To

Tattico
Vijay Lala

From

Woods
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W-REF: P21-440
22 December 2021
Reviewer: Pranil Wadan – Principal Engineer

Memorandum

The Hill – Stormwater Assessment

1. Executive Summary

The Hill, located at 100 Ascot Avenue within the Ellerslie Racecourse, is proposed to be developed to a combination of medium to high density dwellings including apartment blocks. Woods have undertaken a preliminary stormwater assessment to understand flood and stormwater management for the site.

Flood modelling has been undertaken to understand any impacts and flood effects resulting from the proposed development including filling of the private pond and the discharge to the 1950mm dia. pipeline. Two options have been considered with Option 1 including full diversion of flows inclusive of flows from Derby Downs catchment and Option 2 involving only The Hill site. Both options were deemed viable. However, Option 1 is noted as being the preferred solution and accordingly the models have further been refined for this scenario. It is acknowledged that there are alternative stormwater mitigation solutions that exist (albeit not considered necessary).

As part of flood modelling, Woods have also undertaken blockage scenarios in accordance with Auckland Council Stormwater Code of Practice Version 3. These assumptions were applied over the entire modelled network i.e., not just applied for The Hill development area and therefore the assessment is considered conservative. The flood modelling undertaken indicates no offsite effects as a result of the development.

The development site is not located within a Stormwater Management Area Flow (SMAF) control area as per the Auckland Unitary Plan: Operative in Part. It is considered a 'greenfields' under the Regionwide Network Discharge Consent and therefore water quality treatment is required to be provided for all impervious surfaces. In terms of hydrology mitigation, the site is proposed to discharge to Waiatarua Reserve which discharges to Orakei Basin and ultimately Hobson Bay which is a coastal environment. It is also noted that the Hill development site has a total area of 6.4ha, which is equivalent to approximately 2-3% of the contributing catchment area currently discharging to Waiatarua Reserve. Therefore, given the above hydrology mitigation is not proposed to be provided for The Hill development due to the benefits being limited. This has been tabled with Healthy Waters with agreement gained in principle. However, during discussions with Healthy Waters, it was noted an ecological assessment would be required at Waiatarua Reserve to further determine the receiving environment and the erosion risk of additional flows.

Woods have also consulted with Healthy Waters in regards to flood modelling undertaken, optioneering, refinement of flood models and stormwater management options.

In summary, the assessment undertaken concludes there are solutions available for addressing stormwater matters to support The Hill development which are to be further developed through future fast track resource consenting application.

Overall, there are no significant impediments with respect to stormwater.

2. Introduction

The development site, here in referred to as "The Hill", is located at 100 Ascot Avenue, Greenlane, within the Ellerslie Racecourse. Auckland Thoroughbred Racing Inc and Fletcher Residential Living (FRL) propose to develop the site to a combination of medium to high density dwellings including apartment blocks.

An application has been made to the Minister requesting that the project be referred to an expert consenting panel under the COVID-19 Fast-track consenting route.

This memorandum summarises the preliminary stormwater assessment undertaken for the development to date. It provides an overview of the stormwater management requirements for the development including flood management.

3. Existing site

The Hill development site, consisting of approximately 6.4ha is located on the eastern side of the Ellerslie Racecourse and is currently accessed via Derby Downs Place. The site is currently undeveloped with limited impervious coverage and an existing private stormwater pond located within the site. The topography of the site ranges from approximately 60 mRL along the north-eastern boundary to the pond sitting at approximately 39 mRL.

A plan of the existing site is shown in Figure 1 below.

Figure 1: Existing site

The development site is located within the Ellerslie catchment; however, the site discharges to the south towards One Tree Hill catchment and ultimately to the Mangere Inlet as described in Section 3.1 below.

3.1. Existing private pond and drainage

The existing pond located within The Hill development site is private and is currently not serving a stormwater management function. It provides for attenuation and irrigation at the existing racecourse.

Based on information available on Auckland Council GIS, the primary and secondary flows from the existing site discharges to the private pond. There is also a 1200mm dia. public stormwater pipe discharging primary flows from a residential catchment located to the south of The Hill to the private pond as can be seen in Figure 2 below. The private pond discharges to the south via a 375mm dia. public stormwater pipe towards Lonsdale Street discharging to One Tree Hill Catchment and ultimately to Mangere Inlet.

There is also an existing tunnel discharging flows from the racecourse to the private pond. For the purpose of this assessment, it is assumed the flows from the existing racecourse to the private pond are to be disconnected and managed by Ellerslie Racecourse/ Auckland Thoroughbred Racing as part of its future development.

Figure 2: Existing private pond

3.2. 1950mm dia. pipe

There is also a 1950mm dia. pipe located within The Hill development site traversing to the east, along Abbots Way and discharging to Waiatarua Reserve (Figure 3). The 1950mm dia. pipe is noted to be approximately 18m deep within the development area and recently installed in 2012. Consultation with Healthy Waters has indicated the pipe has been designed to relieve the flood risk along Peach Parade and addressing flooding issues further north of the catchment. There is a 1950mm dia. stub available for extension into the Ellerslie Racecourse area.

3.2.1. Waiatarua Reserve

Waiatarua Reserve is located to the northeast of the site and is a large open space with an urban wetland (Figure 3). The reserve discharges towards Orakei Basin/ Hobson Bay via a 1200mm dia. pipe. Orakei Basin/ Hobson Bay is a coastal environment. This is discussed further in Section 9.1.2.

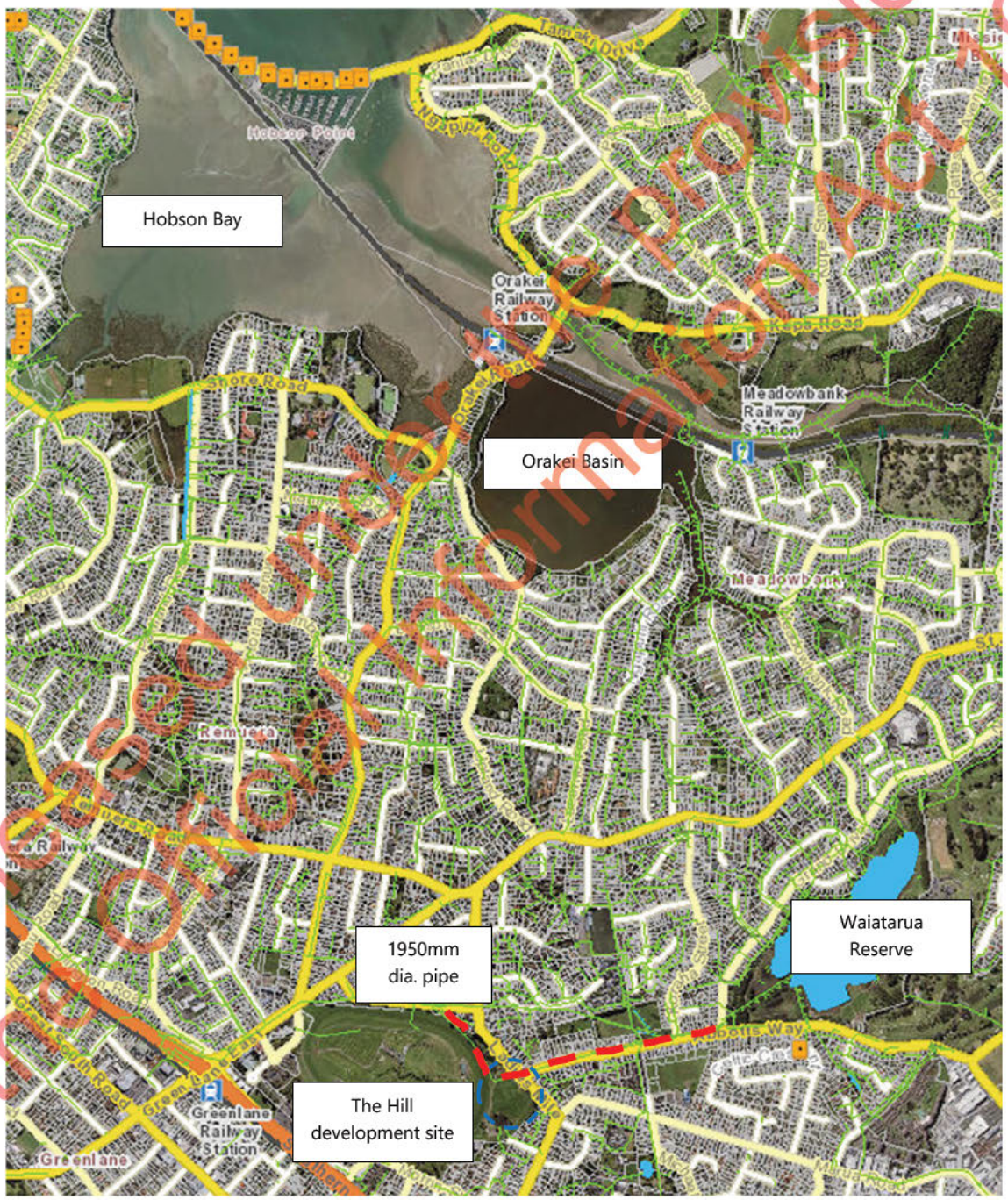


Figure 3: Receiving environment

3.3. Existing secondary network and flooding

Figure 4 shows the existing published flood hazards within and in the proximity of The Hill development site. The existing private pond within the development area is indicated to be a flood prone area and flood plain as per Auckland Council GIS.

Flood hazards are also indicated immediately downstream of the site along Robert Street in the One Tree Hill Catchment with flooding also shown to the east of the site within the Ellerslie Catchment.

Figure 4: Existing flood hazards

4. Proposed development

The Hill development site is zoned 'Special Purpose' zone as per Auckland Unitary Plan Operative in Part (AUP: OiP). As discussed in Section 2, FRL proposes to develop the site to a combination of medium to high density dwellings including apartments. The development scheme includes filling in of the existing private pond located within the development site.

5. Proposed stormwater discharge options

As part of the preliminary stormwater assessment, Woods have investigated two stormwater discharge options for enabling development and filling of the private pond located within the development site. This section describes the options with the simulations and model results provided in Section 6.

Stormwater flows from The Hill development site are proposed to discharge to the 1950mm dia. pipe. However, the optioneering undertaken is to facilitate consideration of whether discharges from the upstream Derby Downs catchment that is currently discharging to the private pond via a public network can also discharge to the 1950mm dia. pipe and to understand the resultant effects.

5.1.1. Option 1 – Full site diversion

This option includes diversion of primary and secondary flows from The Hill development site as well as the primary flows from the upstream catchment from Derby Downs to the 1950mm dia. stormwater pipe. The contributing catchment area associated within this catchment is shown in Figure 5.

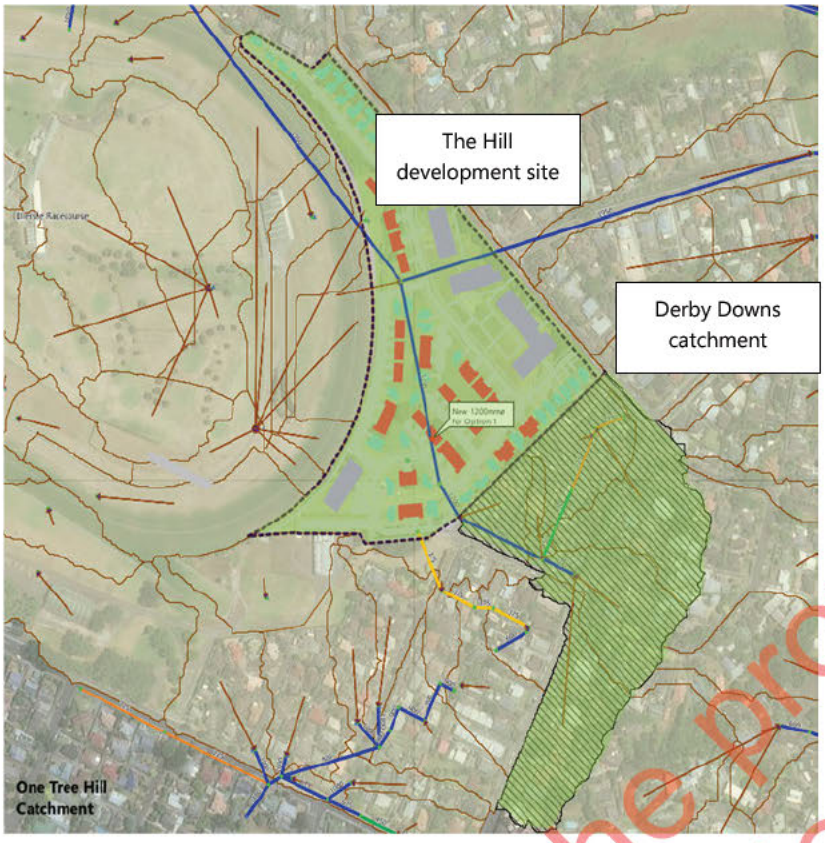


Figure 5: Option 1

5.1.2. Option 2 – Partial diversion

Option 2 includes diversion of primary and secondary flows from The Hill development site only with the catchment from Derby Downs to discharge south to One Tree Hill catchment as can be seen in Figure 6.

