling	2
3 bedroom dwellings	23	2 spaces per dwelling	46
Visitors	Total of 25 dwellings	1 space per 4 dwellings (rounded up to the nearest whole number)	7
Total car spaces			**55 spaces**

As per the above table, the proposal has a statutory parking provision requirement of 55 car spaces. The proposal provides 55 car spaces (1 car space each for the 1 bedroom dwellings + 2 car spaces each for the 3 bedroom dwellings + 7 visitor spaces), which satisfies the above requirement.

4. CAR PARKING DESIGN REVIEW

This section provides a review of the proposed on-site car parking design against the minimum requirements in the Australian Standards (AS 2890.1 - 2004). This section shall be read in conjunction with the complete site layout plans submitted as a part of the Development Application lodgement.

4.1 Open 90 Degree Car Space Dimensions

Based on AS 2890.1:2004, 90-degree car spaces which are categorised under user class 1A (residential/domestic parking) are required to be 2.4m wide by 5.4m long with 5.8m of aisle width. All four of the regular car spaces (allocated for visitors at the site frontage) have been designed to comply with the above-identified AS 2890.1 requirements.

4.2 Open Parallel Car Space Dimensions

The proposed car parking area includes 3 parallel car parking spaces that will be used by visitors. The car spaces will be accessed through the aisle that is 5.5m wide. Figure 2.5 of AS 2890.1 states a requirement of 5.9m length for parallel spaces accessed through an aisle that is 3.6m. The proposed spaces are designed at 6.3m length and 2.4m width (2.1m minimum space width + 300mm clearance). Therefore, the proposed parallel car spaces are dimensionally compliant with the requirements outlined in AS 2890.1.

4.3 Double Garages

The 3 bedroom dwellings have been provided with double garages. The parking user class for the proposed double garages, as per AS 2890.1:2004, is user class 1A (residential/domestic parking). User class 1A car spaces are required to be 2.4m wide by 5.4m long. AS 2890.1 stipulates the following requirement in relation to the design of double garages which includes a single door for all car spaces:

The spaces shall be contiguous with the end spaces having a minimum width between the centre-line of the space and the end wall or obstruction of 1.5 m to allow clearance for door opening, and the door width shall be the space width times the number of spaces (in metres).

As per the above, both car spaces within each double garage should be designed at 2.7m width (2.4m minimum width for the car space + 300mm door opening clearance) – this implies that the internal width of each double garage should be 5.4m minimum. Also, the length of each double garage car space should be a minimum of 5.4m, with an aisle width of 5.8m minimum behind each space. Additionally, the minimum door width requirement for each double garage is 4.8m (i.e., 2 car spaces at 2.4m minimum width requires a 4.8m wide garage door).

All proposed double garages comply with the above-identified minimum dimensional requirements.

4.4 Single Garages

The one bedroom dwellings have been provided single garages. AS 2890.1 provides the following requirement in relation to the design of single garages:

The overall internal width shall be 3.0m minimum and the minimum internal length shall be 5.4m (as per Figure 5.2 in AS 2890.1). A doorway of 2.4m minimum width shall be provided.

The proposed single garages are designed at 3.5m internal width (with >2.4m wide doorways) and 6m internal length, which satisfy the minimum internal width and length requirements.

4.5 Accessway Width

All internal accessways have been designed at 5.5m minimum width (plus 300mm clearance on either side from obstructions higher than 150mm) to cater for two way vehicle movements.

4.6 Gradients within Parking Modules

AS 2890.1 states that parking modules, at maximum, should have a grade of 1 in 20 (measured parallel to the angle of parking) and 1 in 16 (measured in any direction other than parallel to the angle of parking). The proposed open visitor car parking modules comply with the above requirements.

4.7 Gradient of Access Driveway

In relation to the gradient of the access driveway, AS 2890.1 requires the first 6m into the car park to include a maximum grade of 5% (1 in 20). The first 6m into the proposed car park (off Maxwell Drive) includes a maximum grade of 5%.

4.8 Accessway Grade

AS 2890.1-2004 states the grade requirements for straight ramps at private or residential car parks as follows:

(i) Longer than 20 m—1 in 5 (20%) maximum.

(ii) Up to 20 m long—1 in 4 (25%) maximum. The allowable 20 m maximum length shall include any parts of grade change transitions at each end that exceed 1 in 5 (20%).

(iii) A stepped ramp comprising a series of lengths each exceeding 1 in 5 (20%) grade shall have each two lengths separated by a grade of not more than 1 in 8 (12½%) and at least 10 m long.

Furthermore, where the difference in grade between two sections of ramp or floor is greater than 1:8 (12.5 percent) for a summit grade change, or greater than 1:6.7 (15 percent) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming.

The proposed accessways (including those serving the individual dwellings) are designed to have a maximum grade of 1:8 (12.5%), which complies with the above requirements.

4.9 Vehicle Manoeuvrability Conditions

In order to investigate the anticipated manoeuvrability conditions of vehicles entering and exiting each of the proposed residential car spaces, swept path assessments were undertaken using AutoTURN software (the industry standard vehicle swept path assessment software). Figure 4 illustrates the template of the 85th percentile vehicle (B85 vehicle) used to simulate the swept paths (it is noted that this 85th percentile vehicle template is developed according to the dimensions specified in AS 2890.1-2004).

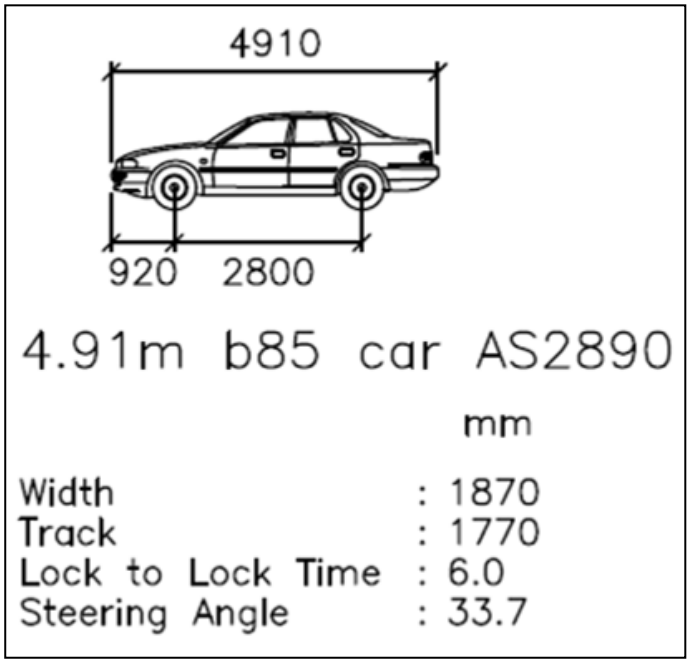


Figure 4: Template of an 85th percentile vehicle (AS2890.1-2004)

Appendix A illustrates the results obtained from the swept path analysis.

It is noted that the Blue and Cyan colour lines in the swept paths indicate the front and rear tyre tracks of the vehicle, respectively, while the Black colour of the swept paths indicate the vehicle body (the Green colour line indicated the centreline of the swept path while the dashed Red colour lines indicate the 300mm vehicle body clearance envelop).

As can be seen from the swept path results presented in Appendix A, all car spaces (except for the single car space at Dwelling 20 and the two car spaces in Dwelling 21) can be accessed by vehicles without requiring any correctional manoeuvres. The single car space at Dwelling 20 and the two car spaces at Dwelling 21 require a single additional correction when exiting, due to their access configuration. This level of manoeuvrability is considered acceptable for low turnover residential developments, where the drivers will be regular users who are familiar with the layout of the car park.

Appendix A also provides the swept path result of the Council waste collection vehicle within the car park (Figure 5 shows the template of this vehicle). The swept path results indicate that the waste collection vehicle can sufficiently manoeuvre within the accessway to undertake bin collections and exit the site in forward gear.

AS 2890.2 states that access for heavy rigid vehicles (up to 12.5m long) should have a maximum allowable grade of 15.4%. The accessway sections that will be used by the Council waste truck include a maximum grade of 11.1% which complies with the above requirement.

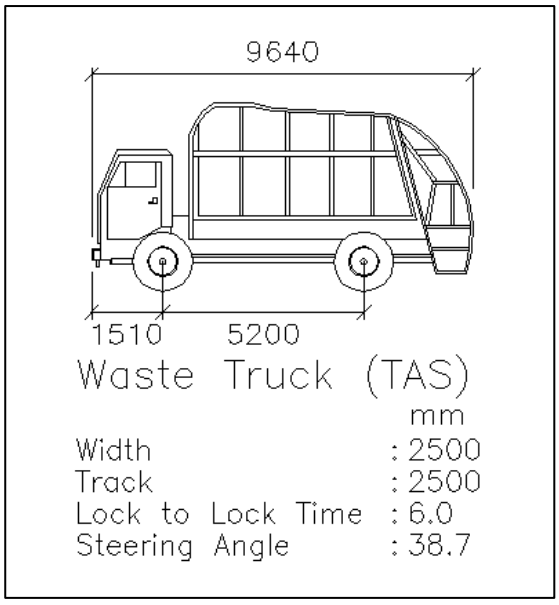


Figure 5: Template of the Council waste truck

4.10 Pedestrian Sight Distance Availability

AS 2890.1 requires a sight triangle of 2.5m length by 2m width, to be provided at the site egress location, to ensure sufficient sight distance availability for pedestrians. This requirement is illustrated in Figure 6.

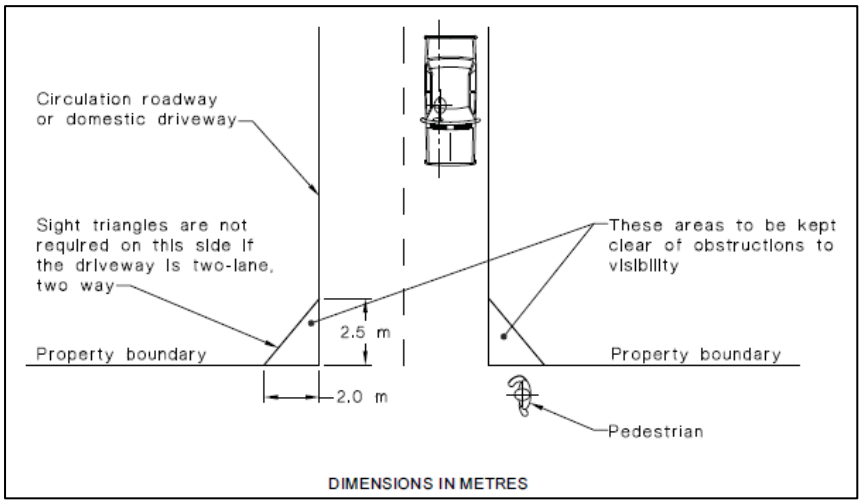


Figure 6: Pedestrian sight distance requirement (AS 2890.1)

Figure 7 illustrates the preservation of pedestrian sight triangles at the proposed sight access point off Maxwell Drive. It is noted that since the driveway is designed to cater for two way movements, the pedestrian sight triangle is only required towards the left-hand side of a vehicle exiting the site. As can be seen, this sight triangle can be fully preserved within the proposed design.

