Further information requested under Clause 23, First Schedule of the Resource Management Act 1991

Private Plan Change Request

FDFH Silverdale West Industrial Area

AC Comments and further information request under clause 23(2)

STORMWATER

Black text – responses provided in table and SMP updated accordingly
Red text – This information is not being provided now. It is considered to be too detailed for the plan change process, or not able to be confirmed and provided until physical design work commences.

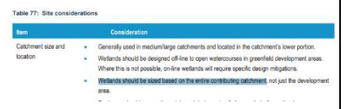
4 Stormwater/Healthy Waters					Healthy Waters Response	Civix Responses – 10/04/2024	**Healthy Waters 7/05/2024**	**Civix Responses – 29/05/2024**
SW1	Stormwater Management Plan	• The information provided in the Stormwater Management Plan is not sufficient to the scale and significance of the effects of the implementation of the proposed private plan change.	To enable a better understanding of the effects of the proposed private plan change on stormwater in the catchment.	<u>Civix comment:</u> Section 6 of the Stormwater Management plan has been updated to provide more detail on the options assessment undertaken for this project and how the proposed mitigation strategies address the effects of the development.	The applicant's response states that communal devices are to be used; however, the SMP does not state this clearly. Section 6.2 provides a range of potential stormwater management options. Each of the options has potential issues. Please amend the SMP to clearly identify what the suitable option(s) are and why. And does Table 2. also apply to roads, please clarify. Section 6.2.1 states that wetlands are proposed to treat all impervious areas, but it also states that catchpits with LittaTrap shall be used for waste storage areas, this promotes the use of proprietary devices, which is not supported in the Stormwater Code of Practice (SWCoP). Also, no guidance reference has been made to the SWCoP. Please clarify. Section 6.2.2 outlines the use of SMAF-1. Please provide further information as to whether SMAF-1 is sufficient to mitigate the effects on the stream in the catchment.	*SMP has been updated to clarify.* *Section 6.2 has been updated to clarify on the options to be implemented with discussion/clarification on the selected best practical option.* *LittaTraps are proposed only for the waste storage bin areas within the private development. It captures and retains plastic and litter before they enter the drainage system and therefore before they can reach the wetland and streams. The maintenance of this system will be within the private lot owner. Section 6.2.1 has been updated to further clarify.* *- Our proposal ensures no direct discharge to the stream from the development in the 10-year event. All runoffs from the development will be conveyed to the proposed communal wetlands where the treatment and detention are provided to mimic up to the 10-year pre-development flow into the stream.* *- SMAF-1 is proposed in addition to the 10-year detention that mimic the pre-development flows into the stream. In accordance with AUP E10, SMAF-1 are for those catchments*	Noted Improved but need clarification. LittaTraps are proposed within catchpits, would catchpits also be privately owned? Prefer communal GPT upstream of wetland instead of private LittaTraps. 6.1 Principles of stormwater management – Stream Hydrology – Please clarify how "or other treatment methods such as wetland and propriety devices" will achieve stream hydrology mitigation? 6.2.1 Water quality - drawing 50000 is referred to, this should be 30001	LittaTraps are proposed within catchpits located in the waste storage bin areas which is within the privately owned lot. Therefore, yes, catchpits will also be privately owned. At-source GPTs are much more effective than those placed in the middle or downstream. We are implementing communal wetlands for treatment, and LittaTraps are proposed for areas with a high potential for rubbish entering the pipe network. Additionally, adding communal GPTs will result in high maintenance costs and is less likely to be effective in this case. Section 6.2.2. of the SMP clarifies on how Stream hydrology mitigation is achieved. Agreed and amended.

					Table 6.4 of the SMP sets out alternative mitigation devices; however, there is no guidance provided on how these devices could be implemented, or how devices could be selected. Furthermore, Table 6-4 sets out management options that do not align with Schedule 2 or 4 of the NDC and will be difficult to implement by future users of the SMP, what is the relevance of Table 6.4, please update the SMP accordingly. It is required that the SMP clearly set out, • the preferred stormwater management solution for the site, the location, design and concept sizing of the stormwater management solution to ensure that the device(s) can be incorporated into the proposed future urban layout and there is sufficient room and gradient to allow for operations and maintenance. This needs to be included in the precinct plan to ensure the land required will be available and used for this purpose. • Reasoning for the design/size of the device, is it consistent with	*which discharge to sensitive or high value streams that have relatively low levels of existing impervious area. While SMAF-2 areas typically discharge to streams with moderate to high values and sensitivity to stormwater, but generally with higher levels of existing impervious area within the catchment. Although this plan change area is not identified to be within the stormwater management area controls, we have taken a conservative approach to adopt SMAF-1 for the entire plan change area. SMAF-1 detention for the plan change area will be provided via communal wetlands which will also act as a detention for stream protection and will be in accordance with GD01. Furthermore, the area downstream of the plan change site has been already identified as the SMAF-1 control area. Additionally, it is also in consistent with Silverdale West Industrial Plan Change SMP dated 25/11/2022 which identified that SMAF1 retention and detention are to be applied for hydrology mitigation. So, we believe use of SMAF-1 is appropriate to mitigate the effects on the stream in the catchment.* *- Table 6.4 lists out the alternative options considered for Stream Hydrology mitigation. However, they have been considered as not appropriate like pointed out as they do not align with the Schedule 2 or 4 of the NDC. For clarity, we have removed Table 6.4. It was shown to illustrate the other devices considered to select the BPO which is the communal wetland for treatment and detention for stream protection and to attenuate up to 10-year event.* *While we agree that the preferred stormwater management solution for the site to be clearly set out in the SMP, the location, design and sizing of the stormwater management solution can be conditioned such that the development needs to comply with the SMP. This gives flexibility for the development to consider the appropriate catchment and allocate adequate space to the communal devices within the development. Council/Healthy Waters can review*	6.2.1 Water quality – *"Treatment recommendations from previous SMP's for this catchment have recommended treatment to GD01 standards for high contaminant generating areas and roadways."* – What about roofs? SMPs that are consistent with NDC need to treat all impervious areas. What is the relevance of this sentence? 6.2.4 Network Capacity – *"The stormwater network capacity for the development will be designed to have sufficient capacity for the Development"*. Please clarify what 'sufficient capacity' means, the capacity needs to meet the requirements of the SWCoP. 6.2.4 *"The drainage reserve for the site has been sized to utilise the culverts as hydraulic controls to maintain downstream flows and water levels at pre-development conditions"*. Please clarify in the SMP that pre-development condition is for a 1% AEP. 6.2.6 Outfalls – please provide further information on the indicative number and location of outfalls based on the sub-catchments and location of proposed communal wetland for each sub-catchments, please include justification. 6.2.7 Impervious Coverage *"To meet the esplanade reserve requirement, all lot areas have been set back at least a minimum 20m from the stream edge, with most lots extending more than 30m and others more than 50m away from the stream edge to facilitate room for the existing wetland areas to the east, new wetland area to the west and formation of gentle earthworks batters and landscaping/greenway along the length of John Creek".*	Treatment is provided/proposed via communal wetland for all impervious areas including roofs. 2nd paragraph of 6.2.1 confirms this. Primary network will be designed for 10% AEP and Secondary System will be designed for 1% AEP event. Section 6.2.4 amended for further clarity. Pre-development refers to greenfield or grassed state, i.e. existing condition. Justification/Rationalisation on the sub-catchments and Wetland numbers are provided in Section 6.2.5 already. Each wetland will have a separate outfall to convey water into the stream.

