

PROPOSED RESIDENTIAL DEVELOPMENT

Stage 3 & 4

2182 East Coast Road
SILVERDALE

TRAFFIC IMPACT ASSESSMENT

Prepared By:

Udit Bhatti and Todd Langwell

December 2021

Reference: 21648

Issue A – Draft

Auckland Office:
P O Box 60-255, Titirangi, Auckland 0642
Level 1, 400 Titirangi Road, Titirangi Village
Tel: (09) 817 2500
Fax: (09) 817 2504
www.trafficplanning.co.nz

Project Information:

Client	Build Rich Limited
Job Number	21648
Title	Proposed Residential Development – Stage 3 and 4, 2182 East Coast Road, Silverdale - Traffic Impact Assessment
Prepared By	Udit Bhatti and Todd Langwell
Date	December 2021

Document History and Status

Revision	Date Issued	Reviewed By	Approved by	Date approved	Status
A	21/12/2021	22/12/2021	T Langwell	22/12/2021	Draft

This document and information contained herein is the intellectual property of Traffic Planning Consultants Ltd and is solely for the use of Traffic Planning Consultants Ltd contracted client. This document may not be used, copied or reproduced in whole or part for any purpose other than that for which it is supplied, without the written consent of Traffic Planning Consultants Ltd. Traffic Planning Consultants Ltd accepts no responsibility to any third party who may use or rely upon this document.

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	EXISTING TRANSPORT ENVIRONMENT	2
2.1	Auckland Unitary Plan	2
2.2	The Surrounding Traffic Environment	4
2.3	Traffic Safety	5
2.4	Public Transport Accessibility	5
2.5	Pedestrian Facilities	6
2.6	Cyclist Facilities	6
3.0	THE PROPOSAL	7
3.1	General Description of Site Layout	7
3.2	Trip Generation.....	8
3.3	Road Design	8
3.4	Intersection Design	10
3.5	Lot Access Summary – Single Lots	11
3.6	Sight Distance at Vehicle Access Points.....	12
3.7	Vehicle Access Design	12
3.8	Car Parking Design	13
3.9	Bicycle Parking	13
3.10	Pedestrian and Cyclist Facilities	14
3.11	Refuse Collection & Deliveries	14
4.0	TRANSPORTATION EFFECTS OF THE PROPOSAL	15
4.1	Trip Generation Assessment	15
4.2	Safety Impacts	16
4.3	Construction Related Traffic Impacts	16
5.0	AUCKLAND UNITARY PLAN STANDARDS	17
6.0	AUCKLAND UNITARY PLAN - ASSESSMENT CRITERIA.....	21
7.0	CONCLUSIONS.....	27

1.0 INTRODUCTION

This report examines and describes the traffic and parking effects of the proposed residential development at 'Stage 3 and 4' area at 2182 East Coast Road, Silverdale. The overall development is located to the west of East Coast Road and to the south of Hibiscus Coast Highway, as illustrated in **Figure 1**. The overall site includes an approximate land area of 26 hectares.

The site is subject to the provisions of the Auckland Unitary Plan – Operative in Parts (AUP) and is zoned partially Residential – Mixed Housing Urban Zone. It is also subject to the development rules under the '1537 Silverdale 3 Precinct' plan.

The proposal is described in more details in the resource consent application and involves creation of 276 residential dwellings across both single and super lots and 25 vacant lots for future development, plus four new local roads to vest to Council.

Various subdivision and land use consents of Stage 1, Stage 2 and Stage 5 of the development has been approved under a previous application. Stage 3 and 4 and its new roads have been designed consistent with the design principles as Stages 1 and 2 of the development.



Figure 1: Site Location

Source: Aerial 2017, Geomaps, Auckland Council

2.0 EXISTING TRANSPORT ENVIRONMENT

2.1 Auckland Unitary Plan

Currently, the overall site is zoned partially Residential – Mixed Housing Urban (shown in Beige) and Business – General Business (shown in purple strips), as illustrated in **Figure 2**. Stages 3 and 4 development is located completely within Residential – Mixed Housing Urban zone.

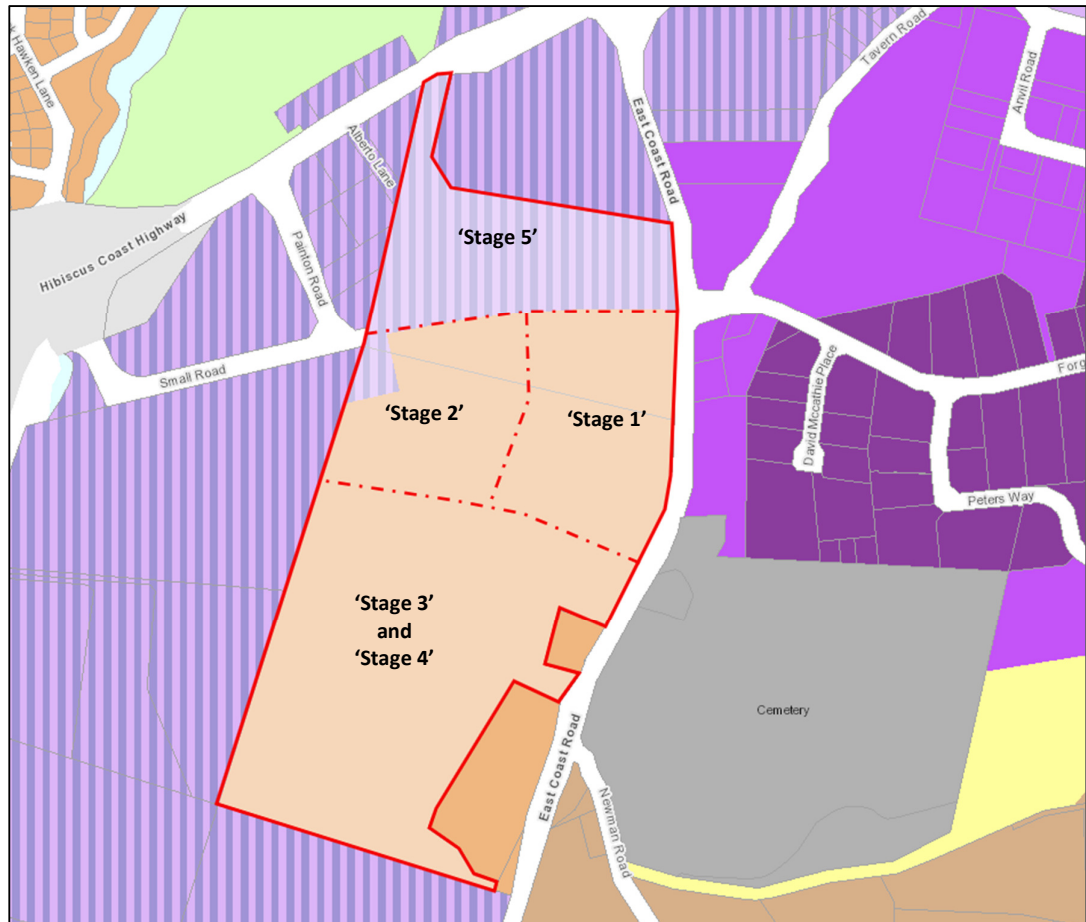


Figure 2: Auckland Unitary Plan Zone Map

Source: Auckland Unitary Plan Zone Map, Geomaps, Auckland Council

The AUP also includes a section to set specific development standard for some precincts. The development site is also located in the area under '1537 Silverdale 3 Precinct', as illustrated in **Figure 3**. Stages 3 and 4 are located within sub-precinct B area.

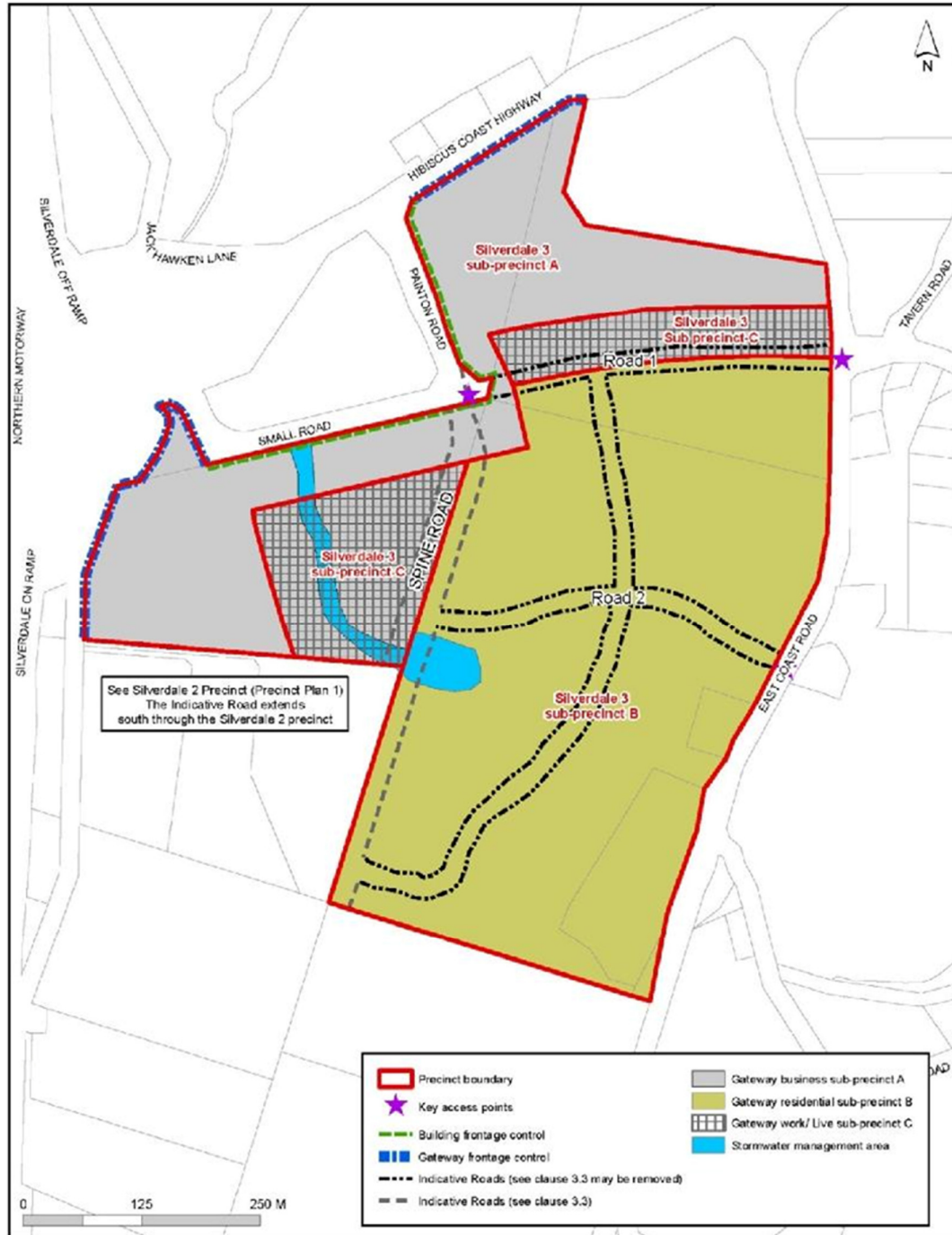


Figure 3: Silverdale Precinct 3 Area
Source: Auckland Unitary Plan

2.2 The Surrounding Traffic Environment

The site is located approximately 1.0 kilometre west the local Silverdale Centre. Silverdale industrial centre is located to the east of East Coast Road, and the residential area to the north of Hibiscus Coast Highway is current being developed. The main connection for the site to the wider network will be from East Coast Road, Hibiscus Coast Highway, and Northern Motorway.

East Coast Road

The existing activity along East Coast Road is primarily rural in nature with residential activity along a brief section of its length. It runs from Milford town centre at its southern end, ending at the Hibiscus Coast Highway in the north. East Coast Road is classified as an arterial road in the AUP and has the primary function of providing vehicle movements between areas.

Along the site frontage, East Coast Road has a kerb to kerb carriageway width of some 15.0 metres which provides two traffic lanes in each direction separated by a central island. Roads that intersect with East Coast Road are currently controlled via a stop control on the Tavern Road approach. This intersection is proposed to be upgraded to a signalised intersection with a new road connection in the site (Road 1) as part of the intersection.

