Sunfield Developments Limited

ADDENDUM GEOTECHNICAL ASSESSMENT REPORT

Sunfield Landholding, Ardmore

Project Reference: J01627
October 10, 2025

DOCUMENT CONTROL

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This report constitutes an addendum to a previous Geotechnical Assessment Report carried out by LDE Limited for and in accordance with instructions received from Sunfield Developments Limited with regard to a consent application for the Sunfield Landholding, Ardmore.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact the engineers listed above.

CONTENTS

1 PROJECT BRIEF AND SCOPE

This addendum report has been prepared for Sunfield Developments Limited to accompany a substantive application under the Fast Tract Approvals Act 2024. It should be read in conjunction with our previous Geotechnical Assessment Report (GAR; ref. J01627, dated 6 December 2024) prepared for this development (refer Section 2.1 below).

Our 2024 GAR outlined the site description, development proposal, our investigation findings, and our initial analysis results and recommendations. Based on the appended client supplied drawings (Appendix A), it is apparent that the proposed earthworks scheme has changed from the time of the 2024 GAR. We have also been provided with additional testing data undertaken by Initia (refer Section 2.2 below).

This report represents our analysis results and recommendations updated to incorporate these earthworks scheme changes and additional testing data.

2 PROJECT DATA

2.1 Related Reports

In preparing this report we have reviewed the following existing geotechnical report prepared by this consultancy:

- LDE Limited. Geotechnical Assessment Report (GAR) for Sunfield Landholding Ardmore, Reference J01627, Revision 0, Dated 6 December 2024.

This addendum report should be read in conjunction with our 2024 report. All recommendations of our 2024 report remain applicable unless specifically superseded in this addendum report.

We have also reviewed the following existing memorandum prepared by this consultancy:

- LDE Limited, Trial Preload Design and Settlement Monitoring for Sunfield Landholding Phase 1 Ardmore, Reference J01627, Dated 7 July 2025.

That memorandum detailed trial preload design and settlement monitoring protocols for this development.

Further, we have reviewed the following groundwater dewatering report completed by Earthtech Consulting Limited:

- Earthtech Consulting Limited, Groundwater Dewatering and Ground Settlement Effects Assessment Report, Reference R10015-1, Revision B, Dated 13 June 2024.

2.2 Additional Test Data

In addition to the test data included in our 2024 report (refer Section 2.1 above), we have been provided with data from 45 Cone Penetrometer Tests (CPTs) undertaken by Initia. These tests are attached (refer Appendix F), and comprise the 100, 200 and 300 series shown on Figure 1.1 (Appendix B). We have incorporated this test data into our analyses below.

3 GEOTECHNICAL HAZARD ASSESSMENTS

3.1 Risk Register

In accordance with section 2.4 of Auckland Council Code of Practice (ACCoP), we have undertaken a qualitative site-specific geohazards risk assessment for the proposed development. The risks we have assessed include the geohazards outlined in section 2.5 of ACCoP as well as any additional geotechnical hazards for the site that we have identified as being relevant using Table 1: risk classification table (as per insert right) and also their guidance on how to assess both likelihood (Table 2: likelihood classification) and consequence (Table 3: consequence classification) scores.

		Consequence				
		Insignificant 1	Minor 2	Moderate 3	Major 4	Extreme 5
Likelihood	Almost Certain 5	Medium 5	High 10	Very high 15	Extremely high 20	Extremely high 25
	Likely 4	Low 4	Medium 8	High 12	Very high 16	Extremely high 20
	Moderate 3	Low 3	Medium 6	Medium 9	High 12	Very high 15
	Unlikely 2	Very low 2	Low 4	Medium 6	Medium 8	High 10
	Rare 1	Very low 1	Very low 2	Low 3	Low 4	Medium 5

Table 1 presents the assessed risk register for the proposed development. In summary, it is considered that a residual risk level (i.e., following implementation of the proposed engineering mitigation measures or design solutions) of very low to low can be achieved which is deemed an acceptable risk level for the end owner as per ACCoP's guidance. We also confirm that the proposed development therefore also fulfils Section 106 of the Resource Management Act. Regional hazards are beyond the scope of this report.

Table 1. Risk Register (risk rating score in accordance with Section 2.4.3 of ACCoP)

Seismic Hazards	Untreated Risk	Residual Risk	Risk Owner
	2 (Very Low)	1 (Very Low)	Building Designer
Potential Susceptibility	The site is approximately 10km from the nearest active fault (the Wairoa North Fault).		
Mitigation Measures	Refer to Section 7.8.1 of our 2024 GAR.		
Liquefaction	Untreated Risk	Residual Risk	Risk Owner
	9 (Medium)	4 (Low)	Contractor and Foundation Designer
Potential Susceptibility	We have updated the liquefaction analyses undertaken as part of our 2024 GAR, and liquefaction susceptibility is assessed in Section 3.3 below.		
Mitigation Measures	Refer to Section 7.4.7 of our 2024 GAR and Section 3.3 below.		

Settlement and Compressible Soils	Untreated Risk	Residual Risk	Risk Owner
	12 (High)	4 (Low)	Contractor and Foundation Designer
Potential Susceptibility	We have updated the settlement analyses undertaken as part of our 2024 GAR, and consolidation settlement susceptibility is assessed in Section 3.4 below.		
Mitigation Measures	Refer to Section 7.3.1 of our 2024 GAR and Section 3.4 below.		
Expansive Soils	Untreated Risk	Residual Risk	Risk Owner
	12 (High)	4 (Low)	Foundation Designer
Potential Susceptibility	Laboratory testing found that the soils present on this site are outside of the definition of 'Good Ground' in NZS 3604 on account of soil expansivity.		
Mitigation Measures	Refer to Section 8.2 of our 2024 GAR.		
Sensitive Soils	Untreated Risk	Residual Risk	Risk Owner
	6 (Medium)	3 (Low)	Contractor
Potential Susceptibility	Zone 1 soils are relatively sensitive to disturbance, and Zone 2 soils may also be sensitive to disturbance.		
Mitigation Measures	Refer to Section 8.4 of our 2024 GAR.		
Collapsible Soils	Untreated Risk	Residual Risk	Risk Owner
	1 (Very Low)	1 (Very Low)	N/A
Potential Susceptibility	No evidence of collapsible soils was encountered on this site.		
Mitigation Measures	Nil		
Landslide Susceptible Ground	Untreated Risk	Residual Risk	Risk Owner
	2 (Very Low)	2 (Very Low)	N/A
Potential Susceptibility	The prevailing topography on site slopes at less than 1(v) in 4(h), with no obvious evidence of slope instability other than shallow seated movements within localised over steepened gully flanks. As discussed in Section 7.2 of our 2024 GAR, the primary area of concern is the proposed 1(v) in 4(h) flanks forming the proposed stormwater conveyance channel incised within Zone 1 soils. We have updated the stormwater conveyance channel stability analysis undertaken as part of our 2024 GAR, and slope stability of this channel is assessed in Section 3.5 below.		
Mitigation Measures	Nil		
Stream Instability and Erosion	Untreated Risk	Residual Risk	Risk Owner
	1 (Very Low)	1 (Very Low)	N/A
Potential Susceptibility	There are several artificial watercourses present on site, however these are expected to be rerouted (e.g., into the proposed stormwater conveyance channel) as part of the proposed development. We anticipate stream erosion will be considered at the subdivision design stage by the Civil Engineer. Stream instability is therefore not considered a high risk to the proposed development.		
Mitigation Measures	Nil		

Coastal Instability and Erosion	Untreated Risk	Residual Risk	Risk Owner
	1 (Very Low)	1 (Very Low)	N/A
Potential Susceptibility	The nearest coastline is located approximately 2.5km to the west of the site.		
Mitigation Measures	Nil		
Geothermal Issues	Untreated Risk	Residual Risk	Risk Owner
	1 (Very Low)	1 (Very Low)	N/A
Potential Susceptibility	There is no evidence of geothermal activity on this site.		
Mitigation Measures	Nil		
Soil Erosion	Untreated Risk	Residual Risk	Risk Owner
	4 (Low)	2 (Very Low)	Contractor
Potential Susceptibility & Mitigation Measures	The risk of erosion is considered low provided appropriate silt control erosion control measures are completed during construction works in accordance with GD05.		
Rockfall or Falling Debris	Untreated Risk	Residual Risk	Risk Owner
	1 (Very Low)	1 (Very Low)	N/A
Potential Susceptibility	There is no ground elevated steeply above the site.		
Mitigation Measures	Nil		
Uncontrolled Fill	Untreated Risk	Residual Risk	Risk Owner
	4 (Low)	2 (Very Low)	Contractor and Geotechnical Engineer
Potential Susceptibility	An area of uncontrolled fill was encountered during site works in July 2024 (likely associated with an old rubbish pit). The presence of rubbish pits elsewhere should never be discounted in farm environments.		
Mitigation Measures	Refer to Section 8.3 of our 2024 GAR.		
Groundwater Drawdown	Untreated Risk	Residual Risk	Risk Owner
	4 (Low)	4 (Low)	N/A
Potential Susceptibility	The proposed cuts are up to approximately 19m deep. The groundwater table was measured at up to 0.2m depth in our machine borehole piezometers. We have undertaken an AUP Section E7 assessment in Section 3.2 below.		
Mitigation Measures	Nil		

3.2 Groundwater Drawdown: AUP Section E7 Assessment

As part of our 2024 report, groundwater measurements were undertaken in machine borehole piezometers across the site over the course of a seasonal year. These groundwater measurements are shown in Table 2 below.

Table 2: Machine Borehole Piezometer Groundwater Measurements

Machine Borehole	Proposed Cut Depth at Borehole Location (m)	Groundwater Measurements (mBEGL)				
		30.04.21	30.07.21	27.10.21	17.01.22	09.02.23
MH01	2.0	1.66	1.05	1.61	1.73	-
MH02	2.0	1.57	0.50	-	0.92	-
MH04	0.5	3.37	0.60	2.92	3.30	-
MH05	-	1.46	0.50	0.52	1.00	-
MH06	6.0	7.17	3.50	4.26	5.68	-
MH07	-	1.87	0.60	0.56	0.72	-
MH08	-	3.23	3.45	3.39	3.37	-
MH09	-	1.55	0.40	0.39	0.91	-
MH10	-	2.69	1.00	0.97	2.43	-
MH11	2.0	2.54	0.20	0.32	1.28	-
MH12	-	1.30	1.20	1.17	1.44	-
MH13	2.0	1.26	0.60	0.63	1.03	-
MH14	-	-	-	-	-	1.15
MH15	-	-	-	-	-	1.16

The highest groundwater measurements in each piezometer have been conservatively taken as the assumed 'natural' groundwater level for the purposes of our AUP E7 assessment. As such, the maximum expected potential drawdown as a result of the proposed cuts/earthworks is approximately 2.5m (at the location of MH06). This is generally consistent with the Earthtech Consulting Limited groundwater dewatering report (refer Section 2.1).

Table 3 assesses the compliance of the proposed excavations to the AUP E7 groundwater guidelines, rules E.7.6.1.6 and E7.6.2.10:

Table 3: AUP E7 Assessment

	Activity	Applicability to Site
E7.6.1.6	**(1)** The water take must not be geothermal water.	**Complies:** There is no evidence of geothermal activity at the site.
	(2) The water take must not be more than 10 days (peat), or 30 days (other soils).	**Does Not Comply:** Groundwater take will be permanent.
	(3) The water take must only occur during construction.	**Does Not Comply:** Groundwater take will be permanent.

	Activity	Applicability to Site
E7.6.1.10	**(2)** Any excavation that extends below natural groundwater level must not exceed 1ha and 6m depth below the natural ground level	**Does Not Comply:** Excavations in the eastern corner of the site are shown to be more than 1ha and will extend more than 6m below the natural ground level.
	(3) The natural groundwater level must not be reduced by more than 2m on the boundary of any adjoining site.	**Complies:** The maximum expected potential drawdown resulting from the proposed excavations is approximately 2.5m.
	4) Any structure, excluding sheet piling remaining in place no more than 30 days, that physically impedes the flow of groundwater must not impede the flow of groundwater over a length of more than 20m or extend more than 2m below the natural groundwater level	**Complies:** No structure that physically impedes the flow of groundwater is proposed.
	(5a) The distance to any existing neighbouring structure (excluding timber fences and small structures) from the edge of any excavation extending below natural groundwater level must be at least equal to the depth of the excavation	**Complies:** The proposed excavations are generally centralized in the site (i.e., excavations extending below natural groundwater level are positioned well away from site boundaries). The point of maximum expected potential drawdown (MH13) is located more than 25m from the nearest site boundary, and the point of maximum proposed cut anywhere on site is located approximately 200m from the nearest site boundary.

Our assessment has found that a permanent groundwater drawdown of up to 2.5m can be anticipated based on the proposed cuts. The excavation therefore does not comply to rule E7.6.1.6 (2) and (3) or rule E7.6.1.10 (2).

The anticipated potential drawdowns as a result of the proposed cuts/earthworks are up to 1.5m in the Zone 1 'peat' soils (at the location of MH02) and up to 2.5m in the Zone 2 East Coast Bays Formation (ECBF) soils (at the location of MH06). Consolidation settlement as a result of groundwater drawdown based on typical coefficient of compressibility values of 1.2×10^{-3} m^2 kN^{-1} for the 'peat' soils and 3.0×10^{-5} m^2 kN^{-1} for the ECBF soils (based on the findings of our 2024 report) is calculated to be less than 30mm, as outlined below.

- Zone 1 'Peat' Soils:
    - Coefficient of compressibility (Mv) = $1.2x10^{-3}$ m^2 kN^{-1} (refer Appendix 3.1 from our 2024 report)
    - Thickness of affected soil (d) = 1.5m
    - Change in stress (Δσ) = unit weight of water x depth of drawdown = $15kNm^{-2}$
    - Total settlement = Mv x d x Δσ = <30mm
- Zone 2 ECBF Soils:
    - Coefficient of compressibility (Mv) = $3.0x10^{-5}$ m^2 kN^{-1} (refer Appendix 3.1 from our 2024 report)
    - Thickness of affected soil (d) = 2.5m
    - Change in stress (Δσ) = unit weight of water x depth of drawdown = $25kNm^{-2}$
    - Total settlement = Mv x d x Δσ = <5mm

Further to this, all excavations extending below natural groundwater level are positioned well away from site boundaries, with the point of maximum expected potential drawdown located more than 25m from the nearest site boundary. As such, we consider that the anticipated groundwater drawdowns will have a negligible effect on any neighbouring structures. A programme of preloading is also proposed following bulk earthworks, which will allow any settlements induced by groundwater drawdown to attenuate prior to construction of end use structures. **Groundwater drawdown should therefore be dismissed as a geotechnical issue and a Consent (if deemed necessary) issued for this proposed development.**

No retaining walls are proposed as part of the development (i.e., retaining structures proposed are limited to box culverts, bridge abutments, etc.), and as such mechanical settlement resulting from retaining structures is dismissed as a geotechnical issue. Based on this consideration and the above drawdown assessment, **a Groundwater Settlement Monitoring & Contingency Plan (GSMCP) is not considered necessary for the proposed development.**

3.3 Liquefaction

3.3.1 Computer Liquefaction Analysis

We have updated the liquefaction assessment undertaken in Section 7.4 of our 2024 GAR to incorporate the additional CPT data provided to us (refer Section 2.2) as well as the latest earthworks plans.

Our liquefaction assessment has been completed using GeoLogismiki CLiq v.3.5.2.5 software and in accordance with the parameters and assumptions used in our previous assessment, with the following exceptions:

- The proposed cuts and fills have been modelled for both SLS (Case 1) and ULS (Case 2) scenarios.
- For the additional CPTs, clay-like cyclic softening was applied where the CPTs / nearby boreholes indicate Undifferentiated Holocene Alluvium (i.e., we have followed the same assumptions used in our previous assessment for the geological zoning of all previously assessed CPTs).

Detailed summary tables and full output results from our computer liquefaction analyses are presented in Appendix D.

No vertical settlements were calculated under SLS seismic conditions for any CPT, with the exception of CPT131 where theoretical vertical settlements of up to 90mm were calculated. Under ULS seismic conditions, theoretical vertical settlements of up to 150mm were calculated, again with the exception of CPT131 where theoretical vertical settlements of up to 430mm were calculated.

