



## **ERF 974/1 Misty Cliffs**

Addendum to Transport Impact Statement

Final Report

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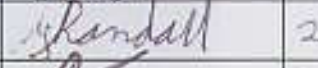

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<b>SYNOPSIS :</b>  This Traffic Impact Statement (TISm) forms part of the requirements of the Urban Transport Act (1977). The purpose of the TISm is to determine the transport impact of the rezoning of Erf 974/1, Misty Cliffs. The TISm investigates three viable access alternatives for the proposed development.				
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## 1. INTRODUCTION

### 1.1 Terms of Reference

Jeffares & Green (Pty) Ltd were appointed by Mr Malcolm Driessel on 23 March 2010 to undertake a Transport Impact Statement (TISm) for a proposed new vehicular access to Main Road (M65) for Erf 974/1 Misty Cliffs, Cape Town.

Several above- and below-road alternatives were considered for the purpose of the TISm and each was assessed using various geometric criteria, as agreed with City of Cape Town Transport Planning Officials. The analysis found the most favourable option from a transportation point of view to be **Alternative A** (J&G, 2010).

The above-road option (henceforth referred to as **Alternative D**) was not assessed in detail in the TISm. The extent of construction and excavation that would be required in the Main Road reserve fronting the neighbour's property on both sides (especially the north-west side), to enable more acceptable driver sight lines, would be so great in terms of cost and bulk earth works – along with a visually intrusive impact – that the option was not considered practically feasible.

Upon completion of the final draft of the TISm report, the document was made available to the public by Geostratics Environmental Consultants as part of the Basic Assessment process, in order to address potential transportation concerns that may arise in response to the planning application.

Comments received by Geostratics from interested and affected parties included transport-related queries which necessitated a more detailed geometric analysis and vehicle movement assessment of the driveway ramps than what was conducted in the TISm report. Such detailed assessment was not undertaken as part the TISm, as it fell outside the document's agreed scope of work.

Hence, in order to address these additional public concerns, a detailed geometric analysis was conducted of the driveway ramps for both alternatives. The methodology and results of these assessments are presented in this report, which is an **Addendum that should be viewed in conjunction with the initial TISm report**, as the findings of the TISm are not repeated here. It is the intention of this document to address the additional transport-related concerns and ultimately provide guidance in selecting the most appropriate means of access to the site.

### 1.2 Background Information & Guidelines

In addition to the source information received for the purpose of the TISm, a preliminary layout - showing both development alternatives and their respective accesses and driveways - was obtained from Peerutin Architects and was used as the base for the detailed geometric assessment conducted as part of this study.

It should be noted that topographical information for the portion of Erf 974/1 above Main Road is course and should only be used as a guide for the purposes of this report. Should a detailed design be required at a later stage for the portion of ERF 974/1 above Main Road, a detailed survey of the area should be undertaken.

Access driveways for each alternative were conceptually designed in accordance with the Geometric Design of Urban Collector Roads (CUTA, 1988). Within this document, it was prescribed that the driveway gradients were not to exceed a gradient steeper than 20% and that a recommended maximum of 15% be used. Unless a vertical curve of the length of a typical vehicle wheelbase was used, the changes in grade should not exceed 8 to 10%.

In addition, the National Building Regulations state that the last 5m of driveway closest to the road reserve boundary shall not exceed a gradient of 4%. This can however be relaxed in topographically acute areas, where the local authority may grant exemption from the Building Regulations, if requested (CUTA, 1988).

## 2. ALTERNATIVE A

As discussed in the TISm, **Alternative A** consists of an access driveway located on the portion of Erf 974/1 below Main Road and leads to a parking lift on the residential property, as shown in **Figure 2.1**.

The driveway consists of a minimum width of 4.46m, which is acceptable for two-way access to a single residential property. The north-west side of the driveway includes a turning shunt to assist drivers in turning their vehicle around and exit the driveway in a forward gear.

### 2.1 Driveway Geometry

Profiles showing the left and right edges of the driveway in respect of the natural ground level in **Figure 2.1** indicate the gradients at which the driveway will slope from the Main Road edge towards the park lift facility below. A contour plan showing the general slope of the site is also shown in **Figure 2.1**

To ensure that vehicles are able to safely reverse out of the park lift facility and into the turning shunt without difficulty, the driveway gradients do not exceed 5% at any point where the vehicle could be expected to perform a reverse movement.

The installation of a turn-table mechanism inside a garage at the end of the driveway (replacing the vehicle lift) will allow steeper driveway gradients, as the 5% grade limit to allow for the reversing movement is eliminated. However, the level change (and associated ramp gradient) required to ensure that the roof of the garage structure is sufficiently below road level is too great, rendering the turn-table option infeasible - unless it is considered acceptable for the garage roof to extend above Main Road level.

### 2.2 Vehicle Movement

AutoTURN vehicle movement tracking software was used to track the most extreme turning movements that a vehicle would potentially be required to make when entering and exiting the driveway. The dimensions of the vehicle used for modelling the turning movements are comparable to those of a very large sedan vehicle or sports utility vehicle.

The vehicle dimensions and track paths, for entering and exiting the driveway, can be seen in **Figure 2.3**, which also shows that a turning shunt is required if vehicles are to exit the driveway in a forward gear.