					requirements in the SWCoP and GD01. • Provide guidance on how the stormwater infrastructure will be implemented. Section 6.2.3 outlines the removal of Willows, however following site visit it was noted that there were also existing culverts in poor condition along the stream, will these be removed? Was there an assessment on the effects of the existing culverts along the stream? Riparian planting is also outlined as a method to reinforce banks and provide buffer from development, however, it is not clear if the riparian planting is a minimum of 20 meters for all streams in the plan change area and whether this is sufficient to achieve the outcome of stream protection. Please update the SMP and provide further assessment. It is recommended that riparian planting is based on the character of the stream, and that 20m or more may be required. In section 6.2.7 flooding – Results, please state where were the minimum floor levels taken from. How does the flood modelling result support the minimum floor level stated in the SMP? How is this consistent with the SWCoP guidance on floor levels. Please update the SMP. Section 6.2.6 talks about Development stages. Please also provide information in the SMP on the implementation of the stormwater infrastructure and stream works. Section 6.4 provides some information on asset ownership, please provide further information on what devices will be vested to Auckland Council, the number of devices and associated structures, whether these devices will meet Health & Safety, operations and maintenance or other design criteria,	*and comment at the time of resource consent. However, please find the catchment plan showing the indicative sub-catchments and location of proposed communal wetland for each sub-catchments.* *Wetlands have been sized at 3% of the impervious area they treat. Previous studies have found that wetlands are approximately 1.5% to 2.5% of the impervious area they serve, including area required for O&M access. Therefore, the 3% figure used is conservative and will likely reduce with detailed design of the wetlands for Resource Consent and EPA. This sizing strategy should be adequate for the plan change process.* *Section 6.2 has been updated to clarify on the BPO for SW infrastructure implementation.* *There is no public SW culvert identified within the site. The existing culverts are considered as ford culverts put in place to create access points over the stream. Where new stream crossings are required, culverts will be adequately sized and designed in accordance with SW COP and AT TDM.* *Riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. SMP has been updated accordingly.* *The minimum floor levels are set based on the maximum flood level adjacent, plus the freeboard required as per SW CoP Guidance. To further clarify, the SMP has been updated accordingly.* *We understand RC will not be granted unless the stormwater management solutions are proposed in compliance with the SMP and the precinct provisions. This can be provided as the development gets developed. The SMP will set the principles/solutions to comply for the development.* *Any communal devices such as Communal Wetlands and Public SW*	Please clarify the definition of stream edge, is it the bank of the river? Please also include information on how the setback areas will also facilitate the requirements of the stream, as the channel is in a degraded state, and the channel will continue to adjust and widen because of past erosion, taking up more of the proposed esplanade area. Table 6-2-5 Peak Outflow summary results – please also include information on ED results (without climate change). Table 5 of the SW CoP Guidance –Please include the version number for the SWCoP and add ‘ and any subsequent update’ to refences of Table 5 of the SW CoP. 7. Conclusion *“Stormwater treatment can be provided either at source or within artificially constructed wetlands.”* Please clarify, what is at source and what is artificial wetland, as both are used. Please note BPO is Best Practicable Option.	Top of stream bank on either side has been taken as the edge of the stream. Assuming, ED = Existing Development condition, it appears to be inconsistent to compare existing without climate change to the proposed with climate change. Reference to the versions added. Apologies for the confusion, this SMP only proposing artificially constructed wetlands for the treatment. In addition to the wetlands, Littatraps (which is a GPT device) are proposed at source for areas where high source of contaminants such as plastics and rubbish are anticipated.

					the SWCoP and the Stormwater Bylaw. The SMP indicates the possibility of 14 stormwater wetlands and associated drainage and outfall that may be public. Please provide further information on how the number of devices were decided and how this is BPO as if they are vested to Auckland Council there will be ongoing maintenance and operations cost. SMAF-1 will also be used, does this affect the number of stormwater wetlands proposed. Please clarify.	*pipe network will be vested to Council upon completion. The process as set in SW CoP guidance, particularly Section 4.3.6.2 shall be complied. Section 6.4 has been updated to clarify this.* *The site is divided into 14 sub-catchments, each requiring specific design and grading to accommodate the masterplan. Therefore, implementing a communal device (such as a wetland) in each sub-catchment is deemed essential. The minimum catchment for a wetland is 1.3Ha* *These communal devices serve multiple purposes, including hydrology and flood mitigation for all land uses within the sub-catchments. They are proposed downstream but before discharge into the high-value stream, thus functioning as the Best Practice Option (BPO). This approach efficiently provides attenuation and detention while avoiding challenges associated with implementing these measures within the road corridor. Additionally, Council's choice of control devices and their placement also strongly influence mitigation effectiveness.*		
SW2	Stormwater Management Plan	• The level of detail in the proposed Stormwater Management Plan (SMP) overall is not sufficient for this scale of greenfield urbanisation. Please provide an in depth analysis which shows the stormwater effects of urbanising this catchment area and how any adverse effects will be mitigated.	To enable a better understanding of the effects of the proposed private plan change on stormwater in the catchment.	<u>Civix comment:</u> Section 2 & 5 of the Stormwater Management plan has been updated to provide additional context on the effects of the proposed development on downstream systems.	Section 2.3 and Section 2.6 outlines existing infrastructure. However there is no identification of existing stormwater ponds/wetlands and culverts in the stream. Please identify all the existing infrastructure so that an assessment of the effects of the proposed development on all existing infrastructure will be included in the report. A site walkover should be carried out to get accurate on ground information. Section 2.7 identifies flooding and flow paths, however there is minimal information on existing flooding risk downstream. Please identify any flooding risk in the catchment and the effects the proposed development will have. Such as the current flooding risk on State Highway 1, Small Road, associated road embankments, 2 and 4 Blue Gum Avenue, and any other relevant properties and infrastructure. Please include the information in the SMP. What flood risk mitigation within the plan change areas is recommended in the SMP to manage flood risk to	*- Further information has been added to Section 2.3 & 2.4 including Watercourses and ponds within the site are shown in Figure 3, while Figure 4 displays a summary of the site's inflow and outflow through various culverts under the motorway. It is also in consistent with Silverdale West Industrial Plan Change SMP dated 25/11/2022.* *- As shown in Council Geomaps, the SH1 is predicted (under the existing scenario) to flood at the downstream end, i.e., ahead of Silverdale northbound off ramp. However, the proposed scenario (i.e., the plan change development) shows no increase to the predicted flooding outside of the site. The downstream culvert (which acts as the exit for the site flow) has been throttled in order to not increase flood water levels downstream. This throttled effect will allow water to back up behind the structures to alleviate pressure downstream. As such, there is no adverse effect to the downstream properties and infrastructure due to*	Noted	

