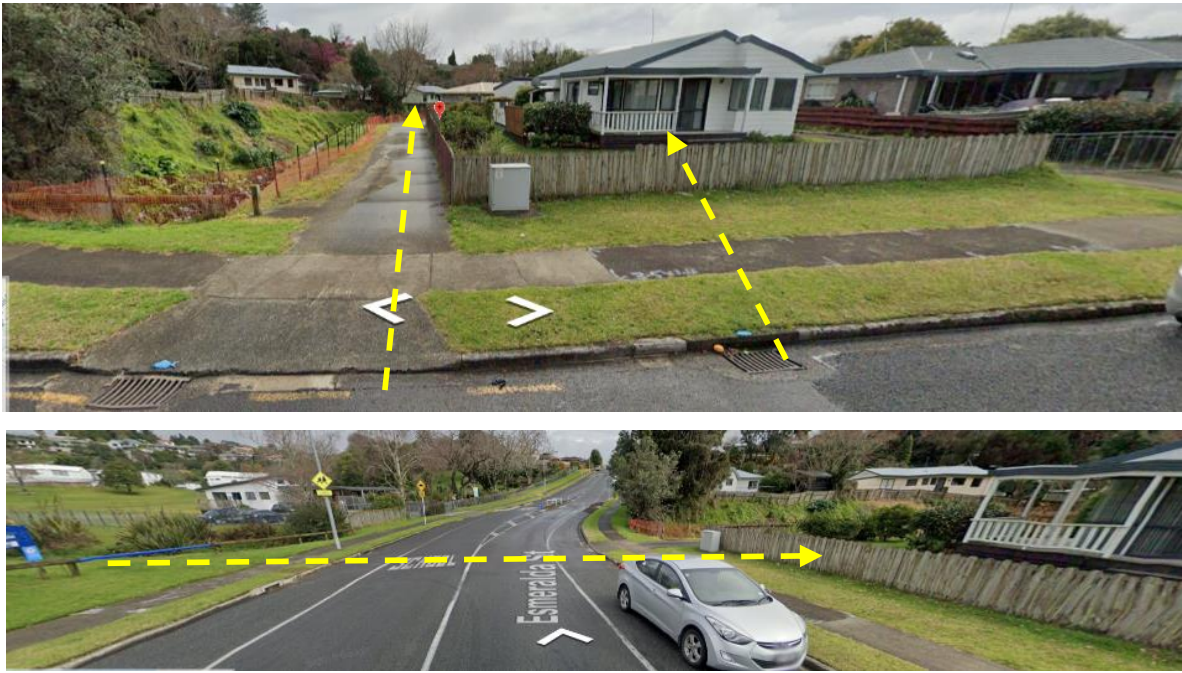
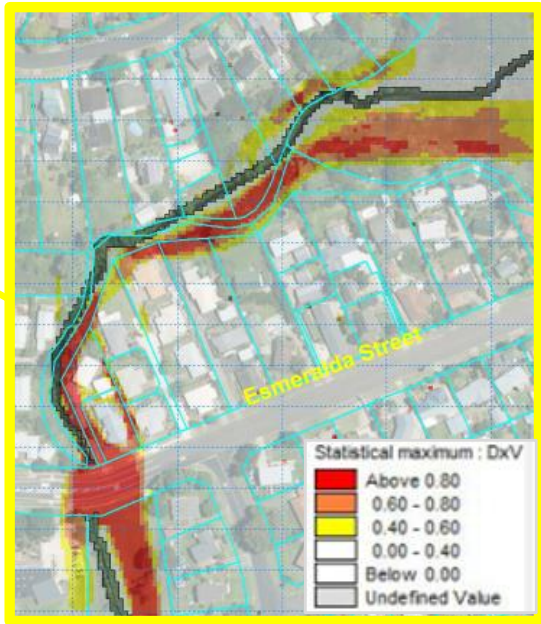
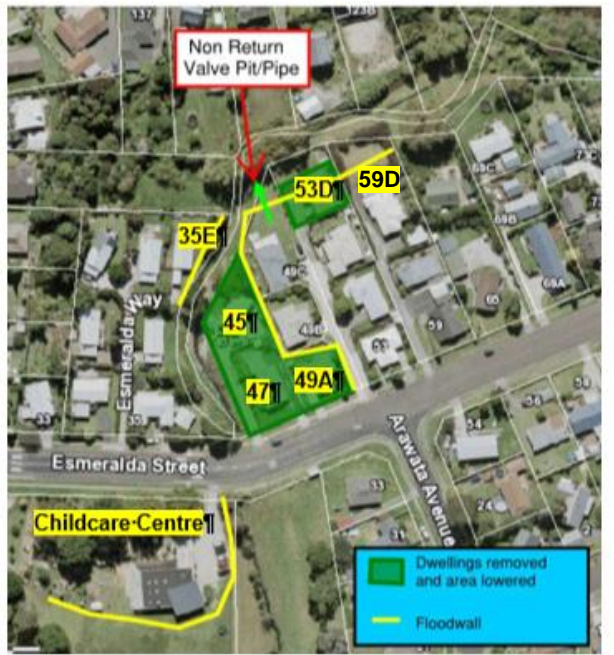


PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORK
<b>Esmeralda Street, Welcome Bay – Level of Service (DxV)</b>		
<p>14 residential dwellings impacted by DxV at levels exceeding the intervention threshold for residential zoned land. These properties are located at numbers 35-53 Esmeralda Street and at 127 Forrester Drive. A commercial building at 309 Welcome Bay Road (currently occupied by a childcare centre) to the south of Esmeralda Street is also impacted.</p> <p>Project comprises acquisition of five DxV affected properties and a small portion of a sixth. Three dwellings are removed, the ground lowered to create conveyance/storage, flood retaining fencing constructed to protect remaining houses and excess land and dwellings sold to offset project costs. Project also includes minor realignment of adjacent stream to manage flood flows.</p>	<ul style="list-style-type: none"> <li>• All land acquisitions are complete</li> <li>• Two dwellings have been sold and relocated, two further dwellings are currently being marketed for sale</li> <li>• Detailed design of ground lowering and flood walls well progressed</li> <li>• Consent application for works to be lodged in coming 1-2 months</li> <li>• Construction anticipated early 2021</li> </ul>	<ul style="list-style-type: none"> <li>• Continue to market remaining two properties for sale</li> <li>• Lodge consent application</li> <li>• Complete construction early 2021 utilising the Stormwater Bulk Fund LIPS 2169 20/21 FY budget</li> </ul>



**Upper)** White house (no. 47), no. 45 to rear and grey roof (no. 49A) all purchased and dwellings sold/relocated or about to be – this is the location of ground to be lowered and flood fencing to be constructed. Direction of flood flow (yellow dash)



**Above)** Proposed works – green shading is ground lowering, yellow line is flood fencing. 45, 47, 49A, 53D and 59D have been purchased. All dwellings except 53D have been or will be sold and relocated off-site. The rear of 53D and 59C will be retained and the remaining land/dwelling subdivided and sold on completion of works.