Upon entering the driveway from Main Road, the motorist would drive down the ramp and activate the underground park lift facility, which will temporarily rise above ground level to allow the vehicle to enter, before returning to its default position below-ground and out of sight.

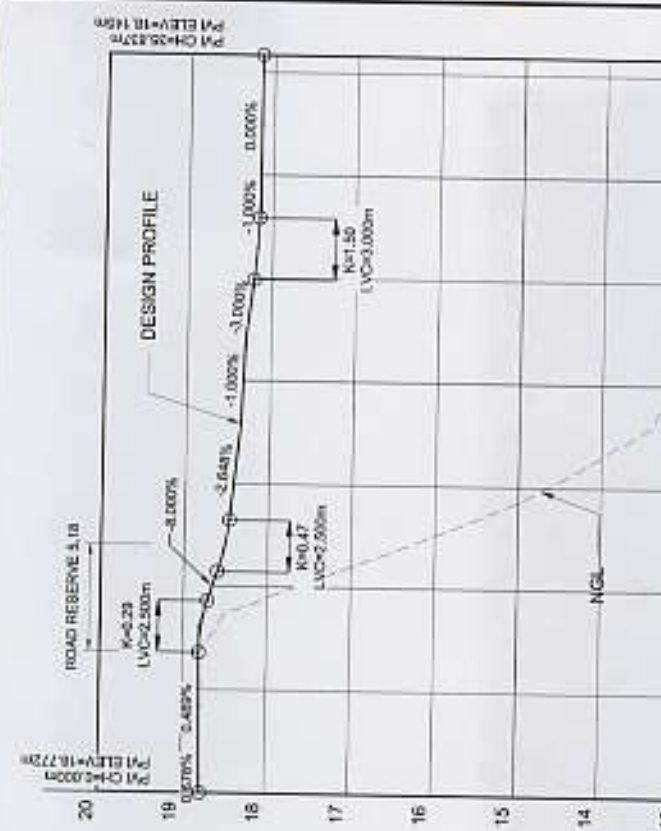
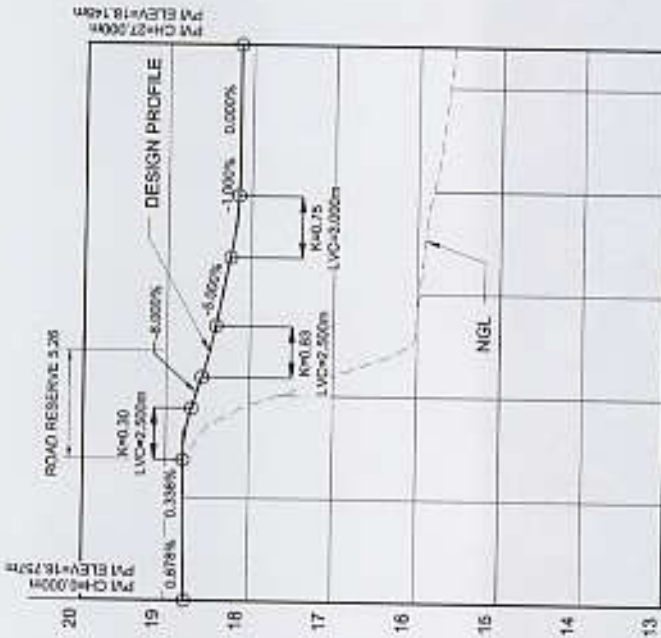
Upon egress, the resident will activate the park lift containing the vehicle from below-ground, up to ground level. The driver will then enter the vehicle and reverse into the turning shunt, before exiting the driveway in a forward motion (see **Figure 2.3**).

### 2.3 Visibility

As discussed in the TISm, given the variables applicable to this section of Main Road, as well as the access location, 60m and over 80m stopping sight distance is available to the north-west and south-east of the proposed access respectively. The 60m available distance to the north-west is 75m less than the prescribed distance of 135m, as this section of the road operates at a 90km/h speed limit.

Should the speed limit be reduced to 60km/h (as it is to the south-east of Erf 974/1), the available stopping sight distance will only fall short by 20m (as only 80m will be required). It is hence of key importance that the speed limit be reduced from 90km/h to 60km/h on the portion of Main Road to the north-west of Erf 974/1.





C/L Ground Levels	18.788	18.943	18.320	18.968	18.152	18.158	18.828	
Left Edge Level	18.788	18.943	18.320	18.968	18.152	18.158	18.828	
Horizontal Curves	STRAIGHT LVC=2.00m 43° 56' 12"	STRAIGHT LVC=2.00m 357° 45' 18" 317° 42' 10"	STRAIGHT LVC=2.00m 147° 00' 00"	STRAIGHT LVC=2.00m 147° 00' 00"	STRAIGHT LVC=2.00m 203° 10' 42' 10"	STRAIGHT LVC=2.00m 203° 10' 42' 10"	STRAIGHT LVC=2.00m 203° 10' 42' 10"	STRAIGHT LVC=2.00m 203° 10' 42' 10"
Chainages (m)	5	10	15	20	25	30	35	