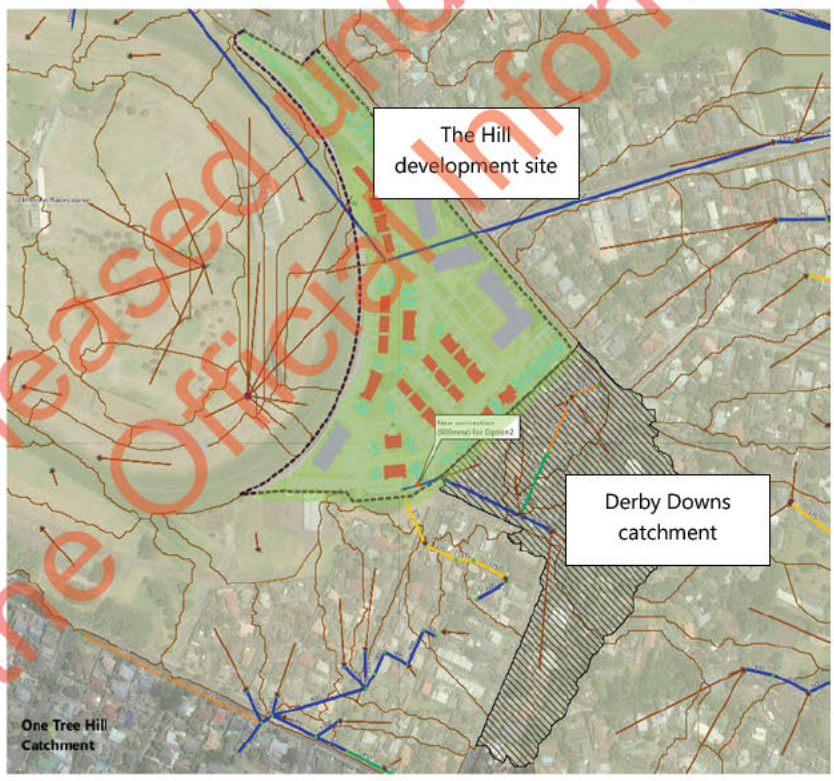


Figure 6: Option 2

6. Flood modelling

As discussed in Section 0, the 1950mm dia. pipeline has been designed and installed to provide flood relief for upstream areas of Peach Parade. Therefore, Woods have undertaken flood modelling to understand any impacts and flood effects resulting from the proposed development including filling of the private pond and the discharge to the 1950mm dia. pipeline.

As part of this exercise, Woods have obtained the existing Ellerslie and One Tree Hill catchment models from Healthy Waters.

This section of the memorandum describes the updates that have been made to the obtained models as well as stormwater discharge options that have been simulated. It is noted flood models have been simulated for the 10- and 100-year rainfall events. A climate change allowance of 3.8 ^{0}C has been provided for within the models in alignment with Auckland Council Stormwater Code of Practice (SWCoP) Version 3 (coming into effect on 22nd January 2022).

A summary of the models simulated are provided below in Table 1.

Table 1: Summary of model simulations

Base	Land use	Network	Rainfall	Climate change
Pre-development	Permitted as per AUP (MPD)	Active	10- and 100-year	3.8^{0}C
		Blocked in accordance with SWCoP V3		
Post-development – Option 1	AUP MPD zoning + The Hill development	Active	10- and 100-year	3.8^{0}C
		Blocked in accordance with SWCoP V3		
Post-development – Option 2	AUP MPD zoning + The Hill development	Active	10- and 100-year	3.8^{0}C

6.1. Inputs to Flood models

The stormwater assessment for the proposed development used a 1D/2D hydraulic model based on the stormwater catchment models provided by the Auckland Council (Healthy Waters department) as listed below:

- Ellerslie catchment model (2020)[1] - 1D-2D coupled hydraulic model developed using Mike by DHI modelling package representing Maximum Probable Development (MPD) scenario
- One Tree Hill Catchment model (2020)[2]- 1D-2D coupled hydraulic model using Mike by DHI modelling package representing MPD scenario

6.2. Model build

The Ellerslie model was converted to InfoWorks ICM version 2021 as recommended by Healthy Waters and further extended to include stormwater network along Robert Street and The Highway based on the One Tree Hill model to develop a base predevelopment model.

[1] Ellerslie Catchment SW Modelling Model Build and System Performance Report. By HG prepared for Auckland Council, June 2020

[2] One Tree Hill FHM – Model Build and System Performance Report. By Tonkin and Taylor prepared for Auckland Council, June 2020

A summary of changes made to the model are outlined in Table 2.

Table 2: Summary of model changes

Item	Information	Changes undertaken
Hydrology Updates		
Subcatchments	Total subcatchments within Ellerslie catchment model: 2334 with three overlapping subcatchments (778) representing impervious roads, impervious remaining and pervious areas (x3)	***Pre-development scenarios:*** 72 additional modelled subcatchments were imported from One Tree Hill catchment Total subcatchments: 2406 ***Post-development scenarios:*** Subcatchment boundaries within proposed development extent updated based on revised delineation Total subcatchments: 2406
Imperviousness	Imperviousness as per Auckland Unitary Plan - Operative in Part	***Pre-development scenarios*** No changes ***Post-development scenarios*** Catchment wide MPD based on underlying zoning with The Hill development site area imperviousness based on the proposed concept plan
Rainfall	Council models based on 24-hour rainfall depth obtained from TP108 guidelines and climate change uplift based on Stormwater Code of Practice version 2	***Pre- and Post-development scenarios*** 24-hour rainfall depth obtained from TP108 guidelines and climate change uplift based on Stormwater Code of Practice version 3
Hydrological parameters	As documented in Ellerslie and One Tree Hill catchment model build reports	***Pre- and Post-development scenarios*** No changes
Topography		
Topography	Council models were developed based on LiDAR 2013 DEM data	***Pre-development scenarios*** Modelled topography was updated using LiDAR 2016 DEM data, stream levels within Waiatarua Reserve retained as modelled in Ellerslie catchment model ***Post-development scenarios*** Topography within proposed development updated with design surface
Stormwater Network		
1D -2D couplings and soakage representation	• Manholes coupled to 2D using Mike Flood • Loading nodes coupled with weir coupling • Soakage represented using Q-h curves to dummy outfall	***Pre- and Post-development scenarios*** Coupling updated as follows: • 242 dummy weirs replaced with dummy pipes to represent source points, coupled with 2D outfalls • 87 dummy weirs replaced with dummy pipes to represent modelled soakage • 256 weir loadings replaced with 2D manholes • 288 head discharge curves updated to reflect initial levels in ICM
Pipes	1020 modelled pipes (public and dummy pipes) and 649 dummy weirs modelled for coupling	***Pre-development Scenarios:*** • 71 pipes added from One Tree Hill model • Inlets & outlets within Koraha Reserve updated based on site visits and GIS information which were modelled differently in Ellerslie catchment model (Appendix A), outlet of stormwater network from the Richard Farrel Avenue (Northwest) updated from a rectangular culvert

Item	Information	Changes undertaken
		(3m x 1.7m) to two 1800mm ø pipes and outlet pipe updated from user control with Q-h relationship to two 1800mm ø pipes. This is further illustrated in Appendix A including visual inspections undertaken. • The final base scenario has 1063 conduits between public stormwater pipes and dummy connection links. ***Post-development scenarios*** **Option 1:** 1200mm ø diversion pipe from Derby Downs catchment discharging to existing irrigation pond diverted to existing 1950mm pipe **Option 2:** 1200mm ø diversion pipe from Derby Downs catchment discharging to existing irrigation pond diverted to existing 1950mm pipe and 900mm ø connection from Derby Downs catchment to the existing network discharging towards Robert Street to the south
Manholes	1378 manholes modelled (public manholes, outlets, dummy manholes, dummy outlets)	***Pre-development scenarios:*** • 91 nodes added from One Tree Hill model • The final base scenario has 1643 nodes modelled ***Post-development scenarios:*** • No new nodes were added
Roughness surface	Spatially varying roughness modelled in Ellerslie and One Tree Hill model	***Pre-development scenarios:*** Roughness modelled for building footprints and road layers with a Manning (n) of 0.017 and 0.02, respectively as per the values adopted in the Ellerslie and One Tree Hill models ***Post-development scenarios:*** Roughness within the proposed development updated as per the design layout
Boundary Conditions		
Water Levels	• Initial water level of 23.2mRL applied at Waiatarua Reserve • Free flow at boundary with One Tree Hill catchment boundary in Ellerslie catchment model	***Pre- and Post-development scenarios:*** • Initial water level of 23.2mRL applied at Waiatarua Reserve • A constant water level of 28.0mRL applied at manhole NJ7259 (intersection of Main Highway and Arthur Street) representing surcharged network downstream within One Tree Hill network extent
Modelled Scenarios		
Modelled scenarios	MPD land use adopted for Ellerslie and One Tree Hill models provided	***Pre-development scenarios:*** • *100-year ARI MPD with CC (SWCoP v3)* • *10-year ARI MPD with CC (SWCoP v3)* ***Post Development scenarios:*** Option 1: • *100-year ARI MPD with CC (SWCoP v3)* • *10-year ARI MPD with CC (SWCoP v3)* Option 2: • *100-year ARI MPD with CC (SWCoP v3)* • *10-year ARI MPD with CC (SWCoP v3)*

7. Model results

The model results were analysed to extract the flood extents, peak water levels and flood depths for each scenario to have a better understanding of the flood risk of the pre- and post-development scenarios. Peak water level differences maps (afflux maps) were generated to understand the differences in the flood impacts within and around the proposed development, along with reviewing the performance of the existing and proposed stormwater network.

As per section 2 above, two options were assessed, and both were deemed viable. Option 1 is noted as being the preferred solution and accordingly the models were further refined for this scenario. These flood maps and difference plots are provided in Appendix B and Appendix C with extractions from the plans provided in the following sections.

7.1. Option 1 – Pipe network operational

Figure 7 shows the afflux plot between pre-development and post-development scenario for Option 1 100-year rainfall event inclusive of climate change.

The results indicate localised increases at the racecourse which is due to the termination of an existing private connection from the racecourse to the existing private pond. As discussed in Section 3.1, for the purpose of this preliminary assessment, the discharge from the racecourse is not considered as it is understood that this will be managed by Ellerslie Racecourse/ Auckland Thoroughbred Racing as part of future development.

The model results do not indicate any offsite effects.