**Left): 1 in 100-year Flood Hazard** (flood depths (metre) indicated in key to bottom right)

**Right) Depth x Velocity Flood Hazard** (yellow/orange/red indicate flows in excess of Council's threshold for intervention of  $\geq 0.4\text{m}^2/\text{s}$ )



PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORKS
Awaiti Place, Kaitemako – Level of Service (DxV)		
<p>105 properties and Awaiti Place, McFetridge Lane and Poike Road corridors impacted by DxV at levels exceeding the intervention threshold for residential zoned land. Analysis of modelling confirms significant flood depths/flows for extended durations (hours) on roads and at road crossings (including recently upgraded McFetridge Lane) which would render the roads impassable to vehicles even in &lt;10 yr events. A subdivision is currently being developed (approx 192 sections) upstream of the McFetridge Lane Road crossing - these properties will have compromised access at these times as it is the only route in and out.</p> <p>Mitigation works (Suite A) to include:</p> <ul style="list-style-type: none"><li>a. Construction of a flood attenuation dam upstream of McFetridge Lane</li><li>b. Upgrade of McFetridge Lane culverts</li><li>c. New stormwater 1800mm diam pipeline between Awaiti Pond and Poike Road</li><li>d. Awaiti Pond outlet chamber upgrades</li><li>e. Minor localised flood protection at Harrisfield Drive and Awaiti Place:</li></ul>	<ul style="list-style-type: none"><li>• Design well progressed</li><li>• Consent application well progressed</li><li>• Construction to commence early 2021 (pending approval by ISP governance team of updated cost estimate)</li></ul>	<ul style="list-style-type: none"><li>• Proceed with planning, detailed design and cost estimation utilising the Stormwater Bulk Fund LIPS 2169 which has budget of \$3.25M in the 20/21 FY.</li><li>• Report back the updated project cost estimate to the ISP governance team and seek approval to commence construction utilising the LIPS 2169 20/21 FY budget</li><li>• Seek funding in Years 1 and 2 of the LTP to complete construction of the balance of Suite A works (<b>project to be reported to Council on 6 October 2020</b>)</li></ul>



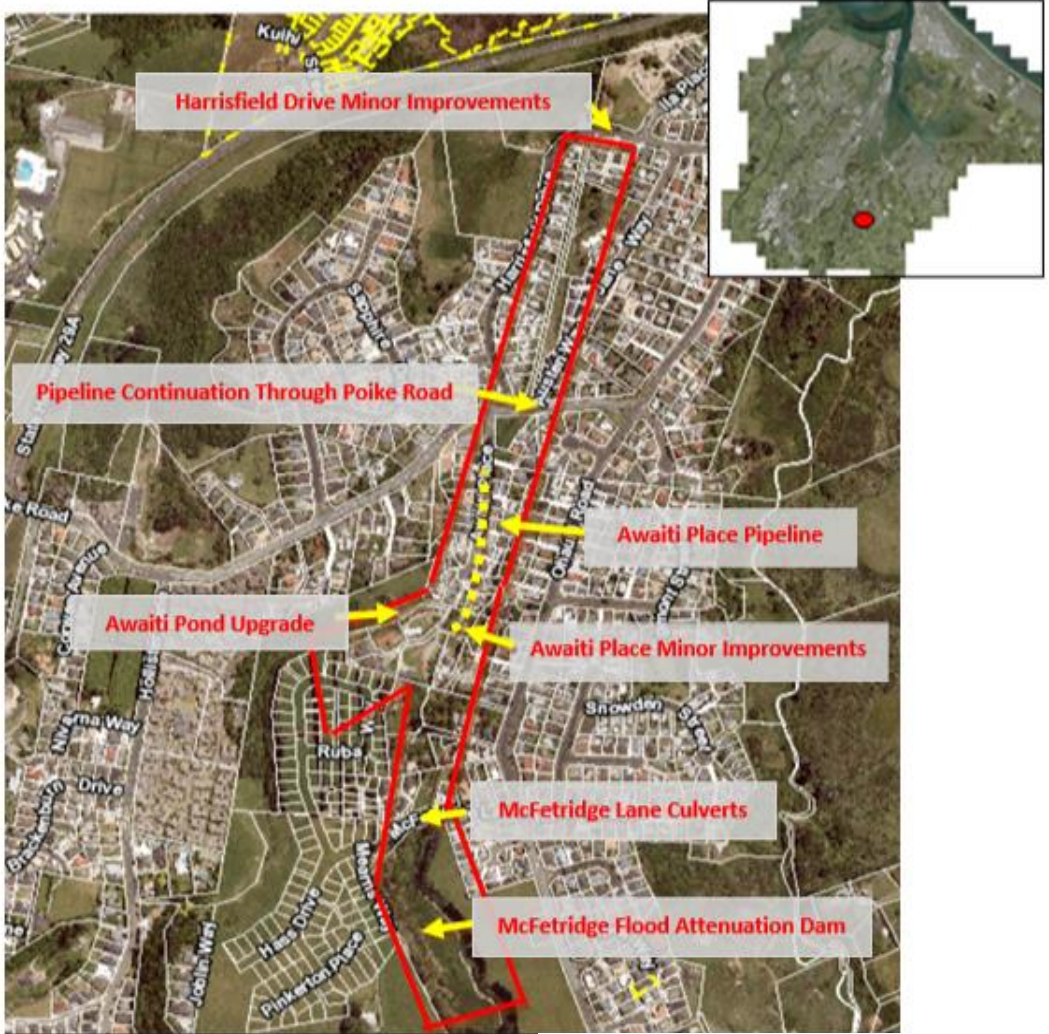
**Above)** Awaiti Place and surrounds1 in 100 year DxV flood hazard – yellow and red above 0.4m<sup>2</sup>/s threshold. 105 properties either directly impacted with flood waters through dwelling and/or land, or access from property onto Awaiti Place severely compromised



**Above)** Awaiti Place with under capacity channel running alongside road corridor (photo insert). Location of proposed 1800mm diameter pipeline upgrade (down Awaiti Place to Poike Road)