					these properties and infrastructure, please clarify further. Sections 2.12, 2.12.1, 2.12.2 provide information on erosion assessment and include the assessment by River Styles Framework, however not all the relevant information for the plan change area was included. Please update the SMP to include all the relevant information and include a plan for easier reference and to easily identify the hotspots. Please include the Silverdale River Styles Framework as an appendix in the SMP. Protecting permanent and intermittent streams should be one of the key features/purposes of the SMP in this plan change area. Please include information on how the proposed development will affect stream baseflows, ground water, and changes in water temperature, and associated mitigation, please include in the SMP.	*the proposed plan change development.* *- Silverdale River Styles Framework has been added to the appendix in the SMP.* *- Noted. As such, riparian yards will be proposed in consistent with Silverdale West Industrial Plan Change SMP dated 25/11/2022.* *- Plan change area is divided into sub-catchments such that the runoff from each sub-catchments will convey into the communal wetland which provides SMAF mitigation and 10-year detention to mimic the pre-development flow into the stream. Also, Riparian yards and plantings proposed will improve the water temperature and minimises erosion. SMP has been updated to include this information.*	2.12.2 Future Erosion Considerations dicusss the condition of the stream, however it is unclear what is recommended in the SMP and how it will be implemented? Please also include information on how the stream channel is adjusting and the importance for an esplanade reserve/setback of 20m or more is required to respond to this. And what would be the 'best guess' on how to determine the recommended setback from the stream.	What is recommended in this SMP and how it is implemented are discussed in Section 6.2.3. Stream Erosion. The setback for the development to the stream is generally >20m which is required to attenuate 1% AEP within the plan change area. With regard to whether that will all be esplanade reserve, it may or may not be, and will be the subject of future resource consent processes given the variety of functions that will likely be accommodated within that land.
					Section 4. Outlines Mana Whenua values, however there is no information about Mana Whenua engagement and other stakeholder engagement. Please clarify in the SMP if there has been any engagement with Mana Whenua and stakeholders. Please include all references used in the SMP in the SMP.	*- We have engaged with iwi at an early stage, and this is ongoing. Notwithstanding that engagement, Iwi will be able to make submissions on the plan change during the notification process if they choose to do so.*			
SW3	Stormwater Management Plan	• The Best Practicable Options (BPO) are not discussed sufficiently. Stormwater management decisions need to be justified as BPO based on the specific catchment characteristics, please provide information that addresses why the proposed stormwater management is considered the BPO.	To enable a better understanding of the effects of the proposed private plan change on stormwater in the catchment.	<u>Civix comment:</u> Section 6 of the Stormwater Management plan has been updated to provide more detail on the options assessment undertaken for this project and how the proposed mitigation strategies address the effects of the development.	See comments in SW1 and SW2.	*- SW1 and SW2 have been addressed.*	*Noted*		
SW4	Stormwater Management Plan	• No reference is made to the Silverdale West Dairy Flat Industrial Area Structure Plan and the associated SMP. The SMP includes	To enable a better understanding of the effects of the proposed	<u>Civix comment:</u> References to the other SMP's have been added into the executive summary and to section 6 of the SMP.	The level of detail in the proposed SMP does not reflect the information required for this plan change, see the above comments.	*- The flood risk management hierarchy, as identified in Silverdale West Dairy Flat Business Area Structure Plan SMP Table 3.2, has*	*Noted*		

		important catchment context which would have been beneficial to the proposed SMP for the private plan change. Please address how the proposed SMP is consistent with the Silverdale West Dairy Flat Industrial Area Structure Plan and reference the associated SMP where appropriate.	private plan change on stormwater in the catchment.		Please provide more detailed information to allow for a better understanding and assessment of the proposed development and stormwater management.	*been adapted for flood modelling and proposed development.* *- Proposed hydrological mitigation and treatment devices are consistent with the options listed.* *SMP has been updated with a comparison table (Table 6-2-1) to show the consistency of the key elements.*		
SW5	Flood Management	• Flood risk management has not been presented clearly in the proposed SMP. Please provide details on the proposed flood mitigation option and its feasibility.	To enable a better understanding of the effects of the proposed private plan change on flooding.	Civix comment: Additional discussion on flood risk management has been provided in section 6.2.5 of the SMP.	Section 6.2.5 states that the wetlands have been sized at 3% of the impervious area they treat, how was this determined, and is the design and sizing of the wetland consistent with requirements in the SWCoP and GDO1? Does the location and area allow for operations and maintenance? And how will the proposed location be identified and protected for stormwater wetland purposed in the plan change area? Are the stormwater wetlands located outside the 10% AEP flood plain? If not please provide information on how the stormwater wetlands will function in a flood event. Please provide further information on what green outfalls mean? It is important the outfall does not increase stream erosion, how will this be achieved? Please update the SMP.	*- Wetlands have been sized at 3% of the impervious area they treat. Previous studies have found that wetlands are approximately 1.5% to 2.5% of the impervious area they serve, including area required for O&M access. Therefore, the 3% figure used is conservative and will likely reduce with detailed design of the wetlands for Resource Consent and EPA. This sizing strategy should be adequate for the plan change process.* *- All communal wetlands are to be located such that they are able to access from the public road corridor for O&M. SMP updated to include this.* *- Yes, 10-year attenuation for the site is provided via the communal wetlands which will be located above the 10-year flood level at the stream.* *- Scruffy dome outlet with smaller orifice catering for detention for stream protection will be provided in the wetland. The downstream of the outlet will be a wingwall culvert with rip-rap protection to ensure the flow does not trigger any stream erosion. SMP updated to include this.*	As per Table 77 of GD01 Wetlands should be sized based on the entire contributing catchment area, allowance must be allowed the Operations and Maintainence access and sediment drying area. Please update the SMP.  Table 77: Site considerations Item: Consideration Catchment size and location: • Generally used in medium/large catchments and located in the catchment's lower portion. • Wetlands should be designed off-line to open watercourses in greenfield development areas. Where this is not possible, on-line wetlands will require specific design mitigations. • Wetlands should be sized based on the entire contributing catchment, not just the development area.	The wetland calculations according to GD01 are now included in Appendix D. Additionally, a summary table has been appended to the SMP, referenced as Table 6-2-5. The allocated area surpasses the required area, considering maintenance access and sediment drying areas. We believe these measures sufficient for the plan change application. It might be beneficial to include a precinct condition specifying that the proposed wetlands must meet GD01 requirements, and the details are to be provided at Resource Consent stage.
SW6	Flood Management	• Please provide more details on the proposed throttling of stream (these will be dams) at stream crossings for flood mitigation. Please include information on the proposed locations, preliminary designs, and show how this can be done safely.	To enable a better understanding of the effects of the proposed private plan change on flooding.	Civix comment: It is proposed Box culvert under the stream crossings to allow the flood through in order to control its volume. The size of these structures is calculated associated to Tuflow modelling of different rainfall events results. The culverts are in accordance with fish passage requirements of the NES-F.	The SMP states that the throttled stream crossing will create backwater effects. Please provide information on the possibility of overtopping at the stream crossing and any flooding risk, firstly the culvert being blocked and secondly, to assess the risk of having an event larger than 1% AEP. Are there any measures to ensure any related flooding risk will be mitigated? There will be bridge crossings above the culverts,	*- No overtopping is intended at the throttled stream crossing locations. The road levels will be set higher to accommodate the required freeboard from the 100-year flood level.* *- mitigation is provided by meeting the freeboard requirements. The stream crossings and actual calculated cross-sectional areas will be addressed via detailed design of the development levels at RC stage.*	Please include the throttle structure detail in the SMP. Please also outline that secondary overland flow paths should be designed adequately in the SMP.	Throttle effect will be proposed via standard Culvert Wingwall structure sized accordingly to the pipe. Finished Contours are added to the drawing 30001 which shows that overland flows from all the sub-catchments will be directed towards the wetland which then flows into the drainage reserve and stream where 1% AEP will be