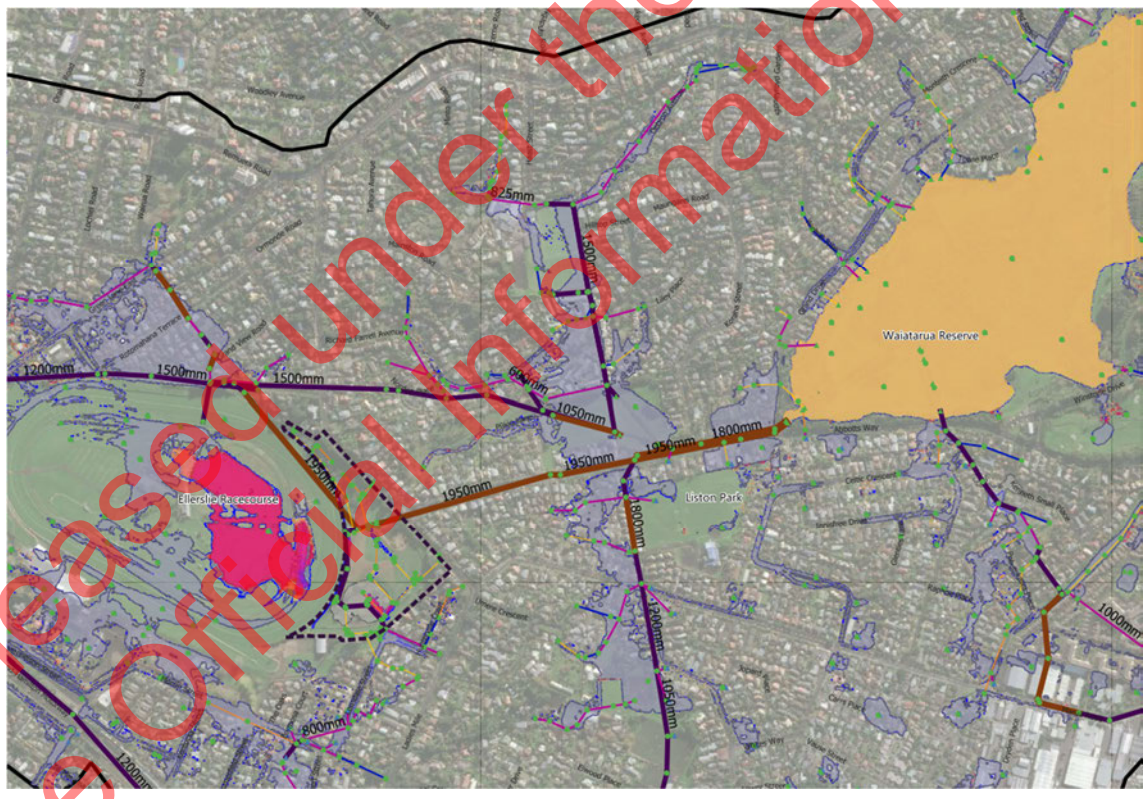


Figure 7: Afflux Option 1 - 100-year + CC

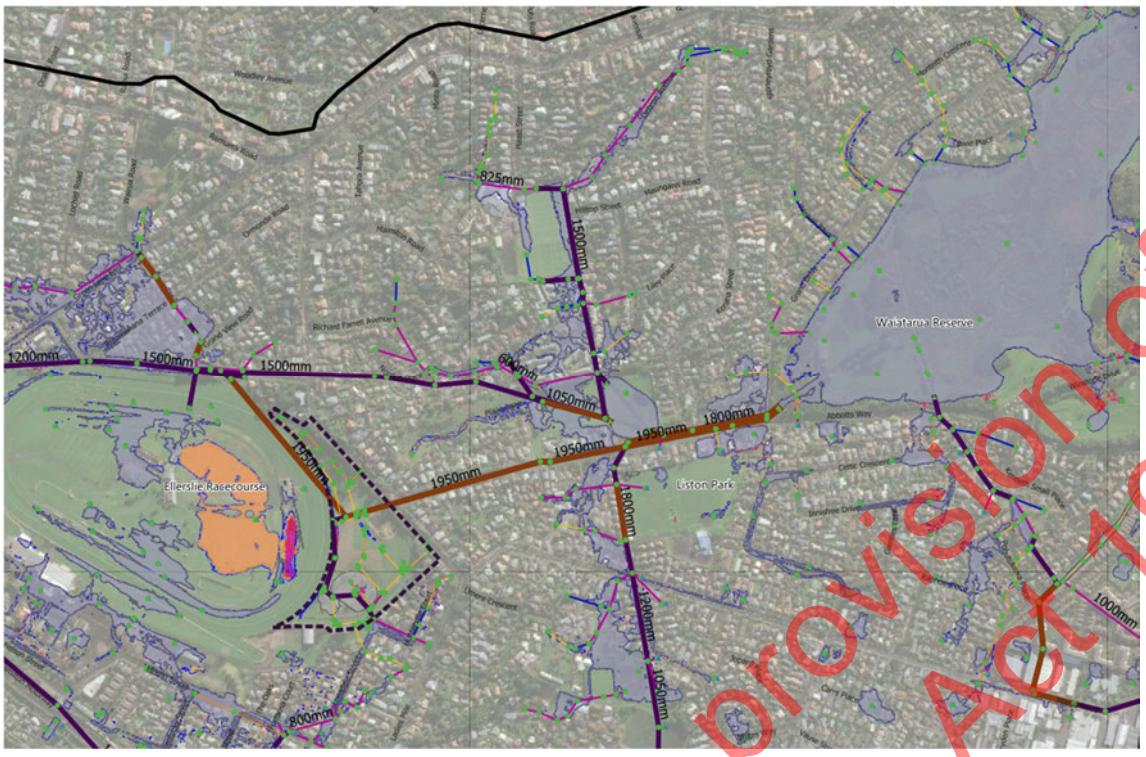


Figure 8: Afflux Option 1 - 10-year + CC

7.2. Option 1 – Pipe network blocked

Woods have undertaken further flood modelling related to network blockage scenarios in accordance with the Auckland Council Stormwater Code of Practice Version 3 (and uplifted climate change allowances with 3.8ºC) which assumes the following:

- 100% blockage of pipes less than DN600
- 50% blockage of pipes DN600 to DN1050
- 10% blockage of pipes in excess of DN1050

It is also noted that these assumptions were applied over the entire modelled network i.e., not just applied for The Hill development area and therefore the assessment is considered conservative. A summary as follows:

- Model results indicate that flows from the Hills site are contained and do not overtop the racetrack, an afflux plot of the predevelopment blockage vs post development (Option 1) blockage.
- The afflux plots demonstrates that there is no increased flood risk upstream or downstream of the Hill site.
- In regards to the Hill development, secondary flows are contained within the proposed road network, refinement will be made during detailed design to ensure adequate freeboard for finished floor levels
- Through detail design, models are to be refined further with respect to the proposed network and inletting capacity which will further reduce any localised flooding within the Hill development.

The plots are shown in Figure 9 and Figure 10.

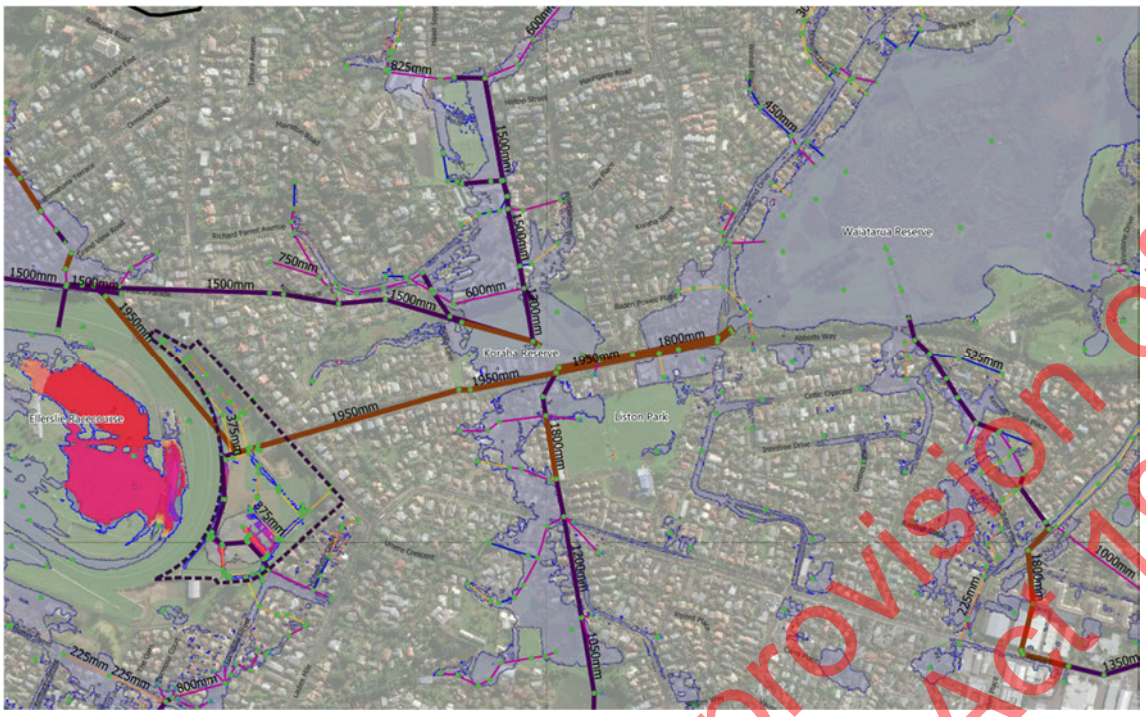


Figure 9: Afflux Option 1 - 100-year + CC (Pipe network blocked)

Figure 10: Afflux Option 1 - 10-year + CC (Pipe network blocked)

The results are included in Appendix C.

7.3. Areas of consideration

This section discusses further areas of consideration within the catchment.

7.3.1. Peach Parade

The 100-year (inclusive of climate change) Post-development Option 1 model results were analysed further around Peach Parade to understand the effects to the proposed discharge of flows from the site to the existing 1950mm stormwater network.

The peak water levels were compared along the stormwater network extending from Peach Parade discharging into Waiatarua Reserve. The extent of the long section is shown in Figure 11 with the pe k water level comparison in Figure 12. The long section comparison from the models are provided i Figure 13 - Figure 16.

As shown in Figure 12, there is approximately a 10m drop in the pipeline between Peach Parade and Ladies Mile, prior to the proposed discharge location. The long sections indicate no backwate effects from the additional discharges to the 1950mm dia. pipe from The Hill development site and Derby Downs catchment (Option 1).

The results also indicate flows are still contained within the stormwater network with no increase to surface flooding as a result of diversion of flows from The Hill development site and Derby Downs catchment (Option 1).