**Left)** Proposed McFetridge Lane dam location – photo depicts flood flows during low-level event (June 2020) - est. 1 in 1 year event based on rain gauge analysis



**Above)** Suite A works



PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORK
Sherwin Street, Kopurererua – Level of Service (DxV, Priority 3 catchment)		
To address severely affected DxV at one property on Sherwin Street by securing the overland flowpath immediately adjacent. Proposed works also rehabilitates the upstream pipework currently at risk of failure which receives all of catchment stormwater discharges.	Design and property negotiations well progressed.	Commence construction in late 2020 utilising the Stormwater Bulk Fund LIPS 2169 20/21 FY budget

**Left)** Sherwin Street 1 in 100 year DxV flood hazard – yellow and red above 0.4m<sup>2</sup>/s threshold.

**Right)** Location of work site, direction of flood flow - yellow dash



PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORKS
52C Langstone Street/Meander Drive – Level of Service (DxV)		
Minor DxV issue located adjacent to Johnson Reserve. Shaping of the northern side of the overland flowpath results in flow extending into 52C Langstone Street. Works at this location involved minor recontouring to direct overland flow away from the property.	Works complete	Works complete



**Left)** Meander 1 in 100 year DxV flood hazard – yellow and red above 0.4m<sup>2</sup>/s threshold.

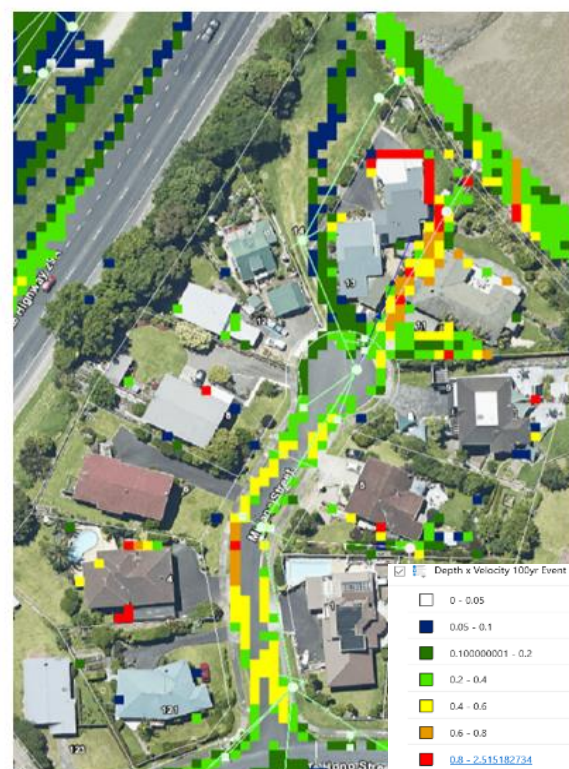
**Right)** Direction of flood flow (yellow dash) and location of minor recontouring (blue dash)



PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORKS
<b>Miriana Street, Kaitemako – Level of Service (DxV)</b>		
<p>Miriana Street falls steeply to the cul-de-sac head, with the road forming the overland flowpath for the catchment and the cul-de-sac head being the low point in the catchment. Once the primary stormwater system capacity is exceeded, flow will generally move down the road and towards the beach accessway and 11 Miriana Street (which is constructed below road level).</p> <p>DxV in excess of the intervention threshold for residential zoned land is exceeded along the road corridor and affects five properties, predominantly 11, 13A and 13B which are located at the head of the cul-de-sac.</p> <p>In the 100-year rainfall event 11, 13A and 13B will be subject to flooding depths above 1m.</p> <p>Mitigation works to include</p> <ul style="list-style-type: none"> <li>• <i>Re-establishing abandoned 375mm stormwater pipeline along accessway between 11 and 13 Miriana Street</i></li> <li>• <i>Installation of a new manhole in the head of the cul de sac,</i></li> <li>• <i>4 catchpit upgrades at head of cul de sac</i></li> <li>• <i>Reconstruction of the outfall with scour protection.</i></li> </ul>	<p>Construction underway</p>	<p>Complete construction utilising the Stormwater Bulk Fund LIPS 2169 20/21 FY budget</p>



**Left): 1 in 100-year Flood Hazard** (flood depths (metre) indicated in key to bottom right)



**Right) Depth x Velocity Flood Hazard** (yellow/orange/red indicate flows in excess of Council's threshold for intervention of  $\geq 0.4\text{m}^2/\text{s}$ )



**Above) Direction of flood flow** (yellow



**Below) Construction – August 2020**



**Left) Existing stormwater network** – blue line represents abandoned 375mm pipeline to be re-established, and on head of cul-de-sac, the location of catchpits to be upgraded



