Memo

TO	Gina Sweetman
COPIED TO	Kate Purton
FROM	David Wilson
DATE	24/06/2022
SUBJECT	PPC 28 Maitahi & Bayview – Technical Assessment - Water Sensitive Design Addendum

Scope of Review

1. This memo is an addendum to my Technical Assessment - Water Sensitive Design memo, which summarised the findings of my water sensitive design review of several documents prepared in support of Private Plan Change request 28 Maitahi & Bayview (PPC28) and a site visit conducted on 16 May 2022.
2. The scope of the review covered the following:
    a. A determination as to whether the water sensitive design aspects of PPC28 can be considered to be complete, correct, adequate, appropriate, technically robust and fit for purpose, that is that they demonstrate the proposal will help promote sustainable management of the environment;
    b. The consistency of PPC28 with any relevant water sensitive design requirements and directions of, or relating to, any national policy statement, the Nelson Resource Management Plan (NRMP) and any relevant non-statutory policy or plan of Nelson City Council;
    c. Comment on proposed policies, rules and other methods relating to water sensitive design; and
    d. The appropriateness of PPC28 based on the above.

Basis of the review

3. The following documents were consulted in undertaking the preparation of this addendum:
    - Evidence Documents prepared in support of PPC28
        - Planning Evidence of Mark Lile;
        - Proposed provisions attached to Mark Lile's evidence;

- Water Sensitive Design Evidence of Stuart Farrant;
- Graphic Attachments attached to Tony Milne's evidence; and
- Stormwater Management Report attached to Maurice Mills evidence.

4. I have also discussed PPC 28 Applicant's Experts' Evidence with the Council's Planning, Ecology, Landscape, Urban Design, Erosion and Sediment Control and Stormwater s42A experts.

Structure of addendum

5. My addendum considers the following Water Sensitive Design matters:
    a. Updated Structure Plan review;
    b. Stormwater Management Plan review;
    c. The proposed lower Kākā stream realignment;
    d. Location of stormwater management devices; and
    e. Recommendations.

Updated Structure Plan Review

6. From discussions with the Council's Landscape expert, Mr Girvan, there is some uncertainty about what the Revegetation Overlay in its current form will achieve. Mr Girvan's addendum states that his understanding of the intent is to "ensure 100% native vegetation cover will occur ". If the intent of Revegetation Overlay was achieved, and it prohibited pastoral activities, prevented vegetation clearance and resulted in the revegetation of this area, I agree with Mr Farrant that this could be considered a positive Water Sensitive Design outcome. The Rural Zoning alone would not prevent grazing or vegetation clearance of these areas.

7. It is still unclear to me the level of multidiscipline Water Sensitive Design that has gone into the Structure Plan. The Environmental or Development Frameworks, as described in paragraph 34 of my original review, have not been provided. These are accepted multidiscipline methods for demonstrating that a multidiscipline approach has been used to develop Structure Plans.

8. A specific concern with the Structure Plan is the limited extent of the freshwater network shown on the Structure Plan, as mentioned in paragraph 31 of my original 42A memo and highlighted in Council's Ecology Expert Dr Blakely's Addendum. The lack of this information reduces the certainty that the Water Sensitive Design principle of protecting and enhancing the values and functions of natural ecosystems will be achieved.

Stormwater Management Plan Review

9. I agree with the statement in paragraph 26 of Mr. Farrant's evidence that

The stormwater management plan has considered the existing best practice guidance in the Nelson Tasman Land Development Manual 2020 (NTLDM) (including GD04) and the objectives and policies within the Nelson Resource Management Plan (NRMP) but it is noted that these existing documents are not considered to provide an optimal level of environmental protection.

10. The Stormwater Management Plan (SMP) does provide additional measures to achieve the "optimal environmental protection". However, I am concerned about both some of the wording in the SMP and how it will be applied through the proposed provisions.

11. Firstly, there is frequent use of "where feasible" within the SMP, this is a greenfield site, and for example, I consider that it would always be feasible to minimise the generation of contaminants through control of building materials. The use of "where feasible" introduces a level of uncertainty as to the outcome the SMP will have.

12. Secondly, the wording for the requirements for retention of at least 5mm runoff depth has been taken from the E10. Stormwater management area – Flow 1 and Flow 2 of the Auckland Unitary Plan. There has been no work to establish if the Auckland criteria and approach are the appropriate on-lot hydrological mitigation for this site.

13. It is unclear to me how the proposed provisions will ensure that the optimal level of environmental protection is achieved. As I understand it, a SMP is required to be produced for each subdivision, and the development needs to be consistent with this SMP. There is no requirement to follow a whole of site SMP. There is also no certainty from the proposed provisions as to what the content of a SMP is to be.