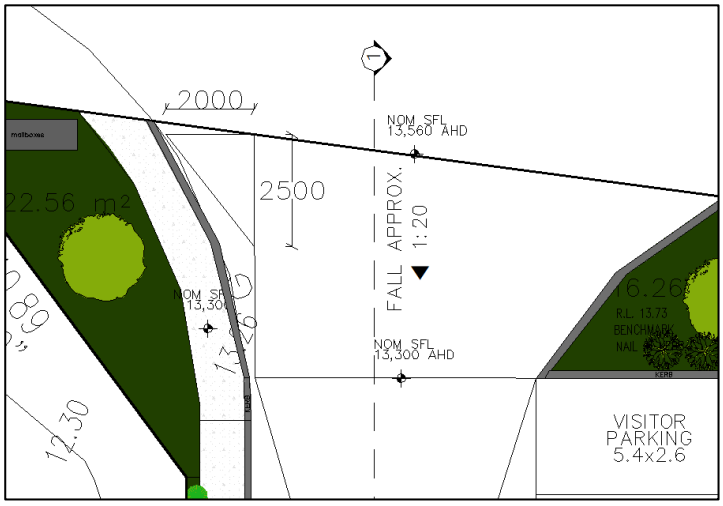


Figure 7: Proposed preservation of the pedestrian sight envelop

4.11 Pedestrian Access

The site plan provides a 1m wide footpath along the section of the accessway that connects the southern dwellings with Maxwell Drive. This footpath is outlined in Figure 8.

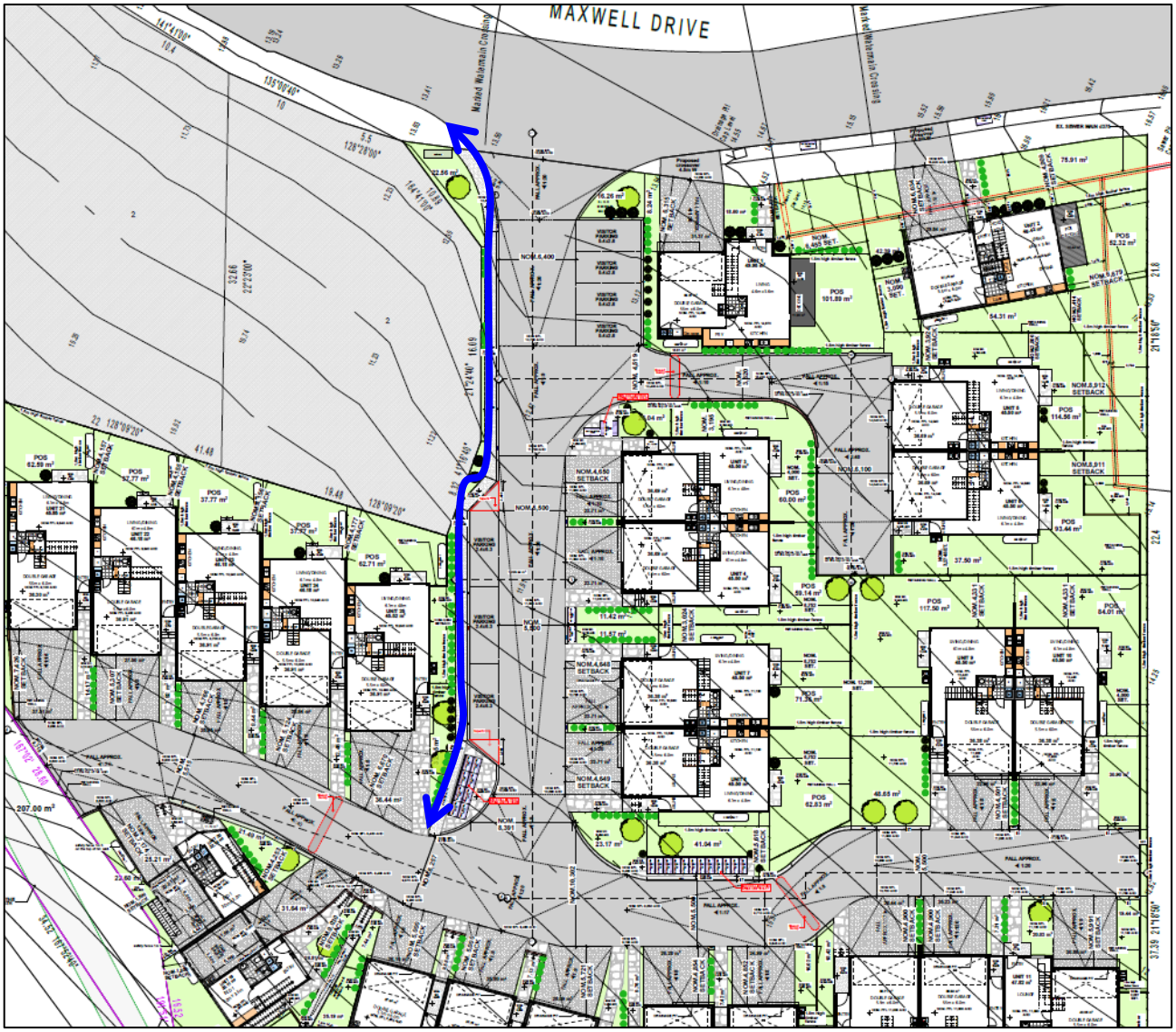


Figure 8: Proposed 1m wide footpath

5. TRAFFIC IMPACT ASSESSMENT

A traffic impact assessment was undertaken to determine the potential impacts caused by the proposed development upon the local road network. According to the Guide to *Traffic Generating Developments (RMS 2002)*, The following daily and peak hour trip rates provided in the aforementioned document, for residential dwelling houses, have been adopted for the subject proposal:

- Daily vehicle trips = 9.0 per dwelling
- Weekday peak hour vehicle trips = 0.85 per dwelling

Applying the above rates to the proposed development which includes 25 dwellings, leads to the following trip generation levels:

- 225 daily trips, and
- 22 weekday peak hour trips.

The above trips will manifest as turning movements at the midblock of Maxwell Drive, at the site frontage.

The above-determined peak hour trips are minor not expected to have any noteworthy impacts on the existing traffic operations on Maxwell Drive, particularly considering the local nature of the traffic served by this road.

6. COUNCIL RFI RESPONSES

The Council RFI letter dated 15/06/2022 (ref: DA2022/134) has mentioned several traffic/parking related matters. These matters are extracted below, with responses to each of them provided.

RFI Item 6 Clause C2.6.2 (A1/P1) - Design and layout of parking areas

Please provide an amended proposal plan and TIA addressing vehicle turning at the end of the shared driveways. Advice: no dedicated turning areas have been provided at the end of the shared driveways. A vehicle is unable to turn if the private driveways/parking spaces are occupied.

Response

The proposed arrangement will prevent any vehicles other than the resident vehicles from accessing the dead-end road sections through the provision of speed bumps and 'No through road' signs at the entrance to the side roads from the main accessway – refer to Figure 9. The proposed visitor car spaces will be clearly demarcated with signage so that visitors are aware of where to park their vehicles, without needing to access the dead-end road sections. The above measures are considered suitable and sufficient alternatives to providing dedicated turning areas at the ends of dead-end roads.

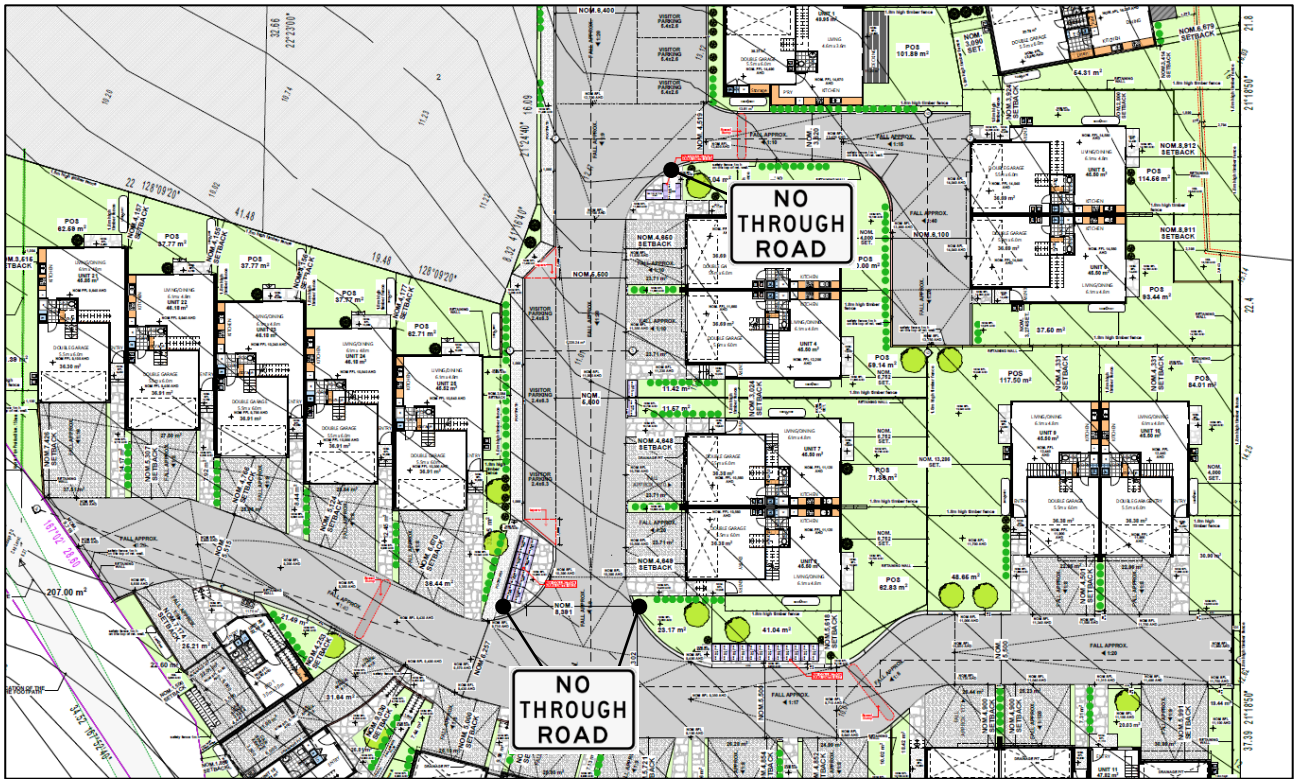


Figure 9: Proposed signage and speed bump plan

RFI Item 7 Clause C2.6.3 (P1) - Number of vehicle accesses for vehicles

Please demonstrate that the proposal can satisfy performance criteria P1 of Clause C.2.6.3. This response should have regard to pedestrian amenity/ safety.

Response

P1 of Clause C.2.6.3 is shown below:

The number of accesses for each frontage must be minimised, having regard to:
(a) any loss of on-street parking; and
(b) pedestrian safety and amenity;
(c) traffic safety;
(d) residential amenity on adjoining land; and
(e) the impact on the streetscape.

Maxwell Drive is a local road that only serves vehicles accessing the residences between Killarney Road and Scott Road. As a result, there are currently limited levels of traffic on this road. The proposal will construct a main driveway and two other separate driveways for Dwellings 1 and 2, off Maxwell Drive. There are currently 3 other driveways on the southern side of Maxwell Drive (see **Figure 10**). With the proposal, there will be a total of 6

driveways. This many driveways are not considered significant and will not impact on the streetscape.

The proposed driveways for Dwellings 1 and 2 are spaced apart by approximately 14m – this length of kerbside space can accommodate 2 vehicles. There is also approximately 17m of kerbside length available to the east of Dwelling 2 – which will enable accommodating 3 vehicles at the kerbside. Therefore, a total of 5 kerbside parking spaces can be accommodated at the frontage of the subject site (see Figure 11). This level of provision for kerbside parking opportunities is considered adequate in this instance, considering the predominantly residential nature of the locality (with very limited number of vehicles needing kerbside parking).

The main driveway to the site will enable all vehicles to exit onto Maxwell Drive in forward gear. The pedestrian sight triangle at the site egress point is preserved of any obstructions. The two driveways to Dwelling 1 and 2 will require vehicles to reverse out onto Maxwell Drive. However, these driveways provide pedestrian sight envelops are clear of any obstructions (see Figure 11). These driveways only include mild gradients (approx. 5%), thus the drivers who will be sitting 1.15m above the driveway level (based on AS 2890.1, the driver's eye height is 1.15m), will be able to clearly perceive any oncoming traffic or pedestrians.