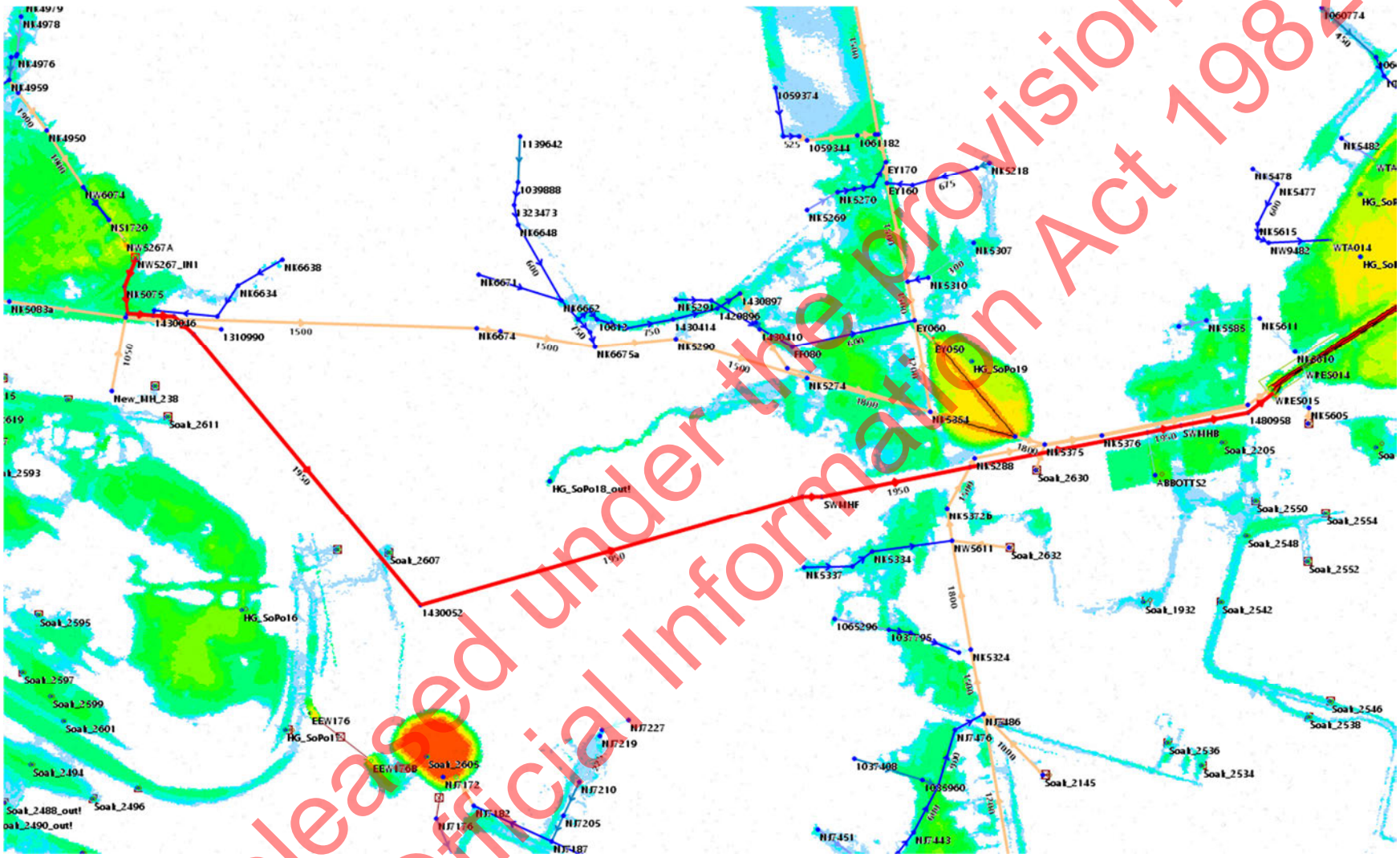


Figure 11: Extent of the 1950mm dia. long se tion

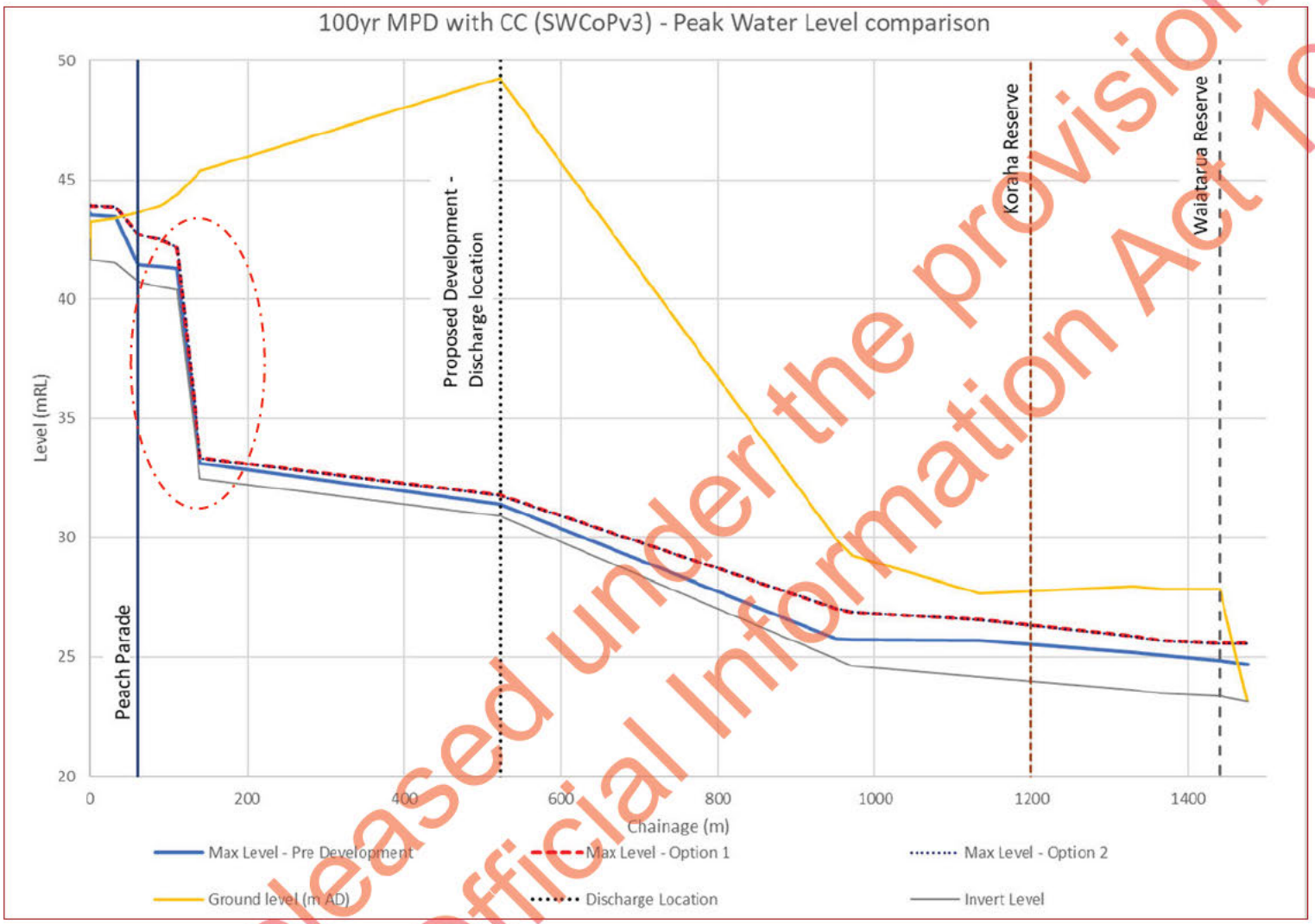


Figure 12: Peak water level comparison

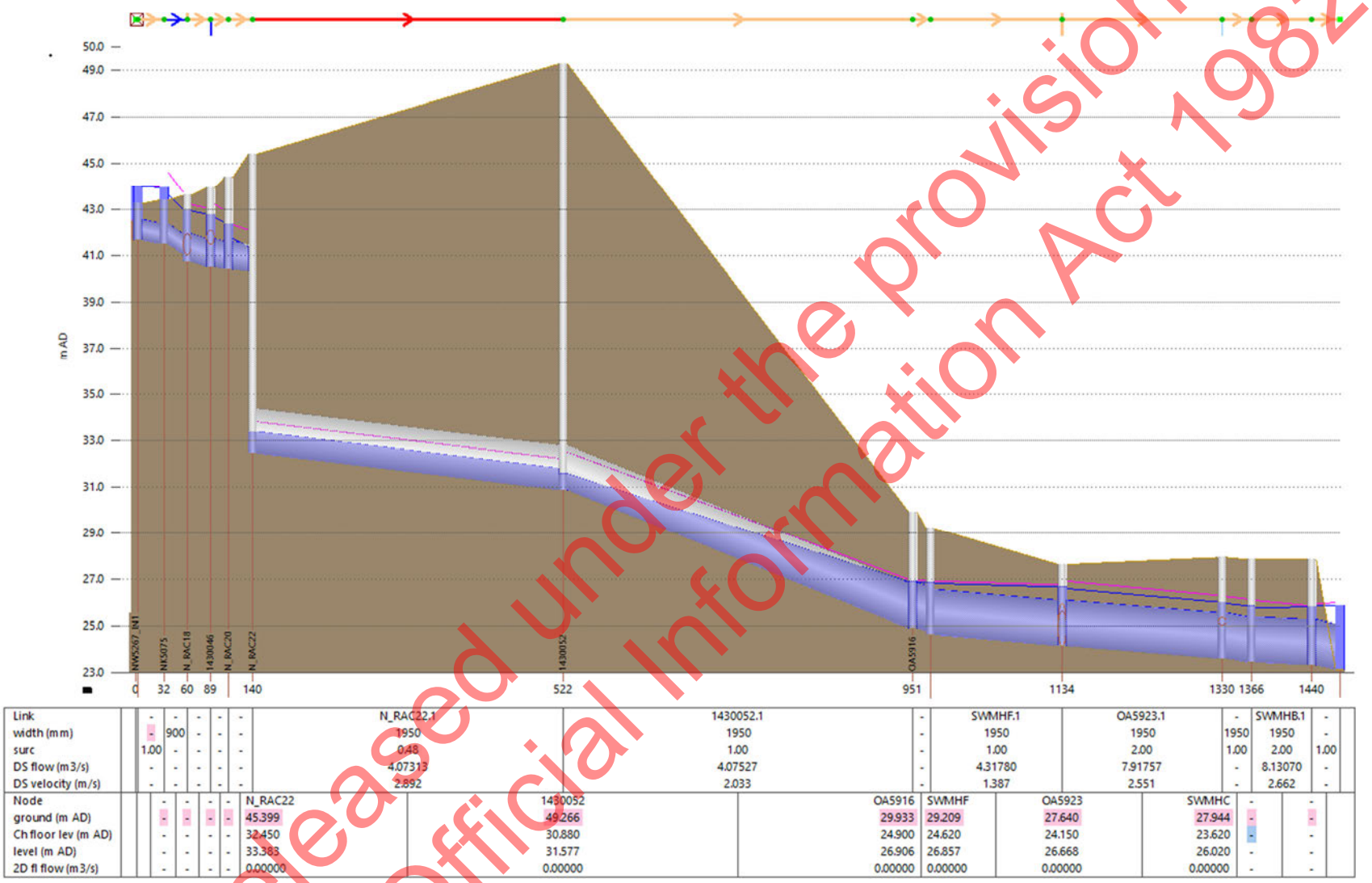
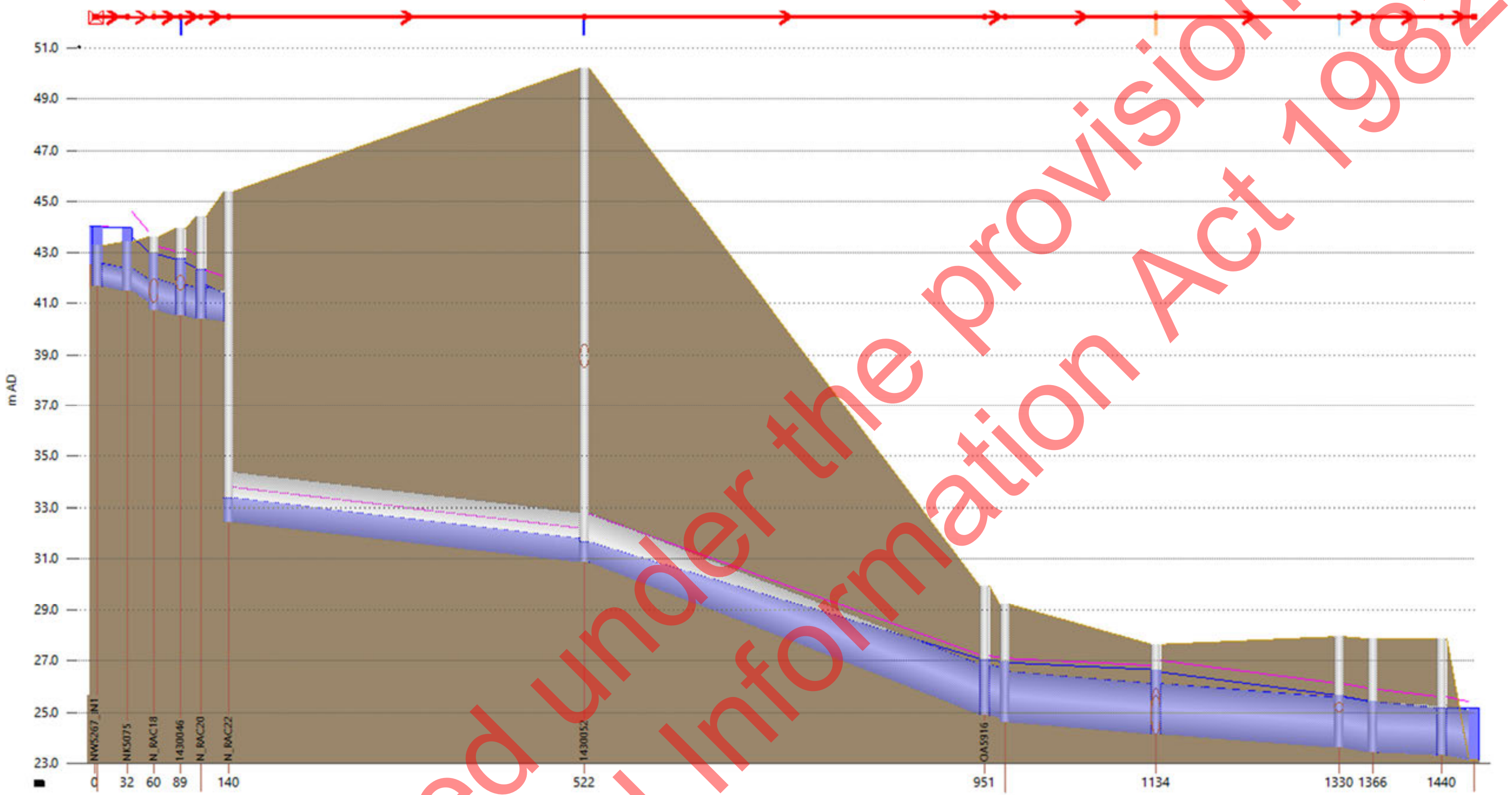


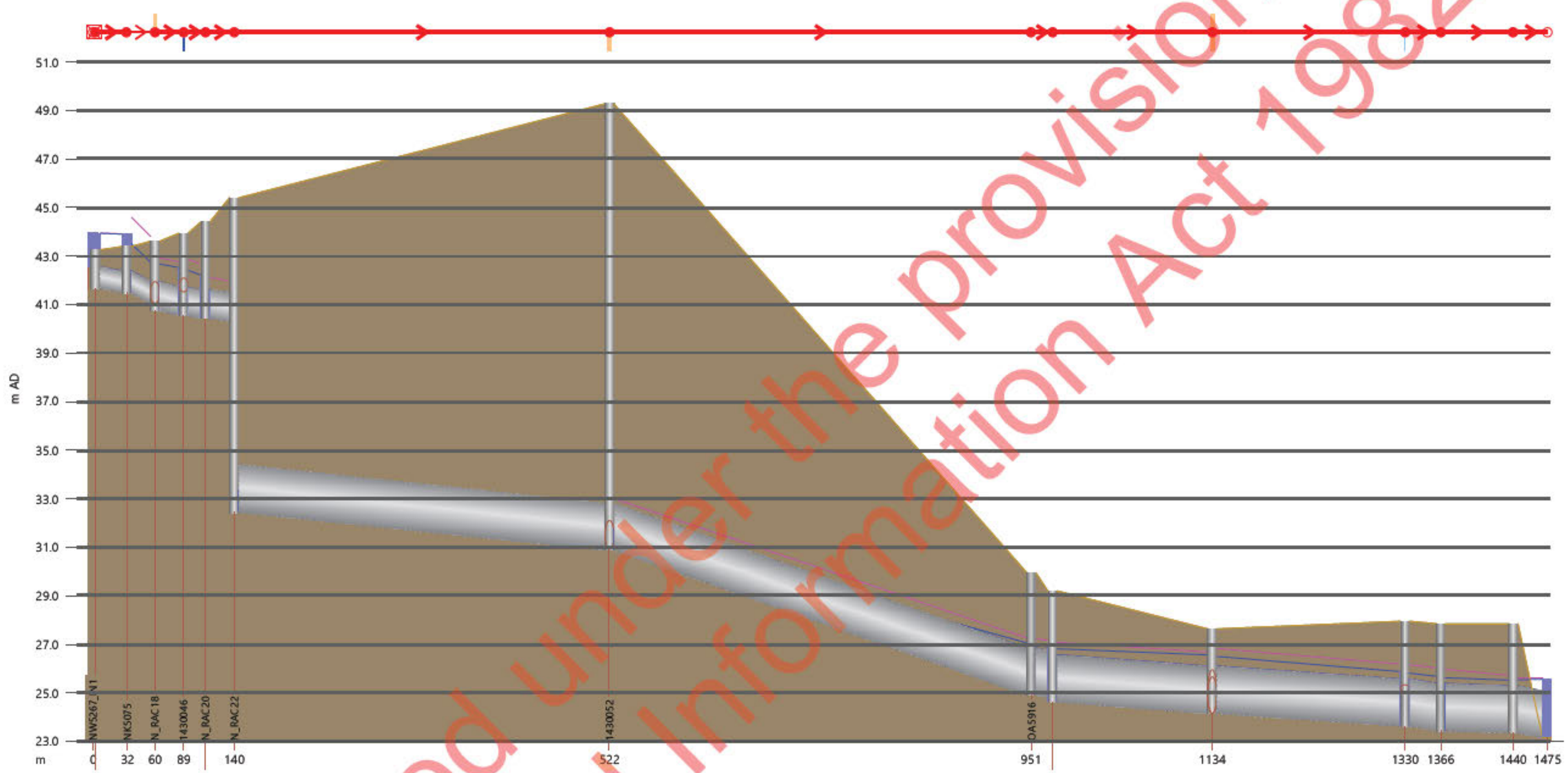
Figure 13: Pre-devel pment model Long Sect on – 100yr with CC



Link	-	-	-	-	-	N_RAC22.1	1430052.1	-	SWMHF.1	OA5923.1	-	SWMHB.1	-
width (mm)	-	900	-	-	-	1950	1950	-	1950	1950	1950	1950	-
surc	1.00	-	-	-	-	0.47	1.00	-	1.00	2.00	1.00	0.99	1.00
DS flow (m3/s)	-	-	-	-	-	3.97965	5.26903	-	6.09780	9.29236	-	9.50888	-
DS velocity (m/s)	-	-	-	-	-	2.875	2.500	-	1.966	3.034	-	3.613	-

Node	-	-	-	-	N_RAC22	1430052	OA5916	SWMHF	OA5923	SWMHC	-	-
ground (m AD)	-	-	-	-	45.399	50.200	29.933	29.209	27.640	27.944	-	-
Ch floor lev (m AD)	-	-	-	-	32.450	30.880	24.900	24.620	24.150	23.620	-	-
level (m AD)	-	-	-	-	33.370	31.673	27.077	26.982	26.654	25.662	-	-
2D fl flow (m3/s)	-	-	-	-	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-	-