14. As an example, the use of SMP's in Auckland is based around a specified template (appended to this memo) that allows the SMP to evolve through the Structure Plan, the Plan Change and the Subdivision stages. Specific sections of the template that are filled out as detailed design are completed, as the follow extract from the template states

    The SMP should be prepared, reviewed and updated in line with the Structure plan/Subdivision design process. It may need to build on the outcomes from any relevant earlier versions by refining the stormwater management approach according to the level of information and data available at the time of preparation. As the design of specific development areas commences, the SMP will need to be revisited to confirm methods of stormwater management are updated to reflect latest available data sets."

15. The earlier iterations of an SMP enable the consideration of the catchment-wide issues which ensures that sub-catchments are developed is in accordance with the catchment wide requirements. However, as stated in Ms Purton's, Council's Stormwater s42A Expert, report, the lack of an overarching SMP can *"lead to problems with stormwater and flood risk management through the development stage, and to leave councils with residual issues to address once vested".* The proposed provisions do not achieve this outcome, as the provisions enable the

preparation of a new SMP for each development without the need to consider the catchment-wide stormwater solutions.

16. The stormwater principles listed in Policy RE6.3 includes principles that I would not expect to see in an SMP. The following are what I would consider typical SMP principles:

    - Recognise the key constraints and opportunities on site and in the xxxxx catchment
    - Devise an integrated stormwater management approach to facilitate urban development
    - Develop a set of best practicable options for stormwater that can be incorporated into the development
    - Emphasise a water-sensitive design approach that:
        a. manages the impact of land use change from rural to urban
        b. protects and enhances stream systems and natural hydrology
        c. mitigates for hydrological changes and manages flooding effects
    - Minimise the generation and discharge of contaminants/sediments into sensitive receiving environment of the xxxxxx
    - Protect key infrastructure, people and the environment from significant flooding events

The proposed lower Kākā stream realignment

17. From a Water Sensitive Design perspective, there are limited positive effects to realigning the Lower Kākā stream. This assessment is based on the key Water Sensitive Design Principles outlined in GD04 and the input from the Council's s42A experts.

18. In terms of protecting and enhancing the values and functions of natural ecosystems, the realignment of the modified lower Kākā Stream is a neutral outcome because the stream could be "restored" on its current alignment.

19. In terms of promoting inter-disciplinary planning and design, the realignment could be considered a slightly positive outcome as:

    a. There is no landscape or natural character driver to move or retain the existing modified stream alignment;

    b. There is no flood hazard driver to move the stream as the impacts of filling the floodplain are equivalent on either alignment; but

    c. The realignment of the modified stream does enable positive urban design outcomes to be achieved, as discussed in Mr McIndoe's s42a addendum.

20. Mimicking natural systems and processes for stormwater management could be achieved without realigning the stream. The realignment of the stream is not required to enable the use of constructed wetlands or bioretention devices.

Location of stormwater management devices

21. Figures 2 and 3 of the SMP Figures show Stormwater Detention facilities located within the Kākā stream and Stormwater Treatment devices located within the Open Space Zone.

22. Detention structures should only be located within the stream corridor if a best practical options process has been followed and it is established by a multidisciplinary team that the stream is the best location to provide these devices. Locating detention within the stream corridor should be avoided if possible. Detention can, for example, be provided in oversized pipes or underground tanks placed within road corridors.

23. Any detention structure located within a stream would have to be designed in accordance with the fish passage requirements of the National Environmental Standard for Freshwater.

24. Stormwater treatment devices may be located within the Open Space Zone but should not be in the Riparian Margin as they will require ongoing inspection and maintenance. Based on discussions with the Council's Ecological expert these activities are not appropriate for the Riparian Margin.

Conclusions

25. The existing and proposed plan provisions together still do not provide sufficient control on future subdivision to ensure Water Sensitive Design outcomes are achieved.

26. The SMP provisions need to be revised to ensure that the contents of the SMP are clear and that an accepted catchment-wide SMP is used as the basis for all future subdivisions.

27. I note that Ms Purton, the Council's Stormwater Expert, considers that "There is still insufficient information to understand the effects of future development should the site be rezoned through PPC28, the proposed stormwater and flood risk management system, and whether this is adequate to mitigate the effects on the receiving environment." Further to this, I have seen no evidence that a multidisciplinary best practical options detention assessment has been completed to establish that detention structures are required in the stream corridors.