					assuming vesting to AT, has AT been engaged regarding the possibility of overtopping? How will these structures in the stream affect the stream and stream erosion, is the proposed location of the structure the best option for the stream, and what measures will be in place to ensure stream health and erosion are not worsened? Please update the SMP.	*Prior AT engagements will happen in the next phase of this plan change application/process.* *- Inlet and outlet for the culverts will be proposed with rip-rap protection to prevent from stream erosion. The locations of stream crossing culverts are shown on the catchment plan Drawing 30001. SMP has been updated with the above information added.*	Engagement with Healthy Waters is required at resource consent stage regarding the detail of the proposed structures, please include in the SMP.	attenuated within the plan change area. Noted and agreed. Further details will be provided at RC stage.
SW7	Flood Management	• Please provide information on any modifications to the floodplain and what effects there may be and associated management.	To enable a better understanding of the effects of the proposed private plan change on flooding.	<u>Civix comment:</u> As the development area is within some of the published flood plain extent and therefore reducing that area, additional storage areas are proposed in the open areas to accommodate flooding volumes. As detailed at section 6.2 of the SMP, flood modelling shows that stormwater flows can be effectively contained in the post-development scenario, with no effect on the up or downstream networks.	Please highlight what assessment has been done to compare the risk pre and post development. Was there an assessment around the overtopping for the culvert under SH1, with frequency, duration and hazard information included? Please update the SMP. Section 6.2.7 of the SMP contains very limited discussion around the modelled results on Flood risk assessment. The SMP only includes some discussion around Existing Development, and Maximum Probable Development including upstream with proposed mitigation, with culverts at stream crossings. However, there was no discussion around whether the proposed devices were intended to address maximum probable development effect with climate change as well. It is not clear what scenarios are used to assess the impacts of development, or why they are being used. For example, what scenario was used to establish the existing flood risks and what scenario looks at the potential impact of development that will be enabled by the plan change? Please clarify.	*- A flood assessment evaluation has been undertaken to assess the flows within the site and upstream/downstream of the site. Flood modelling has been undertaken using Tuflow. The model has been developed for the purpose of demonstrating that the mitigation measures included within the site mitigate the effects of the development. The existing model included the existing state of the site (as 8% impervious). The proposed model included the proposed development on site (as 85% impervious), with the proposed stream crossing culverts and flood storage areas providing attenuation for the 1 in 100 year event. The afflux (which is the difference between pre and post developments) shows no change to the downstream including the SH1. Refer drawing 55004 for details.*	*Noted*	
SW8	Flood hazard assessment	• Please provide TP108 rainfall figures.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	<u>Civix comment:</u> Rainfall 90th Percentile(mm) - 26.358923 Rainfall 95th Percentile(mm) - 37.437984 Rainfall 2 year, 24 hour(mm) - 85.506783 Rainfall 5 year, 24 hour(mm) - 119.370438 Rainfall 10 year, 24 hour(mm) - 142.016769 Rainfall 20 year, 24 hour(mm) - 161.983002 Rainfall 50 year, 24 hour(mm) - 180.000000	Were these rainfalls used in the assessment? If not please provide an explanation as the SMP should reference Auckland data.	*Yes, Table 6-2-3 has been added in the SMP to clarify on the Rainfall depths used for flood modelling.*	*Noted*	

				Rainfall 100 year, 24 hour(mm) - 212.317032				
SW9	Flood hazard assessment	• Please provide information on the effects of climate change and clarify the temperature used, it is recommended a temperature of 3.8° is used.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	Civix comment: Future rainfall depths allow for a projected average temperature increase of 2oC, per the Ministry for Environment's Guidance Manual for Local Government in New Zealand (2008). We have also run the flood model for RCP8.5 (3.8° climate change) rainfall depths and the flood results were good. Discussion on this has been added to section 6 of the report.	Please clarify what temperate increase was used, was it 2.0 degree or 2.1 degree? The SMP needs to include a climate change of 2.1 degree as per SWCoP. What was the difference between 2 degree and 3.8 degree, and if so what changes were made to account for 3.8 degree. Auckland's Climate Plan identifies a climate change factor of 3.8 degree and the SWCoP is currently in the process of being reviewed to include 3.8 degree. Assessments should be based on a 3.8 degree.	*- The modelling used 2.1 degree temperature increase for the flood assessment.* *- SMP has been updated to include both 2.1°C and 3.8°C Climate increase.* *- Results summary is provided in Table 6-2-5.*	Please also include results without climate change in Table 6-2-5.	Please clarify whether for both existing and proposed without climate change is required.
SW10	Flood hazard assessment	• Please provide information on pre and post-development comparison. It is not clear if the comparison used was between pre-development vs. post-development or pre-development vs. post-development with proposed mitigation/intervention.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	Civix comment: The comparison used was between pre-development vs. post-development with proposed mitigation.	See SW7 for details	*- SW7 has been addressed.*	*Noted*	
SW11	Flood hazard assessment	• Please provide further information on the details included in the flood modelling e.g. does it include proposed mitigation structures.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	Civix comment: The flood modelling includes the proposed stormwater network (manhole and pipes). Retention/detention tanks and constructed wetlands are not included in the model. The modelling includes proposed culverts for mitigation.	See SW7 for details.	*- SW7 has been addressed.*	*Noted*	
SW12	Flood hazard assessment	• Please provide further information on the downstream boundary condition as it is not clear where the boundary is and what assets have been included.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	Civix comment: The afflux plan of the flood model shows the downstream properties or the State Highway 1 are not being affect by the proposed development. Culverts included in the model are shown on the flood plain drawings. Full model files of the TuFlow model can be given to council if needed.	Afflux does not provide the full assessment of frequency and duration/depth. The modelling result plans included in the Drawing section of the SMP do not provide adequate information to allow an assessment to be undertaken of the impacts of the proposed development on the State Highway 1 culvert. It is required that results should be tabulated and include the information requested for SW12 and SW13. Please update the SMP. This information is required at the plan change stage so that the effects of land use change can be quantified	*- SMP has been updated to include both 2.1°C and 3.8°C Climate increase scenarios.* *- Results summary is provided in Table 6-2-5 for comparison.* *- Refer Drawing 55000 series for details.* *- Furthermore, TuFlow models can be provided to HW for full review.*	Please also include results without climate change.	We believe it is not a good comparison without climate change, however, we have run the existing without climate change and provided the summary of peak flows in Table 6-2-5 for information.

					and assessed. It will also inform the preferred stormwater management that is required to mitigate the impacts of stormwater discharge. Please update the SMP.			
SW13	Flood hazard assessment	• Please provide information on what the effects may be on the State Highway 1 crossing in the catchment, please include this information in the flood modelling used. (Healthy Waters previous analysis identified that the development of this catchment may result in flooding of the State Highway 1 offramp).	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	<u>Civix comment:</u> Same as SW12	See SW12 for details	*- SW12 has been addressed.*		
SW14	Flood hazard assessment	• Please provide information on why 85% of the catchment area is used for future impervious areas, as industrial zones maximum impervious area can be developed up to 100%.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	<u>Civix and Unio comment:</u> It is acknowledged that the Light Industry Zone does not limit impervious surface, and that conceivably 100% of the Plan Change area could be developed. In practice however, that is not considered to be a viable outcome. The Plan Change area is not considered to be fully developable given the combination of topography, existing stream and wetland areas and the need to retain appropriate land for flood management around those features. It should also be noted that those areas are proposed to be zoned Open Space, not Light Industry Zone. Civix has included an indicative 'stream setback' plan within the SMP which details a potential subdivision structure through the Plan Change area and includes: - esplanade reserve requirements comprising a minimum 20m setback from the stream edge - most indicative lots are actually set back between 30m to 50m away from the stream edge to facilitate room for the existing wetland areas to the east, new wetland area to the west and formation of gentle earthworks batters and landscaping / greenway along the length of John Creek.	The SMP needs to clearly state why the assumption that 100% impervious area is unlikely and provide justification. Please provide details of the calculations to support the 85% and how it can be certain that only 85% of the plan change area will be impervious.	*Table 6-2-3 has been added to the SMP which provides calculation for Site impervious Coverage for the proposed development.* *To summarize, the open space area where no development is proposed will have 0% impervious coverage. This open space constitutes approximately 27% of the total site area designated. Consequently, only 73% of the total site area is allocated for light industrial development, including roadways.* *While the estimated impervious percentage of the site stands at approximately 73%, a conservative approach has been adopted for flood modelling. Consequently, the proposed site imperviousness has been modelled at 85%.*	*Noted*	
SW15	Stream hydrology/	• The streams in this catchment are highly erodible due to the	To enable a better understanding	<u>Civix comment:</u>	Section 2 highlights restoration initiatives however there are no details on the type of work required,	*- Section 6.2.3 has been revised to include restoration initiatives matching to Ecological Values*	*Noted*	