There is no recent traffic count data available on East Coast Road near the site. Considering the arterial nature of the road and its location to the general network, the traffic on this section of East Coast Road is expected to be in the order of 10,000 vehicle movements per day (vpd), and 1,000 vehicle movements per hour (vph) during peak commute hours.

Hibiscus Coast Highway

Hibiscus Coast Highway connects Silverdale and Puhoi through the Orewa town centre. It is classified as an arterial road which has the function of connecting areas of the city. Existing activities along its length are primarily residential in nature with commercial in Silverdale and Orewa. Intersection controls near the site include traffic signals with East Coast Road and Painton Road and Give Way controls with Tavern Road and Wainui Road. No on-street parking is available on Hibiscus Coast Highway.

Hibiscus Coast Highway has a kerb to kerb carriageway width of some 17.2 metres near the site, which provides two traffic lanes in each direction separated by a central island. Approaching the intersection with East Coast Road, four lanes are provided in each direction with two through movement, one right turn lane and one left turn slip lane.

The most recent two-way traffic counts on Hibiscus Coast Highway (between East Coast Road and Whangaparaoa Road) were carried out by Auckland Transport in March 2019. Details of the traffic count are summarised in **Table 1**.

Table 1: Traffic Counts on Hibiscus Coast Highway

Direction	Weekday	Saturday	Sunday	Weekday		
				AM Peak	Midday Peak	PM Peak
Both	44,641	38,790	34,897	3,317	3,446	3,689

2.3 Traffic Safety

Information from the New Zealand Transport Agency's 'Crash Analysis System' for the five-year period, January 2016 to December 2020, along the whole length of Silverwater Drive and along East Coast Road within 200 metres from the Silverwater Drive/ East Coast Road intersection indicates that a total of three crashes were reported which are summarised as:

- One minor injury crash occurred midblock East Coast Road when a vehicle in order to make a U-turn failed to notice the vehicle coming from behind which collided with it;
- One non-injury crash midblock East Coast Road when a vehicle collided with the wing mirror of another vehicle which was trying to overtake using the median, and
- Another non-injury crash was reported midblock East Coast Road when a driver due to unknown distraction failed to stop in time and collided with the vehicle in front of it.

Overall, the reported crash history does not suggest a traffic safety problem for the vehicle access in the vicinity of the site.

2.4 Public Transport Accessibility

The Silverdale area and the development are well served by public transport are considered acceptable including Hibiscus Coast Station located in the north and adjacent to the development. Bus route NX1 runs from city centre to Hibiscus Coast Station via Northern Busway at least every 30 minutes. Other routes connect different parts of area in the vicinity including Orewa, Gulf Harbour. **Figure 5** shows the adjacent public transport network.



Figure 5: Local Public Transport Routes

Source: Central Guide, February 2019, Auckland Transport

2.5 Pedestrian Facilities

Footpaths are currently available on Hibiscus Coast Highway and the around the Hibiscus Coast Station. No pedestrian facilities are available on East Coast Road. Pedestrian links and facilities proposed on the new roads through the site are currently under construction.

Although the level of pedestrian facilities is typical of the residential neighbourhood, improvements to pedestrian facilities as part of any development should be addressed to promote alternative modes of travel. Safe and legible pedestrian connections in particular are going to be important in the success of the neighbourhood planning and should be a primary objective during any overall design for the site.

2.6 Cyclist Facilities

The Auckland Transport Central Cycle Map shown in **Figure 6** for the area indicates that there is a shared path on Hibiscus Coast Highway and wider connection to Orewa and Millwater development.

As part of the development of Stages 1, 2 and 5, shared cycle paths are also provided along both sides of Goldwater Drive and the Spine Road connecting the development to the wider cycling network.

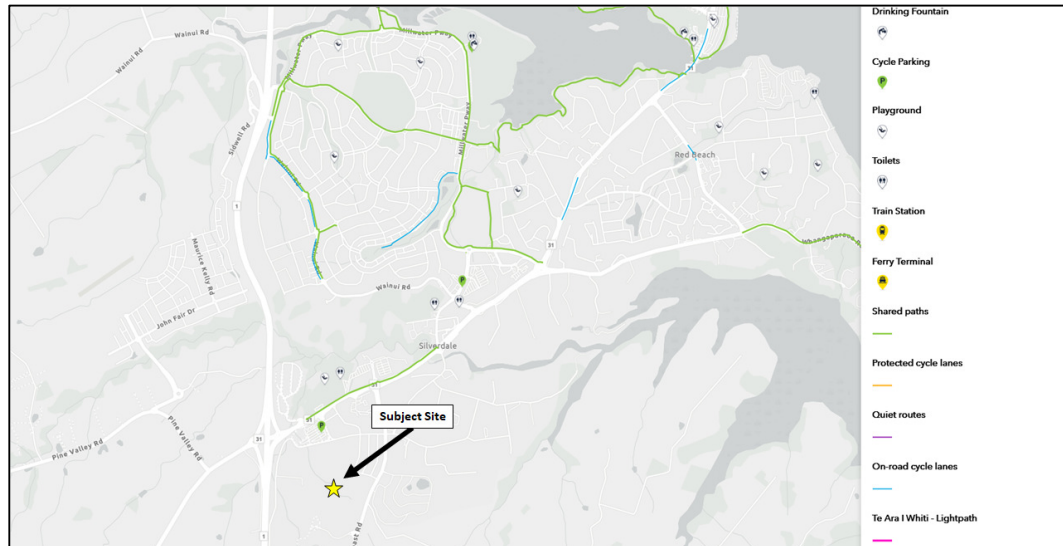


Figure 6: Site Vicinity Cycling Provisions

Source: Cycle Map (Central), Auckland Transport

3.0 THE PROPOSAL

3.1 General Description of Site Layout

The proposal is discussed in more detail within the application. It involves construction of 276 residential dwellings and 25 vacant lots.

To provide access to each lot four new roads will be constructed as well as two Jointly Owned Access Lots (JOAL's) and two Right of Ways (ROW). Road 1 will provide a connection between Silverwater Drive and Spine Road while Road 2, Road 3 and Road 4 will have intersections with Silverwater Drive.

A series of pedestrian link will also be provided between new roads, which will be aligned to the pedestrian links in Stage 3 and 4 area. The proposed roading network for Stage 3 and 4 is illustrated in **Figure 7**.

Each lot with a dwelling will have either a single or a double garage. Vehicle access to each lot will be via conventional vehicle crossings. Exclusive pedestrian access points will be provided for each dwelling.

Further discussion of the appropriateness and formation of the access points and parking is included later in this report.



Figure 7: Proposed Stage 3 and 4 Roading Network

Source: ASC Architects

3.2 Trip Generation

Under section E27 of the Auckland Unitary Plan Standards, any residential developments with more than 100 dwellings are subject to a trip generation assessment.

It is important to understand the potential trip generation to understand its effect and ensure an appropriate access strategy is provided.

To be consistent with the previous assessment on trip generation for Stages 1 and 2, this report adapts the trip generation rates from those applications. Information from “*Guide to Traffic Generating Developments*” produced by the New South Wales Roads and Maritimes Services (RMS Guide) was used to identify the predicted. The RMS Guide indicates daily traffic generation rates of 9 vehicle movements per unit per day and a peak hour rate of 0.85 vehicle movements per unit per hour.

Based on the trip rates discussed above, the potential trip generation within Stages 3 and 4 will be in the order of about 2,710 vehicle movements per day and 256 vehicle movements per hours during peak commute hours.

This is expected to be at the high end of the likely trip generation for this stage of development and Stages 1 and 2. With the proximity of the park & ride bus station, accessibility to cycle paths and several mixed-use activities developing within the precinct will help promote reduced car use.

A trip generation assessment is discussed later in the report.

3.3 Road Design

Four new roads are proposed to be vested to Council as part of Stages 3 and 4. A continued extension of the Spine Road is also proposed along the western boundary of the site consistent with the Silverdale 3 Precinct provisions. Each road has a generally straight alignments and gradients no greater than 12.5% and designed to be consistent with the previously approved road designs in Stages 1 and 2.

Road 1

Road 1 is a local road which will provide a connection between Silverwater Drive and Spine Road. It will have an overall length of 449 metres.

Road 2

Road 2 is a local road having a length of 297 metres. It runs in a general north-south direction forming intersection with Silverwater Drive at its northern end and with Road 1 at its southern end.

Road 3 and Road 4

Road 3 and Road 4 are local roads running in the north-south direction having lengths of 392 metres and 154 metres respectively. They will form T-Junctions with Silverwater Drive at their northern end and will provide connection to further developments in future towards the south. In the interim,

Figure 8 shows the cross-sectional configuration of all the roads. All local roads will have a road reserve of 15.0 metres and carriageway width of 5.74 metres to accommodate two-way traffic movement. Footpath 1.8 metres wide are proposed on both sides of the road with the balance of the berm set aside for utilities, grass, and street trees and parking.

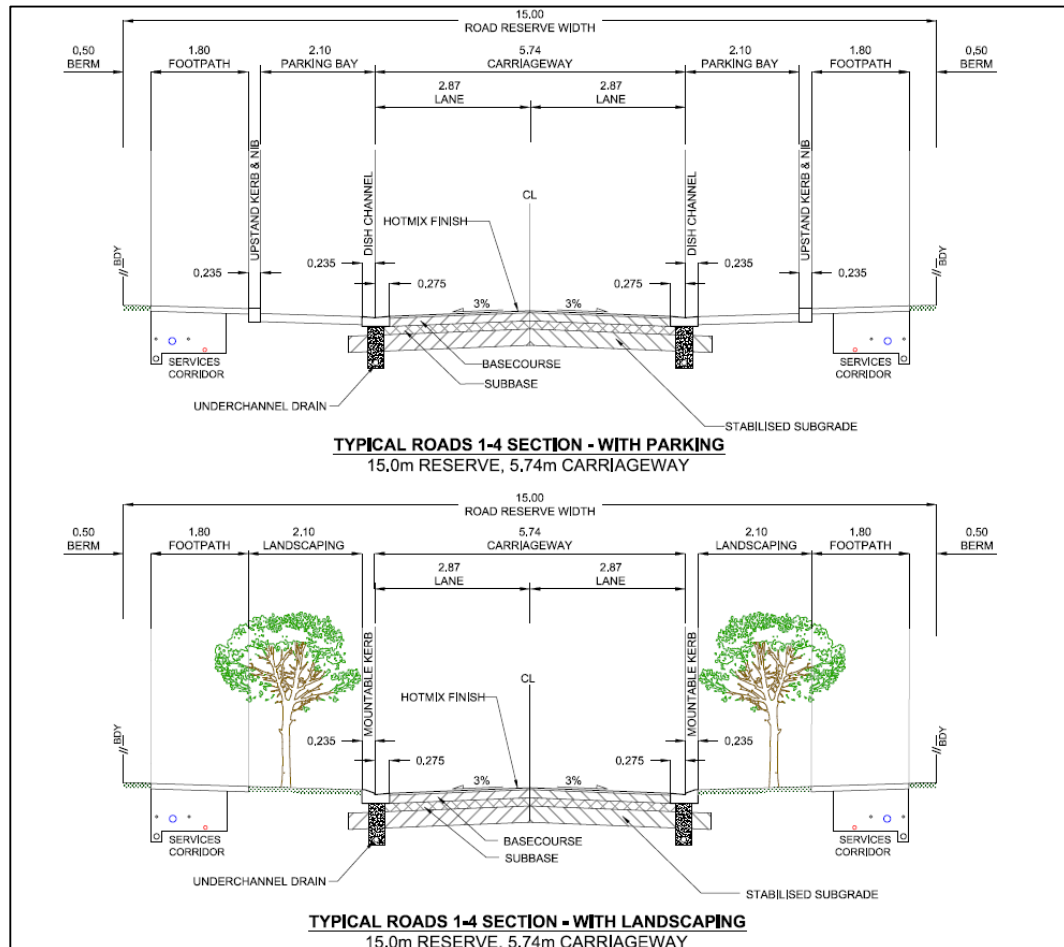


Figure 8: Proposed Road Cross Section – Road 1 to Road 4

Source: Aspire

Spine Road Extension

The Spine Road will be extended along the western boundary of the site past where it forms an intersection with Road 1 to provide access to Lots 153 to 156. In the precinct provisions, the Spine Road is designed to intersect with Small Road and Painton Road. The Spine Road will form T-Junctions with Road 1 and Road 2 within the development area.