**LEFT EDGE LONGSECTION**  
H. SCALE 1:200  
V. SCALE 1:50

<b>LEGEND</b>
NGL
DESIGN

C/L Ground Levels	16.798	16.858	17.884	18.420	18.302	18.145	18.215	18.145	18.145
Right Edge Level	16.798	16.858	17.884	18.420	18.302	18.145	18.215	18.145	18.145
Horizontal Curves	STRAIGHT LVC=2.00m 42° 22' 58"	STRAIGHT LVC=2.00m 1136° 11' 40"	STRAIGHT LVC=2.00m 1136° 11' 40"	STRAIGHT LVC=2.00m 1136° 11' 40"	STRAIGHT LVC=2.00m 1136° 11' 40"	STRAIGHT LVC=2.00m 223° 22' 42' 10"	STRAIGHT LVC=2.00m 223° 22' 42' 10"	STRAIGHT LVC=2.00m 223° 22' 42' 10"	STRAIGHT LVC=2.00m 223° 22' 42' 10"
Chainages (m)	5	10	15	20	25	30	35	40	

**RIGHT EDGE LONGSECTION**  
H. SCALE 1:200  
V. SCALE 1:50

PROJECT **ERF 974-1 MISTY CLIFFS**  
TITLE ALTERNATIVE A - DRIVEWAY PROFILES  
SCALE AS SHOWN  
LEFT AND RIGHT EDGE



Fig. 2.2

5.79



0.91 3.35

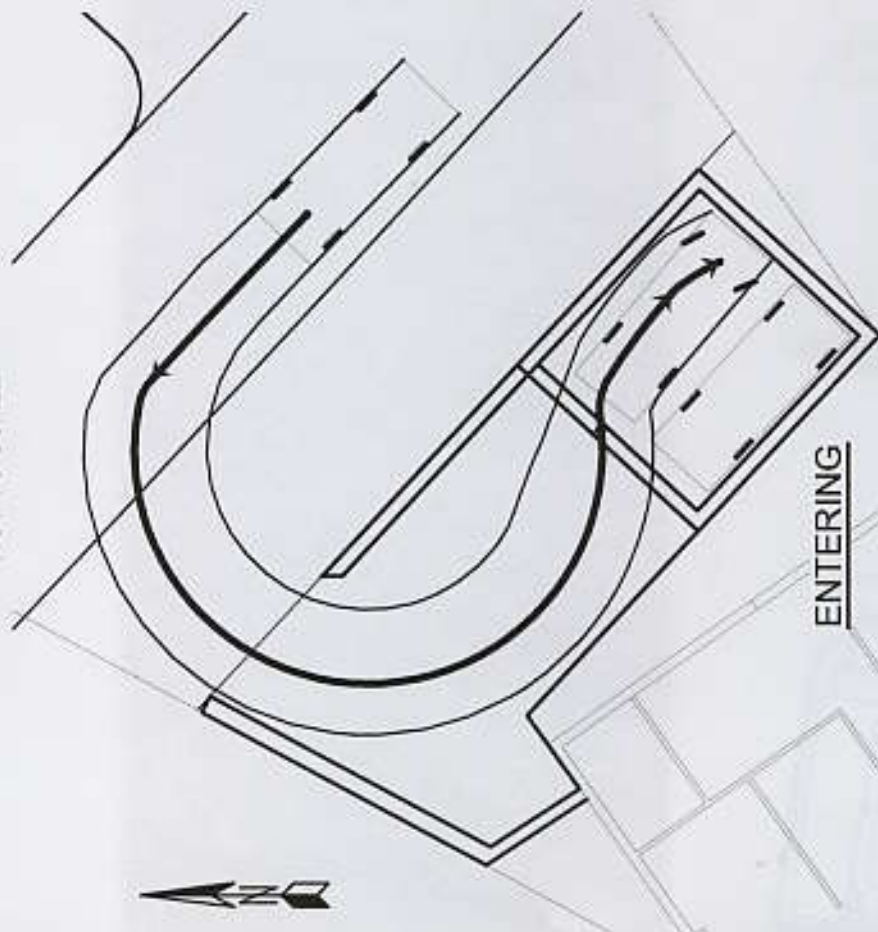
### Large Sedan

meters

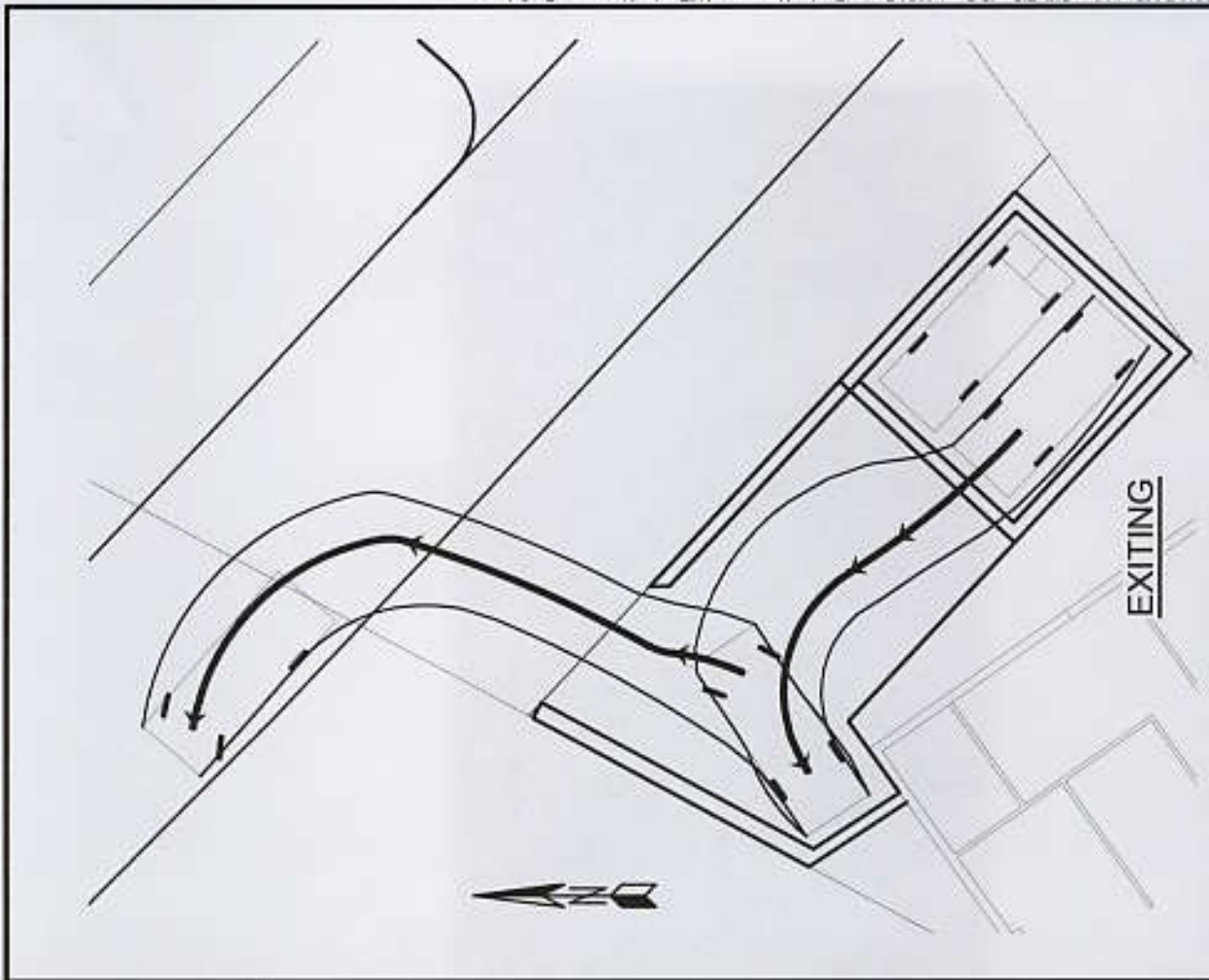
- Width : 2.13
- Track : 2.13
- Lock to Lock Time : 6.0
- Steering Angle : 31.6

### VEHICLE INFORMATION

NOT TO SCALE



ENTERING



EXITING

PROJECT

**ERF 947-1 MISTY CLIFFS**

TITLE

ALTERNATIVE A  
VEHICLE TURNING MOVEMENTS

SCALE

1:200



FIG. 2.3

### 3. ALTERNATIVE D

As discussed in **Section 1, Alternative D** consists of an access to a residence on the portion of Erf 974/1 situated above Main Road. **Figure 3.1** shows the driveway, the residential building and the extents of the block retaining wall structures required.

The driveway consists of a 4m wide surface, which spans approximately 43m, connecting the proposed residential building to Main Road below.

#### 3.1 Driveway Geometry

The centre line profile along the driveway, shown in **Figure 3.2**, illustrates the grades of the driveway access in relation to the natural ground level.

Although maximum gradients of up to 18% on horizontal straights and 10% on horizontal curves were used for profiling the driveway, these grades could potentially be increased further, if required.