	Stream erosion	modification to agriculture use and the excess flows. Stream bank erosion will be exacerbated by changes in hydrology as a result of the proposed change in land use in the area. Please provide further assessment of how the proposed development will affect stream bank erosion. It is important the stream will be able to cope with the new hydrology as a result of future development in the area and not degrade at a faster rate.	of the effects of the proposed private plan change on stream hydrology and erosion.	Discussion on stream erosion has been added to section 2 and section 6 of the SMP covering the discussion with Healthy Waters on this issue. We request that the SMP is considered for 'adoption in principle' while these discussions are ongoing with Healthy Waters. <u>Unio comment:</u> This item is considered to be eminently manageable via suite of engineering interventions. Specific interventions are not needed at this point in time, however the SMP is able to identify a toolbox of methods to appropriately mitigate these potential effects, with final details to be implemented through later consenting processes.	guidance on how this will be implemented or details of the timeframe for the work. This needs to be clearly outlined in the SMP. Details such as methods for Willow tree removal need to be provided. It is recommended that the Willow tree removal include the removal of roots and follows best practice. The 'engineering interventions' need to be clearly outlined. What are the methods in the toolboxes for stream works? E.g. stream bank grading and planting, stream bed protection, riparian margin planting etc. Please clarify in the SMP. The standards allow for a 10m riparian yard. Unless site specific information outlines reasons why a 10m riparian yard is sufficient to protect the health of the stream, please provide a 20m riparian yard, given the condition of the stream in the plan change area and riparian planting is being relied on to manage the effects of the proposed development on the stream health. The SMP will need to set out details and the conditions, leaving it to the resource consent stage could lead to private interventions rather than communal interventions and may not provide a catchment wide approach.	*Assessment prepared by RMA Ecology Limited. Cross references are added for further clarity.* *- Further to discussion with the Ecologist, existing Willow tree(s) are identified as an ecological feature that provides shades and supports to the bank bed and banks. Therefore, it is not proposed to remove any willow trees in this plan change area. SMP has been updated with no willow tree removal.* *- See updated Section 6.2.3. Further details can be provided in consultation with the ecologist at the resource consent stage.* *Riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. The stream banks have predominantly deteriorated due to stock movements. The proposed development involves removing the stock and redirecting runoff through communal wetlands to facilitate a slow discharge into the stream, expected to improve its health. SMP has been updated accordingly.* *- Noted.*		
SW16	Stream hydrology/ Stream erosion	• The streams in the area have been identified in the Ecology Assessment as 'highly degraded'. Healthy Waters assessment of the catchment identified headcut processes with significant changes in incisional trends/width to depth ratios over a relatively short longitudinal distance. Therefore SMAF 1 mitigation plus riparian planting cannot mitigate this process. Please provide further evaluation which demonstrates that the use of SMAF 1 is sufficient to mitigate the effect of urbanisation of the catchment, if not please provide other management options, such as in stream	To enable a better understanding of the effects of the proposed private plan change on stream hydrology and erosion.	<u>Civix and Unio comments:</u> As above for SW15.	See SW1 and SW2 for details	*- SW1 and SW2 have been addressed.*	*Noted*	

		works. A stream assessment and stabilisation plan is recommended.						
SW17	Stream hydrology/ Stream erosion	• Please show that how retention through reuse is feasible for industrial land uses and how it will be ensured that retention will be provided at the time of development of individual lots. Commonly, the water demand for reuse for industrial or commercial sites is very low compared to the retention volume.	To enable a better understanding of the effects of the proposed private plan change on stream hydrology and erosion.	Civix comment: Retention will be provided as far as practicable as soakage is not sufficiently viable in this catchment. The Applicants are open to discussion on alternative forms of mitigation, including the potential to work with council on stream restoration.	To what extent will retention be provided, please provide further details. What are the other options, please clarify.	*- Retention will be provided via water reuse tanks on private lots, while GD01 recommended devices on public roadways wherever practicable.* *- where it is not practicable, retention will be taken up as additional detention in the communal wetland as follows: provide detention (temporary storage) and a drain down period of 24 hours for the difference between the predevelopment and post development runoff volumes from the 95th percentile (SMAF 1), 24 hour rainfall event minus any retention volume that is achieved, over all the impervious area.*	"where it is not practicable, retention will be taken up as additional detention", this discussion is not presented consistently in the SMP, please update the SMP to ensure it is consistent presented throughout the SMP.	Noted and updated in the SMP.
SW18	Stream hydrology/ Stream erosion	• Please provide further information on how riparian margins were determined. It is important to recognise the need for additional setbacks from streams due to vulnerability to erosion, please account for the condition of the streams and the effects of the proposed riparian margins.	To enable a better understanding of the effects of the proposed private plan change on stream hydrology and erosion.	Civix comment: Further discussion added to section 2 and additional plans showing riparian zones are included. Unio comment: The proposed Open Space zoning follows the existing stream and wetland areas along John Creek, and accounts for 10m / 20m riparian / esplanade areas and much broader flood management areas. The additional setbacks indicated by this request are being provided for through the above mechanisms.	The SMP states "A minimum of 20m each side of the permanent stream would be proposed to be planted with Riparian planting". See SW1 for details.	*Riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. The stream banks have predominantly deteriorated due to stock movements. The proposed development involves removing the stock and redirecting runoff through communal wetlands to facilitate a slow discharge into the stream, expected to improve its health. SMP has been updated accordingly.*	Please clarify the definition of stream edge, is it the bank of the river? Please update SMP accordingly.	Top of stream bank on either side has been taken as the edge of the stream.
SW19	Stream hydrology/ Stream erosion	• The plans provided show stream reclamation, however this is not discussed. Please provide further information on how this was decided and the associated effects of the loss of the stream and proposed mitigation. Please include an assessment of the alternatives to not reclaiming the stream that was investigated.	To enable a better understanding of the effects of the proposed private plan change on stream hydrology and erosion.	Unio comment: To facilitate urban development of the land, some future stream reclamation may be necessary to construct roads and other infrastructure. The plans to support the Plan Change application are indicative only and the need for any stream reclamation will not be determined until detailed design at the resource consent stage. The effects of reclamation and the adequacy of the mitigation or compensation proposed would be considered as part of the resource consent process under the standard AUP provisions at that time. Where any stream reclamation is required which may result in loss of stream habitat, the effects can be offset through enhancement of other sections of streams within the precinct in the	Any change to overland flow paths and flood plains needs to be addressed in the SMP. It appears the precinct plan promotes reclamation of the stream south of the plan change area. The SMP needs to include justification and appropriate mitigation for the loss in any stream as a result of the reclamation, including flood mitigation and effects on stream health. The AUP seeks a high level of protection for permanent and intermittent streams in the region. The SMP needs to be consistent with this.	*- There has been no change to the OLFPs.* *- No intermittent and permanent streams are reclaimed within this plan change area.*	*Noted*	