However, these vertical settlement values do not take into account non-liquefiable crust thickness overlying the liquefiable layers, nor do they account for the Liquefaction Severity Number (LSN) for each analysis or the geological age and fabric of the soils. The geological age and soil fabric criteria are outlined in Sections 7.4.3 and 7.4.4 of our 2024 GAR (these factors remaining unchanged), and the non-liquefiable crust thickness and LSN criteria are outlined in Sections 3.3.2 and 3.3.3 below. Further, assessed vertical settlements following consideration of these factors are presented in Section 3.3.4 below.

3.3.2 Liquefaction Severity Number

MBIE Module 3 Table 5.1 (inset right) indicates expected performance levels for liquefied deposits based on the Liquefaction Severity Number (LSN). The potential for ground surface damage as a result of the computer liquefaction settlements has therefore been evaluated using LSNs for each CPT assessed.

Table 5.1: General performance levels for liquefied deposits

	EFFECTS FROM EXCESS PORE WATER PRESSURE AND LIQUEFACTION	CHARACTERISTICS OF LIQUEFACTION AND ITS CONSEQUENCES	CHARACTERISTIC F_L, LPI, LSN
L0	Insignificant	No significant excess pore water pressures (no liquefaction).	$F_L > 1.4$ LPI=0 LSN <10
L1	Mild	Limited excess pore water pressures; negligible deformation of the ground and small settlements.	$F_L > 1.2$ LPI = 0 LSN = 5 – 15
L2	Moderate	Liquefaction occurs in layers of limited thickness (small proportion of the deposit, say 10 percent or less) and lateral extent; ground deformation results in relatively small differential settlements.	$F_L = 1.0$ LPI < 5 LSN 10 – 25
L3	High	Liquefaction occurs in significant portion of the deposit (say 30 percent to 50 percent) resulting in transient lateral displacements, moderate-to-large differential movements, and settlement of the ground in the order of 100 mm to 200 mm.	$F_L < 1.0$ LPI = 5 – 15 LSN = 15 – 35
L4	Severe	Complete liquefaction develops in most of the deposit resulting in large lateral displacements of the ground, excessive differential settlements and total settlement of over 200 mm.	$F_L << 1.0$ LPI > 15 LSN > 30
L5	Very severe	Liquefaction resulting in lateral spreading (flow), large permanent lateral ground displacements and/or significant ground distortion (lateral strains/stretch, vertical offsets and angular distortion).	

Inset 1: MBIE Module 3 Table 5.1

As shown in Appendix D, the calculated LSN value for SLS ground shaking in CPT131 (the only CPT where liquefaction was calculated under SLS conditions) is 15, indicating insignificant to mild effects as a result of liquefaction. The LSN values for ULS ground shaking are typically less than 10 with almost all of the remaining values in excess of 10 but still less than 15. This indicates insignificant to mild effects as a result of liquefaction across all but six of the analysed CPTs as per MBIE Module 3 Table 5.1. However, CPT102, 123, 202, and 302 have calculated LSNs between 25 and 35 (moderate to high effects as a result of liquefaction), while CPT131 and CPT206 have calculated LSNs in excess of 35.

The average LSN for the Zone 1 soils for the ULS case is approximately 8.3, while the average LSN for the Zone 2 soils is approximately 7.7. This indicates insignificant to mild liquefaction effects generally prevail under ULS shaking across both of these zones, resulting in limited excess pore water pressures, negligible deformation of the ground and small settlements only.

3.3.3 Surface Manifestation Criteria

MBIE Module 3 provides guidance around consideration of crust thickness. A non-liquefiable crust thickness of 3m is generally deemed thick enough to suppress surface manifestation of deep liquefaction occurrence for earthquakes with a PGA of 0.2g or less.

Research completed by Bowen & Jacka (2013)[1] has compared this theory to the damage recorded during the 2010 and 2011 Canterbury earthquake sequence which also found that where the crust thickness of 3m or more is present (for a PGA of 0.2g), liquefaction was considered unlikely to occur as the crust thickness was considered too thick for the underlying liquefied soils to 'break through', for example in the case of sand boils. The research also suggests that the thickness of the underlying liquefied layer is a less important factor except in instances where a liquefied layer of between 0.5m and 2.0m were present within the upper 3m.

The results of our computer liquefaction analysis have considered the thickness of non-liquefiable crust layers, and these demonstrate that the non-liquefiable crust thickness was between 1.0m and 6.3m under ULS seismic conditions (refer Appendix D). For SLS seismic conditions in CPT131 (the only CPT where liquefaction was calculated under SLS conditions), the non-liquefiable crust was 8.0m thick.

A significant number of CPTs in Zone 1 (18 out of 33) have non-liquefiable crusts less than 3m thick under ULS seismic conditions, while out of the Zone 2 CPTs, only 14 out of 49 have non-liquefiable crusts less than 3m thick. Based on this, the Zone 1 soils could result in more surface manifestation of liquefaction during a ULS earthquake, while the Zone 2 soils are generally not expected to show surface manifestation based on crust thickness criteria.

3.3.4 Assessed Vertical Settlements

Based on the criteria assessed above, the Zone 1 soils are possibly susceptible to liquefaction only under ULS shaking with calculated settlements of up to 430mm, while the Zone 2 soils are considered to be less susceptible to liquefaction. Recommendations around development on liquefaction-prone (Zone 1) soils are provided in Section 7.4.7 of our 2024 report. Our recommendations remain unchanged in this regard.

3.4 Consolidation Settlement

We have updated the consolidation settlement assessment undertaken in Section 7.3 of our 2024 report to incorporate the additional CPT data provided to us (refer Section 2.2) as well as the latest earthworks plans.

Our consolidation assessment has been completed using CPeT-IT v3.9.4.11 software (for the CPT data) and DMT Settlements v1.1.2.0 software (for the DMT data) and in accordance with the parameters and assumptions used in our previous assessment, with the following exceptions:

[1] Bowen, H. & Jacka, M. (2013) "Liquefaction induced ground damage in the Canterbury earthquakes: predictions vs reality" Proc. 19th NZGS Geotechnical Symposium.

- Three cases have been modelled. Case 1 has been modelled with the proposed earthworks loads only, Case 2 has been modelled with the proposed end use loads only, and Case 3 has been modelled with both proposed earthworks loads and end use loads. Case 3 settlement values have been calculated from Case 1 plus Case 2 settlement values except where total earthworks plus end use surcharge yields higher settlement values in the software analyses.
- A nominal 10m x 20m rectangular building footprint has been used for proposed residential end use areas, along with a nominal 180m x 360m footprint for proposed commercial or industrial end use areas. For proposed end use loads, a rigid footing (i.e., stiffened pod-raft) is used.
- The end use loads applied to our analyses have been determined from the delivery standard we understand is to be used for the development.

Detailed summary tables and full output results from our computer settlement analyses are presented in Appendix E.

Based on the results of our settlement analyses, total settlement beneath the proposed loads are summarised for Case 1 (earthworks surcharge), Case 2 (end use surcharge) and Case 3 (earthworks plus end use surcharge), respectively, as follows:

Zone 1:

- Up to 345mm, 180mm and 460mm (using the DMT data).
- Up to 920mm, 230mm and 1,010mm (using the CPT data)

Zone 2:

- Up to 0mm, 85mm and 85mm (using the DMT data).
- Up to 240mm, 690mm and 690mm (using the CPT data).

It should be noted that there is a reasonable disparity between CPT and DMT settlement estimations. DMT methods are widely regarded as a more accurate in-situ test for estimating settlements due to the direct measurement of the soil constraint modulus (M). Notwithstanding, trial preloading (as discussed in Section 7.3.1 of our 2024 report and in our trial preload design memorandum referenced in Section 2.1 above) will help assess actual response of the ground to surcharge application, as opposed to reliance on widely varying theoretical estimations.

Our settlement analyses do not encompass the proposed recreational areas, as we understand they are proposed to comprise generally permeable areas with low loadings (e.g. playgrounds). For these recreational areas, consolidation and groundwater drawdown settlements are considered unlikely to present geotechnical risk, however the subdivision design should allow for groundwater recharge as is usual in peat soils, further limiting any risk.

3.5 Slope Stability

We have updated the slope stability assessment undertaken in Section 7.2 of our 2024 report, which assesses the stability of the 1(v) in 4(h) and approximately 3.5m high (measured vertically) flanks of the proposed stormwater conveyance channel. Our slope stability assessment has been completed using Slide2 and in accordance with the parameters and assumptions used in our previous assessment, with the following exceptions:

- For the seismic scenario, a factor of safety (FoS) of 1.0 and ULS seismic load of 0.19g was used as specified in the NZGS Earthquake Geotechnical Engineering Practice Module 1, 2022.

Full output results from our computer settlement analyses are presented in Appendix C.

The existing groundwater and elevated groundwater scenarios both returned satisfactory FoS in our analyses. However, the ULS seismic FoS was not achieved, and a Newmark analysis was performed to estimate the permanent slope displacement. Estimated displacements for existing conditions using the displacement-based Jibson (2007) method estimates that limited (50th percentile permanent) lateral displacement of up to 3mm could occur at this site. Therefore, lateral displacement from the analysed earthquake event is considered insignificant.

Nevertheless, as discussed in our 2024 report, the proposed channels are subject to detailed design and it is recommended that further geotechnical assessments are completed once the final channel locations and geometries have been confirmed.

4 LIMITATIONS

This addendum report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for Sunfield Developments Limited in relation to the specific project described herein, in accordance with the brief given to us or the agreed scope. Sunfield Developments Limited will be deemed the exclusive owner on full and final payment of the invoice.

Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended. All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

This report was prepared in general accordance with current standards, codes and best practice at the time of this report. These may be subject to change.

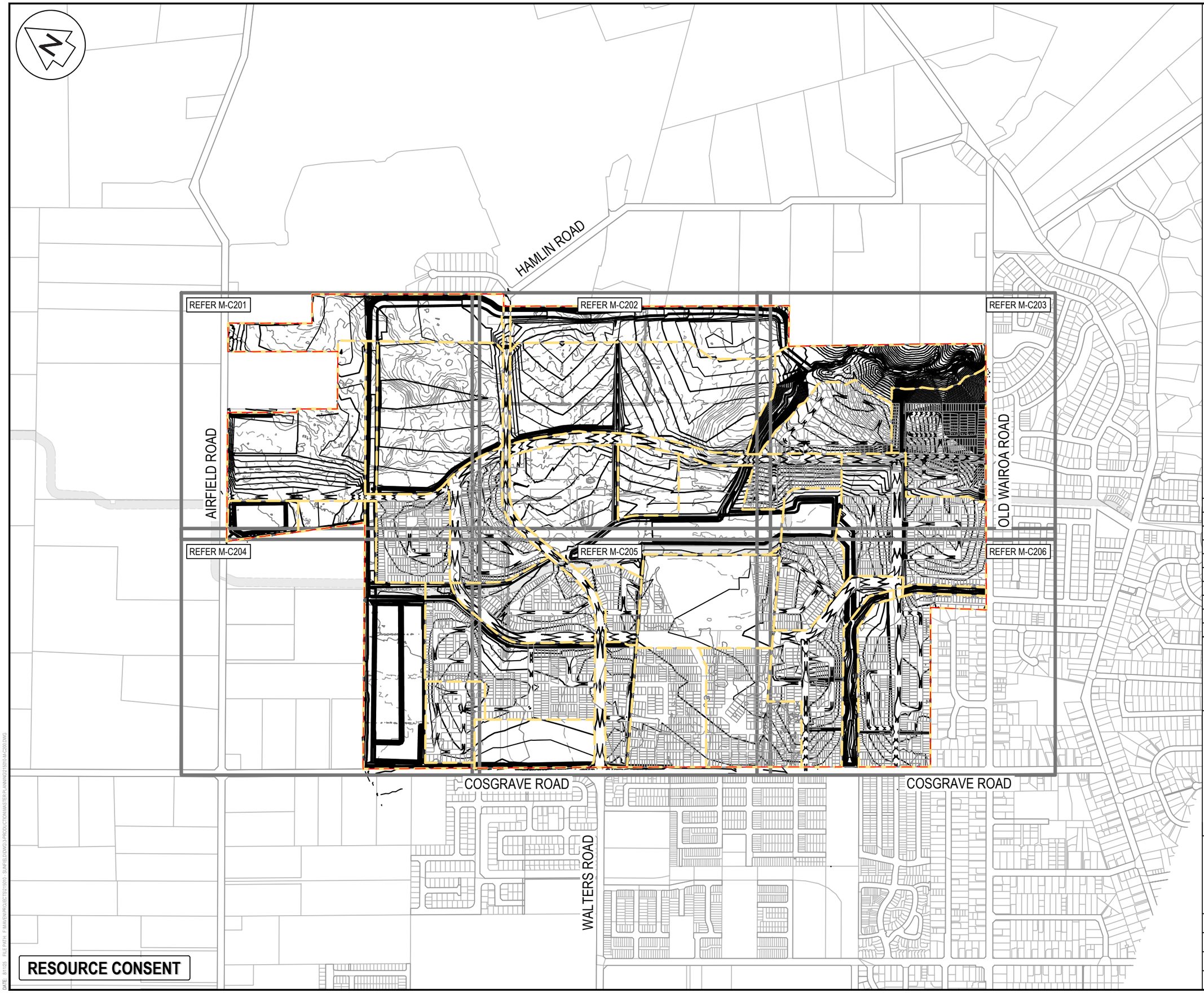
Factual evidence, opinions, recommendations and comments given in this report result from the application of normal methods of site investigation and are based on visual methods and subsurface investigations at discrete

locations and are designed to the constraints of the project scope to provide the best assessment of the environment. By their nature these methods only provide information about a relatively small volume of subsoils and it must be appreciated that the nature and continuity of the subsurface materials between these locations are inferred and that actual conditions could vary from that described herein. There may therefore be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report.

We should be contacted immediately if the conditions are found to differ from those described or assumed to exist in this report.