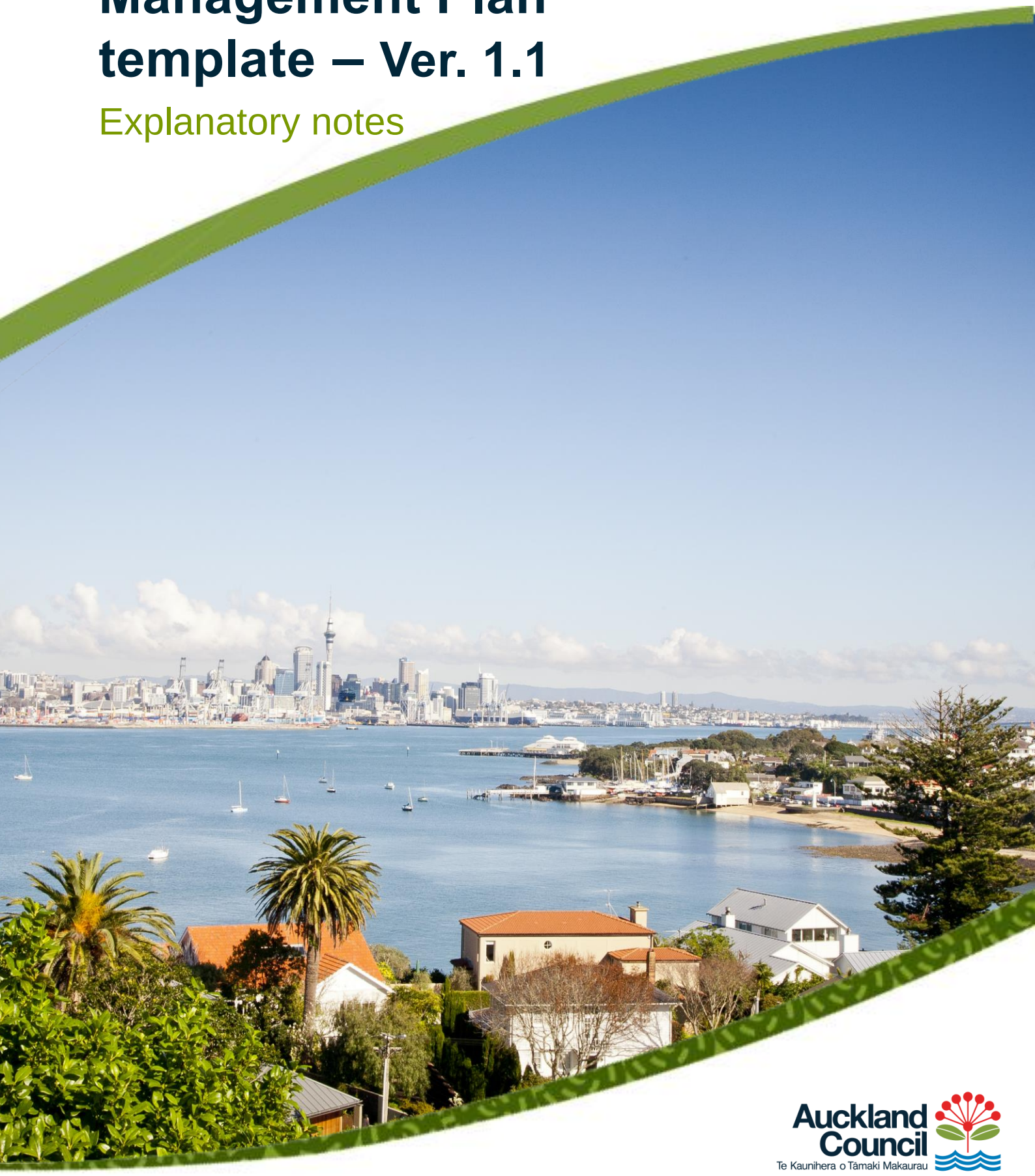
28. If the Revegetation Overlay provisions are revised as per the Council’s Landscape and Ecological Experts’ addendums, so that they achieve the stated intent, this would achieve a positive Water Sensitive Design outcome.

29. Provided recommended changes are made to the provisions regarding the SMP and revegetation overlays and that an acceptable SMP can be provided, I consider that the updated Structure Plan, with the additional overlays and the SMP, could ensure that the Structure Plan area is developed in a Water Sensitive Design manner.

Appendix 1: Auckland Council’s Stormwater Management Plan template – Ver. 1.1 (with Explanatory notes).

Stormwater Management Plan template – Ver. 1.1

Explanatory notes



Auckland Council
Te Kaunihera o Tāmaki Makaurau

Purpose of the Stormwater Management Plan

- *A Stormwater Management Plan should demonstrate that the proposed stormwater management is the best practicable option, taking into consideration the existing site features.*
- *The plan should present water sensitive design applications and the proposed development layout.*
- *If applicable, the plan should assess how the proposed stormwater management meets the criteria set out in the regionwide Network Discharge Consent, or any departures, with a justification.*
- *Ultimately, the plan will be used to inform future development at the site for private entities and Auckland Council regulatory staff.*

The Stormwater Management Plan (SMP) sets out the stormwater management for the proposed development area. It demonstrates that the stormwater management approach for large scale development is the Best Practicable Option (BPO) and seeks to protect te mauri o te wai *(the life supporting capacity of water)*. The stormwater management should meet the requirements, objectives and outcomes of the NDC, together with the Code of Practice, GD01 and GD04.