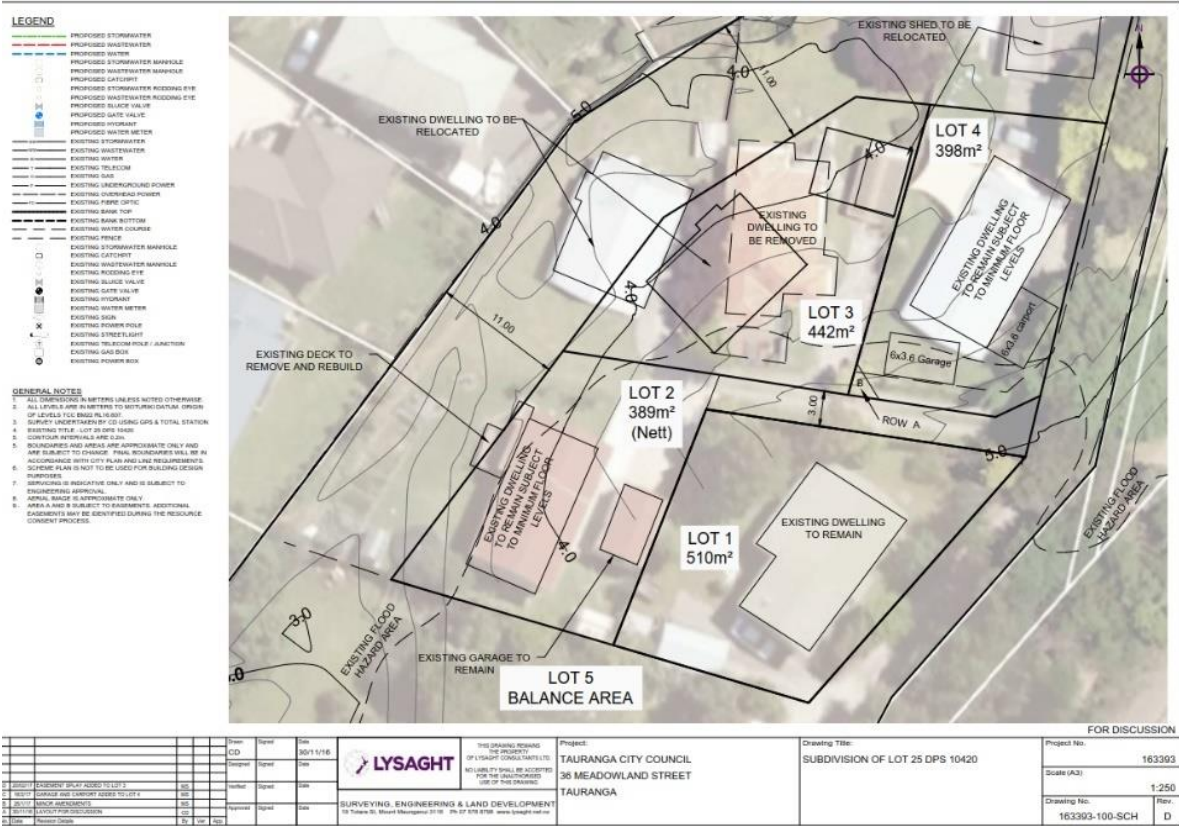
PROJECT BRIEF	STATUS UPDATE	FUTURE WORK
<b>Meadowland Street, Matua – Level of Service (DxV, Priority 1 catchment)</b>		
<p>Acquire 5 properties and a portion of a sixth to mitigate DxV on these and adjacent properties. Remove one dwelling and relocate others to adjacent land to create a formed overland flow path.</p> <p>Project will result in three freehold properties, free of flood risk, which will be sold to offset project costs.</p>	<ul style="list-style-type: none"> <li>• Acquisition of all land complete</li> <li>• Upstream property subdivided and back of section retained for upstream extent of overland flowpath. Upstream property sold.</li> <li>• 3 dwellings in downstream extent of overland flowpath relocated out of swale footprint</li> <li>• Swale construction complete</li> </ul>	<ul style="list-style-type: none"> <li>• Refurbishment of 3x properties in readiness for future sale</li> <li>• Sale of excess 3x properties on completion of subdivision/ freeholding</li> </ul>



**Above) 1 in 100-year Flood Hazard** (flood depths (metre) indicated in key to bottom right). Red dot/dash indicate properties/land purchased. Overland flowpath extent roughly denoted by yellow dashed lines



**Right) Depth x Velocity Flood Hazard** (yellow/orange/red indicate flows in excess of Council's threshold for intervention of  $\geq 0.4m^2/s$ )



**Above):** Indicative subdivision layout plan depicting three new freehold lots to be sold (Lots 2-4). Fourth property already sold is 34 Meadowland Street (less a portion of the back yard which has been retained by Council as part of the overland flowpath).



MEADOWLAND STREET ‘Continued’



**Above Left)** Prior to work **Above Middle)** Schematic **Above Right)** Overland flowpath nearing completion – looking from driveway to 36E Meadowland Street to Matua Saltmarsh



**Above Left)** Completed driveway/fencing leading to 36E Meadowland Street – yellow dash is direction of overland flow discharging via grate to swale  
**Above Right and Below Left)** 3x properties relocated out of swale footprint. To be refurbished and sold as freehold sites.



PROJECT BRIEF	STATUS UPDATE	FUTURE WORK
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Mount North (CBD/High Density) – Non-Level of Service (non-DxV, Priority 2 catchment)		
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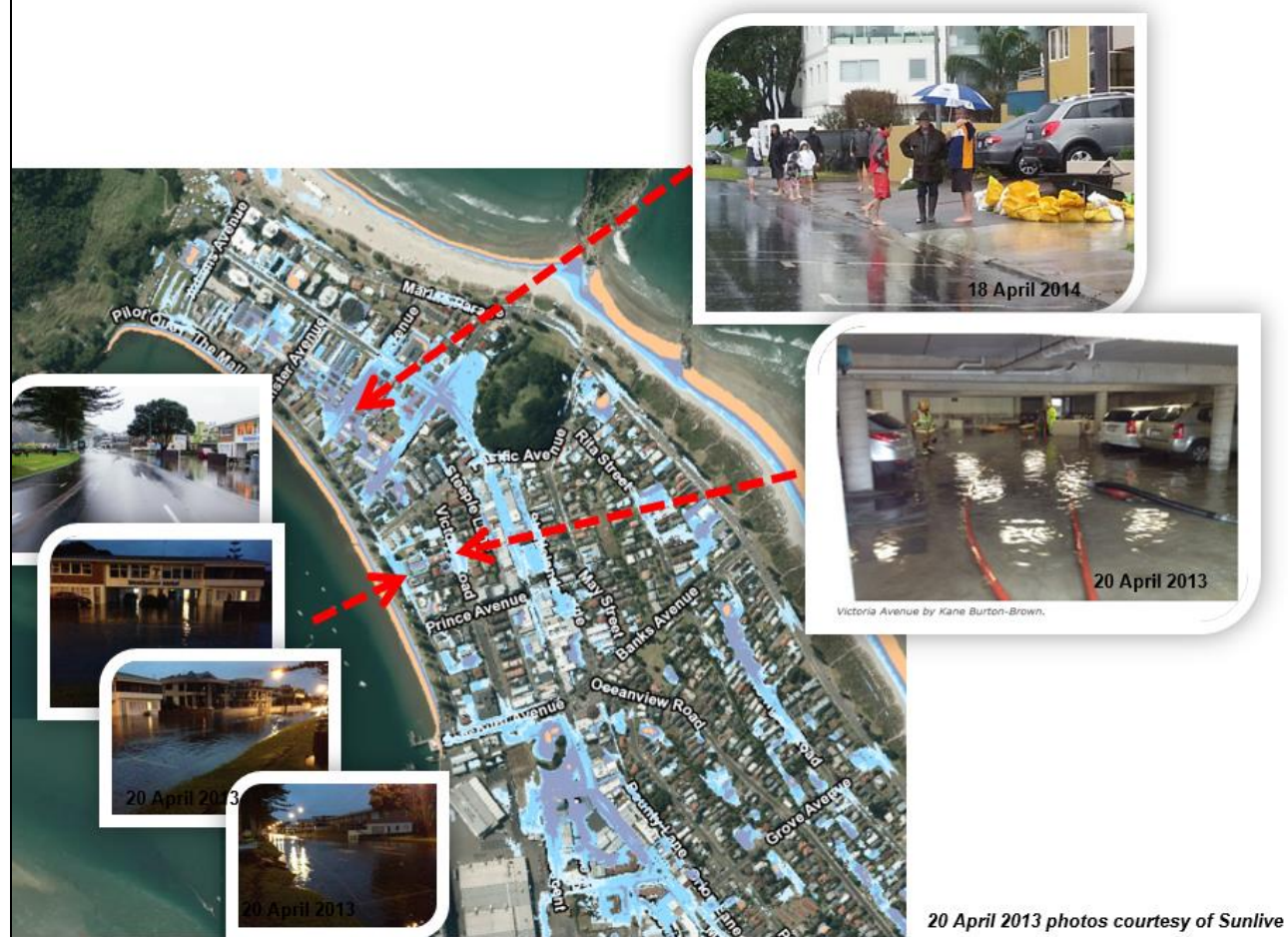
To develop a robust, adaptable long-term strategy to address the flooding and climate change effects for this catchment. The catchment extends roughly from Adams Avenue to Salisbury Avenue and encompasses the Mount CBD.