				first instance, and then off-site to ensure no net loss is achieved.				
SW20	Water Quality	• Healthy Waters expectation is that ALL impervious areas will be treated to GD01 standard, as is set out in Schedule 4 of the Regional Wide Discharge Consent. This is not clear in the proposed SMP, under 6.2.1. Water quality only carparks are outlined. Please provide further information on how each type of impervious area will be managed, such as roads, yards, roofs, etc. and please include information about the proposed devices. • It is noted that Section 6.2.1 only discusses car parks	To enable a better understanding of the effects of the proposed private plan change on water quality.	<u>Civix comment:</u> ▪ Wetlands are proposed to treat all the impervious roadways and COAL areas prior to slowly discharging the runoff into the natural stream, this meets the NDC objectives and is the BPO. ▪ Retention via tanks and reuse for non-potable purposes for roof areas. This solution has been chosen as it is the SMAF 1 specified outcome, which is the most restrictive outcome and will achieve equivalent hydrology (infiltration, runoff volume, peak flow) to pre-development (grassed state) levels for the industrial sites. ▪ No mitigation required for the landscape area. ▪ Discussion on this has been updated in section 6.2.1 of the SMP <u>Unio comment:</u> The treatment of all impervious areas is able to be appropriately managed by way of existing Auckland-wide Unitary Plan provisions and compliance with the Auckland Regional Stormwater Network Discharge Consent.	Please provide further details as outline in SW1.	*- SW1 has been addressed.*	*Noted*	
SW21	Water Quality	• Please provide further information on the proposed stormwater wetlands. Please include information but not limited to the following, o How the number of stormwater management devices were decided, there is a large number of devices proposed o The Lifecycle cost analysis of the proposed stormwater management o Likely contributing catchments for each device o Whether the contributing catchments are sufficiently sized to maintain water levels in the stormwater wetlands	To enable a better understanding of the effects of the proposed private plan change on water quality.	<u>Civix comment:</u> ▪ 14 constructed wetlands (rather than the 10 shown in the catchment area within the Council's Draft SMP) are indicatively detailed on the basis of a more resolved Masterplan layout for the Precinct. Actual size, location and design will depend on actual subdivision / development design, timing, and the specifics of future resource consent processes. ▪ Additional comments on lifecycle costing are provided in section 6.2.4 of the report. The previously accepted SMP for this location from WSP does not contain or require a life cycle costing assessment for the proposed site. Further to this, the Woods SMP prepared also does not include this information and the Auckland Council SMP recommends this is provided with development applications but is not included within the plan change SMP itself. Our recommendation is that Life Cycle costings should be provided	Please provide further details as outline in SW1 and SW5.	*- SW1 and SW5 have been addressed.*	*Noted*	

		○ Please clarify the proposed treatment for road runoff ○ Please clarify the design sizing for the stormwater wetlands ○ Please clarify if the areas for the stormwater wetlands include space for operations and maintenance.		at the time of consent application for a development, this has been added to the conclusions of the report. ▪ The contributing catchments have been added to the SMP drawings, please refer to the Catchment Delineation drawing for details. The catchments are sufficient to maintain water levels in the wetland, (minimum size 1.3Ha) additional discussion on this has been added to section 6.2.5 of the SMP. ▪ The proposed treatment for roads is through the wetlands. ▪ The stormwater wetlands have conservatively sized at 3% of the catchment areas they serve. Typically wetland areas sized for treatment are 1.5% to 2.5% of the catchment area they serve so this sizing methodology is conservative. Wetland sizing will be refined with detailed design. ▪ The analysis above on wetland area includes required O&M areas. Additional detail on how this is achieved will be provided with detailed design. Discussion has been added to section 6.2.5 on this.				
SW22	Natural Wetland reclamation	• Fifteen wetlands are proposed to be reclaimed. Please provide further information on how this may affect water quality and flooding mitigation in the catchment.	To enable a better understanding of the effects of the proposed private plan change on wetlands.	<u>Civix comment:</u> There are 15 existing natural inland wetlands as defined by the NPS-FM, located within the proposed plan change area. The function of those is are proposed to be supplemented by stormwater outfalls to new communal artificially created wetlands prior to discharging to stream.	Please include information in the SMP.	*- Locations of existing natural inland wetlands are shown in Figure 3. For further details, refer to Ecological Values Assessment prepared by RMA Ecology Limited.*	Noting there is disagreement with Council specialist about wetland classification.	Noted
SW23	Natural Wetland reclamation	• How is the proposed reclamation of wetlands consistent with the objectives (6) and (7) in the proposed 'Silverdale West Precinct' and the NPS-FM and NES-F.	To enable a better understanding of the effects of the proposed private plan change on wetlands.	<u>Unio comment:</u> There is no proposed reclamation of wetlands as part of the Plan Change request. Any future reclamation will be undertaken subject to obtaining all necessary resource consents prior.	Please include information in the SMP.	*- No reclamation of wetland is anticipated.*	Noting there is disagreement with Council specialist about wetland classification.	Noted
SW24	Network	• Please discuss whether green outfalls have been considered and related reasoning.	To enable a better understanding of the effects of the proposed private plan change on water quality.	<u>Civix comment:</u> Green outfalls will be proposed as part of future development phases, with details will be provided as part of the necessary future approval stages.	See SW5 for details.	*- SW5 has been addressed.*	Noted	
SW25	Open Space	• Please provide information on why the proposed open	To enable a better	<u>Civix comment:</u>	See SW7 for details.	*- SW7 has been addressed.*	Noted	

	and Riparian Margins	space extent is smaller than the published flood plain extent.	understanding of the effects of the proposed private plan change on riparian margins and open space.	Same as SW7.				
SW26	Open Space and Riparian Margins	• Please provide further detailed maps of the proposed open space and riparian margin.	To enable a better understanding of the effects of the proposed private plan change on riparian margins and open space.	Civix comment: Please refer to the "Stream Setback" Plan appended to the SMP.	Noted. Please ensure all maps/plans/references used in the SMP are included in the SMP. Please ensure there are keys with all the plans, e.g. Catchment Areas plan by Civix does not have a key.	*- Noted. Key/Legend to be added.*	Please include Legends for Figure 1: Silverdale West Plan change area. Figure 2: CMW Ground Model Plan – the image and legend and details are difficult to read, is it possible to get a copy of a clearer image. Please include Legend/date for Figure 3: Wetlands (turquoise/ orange polygons) at the site, and site boundary (turquoise line) and ponds at the site. Please include date for Figure 5 Please include Legend/date Figure 6: Existing OLFP & Flood plain associated with John Creek Figures 1, 2, and 6 are not referenced within the body of the SMP. Please provides comments about the Figures and its relevance.	1. Legend added 2. Figure 2 is included as a PDF for clarity 3. Figure 3 is included as a PDF for clarity from the source document (Ecological Values Assessment dated August 2023, prepared by RMA Ecology Limited). 5. Added 6. Added Comments added to Figures 1, 2 and 6.
SW27	Open Space and Riparian Margins	• Please provide detailed information on the value of riparian vegetation across all water bodies identified.	To enable a better understanding of the effects of the proposed private plan change on riparian margins and open space.	Civix comment: ▪ Wetlands are proposed to treat all the impervious roadways and COAL areas prior to slowly discharging the runoff into the natural stream, this meets the NDC objectives and is the BPO. ▪ Retention via tanks and reuse for non-potable purposes for roof areas. This solution has been chosen as it is the SMAF 1 specified outcome, which is the most restrictive outcome and will achieve equivalent hydrology (infiltration, runoff volume, peak flow) to pre-development (grassed state) levels for the industrial sites. ▪ No mitigation required for the landscape area. ▪ Discussion on this has been updated in section 6.2.1 of the SMP Unio comment: As staged subdivision / development is undertaken across the Plan Change area, stream margins and wetlands will be progressively enhanced through the	Please highlight the benefits riparian yards provide in a flood event in the standard for yard setback in the precinct provision to be consistent with the SMP.	*Key benefits include:* *- Erosion Control: Riparian vegetation, including trees, shrubs, and grasses, help stabilize soil along riverbanks, reducing erosion caused by water flow* *- Stormwater Management: Riparian vegetation helps slow down and absorb stormwater runoff, reducing the volume and velocity of water entering streams and rivers. This can help prevent streambank erosion and minimize the risk of flash floods.* *As such, riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. The stream banks have predominantly deteriorated due to stock movements. The proposed development involves removing the stock and redirecting runoff through communal wetlands to facilitate a slow discharge into the stream,*	Noted	