APPENDIX A

CLIENT SUPPLIED DRAWINGS



RESOURCE CONSENT

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM (NZVD) 2016.
3. ORIGIN OF LEVELS = SM 5812 SO 58209 (BUU5) PUBLISHED RL=30.588, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
6. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
7. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
8. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO ENGINEER.
9. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

- EX BDY
- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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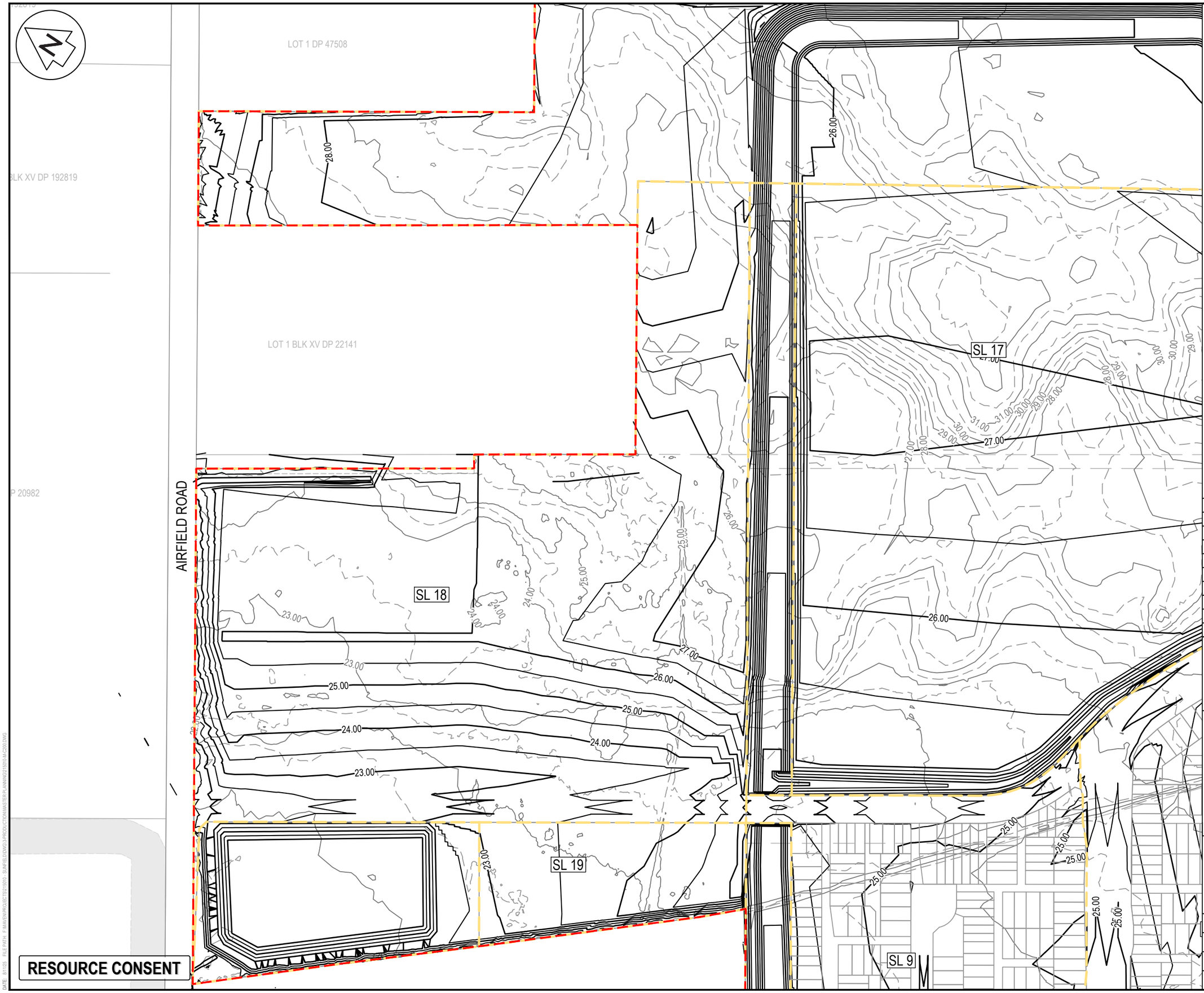
Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED OVERVIEW EARTHWORKS PLAN

Project no.	215010		
Scale	1:10000 @ A3		
Cad file	215010-M-C200.DWG		
Drawing no.	M-C200	Rev	A



NOTES

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9. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

- EX BDY
- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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Project

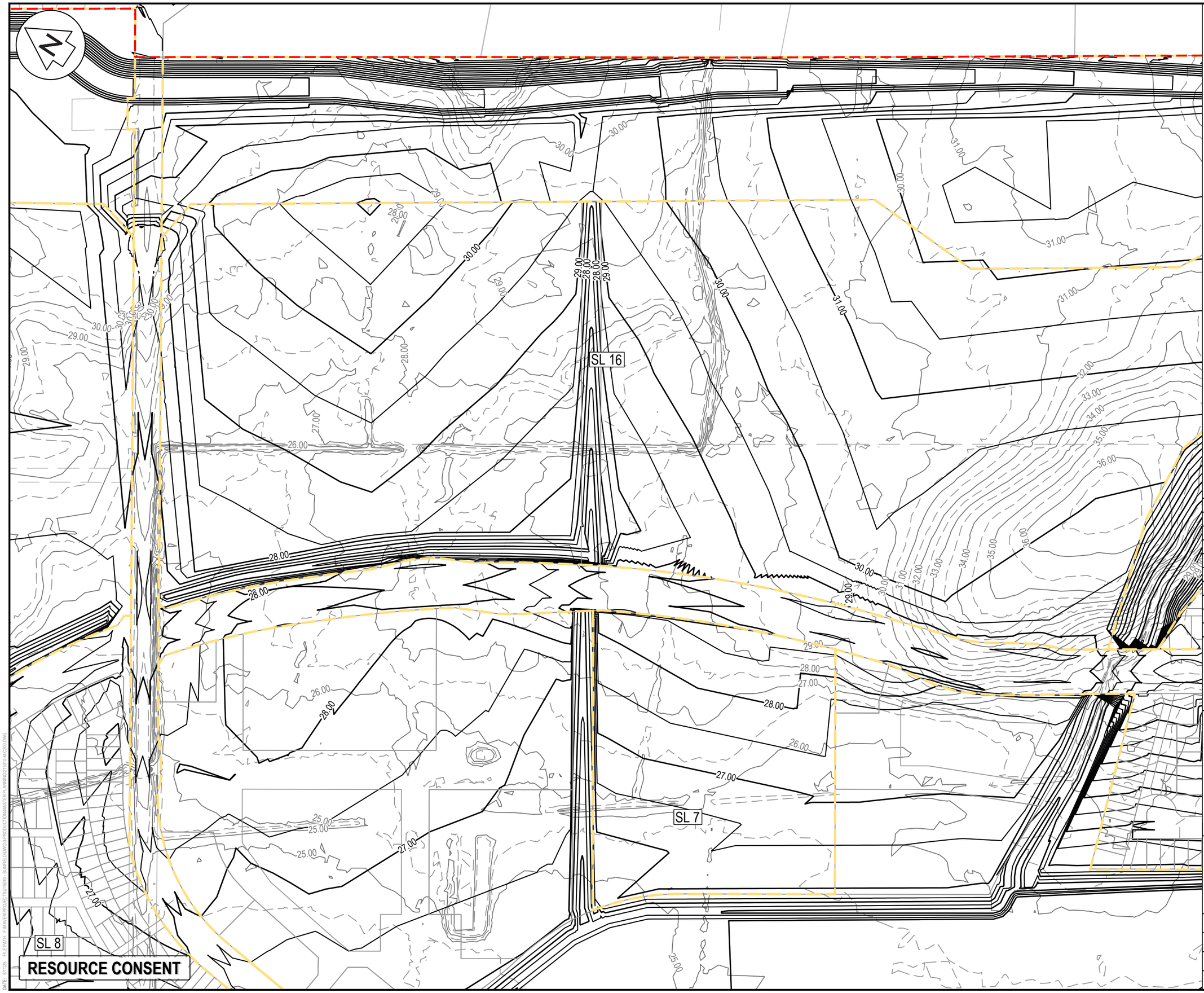
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED EARTHWORKS PLAN: SHEET 1

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C200.DWG
Drawing no.	M-C201 Rev A

RESOURCE CONSENT



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- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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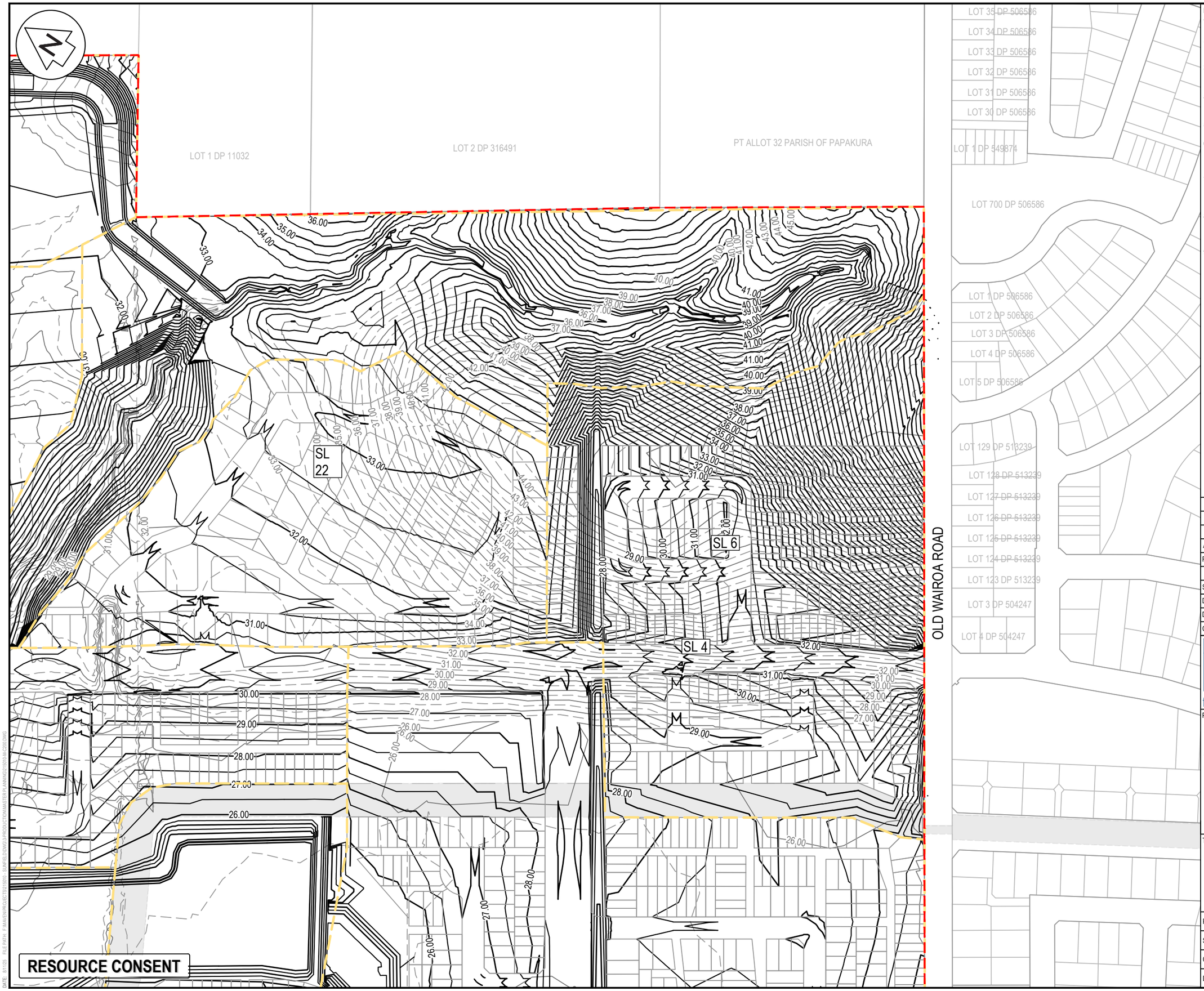
Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED EARTHWORKS PLAN: SHEET 2

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C200.DWG
Drawing no.	M-C202 Rev A



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- EX BDY
- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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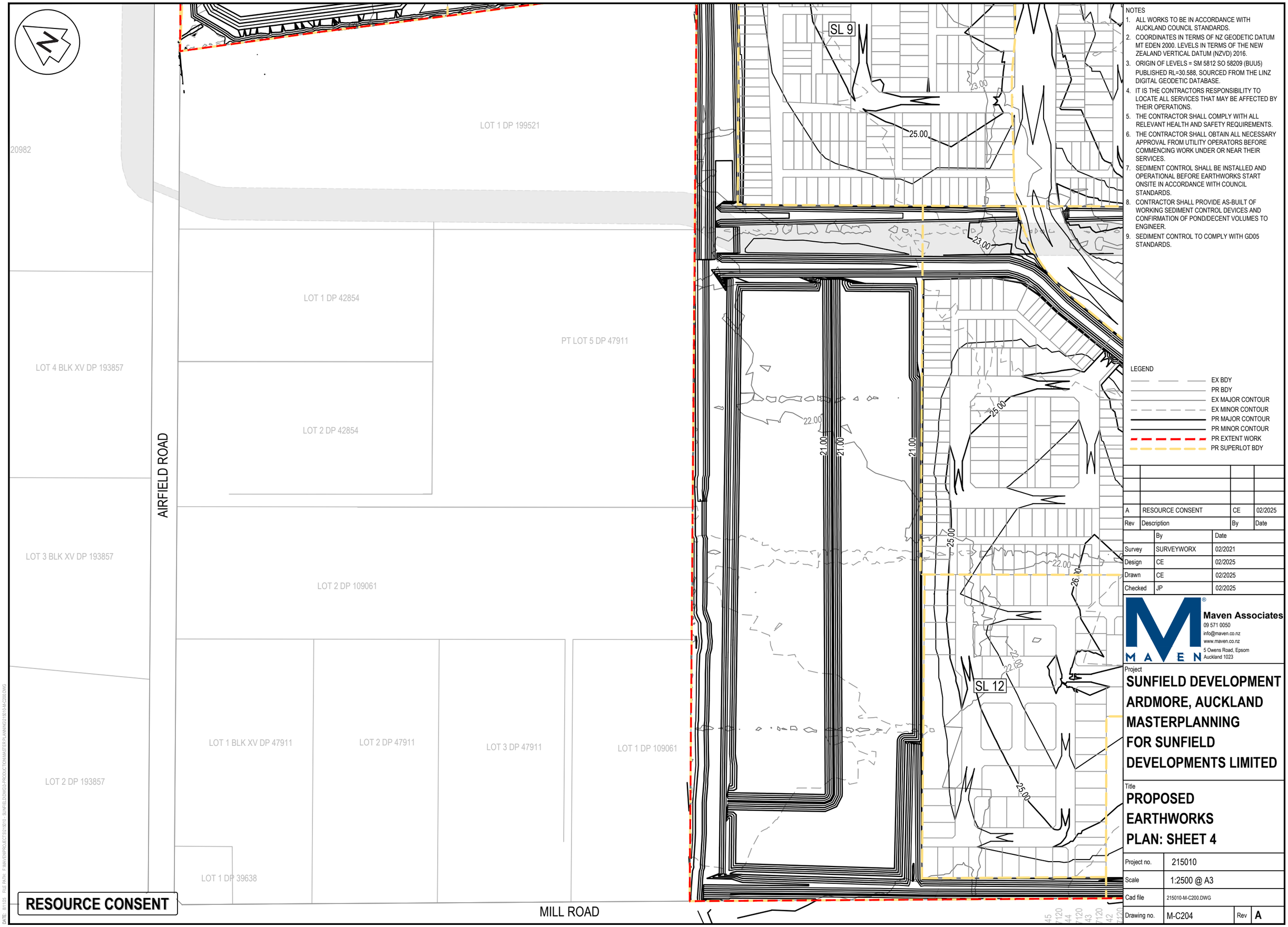
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED EARTHWORKS PLAN: SHEET 2

Project no.	215010		
Scale	1:2500 @ A3		
Cad file	215010-M-C200.DWG		
Drawing no.	M-C203	Rev	A



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LEGEND

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- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

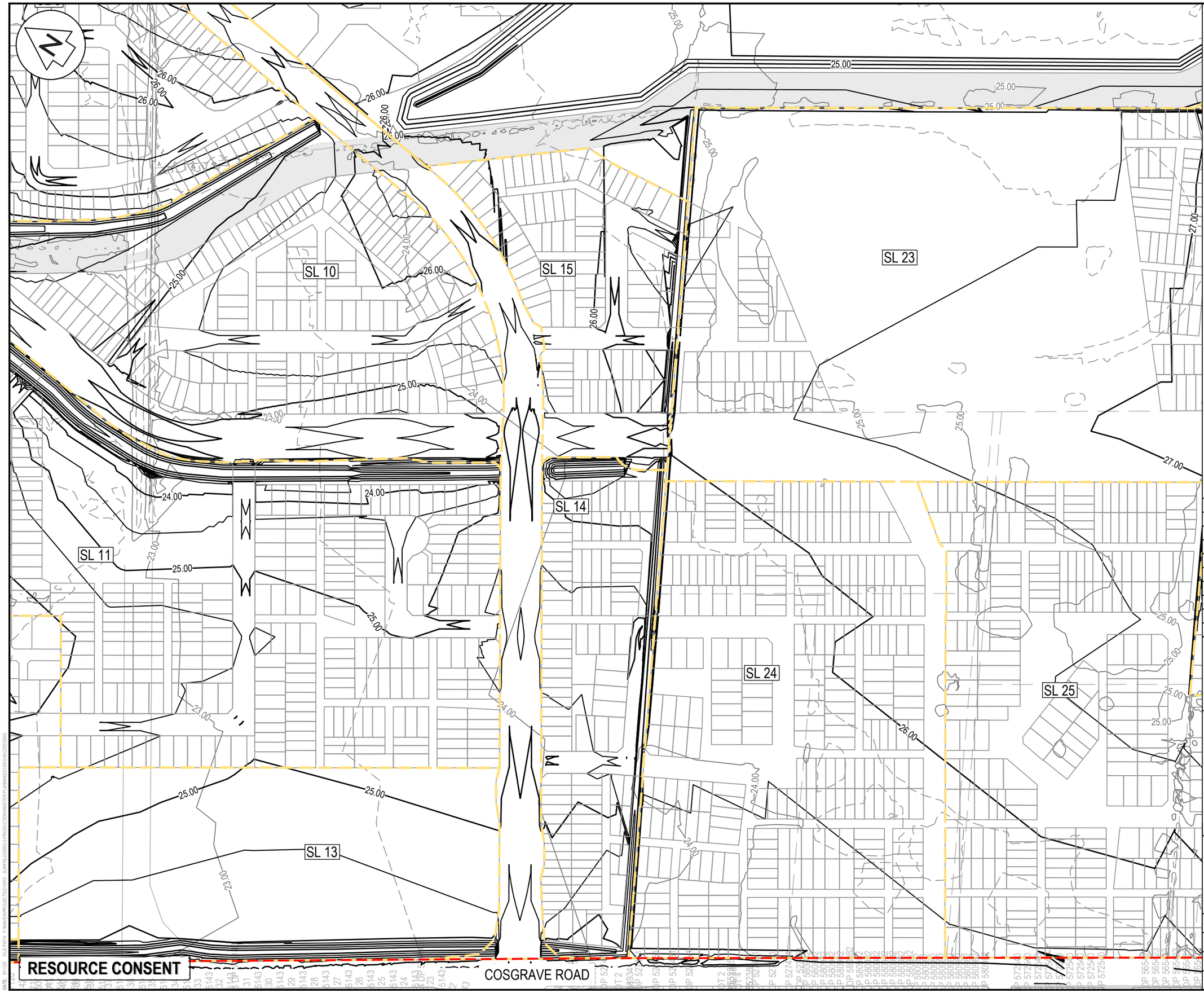
Title

PROPOSED EARTHWORKS PLAN: SHEET 4

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C200.DWG
Drawing no.	M-C204 Rev A