Healthy Waters will work collaboratively with applicants to establish the BPO for the site which will also ensure that any infrastructure will also be appropriate.

SMPs that meet these outcomes and requirements can be adopted into the NDC which means that the stormwater diversion and discharge from the development will be authorised under the council's NDC.

Key Considerations

The BPO for stormwater management should be identified in, and developed through, the SMP, taking into consideration:

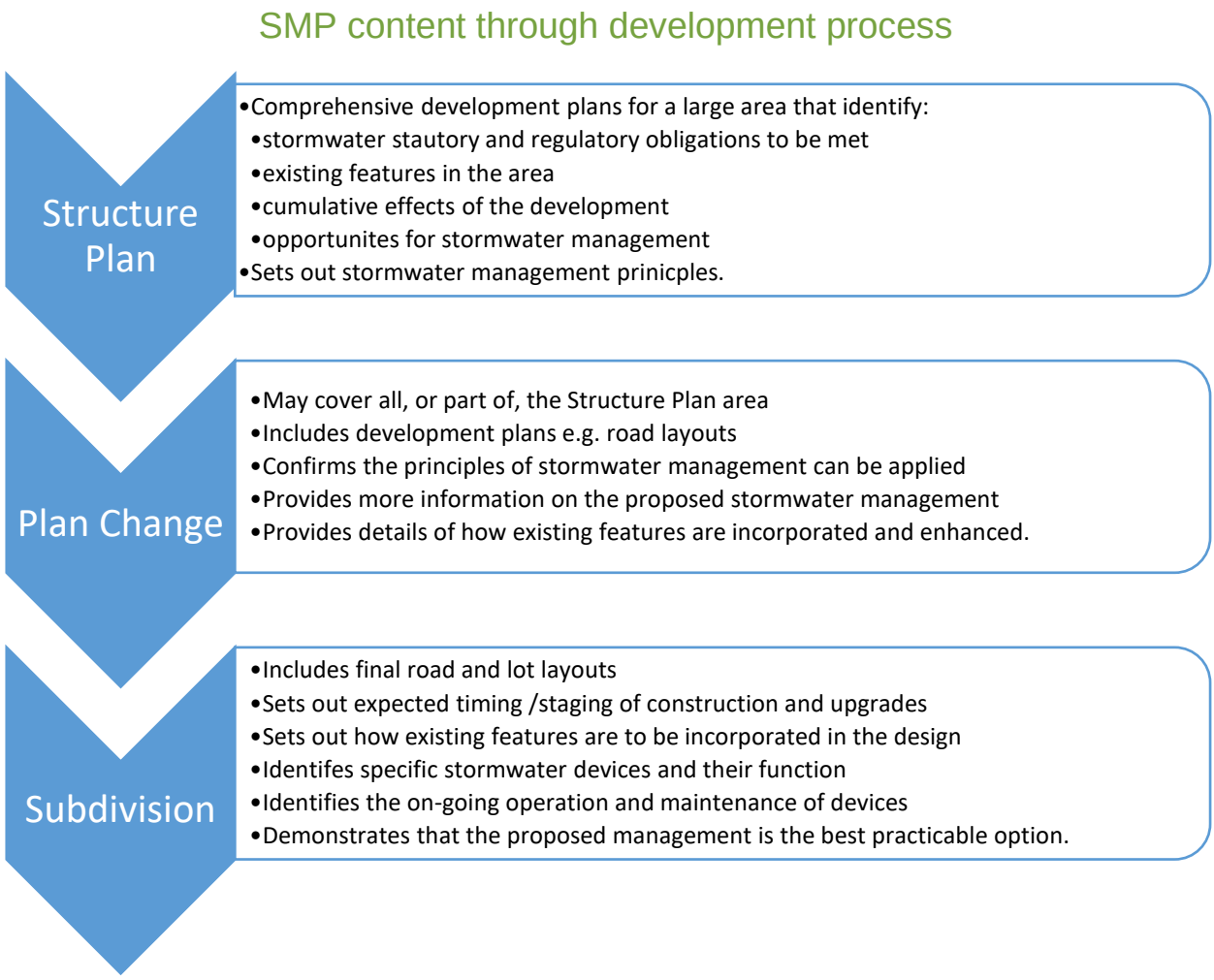
- The existing hydrological and environmental features of the area
- Appropriate scaling of Water Sensitive Design applications that meet management requirements to integrate with the proposed urban form of the development.

The SMP should be prepared, reviewed and updated in line with the Structure Plan/Subdivision design process. It may need to build on the outcomes from any relevant earlier versions by refining the stormwater management approach according to the level of information and data available at the time of preparation.