Due to the Erf boundary constraints and the driveway being predominantly in cut, a soil retaining structure will be required on both sides of the driveway. A 60 degree Terraforce block retaining wall was used to determine the extents of the area required to accommodate the retaining structures within Erf 974/1, without encroaching on the neighbouring property (see **Figure 3.1**).

The maximum driveway width, including retaining structures is approximately 10.13m – at a point where the driveway approaches the top parking and garage area.

However, due to the inaccuracy of the topographical data used, a detailed survey of the portion of Erf 974/1 above Main Road should be conducted at detailed design stage. Further, an assessment by a structural engineer will also be required at detailed design stage to determine the most appropriate type of retaining wall and, thus, the extents of the structure.

The length of the driveway was taken up to a point where the residential building would be 10m or more from the Erf boundary. However, the driveway can be extended further up Erf 974/1, should the residential home be required to lie further than 10m from the cadastrals on either side.

Should the building be required to be offset further from the cadastral boundaries on either side, it would need to be shifted further up (away from Main Road), thereby extending the length of the driveway required to reach the household. For example, should the building be required to offset 15m from the Erf boundaries on either side, the driveway would need to be extended by approximately 86m, given the gradient constraints used in this case. However, as discussed above, the ramp gradients could potentially be increased if so required.

### 3.2 Vehicle Movement

Figure 3.3 shows that vehicular movements for entering and exiting the Erf can be accompanied within the driveway layout. It is also shown that vehicular movements required for the vehicle to exit the Erf in a forward gear can be achieved within the parking area near the residential building.