Spine Road will have a road reserve of 20.0 metres illustrated in **Figure 10**. Part of Spine Road designation is located outside of the development area, which will be completed by other parties once the adjacent site is developed.

As the Spine Road has yet to have any future connections, sub roads and temporary turning arrangement will be formed at each end to permit vehicles to turn until such time as the roads are complete.

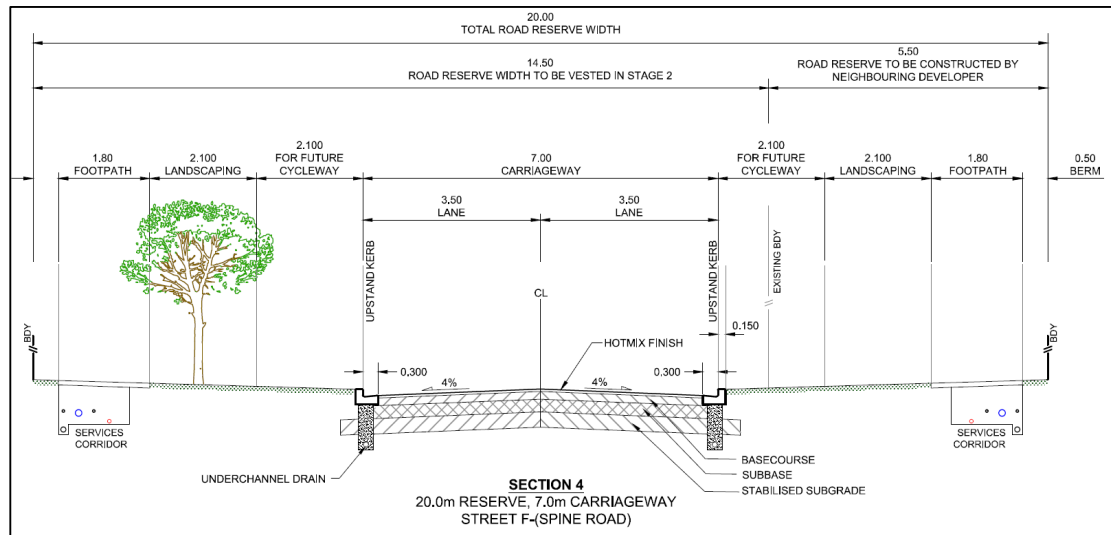


Figure 10: Proposed Road Cross Section – Spine Road

Source: Aspire

3.4 Intersection Design

The operational safety at an intersection is influenced by the available sight distance, the speed of approaching traffic, and the ability of a vehicle to avoid a collision, either by stopping in time or by being able to take other evasive action.

Appropriate sight distance standards at an intersection are indicated in the AUSTROADS publication “Guide to Road Design” Part 4A “Unsignalised and Signalised Intersections”. There are three key sight distance parameters indicated in the guide:

1. Approach Sight Distance (ASD) which is a minimum requirement to provide the driver of a vehicle adequate distance to observe the roadway layout in sufficient time to react and stop if necessary, before entering a conflict area. It is measured from driver eye height (1.15m) to the road surface (0m).
2. Safe Intersection Sight Distance (SISD) provides a sufficient distance for a driver of a vehicle on the major road to observe a vehicle from a minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point. It is measured from driver eye height (1.1m) to the top of an approaching car (1.25m).
3. Minimum Gap Sight Distance (MGSD) provides a sufficient distance for a driver of a vehicle entering onto a major road to see a vehicle in the conflicting traffic stream in order to safely commence the desired manoeuvre. It is measured from driver eye height (1.1m) to the object height of approaching vehicle (0.65m).

Local Road vs Local Road

Five new intersections are created between new road and local roads. Their design has been completed to attempt to align with the Auckland Transport Code of Practice (ATCOP) and AUSTRROADS guidelines and to accommodate tracking of a design vehicle of a large rigid truck. In all instances the design is considered to be acceptable. The following points are noted in this regard:

- Approach sight distances and safe intersection sight distances are achieved;
- The radii and carriageway widths have been minimised to control turning speeds while still accommodating the appropriate design vehicles; and
- The volume of traffic turning through these intersections is considered very low such that the likelihood of an incident occurring is also low.

Although the speeds of vehicles using each road have been estimated based on a future posted speed of 50 km/hr, the operating speed will be ranged from 30 – 40 km/hr depending on the approach and intersection configurations.

Based on reaction time of 2 seconds, the AUSTRROADS guide recommended SISD, ASD and MGSD will be 73, 40, and 44 metres respectively for the speed of 40 km/hr. Given the straight alignment of each frontage road, the available sight distance at each intersection can easily meet the recommended distances for the proposed operating speed.

3.5 Lot Access Summary – Single Lots

Each lot will have an individual vehicle crossings and access to serve the site.

- 80 lots will be directly accessed from Road 1;
- 62 lots will be directly accessed from Road 2;
- 63 lots will be directly accessed from Road 3;
- 17 lots will be directly accessed from Road 4;
- 16 lots will be directly accessed from the JOAL; and
- 34 lots will have direct access via Spine Road.

All these access points will be formed as standard vehicle crossings where they connect with the roads to control entry speeds and maintain the priority for pedestrian movements past the site. The width of vehicle crossings will be minimised to ensure no excessive crossing distance on the street. Sufficient separation will also be provided to ensure pedestrian safety.

3.6 Sight Distance at Vehicle Access Points

In considering vehicle access to a site, it is important that adequate design and sight distance are provided to ensure safe traffic and pedestrian movement.

In respect of sight distance, the appropriate standard to use is the Land Transport Safety Authority publication 'Guidelines for Visibility at Driveways' (RTS 6). There are two components to the sight distance measurement the first being the sight distance requirement and the second being the lines of clear sight. The sight distance/lines of clear sight required is dependent upon the traffic generation of the proposal, the 85th percentile speed of vehicles on the frontage road and the classification of the frontage road.

In this instance, all roads are considered local roads and the predicted number of vehicle movements at each of the vehicle crossings are less than the rating threshold of 200 vehicle trips per day, such that the accesses are defined as 'low volume' according to RTS 6. The 85th percentile speeds are expected to be no more than 40 km/hr near the access points with some variations due to the proximity to intersections. Based on the above information, RTS 6 recommends a minimum sight distance of 30 metres at each proposed access point.

Given the generally straight alignment and flat topography of each frontage road, the available sight distance at most vehicle crossings meets the recommended minimum. Where the accessway is located close to a T-Junction, the available sight distance may be reduced. Given the speed at intersection is very low, this is considered acceptable.

3.7 Vehicle Access Design

Vehicle access to dwellings will be typically 2.8 metres wide. Vehicle crossings for Lots 204 and 205 will be provided with a width of 5.2 metres serving two parking spaces. Under the AUP, vehicle crossing serving two parking spaces should be provided with a width of 2.75 – 3.0 metres. Therefore, the proposal does not comply with this standard for these two lots and this non – compliance is assessed later within this report.

The vehicle crossing for the Block 3B JOAL will be provided with a width of 4.6 metres serving three parking spaces where a maximum of 3.5 metres is permitted. This non-compliance is assessed later within this report.

22 Lots in Block 1A, 20 Lots in Block 2A, 20 Lots in Block 1B, 22 Lots in Block 2B, 12 Lots in Block 3A, 14 Lots in Block 3B, 4 Lots in Block 4, 18 Lots in Block 5A, 10 Lots in Block 5B, 30 Lots in Block 6 and 45 Lots in Block 7 will be having non-complying separation with the adjacent vehicle crossing. A minimum separation of 2.0 metres should be provided between adjacent lot's vehicle crossing where some 1.7 metres of separation is provided. Further assessment is provided later within this report.

Most vehicle crossings will be located away from adjacent intersection. The vehicle crossings for Lots 159, 160 and 161 will be located within 10 metres from the adjacent intersection, and therefore vehicle access restrictions applied to them.

Vehicles utilising these driveways will be required to reverse onto the adjacent roads while leaving the residential lots. The vehicles reversing onto the minor roads will be doing so under low levels of vehicle activity and with suitable sight lines such that this manoeuvre can be completed safely.

All vehicle circulating area will be formed with all-weather surface. The gradient of the vehicle circulating areas will have gradients no steeper than 1 in 8 (12.5%). Where the proposed accessway adjoin the road boundary, the accessways will have typical gradients of 1 in 20 (5.0%), or 1 in 12 (8.3%). The proposed gradients are considered suitable for the residential use. Resource consent will be required for those access points with a grade steeper than 1 in 20 (5.0%).

With low-profile fence and landscaping provided in the front yard, a pedestrian visibility splay of more than 2 metres in width and 2.5 metres in depth can be achieved in both directions from the driveway exits, in accordance with minimum Sight Lines for Pedestrian Safety set out in 'Australia / New Zealand Standard for Parking facilities Part 1: Off-street car parking'. The proposed site accesses thus have good inter-visibility between vehicles and pedestrians.

Overall, the proposed vehicle access arrangement is considered to be acceptable for the intended use and within the current traffic environment. Detailed assessment on the design against AUP standards will be discussed later in the report.

3.8 Car Parking Design

Each dwelling will be provided with either a single or a double garage. The effective parking dimension for them will be at least 2.5 metres wide and 5.0 metres deep, with a minimum manoeuvring space of 6.7 metres including part of the adjacent road carriageway. These parking spaces will be formed on a flat gradient. Gradient within manoeuvring area will have a maximum grade of 1 in 8 (12.5%).

Additional parking opportunities are also available within each lot. The accessway in front of each garage will be sufficient to park a car, when there is a need. However, these spaces will have a minimum gradient of 1 in 12 (8.3%) where a maximum gradient of 1 in 25 (5.0%) is permitted. This non-compliance is assessed later within this report.

Overall, the proposed parking arrangement is considered to be acceptable for the intended use and within the current traffic environment. Detailed assessment on the parking design against AUP standards will be discussed later in the report.

3.9 Bicycle Parking

For development of 20 or more dwellings, 1 visitor bicycle parking space per 20 dwellings and 1 secure bicycle parking space per dwelling without a dedicated garage is required. Based on the above rate, 14 visitor parking spaces are required for the overall site.

There is enough space within each residential lot to accommodate visitor cycle parking. Therefore, the provision of bicycle parking spaces meets the AUP standard.

3.10 Pedestrian and Cyclist Facilities

The footpaths and pedestrian facilities on the new vested road will be retained as they are currently designed. A series of pedestrian links will also be provided in the east-west direction. These pedestrian links will ultimately connect between East Coast Road in the east and the Spine Road in the west.

3.11 Refuse Collection & Deliveries

The proposal is expected to be serviced predominantly by trucks collecting refuse on a regular basis and to a lesser extent by trucks shifting furniture to and from the residential dwellings. No dedicated loading area will be provided for the development. However, space is available on the frontage roads for trucks to park temporarily when carrying out deliveries. Refuse collection will need to take place on street where bins will be wheeled out to a waiting truck from the lots to be emptied into the truck.

Overall, it is considered that the design is adequate to meet the needs of the truck activity associated with the new residential development.

4.0 TRANSPORTATION EFFECTS OF THE PROPOSAL

4.1 Trip Generation Assessment

The 'I537 Silverdale 3 Precinct' section of the AUP includes development controls requiring the provision of specific road infrastructure and upgrades based on the percentage of land development and the number of vehicle movements generated by the Precinct in the PM Peak hour onto Hibiscus Coast Highway in dependence on the level of completion of the surrounding road and transport infrastructure. These thresholds are summarised as follow:

Table 2: Trip Generation and Development Thresholds (I537)

Development Area	PM Peak hour Trips Generated	Key Infrastructure Requirements
Up to 15%	136	No specific infrastructure required.
Up to 25%	227	A road connection between East Coast Road and an internal 'Spine Road' (a proposed road extending south from the Painton Road roundabout along the boundary of the site) must be completed (Road 1) Construction of the Hibiscus Coast Busway Station has commenced.
Up to 50%	461	A second road connection between East Coast Road and the 'Spine Road' has been completed (Road 2). A third eastbound exclusive through lane on Hibiscus Coast Highway has been provided.
Over 50%	>461	That physical construction works of Penlink between Weiti River and Whangaparaoa Road has commenced.

The effects of the previous stages of development have been assessed against the 'up to 50% threshold, as the corresponding infrastructure will have been in place by the time dwellings and activities are occupied and the trip generation threshold is met. The following key infrastructure requirements will be completed as part of previous consents within the precinct:

- Road 1 will be provided as part of the Stage 1 development and connected to East Coast Road;
- Hibiscus Coast busway station is already operational;
- As part of Stage 2, a secondary road (Silverwater Drive) will be constructed between East Coast Road and the Spine Road; and
- A third eastbound exclusive through lane on Hibiscus Coast Highway will be constructed as part of the Stage 2 development.