As the design of specific development areas commences, the SMP will need to be revisited to confirm methods of stormwater management are updated to reflect latest available data sets.

The stormwater management of a development should incorporate the Water Sensitive Design (WSD) principles that are set out in the Auckland Council Guideline Document 04 Water Sensitive Design Guide (GD04) and take into account te ao Māori (worldview) through engagement with mana whenua.

To identify and promote the BPO for stormwater management it is critical that the underlying principles of WSD be clearly stated for the development area as early as possible, and prior to the road layout design. This approach will allow the incorporation of features into the development layout, resulting in better environmental outcomes as well as amenity aspects for future residents. The approach of developing the stormwater management in isolation to the development layout is not acceptable as this often results in poor long-term outcomes, particularly for the environment.



Production of the SMP to support development needs to be prepared by a professional who understands the concepts of WSD and has sufficient data to enable a robust assessment can be made of the existing site.

Stormwater Management Plan resources

- *A range of information sources will need to be used in preparing the Stormwater Management Plan*
- *These resources enable the development of robust, long-term sustainable stormwater management to achieve the best practicable outcomes from a development.*

Technical and design guides

Auckland Council has a suite of regulatory and guideline documents and examples of good stormwater management practice. They are available on the Auckland Design Manual (http://www.aucklanddesignmanual.co.nz). Examples of these resources include:

- **Stormwater Management Devices in the Auckland region (GD01)**
  - http://content.aucklanddesignmanual.co.nz/regulations/technical-guidance/stormwatermanagement/Documents/GD01_SWMD.pdf
  - This guideline document, Stormwater Management Devices in the Auckland region (GD01), provides detailed design considerations aligned with the Auckland Council philosophy of stormwater management. Cultural values, social needs and natural features are considered integral to the functional design of the stormwater network

- **Water Sensitive Design Guide (GD04)**
  - http://content.aucklanddesignmanual.co.nz/regulations/technical-guidance/Documents/GD04 WSD Guide.pdf
  - Provides guidance on the use of water sensitive design (WSD) in land use planning and land development, with a focus on stormwater and freshwater management.

- **Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland region (GD05)**
  - http://content.aucklanddesignmanual.co.nz/regulations/technical-guidance/Documents/GD05 Erosion and Sediment Control.pdf
  - Provides technical guidance for the selection, design and use of erosion and sediment control practices and measures for land disturbing activities in an Auckland context.

- **Auckland Council Code of Practice for Land Development and Subdivision (CoP)**
  - http://www.aucklanddesignmanual.co.nz/regulations/codes-of-practice
  - Chapter 4 of the CoP provides details on stormwater requirements for stormwater infrastructure design and construction.

The Auckland Unitary Plan

In addition to the technical requirements for stormwater infrastructure application and design, the Auckland Unitary Plan (AUP) should be used to define land uses, maximum impervious areas and other planning constraints. Precinct chapters can also include specific stormwater requirements where these have already been defined.

- Chapter D Overlays, particularly relating to aquifers, streams, Significant Ecological Areas and Sites and Places of Significance to Mana Whenua.
- Chapter E1 Water quality and integrated management
- Chapter E3 Lakes, rivers, streams and wetlands
- Chapter E4 Other discharges of contaminants
- Chapter E8 Stormwater – Discharge and diversion
- Chapter E9 Stormwater quality – High contaminant generating car parks and high use roads
- Chapter E10 Stormwater management area – Flow 1 and Flow 2
- Chapter E26 Infrastructure
- Chapter E36 Natural hazards and flooding
- Chapters E38 and E39 Subdivision
- Chapter H Zones (in particular maximum impervious areas)
- Chapter I Precincts

The full Auckland Unitary Plan text can be found at:

- http://unitaryplan.aucklandcouncil.govt.nz/pages/plan/Book.aspx?exhibit=AucklandUnitaryPlan_Print

Regionwide Network Discharge Consent

The regionwide Network Discharge Consent (NDC) is a single, regionwide consent that is held by Auckland Council's Healthy Waters department.

The consent authorises the diversion of stormwater through the public stormwater network and the discharge of that stormwater into receiving environments. Receiving environments include land, rivers and streams, wetlands, lakes, groundwater aquifers and the Coastal Marine Area.

The scope of the NDC covers:

- existing diversions and discharges to and from the public stormwater network within the urban area
- future diversions and discharges that result from the extension of the public network to service intensification and greenfield growth
- new or modified diversions and discharges that result from the upgrading of the public network.

The consent provides a process for considering how to manage new discharges from the public network by specifying the stormwater management requirements in different scenarios. It requires the preparation of bespoke stormwater management plans for development sites.

Schedule 4 of the NDC sets out the requirements for stormwater management for development and outlines when an SMP needs to be prepared and what should be addressed where an SMP is being prepared in that context.