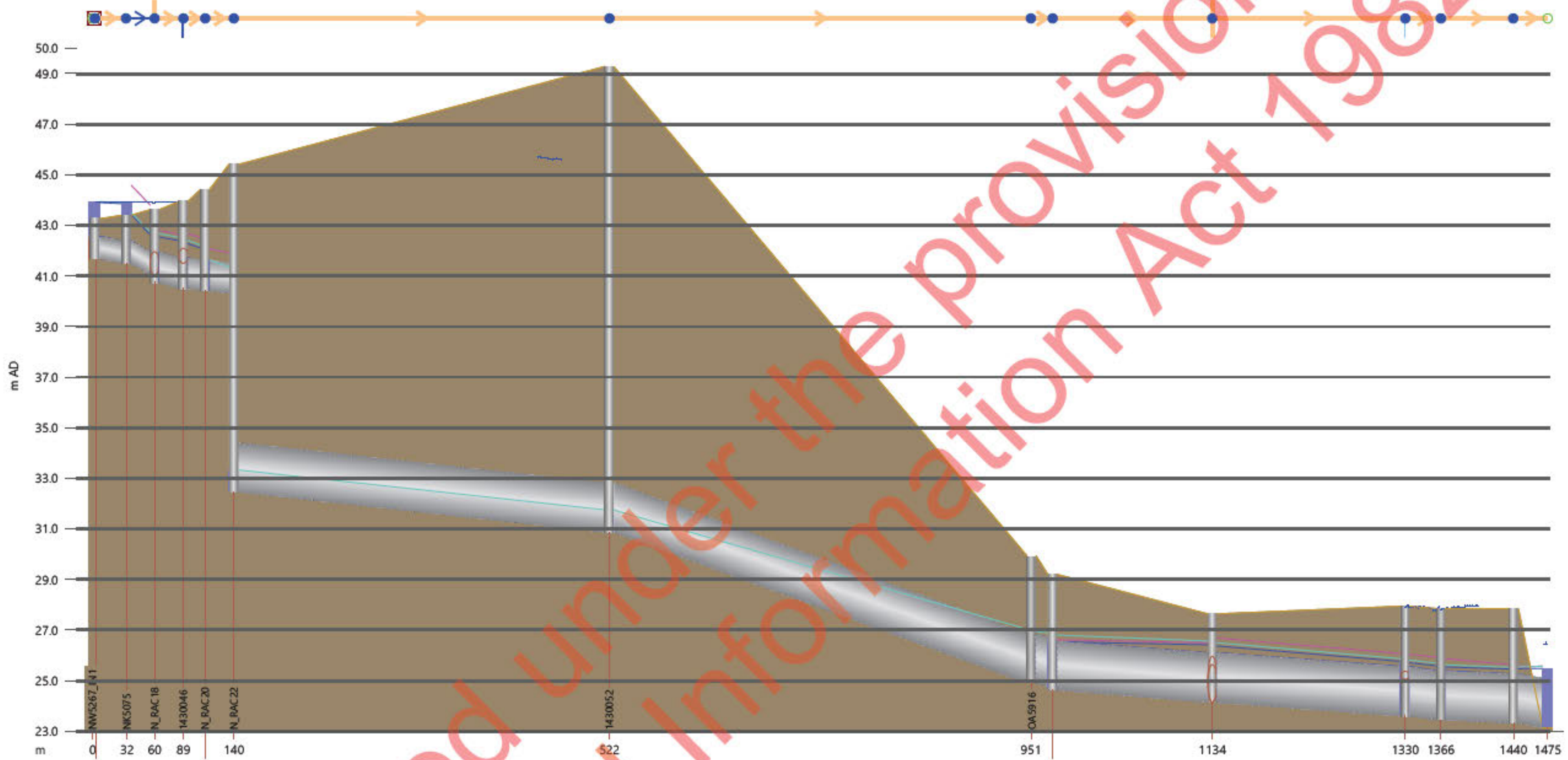
Figure 14: Post-development Option 1 model Long Section– 100yr with CC



Link	-	-	-	-	-	N_RAC22.1	1430052.1	-	SWMHF.1	OA5923.1	-	SWMHB.1	-
width (mm)	-	900	-	-	-	1950	1950	-	1950	1950	1950	1950	1950
surc	1.00	2.00	1.00	-	2.00	0.45	1.00	-	1.00	2.00	1.00	2.00	1.00
DS flow (m3/s)	-	-	-	-	-	3.65213	6.22988	-	7.09544	7.92187	-	8.11784	-
DS velocity (m/s)	-	-	-	-	-	2.809	2.453	-	2.288	2.568	2.629	2.742	-

Node	-	-	-	-	N_RAC22	1430052	OA5916	SWMHF	OA5923	SWMHC	-	-
ground (m AD)	-	-	-	-	45.399	49.266	29.933	29.209	27.640	27.944	27.854	27.855
Ch floor lev (m AD)	-	-	-	-	32.450	30.880	24.900	24.620	24.150	23.620	23.440	23.330
level (m AD)	-	-	-	-	33.326	31.757	27.044	26.897	26.561	25.861	25.679	25.538
2D fl flow (m3/s)	-	-	-	-	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-	-

Figure 15: Post-development Option 2 model Long Section– 100yr with CC



Link	-	-	-	-	-	N_RAC22.1	1430052.1	-	SWMHF.1	OA5923.1	-	SWMHB.1	-
width (mm)	-	900	-	-	-	1950	1950	-	1950	1950	1950	1950	1950
surc	1.00	2.00	1.00	-	0.99	0.44	0.87	-	1.00	2.00	1.00	2.00	1.00
DS flow (m3/s)	-	-	-	-	-	3.52259	3.54714	-	3.96718	7.71777	-	7.92176	-
DS velocity (m/s)	-	-	-	-	-	2.782	2.032	-	1.354	2.531	2.564	2.663	-

Node	-	-	-	-	N_RAC22	1430052	OA5916	SWMHF	OA5923	SWMHC	-	-
ground (m AD)	-	-	-	-	45.399	49.266	29.933	29.209	27.640	27.944	27.854	27.855
Ch floor lev (m AD)	-	-	-	-	32.450	30.880	24.900	24.620	24.150	23.620	23.440	23.330
level (m AD)	-	-	-	-	33.309	31.530	26.587	26.554	26.421	25.758	25.590	25.476
2D fl flow (m3/s)	-	-	-	-	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-	-

Figure 16: Post-development Option 1 model long section comparison with pre-development model – 100yr with CC

8. Model review

The models were supplied to Healthy Waters for review. Healthy Waters provided comments back to Woods on 15/12/2021. The key changes were:

- Rainfall profile
- Losses applied at inlet and outlet structures, mainly at Koraha Reserve
- Pipe head losses in network imported from One Tree Hill model to be updated.

Woods have made these amendments to the models and the results presented in this memorandum are based on these changes. It is noted as a result of the changes made to the inlet and outlet structures the effects at Koraha Reserve previously discussed with Healthy Waters are now reduced and do not demonstrate any significant changes.

The headlosses have been updated for the network imported from the One Tree Hill model in addition to the internal pipe network that has been incorporated. This has resulted in no increased flooding along Lonsdale Road which was raised as a concern previously by Healthy Waters.

Woods have re issued copies of models, model results and the completed review form back to Healthy Waters on 20/12/2021 and had a follow up meeting on the 22/12/2021 to close out the model review process. Healthy Waters have confirmed that the model review process is now completed with additional sensitivity scenarios being requested to support the SMP.

9. Stormwater management

The development site is not located within a Stormwater Management Area Flow (SMAF) control area as per the AUP: OiP.

As per the Regionwide Network Discharge Consent (NDC), the site is considered a 'greenfields' site. The requirements of a 'greenfields' site is shown in Figure 17 below.

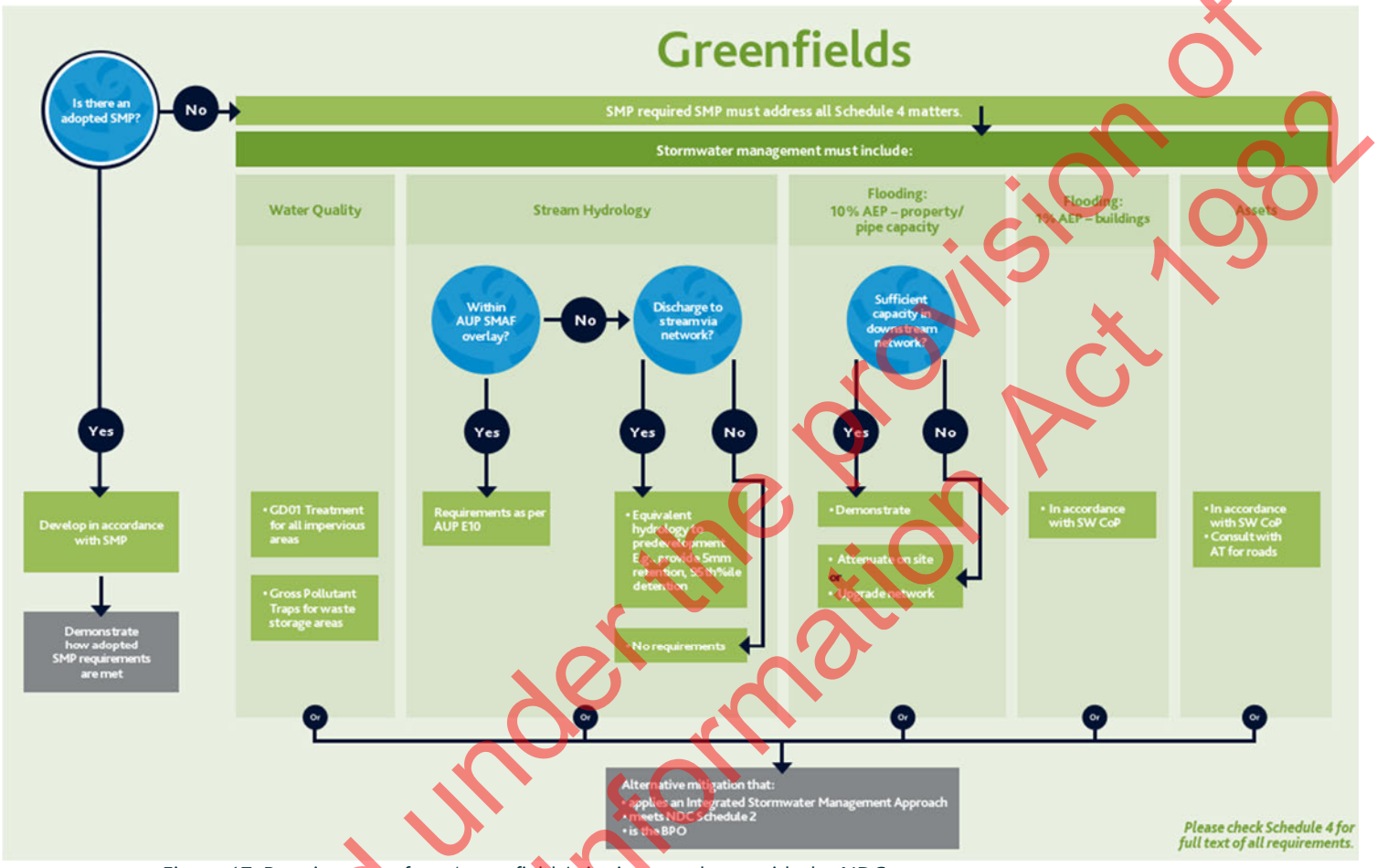


Figure 17: Requirements for a 'greenfields' site in accordance with the NDC

9.1. Proposed stormwater management

9.1.1. Water quality

It is proposed that water quality treatment of all impervious surfaces for The Hill development are to be provided in accordance with the NDC requirements.

This will be refined at detail design stages; however, this is proposed to consist of the following:

- Inert roofing material for all dwellings
- JOALs/ private roads to be treated via raingardens or similar
- Other hardstand areas including driveways to be treated prior to discharge
- Public roads to be treated via raingardens/ tree pits or swales

9.1.2. Hydrology mitigation

As described above, the primary and secondary flows from The Hill development site is to be discharged to the 1950mm dia. pipe which discharges to Waiatarua Reserve. As discussed in Section 3.2.1 the reserve

then discharges to Orakei Basin and ultimately Hobson Bay which is a coastal environment. The catchment is noted as not being located within a SMAF overlay.

Waiatarua Reserve has a section of open stream at the entrance to the reserve. Site observations have indicated the water level is high in this area with the levels governed by several structures. It is also noted that the Hill development site has a total area of 6.4ha, which is equivalent to approximately 2-3% of the contributing catchment area currently discharging to Waiatarua Reserve. Therefore, given the above hydrology mitigation is not proposed to be provided for The Hill development due to the benefits being limited.

This has been tabled with Healthy Waters with agreement gained in principle. However, during discussions with Healthy Waters, it was noted an ecological assessment would be required at Waiatarua Reserve to further determine the receiving environment and the erosion risk of additional flows.

Photos from the site observations within Waiatarua Reserve are included in Appendix D.

10. Healthy Waters consultation

Woods have consulted with Healthy Waters in regards to the proposed stormwater and flood management proposed for the development. Table 3 below provides a summary of the meetings with further notes and minutes included in Appendix E.