Development below the thresholds are deemed permitted and do not require additional assessments. It is on this basis that Stages 1, 2 and 5 of the overall development has been delivered.

It is anticipated that Stages 1, 2, 3, 4 and Stage 5 will be completed and occupied within the next three years. It is not clear at what stage other elements of the Precinct are in terms of development, however if the previously consented schemes are delivered in the next 5 years, then the total trip generation associated with these phases is more than 461 vehicle trips.

Therefore, for houses within Stages 3 and 4 to be occupied, the physical construction works of Penlink between Weiti River and Whangaparaoa Road will have to be commenced. We understand that the applicant has agreed that a suitable condition of consent can be proposed to this effect.

4.2 Safety Impacts

The spacing of access points into the site are such to enable good separation and ensure each can be formed to optimise sight lines and tracking paths.

The establishment of this proposal should have no detrimental impact on general road safety. The reported crash history on roads bounding the development area does not indicate that vehicles using these roads and the increase in vehicle movements to and from the site, will have an adverse effect in terms of road safety. The new intersections created as part of the overall development have been designed to meet TDM standards with suitable sight lines and controls.

Separate pedestrian links are provided into each dwelling and through the site. From the road frontage, clear lines of sight are provided at the access for vehicles entering and leaving the site, which will ensure that pedestrian safety will not be compromised for those walking past the site.

4.3 Construction Related Traffic Impacts

The need to introduce truck and other vehicle movements during the construction phases of any development always has a potential to impact on the surrounding area and road network, but a certain degree of impact for what is normally a relatively short period of time (at least in the context of the life of the proposed development) is inevitable, and should not normally be a reason for restricting development.

What is important however, is that measures must be put in place to minimise the potential impacts of construction traffic, and this is generally achieved through the requirement for a traffic management plan to be prepared and approved prior to work commencing. Where necessary this seeks to control the times of operation (e.g. avoiding peak periods), routes used, and other matters to minimise potential impact.

In terms of capacity the adjacent road network can accommodate the traffic volumes associated with the construction phases, and the application of a traffic management plan will ensure that any potential impact on the surrounding area is minimised.

5.0 AUCKLAND UNITARY PLAN STANDARDS

Section E27 of the Auckland Unitary Plan sets out the development standards relating to transport. **Table 3** lists the relevant standards that apply to the proposed 276 single lot residential dwellings and comments on compliance. Where there is non-compliance, further assessment has been undertaken against the criteria set out in Section E27.8.2 of the AUP.

Table 3: Transport Development Controls

Standard	Requirement/Details	Comment
E27.6.2 (1) Number of Parking Spaces	Defines the minimum and maximum number of parking spaces for new developments. In the Residential – Mixed Housing Urban Zone, there is a minimum requirement to provide one parking space for dwelling with two and more bedrooms.	All proposed residential lot will be located within Residential – Mixed Housing Urban zone. Each lot will be provided with at least a single parking space – complies
E27.6.2 (6) Cycle Parking	Defines the number of bicycle parks required for new residential and commercial developments. For development of 20 or more dwellings, 1 visitor bicycle parking space per 20 dwellings and 1 secure bicycle parking space per dwelling without a dedicated garage is required.	All lot will be provided with a garage or secure cycle storage for long- and short-term user – complies
E27.6.2 (7) End Trip Facilities	End trip facilities to be provided for any office, education or hospital facilities.	The proposal is for residential buildings – does not apply
E27.6.2 (8) Number of Loading Spaces	Outlines the minimum loading space requirements for new developments. 1 loading space is required for residential activities with GFA between 5,000m ² and 20,000m ² .	Each residential dwelling and lot will have a GFA less than 5,000m ² - complies
E27.6.3.1 (1) Size and Location of Parking Spaces	Defines the size, use and location of parking spaces. Every parking spaces must: • be located on the same site as the activity to which it relates; • not be used for any other purpose; and • be kept clear and available at all times the activity is in operation. 90° parking spaces are required to be at least 5.0m deep.	All spaces are located within the same site, will not be used for any other purposes, and will be available at all times – complies Each lot having direct onto public road will have a parking space with a minimum width of 2.5 metres, a depth of 5.0 metres and will have a manoeuvring space of over 6.7 metres inclusive of portion of carriageway along respective roads – complies

Standard	Requirement/Details	Comment
	The manoeuvring space (for regular users) should be no less than: 7.1m for 2.4 metres wide parking space; 6.7m for 2.5 metres wide parking spaces; 6.3m for 2.3 metres wide parking space; and 5.9m for 2.7 metres or more wide parking space.	Parking spaces provided within the Block 1B JOALs will be 2.9 meters wide, 5.0 metres deep with a manoeuvring depth of 5.9 metres available – complies Six parking space provided within the Block 2B eastern zone will be 2.7 metres wide, 5.0 metres deep with 5.9 metres of manoeuvring depth available – complies Four parking spaces provided within Block 2B western JOAL will be at least 2.4 metres wide, 5.0 metres deep with a manoeuvring depth of 7.1 metres available – complies Three parking spaces provided with the Block 3B JOAL will be 2.8 metres wide, 5.0 metres deep with 5.9 meters of manoeuvring depth available –
E27.6.3.2 Size and Location of Loading Spaces	Defines the size, use and location of loading spaces	No loading spaces are provided – does not apply
E27.6.3.3 Access and Manoeuvring for Parking	Defines the requirements for design vehicles, driveways, manoeuvring area and stacked parking allowances. Every parking space must have driveways and aisles for entry and exit of vehicles to and from the road, and for vehicle manoeuvring within the site. Access and manoeuvring areas must accommodate the 85th percentile car tracking curves. Stacked parking is allowed for dwellings having more than one parking spaces	All parking spaces are designed to accommodate B85 vehicle tracking as demonstrated in Attachment 1 – complies A total of 261 Lots will be provided with stacked parking space – complies
E27.6.3.4 Reverse manoeuvring	Defines the conditions in which reversing manoeuvring is prohibited to and from a site. - Four or more parking spaces are served by a single access - More than 30 metres between the spaces and road boundary - Access on to the road where Vehicle Access Restriction applies	Reverse manoeuvring from Lots 159, 160 and 161 is not permitted where the vehicle accesses are subject to the vehicle access restriction – does not comply Two vehicles from Block 2B eastern JOAL will need to reverse onto Road 3 where the JOAL is serving five parking spaces – does not comply Reverse manoeuvring from other vehicle crossings is permitted – complies

Standard	Requirement/Details	Comment
E27.6.3.5 Vertical Clearance	Defines the minimum overhead clearance for vehicles can pass safely under overhead structures. A minimum of 2.1m vertical clearance should be provided for car circulation, and 3.8m provided where loading is required.	A minimum vertical clearance of 2.1 metres will be provided to the garage's doors and within vehicle circulating areas – complies
E27.6.3.6 Formations and Gradients	Defines the formation and gradients for all parking spaces and manoeuvring areas. All parking and manoeuvring areas must be formed, drained, with all-weather surfaces. All parking spaces must have gradients no steeper than 1 in 20 (5%). Gradients within manoeuvring areas must not exceed 1 in 8 (12.5%).	All parking and manoeuvring areas will be formed, drained, with all-weather surfaces – complies All garaged/ open parking spaces and spaces within Blocks 1B and 2B JOALs will have gradients no steeper than 1 in 20 (5.0%) – complies Secondary stacked parking spaces within some lots will be provided with a gradient of 1 in 12 (8.3%) – does not comply Gradient of the manoeuvring area will not be provided steeper than 1 in 8 (12.5%) – complies
E27.6.3.7 Lighting	Lighting is required where there are 10 or more parking spaces and associated pedestrian routes used in the hours of darkness.	All accessways will be serving no more than three parking spaces – does not apply All the JOALs will be serving no more than five parking spaces – does not comply Suitable lighting will be provided for the JOAL connecting Silverwater Drive and Road 5 – complies
E27.6.4.1 Vehicle Access Restrictions	Defines the acceptable locations of access points in relation to strategic roads and intersections. Vehicle Access Restrictions apply and vehicle crossings must not be constructed or used to provide vehicle access across that part of a site boundary which: - is located within 10m of any intersection as measured from the property boundary; - is subject to the following types of Vehicle Access Restriction as identified on the planning maps; has frontage to an arterial road as identified on the planning maps.	All roads will be classified as a local road – complies Vehicle crossings for Lots 159, 160 and 161 will be located within 10m from adjacent intersections – does not comply

Standard	Requirement/Details	Comment
E27.6.4.2 Width and Number of Vehicle Crossings	Defines the maximum number of vehicle crossings, proximity to others and permitted widths. For vehicle crossings with VAR, a maximum of one crossing per 50m of frontage is permitted, otherwise one crossing per 25m of frontage is permitted. Vehicles crossings must be separated by at least 2m from crossings serving adjacent sites. Vehicle crossings serving 1 to 2 parking spaces must be at least 2.75m wide and no more than 3.0m wide at the site boundary.	Each lot will have only one vehicle crossing – complies A minimum separation of 2.0m will be provided between the proposed vehicle crossings – complies The vehicle crossings for the Block 1B and Block 2B JOALs will be provided with a width of 3.5 metres where serving at least three parking spaces – complies The vehicle crossing for the Block 3B JOAL will be provided with a width of 4.6 metres where serving three parking spaces (maximum width of 3.5 metres permitted) – does not comply Vehicle crossing for Lots 204 and 205 will be provided with a width of 5.2 metres where serving two parking spaces (maximum three metres permitted) – does not comply All other vehicle crossings will be at 2.8m wide at the site boundary – complies 22 Lots in Block 1A, 20 Lots in Block 2A, 20 Lots in Block 1B, 22 Lots in Block 2B, 12 Lots in Block 3A, 14 Lots in Block 3B, 4 Lots in Block 4, 18 Lots in Block 5A, 10 Lots in Block 5B, 30 Lots in Block 6 and 45 Lots in Block 7 will be having non-complying separation with the adjacent vehicle crossing (minimum 2.0 metres required) – does not comply
E27.6.4.3 Width of Vehicle Access and Queuing	Defines the standards for vehicle access widths for on-site parking and pedestrian movements. Vehicle access serving 1 to 2 parking spaces must be at least 2.5m wide clear of buildings.	The vehicle accesses will have a minimum width of 2.8m – complies All JOALs will be provided with a minimum compliant width of 5.9 metres – complies
E27.6.4.4 Gradient of Vehicle Access	Defines the gradients of circulating aisles for vehicle movements. Vehicle access serving residential must have a maximum gradient not exceeding 1 in 5 (20%). All vehicle access must be designed so that where the access adjoins the road there is sufficient space onsite for a platform so that vehicles can stop safely and check for pedestrians	All gradients within vehicle circulating areas will be no steeper than 1 in 8 (12.5%) – complies The vehicle accesses are designed with gradients of either 1 in 20 (5.0%) and 1 in 12 (8.3%) for a distance of over 4.0m where the accesses adjoin the road boundary – does not comply

Standard	Requirement/Details	Comment
	and other vehicles prior to exiting. The platform must have a maximum gradient no steeper than 1 in 20 (5%) and a minimum length of 4m for residential activities and 6m for all other activities.	
E27.6.5 Design and Location of Pedestrian/Cycle Facilities	Defines the requirements for off-road and pedestrian and cycle facilities.	The pedestrian facilities on site are considered to meet the requirements of this standard - complies

6.0 AUCKLAND UNITARY PLAN - ASSESSMENT CRITERIA

Section E27.8.2 of the AUP sets out the assessment criteria when there is an infringement in development standards for a development. For this proposal, consent is required under the following standards:

- E27.6.3.4 – Reverse Manoeuvring (Criteria 8);
- E27.6.3.6 – Formation and Gradient (Criteria 8);
- E27.6.4.1 – Vehicle Access Restrictions (Criteria 11);
- E27.6.4.2 – Width and Separation of Vehicle Crossing, and
- E27.6.4.4 – Gradient of Vehicle Access (Criteria 8).

The following lists the relevant assessment criteria for these infringements and comments as applied to this development.