RESOURCE CONSENT

DATE: 8/1/25 FILE PATH: F:\MAVEN\PROJECTS\215010_SUNFIELD\CAD-PRODUCTION\MASTERPLANNING\215010-M-C200.DWG



NOTES

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- EX BDY
- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED EARTHWORKS PLAN: SHEET 5

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C200.DWG
Drawing no.	M-C205 Rev A

DATE: 8/1/25 FILE PATH: P:\MAVEN\PROJECTS\2015\SUNFIELD\WORKS\PRODUCTION\MASTERPLANNING\215010-M-C200.DWG

NOTES

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LEGEND

- EX BDY
- PR BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PR EXTENT WORK
- PR SUPERLOT BDY

Rev	Description	By	Date
A	RESOURCE CONSENT	CE	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	CE	02/2025
Drawn	CE	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

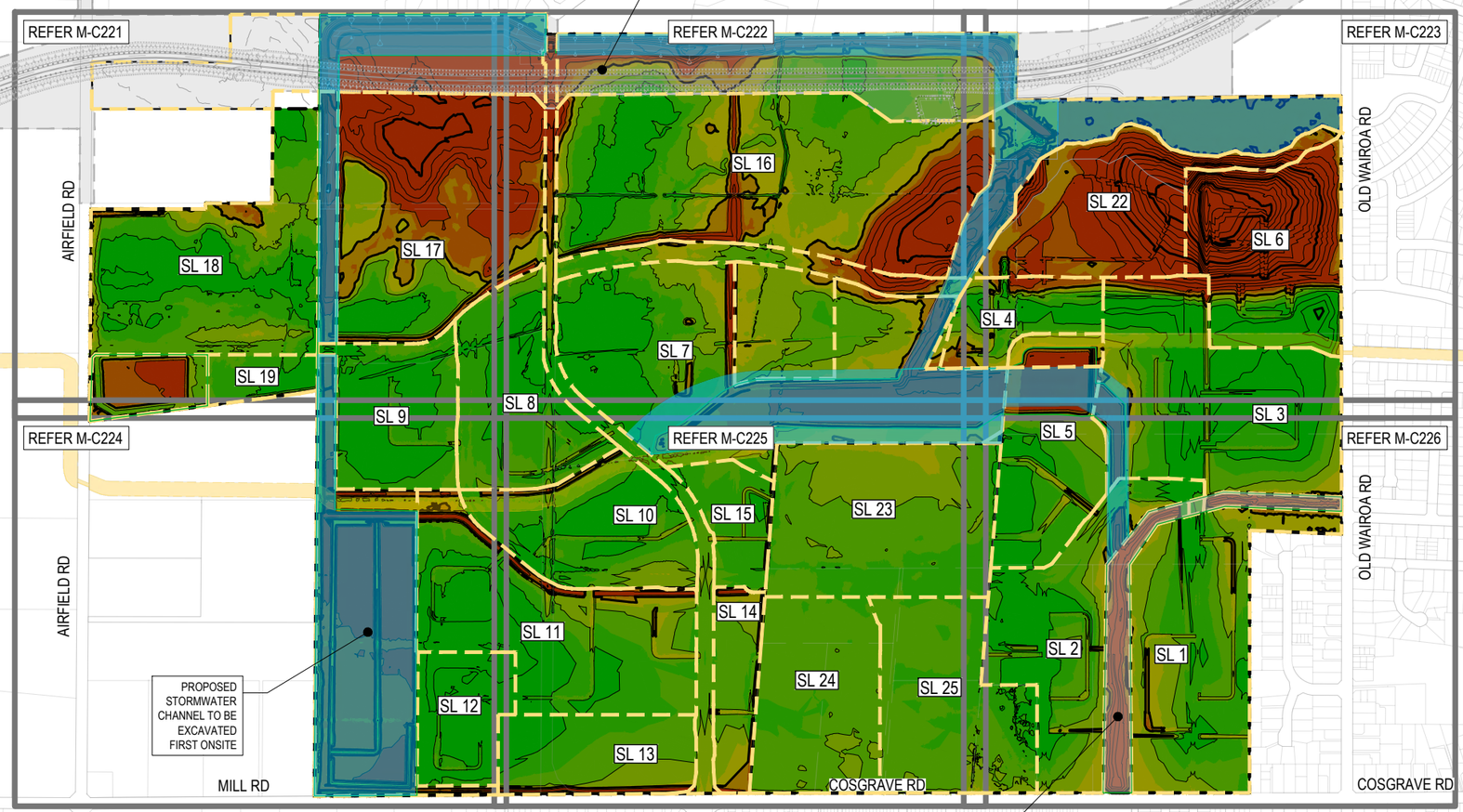
Title

PROPOSED EARTHWORKS PLAN: SHEET 6

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C200.DWG
Drawing no.	M-C206 Rev A

EARTH WORKS (SURFACE BULK EARTHWORKS WITH ROAD SUBGRADE COMPARISON WITH SURFACE EGL)

EARTHWORKS AREA	2,440,000m² / 244 Ha
FILL REQUIRED (EXCLUDES PRELOAD)	1,490,000 m³
CUT VOLUME	1,700,000 m³
BULK EARTHWORKS CUT TO FILL (INCLUDING COMPACTION FACTOR OF 0.8)	1,360,000 m³
CUT TO FILL OF SURPLUS MATERIAL FROM SERVICES & DRAINAGE	100,000 m³
NET CUT/FILL BALANCE (FILL IMPORT)	30,000 m³
PRELOAD (IMPORT) (BASED ON PRELOADING ONE SUPERLOT AT A TIME)	100,000 m³



NOTES

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LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- SUPER LOT BDY

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-18.84	-1.00	
2	-1.00	-0.50	
3	-0.50	0.00	
4	0.00	0.50	
5	0.50	1.00	
6	1.00	1.50	
7	1.50	2.00	
8	2.00	5.39	

Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

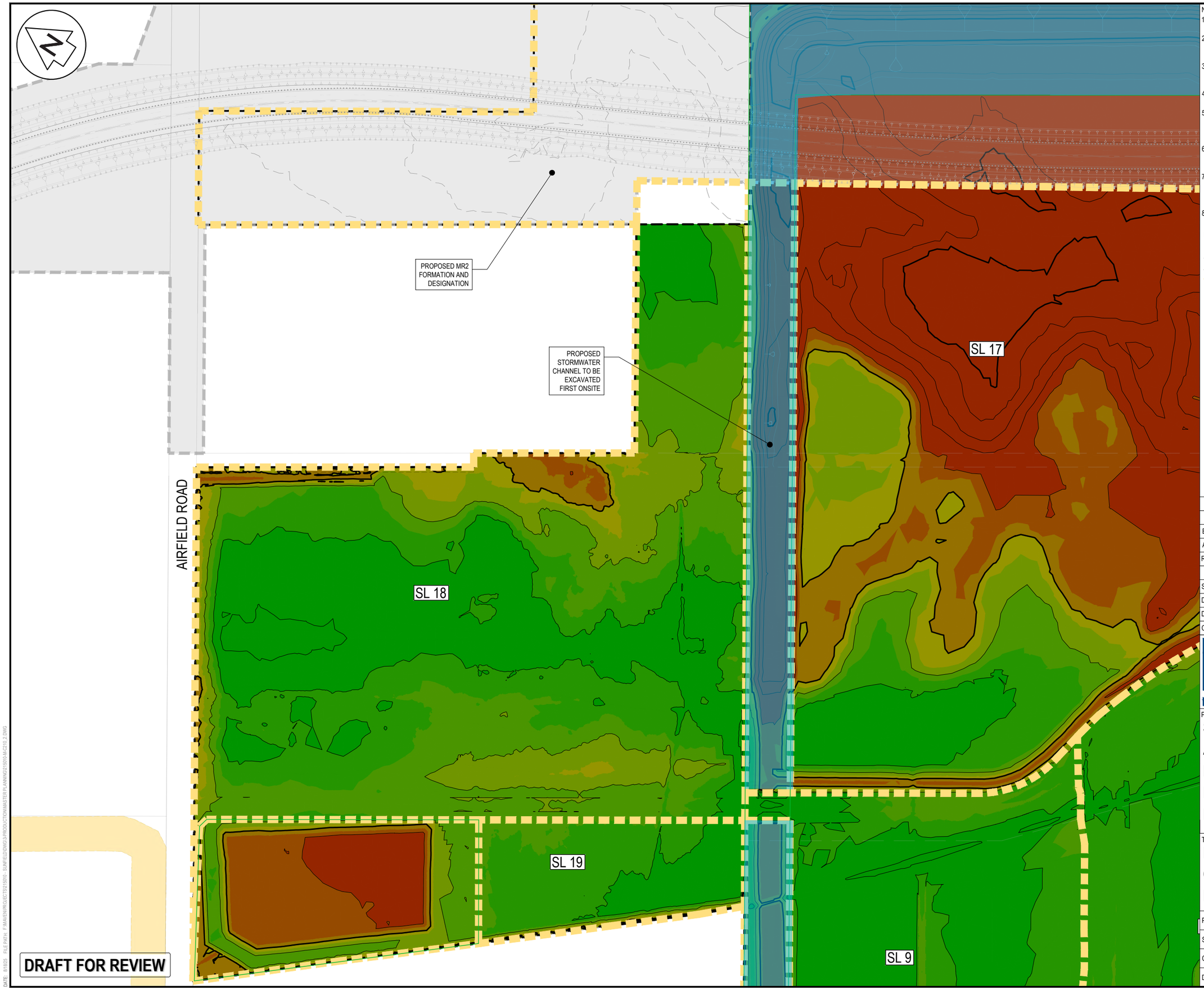
Title

PROPOSED OVERVIEW CUT/FILL PLAN

Project no.	215010
Scale	1:10000 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C210 Rev B

DRAFT FOR REVIEW

DATE: 8/10/25 FILE PATH: F:\MAVEN\PROJECTS\215010_SUNFIELD\DWG\3-PRODUCTION\MASTERPLANNING\215010-M-C210_2.DWG



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Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED CUT/FILL PLAN: SHEET 1

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C211 Rev B

DRAFT FOR REVIEW

DATE: 3/18/25 FILE PATH: P:\MAVEN\PROJECTS\215010 - SUNFIELD\DWGS\PRODUCTION\MASTER PLANNING\215010-M-C210_2.DWG

PROPOSED MR2 FORMATION AND DESIGNATION

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

SL 16

SL 7

SL 8

DRAFT FOR REVIEW

NOTES

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Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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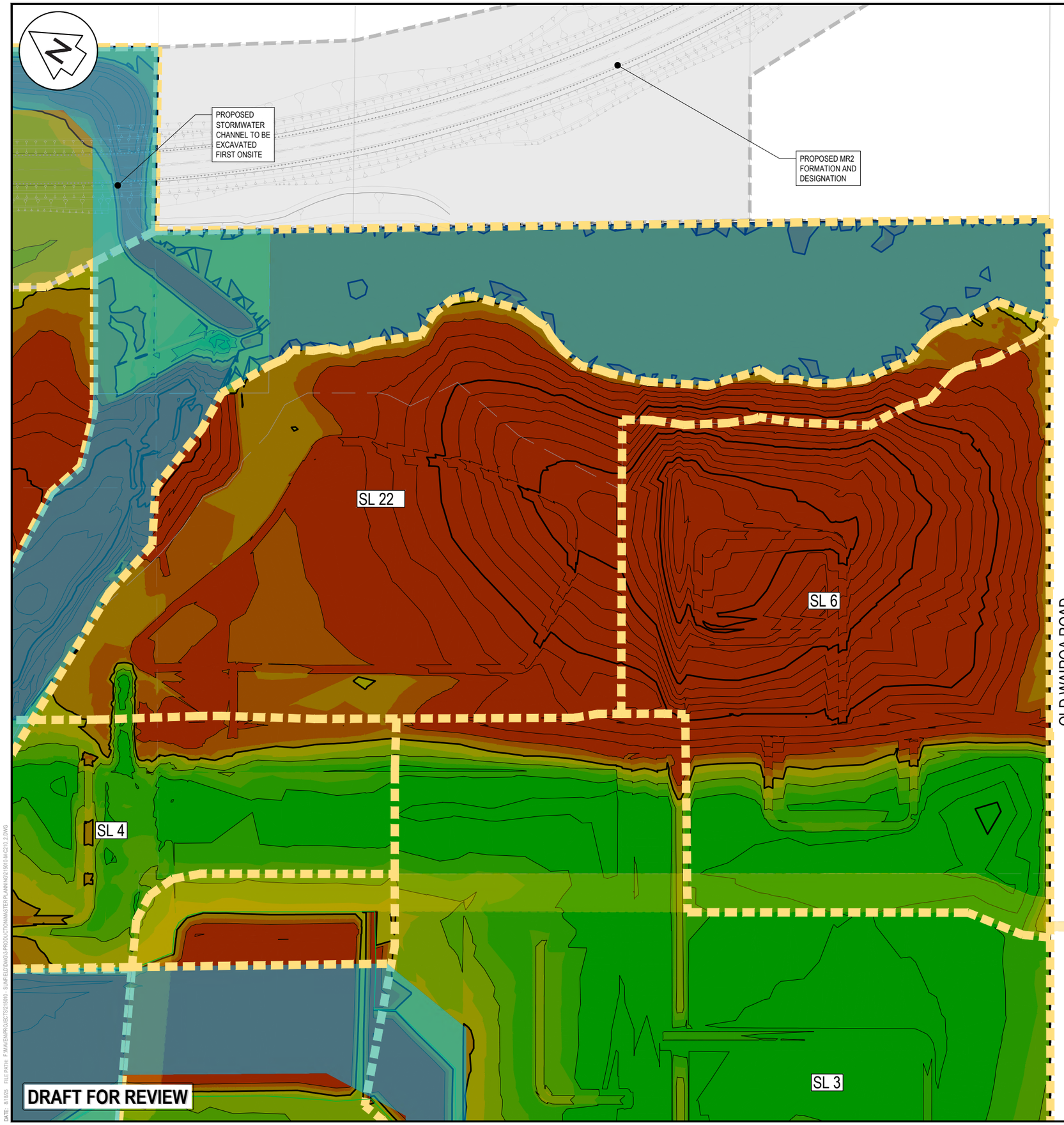
Project