Table 3: Summary of consultation

Date	Parties	Discussion and outcome
09/11/2021	Healthy Waters modelling and catchment management team	This discussion was centred around flood modelling undertaken including limitation of the models. Brief discussion around the options and model results.
15/11/2021	Healthy Waters	This meeting was held with the wider Healthy Waters team, FRL, Woods, Crang Civil and Tattico. Items discussed included the following: • Existing stormwater features within the site including the existing private pond and the 1950mm dia. pipeline • Flood modelling including updated scenarios based on site observations and information on Auckland Council GIS • Proposed stormwater management for The Hill development site • Proposed primary stormwater network including connection to the existing 1950mm dia. pipe • Secondary flows and discussions around piping of secondary flows from The Hill development site In general, Healthy Waters were favourable of the proposed stormwater strategy. However, the following were required to further assess: • Long sections of the 1950mm dia. pipeline to assess any backwater effects or surface flooding as a result of the proposed discharge further upstream of the site/racetrack, in particular around Peach Parade • Sensitivity runs around blockage scenarios to assess piping of secondary flows from The Hill Development site

		• An ecology assessment of the receiving environment to ensure the proposal for not providing hydrology mitigation is satisfactory It was also suggested that as The Hill development is to be consented via the COVID-19 Fast-track consenting route, stormwater discharge would not be authorised as it triggers the NDC. Therefore, it was recommended the process for provisional approval of the SMP (from Healthy Waters) also be undertaken in parallel with the Covid-19 Fast Track consent process. Meeting minutes are included in Appendix E.
10/12/2021	Healthy Waters	A follow up meeting was held with Healthy Waters, FRL, Woods, Crang Civil, Tattico and Ellerslie Racecourse to discuss outstanding items. Items discussed included the following: • Concept involved with piping of secondary flows. Healthy Waters Healthy Waters interested in seeing blockage scenarios and any downstream effects. • The pipe long section and hydraulic grade nes along the 1950mm dia. lin and effects upstream around Peach Parade. It s noted that flooding at Peach Parade is due to network constraints prior to dropping to the 1950mm dia pipe and topographic l constraints. • Discussions around whether the 'Hill' development is cover d by the Regionwide NDC. Healthy Waters are yet o confirm, howev r th development Planner has confirmed an SMP p epared for The Hill can be adopted through chedule 8 into the NDC. Meeting minutes are included in Appendix E.

11. Conclusions

In summary, the assessment undertaken demonstrated there are solutions available for addressing stormwater matters to support the Hill development. These are to be further developed through detail design and future fast track resource consent application.

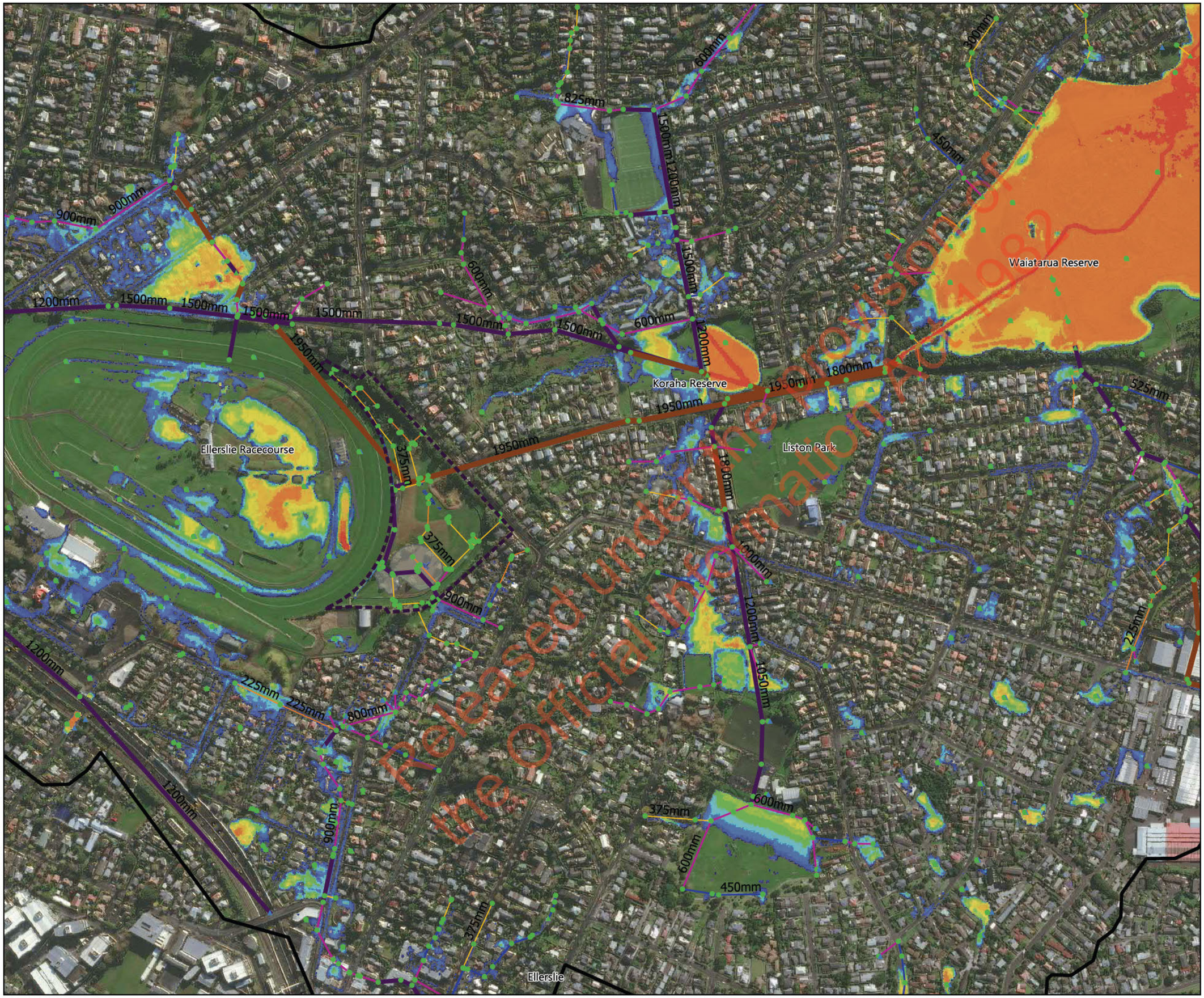
The assessment concludes there are no significant impediments with respect to stormwater matters.

Appendix A

Koraha Reserve – Model Update

Appendix B

Model Results – Flood depth plots



WOODS
EST.1970

Model Extent
Proposed project extent
Post Dev. Flood Extent. 10yrCC ARI
Pre Development. 10yrCC ARI Flood Extent (Depth>0.05m)

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Max. Depth. Option 1. 10yrCC [m]
- 0m - 0.05m
- 0.05m - 0.1m
- 0.1m - 0.2m
- 0.2m - 0.3m
- 0.3m - 0.4m
- 0.4m - 0.5m
- 0.5m - 0.7m
- 0.7m - 1.0m
- 1.0m - 2.0m
- >2.0m

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

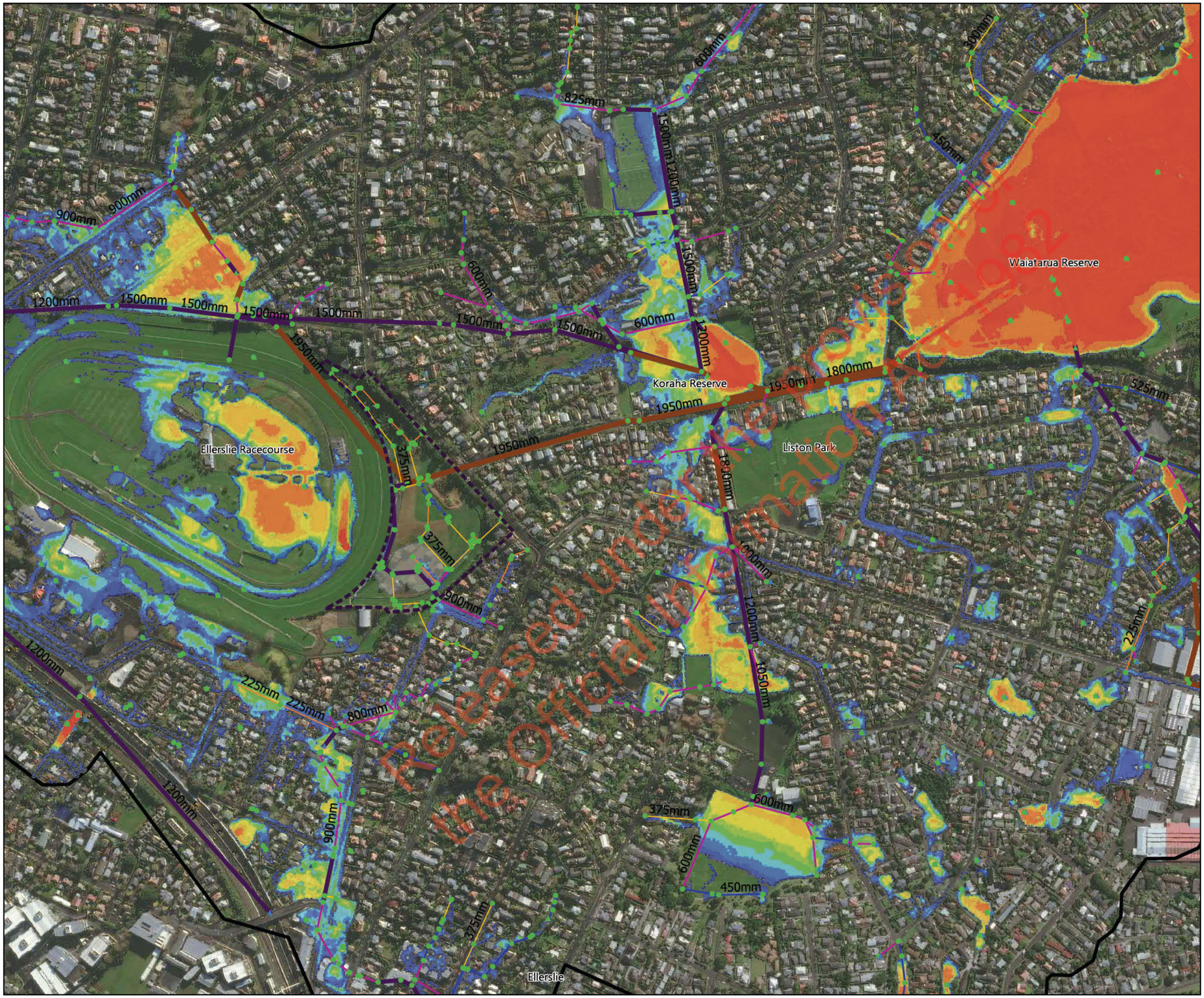
N

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Maximum Depth -Temp. Increase 3.8° (SWCoPv3)
10yr CC Option 1 - Full Diversion

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:6500 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0002	

This drawing was generated from QGIS\\wapco.local\dfs\Stormwater\Stormwater\ICM Models SW\The Hills\TheHills_Miguel.qgz



WOODS
EST.1970

Model Extent
Proposed project extent
Post Dev. Flood Extent. 100yrCC ARI
Pre Development. 100yrCC ARI Flood Extent (Depth>0.05m)

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Max. Depth. Option 1. 100yrCC [m]
- 0m - 0.05m
- 0.05m - 0.1m
- 0.1m - 0.2m
- 0.2m - 0.3m
- 0.3m - 0.4m
- 0.4m - 0.5m
- 0.5m - 0.7m
- 0.7m - 1.0m
- 1.0m - 2.0m
- >2.0m

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

N

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Maximum Depth -Temp. Increase 3.8° (SWCoPv3)
100yr CC Option 1 - Full Diversion

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:6500 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0001	

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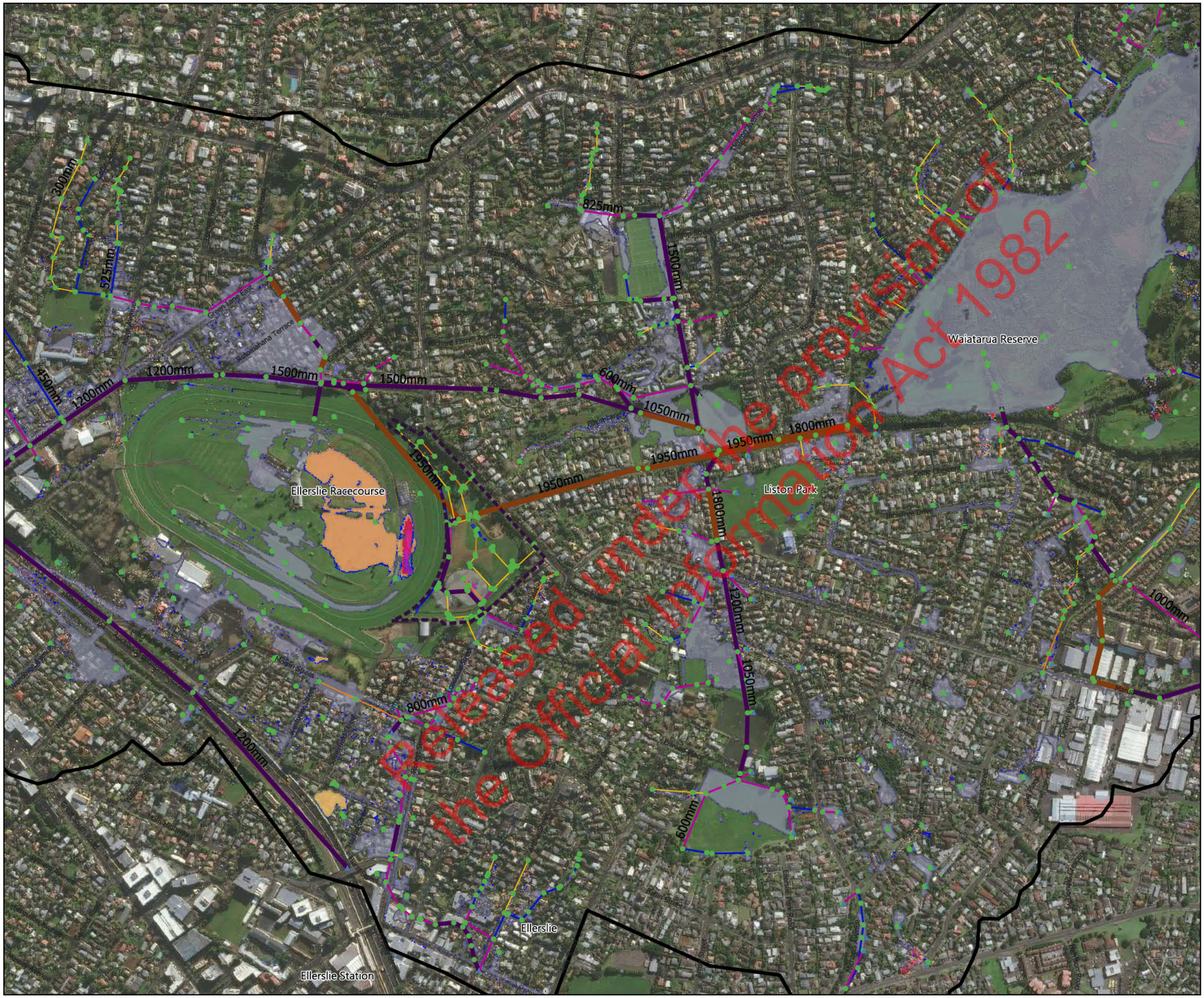
Appendix C