A short list of possible (infrastructure and non-infrastructure) responses for the catchment have been identified.

Next steps **to be presented to Council at meeting on 17 November** for endorsement of funding through the Long Term Plan. Further work to include:

- Completing the remainder of an Indicative Business Cases (economic and strategic cases only completed) and a Detailed Business Case
- Short list response assessment leading to a preferred response
- Design/consenting for the preferred response
- In later years of the LTP the potential implementation of responses.

This 17 November report to Council follows the two Executive Briefings on 10 August (complete) and 8 October.



20 April 2013 photos courtesy of Sunlive

Mount North (CBD/High Density) 1 in 100 year flood hazard map with photo overlay



20 April 2013 photos courtesy of Sunlive



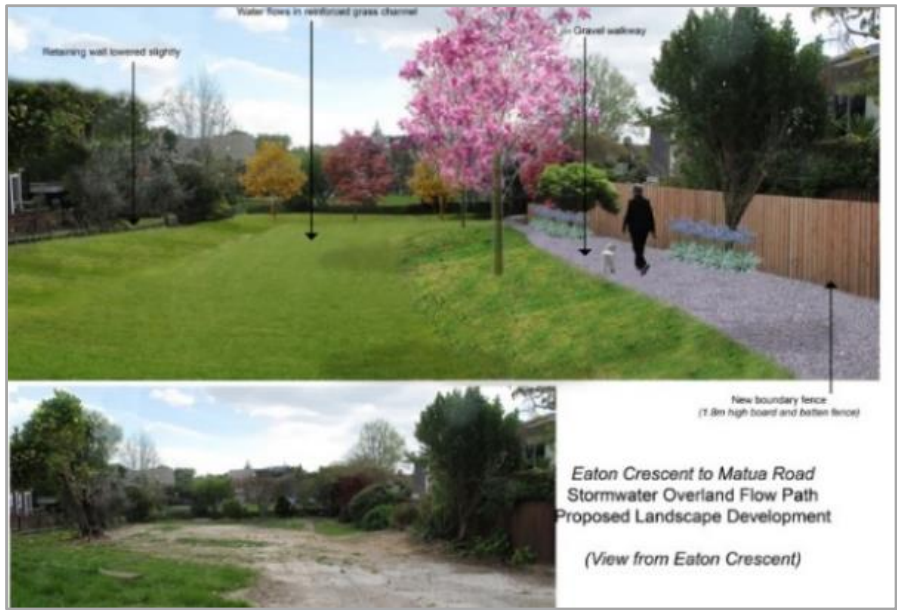
PROJECT BRIEF	STATUS UPDATE	FUTURE WORKS
Smiths / Eaton, Matua – Level of Service (DxV, Priority 1 catchment)		
Acquire six properties to create an overland flow path to convey stormwater from Eaton Crescent to Matua Road and reduce flood risk on adjacent and downstream land. Sale and relocation of all dwellings.	Project complete	Project complete



**Left)** Orange dots indicate properties purchased, sold and relocated, blue dots previously flood prone properties



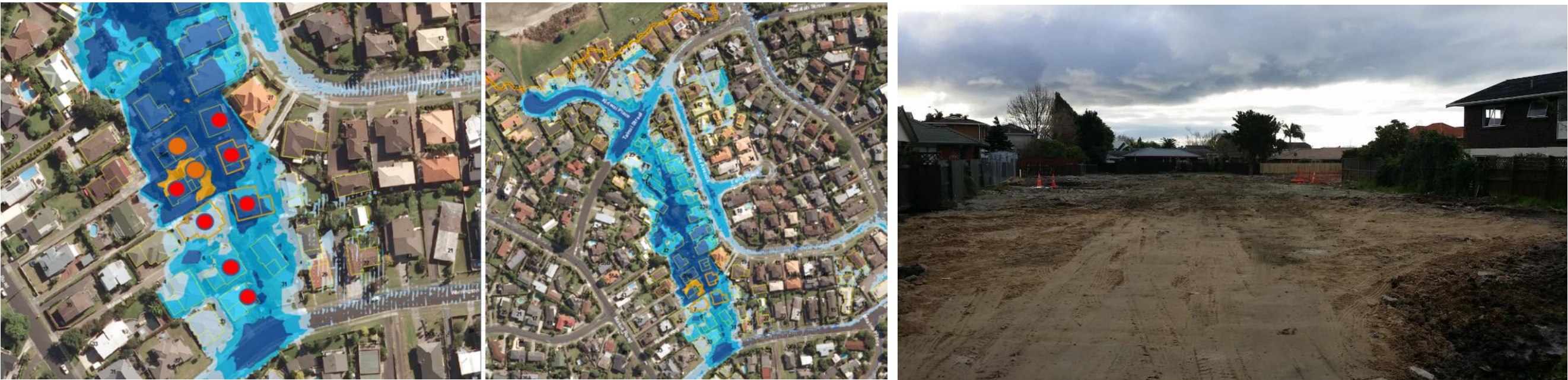
**Top)** Looking down completed swale from Eaton Crescent  
**Bottom)** Looking up completed swale from Smiths Road



**Above)** Artists impression of overland flowpath prior to construction commencing



PROJECT BRIEF	STATUS UPDATE	FUTURE WORKS
Warrington/Percival, Matua – Level of Service (DxV, Priority 1 catchment)		
Acquire nine properties for stormwater purposes, sale and relocation of dwellings and construction of a reserve to convey and attenuate stormwater reducing flood risk on adjacent and downstream properties.	Project complete	Project complete