### 3.3 Visibility

The above-road access has highly sub-standard sight-lines available along Main Road, especially to the north-west. Poor visibility from this point is mainly ascribed to the fact that the access is located on the less-favourable position on the 'inside' of the curve of Main Road.

However, the stopping and shoulder sight distance at this access could be brought more in line with the prescribed standards by cutting back a portion of the embankment in the road reserve on the upper side of Main Road, so as to create a clear line of sight to and from the proposed access. This "daylighting", in conjunction with the same speed limit reduction discussed in Section 2.3, would enable much improved sight lines.

A soil retaining structure would be required on both the north-west and south-east sides of the access points (as shown in Figure 3.4) to ensure that road users have adequate sight distance for the access to operate safely. Structural engineering expertise will be required to determine the exact type of soil retaining structure to be used for this purpose, as well as the extents thereof.

Figure 3.4 indicates that if a soil retaining structure was to be installed, the shoulder and stopping sight distances on the south-east side of the proposed access would meet the requirements, should the speed limit on Main Road to the north-west of the access be reduced to 60km/h (as it is to the south-east of Erf 974/1).

Although the north-west side of the proposed access would still have a shoulder sight distance shortfall of 27m, the stopping sight distance would fall within the requirements.

Although the retaining wall will be accommodated within the road reserve, it will span along the front of the neighbouring properties on either side of Erf 974/1, at varying heights.

As discussed in the TISm, the existing 60 km/h speed limit road signs (R201) should be relocated further to the north-west of the proposed access to reduce the operating speed from 90km/h to 60km/h on this section of Main Road for the purpose of traffic calming upon entering a residential area. This is a key requirement, which needs to be implemented in order for either option to be viable from a traffic safety point of view.

**LEGEND**

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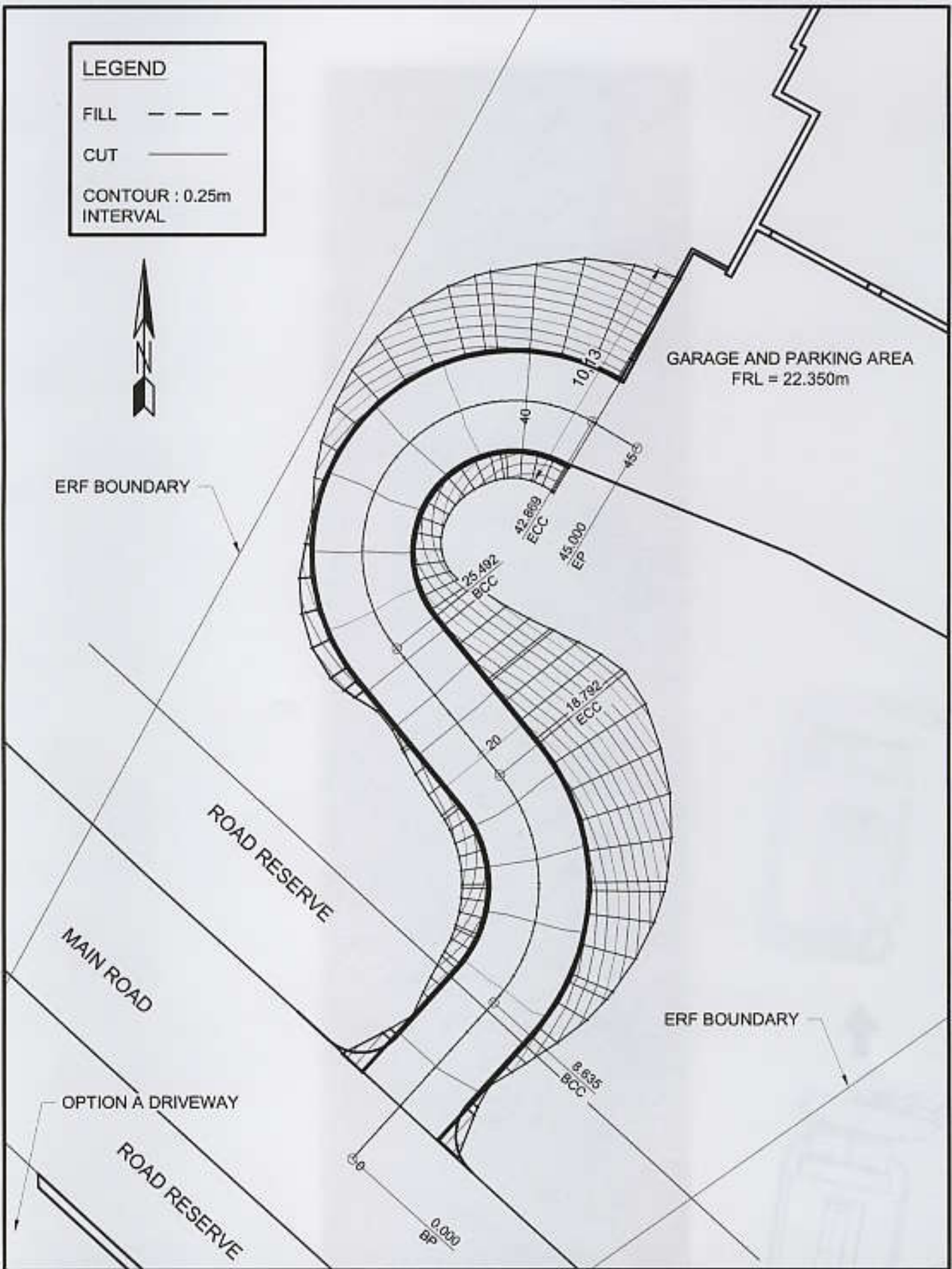
CUT ————