Model Results – Afflux plots



WOODS
EST.1970

Model Extent
Proposed project extent
Pre Development 10yrCC Flood Extent (Depth>0.05m)
ModelExtent_TheHillsPost10yr

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Afflux - Water Level. 10yrCC [m]
Opt Minus Pre-Development
- 0.01-0.05
- 0.05-0.1
- 0.1-0.15
- 0.15-0.2
- 0.2-0.25
- 0.25-0.6
- 0.6-1
- 1-2
- 2-3
- 3-6

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

N

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Afflux Plot Pre Vs Post (Option 1)
Temp. Increase 3.8° (SWCoPv3)
10yr CC Option

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:8000 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0002	

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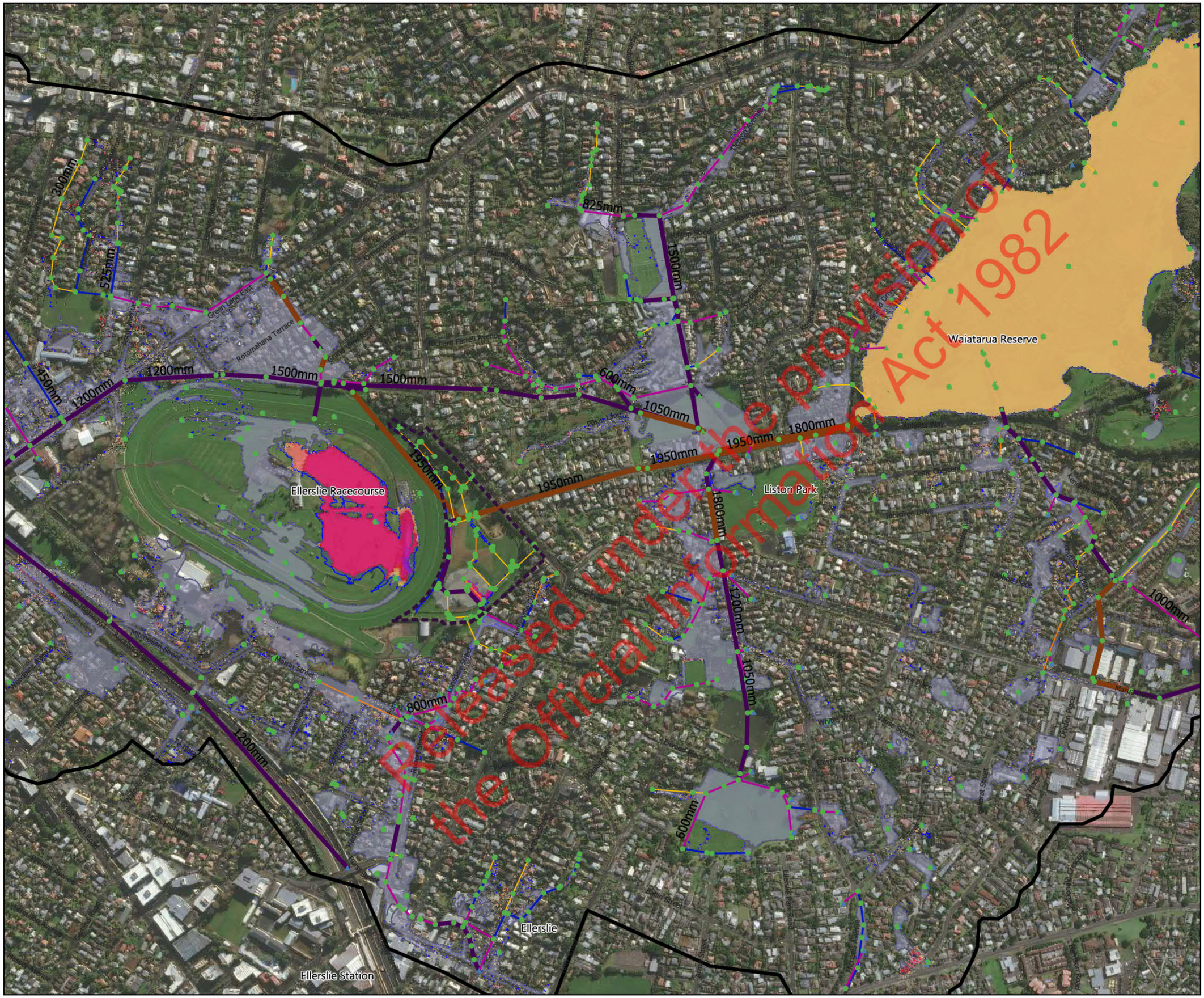


WOODS
EST.1970

Model Extent
Proposed project extent
Pre Development 100yrCC Flood Extent (Depth>0.05m)
ModelExtent_TheHillsPost100yr

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Afflux - Water Level. 100yrCC [m]
Opt Minus Pre-Development
- 0.01-0.05
- 0.05-0.1
- 0.1-0.15
- 0.15-0.2
- 0.2-0.25
- 0.25-0.6
- 0.6-1
- 1-2
- 2-3
- 3-6

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

N

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Afflux Plot Pre Vs Post (Option 1)
Temp. Increase 3.8° (SWCoPv3)
100yr CC Option

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:8000 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0001	

This drawing was generated from QGIS\\wapco.local\dfs\Stormwater\Stormwater\ICM Models SW\The Hills\TheHills_Miguel.qgz

Model Extent
Proposed project extent
Flood Extent Pre Dev. Scenario 10yrCCv3
Flood Extent Post Dev. Scenario (Opt1) 10yrCCv3

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Afflux - Water Level. 10yrCC [m]
Opt Minus Pre-Dev. [Blocked]
- 0.01-0.05
- 0.05-0.1
- 0.1-0.15
- 0.15-0.2
- 0.2-0.25
- 0.25-0.6
- 0.6-1
- 1-2
- 2-3
- 3-6

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

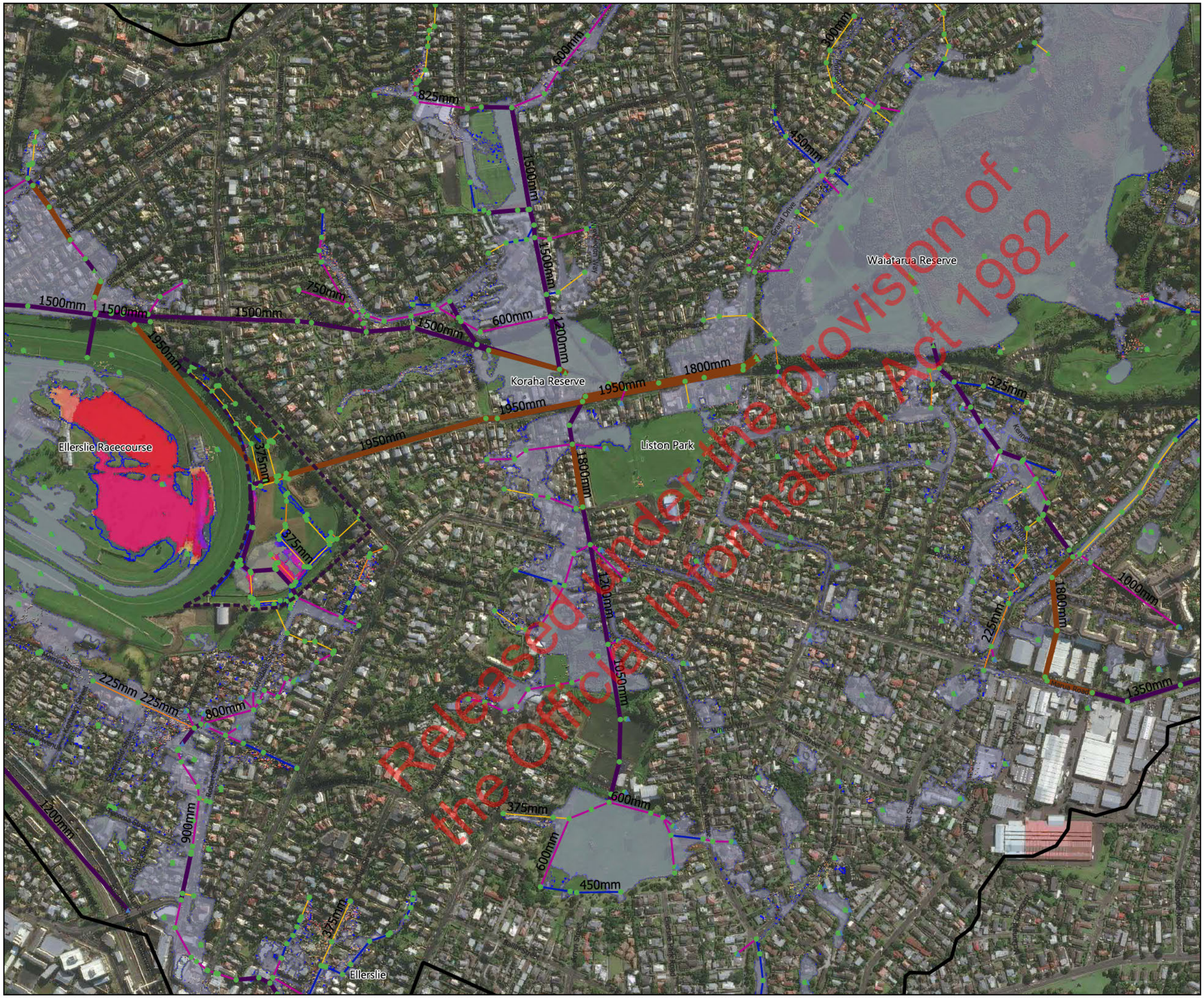
SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Afflux Plot Pre Vs Post (Option 1)
Blockage Scenario (No Tunnel)
10yr CC (SWCoPv3) (3.8°C)

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:6500 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0002	

This drawing was generated from QGIS\\wapco.local\dfs\Stormwater\Stormwater\ICM Models SW\The Hills\TheHills_Miguel.qgz



Model Extent
Proposed project extent
Flood Extent Pre Dev. Scenario 100yrCCv3
Flood Extent Post Dev. Scenario (Opt1) 100yrCCv3

Nodes
- Manhole
- Outfall 2D
- Outfall 1D

Links
- 200 - 299
- 299 - 400
- 450 - 600
- 600 - 1000
- 1000 - 1500
- 1500 - 2600

Afflux - Water Level. 100yrCC [m]
Opt Minus Pre-Dev. [Blocked]
- 0.01-0.05
- 0.05-0.1
- 0.1-0.15
- 0.15-0.2
- 0.2-0.25
- 0.25-0.6
- 0.6-1
- 1-2
- 2-3
- 3-6

REVISION DETAILS		BY	DATE
1.0	Issued for information	PW	20/12/2021

SURVEYED	-	
DESIGNED	MH	
DRAWN	MH	
CHECKED	AD	
APPROVED	AD	WOODS.CO.NZ

Note:
Option 1: Full diversion (Hills development + Derby downs to 1950mm trunk).
Option 2: Partial diversion (Hills development only to 1950mm trunk, Derby Downs towards south Robert Street).