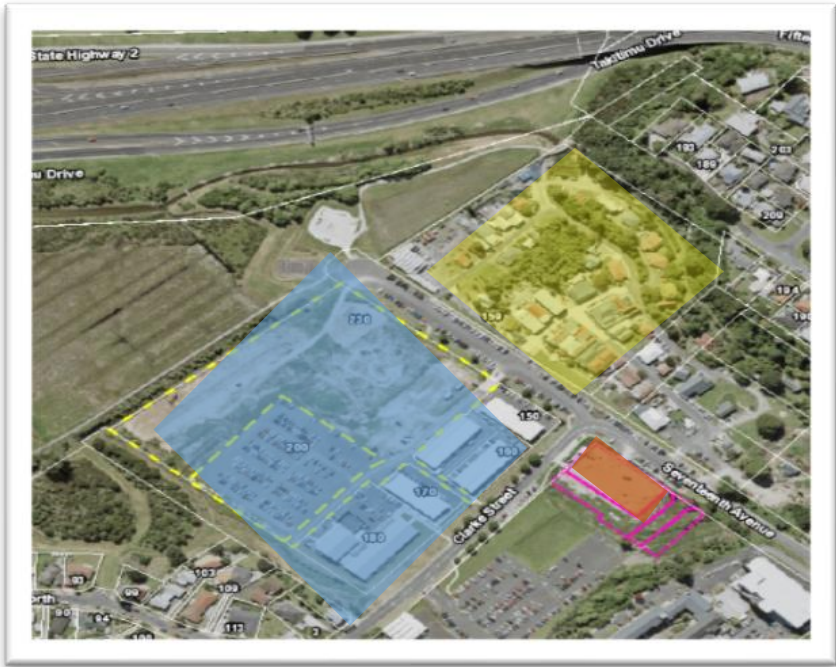
**Above left)** Flood hazard mapping for Warrington/Percival. Red/orange dots indicate properties purchased.  
**Above right):** Proposed swale as at July 2017– house relocation complete



**Left)** Completed reserve (August 2020) – looking from Warrington Street



PROJECT ISSUE / BRIEF	STATUS UPDATE	FUTURE WORK
Seventeenth Avenue Bund, Kopurererua – Level of Service (DxV, Priority 3 catchment)		
<p>Construction of an earth bund (location 1 below right) to mitigate river influenced (and depth x velocity) flood risk of the Historic Village, a number of commercial properties and the St Johns Ambulance base located on the corner of Clarke Street and Seventeenth Avenue. Works were carried out in conjunction with an adjacent bund which funded by the owner of adjacent commercial land.</p> <p>Pre construction flood risk comprised:</p> <ul style="list-style-type: none"><li>• flood depths in <u>excess of 1m</u>, and depth x velocity <u>in excess of 0.8m<sup>2</sup>/s</u> across:<ul style="list-style-type: none"><li>○ the TCC reserve area to the north of the commercial land/Historic Village;</li><li>○ the Historic Village (yellow shaded area); and,</li><li>○ the lower sections of Clarke Street / Seventeenth Avenue road reserves extending <u>up to and past</u> the St Johns Ambulance base.</li></ul></li><li>• flood depths <u>between 0.5 to 1m</u>, and depth x velocity <u>from 0.4 to &gt;0.8m<sup>2</sup>/s</u> across the St Johns ambulance site (orange shaded area).</li><li>• flood depths between 0.25 and 1m, and depth x velocity from 0.4-0.8m<sup>2</sup>/s, across the blue shaded land commercial land.</li></ul>	Project complete	Project complete



Left) Extent of Proposed Works (1=TCC, 2=Private)

Below and Right) Work site during construction (2019)



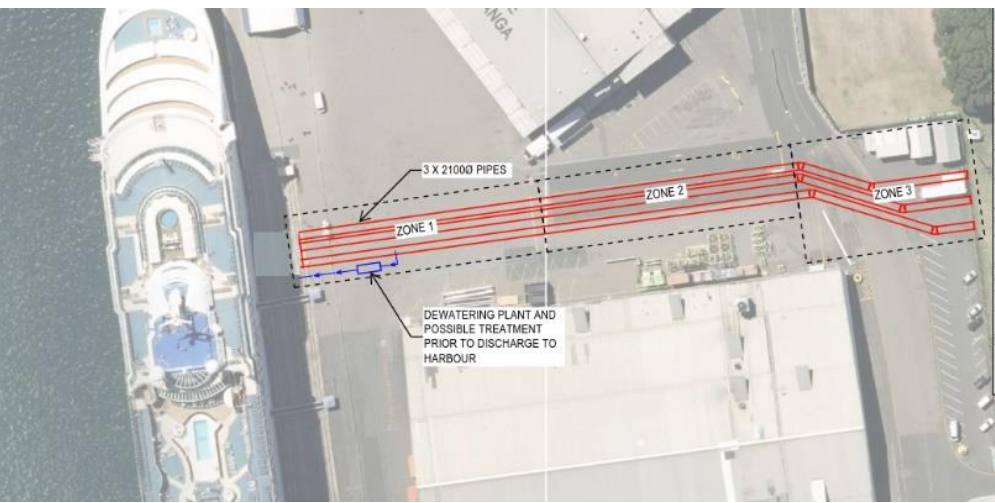
Above) Site Location

- Blue shaded area– 4.2 hectares of privately owned commercially zoned land.
- Orange shaded area (to the south of Clarke Street) the St Johns Ambulance base
- Yellow shaded area – the northern portion of the TCC owned Historic Village
- Road reserves – the lower reaches of Clarke Street and Seventeenth Avenue facilitating access to and from the above.