SUNFIELD DEVELOPMENT
ARDMORE, AUCKLAND
MASTERPLANNING
FOR SUNFIELD
DEVELOPMENTS LIMITED

Title

PROPOSED
CUT/FILL
PLAN: SHEET 2

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C212 Rev B



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Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
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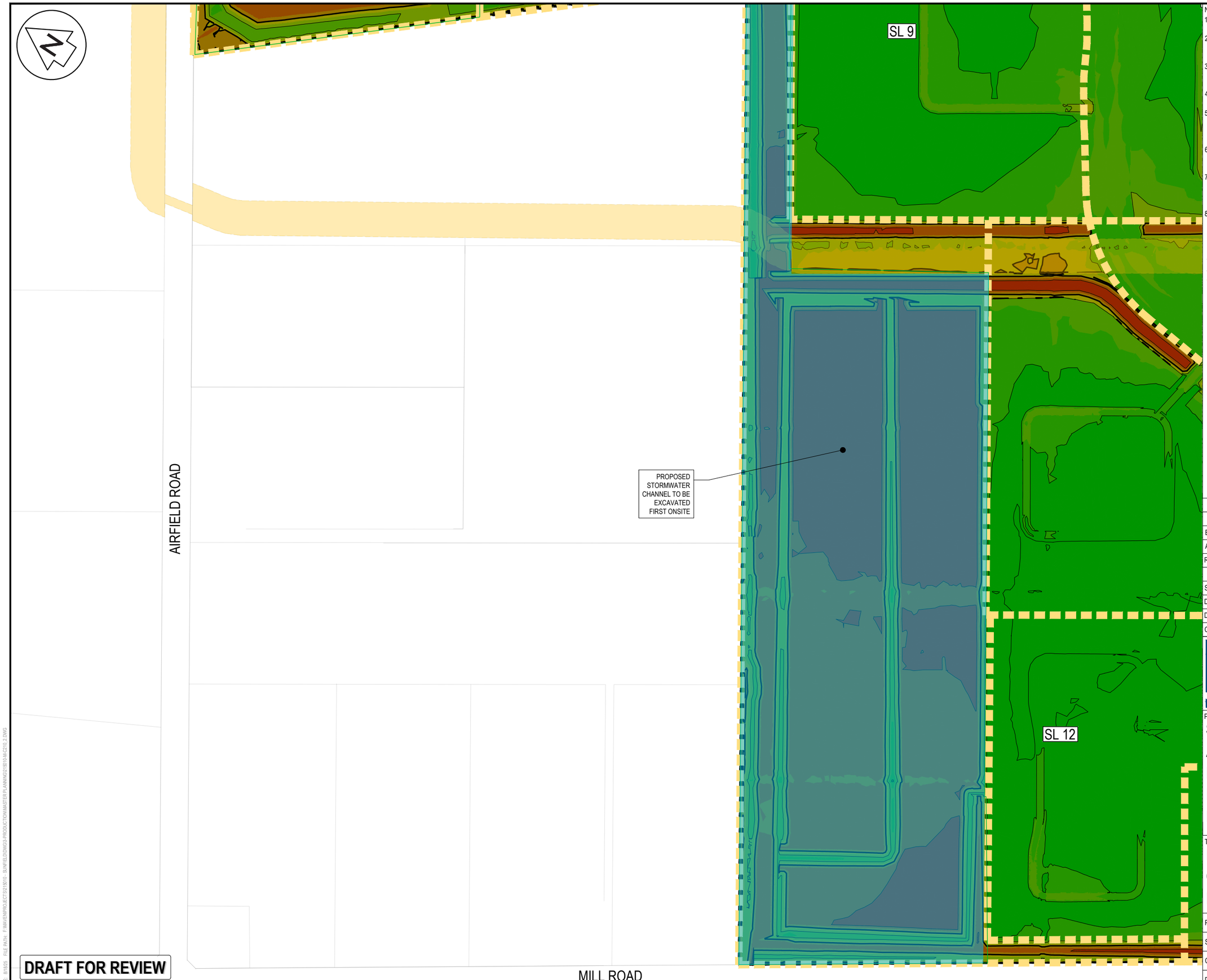
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED CUT/FILL PLAN: SHEET 2

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C213 Rev B



NOTES

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8. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- SUPER LOT BDY

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-18.84	-1.00	
2	-1.00	-0.50	
3	-0.50	0.00	
4	0.00	0.50	
5	0.50	1.00	
6	1.00	1.50	
7	1.50	2.00	
8	2.00	5.39	

Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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5 Owens Road, Epsom
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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED CUT/FILL PLAN: SHEET 4

Project no.	215010		
Scale	1:2500 @ A3		
Cad file	215010-M-C210_2.DWG		
Drawing no.	M-C214	Rev	B

DRAFT FOR REVIEW

NOTES

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LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- SUPER LOT BDY

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
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2	-1.00	-0.50	
3	-0.50	0.00	
4	0.00	0.50	
5	0.50	1.00	
6	1.00	1.50	
7	1.50	2.00	
8	2.00	5.39	

Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED CUT/FILL PLAN: SHEET 5

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C215 Rev B

DRAFT FOR REVIEW

DATE: 8/10/25 FILE PATH: F:\MAVEN\PROJECTS\215010_SUNFIELD\DWG\3-PRODUCTION\MASTERPLANNING\215010-M-C210_2.DWG

DRAFT FOR REVIEW

NOTES

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8. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND

- EX BDY
- PROP BDY
- PROP EXTENT WORK
- SUPER LOT BDY

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	-18.84	-1.00	
2	-1.00	-0.50	
3	-0.50	0.00	
4	0.00	0.50	
5	0.50	1.00	
6	1.00	1.50	
7	1.50	2.00	
8	2.00	5.39	

Rev	Description	By	Date
B	S52 RESPONSE	CE	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED CUT/FILL PLAN: SHEET 6

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C210_2.DWG
Drawing no.	M-C216 Rev B

DATE: 2/08/25 FILE PATH: P:\MAVEN\PROJECT\215010 - SUNFIELD\DWGS\PRODUCTION\MASTER PLANNING\215010-M-C210_2.DWG

OVERLAND FLOW CATCHMENT

OVERLAND FLOW CATCHMENT

HAMLIN ROAD

SUPER SILT FENCE AROUND STORMWATER CHANNEL AFTER EXCAVATION

OVERLAND FLOW CATCHMENT

EXISTING STREAM CHANNEL TO BE PROTECTED

REFER TO M-C221

REFER TO M-C222

REFER TO M-C223

EXISTING STREAM CHANNEL TO BE PROTECTED

STABILISED VEHICLE ENTRANCE

STAGE 4

STABILISED VEHICLE ENTRANCE

SUPER SILT FENCE TO PROTECT EXISTING STREAM

AIRFIELD ROAD

OLD WAIROA ROAD

STAGE 2

STAGE 3

REFER TO M-C224

REFER TO M-C225

REFER TO M-C226

STAGE 5

TOPSOIL STOCKPILE AREA

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

PROPOSED STORMWATER CHANNEL. SEDIMENT CONTROL EROSION PLAN SUBMITTED UNDER A DIFFERENT RESOURCE CONSENT. WILL UNDERGO FIRST CONSTRUCTION ONSITE.

STAGE 1

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

STAGE 6

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

SUPER SILT FENCE AROUND STORMWATER CHANNEL AFTER EXCAVATION

COSGRAVE ROAD

WALTERS ROAD

STABILISED VEHICLE ENTRANCE

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

OVERLAND FLOW CATCHMENT

STABILISED VEHICLE ENTRANCE

TOPSOIL STOCKPILE AREA

RESOURCE CONSENT

SOIL GEOLOGY

- S1a - ZONE 1: CRUST MATERIAL
- S1b - ZONE 1: PEAT
- S2a - ZONE 2: OVERCONSOLIDATED CLAYS/SILTS
- S2a - ZONE 2: RESIDUAL CLAYS/SILTS

NOTES

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LEGEND

- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
B	EW MEMO RESPONSE	MA	08/2025
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--/--	--/----
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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Project

SUNFIELD DEVELOPMENT AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENT LTD

Title

PROPOSED SEDIMENT EROSION CONTROL PLAN - OVERVIEW

Project no.	215010
Scale	1:7500 @ A3
Cad file	215010-M-C220.DWG
Drawing no.	M-C220 Rev B

DATE: 8/11/25 FILEPATH: P:\MAVEN\PROJECTS\215010 - SUNFIELD\CIVIL\3-PRODUCTION\MASTER PLANNING\215010-M-C220.DWG

OVERLAND FLOW CATCHMENT

SEDIMENT EROSION POND 4
CATCHMENT AREA = 45914m²
BASE AREA 12.1m x 36m
DEPTH 1.50m
TOP = 18m x 44m
FOREBAY = 5m x 18m
TOTAL AREA = 880m²

CLEAN WATER/DIRTY WATER PERIMETER BUND AROUND AWAKERI WETLANDS SITE BOUNDARY. BUND TO BE CONSTRUCTED 0.5m ABOVE EXISTING GROUND LEVEL

SEDIMENT EROSION POND 7
CATCHMENT AREA = 46666m²
BASE AREA 12.2m x 37m
DEPTH 1.50m
TOP = 18m x 44m
FOREBAY = 5m x 18m
TOTAL AREA = 893m²

SEDIMENT EROSION POND 3
CATCHMENT AREA = 41902m²
BASE AREA 11.4m x 34m
DEPTH 1.50m
TOP = 17m x 42m
FOREBAY = 5m x 17m
TOTAL AREA = 811m²

SEDIMENT EROSION POND 6
CATCHMENT AREA = 45309m²
BASE AREA 12.0m x 36m
DEPTH 1.50m
TOP = 18m x 43m
FOREBAY = 5m x 18m
TOTAL AREA = 870m²

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

SEDIMENT EROSION POND 5
CATCHMENT AREA = 42369m²
BASE AREA 11.0m x 34m
DEPTH 1.50m
TOP = 17m x 42m
FOREBAY = 5m x 17m
TOTAL AREA = 819m²

STABILISED VEHICLE ENTRANCE

SEDIMENT EROSION POND 2
CATCHMENT AREA = 43707m²
BASE AREA 11.7m x 35m
DEPTH 1.50m
TOP = 18m x 43m
FOREBAY = 5m x 18m
TOTAL AREA = 842m²

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

SEDIMENT EROSION POND 1
CATCHMENT AREA = 44643m²
BASE AREA 11.9m x 21m
DEPTH 1.50m
TOP = 18m x 28m
FOREBAY = 5m x 18m
TOTAL AREA = 596m²

SEDIMENT EROSION POND 20
CATCHMENT AREA = 47693m²
BASE AREA 12.3m x 37m
DEPTH 1.50m
TOP = 18m x 44m
FOREBAY = 5m x 18m
TOTAL AREA = 911m²

P1 P2 P3 P4 P5 P6 P7 P20

AIRFIELD ROAD

RESOURCE CONSENT

NOTES
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10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND
- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 1

Project no.	215010		
Scale	1:2500 @ A3		
Cad file	215010-M-C220.DWG		
Drawing no.	M-C221	Rev	B

OVERLAND FLOW CATCHMENT

P19

P18

P17

P16

P15

P14

P12

P11

P10

SEDIMENT EROSION POND 19
CATCHMENT AREA = 50226m²
BASE AREA 12.7m x 38m
DEPTH 1.50m
TOP = 19m x 46m
FOREBAY = 5m x 19m
TOTAL AREA = 955m²

SEDIMENT EROSION POND 18
CATCHMENT AREA = 47236m²
BASE AREA 12.3m x 37m
DEPTH 1.50m
TOP = 18m x 44m
FOREBAY = 5m x 18m
TOTAL AREA = 903m²

SEDIMENT EROSION POND 17
CATCHMENT AREA = 44155m²
BASE AREA 11.8m x 35m
DEPTH 1.50m
TOP = 18m x 43m
FOREBAY = 5m x 18m
TOTAL AREA = 850m²

SEDIMENT EROSION POND 16
CATCHMENT AREA 1= 46265m²
CATCHMENT AREA 2= 44299m²
BASE AREA 12.1m x 36m
DEPTH 1.50m
TOP = 18m x 44m
FOREBAY = 5m x 18m
TOTAL AREA = 886m²

SEDIMENT EROSION POND 15
CATCHMENT AREA = 50055m²
BASE AREA 12.7m x 38m
DEPTH 1.50m
TOP = 19m x 46m
FOREBAY = 5m x 19m
TOTAL AREA = 952m²

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

CLEAN WATER/DIRTY WATER PERIMETER BUND AROUND AWAKERI WETLANDS SITE BOUNDARY. BUND TO BE CONSTRUCTED 0.5m ABOVE EXISTING GROUND LEVEL

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

SEDIMENT EROSION POND 12
CATCHMENT AREA = 49519m²
BASE AREA 12.6m x 38m
DEPTH 1.50m
TOP = 19m x 45m
FOREBAY = 5m x 19m
TOTAL AREA = 943m²

SEDIMENT EROSION POND 11
CATCHMENT AREA = 30255m²
BASE AREA 9.3m x 28m
DEPTH 1.50m
TOP = 15m x 36m
FOREBAY = 4m x 15m
TOTAL AREA = 606m²

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

SEDIMENT EROSION POND 10
CATCHMENT AREA = 50244m²
BASE AREA 12.7m x 38m
DEPTH 1.50m
TOP = 19m x 46m
FOREBAY = 5m x 19m
TOTAL AREA = 955m²

RESOURCE CONSENT

NOTES
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LEGEND
- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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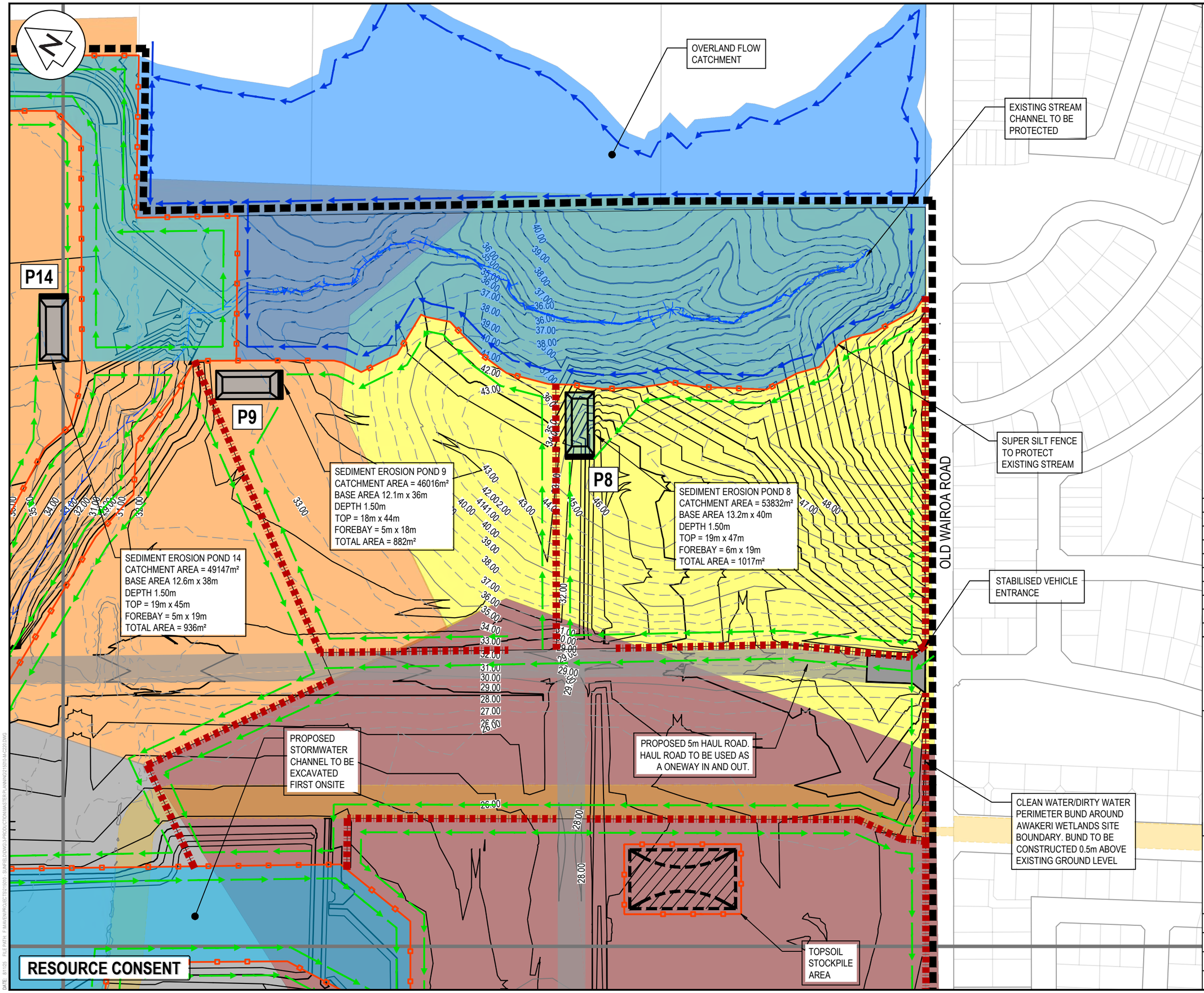
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 2