The Hills
Stormwater Model Results
Afflux Plot Pre Vs Post (Option 1)
Blockage Scenario (No Tunnel)
100yr CC (SWCoPv3) (3.8°C)

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:6500 @ A3	1.0
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P21-440-SKT-0001	

This drawing was generated from QGIS\\wapco.local\dfs\Stormwater\Stormwater\ICM Models SW\The Hills\TheHills_Miguel.qgz

Appendix D

Waiatarua Reserve – Visual Inspections

Appendix E

Healthy Waters

Location	MS Teams			
Time & Date	2.000pm	15/11/2021	**Taken by**	Bidara Pathirage
Attendees	**Initials**	**Name**		**Company**
	PW	Pranil Wadan		Woods
	AD	Ajay Desai		Woods
	BP	Bidara Pathirage		Woods
	JC	James Crews		Fletcher Residential L ving
	FW	Fabian Wineera		Fletcher Residential Living
	HL	Hinsan Li		Fletcher Residential Living
	GL	Gracen Luka		Fletcher Residential Living
	VL	Vijay Lala		Tattico
	VC	Vaughan Crang		Crang Civil
	MI	Mark Iszard		Auckland Council
	PS	Preetika Singh		Auckland Council
	HL	Hansol Lee		Auckland Council
Apologies	DG	Don Greenaway		Auck and Thoroughbred Raci g
	CB	Cheryl Ba		Auckland Council

Meeting Minutes - 15/11/2021

The Hill – Stormwater – Meeting with Healthy Waters

1. Introductions around the group
2. A brief background on the project is prov ded by JC including the proposed scheme. An application has been put in for a referral o the Minister under the COVID-19 Fast-track consenting oute. The current focus is to close out the due diligence phase. The intent for the meeting i to understand if a robust solution can be established for stormwater for the development.
3. VC provides an overview of the proposed primary network. A preferred option for the proposed connections to the 1950mm dia. pipe are discussed along with an alternative option. Piping of the secondary flows is discussed with inletting to the pipe under consideration via a scruffy dome/ catchpit. A 1950mm dia. stub is available for extension to the Ellerslie Racecourse area. The propose connection would include connecting to this stub.
4. PW disc sses existing stormwater features within the site with an existing private pond located within The Hill development used for irrigation purposes. It is noted that the existing public network from south, referred to as Derby Downs catchment, discharges to the private pond. The pond discharges south towards One Tree Hill catchment. The pond is proposed to be removed as part of the development which has fed into the optioneering process in understanding effects as a result of removing the pond but also dealing with the Derby Downs catchment. The 1950mm dia. pipeline traversing the site discharges to Waiatarua Reserve.
5. PW discusses stormwater options considered; Option 1 includes full diversion (The Hill and Derby Downs catchment) to the 1950mm dia. pipe (Ellerslie Catchment). Option 2 is partial diversion which only involves diverting The Hill development site. With Option 2, the Derby Downs catchment would discharge to the existing stormwater network to the south (One Tree Hill catchment).

6. PW and AD provides a general overview of the modelling including changes/ updates to the model. Changes include converting Healthy Waters Ellerslie DHI model to InfoWorks ICM model as requested by Healthy Waters along with further changes to include One Tree Hill catchment to understand effects resulting from Option 2 and changes made to pipe diameters at Koraha Reserve. 10- and 100-year models have been simulated inclusive of climate change in accordance with Version 3 of Auckland Council Stormwater Code of Practice (CoP) coming into effect 22nd January 2022.

7. AD and PW discuss changes made to the model around Koraha Reserve based on visual inspections undertaken and information available on Auckland Council GIS. It is noted the information in the model contradicts what was on Auckland Council GIS. The GIS information was verified and confirmed via the site inspections and hence updated in the models.

8. PW discusses model results. Increases are observed at the racecourse which is a result of the termination of the pipeline coming from the racecourse to the existing private pond. Ma n effects from the development as a result of the diversion of flows to the 1950mm dia. pipeline are at Koraha Reserve (up to 0.11m) and increases less than 0.02m at Waiatarua Reserve for the 100yr MPD with CC scenarios. Flood extents within Koraha Reserve have been i ves igated further and noted to be contained within the reserve area and not extending to third party land/residential lots. It is noted that a habitable floor level survey is recommended for adjoining properties to further confirm protection for flood risk during the next phases of the project. The inc eases are noted to be related to the interaction of the outlet from Koraha Reserve to the 950mm dia. pipe and the increase in flows from the development site. The Watercare pump station is also briefly discussed as a potential risk. The results remain simila between Options 1 nd 2.

9. PW discusses the proposed stormwater management strategy for the development. The Hill site is a greenfield site under the NDC and is not located within a SMAF overlay. Water quality treatment to be provided for all impervious surfaces in accordance with he NDC. However, in relation to hydrology mitigation, it is noted the 1950mm dia. pipeline d scharges to Waiatarua Reserve which ultimately discharges to Orakei Basin and Hobson Bay which is a coastal environment. Waiatarua Reserve has a small section of open stream at the e rance; however, the water level is high and governed by several struct res. The contribution of flows from the Hill development site is also relatively small in comparison with the total contributing catchment area of Waiatarua Reserve (approximately 2-3%). Therefore, given th flow regime and interceptions by hydraulic structures, hydrology mitigation is not proposed to be provided for this development.

10. PW reiterates the purpose of this session is to understand if there any gaps in the approach and close out any Healthy Waters co cerns. It is also noted that AD/ PW/ HL and PS have also had a session to go through flood modelling previously.

11. MI notes high level princip s discussed and gain alignment:

    a. Piping of the 100-year flows – Typically not what is undertaken but Healthy Waters, would ike to understand impact of blockage scenarios and resulting overland flows that w uld traverse south to One Tree Hill catchment. PW notes this will be undertaken at the next phase of works (as the network gets designed) and MI iterates assessments greater than what's been provided for in the CoP would require to be undertaken as the CoP assumes there are secondary flow paths. MI noted that as this is critical to the SW solution for the site, there is inherent risk to proceeding before this has been resolved.

    b. PS commented regarding the capacity of the 1950mm pipe, and that this pipe may not have been designed to accommodate flows from the proposed development site in the northeast of the Ellerslie Racecourse grounds. HL note no significant objections with diverting flows to the 1950mm dia. pipe but further model results and clarifications were needed. MI notes the pipe was installed to relieve flood risk further north of the racecourse i.e., around Peach Parade. There is also known flood risk south of Derby Downs catchment within the One Tree Hill catchment.

c. POST meeting note from MI, While the 1950mm pipe was designed to accommodate some of the Racecourse catchment as part of a landowner agreement between the Racecourse and Council in consideration for installing the SW shaft on the Racecourse land, the area proposed or nominated to be serviced by this connection was not the land associated with the Hills, but a future development block adjacent to the existing grandstand. Due consideration needs be given as to the impacts of 'reassigning' of this connection capacity to the Hills and away from this future development block. This should also take into account the flows that were allowed from the Racecourse site when designing this 1950mm pipe and are referenced in item 11b above.

d. Post meeting note response from VL – having reviewed this agreement and received legal advice, the landowner agreement applies to the whole ATR site, including The Hill as it is part of the parent title. The landowner agreement is not limited to the development block adjacent the existing grandstand. DG has also confirmed that he is not aware of ATR entering into any formal legal agreements to assign its rights in respec to discharging stormwater into the asset. DG also confirms that any resource consents/or SMP approval requests are intended to be lodged join ly by ATR and FRL.

e. PW/JC noted that the racecourse site and The Hill site are dealt w th separately

f. PW/JC notes soakage within The Hill site is limited; however, it is understood the e is soakage within the racecourse site.

g. MI would like to understand the impacts on the upstream catchment (at the head of the 1950mm dia. pipe) as a result of the diversion of flows from The Hill site and Derby Downs. A hydraulic grade line analysis would be good to understand impact on upstream flooding.

h. PS also raises there is a consented development at P ach Parade also proposing to divert flows to the 1950mm dia. line. PW/ AD notes post development models assume MPD zoning (based on AUP zoning) catchment wide that would reflect future flows assuming the entire catchment develops to MPD impervious coverages.

i. MI raises effects r sulti g from filling of the irrigation pond, PW confirmed that this has been allowed for in the modelling undertaken.

j. MI/ PS/ HL note agreement in principle, however further analysis would be required with model and associated results provided to Healthy Waters for review and acceptance.

k. tormwater management – MI agrees with water quality treatment for all impervious surfaces. PW notes roofs to be inert with hardstand areas/ public roads to be treated in line with NDC requirements. MI and PS also note Waiatarua Reserve is a natural wetland and therefore does not provide any treatment function.

l. Stormwater m nagement – MI agrees in principle with the hydrology mitigation proposal however notes an ecological assessment will be required to confirm that the stream is not at risk of erosion and is stable and verify if providing detention/ retention is beneficial for Waiatarua Reserve.

m. PW iterates The Hill site and racecourse would be considered separately with a SMP to be prepared for The Hill site.

n. MI notes the existing 1950mm dia. pipeline is to be protected to which all are in agreement.

o. MI notes under COVID-19 Fast-track consenting, the stormwater discharge will not be authorised as it triggers the NDC. Therefore, it is recommended a condition be included for provisional approval of a SMP prior to lodging an EPA. It is also recommended process for provisional approval of the SMP (from Healthy Waters) be undertaken in parallel with the Covid-19 Fast Track consent process.

Location	MS Teams			
Time & Date	11.30am	10/12/2021	**Taken by**	Bidara Pathirage
Attendees	**Initials**	**Name**		**Company**
	PW	Pranil Wadan		Woods
	AD	Ajay Desai		Woods
	BP	Bidara Pathirage		Woods
	MH	Miguel Hernandez		Woods
	JC	James Crews		Fletcher Residential Living
	FW	Fabian Wineera		Fletcher Residential Living
	HL	Hinsan Li		Fletcher Residential Living
	VL	Vijay Lala		Tattico
	VC	Vaughan Crang		Crang Civil
	MI	Mark Iszard		Auckland Council
	HL	Hansol Lee		Auckland Council
	KH	Katja Huls		Auckland Council
	DC	Danny Curtis		Auck and Council
	DG	Don Greenaway		Auck and Thoroughbred Racing
Apologies	PS	Preetika Singh		Auckland Council

Meeting Minutes - 10/12/2021

The Hill – Stormwater – Follow up meeting with Healthy Waters

1. AD notes this meeting is to go through the outstanding items from the last meeting.
2. The piping of secondary flows is discussed in reference to the masterplan. The concept involves a swale running north to south collecting secondary flows via scruffy domes to pipelines which then discharges to the 1950mm dia. pipe.
3. The pipe long sections and hydraulic grade lines along the 1950mm dia. pipe are discussed, in particular upstream of the Hill discharge location, around Peach Parade. AD notes the results indicate no effects at Peach Parade as a result of the proposed discharge from the Hill site. Peach Parade flooding is noted to be due to network constraints prior to dropping to the 1950mm dia. network and topographical constraints. AD also confirms the model has been checked against GIS/ as-built information where available with site checks undertaken around Koraha Reserve/ Waiatarua Reserve where applicable as discussed at the last meeting.
4. DC raises the question regarding the land use of the pre-dev model. AD confirms pre-dev model s MPD land use (permitted existing coverages) with the Hill site at existing development.
5. Healthy Waters questions downstream effects as a result of the connection from the Hill site. AD and PW note effects are observed downstream at Koraha Reserve (contained within the reserve) and Waiatarua Reserve, as discussed at the last meeting (50mm).
6. DC asks whether the 1950mm dia. pipe has been designed for the 100-year or 10-year event. MI confirms the pipeline was designed to be as big as it could be between soil basalt layers.

7. MI questions whether the model has been reviewed by Healthy Waters. AD notes the model, results and model review form has been issued to Healthy Waters. HL to review week commencing 13/12/2021.

8. MI questions regarding the remaining discharges from the ARC site. JC notes the assessment is currently only being undertaken for the Hill site. MI agrees, however notes that Healthy Waters would like to look at an integrated catchment approach to understand what happens to the discharges from the wider ARC site. DG confirms Woods have been tasked separately in understanding the wider ARC site, however, flows from the Hill to be considered first.

9. Piping of secondary flows and blockage scenarios are discussed. Healthy Waters note the concept looks OK, however need to understand if there are any impacts to third party i.e., further downstream in Ellerslie catchment or down Lonsdale Rd in One Tree Hill catchment.

10. PW questions whether blockage assessments are required for assessing third party effects. MI and KH confirm impacts of blockage assessments on downstream properties, in accordance with the SWCOP, is important to be considered as part of Resource Consent applications. MI is keen to understand a sensitivity analysis for the blockage assessment, particularly around Lonsdale.

11. MI raises if any works get undertaken at Peach Parade to relieve the flood effects (currently constrained due to topography and network), would there be any downstream effects. HL and AD to assess downstream network constraints in the 1950mm dia. pipe if all flows from Peach Parade discharge to the 1950mm dia. pipe.

12. DC raises whether the Hill development (considered non-complying land use consent) gets covered under the Regionwide NDC. VL confirms it is not a non-complying land use consent, rather 'Special Purpose – Major Recreation Facility Zone' turning to Residential. KH to check internally whether this will be covered under the NDC and confirm.

13. PW discusses the way forward and gaining provisional approval of a draft SMP prior to lodgement of Fast-track (May 2022). It is noted the draft SMP to be provided to Healthy Waters review by end of Feb 2022.

14. Post meeting notes from KH - The development is likely not covered by the NDC. In the absence of a plan change, if the site discharges to a marine SEA, or to a stream that discharges to a marine SEA, or a terrestrial SEA then it can't be brought under due to the lack of a public process. This site drains to a marine SEA (Orakei Basin) but via a tunnel, so that's probably OK, but Waiatarua looks like it may have an SEA over it – the GIS layer looks incomplete. I know we were trying to have it removed as it's largely a treatment device, but I don't know where that landed. KH to seek further confirmation.

15. Post meeting note from VL in relation to KH's comment regarding NDC: The methodology referred to below does not apply to The Hill. That only apply to Rural or Future Urban Zones. In this instance the land is within the Rural Urban Boundary and for example a large grandstand up to 25m high could be developed on the land as a permitted activity and the stormwater would have to be dealt with. Since the proposed SMP for the residential development of The Hill does not impose more stringent requirements on a third party or propose works on a third party without their written approval the SMP for The Hill can be adopted through Schedule 8 into the NDC.

List of actions

Action	By	When
Review and acceptance of models	AD/ HL	17/12/2021
Review of future pipe upgrades at Peach Parade	HL	17/12/2021
Issue blockage assessment scenarios to Healthy Waters review and any further assessments	PW/ AD	15/12/2021

To checked whether development falls under the NDC	KH	15/12/2021