PROJECT BRIEF	STATUS UPDATE	FUTURE WORK
Mount North Flood Mitigation – Non-Level of Service (Non-DxV, Priority 2 catchment)		
Construction to secure a stormwater outlet for the Mount North area of Mount Maunganui by carrying out construction works on Port of Tauranga land extending to Nikau Crescent and Maunganui Road.	Project complete	Project complete (2018)

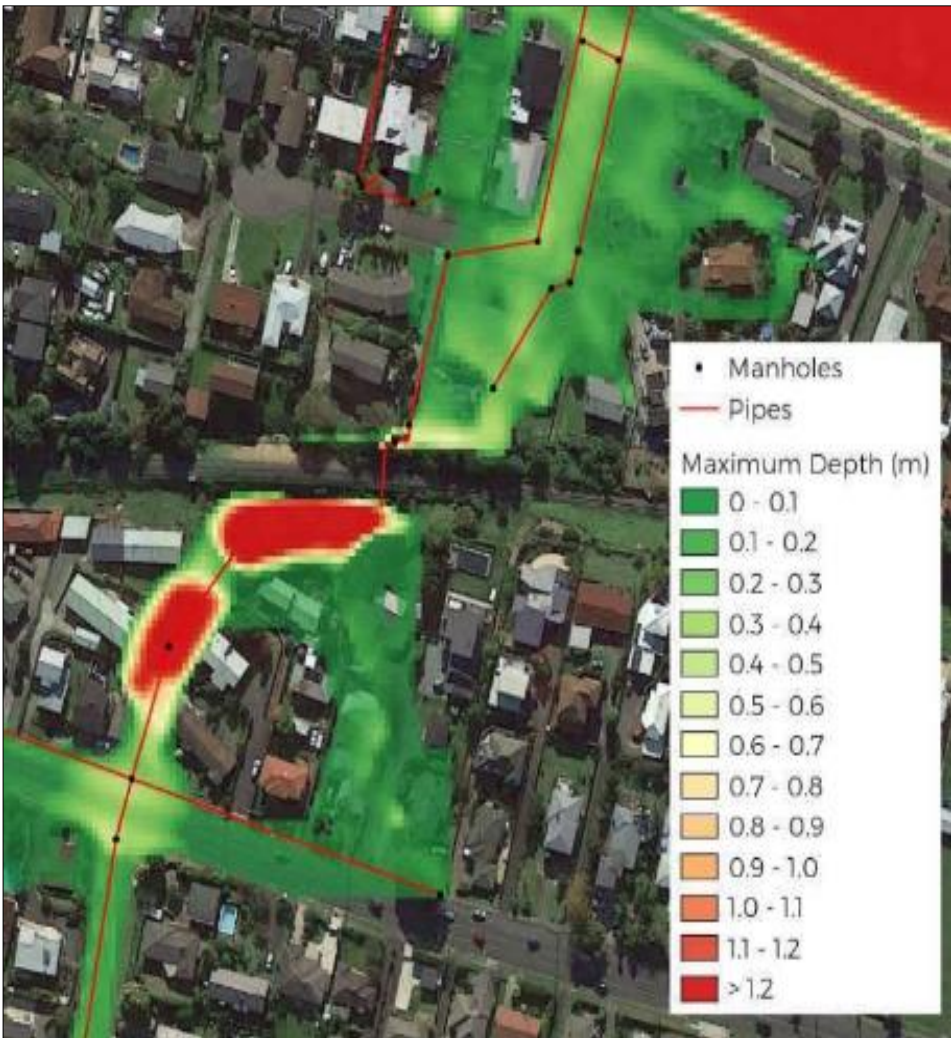


**Left):** Flood hazard map for Mount North in vicinity of outlet (indicative location denoted in red)  
**Right top):** Three sub-catchments which can be serviced by the new outlet  
**Centre)** During outlet construction (late 2017/2018)  
**Right bottom):** Outlet alignment through Port of Tauranga



Level of Service (DxV) Scoping (Optioneering) Studies - Ongoing

247B Ngatai Road (and surrounds), Pillans Bureta – Level of Service (DxV)	
Description of Issue / Recommendation (if Identified)	Next Steps
One property is impacted by DxV at levels exceeding the intervention threshold for residential zoned land together with extensive and frequent non-DxV flooding of this and neighbouring properties (estimate current level of protection is 1 in 1 year event). Given DxV risk and frequency and severity of flooding consideration is being given to intervention.	Staff are currently considering a range of options including: <ul style="list-style-type: none"><li>• Do nothing</li><li>• Site specific solutions at 247B Ngatai Rd to address DxV only</li><li>• Complete pipeline upgrade to address DxV and land flooding (up to a 10 year event only)</li><li>• Council purchase of property through Reactive Reserve Fund, undertake site specific works to address DxV and on sell</li></ul>



Upper and Lower: 247B Ngatai Road, yellow hatch and arrows show ponding and direction of overland flow from Freyberg Street and Ngatai Road overtopping driveway and passing down side of property



James Cook Drive/Resolution Road, Welcome Bay – Level of Service (DxV)

Description of Issue / Recommendation (if Identified)

Modelling reveals 32 residential dwellings are impacted by DxV exceeding the intervention threshold for residential zoned land. All affected properties were surveyed to determine floor levels and these were then compared against modelled flood levels. This comparison indicates that 23 of the 32 dwellings and 8 attached garages have flood levels exceeding floor levels (to depths of up to 1.6 m).