Figure 10: Existing driveways on the southern side of Maxwell Drive

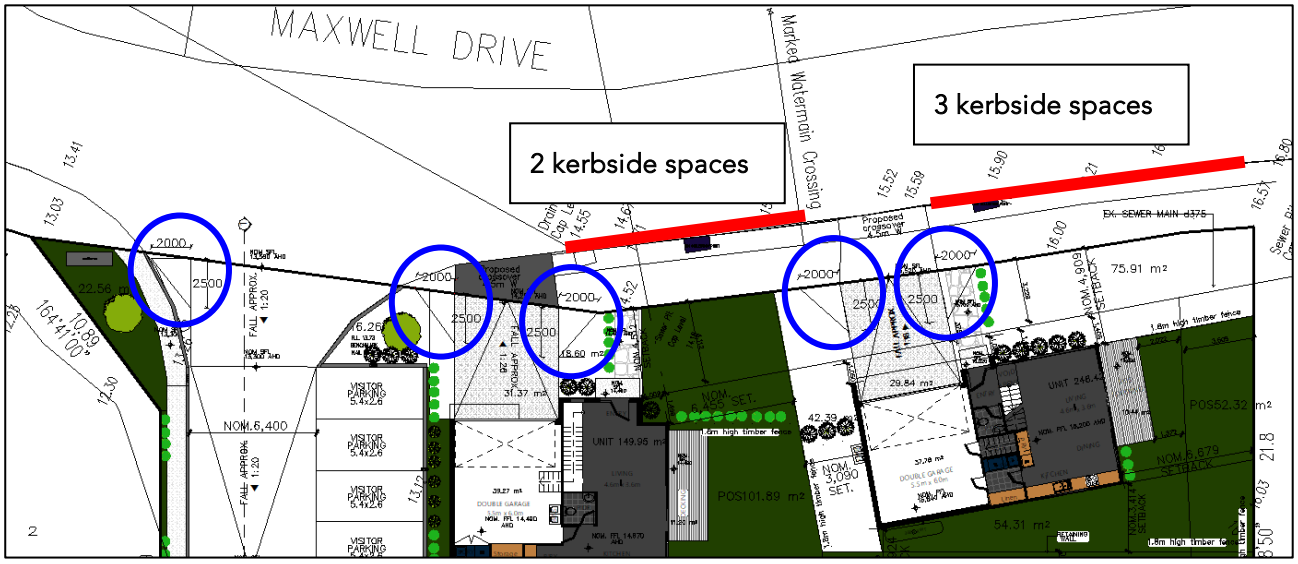


Figure 11: Pedestrian sight distance provisions at driveways

RFI Item 8 Clause C2.6.5 - Pedestrian Access

Please provide an amended TIA and proposal plan demonstrating that the proposal can satisfy A1.1 or P1of the Standard.

Response

As outlined in the Parking Design Review section of this report, the proposed car parking design complies with the relevant Australian Standard requirements and provides adequate manoeuvrability levels for all vehicles.

The site design has now been updated to provide a 1m wide footpath that connects Maxwell Drive with the visitor car parking spaces, with a kerb separating the footpath from the driveway.

RFI Item 11 Other Matters/ Advice (1 of 4)

Private garbage collection is proposed (this is not Council Officers' preferred option). On-site turning for a garbage truck should still be provided.

Response

The proposed site layout design is capable of accommodating the manoeuvres required by the Council waste collection vehicle – this vehicle is capable of exiting the site in forward gear (refer to Section 4.9 for more information).

RFI Item 11 Other Matters/ Advice (2 of 4)

Barriers required where the driveway has a vertical drop e.g., between units 22 and 23

Response

A 1m high safety fence (on top of the retaining wall) is proposed along the southern side of the driveway towards Dwellings 5 and 6, as shown in Figure 12.

RFI Item 11 Other Matters/ Advice (3 of 4)

Several the driveways in front of garages have insufficient length for a car to park without obstructing the shared driveway.

Response

The tandem parking arrangement proposed previously has now been superseded through the provision of double garages for all 3 bedroom dwellings.

RFI Item 11 Other Matters/ Advice (4 of 4)

The TIA and plans do not address the ability for vehicles to turn at the end of the shared driveways if the unit driveways/parking spaces are occupied.

Response

Please refer to the response to RFI Item 6 above.

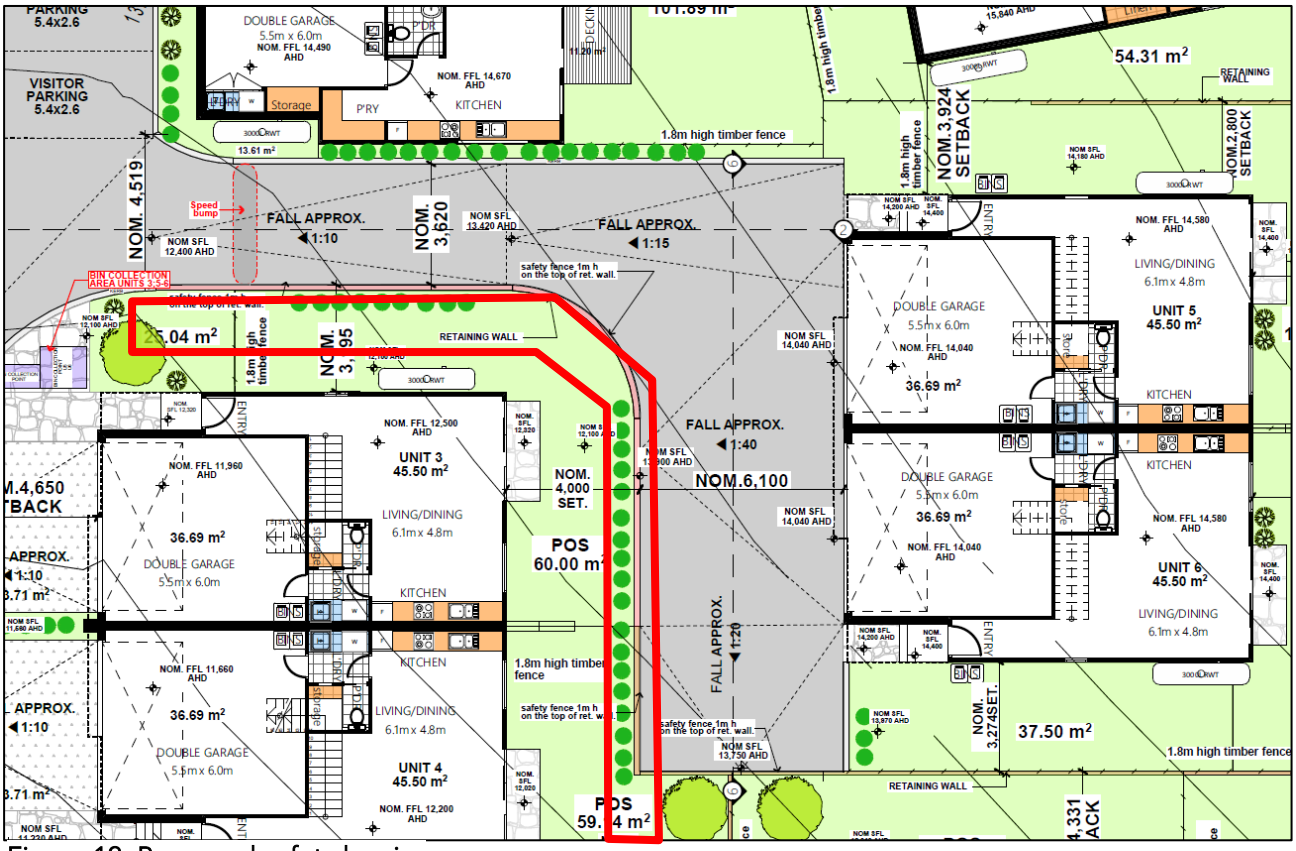


Figure 12: Proposed safety barrier

7. CONCLUSIONS

APEX Engineers were engaged by Michael Ta to provide a traffic impact assessment as a part of the development application for the proposed multi-unit residential development, located at 5-13, 15 & 17 Maxwell Drive, Bridgewater TAS 7030

The subject site is located within <400m (5-minute walk) from bus stops on Scott Road that service bus routes 520 (Bridgewater to Hobart City), 522 (Gagebrook to Hobart City) and X20 (Bridgewater to Hobart City EXPRESS).

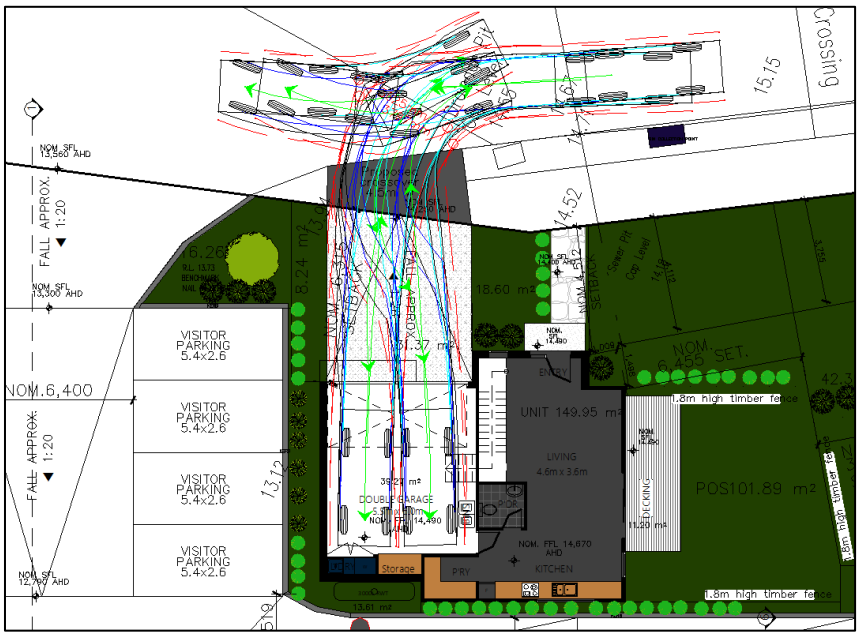
Based on the parking rates presented in Table C2.1 (Parking Space Requirements) of the Tasmanian Planning Scheme – State Planning Provisions, the proposal has a statutory parking provision requirement of 55 car spaces. The proposal provides 55 car spaces (1 car space each for the 1 bedroom dwellings + 2 car spaces each for the 3 bedroom dwellings + 7 visitor spaces), which satisfies the above requirement.

The proposed car parking design was assessed with reference to AS 2890.1. It was found that the proposed car park design is compliant with the relevant design requirements. The swept path assessments carried out reveal sufficient manoeuvrability conditions for vehicles using the proposed car spaces and the Council waste truck accessing the site.