An SMP prepared for approval under the NDC must detail the Best Practicable Option and address:

- The management approach and key elements including:
    - areas of development, including roads and reserves
    - location of vested infrastructure, including green infrastructure (note that assets located in the road corridor also require approval of Auckland Transport)
    - areas of on-site and communal (public) stormwater management
    - significant site features and hydrology
    - protection and enhancement of te mauri o te wai (the life giving capacity of water)- how the connection/vesting requirements below are met or the alternative that is proposed.
- An assessment, which includes detail that demonstrates the scale and significance of the effects of the proposal, how an Integrated Stormwater Management Approach has been adopted in the design and associated stormwater management in accordance with the policies in the AUP Sections E1.3, B7 and B8 to:
    - minimise the stormwater related effects of development
    - retain/restore natural hydrology as far as practicable
    - minimise the generation and discharge of contaminants (including gross stormwater pollutants) and stormwater flows at source
    - minimise temperature related effects
    - enhance freshwater systems including streams and riparian margins
    - minimise the location of engineered structures in streams
    - protect the values of Significant Ecological Areas as identified in the Auckland Unitary Plan.
- Any stormwater plan prepared as part of a relevant structure plan.

Schedule 4 also provides specific requirements for stormwater management including:

- water quality
- stream hydrology
- flooding
- stormwater assets.

Any SMP must be consistent with the objectives and outcomes in Schedule 4.

Guidance and information relating to the NDC can be found at:

- www.aucklanddesignmanual.co.nz/ndc

Other resources

- Catchment Management Plans
    - The Auckland region has been divided into hydrological stormwater catchments draining to 10 consolidated receiving environments (CREs). Many of these stormwater catchments have published Catchment Management Plans (CMP) covering at least some of the land contained within the drainage boundary.

    - The CMPs set out, at a catchment level, the overall stormwater management approach and core infrastructure required for the long-term sustainable stormwater management. These may include:
        - specific treatment required and areas required for it
        - areas required for stormwater conveyance and culvert upgrades required to enable conveyance of the 1% AEP
        - flow attenuation devices to be constructed / attenuation required
        - overland flowpaths and 1% AEP floodplains, flood sensitive and flood prone areas.

    - Some of the existing CMPs can be dated and the recommendations for stormwater management have been superseded by the requirements of the Auckland Unitary Plan and current WSD principles set out in GD04.

- Stormwater Management Plans
    - For more recent structure plans and plan change areas, an SMP may already have been prepared at the higher level. This document will provide the guiding stormwater management principles that are required for the site design.
    - SMPs prepared for neighbouring sites, or sites within the same catchment boundary as the current development can also be used as reference material for the SMP being prepared.
    - SMPs which have been adopted into Auckland Council's regionwide Network Discharge Consent will be available to view through the GeoMaps GIS viewer.

- Flood hazard mapping
    - Auckland Council has undertaken a programme of catchment modelling to identify the overland flowpaths, floodplains, flood sensitive and flood prone

areas. This is an ongoing programme and the outputs are useful for SMP production through identifying key hydrology and hydraulic connectivity through the development area.

- Auckland Council GeoMaps GIS Viewer
    - The online GIS viewer presents a wide range of information that can be used to prepare the SMP. This data includes details of public and private stormwater infrastructure, flowpaths and floodplains and Unitary Plan layers.
    - The content of the GIS viewer is particularly useful at the Structure Plan and Plan Change level SMPs, where site specific investigations have not been completed and the higher level WSD principles are being presented.
    - GeoMaps is located at: https://geomapspublic.aucklandcouncil.govt.nz/viewer/index.html.

- Auckland Council Healthy Waters Catchment Planning
    - Healthy Waters Catchment Planners can provide guidance and assistance in the development of the SMP and historical catchment knowledge.
    - They will be able to provide the latest flood hazard mapping information and CMPs / SMPs where they are published and current.
    - To ensure the correct Catchment Planner is assigned to the development please email HWDevelopment@aucklandcouncil.govt.nz stating the site address and the information that is required.

- Auckland Council Stormwater Bylaw
    - Regulates land drainage throughout the region
    - The Stormwater Bylaw (2015) is located at: https://www.aucklandcouncil.govt.nz/plans-projects-policies-reports-bylaws/bylaws/Documents/stormwaterbylaw2015.pdf.

- Iwi Management Plans
    - Some iwi have made their management plans available for their rohe. These plans begin to provide some understanding of iwi aspirations and values for these areas and provide a good starting point for engaging with mana whenua.
    - These plans can help to align with cultural values and identify where further work will be required together with mana whenua.
    - Other iwi authorities do not have a publicly available plan, however, understanding the cultural values that are important to give effect to can be achieved through the engagement process detailed in Chapter 3.