8. *any activity or development which infringes the standards for design of parking and loading areas or access under Standard E27.6.3:*

- (a) effects on the safe and efficient operation of the adjacent transport network having regard to:*
- (i) the effect of the modification on visibility and safe sight distances;*
 - (ii) existing and future traffic conditions including speed, volume, type, current accident rate and the need for safe manoeuvring;*
 - (iii) existing pedestrian numbers, and estimated future pedestrian numbers having regard to the level of development provided for in this Plan; or*
 - (iv) existing community or public infrastructure located in the adjoining road, such as bus stops, bus lanes, footpaths and cycleways.*

- (b) *effects on pedestrian amenity or the amenity of the streetscape, having regard to:*
- (i) *the effect of additional crossings or crossings which exceed the maximum width; or*
 - (ii) *effects on pedestrian amenity and the continuity of activities and pedestrian movement at street level in the Business – City Centre Zone, Business – Metropolitan Centre Zone, Business – Town Centre Zone and Business – Local Centre Zone.*
- (c) *the practicality and adequacy of parking, loading and access arrangements having regard to:*
- (i) *site limitations, configuration of buildings and activities, user requirements and operational requirements;*
 - (ii) *the ability of the access to accommodate the nature and volume of traffic and vehicle types expected to use the access. This may include considering whether a wider vehicle crossing is required to:*
 - *comply with the tracking curve applicable to the largest vehicle anticipated to use the site regularly;*
 - *accommodate the traffic volumes anticipated to use the crossing, especially where it is desirable to separate left and right turn exit lanes;*
 - *the desirability of separating truck movements accessing a site from customer vehicle movements;*
 - *the extent to which reduced manoeuvring and parking space dimensions can be accommodated because the parking will be used by regular users familiar with the layout, rather than by casual users;*
 - (iii) *any use of mechanical parking installation such as car stackers or turntables does not result in queuing beyond the site boundary; or*
 - (iv) *any stacked parking is allocated and managed in such a way that it does not compromise the operation and use of the parking area.*

Comment (E27.6.3.4) – Reverse Manoeuvring [Criteria 8]

The infringement under this standard relates to vehicles reversing onto Road 1, from the proposed vehicle accesses for Lots 159, 160 and 161 which is subject to vehicle access restriction. The following points are noted in regard of this infringement:

- drivers using the infringed accesses will be regular users and they will be aware of site constraints and comfortable reversing onto respective roads;
- separate pedestrian access is provided for all lots such that the conflict between vehicles and pedestrian at parking areas is minimised.
- no more than two parking spaces are served by each infringed vehicle accesses. With minimised width of vehicle crossings, no more than one vehicle can reverse onto respective roads at any one time.
- as discussed earlier, vehicle movement to the proposed access enjoys a high standard of sight lines and inter-visibility between drivers and all other road users such that the traffic

from the accesses will not have any negative effect on safety and the operation of the adjacent road network.

On this basis, the effect of this non-compliance is considered to be less than minor.

The second reason for consent under this standard relates to vehicles from two parking spaces in Block 2B's eastern JOAL will also need to reverse from the site. As the site is serving more than three parking spaces, resource consent is required for this infringement. The following points are noted in regard of this infringement:

- low height fencing is proposed along the frontage of the super lot, allowing for unobstructed views for vehicles exiting;
- the access has been designed with good sight distance and inter-visibility with each other, and with the footpath and carriageway;
- the access is expected to generate three peak hour trips which is expected to be low and reversing vehicle will be able to do so without obstructing other vehicles;
- the accessway is designed with a near flat gradient which will prevent sudden acceleration/deceleration of the reversing vehicles;
- the likelihood is that only one vehicle would utilise the combined crossing at a given time, as the vehicles entering/exiting the respective Units would give-way to each other, and
- the users of the access will be regular and residents who will be aware of the site layout.

For these reasons, the proposed reverse manoeuvring will have less than a minor effect on the surrounding road environment and is considered acceptable.

Comment (E27.6.3.6) – Formations and Gradients [Criteria 8]

The reason for consent under this standard relates to the secondary parking spaces having gradients steeper than 1 in 20 (5%). These parking space are proposed with a maximum gradient of 1 in 12 (8.3%). The following points are made in support of the proposed parking space gradients:

- providing complying gradients will require earthworks or retaining structures, and will have an adverse effect on the outdoor amenity of the respective lots;
- each Lot is provided with a minimum of two parking spaces, with one space provided within a garage on a near-flat, complying gradient, for use by residents that may find steeper gradients challenging;
- sightlines along the road frontage of these lots are suitable in both directions. The proposed landscaping and fencing will provide for suitable inter-visibility between vehicles and pedestrians along the road frontage and is unlikely to cause a safety;
- all the secondary parking spaces will be at least 2.8 metres wide providing for sufficient space for vehicle's door opening;

- the parking spaces for these lots will be located near the road boundary. Vehicles manoeuvring from these access points will be travelling at low speeds and will be able to stop and give way to pedestrians or other road users, as needed; and
- within the Auckland Transport Code of Practice/NZS 4404:2010, local roads are permitted to have gradients upwards of 1 in 8 (12.5%), where on-street parking is also permitted, indicating that parking on this gradient can operate safely.

Overall, the effect of this non-compliance is considered to be less than minor.

Comment (E27.6.4.2) – Width and Separation of Vehicle Crossings [Criteria 8]

The first reason for consent under this standard relates to the width of the vehicle crossing serving the Lots 204 and Lots 205. Under the AUP, vehicle crossings serving one or two parking spaces should be provided with a width of 2.5 – 3.0 metres and with 5.2 metres of width provided, resource consent is required for this infringement. Also, Block 3B JOAL where serving three parking spaces is provided with a width of 4.6 metres where a maximum of 3.5 metres is permitted as the vehicle crossing is serving three to nine parking spaces. The following points are made in support of these non-compliances:

- additional width to the vehicle crossing will provide better manoeuvring area for the vehicle to access and egress safely from the parking space;
- these accesses are designed with good sight distance and inter-visibility with the footpath and carriageway;
- as the accesses are serving two or three parking spaces which will generate two peak hour trip, the likelihood of any vehicular or pedestrian conflict will be low;
- vehicle speeds entering and exiting the site will be low due to the parking being provided immediately within the site boundary, and
- the users of the access will be regular and residents who will be aware of the site layout.

For these reasons, the proposed width of the vehicle crossings will have a less than minor effect on the surrounding road environment and are, therefore, considered acceptable.

The second reason for consent under this standard relates to separation between the vehicle crossings serving the same site. 22 Lots in Block 1A, 20 Lots in Block 2A, 20 Lots in Block 1B, 22 Lots in Block 2B, 12 Lots in Block 3A, 14 Lots in Block 3B, 4 Lots in Block 4, 18 Lots in Block 5A, 10 Lots in Block 5B, 30 Lots in Block 6 and 45 Lots in Block 7 will be having non-complying separation with the adjacent vehicle crossing. Under the AUP, there should be a minimum of 2.0 metre separation provided between adjacent vehicle crossings however, there is approximately a 1.7 metre separation distance provided between the vehicle crossings. The following points are made in supporting the vehicle separation width:

- vehicles are not anticipated to enter or exit the site at a speed, such that they would be able to stop for a pedestrian or another vehicle when required;
- vehicles have suitable sightlines along respective carriageways in both the directions to/from the adjacent vehicle crossings;

- the sites are forecast to generate up to two vehicle movements during the peak hours and the likelihood of conflict with the adjacent vehicle crossing is considered very low;
- although non-complying, the 1.7 metres separation is considered sufficient for pedestrians to take refuge in the event of any vehicular conflict given the low frequency of use;
- low-lying fencing and low-lying vegetation between the properties will aid vehicles to stop with plenty of warning, if required, for other vehicles and pedestrians; and
- users of the accesses will be residents and regular users and are anticipated to give way to each other in the rare event of vehicular conflict.

Based on the above, the separation distance between the adjacent vehicle crossings is considered acceptable.

Comment (E27.6.4.4) – Gradient of Vehicle Access [Criteria 8]

This infringement relates to the gradients of the platforms for the proposed accesses onto public roads. Under Standard E27.6.4.4, all vehicle access must be designed so that where the access adjoins the road there is sufficient space on-site for a platform so that vehicles can stop safely and check for pedestrians and other vehicles prior to exiting. The platform must have a maximum gradient no steeper than 1 in 20 (5%) and a minimum length of 4.0 metres for residential activities. The gradients for the platforms are designed with gradients of a complying gradient of 1 in 20 (5.0%), a negative grade of 1 in 12 (8.3%). The latter situation therefore requires resource consent. The following points are made in support of this non-compliance:

- due to the existing contours of the site, the proposal is unable to provide platforms with complying gradients. Given that the proposed gradient is considered flat for cars to drive through, and the drivers will be regular users, there is limited opportunity for cars to exit the site at speed such that they will have trouble stopping;
- as discussed earlier, vehicle movement to the proposed access enjoys a high standard of sight lines and inter-visibility between drivers and all other road users such that the traffic from the accesses will not have any negative effect on safety and the operation of the adjacent road network;
- all frontage roads are quiet local roads, the number of occurrences where pedestrians and vehicles may conflict with one another will be minimal. As such, it is expected to be no adverse risk associated with this vehicle access gradient.

Overall, it is considered that the effects of these non-complying gradients will be less than minor.

11. Construction or use of a vehicle crossing where a Vehicle Access Restriction applies:

(a) this applies where a Vehicle Access Restriction is identified in Standard E27.6.4.1(2) and Standard E27.6.4.1(3), other than a Vehicle Access Restriction Level Crossing or a Vehicle Access Restriction Motorway Interchange:

(i) effects of the location and design of the access on the safe and efficient operation of the adjacent transport network having regard to:

- *visibility and safe sight distances;*

- *existing and future traffic conditions including speed, volume, type, current accident rate, and the need for safe manoeuvring;*
- *proximity to and operation of intersections;*
- *existing pedestrian numbers, and estimated future pedestrian numbers having regard to the level of development provided for in this Plan;*
- *existing community or public infrastructure located in the adjoining road, such as bus stops, bus lanes and cycleways;*
- (ii) *the effects on the continuity of activities and pedestrian movement at street level in the Business – City Centre Zone, Business Metropolitan Centre Zone, Business – Town Centre Zone and Business – Local Centre Zone; or*
- (iii) *the practicability and adequacy of the access arrangements considering site limitations, arrangement of buildings and activities, user requirements and operational requirements, proximity to and operation of intersections, having regard to:*
 - *the extent to which the site can reasonably be served by different access arrangements including:*
 - *access from another road;*
 - *shared or amalgamated access with another site or sites;*
 - *via a frontage road, such as a slip lane or service road; or*
 - *the extent to which the need for access can reasonably be avoided by entering into a shared parking and/or loading arrangement with another site or sites in the immediate vicinity.*

Comment (E27.6.4.1) – Vehicle Access Restriction [Criteria 11]

The infringement under this standard relates to the proposal to provide three vehicle access points for Lots 159, 160 and 161 within 10 metres of the Road 1 and Road 2 intersections. The following points are provided in support of the proposal:

- Lots 159, 160 and 161 are all located immediately to the south of the intersection and most of its frontage is within 10 metres of the intersection. Providing an access clear of the intersection is impossible;
- As mentioned in Section 2, all vehicle crossings enjoy an acceptable standard of sight distance and inter-visibility between all road users, where driver would not have problem stopping and give-way;
- Each infringed vehicle crossing will only serve one dwelling, which is expected to generate 1 vehicle movement per hour, based on the rate of 0.85 vehicle movements per hour from the RMS Guide publication. Given the low level of traffic generation, it is not anticipated that the proposal would adversely impact on the operation of the nearby intersection;
- All frontage roads are local roads serving properties along the street. With less traffic and an acceptable sight distance from infringing vehicle crossings, it is considered that this intersection would have a safe operation after the construction of the proposal.

Based on the above, the effect of the subject site's infringement of the Vehicle Access Restrictions is considered less than minor.

7.0 CONCLUSIONS

Based on the analyses described in this report, the following conclusions can be made in respect of the proposal Stage 3 and 4 residential development of 1 Silverwater Drive, Silverdale:

- The estimated traffic generation of the proposal is likely to be about 2,710 traffic movements per day with peak hour traffic generation of about 256 traffic movements per hour;
- The proposed roads have been designed to a suitable standard and meets all the relevant Auckland Transport standards;
- A review of the E27 transport standards has identified seven infringements against the Auckland Unitary Plan; and
- Vehicle and pedestrian access to the lots is designed to a suitable standard such that the infringement will not have an adverse effect on the surrounding road network, or to the safety of pedestrians and vehicles using the site.