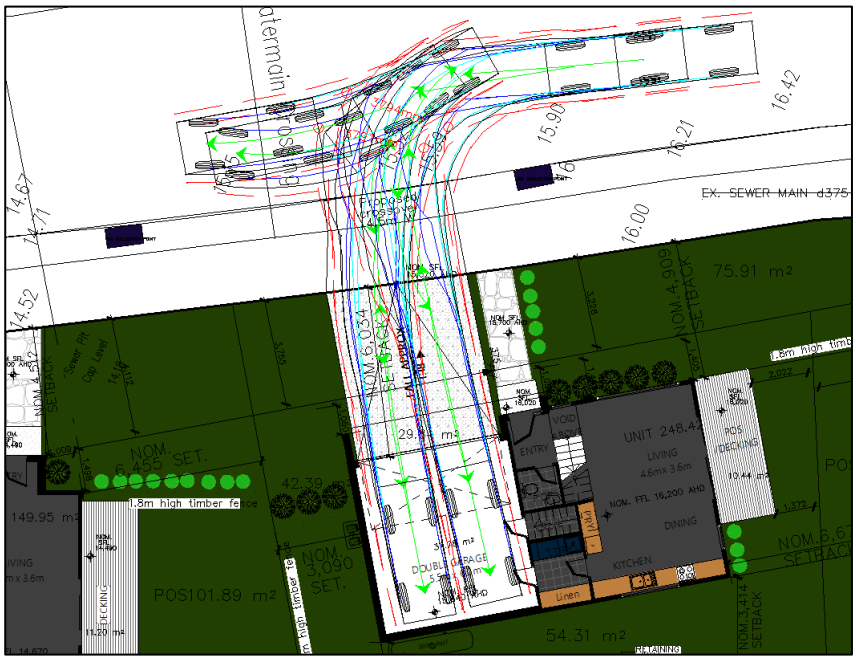
The daily and evening peak hour trip generations for the proposed development were determined from the trip rates provided in the Guide to Traffic Generating Developments (RMS, 2002) for residential dwelling houses. Based on these rates, the proposed development is estimated to generate 225 daily trips and 22 weekday peak hour trips. These trips will manifest as turning movements at the midblock of Maxwell Drive, at the site frontage. The above-determined peak hour trips are minor not expected to have any noteworthy impacts on the existing traffic operations on Maxwell Drive, particularly considering the local nature of the traffic served by this road.

APPENDIX A: SWEPT PATH TEST RESULTS

Dwelling 1



Dwelling 2



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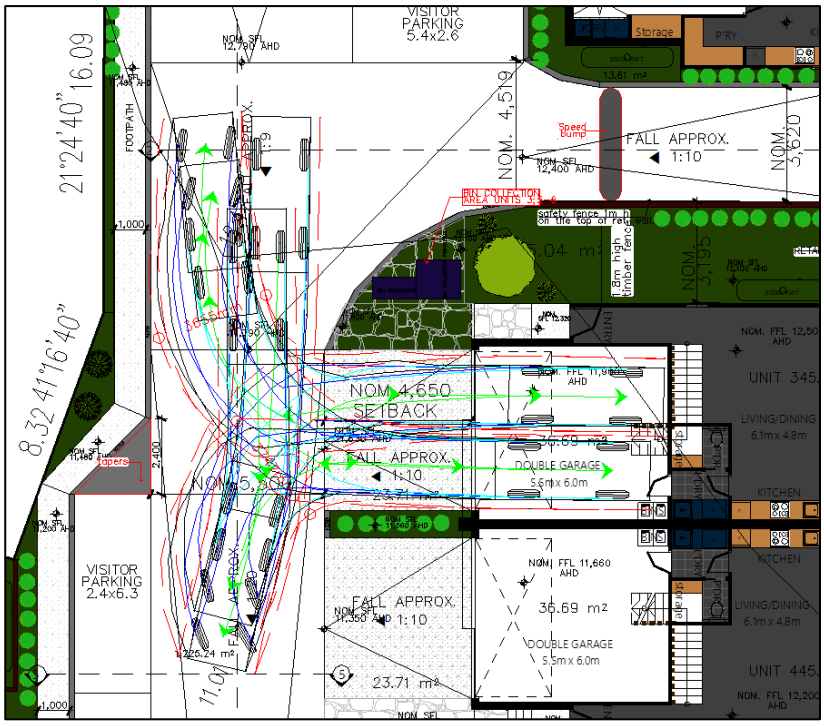

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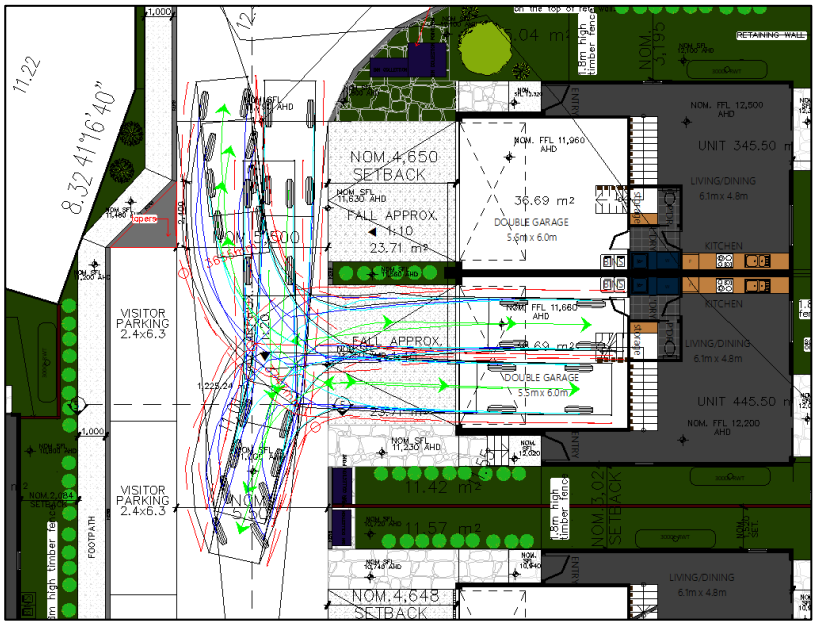
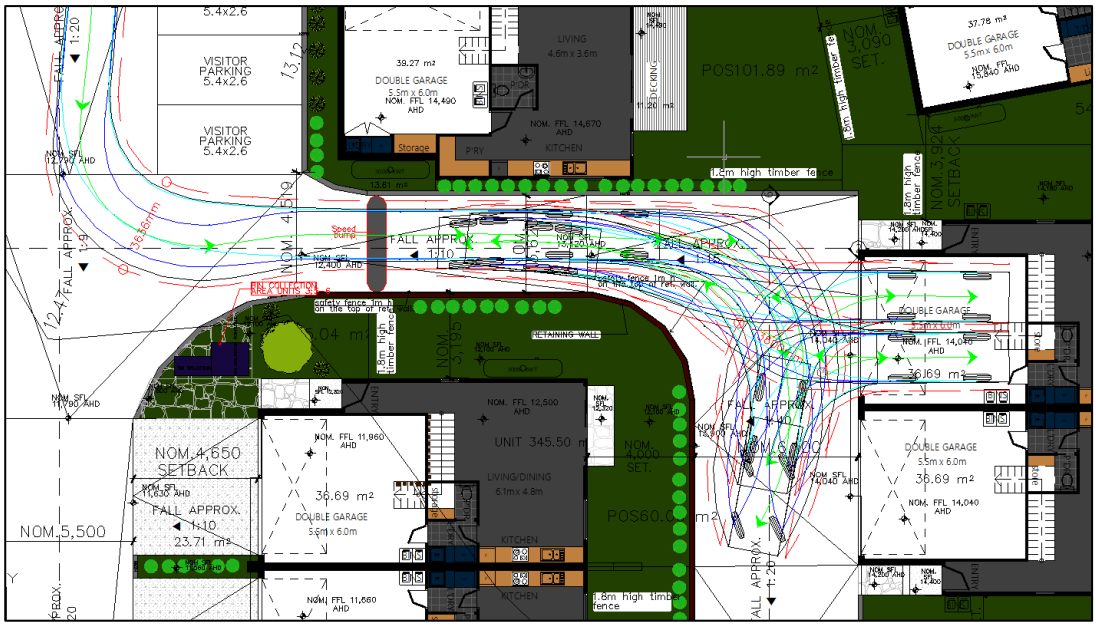
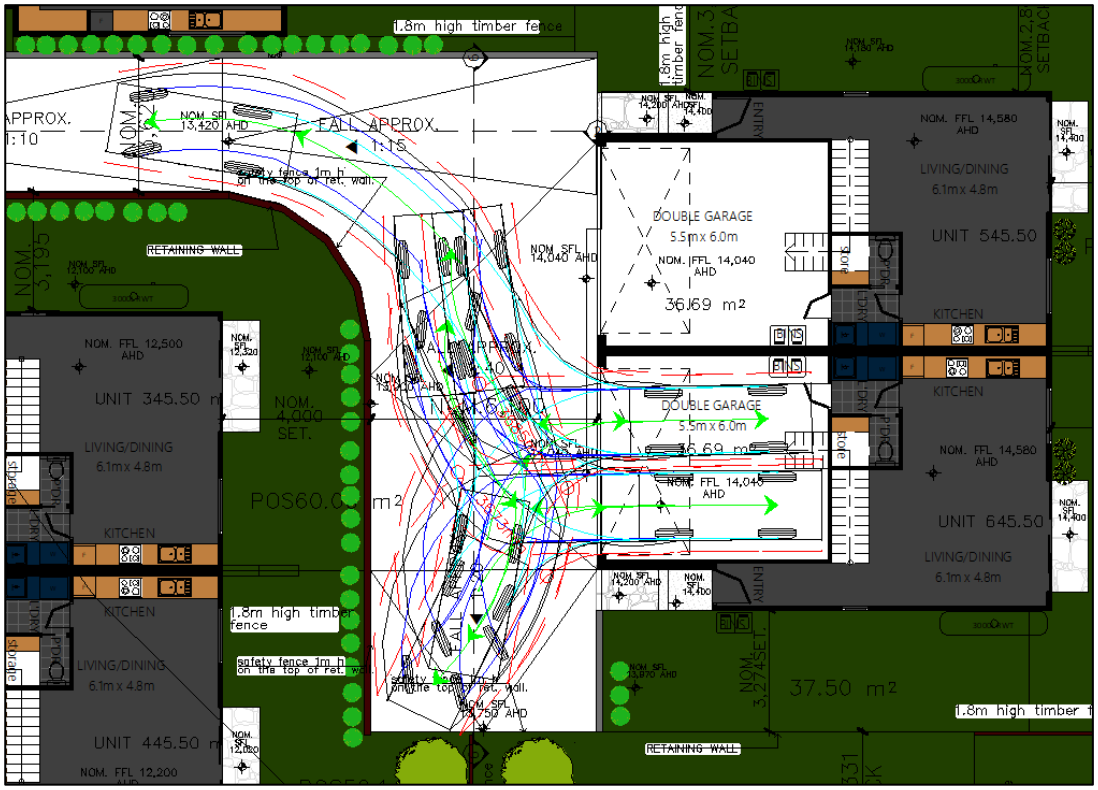


Dwelling 5



Dwelling 6



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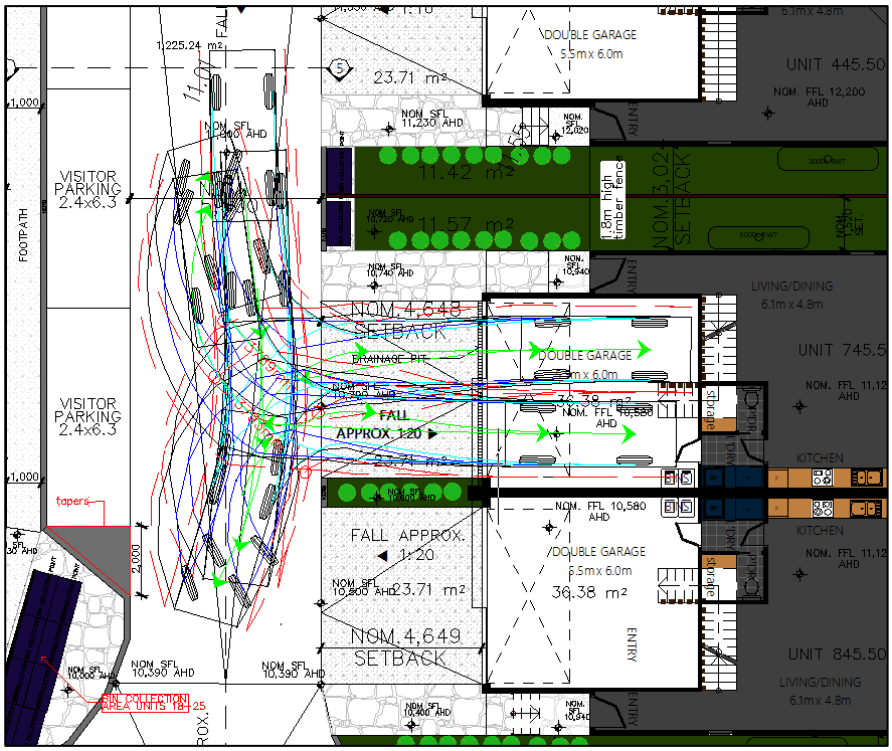