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C220.DWG
Drawing no.	M-C222 Rev B



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LEGEND

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- EX MINOR CONTOUR
- PR MAJOR CONTOUR
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- PROP CLEANWATER
- PROP DIRTYWATER
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- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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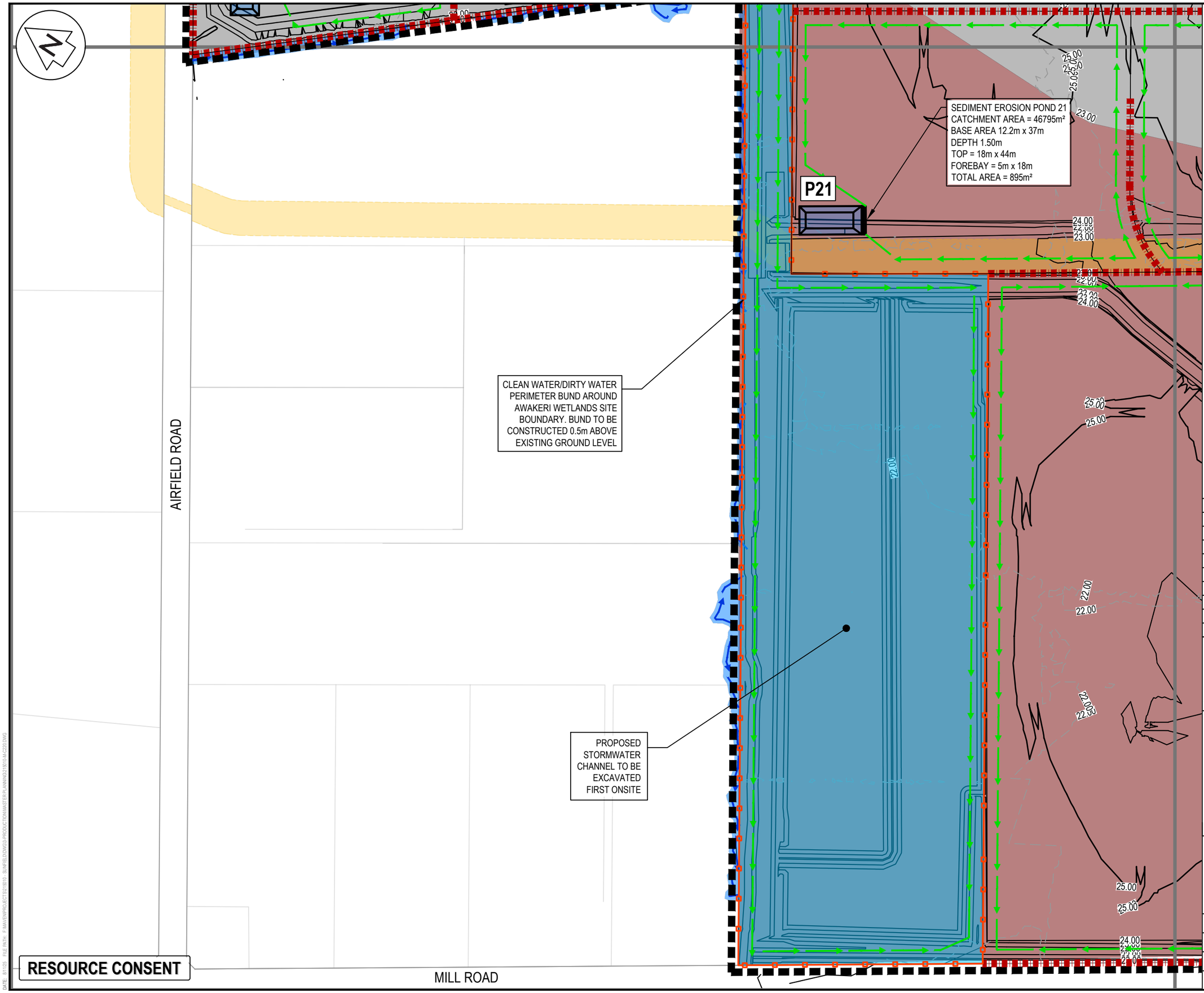
Title
PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 2

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C220.DWG
Drawing no.	M-C223 Rev B



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- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 4

Project no.	215010		
Scale	1:2500 @ A3		
Cad file	215010-M-C220.DWG		
Drawing no.	M-C224	Rev	B

P13

SEDIMENT EROSION POND 13
CATCHMENT AREA 1 = 49815m²
CATCHMENT AREA 2 = 47130m²
BASE AREA 12.7m x 38m
DEPTH 1.50m
TOP = 19m x 45m
FOREBAY = 5m x 19m
TOTAL AREA = 948m²

PROPOSED STORMWATER CHANNEL TO BE EXCAVATED FIRST ONSITE

CLEAN WATER/DIRTY WATER PERIMETER BUND AROUND AWAKERI WETLANDS SITE BOUNDARY. BUND TO BE CONSTRUCTED 0.5m ABOVE EXISTING GROUND LEVEL

PROPOSED 5m HAUL ROAD. HAUL ROAD TO BE USED AS A ONEWAY IN AND OUT.

STABILISED VEHICLE ENTRANCE

RESOURCE CONSENT

COSGRAVE ROAD

NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL=XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
6. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
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8. SEDIMENT CONTROL SHALL BE INSTALLED AND OPERATIONAL BEFORE EARTHWORKS START ONSITE IN ACCORDANCE WITH COUNCIL STANDARDS.
9. CONTRACTOR SHALL PROVIDE AS-BUILT OF WORKING SEDIMENT CONTROL DEVICES AND CONFIRMATION OF POND/DECENT VOLUMES TO ENGINEER.
10. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

LEGEND
- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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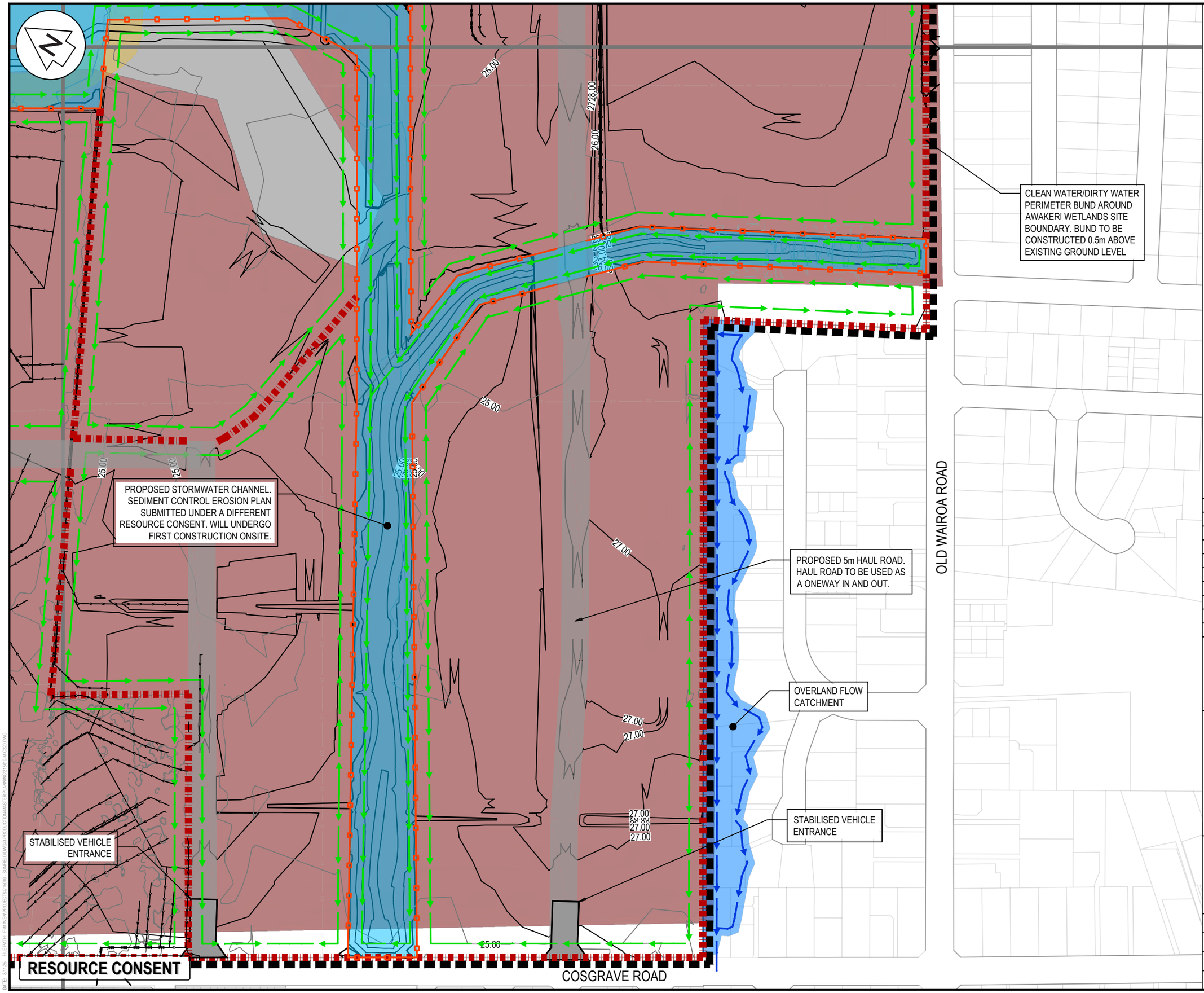
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 5

Project no.	215010		
Scale	1:2500 @ A3		
Cad file	215010-M-C220.DWG		
Drawing no.	M-C225	Rev	B



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
3. LEVELS IN TERMS OF THE AUCKLAND VERTICAL DATUM 1946.
4. ORIGIN OF LEVELS = SM XXXX SO XXXX(XXXX) PUBLISHED RL=XX.XX, SOURCED FROM THE LINZ DIGITAL GEODETIC DATABASE.
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LEGEND

- EX BDY
- PROP BDY
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- PR MAJOR CONTOUR
- PR MINOR CONTOUR
- PROP EXTENT WORK
- PROP CLEANWATER
- PROP DIRTYWATER
- PROP SILT FENCE
- PROP CATCHMENT
- DIVERSION BUND
- PROP STOCKPILE

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	SURVEYWORX	02/2021
Design	MA	02/2025
Drawn	MA	02/2025
Checked	JP	02/2025

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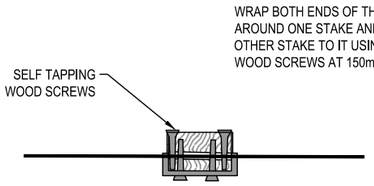
Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

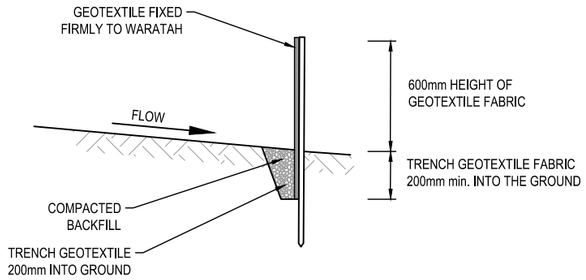
Title

PROPOSED SEDIMENT EROSION CONTROL PLAN: SHEET 6

Project no.	215010
Scale	1:2500 @ A3
Cad file	215010-M-C220.DWG
Drawing no.	M-C226 Rev B

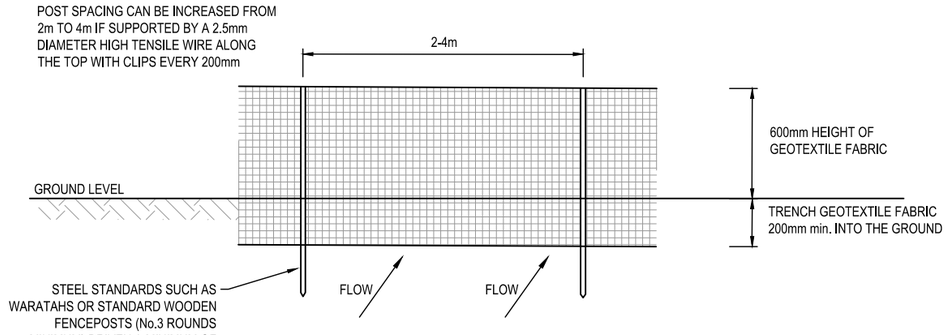


STANDARD DETAIL FOR FABRIC JOIN

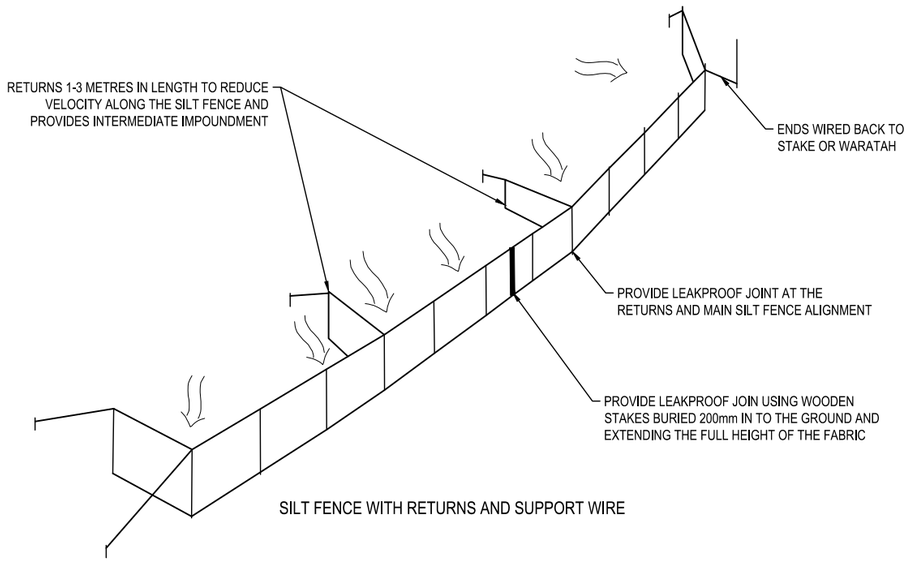


CROSS SECTION

STANDARD DETAIL FOR SILT FENCE

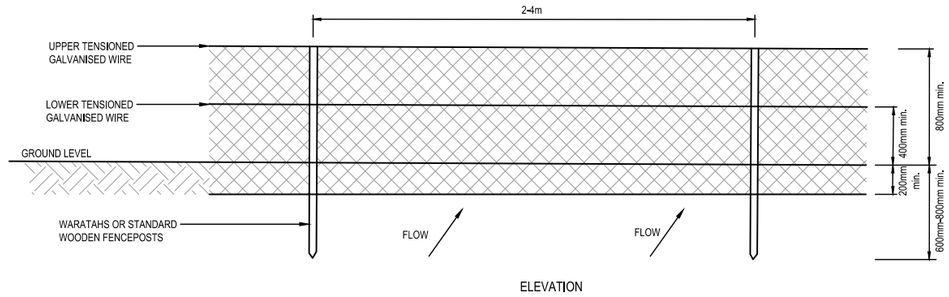


ELEVATION

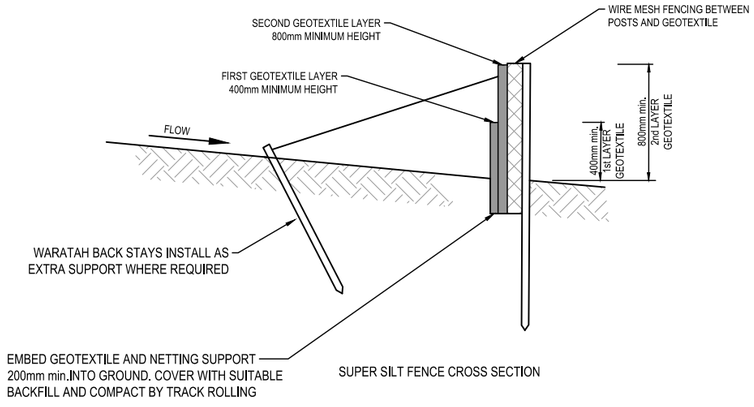


SILT FENCE WITH RETURNS AND SUPPORT WIRE

SUPER SILT FENCE DETAIL



ELEVATION



SUPER SILT FENCE CROSS SECTION

RESOURCE CONSENT

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
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7. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--	--/----
Design	--	-
Drawn	MA	02/2025
Checked	JP/LC	02/2025