Overall, it is considered that the traffic engineering effects of the proposal can be accommodated on the road network without compromising its function, capacity or safety. Therefore, from a traffic engineering perspective it is considered that the proposal will have an acceptable impact.

Prepared by



Udit Bhatti



Todd Langwell

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



Rev	Revisions	By	Date

TPC

TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title

Residential Development
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title

Vehicle Tracking - AT - Delivery Van

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:250 (A3)
Checked	UB	Approved	TL	21648 VTG - (1)	Date	22.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



Rev	Revisions	By	Date

TPC

TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title	Residential Development Build Rich Limited - Silverdale - Stage 3 & 4
Sheet Title	Vehicle Tracking - AT - Refuse Truck

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales
Checked	UB	Approved	TL	21648 VTG - (2)	1:250 (A3)
				Date	22.12.21
This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd. © Copyright 2021 Traffic Planning Consultants Ltd					

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



6.363
0.948 4.035

AT - Delivery Van

Overall Length	6.363m
Overall Width	2.050m
Overall Body Height	2.432m
Min Body Ground Clearance	0.206m
Max Track Width	1.810m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.200m

Rev	Revisions	By	Date

TPC TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title
Residential Development
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - AT - Delivery Van

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales
Checked	UB	Approved	TL	21648 VTG - (3)	1:250 (A3)
				Date	22.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

Rev	Revisions	By	Date



Sheet Title

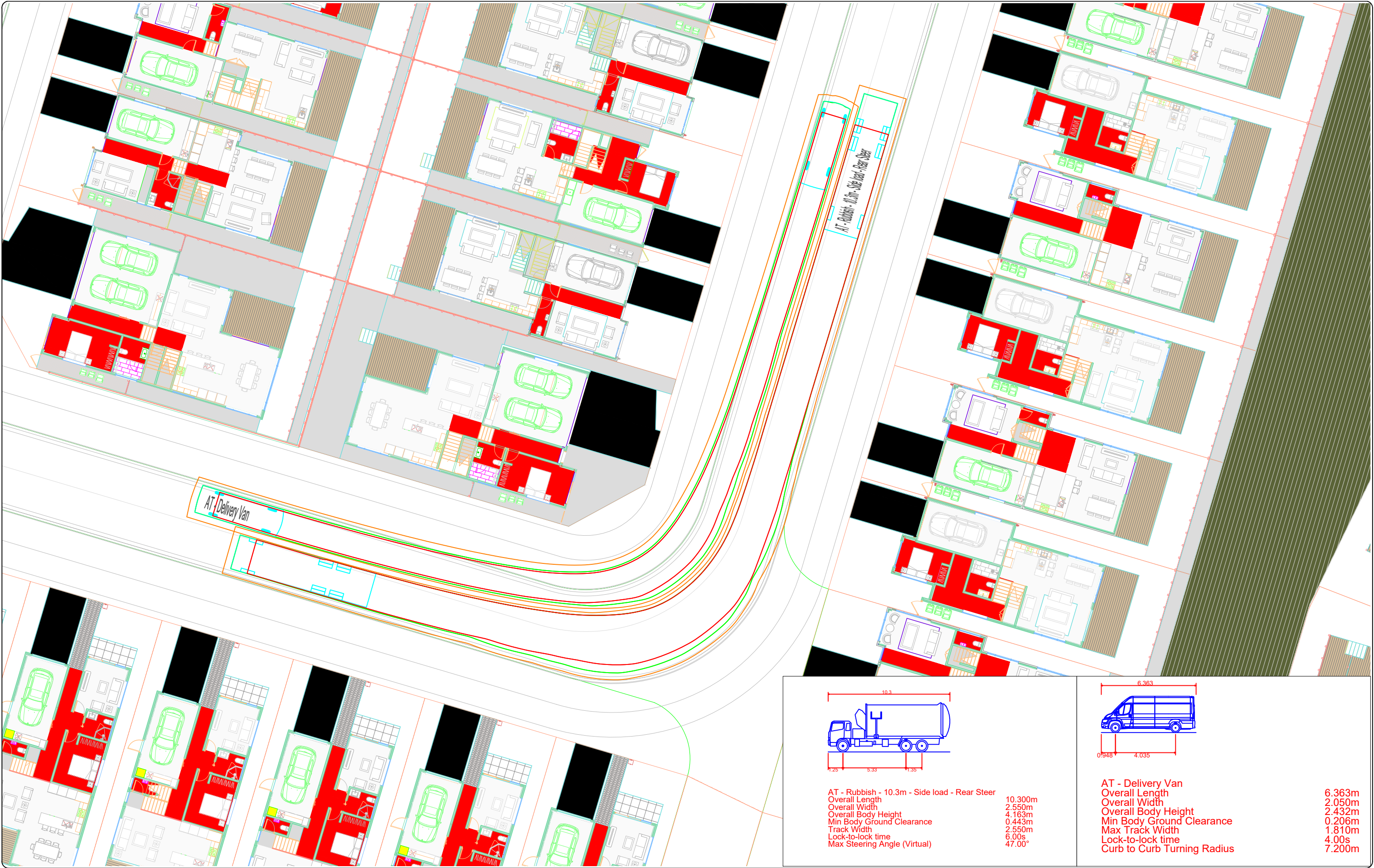
Vehicle Tracking - AT - Refuse Truck

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:250 (A3)
Checked	UB	Approved	TL	21648 VTG - (4)	Date	22.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.

© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



AT - Rubbish - 10.3m - Side load - Rear Steer

Overall Length	10.300m
Overall Width	2.550m
Overall Body Height	4.163m
Min Body Ground Clearance	0.443m
Track Width	2.550m
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	47.00°

AT - Delivery Van

Overall Length	6.363m
Overall Width	2.050m
Overall Body Height	2.432m
Min Body Ground Clearance	0.206m
Max Track Width	1.810m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.200m

Rev	Revisions	By
		Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

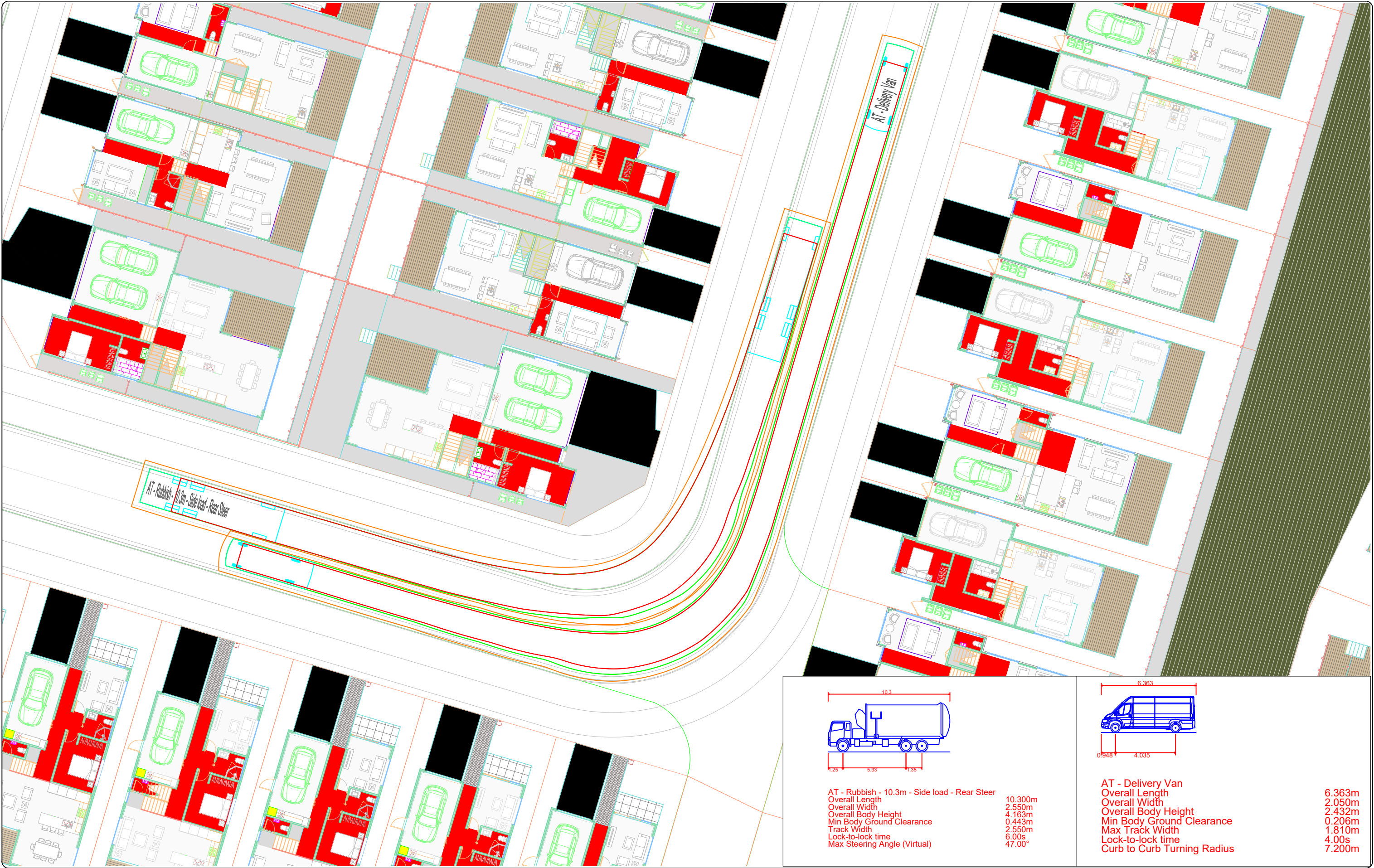
Project Title
Residential Development
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - Refuse Truck Vs Delivery Van

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:250 (A3)
Checked	UB	Approved	TL	21648 VTG - (5)	Date	22.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



AT - Rubbish - 10.3m - Side load - Rear Steer

Overall Length	10.300m
Overall Width	2.550m
Overall Body Height	4.163m
Min Body Ground Clearance	0.443m
Track Width	2.550m
Lock-to-lock time	6.00s
Max Steering Angle (Virtual)	47.00°

AT - Delivery Van

Overall Length	6.363m
Overall Width	2.050m
Overall Body Height	2.432m
Min Body Ground Clearance	0.206m
Max Track Width	1.810m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.200m