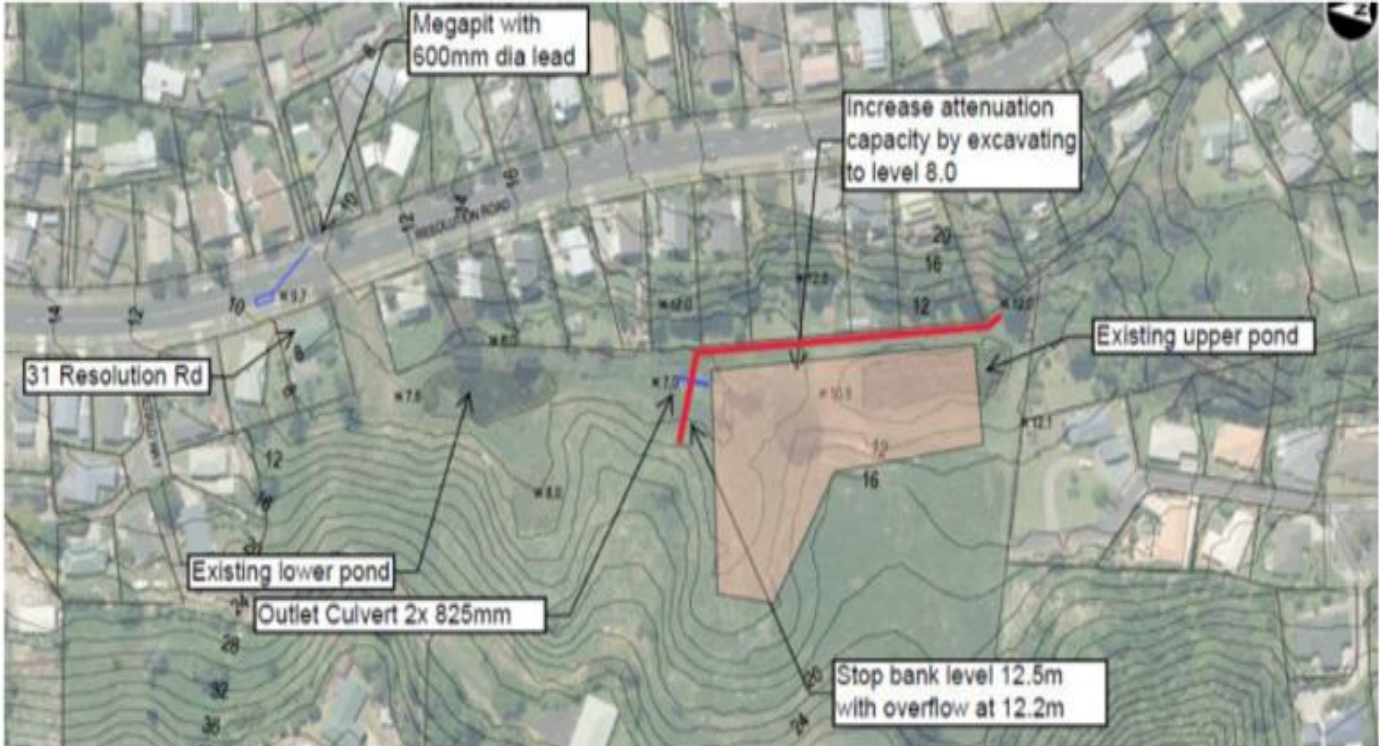
It is also evident that the Waitaha Road corridor would be severely impacted during the 1 in 100 year event. During this event, approximately 200-300m of road is flooded on both sides and an area at the bottom of Waitaha Road has flood depths likely to exceed 1m which would render it impassable.

Next Steps

- The preferred option to address the DxV risk includes:
- Increasing the capacity of an existing stormwater pond to approximately 29,000m<sup>3</sup> (from existing 4,000m<sup>3</sup>) by raising the top of the embankment to 12.5m with a spillway level of 12.2m
  - An outlet capacity of 4.1m<sup>3</sup>/s having 2 x 825mm diameter pipes; and,
  - The addition of a mega-pit and 600mm diameter lead at the low point in Resolution Road.
- Staff are presently working through a range of geotechnical issues at the project site to determine the viability of and costs associated with mitigation works.



Figure 2: DxV flood hazard (yellow, orange and red all indicate flows in excess of Council's LoS threshold for intervention – yellow  $\geq 0.4 \text{ m}^2/\text{s}$ , orange between  $0.6 - 0.8 \text{ m}^2/\text{s}$ , and pink  $\geq 0.8 \text{ m}^2/\text{s}$ )


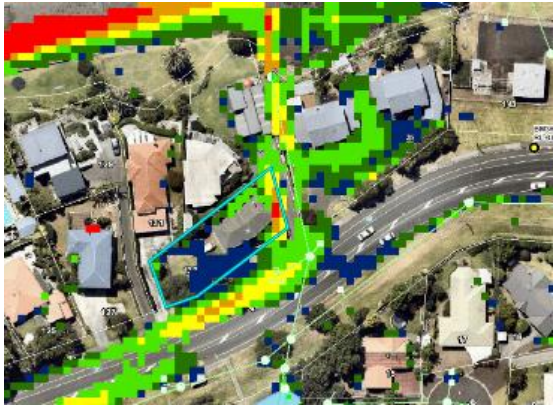
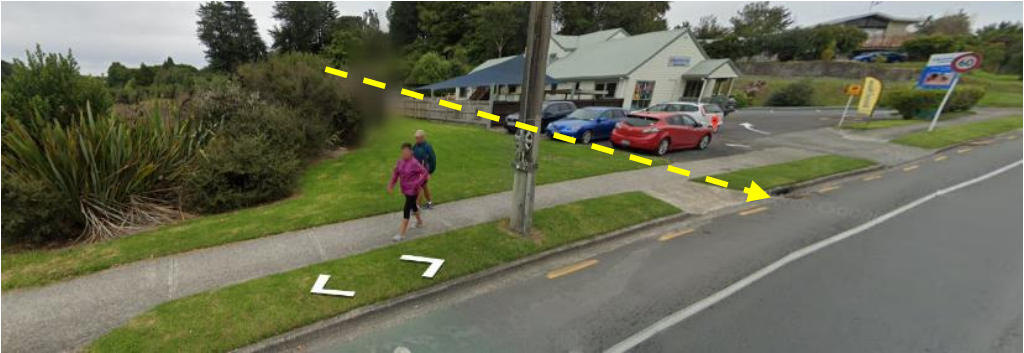
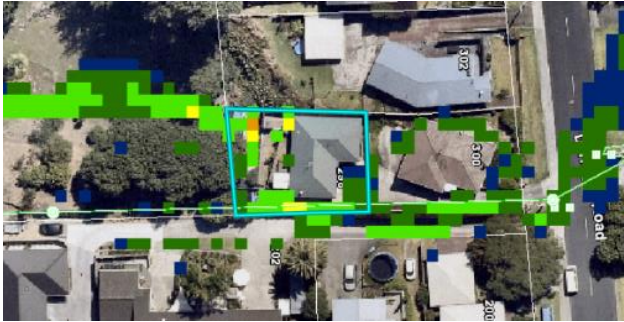


Right) Proposed works under consideration



Scoping Study Location (Assessments Still Underway)	Dwellings Affected	DxV Flood Hazard	Image/Direction of Flow (yellow dash)
Barossa Way, Brookfield	7 dwellings affected 3 of which have impacted floor levels		
Neil Place, Kopurererua	2 dwellings, 1 floor level impacted		
Anchorage Grove, Kaitemako	Modelling assessment underway		
Church Street/Wellesley Grove, Gate Pa	6 properties affected, 4 having floor levels impacted, compromised egress		



<b>Sherwood Street, Brookfield</b>	Modelling assessment underway  Overland flow occurs to rear of Sherwood Street dwellings		
<b>133-137 Welcome Bay Road, Welcome Bay</b>	5 dwellings affected, 2 of which have impacted floor levels		
<b>166 Welcome Bay Road, Welcome Bay</b>	1x childcare facility and 2 sites with compromised egress		
<b>298 Darraghs Road, Brookfield</b>	1 habitable floor affected		
<b>Heronvale Way, Brookfield</b>	6 dwellings affected, 3 having habitable floors impacted, all have compromised access		