CONTOUR : 0.25m  
INTERVAL



ERF BOUNDARY

GARAGE AND PARKING AREA  
FRL = 22.350m



PROJECT	<b>ERF 974-1 MISTY CLIFFS</b>	
TITLE	ALTERNATIVE D - DRIVEWAY LAYOUT AND CONTOUR PLAN	SCALE 1:200



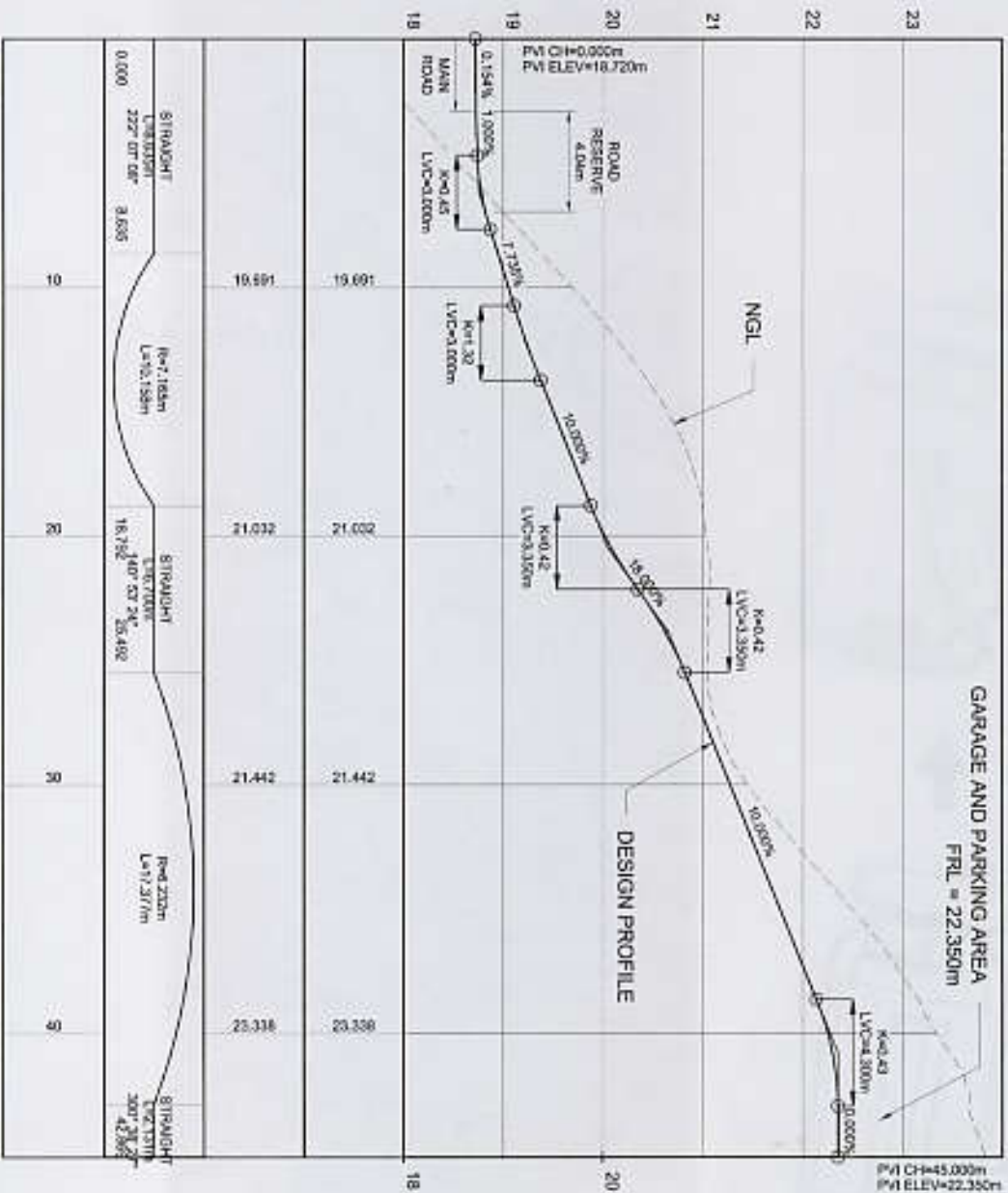
Fig. 3.1

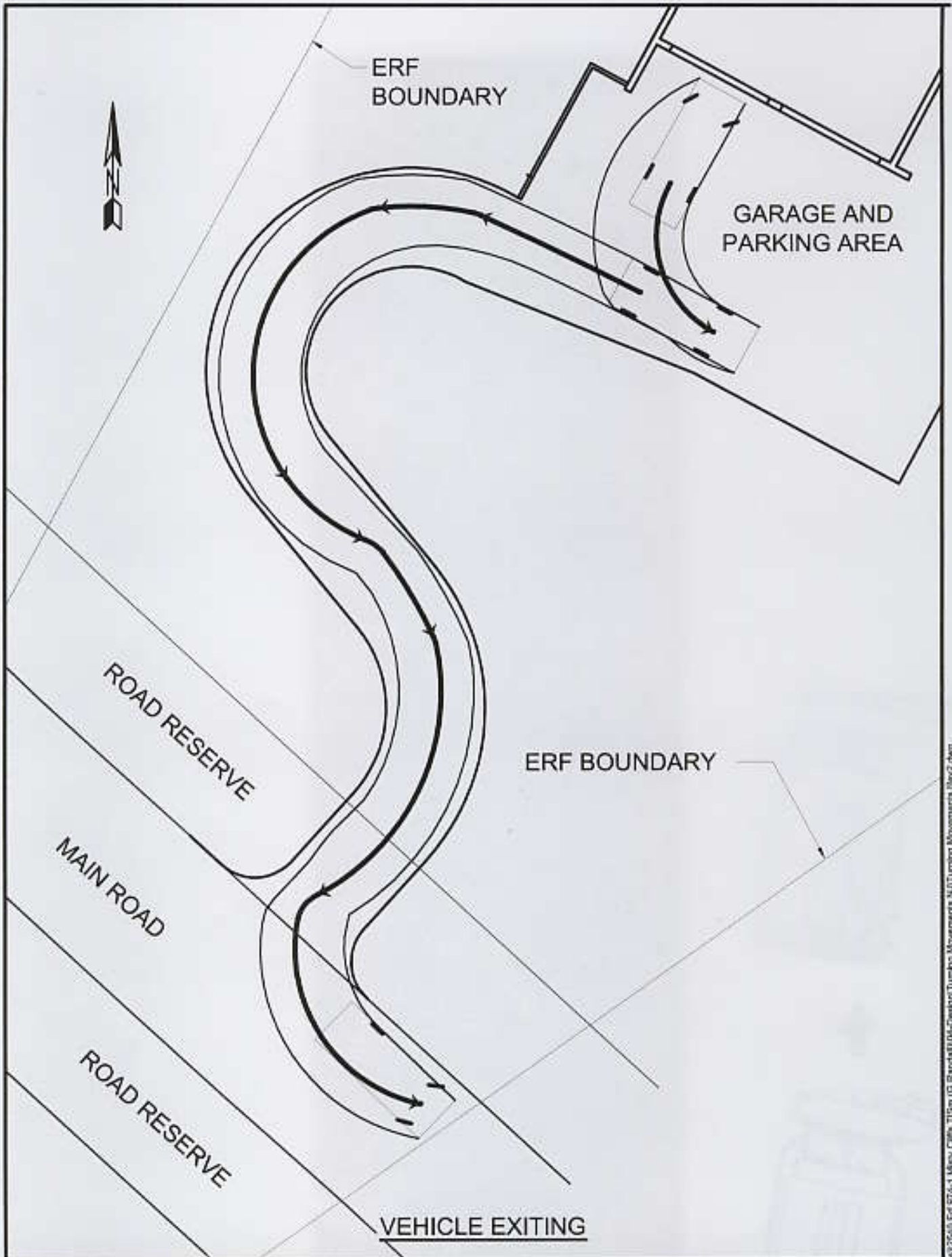
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C/L Ground Levels
Centre Line Level
Horizontal Curves
Chainages (m)