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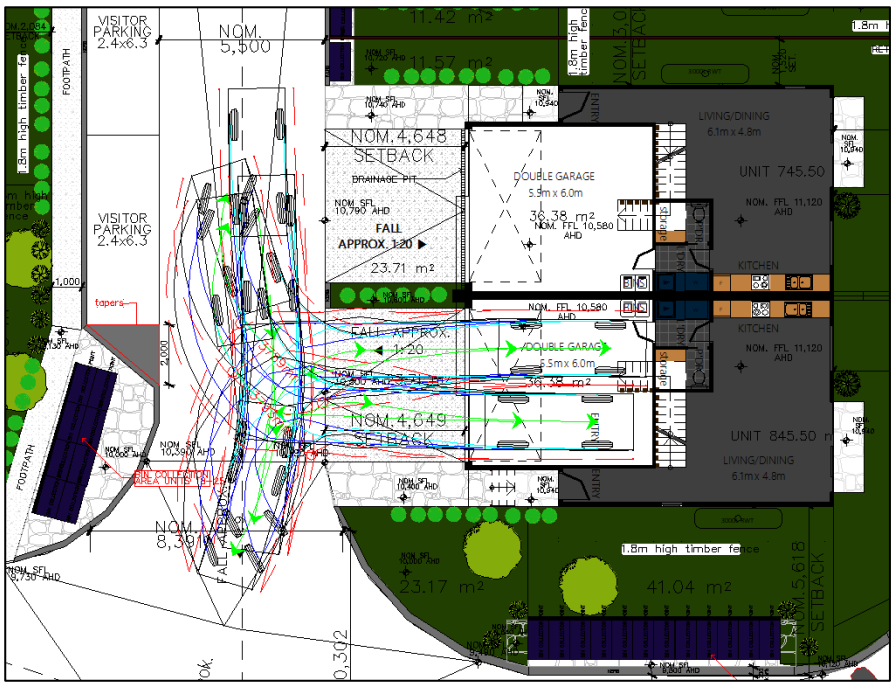

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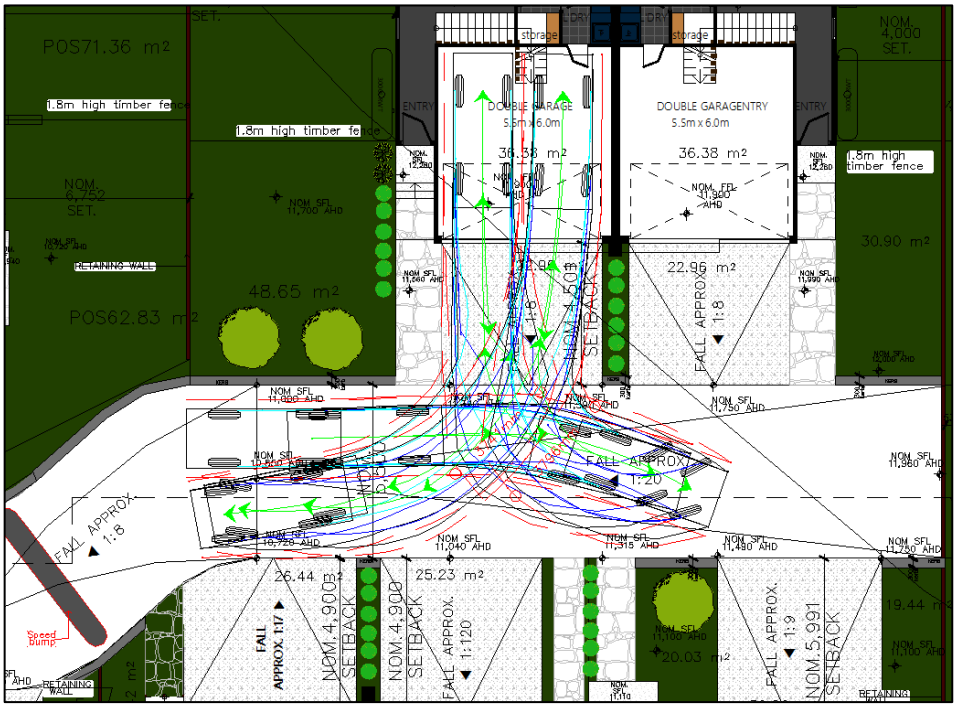
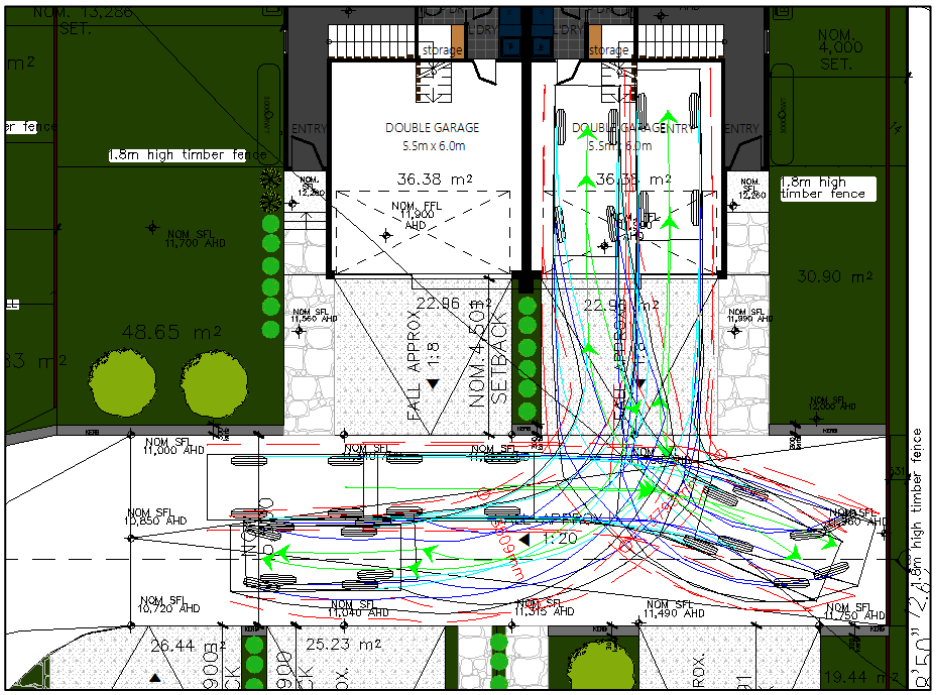
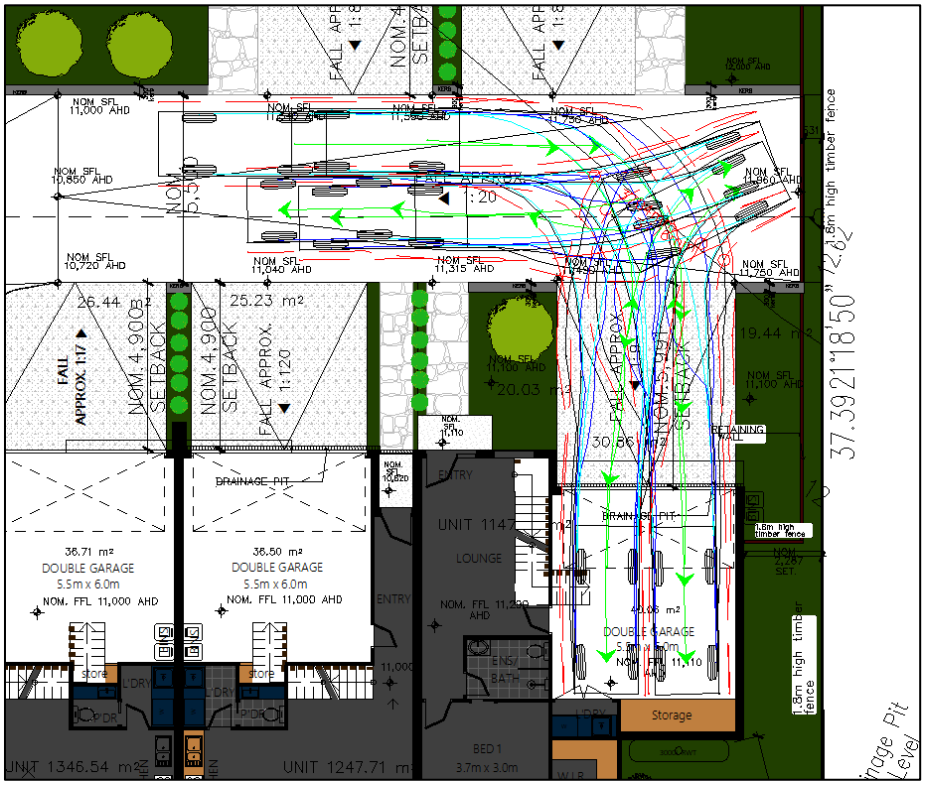


Dwelling 10



Dwelling 11



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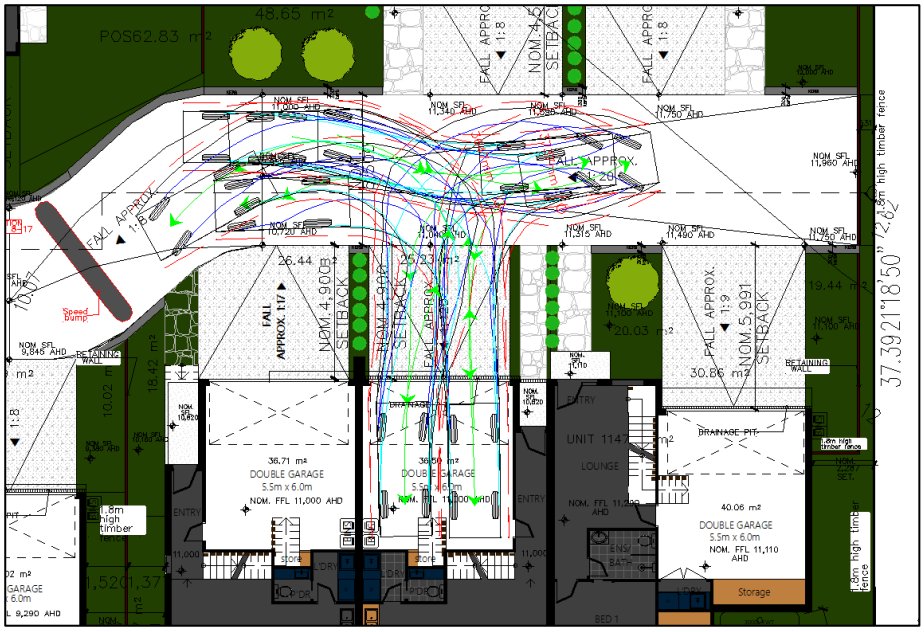