				provision of appropriate planting to support native habitat and water quality outcomes.		*expected to improve its health. SMP has been updated accordingly.* .		
SW28	Planning	• The catchment area has permanent and intermitted streams that are degraded and are prone to erosion. The effects of development on stream erosion and associated effects on stream health need to be addressed. In the proposed 'Silverdale West Precinct' objectives and policies there are no references to the management of stream erosion and associated effects on stream health. Please include stream erosion management in the proposed precinct to ensure stream health is protected, and to achieve the 'strong ecological outcomes' sought by the objective in the precinct.	To enable a better understanding of the effects of the proposed private plan change on stream health and erosion.	<u>Unio comment:</u> The updated SMP prepared in support of the Plan Change request includes discussion on stream erosion at section 2 and 6. While it is not proposed that the SMP be adopted through this process, it is requested that it be reviewed with a view to confirming that it could be 'adopted in principle'. Proposed Policy (16) creates the linkage by requiring that development maintain or enhance water quality and protect stream and wetland environments including by being consistent with any SMP adopted for the precinct by the network utility operator.	See SW1 for details.	- *SW1 has been addressed.*	Noted	
SW29	Planning	• The catchment area has significant overland flow paths and flood plains. In the proposed 'Silverdale West Precinct' objectives and policies there are no references to how natural hazards – flooding upstream and downstream are addressed and managed. Please include natural hazards – flooding in the proposed precinct to ensure the conveyance function of overland flow paths and flood plains are maintained and there is no increase in flooding risk to people and property upstream or downstream of the precinct area as well as within the precinct area.	To enable a better understanding of the effects of the proposed private plan change on the flood hazard.	<u>Unio comment:</u> The intention here is that flood effects be managed in reliance on the existing Auckland-wide provisions and the Auckland Regional Stormwater Network Discharge Consent. Through these mechanisms, any future subdivision or development is going to need to confirm that up and downstream flood effects are appropriately managed within the application site. Civix has advised that Tuflow modelling shows the effects of future development are able to be sufficiently mitigated through the proposed enhancement of flood storage on-site via the culverts proposed. Those culverts are included as requisite upgrades to enable development within Stage 1 and Stage 2 of the Precinct. We consider that an additional standard requiring compliance with an adopted SMP, and special information requirements setting out the broad content of an SMP could be appropriate here, however not strictly necessary.	It is important to maintain the riparian yard/esplanade reserve for flood mitigation, please include in the precinct provision.	*Noted.*		
SW30	Planning	• It is unclear how the 'Silverdale West Precinct' provisions will implement	To enable a better understanding	<u>Unio comment:</u> Prior to any development across the Precinct, confirmation that the Auckland	See SW1 for details. The precinct provision should include an activity status for not complying	- *SW1 has been addressed.*	See precinct provision.	

		the proposed SMP. Please reference the SMP in the proposed precinct and ensure any proposed development is in accordance with the proposed stormwater management plan, this should be referenced throughout the precinct provision.	of the implementation of the SMP.	Regional Stormwater Network Discharge Consent is being relied upon will needed, which necessitates the preparation of an appropriate SMP to be adopted by Healthy Waters. The only alternative is that all necessary discharge consents are obtained separately. Policy 15 requires consistency with any adopted Stormwater Management Plan. As noted above, we consider that an additional standard requiring compliance with an adopted SMP, and special information requirements setting out the broad content of an SMP could be appropriate here, however not strictly necessary.	with the adopted SMP as a discretionary activity to ensure the stormwater management for the plan change area is in accordance with the adopted SMP.			
SW3 1	Planning	• The standard for the Riparian yard is 10m, this should be a minimum of 20m given the existing condition of the streams and the information provided in the proposed SMP under 2.6. Flooding and Flow Paths.	To enable a better understanding of the effects of the proposed private plan change on riparian margins.	<u>Unio comment:</u> Standard IX6.2 Streams and natural inland wetlands proposes to apply a 10m planted riparian margin from the top of the bank of the stream and a 20m building setback from the bank of a river or stream measuring 3m or more in width, consistent with the requirements of E38.7.3.2 (Subdivision establishing an esplanade reserve). This is the preferred option for the following 16inimuns: • The 10m minimum required planted riparian margin ensures that indigenous biodiversity along streams is restored to enhance the ecological values of streams, while maintaining flexibility for appropriate development of cycle and pedestrian paths which must located outside of planted riparian margins and generally within the wider esplanade reserve • The 10m riparian / 20m esplanade requirements align with the Unitary Plan requirements across the region • The 10m minimum required planted riparian margin also aligns with the Auckland Design Manual which recommends a 10 m width planted on each stream bank with wider strips of 20m or more are encouraged for larger rivers • The proposed precinct provisions are consistent with those incorporated within other greenfield precincts within the AUP[1] which incorporate a 10m planted riparian margin; and	The SMP states 16 minimum of 20m each side of the permanent stream would be proposed to be planted with Riparian planting". See SW1 for details. The riparian margin should be dependent on the specific character of the stream and the catchment. The stream in this catchment is in a state where a 20m planted riparian margin would provide the mitigation needed to ensure erosion is not exacerbated and the stream health can be improved over time.	*Riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. The stream banks have predominantly deteriorated due to stock movements. The proposed development involves removing the stock and redirecting runoff through communal wetlands to facilitate a slow discharge into the stream, expected to improve its health. SMP has been updated accordingly.*		

[1] Birdwood 2, Clarks Beach, Drury 1, Drury South, Flat Bush, Franklin 2, Glenbrook 3, Hingaia 1,2 & 3, Long Bay, Redhills and Whenupai 3 (Proposed)