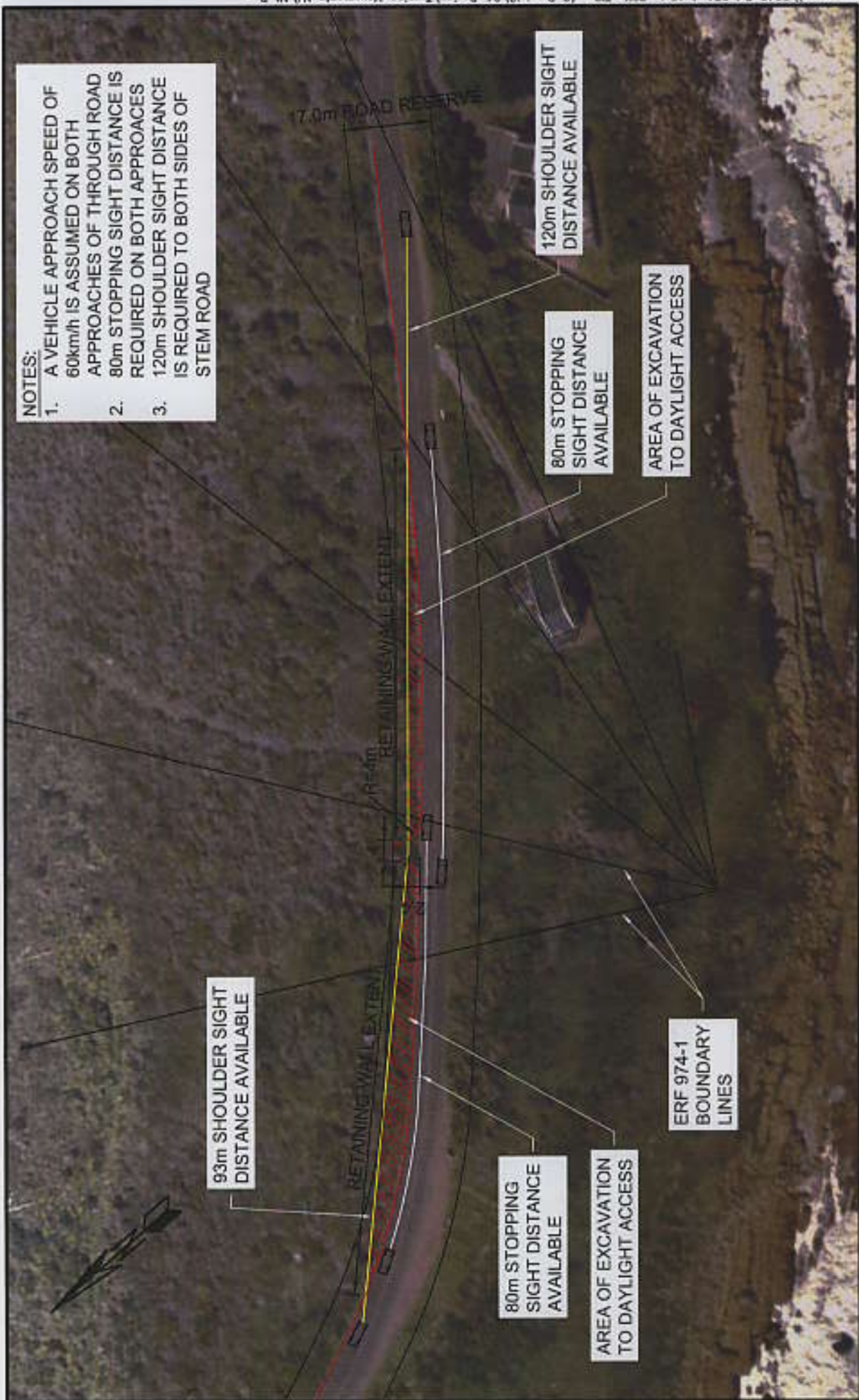
PROJECT	<b>ERF 947-1 MISTY CLIFFS</b>	
TITLE	ALTERNATIVE D VEHICLE TURNING MOVEMENTS	SCALE 1:200



FIG. 3.3

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- NOTES:**
1. A VEHICLE APPROACH SPEED OF 60km/h IS ASSUMED ON BOTH APPROACHES OF THROUGH ROAD
  2. 80m STOPPING SIGHT DISTANCE IS REQUIRED ON BOTH APPROACHES
  3. 120m SHOULDER SIGHT DISTANCE IS REQUIRED TO BOTH SIDES OF STEM ROAD



**FIG. 3.4**



<b>PROJECT</b>	<b>ERF 974-1 MISTY CLIFFS</b>	
<b>TITLE</b>	<b>ALTERNATIVE D - DAYLIGHTING AND SIGHT DISTANCES</b>	
	<b>SCALE</b>	<b>1:1000</b>

#### 4. CONCLUSIONS & RECOMMENDATIONS

The following conclusions and recommendations can be made from this Addendum report – in addition to those listed in the initial TISm Report:

**Alternative A** can be accessed via a driveway ramp that will enable residents to enter, turn around, and exit the property in a safe manner, in a forward gear.

A turning shunt will be required for this purpose and the sections of driveway along which a vehicle can be expected to perform a reverse movement, should not exceed a gradient of 5%. Vehicles can be stored below ground using a park-lift system, the default position for which will be underground and out of sight from Main Road.

A vehicle turn-table option was assessed as an alternative to the park-lift and turning shunt combination. However, the ramp gradient constraints to not allow the garage to be lowered down far enough below Main Road level to ensure that the garage roof structure is not visible from Main Road above.

**Alternative D** can be accessed via a longer (43m) driveway ramp that links with the residence garage/parking area above, where there is sufficient space for vehicles to park and turn around safely, exiting the driveway in a forward gear onto Main Road.

The driveway surface will be approximately 4.5m wide and will require significant retaining structures for support, as the entire driveway will be in cut. Including retaining structures, at its widest point, the driveway will be approximately 10m wide. It is possible to move the house further up the mountain slope (away from Main Road), as the driveway can be extended to accommodate this. There is also scope to potentially steepen the driveway gradients, should it be required.

As mentioned in the TISm report, significant daylighting will be required within the Main Road reserve to either side of the access in order to create more acceptable shoulder and stopping sight lines. The daylighting will entail cutting back the embankment within the Main Road reserve in front of the neighbouring properties. Retaining structures will be required for this purpose.

Although both Alternatives are feasible from a transportation engineering perspective, Alternative D will have a significant visual impact, due to the prominent retaining structures required for the driveway, as well as the daylighting.

Alternative A is likely to have significantly less visual impact, as most transport-related structures can be accommodated out of sight from Main Road.

It is recommended that the appropriate road signage be implemented to safely reduce the current 90km/h speed limit to the north-west of the proposed accesses, to 60km/h, as traffic from that direction approaches Erf 974/1 and the Misty Cliffs residential area. This recommendation applies to both access alternatives - neither of which are feasible without this speed limit reduction.