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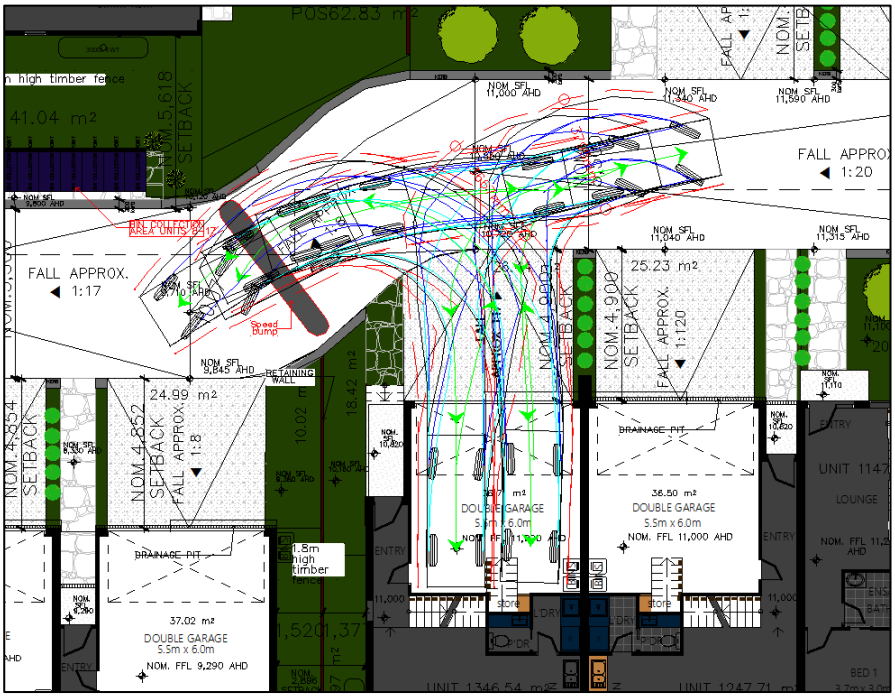
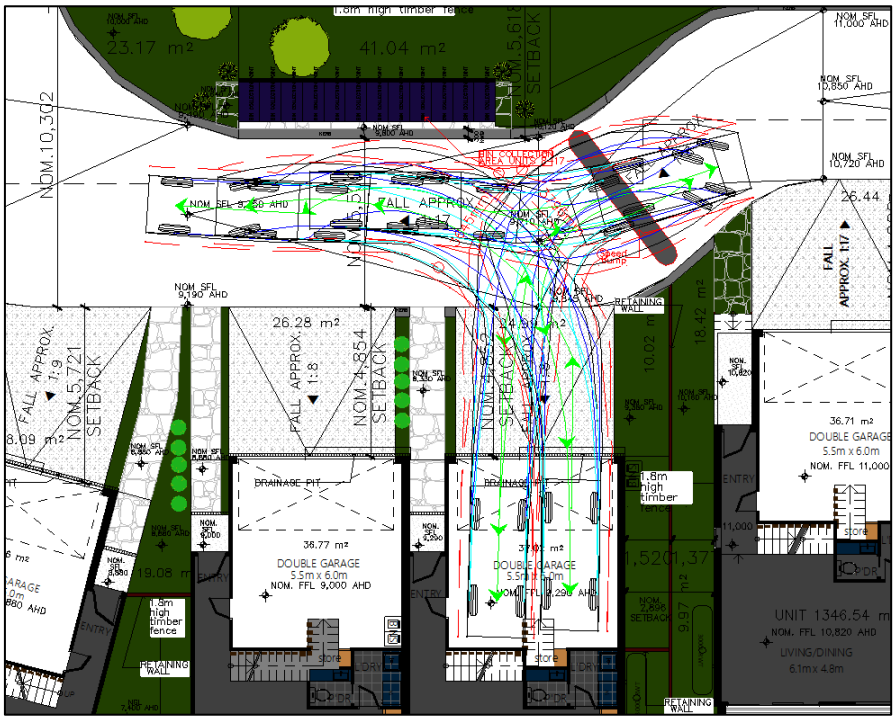


Dwelling 14



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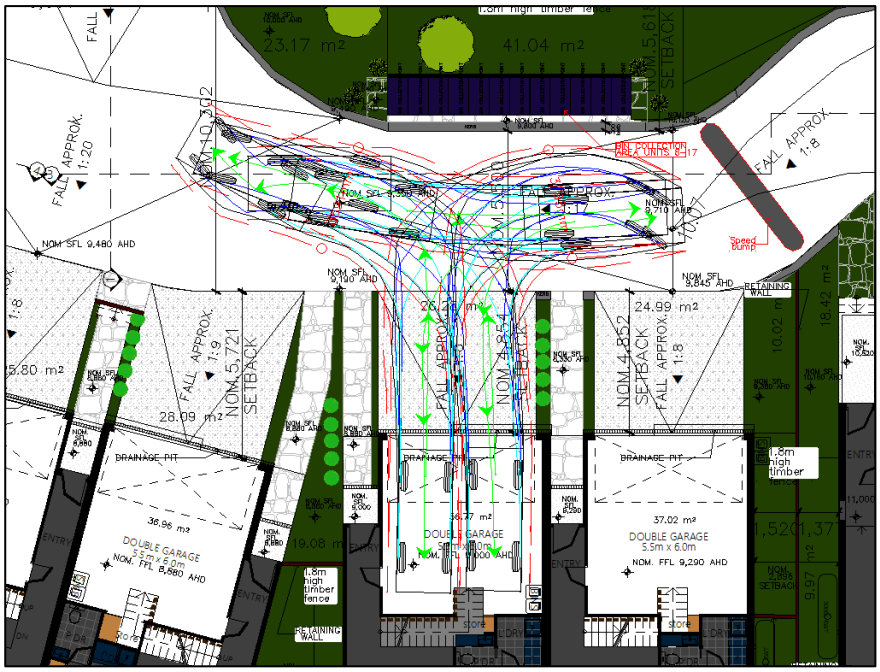
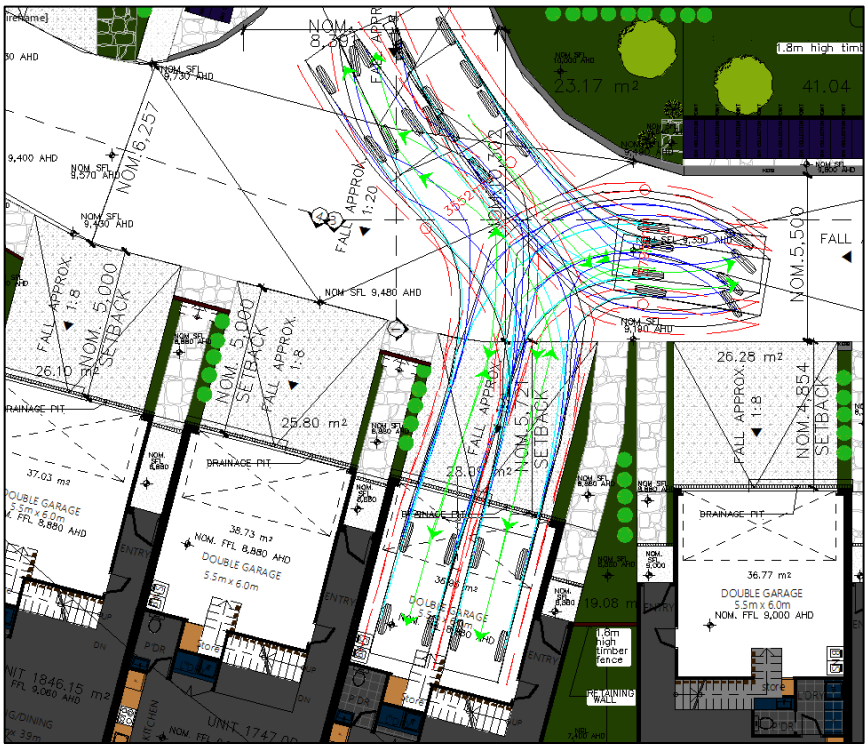
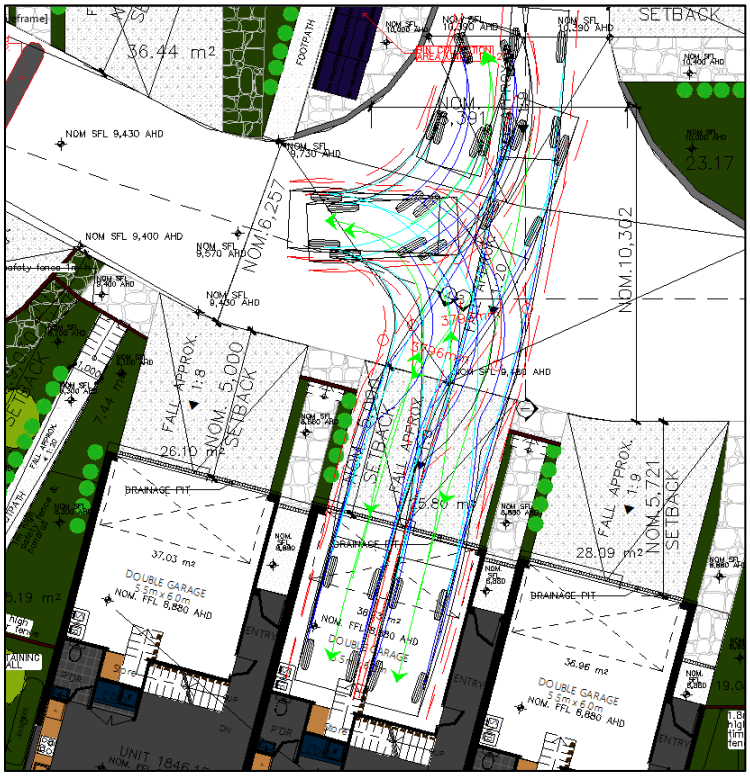


Dwelling 16



Dwelling 17



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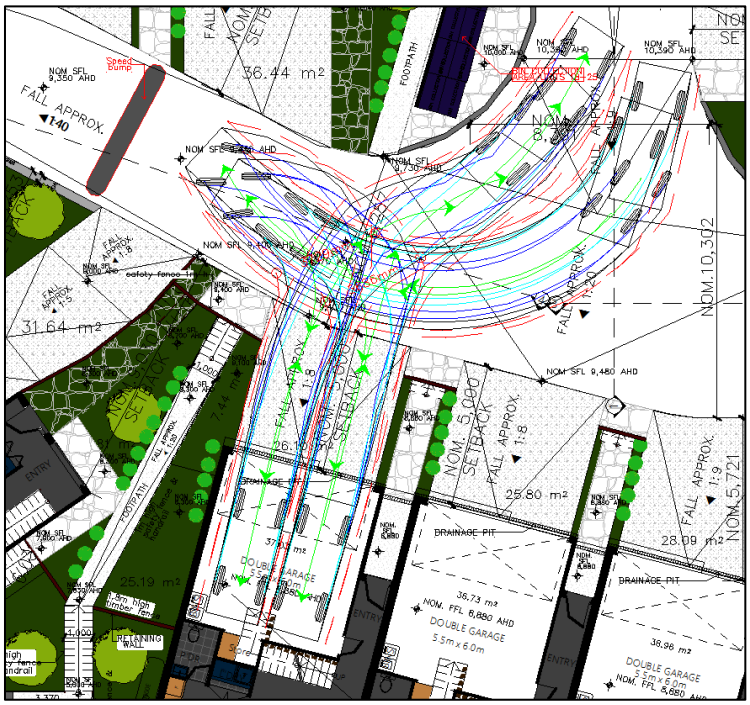