Rev	Revisions	By
		Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

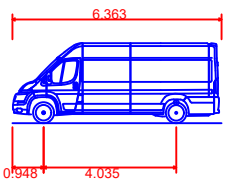
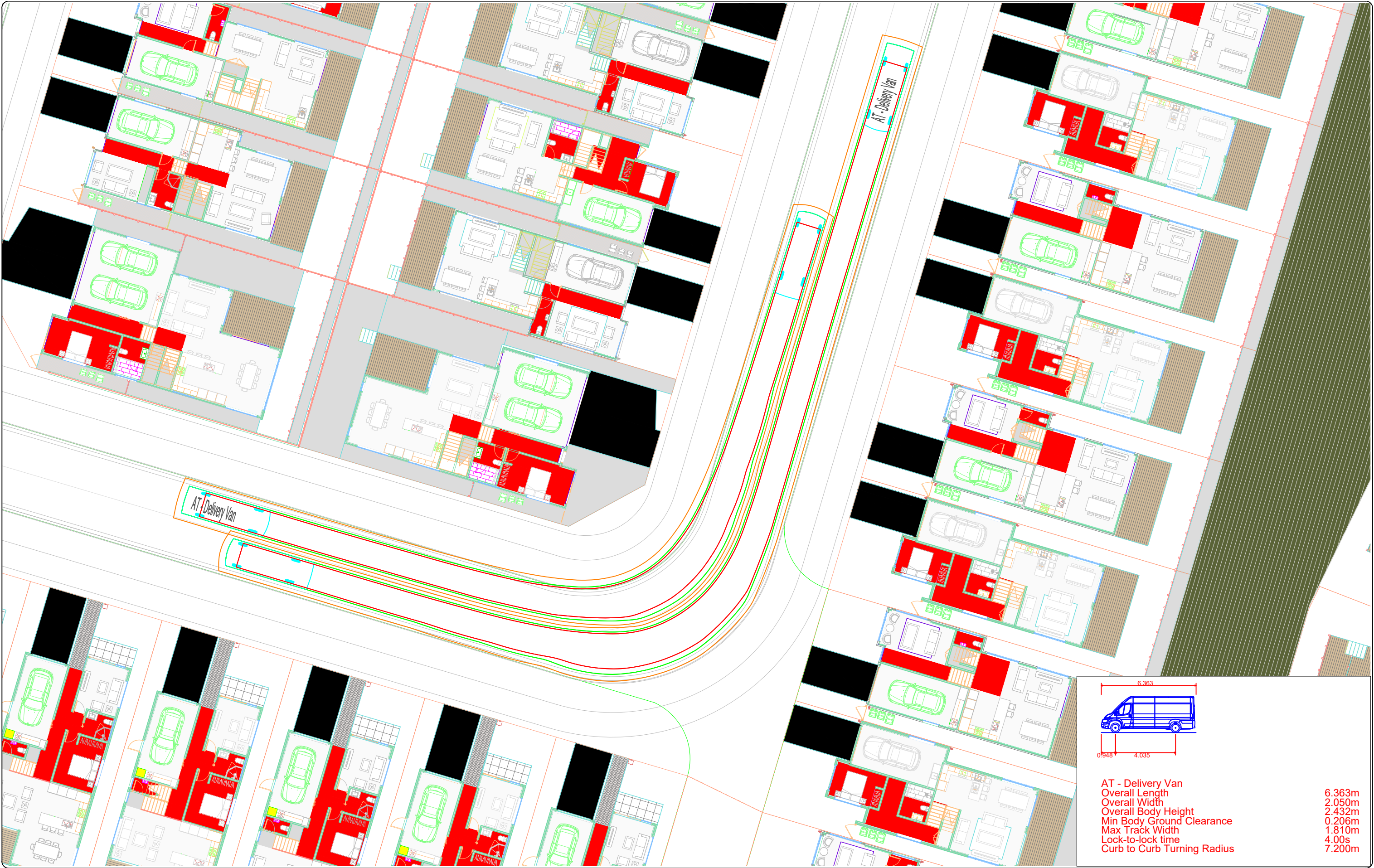
Project Title
Residential Development
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - Refuse Truck Vs Delivery Van

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:250 (A3)
Checked	UB	Approved	TL	21648 VTG - (6)	Date	22.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTG21648 VTG.dwg



AT - Delivery Van	
Overall Length	6.363m
Overall Width	2.050m
Overall Body Height	2.432m
Min Body Ground Clearance	0.206m
Max Track Width	1.810m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	7.200m

Rev	Revisions	By
		Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title	Residential Development Build Rich Limited - Silverdale - Stage 3 & 4
Sheet Title	Vehicle Tracking - AT - Delivery Van

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales
Checked	UB	Approved	TL	21648 VTG - (7)	1:250 (A3)
					Date
					22.12.21
This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd. © Copyright 2021 Traffic Planning Consultants Ltd					

Rev	Revisions	By	Date



Sheet Title

Vehicle Tracking - AT - Refuse Truck

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

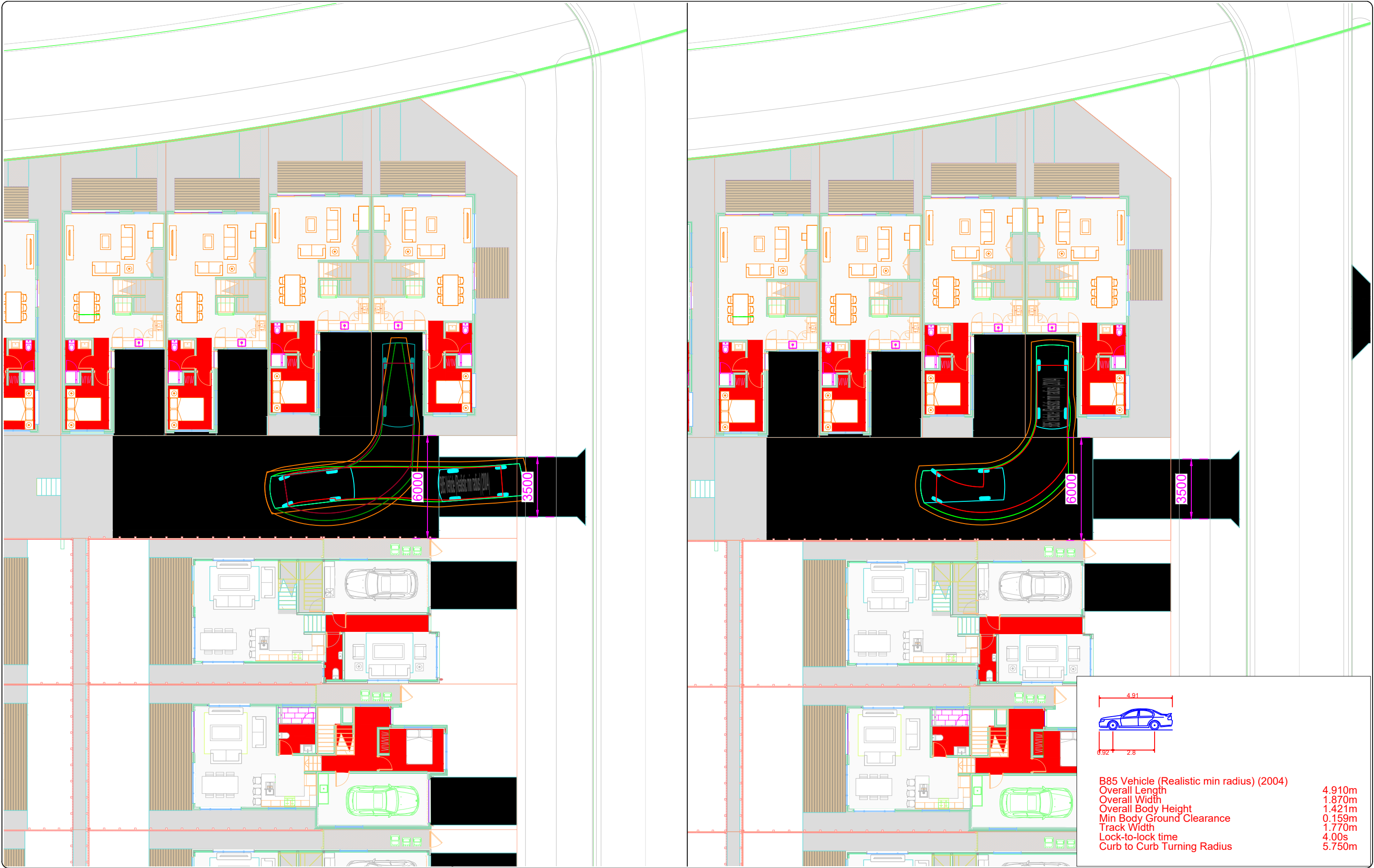
Rev	Revisions	By	Date



Sheet Title Vehicle Tracking - AT - Refuse Truck

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VT\21648 VTF.dwg



Rev	Revisions	By Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (1)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTF21648 VTF.dwg



Rev	Revisions	By	Date

TPC

TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title

Build Rich Limited - Silverdale - Stage 3 & 4

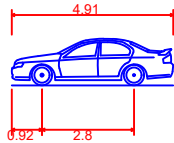
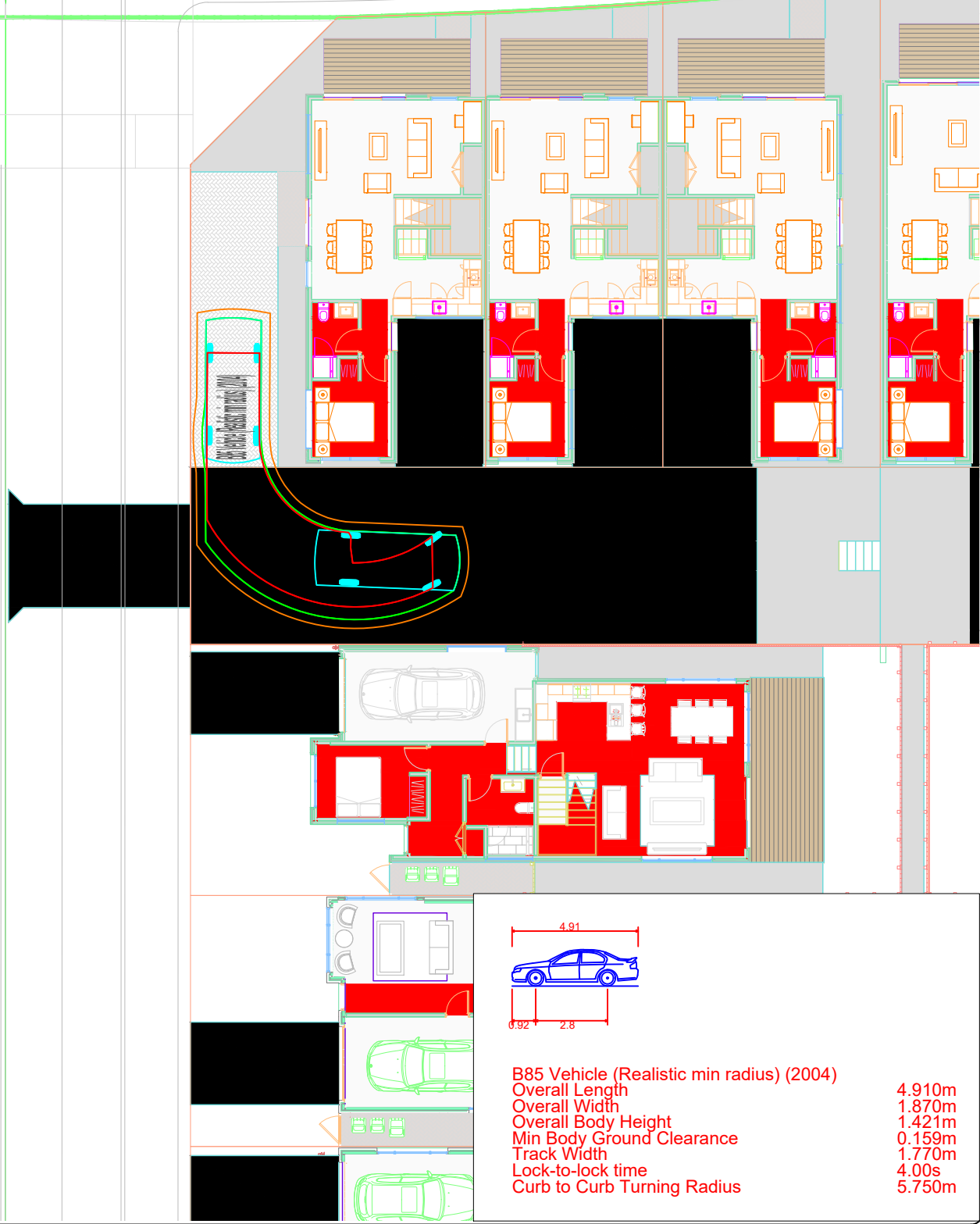
Sheet Title

Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (2)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTf21648 VTF.dwg



B85 Vehicle (Realistic min radius) (2004)
Overall Length 4.910m
Overall Width 1.870m
Overall Body Height 1.421m
Min Body Ground Clearance 0.159m
Track Width 1.770m
Lock-to-lock time 4.00s
Curb to Curb Turning Radius 5.750m

Rev	Revisions	By	Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (3)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