				• Where larger areas are needed to support flood management during 1% AEP flood events, those areas are not necessarily to be planted as they relate to flood storage. These may be grassed areas, including pedestrian and cycle connectivity, etc as they have a different function to the riparian planting areas.				
SW32	Planning	• The proposed SMP under 2.6. Flooding and Flow Paths outline that a minimum of 20m on each side of the permanent stream would be planted, standard IX6.2 outlines a minimum of 10m, this is inconsistent. Information should be provided in standard IX6.2 that references when 20m minimum or a higher minimum shall be considered based on the assessment of the water bodies and flood plain extent.	To enable a better understanding of the effects of the proposed private plan change on riparian margins.	Unio comment: There is no requirement that the outer 10m be planted. The purpose of proposed provision is that a 10m riparian planting area be provided, and that where a stream has an average width of 3m or more, land is provided as esplanade reserve with a 20m width. Note that where stream impacts are proposed within the precinct as part of future resource consents, the outer 10m of an esplanade reserve may be subject to enhancement planting as offset. That would be subject to the specific outcomes of future resource consent processes. Some of the confusion here appears to be the italicised heading within the standard. Accordingly, we propose to amend that to read: *"Riparian margins and esplanade reserves"*	The SMP states "A minimum of 20m each side of the permanent stream would be proposed to be planted with Riparian planting". See SW1 for details.	*Riparian planting is proposed for a minimum of 10 meters on each side of the stream for widths less than 3 meters, and a minimum of 20 meters for widths greater than 3 meters. The stream banks have predominantly deteriorated due to stock movements. The proposed development involves removing the stock and redirecting runoff through communal wetlands to facilitate a slow discharge into the stream, expected to improve its health. SMP has been updated accordingly.*		
SW33	Planning	• The 'Silverdale West Precinct' does not include a planning map with all the water bodies that are to be protected. Please include a planning map with details on all the water bodies and associated riparian margin and any other natural features that are to be protected, this should be referenced in the precinct provision.	To enable a better understanding of the effects of the proposed private plan change on the stream network.	Unio comment: Precinct Plan 1 shows the intermittent and permanent streams with 20m riparian / esplanade areas, but not the wetland as wetlands are dynamic, changing environments and are therefore best reviewed at the time of development. Wetlands will be defined and delineated at the time of resource consent applications, along with an assessment of the potential adverse effects (and protection and restoration) that is proposed.	Need to include the proposed stormwater wetlands in the precinct as well as in the SMP to ensure the locations for the proposed stormwater wetlands are protected, see SW5 for details.	*- Indicative locations of proposed communal wetlands hare shown on the catchment plan Drawing 30001.* *The sub-catchments may be altered through the design phase, as such, locations and numbers of proposed wetlands may change. We can state in the precinct provisions as communal wetlands are to be proposed at downstream prior to discharge into the stream for treatment and detention purpose.*		
SW34	Planning	• Table IX6.8.1 outlines Flood management work within Stage 1, however it is unclear what this is as it is not specified in the precinct provision. Please specify what this is and reference the proposed SMP. However, there are concerns about the flood management proposed in	To enable a better understanding of the effects of the proposed private plan change on flood management.	Unio comment: The flood modelling undertaken by Civix shows that it is possible to mitigate effects on upstream and downstream properties. The provision sets out the performance requirement (i.e., that there is no net increase in flood risk to upstream and downstream properties), and details timing of those works, but does articulate precisely how that	There must be clear guidance that at the subdivision and development stage the developers demonstrate compliance with the adopted stormwater management plan. Any communal device and stream works is required to be constructed before subdivision and development occurs. The SMP needs to be clear on what stormwater management/flood	SMP can change over time. Proof of concept needed, robust basis for proceeding with urbanisation in accordance with precinct plan and zoning, but detail is flexible (and ultimately a HW decision).	6.2.8 Development staging Please include general information on the stormwater management devices that will be require for stage 1 and stage 2, as it is important the stormwater management devices are in place before subdivision and development to manage effects. Stage 1 will need to have	Staging will be carried out in sub-catchments, with each sub-catchment incorporating a communal wetland as it is developed. The specific details will not be known until the detailed design phase. At this stage, we can only commit to performance levels and criteria.

		the SMP, see comments above under 'Flood management'.		outcome is to be achieved. That is because there should be flexibility to manage those effects. The SMP simply acknowledges that these effects can be managed, with one method proven effective.	management/stream work are in Stage 1 and Stage 2. Table IX.6.8.1 could reference the SMP to provide guidance and clarity.		stormwater wetland and throttle stream, Stage 2 will need to have stormwater wetlands etc.	
SW35	Planning	• Please include under IX.9 Special information, a requirement for stream and stabilisation plan assessment for any land modification, development and subdivision which adjoins a permanent or intermittent stream.	To enable management of the effects of the proposed private plan change on stream health and erosion.	Unio comment: Agreed that this can be provided.	Please include (a) "…stabilisation plan assessment <u>to inform the type and scale of instream work required to ensure the effects from the development is managed and there is resilience to any effects of future flow</u>. (b) <u>Any stream work is of a standard that will allow the stream to progressively improve over time where it is degraded.</u> This will provide clarification for the outcome sort from any stream works.	*Noted*	Noted	
SW36	General	Note: The Section 32 report outlines that infrastructure can be provided privately by the applicant to ensure the development of the proposed private plan change area. Development should not occur until the stream is restored, as the stream will not be able to cope with the change in land use and will continue to degrade. Healthy Waters has conducted several investigations along John Creek and Weiti Stream. There are stream enhancement opportunities in the area that will have catchment wide benefit. Healthy Water would be keen to explore opportunities for collaboration with the applicant.		Unio comment: We disagree with this comment. The effects of development will be managed progressively through subdivision and development processes and in accordance with the adopted SMP.	The SMP states that works to manage stream erosion would be more cost effective prior to the implementation of subdivision and development. This needs to be clearly outlined in the SMP and precinct provision. See SW1. SW15 and SW34 for details.	*- See updated SMP*		

Precinct Provisions

The underline text is what is recommended to be added to the precinct provisions Note Appendix 3 Silverdale west Industrial Precinct has been amended to include these suggestions)

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- IX.3 Policies

Stormwater management and ecology

Immediate remediation of the stream is required to ensure that the stream does not enter further degradation trends. Appropriate hydrology mitigation in response to development within the plan change area is required to ensure erosion is not exacerbated at a catchment wide scale. To ensure the health of the stream and not exacerbate stream erosion any stream works required need to occur before subdivision and development.

Utilise in stream works on streams, including bed and bank stabilisation, to provide habitat improvement, resilience to increase flows and capacity for stormwater runoff management within the stream channel, and will occur before subdivision and development.

The SMP outlines up to 14 stormwater wetlands and associated structures are to be public. A policy that recognises this will help to ensure the stormwater management infrastructure are in place.

The location, sizing, design, and construction of stormwater infrastructure to be vested to Auckland Council will occur before subdivision and development and will be in accordance with the requirements of the network utility operator.

- IX.4 Activity table

It is recommended to include an activity that relates to compliance with Standard IX6.10 Stormwater quality

Subdivision and/or development that does not comply with Standard IX6.10 Stormwater quality - Discretionary

- IX6.2 Streams and natural inland wetlands

It is recommended that the riparian margin as stated in IX6.2(1) are planted on either side to a minimum width of 20m, given the stream characteristics in the plan change area.

Any ecological off setting as stated in IX6.2(2) needs to occur prior to subdivision and development to ensure any stream works are in place to protect the stream from further degradation.

The ecological enhancement works must occur before subdivision and development.

- IX.6.3 Yards

The riparian yards also provide flood mitigation, please include this in the purpose for Yards, as riparian yards are also flood plains in this plan change area.

Riparian yard in Table IX6.3.1 Yard setback should be 20m from the edge of a permanent and intermitted stream, unless there is site specific information that a smaller setback is sufficient to protect the health of the stream.

- IX6.10 Stormwater quality

Please include 'John Creek' … *enhance the health and ecological values of John Creek and the receiving environment.*

Recommended to use in accordance rather than be consistent … *development and/or subdivision must be in accordance with the stormwater management plan …*

- IX8.1. Matters of discretion

IX8.1.(3) should also include *effects on stream bed and bank stabilisation and erosion*.

IX8.1.(9) all matters in the SMP should be assessed, including stream health. However, it is recommended IX6.10 Stormwater quality be a discretionary activity, this will allow all matters to be assessed and include all matters in the SMP.

- IX.9 Special information requirements

Riparian planting needs to ensure the plants are resistant to flooding and do not increase flooding and stream erosion.

Stream stabilisation plan needs to include quality work that will have long term benefit for the stream.

IX9.(5) (a)"…stabilisation plan *assessment to inform the type and scale of instream work required to ensure the effects form the development is managed and there is resilience to any effects of future flow*.

(b) Any stream work is of a standard that will allow the stream to progressively improve over time where it is degraded.