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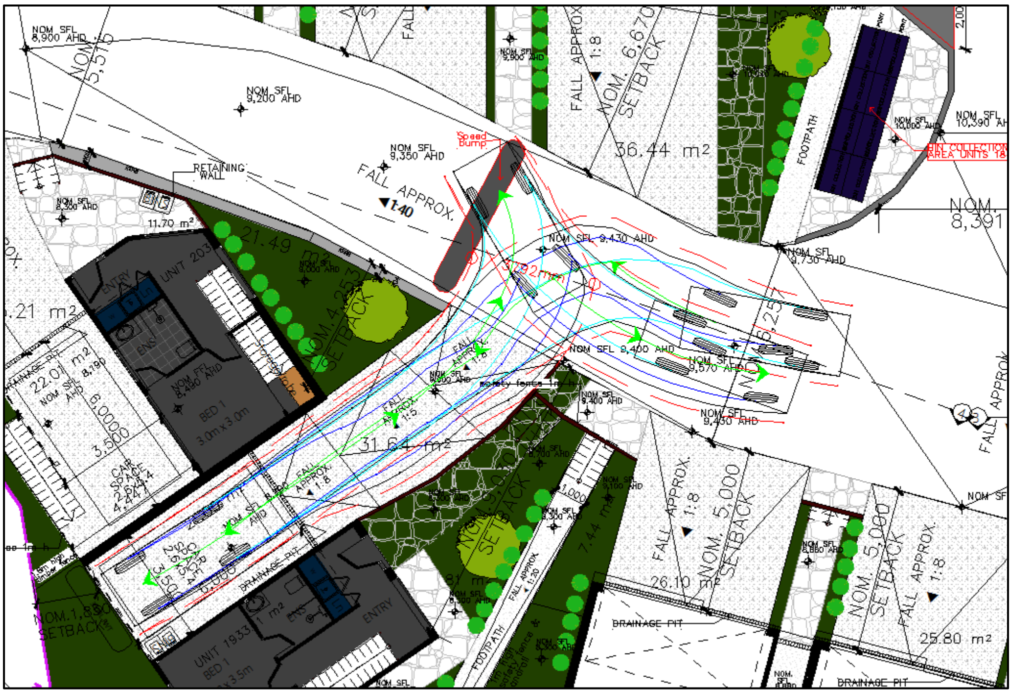
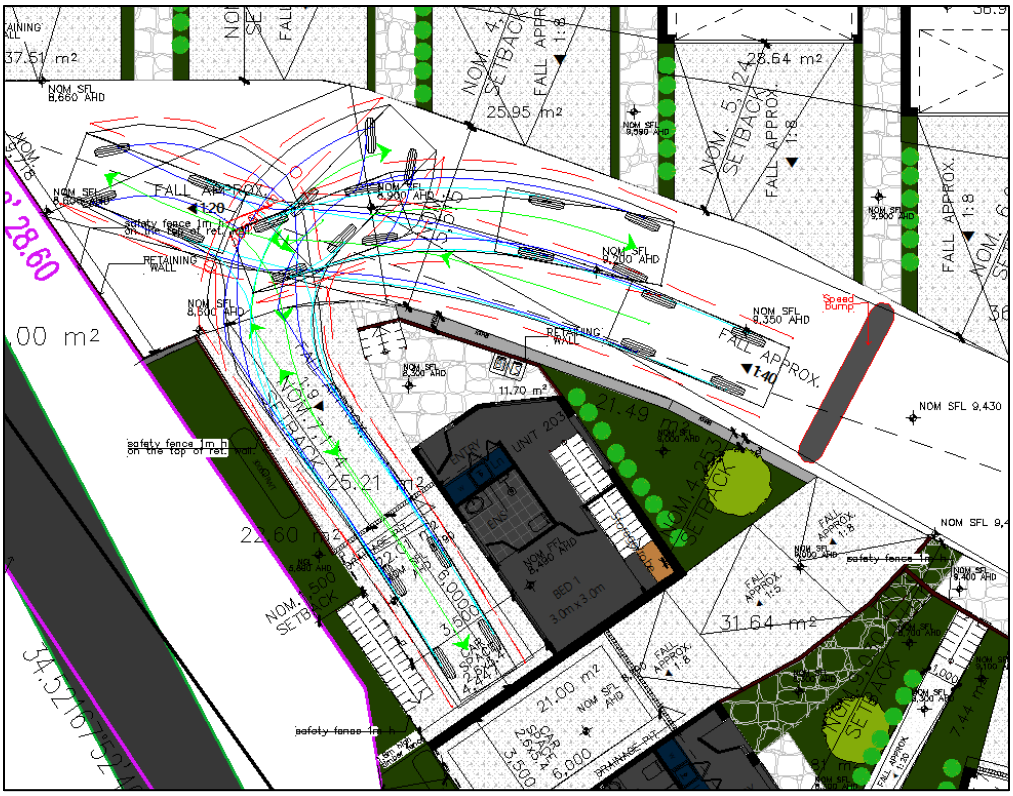
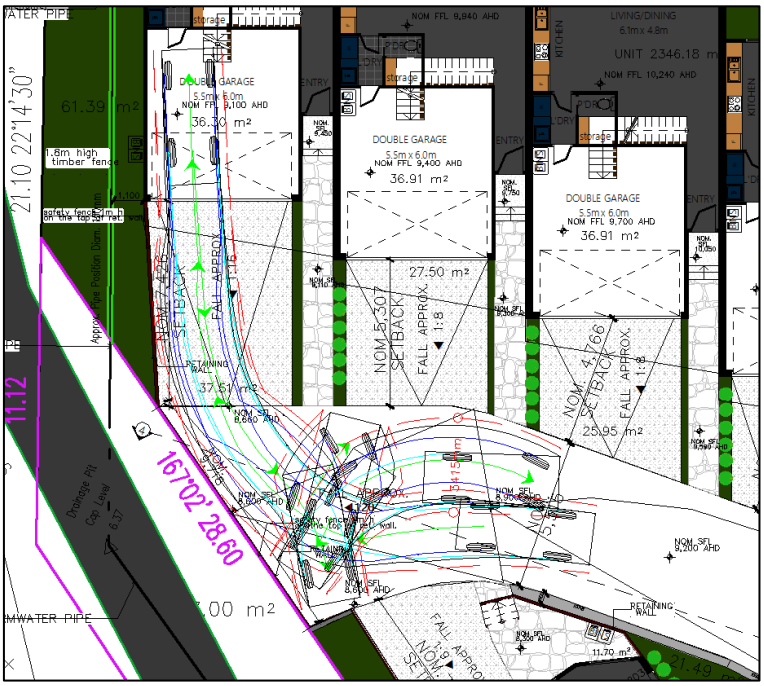


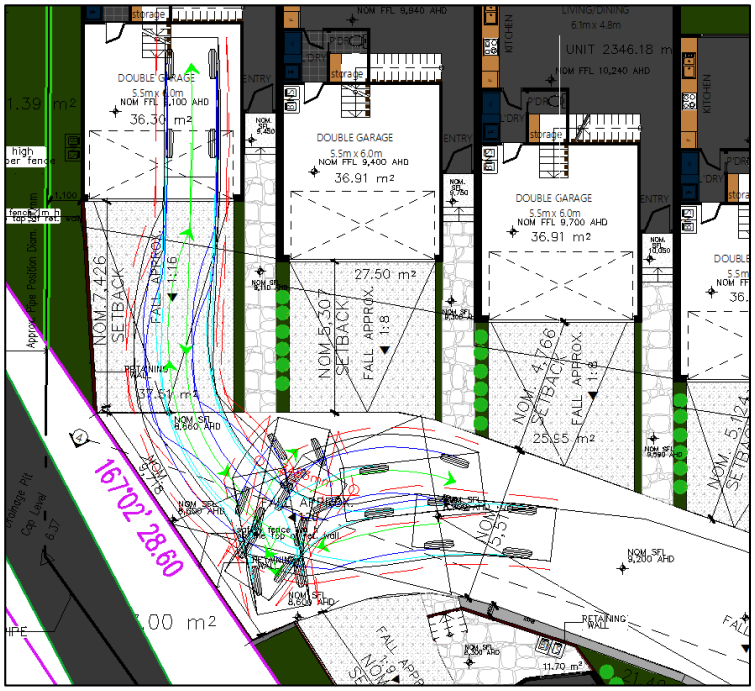
Dwelling 20



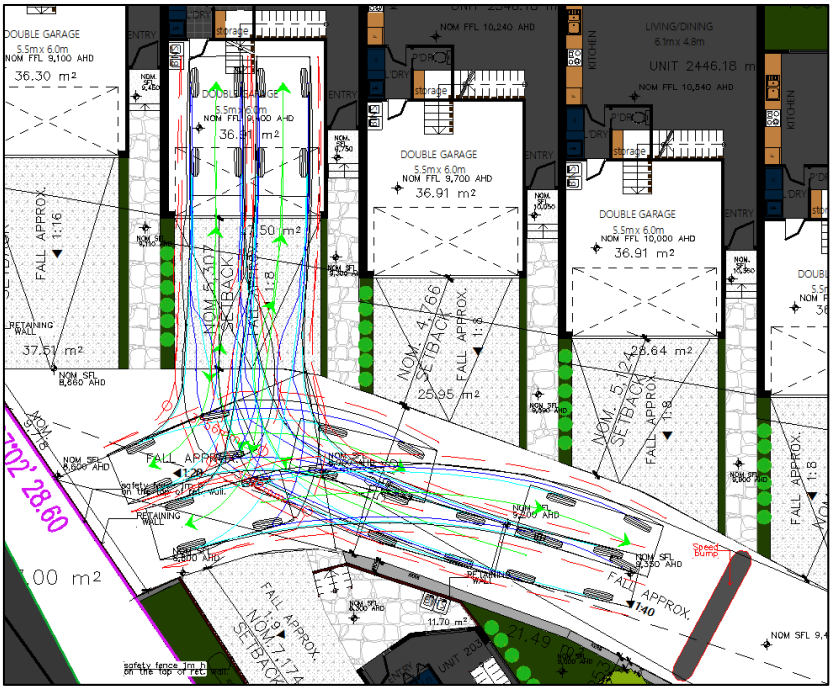
Dwelling 21 (car space 1)



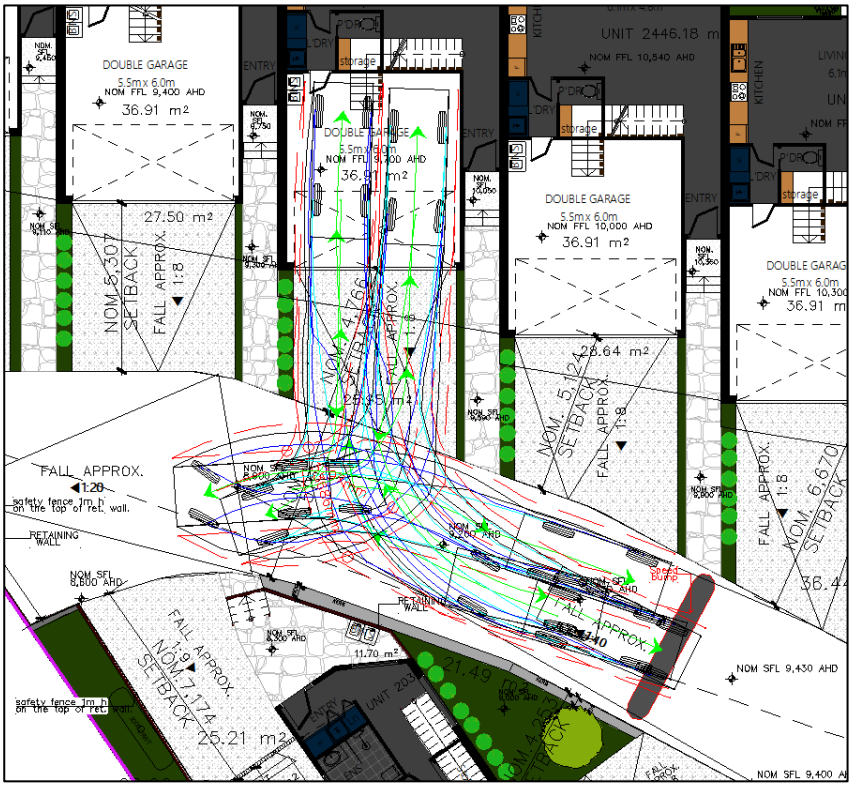
Dwelling 21 (car space 2)