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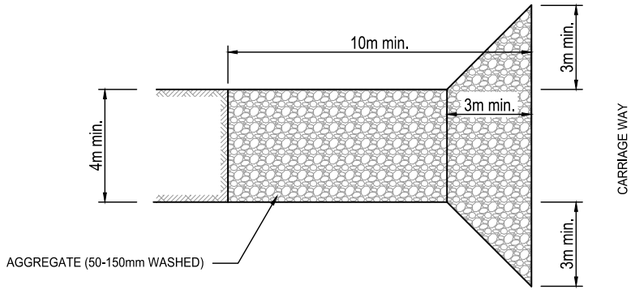
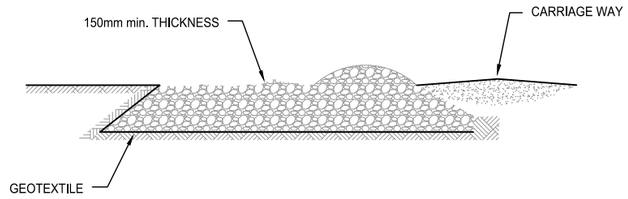
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL DETAILS: SHEET 1

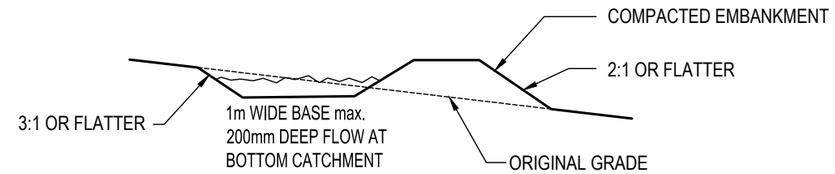
Project no.	215010
Scale	N.T.S
Cad file	215010-M-C230.DWG
Drawing no.	M-C230 Rev A



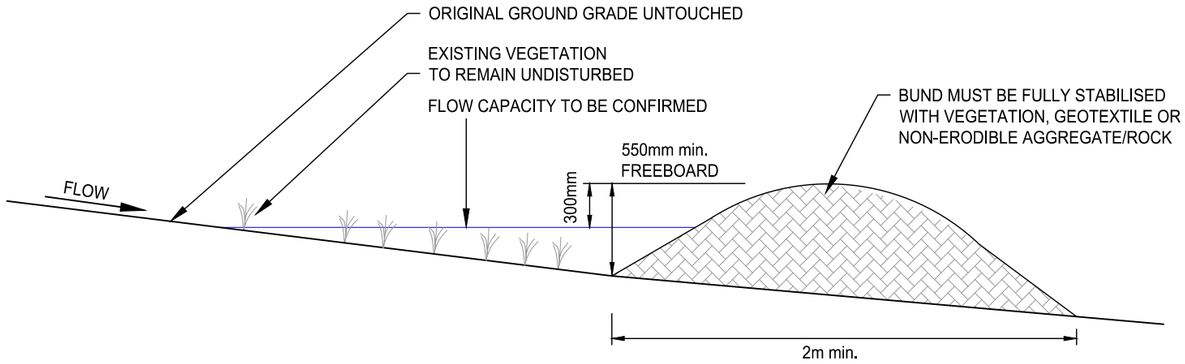
STABALISED VEHICLE ENTRANCE
PLAN VIEW



STABALISED VEHICLE ENTRANCE DETAIL
SIDE ELEVATION



TYPICAL CROSS SECTION OF A RUNOFF DIVERSION
TYPICAL DIMENSIONS UNLESS OTHERWISE NOTED



CLEAN WATER DIVERSION BUND DETAIL

RESOURCE CONSENT

NOTES
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7. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--	--/----
Design	--	-
Drawn	MA	02/2025
Checked	JP/LC	02/2025

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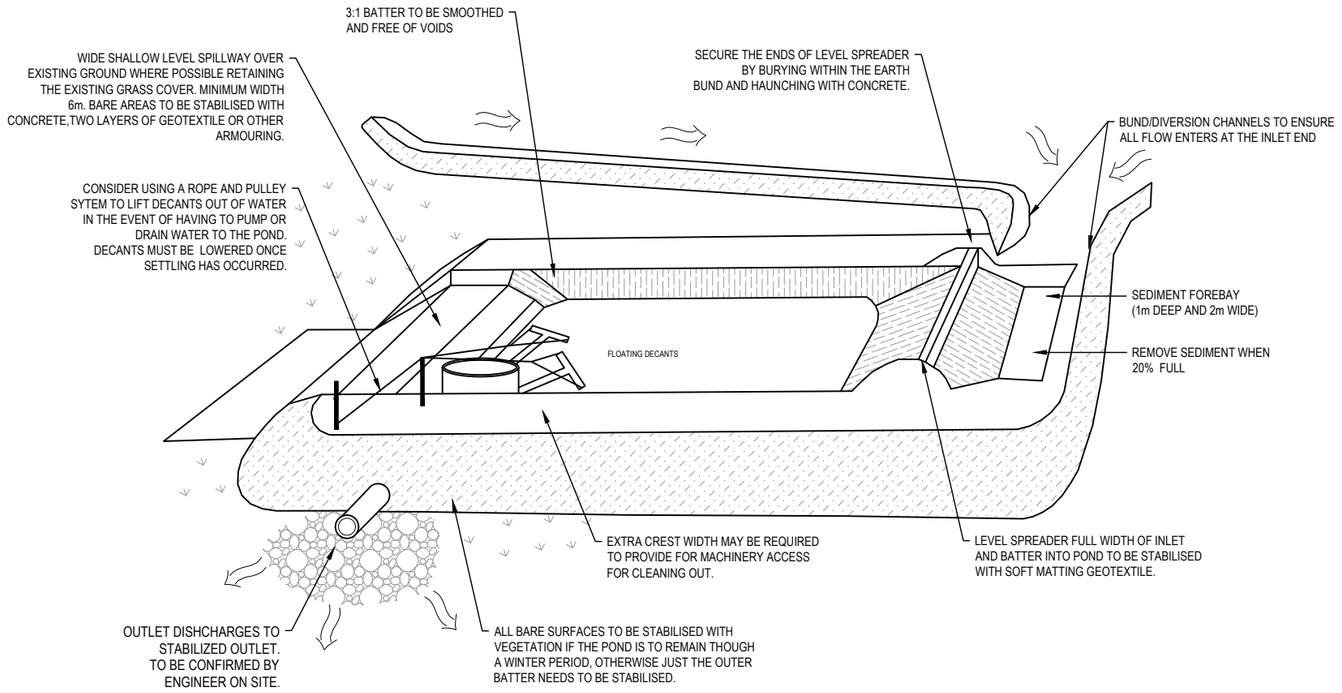
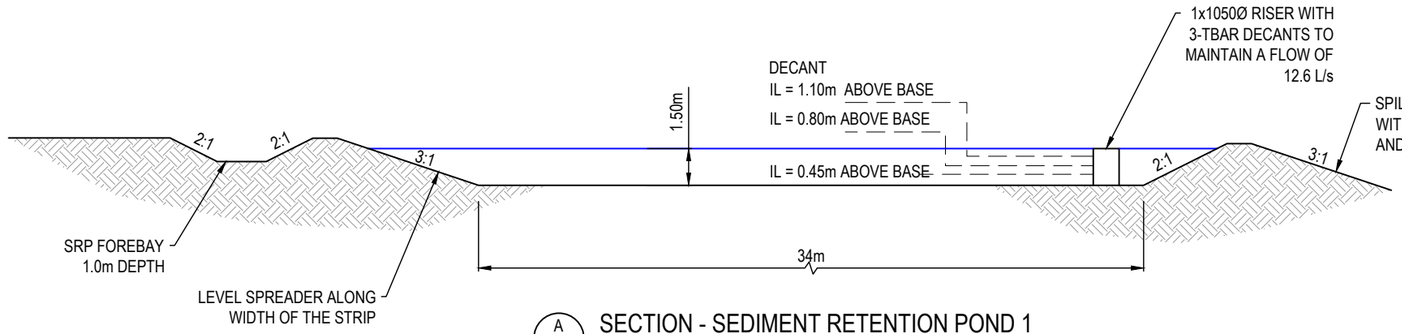
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL DETAILS: SHEET 2

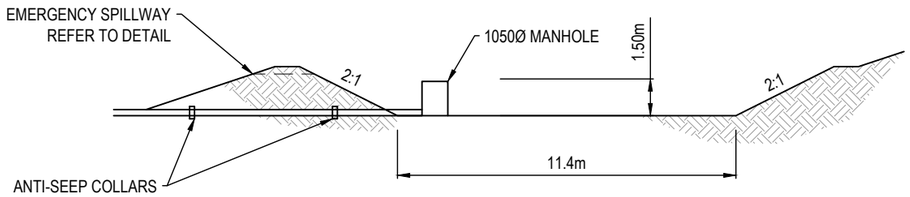
Project no.	215010		
Scale	N.T.S		
Cad file	215010-M-C230.DWG		
Drawing no.	M-C231	Rev	A



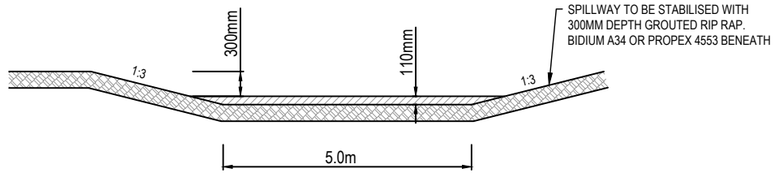
SEDIMENT POND DETAILS
(NTS)



A — SECTION - SEDIMENT RETENTION POND 1
SCALE: N.T.S



B — SECTION - SEDIMENT RETENTION POND 1
SCALE: N.T.S



DETAIL I
EMERGENCY SPILLWAY

RESOURCE CONSENT

NOTES
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7. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--	--/----
Design	--	-
Drawn	MA	02/2025
Checked	JP/LC	02/2025

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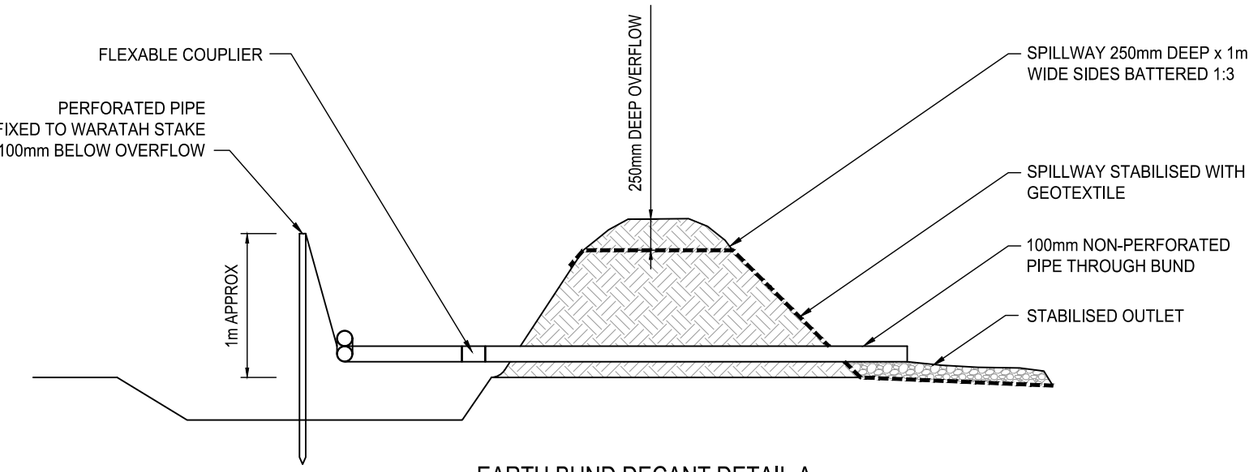
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

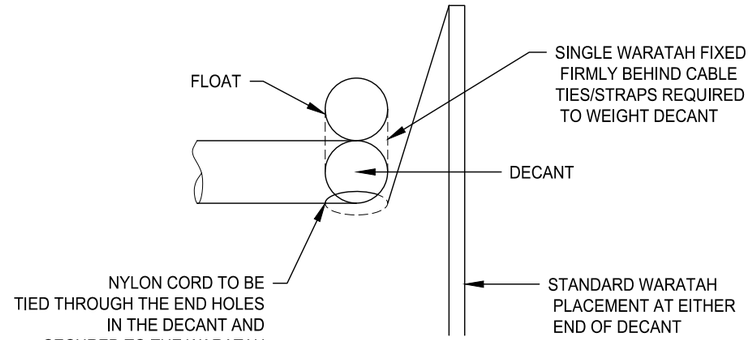
Title
PROPOSED SEDIMENT EROSION CONTROL DETAILS: SHEET 3

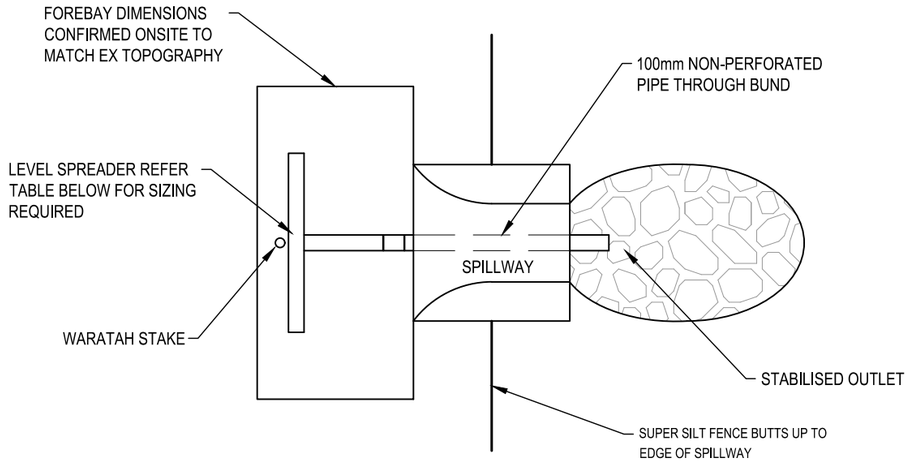
Project no.	215010
Scale	N.T.S
Cad file	215010-M-C230.DWG
Drawing no.	M-C232 Rev A



EARTH BUND DECANT DETAIL A

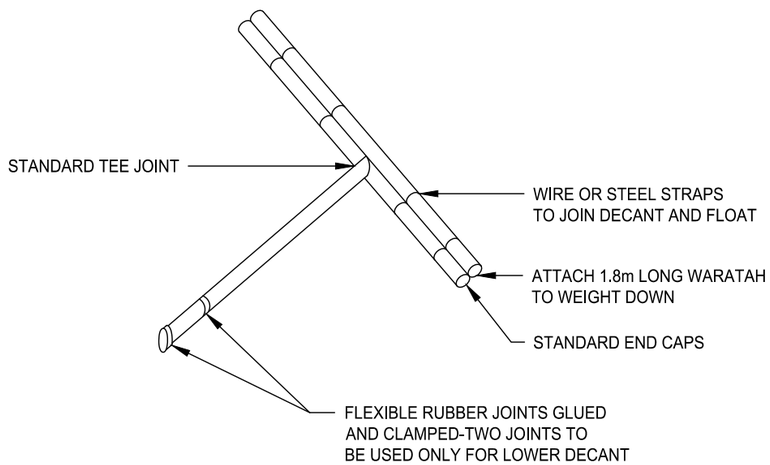
N.T.S





DECANT PLAN VIEW

N.T.S



LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m^3/sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10

RESOURCE CONSENT

NOTES

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7. SEDIMENT CONTROL TO COMPLY WITH GD05 STANDARDS.

Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--	--/----
Design	--	-
Drawn	MA	02/2025
Checked	JP/LC	02/2025

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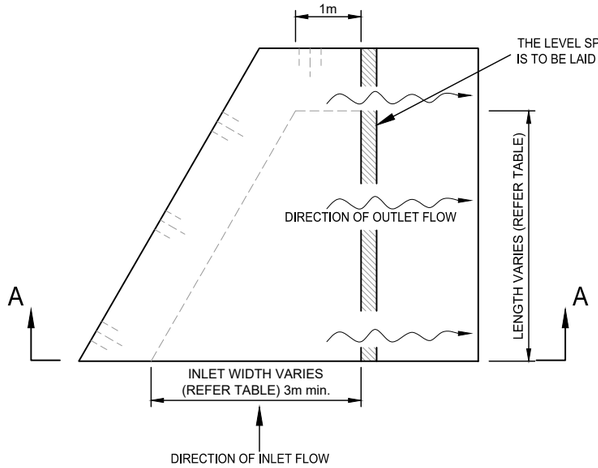
Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

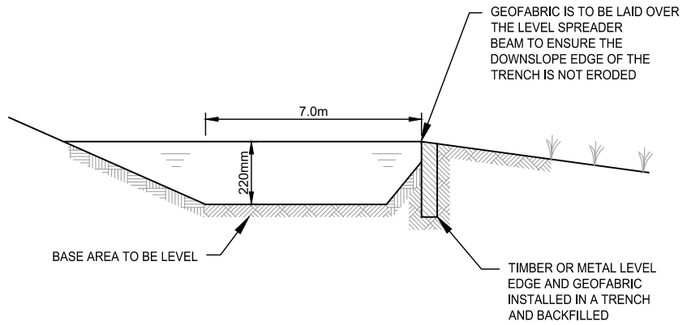
Title

PROPOSED SEDIMENT EROSION CONTROL DETAILS: SHEET 4

Project no.	215010
Scale	N.T.S
Cad file	215010-M-C230.DWG
Drawing no.	M-C233 Rev A

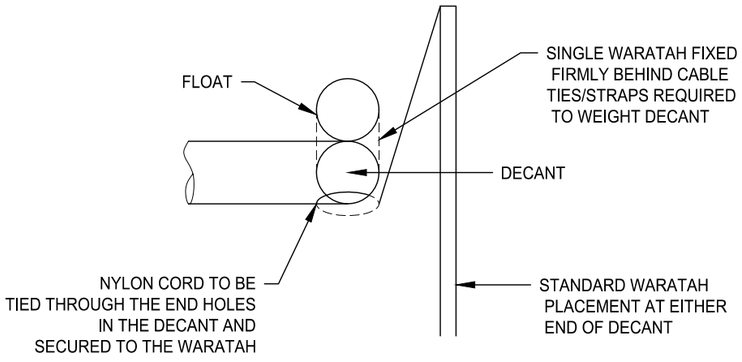


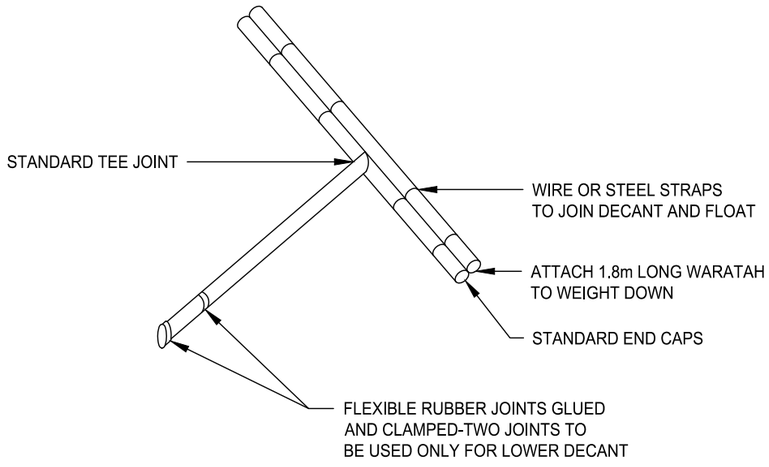
PLAN VIEW



SECTION A-A

LEVEL SPREADER DESIGN CRITERIA (20 YEAR STORM EVENT)				
DESIGN FLOW (m^3/sec)	INLET WIDTH (m)	DEPTH (m)	END WIDTH (m)	LENGTH (mm)
0-0.3	3	150	1	3
0.3-0.6	5	180	1	7
0.6-0.9	7	220	1	10





RESOURCE CONSENT

NOTES
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Rev	Description	By	Date
A	RESOURCE CONSENT	JP	02/2025

	By	Date
Survey	--	--/----
Design	--	-
Drawn	MA	02/2025
Checked	JP/LC	02/2025

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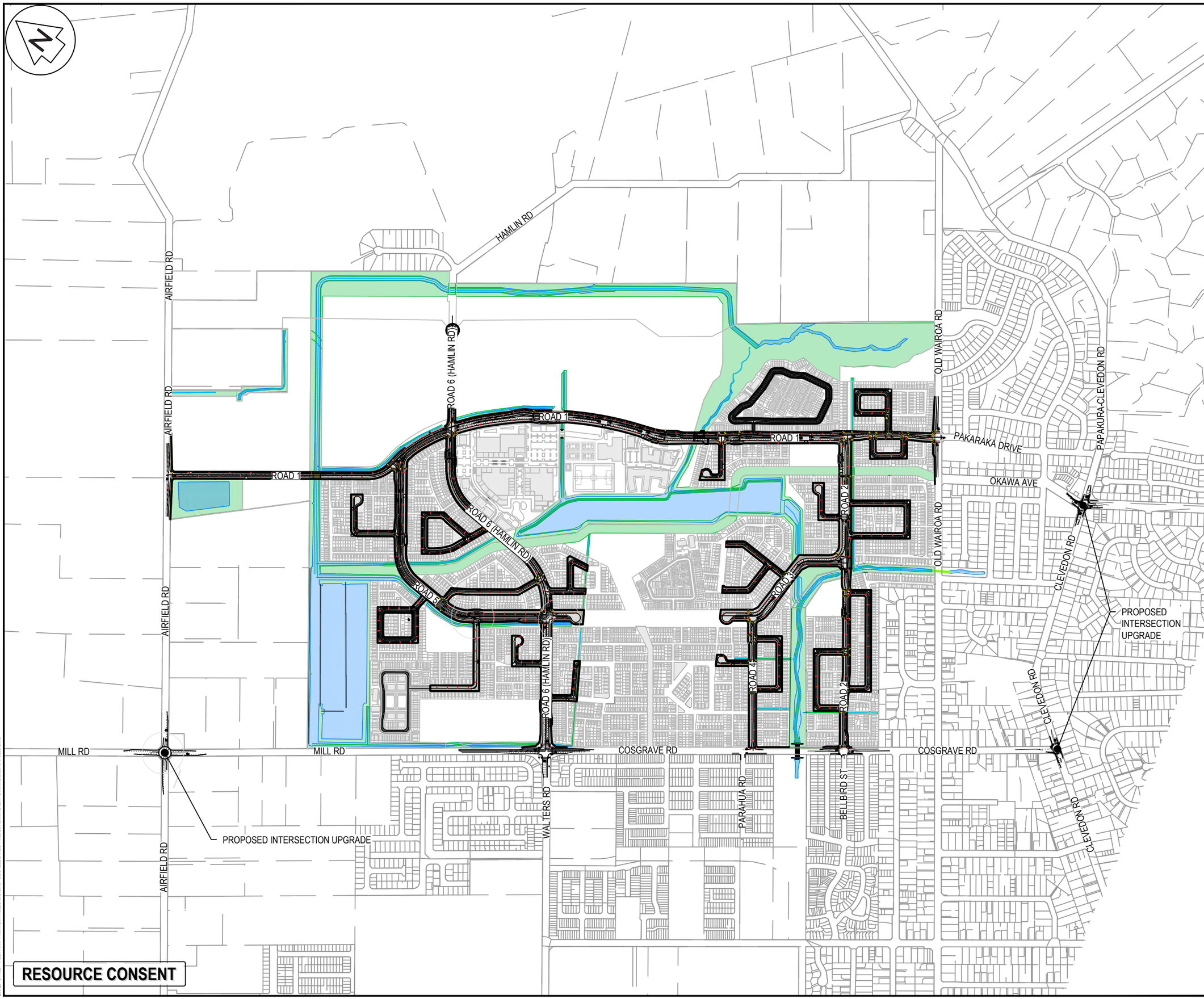
Project
SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND MASTERPLANNING FOR SUNFIELD DEVELOPMENTS LIMITED

Title
PROPOSED SEDIMENT EROSION CONTROL DETAILS: SHEET 5

Project no.	215010		
Scale	N.T.S		
Cad file	215010-M-C230.DWG		
Drawing no.	M-C234	Rev	A



RESOURCE CONSENT

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM (NZVD) 2016.
3. CONTRACTOR IS TO AVOID USING GPS FOR SET OUT OF THE KERB LEVELS WHERE GRADIENTS ARE LESS THAN 1%.
4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
6. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
7. FINAL PAVEMENT DESIGN SUBJECT TO CBR/BEAM TESTS ON SUBGRADE MATERIAL.
8. SETOUT SCHEDULE WITH COORDINATES OF CHAINAGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
9. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
10. ALL DUCTS SHALL HAVE LOCATIONS MARKED ON KERB LINES IN ACCORDANCE WITH SPECIFICATION.

LEGEND:

CENTER LINE 1	WC100R (30m)
CENTER LINE 2	WC100R
NO STOPPING LINE	YI100R1x1
CONTINUITY LINE	WI100R1x3
LIMIT LINE	WC300R
	EX BDY
	PROP BDY
AC	AC PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
K&C	KERB AND CHANNEL
K&N	KERB AND NIB
WS	WHEEL STOP
	PROP SWCP SINGLE
	PROP STREET LIGHT
	PROP STREET SIGN
	ROAD NAME SIGN
	TACTILE PAVERS
	PR SWALE

Rev	Description	By	Date
A	RESOURCE CONSENT	DIJ	02/2025

	By	Date
Survey	BY	MM/YYYY
Design	BY	MM/YYYY
Drawn	YC	11/24
Checked	BY	DATE

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Auckland 1023

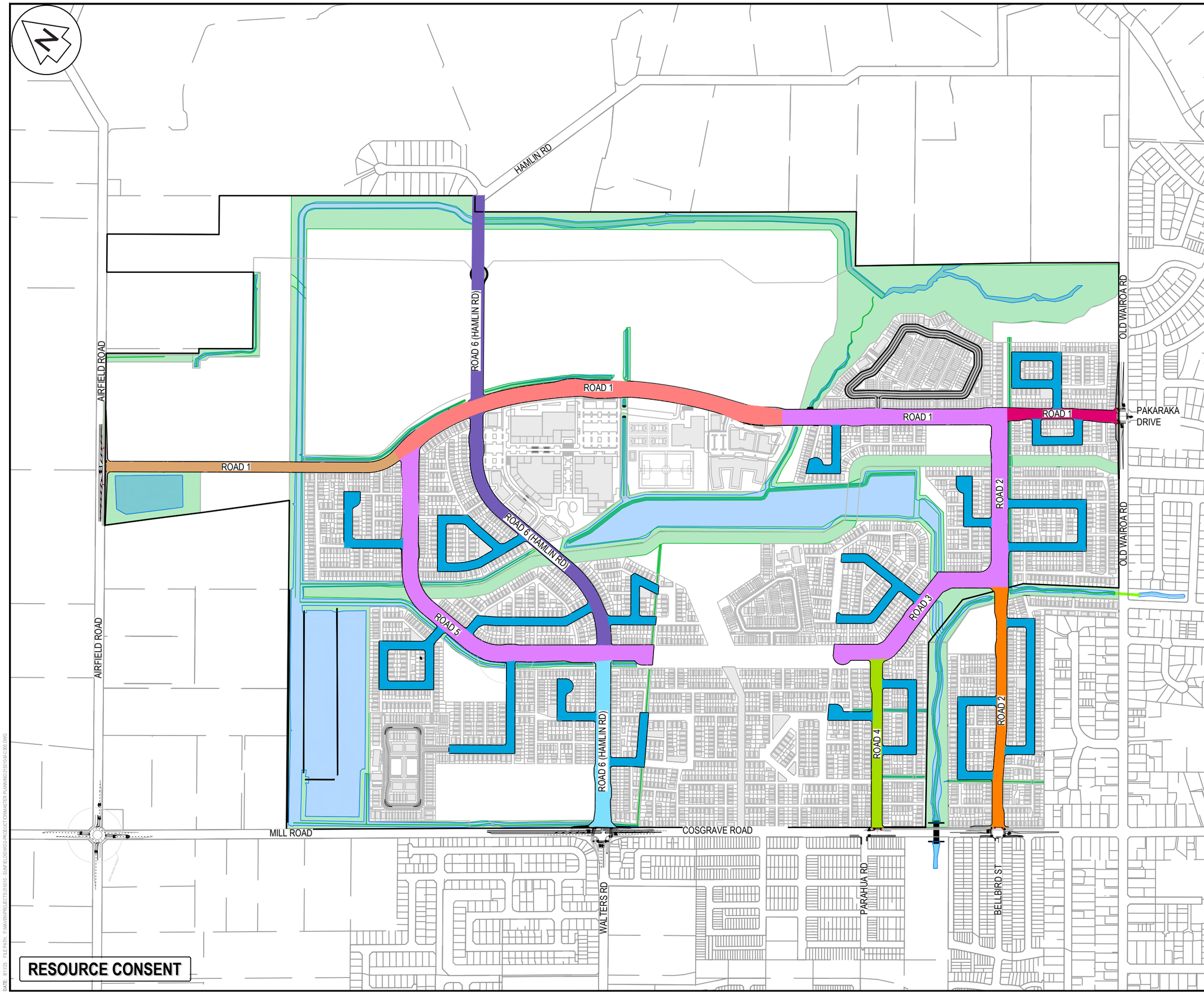
Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND SUPERLOT 18, 19, 20, 21 FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED ROADING OVERVIEW PLAN

Project no.	215010		
Scale	1:10000 @ A3		
Cad file	215010-M-C300.DWG		
Drawing no.	M-C300	Rev	A



NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARDS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NEW ZEALAND VERTICAL DATUM (NZVD) 2016.
3. CONTRACTOR IS TO AVOID USING GPS FOR SET OUT OF THE KERB LEVELS WHERE GRADIENTS ARE LESS THAN 1%.
4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY THEIR OPERATIONS.
5. THE CONTRACTOR SHALL COMPLY WITH ALL RELEVANT HEALTH AND SAFETY REQUIREMENTS.
6. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
7. FINAL PAVEMENT DESIGN SUBJECT TO CBR/BEAM TESTS ON SUBGRADE MATERIAL.
8. SETOUT SCHEDULE WITH COORDINATES OF CHAINAGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
9. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
10. ALL DUCTS SHALL HAVE LOCATIONS MARKED ON KERB LINES IN ACCORDANCE WITH SPECIFICATION.

LEGEND

- EX BDY
- PROP BDY
- PROP RD TYPE 1
- PROP RD TYPE 2
- PROP RD TYPE 3
- PROP RD TYPE 4
- PROP RD TYPE 5
- PROP RD TYPE 6
- PROP RD TYPE 7
- PROP RD TYPE 8
- PROP RD TYPE 9
- PROP RD TYPE 10

Rev	Description	By	Date
A	RESOURCE CONSENT	DIJ	02/2025

	By	Date
Survey	BY	MM/YYYY
Design	BY	MM/YYYY
Drawn	YC	11/24
Checked	BY	DATE

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Project

SUNFIELD DEVELOPMENT ARDMORE, AUCKLAND SUPERLOT 18, 19, 20, 21 FOR SUNFIELD DEVELOPMENTS LIMITED

Title

PROPOSED ROADING HIERARCHY PLAN

Project no.	215010
Scale	1:7500 @ A3
Cad file	215010-M-C300.DWG
Drawing no.	M-C310 Rev A

RESOURCE CONSENT

DATE: 8/11/25 FILE PATH: F:\MAVEN\PROJECTS\215010 - SUNFIELD\DWGS-PRODUCTION\MASTER PLANNING\215010-M-C300.DWG