Rev	Revisions	By	Date



Sheet Title

Vehicle Tracking - B85 Design Vehicle

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTF21648 VTF.dwg



Rev	Revisions	By Date

TPC

TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title

Build Rich Limited - Silverdale - Stage 3 & 4

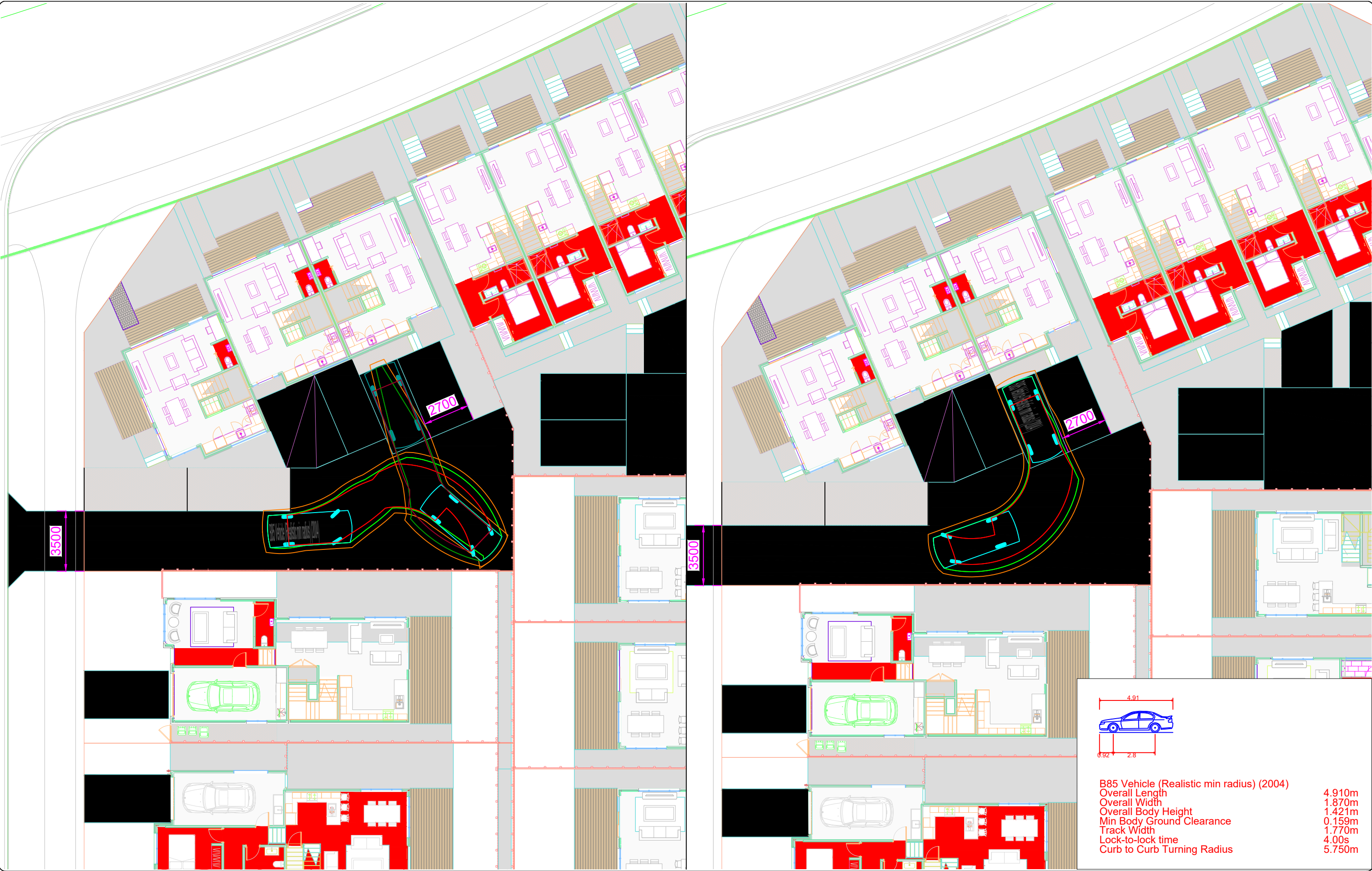
Sheet Title

Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (7)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTf21648 VTF.dwg



Rev	Revisions	By	Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (8)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VT\21648 VTF.dwg



Rev	Revisions	By	Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

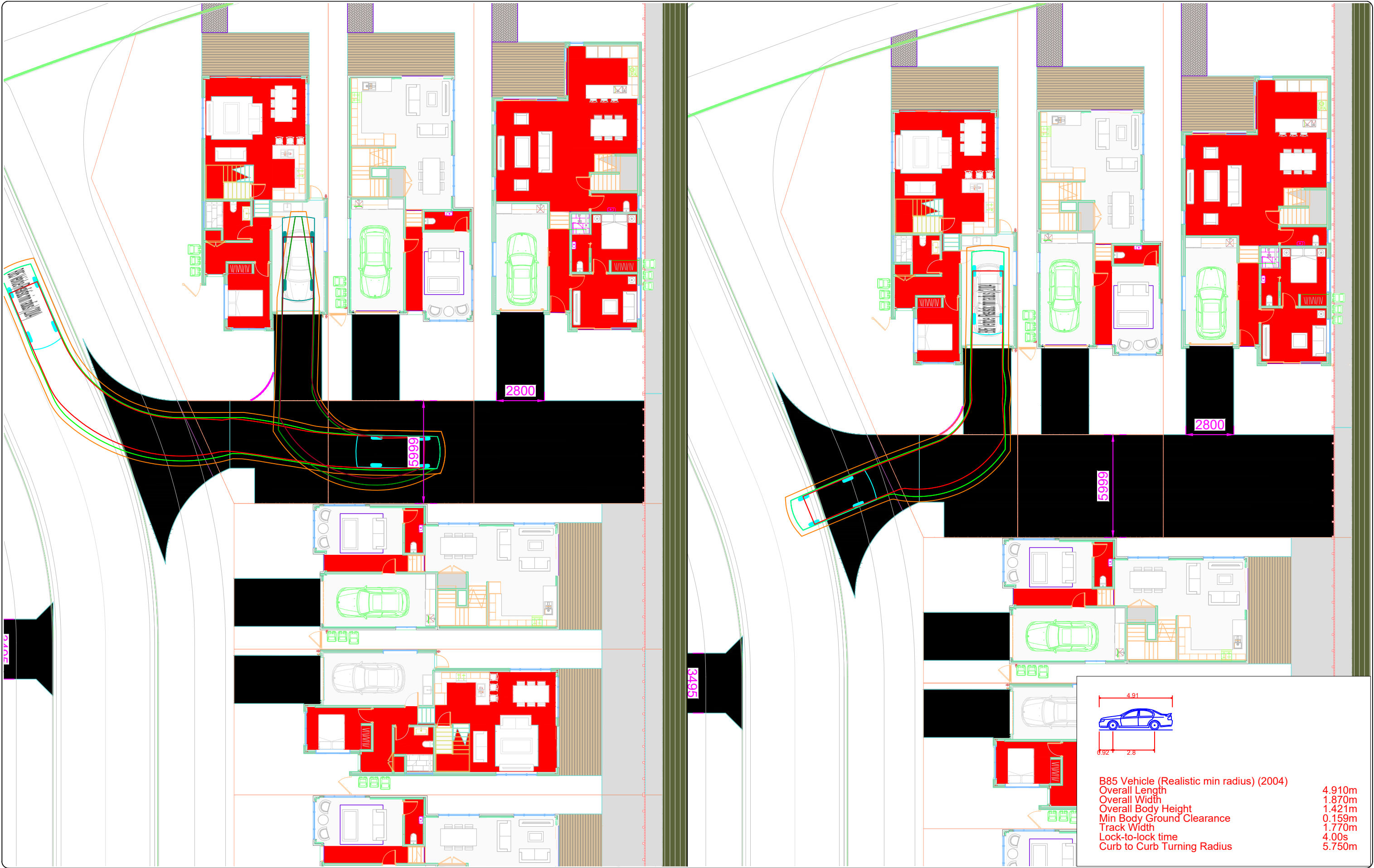
Project Title
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (8) - A	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTF\21648 VTF.dwg



Rev	Revisions	By	Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title
Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title
Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (10)	Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTF21648 VTF.dwg



Rev	Revisions	By	Date

TPC

TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title

Build Rich Limited - Silverdale - Stage 3 & 4

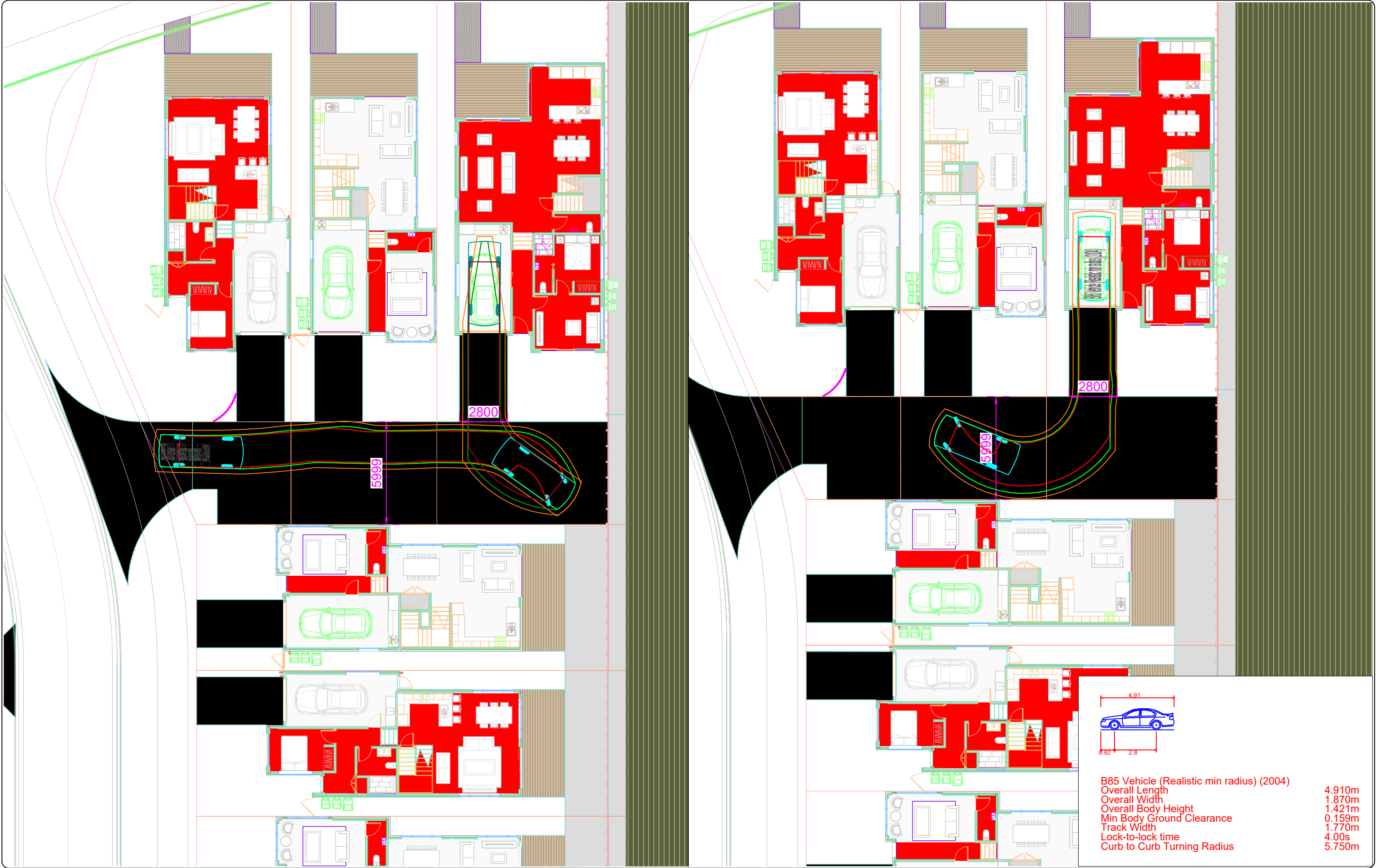
Sheet Title

Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales
Checked	UB	Approved	TL	21648 VTF - (11)	1:200 (A3)
				Date	20.12.21

This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd.
© Copyright 2021 Traffic Planning Consultants Ltd

C:\Users\Ronak\Traffic Planning Dropbox\AUTOCAD Files\2021 Projects\21648 - Build Rich Ltd - Silverdale - Stage 3 & 4\VTf21648 VTF.dwg



Rev	Revisions	By	Date

TPC
TRAFFIC PLANNING CONSULTANTS LTD

Level 1, 400 Titirangi Rd, Titirangi, P.O Box 60-255, Auckland 0604
Phone: 09 817-2500 www.trafficplanning.co.nz

Project Title

Build Rich Limited - Silverdale - Stage 3 & 4

Sheet Title

Vehicle Tracking - B85 Design Vehicle

Designed	RG	Drawn	RG	Project No - (Sheet No)	Scales	1:200 (A3)
Checked	UB	Approved	TL	21648 VTF - (12)	Date	20.12.21
This drawing is the property of Traffic Planning Consultants Ltd. It is an instrument of service, and as such is a confidential document. It therefore cannot be traced, scanned, copied, reproduced, used or exhibited by any third party without the express permission in writing of Traffic Planning Consultants Ltd. © Copyright 2021 Traffic Planning Consultants Ltd						