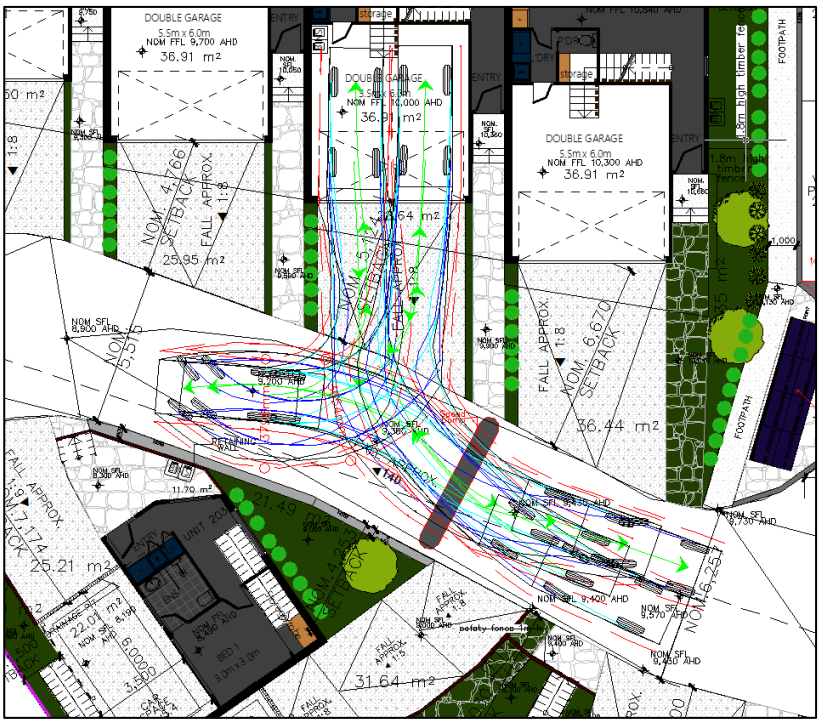
Dwelling 22



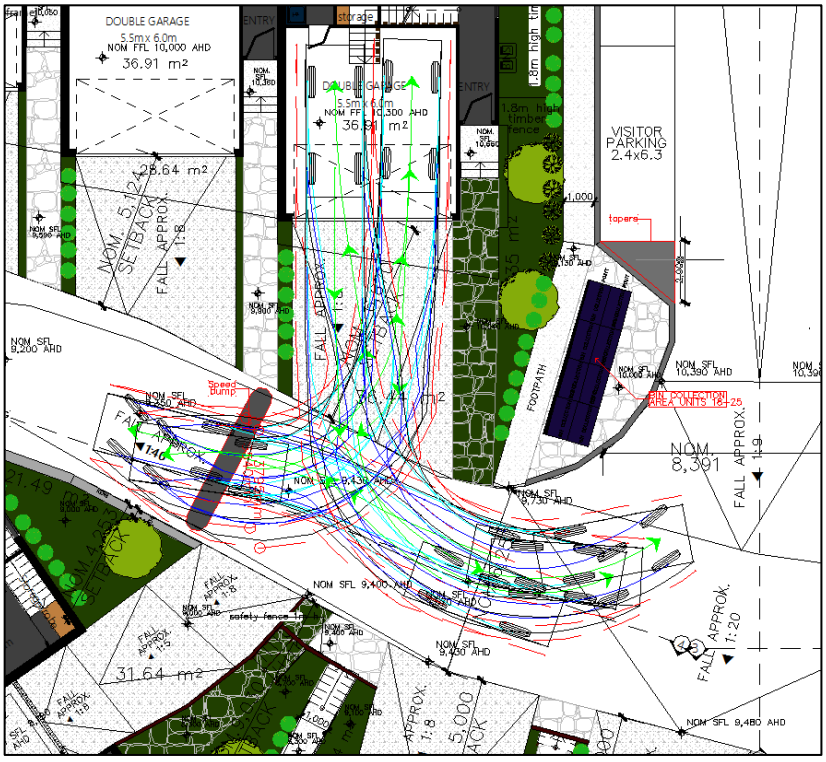
Dwelling 23



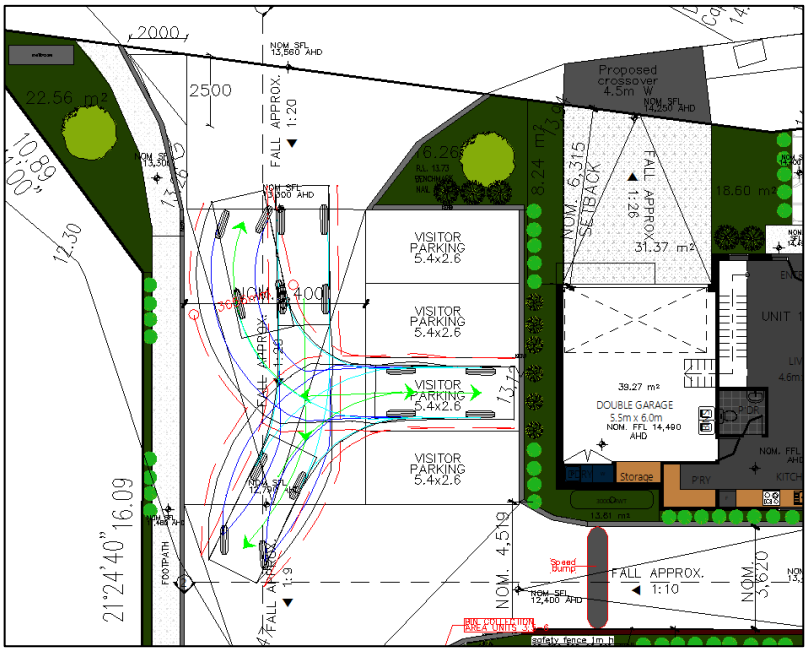
Dwelling 24



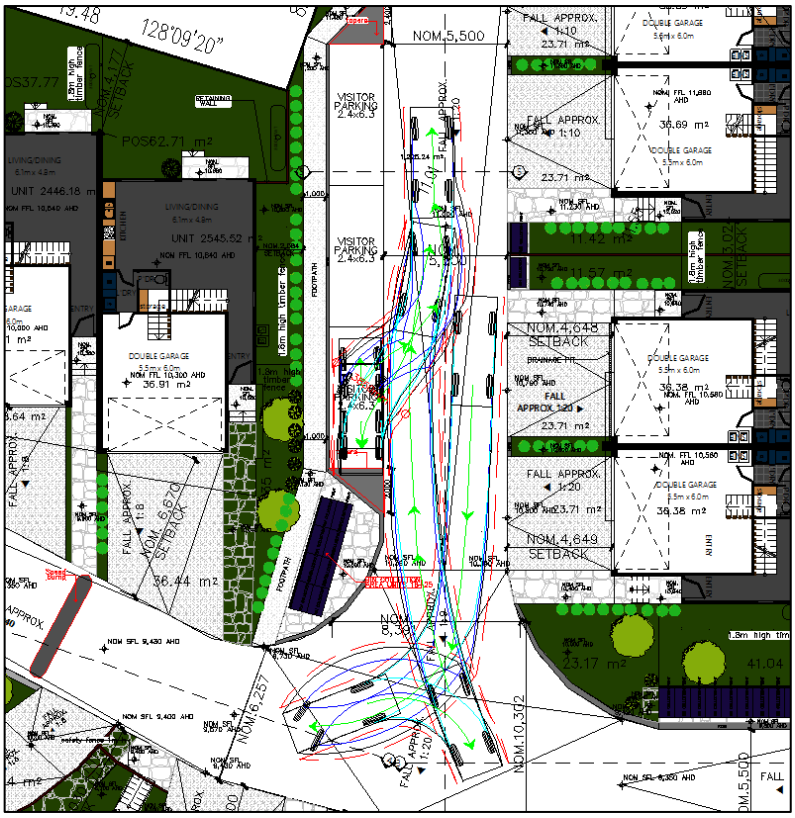
Dwelling 25



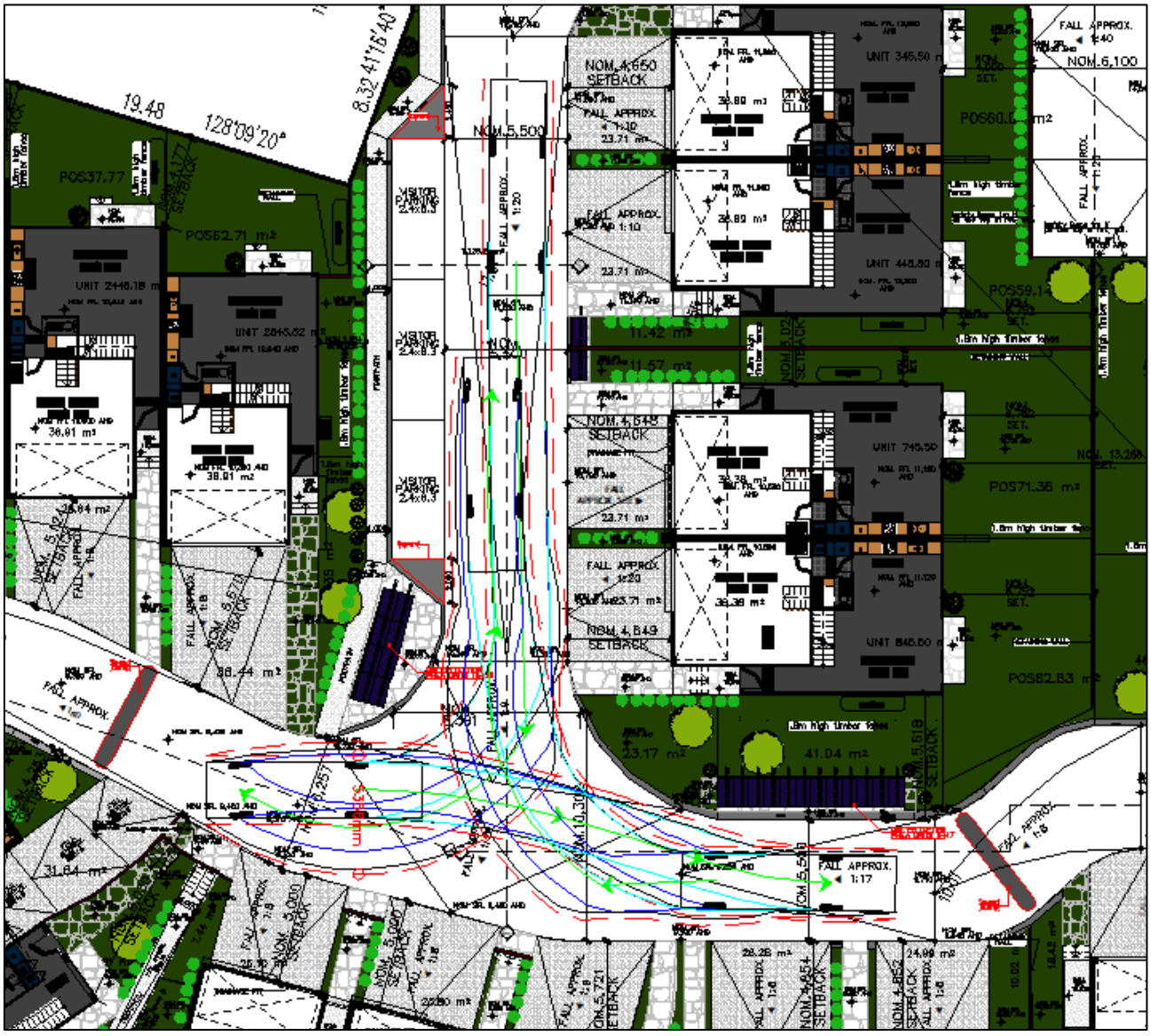
Visitor Parking (typical 90 degree space)



Visitor Parking (typical parallel space)



Council Waste Collection Vehicle



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