How to use this explanatory document

- *Although the Stormwater Management Plan will be area / site specific, the overall structure of the document will follow the same principles of protecting the natural drainage patterns and the natural environment.*

Structure

The SMP template provides guidance on required content, overall structure and outcomes related to the management of stormwater and development while enabling plans to be site and scenario specific.

This SMP explanatory document comprises the following chapters:

	Section name	Comment
	Purpose of the Stormwater Management Plan	Delete in final SMP document
	Scalability of the Stormwater Management Plan	
	Stormwater Management Plan resources	
	How to use the explanatory document	
	Document control	Replaced with author's document control page
	Executive summary	To be completed in SMP
1	Development summary and planning context	
2	Existing site appraisal	
3	Mana whenua : Te ao Māori and mātauranga	
4	Stakeholder engagement	
5	Proposed development	
6	Stormwater management	
7	Departures from regulatory or design requirements	
8	Conclusions and recommendations	
	Appendices	

If any heading is not relevant to the scale of the development, please add the text '*****Not applicable within this SMP*****' under the relevant heading**.**

This Stormwater Management Plan Template explanatory document is presented in an Auckland Council report format. This format does not need to be used in the final SMP submitted to Auckland Council.

Document Control

- *Insert your own document control into this section.*

Purpose

Purpose	• **To provide a template and explanatory text that is to be used by developers and their agents in the preparation of stormwater management plans.** • **For consultation with industry**

Document

Document Name	**Stormwater Management Plan Template - Guidance Notes**

Version History

Ver. 1	**October 2019 – for consultation with industry**
Ver. 1.1	February 2021 – correction of minor errors, clarification in flooding sections, additional references to te mauri o te wai

Approval for Ver. 1

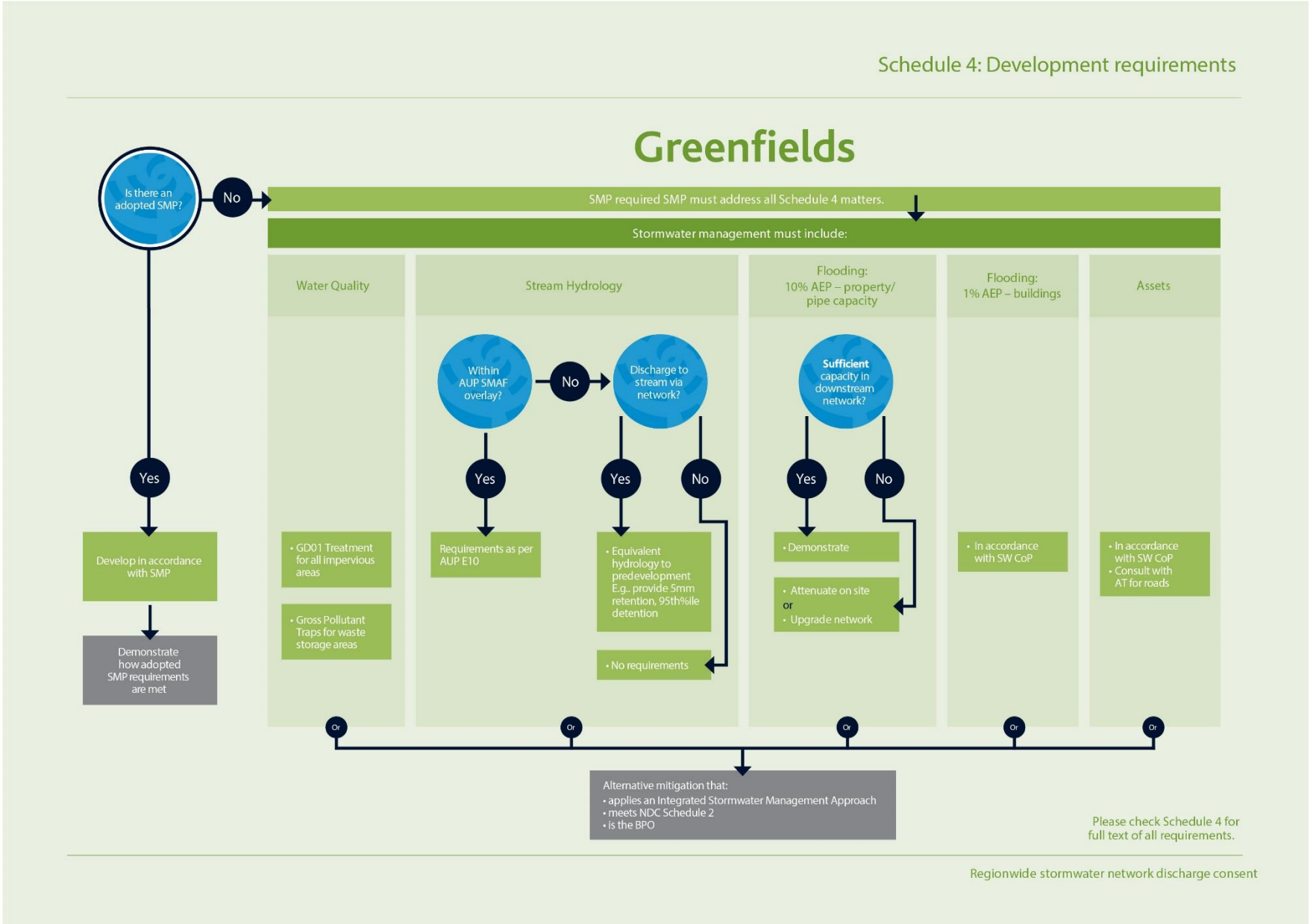
Author of the Stormwater Management Plan		
Reviewed		Date:
Approved		Date:

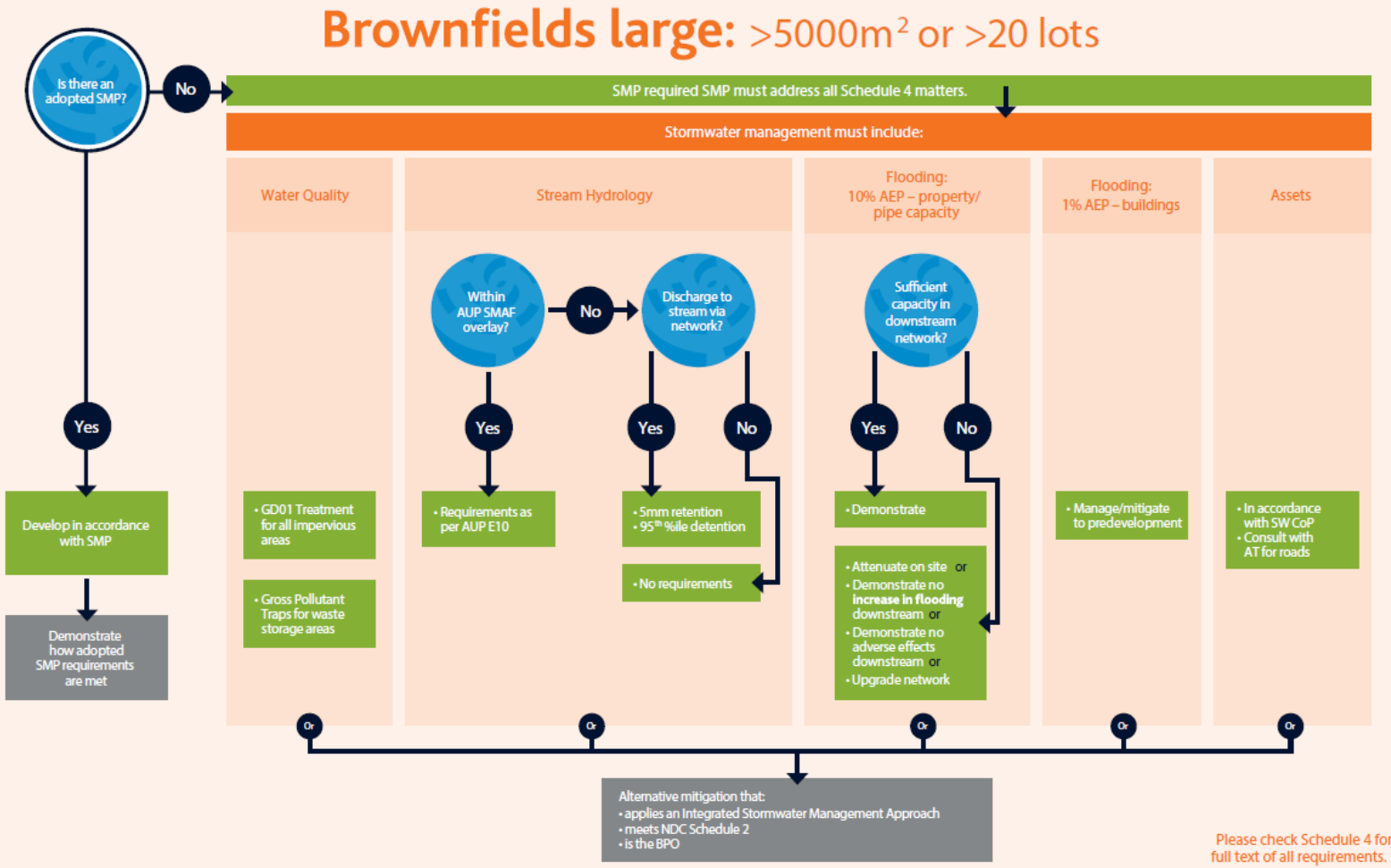
Feedback

As part of the continuous improvement process, Auckland Council welcomes feedback from those using this template.

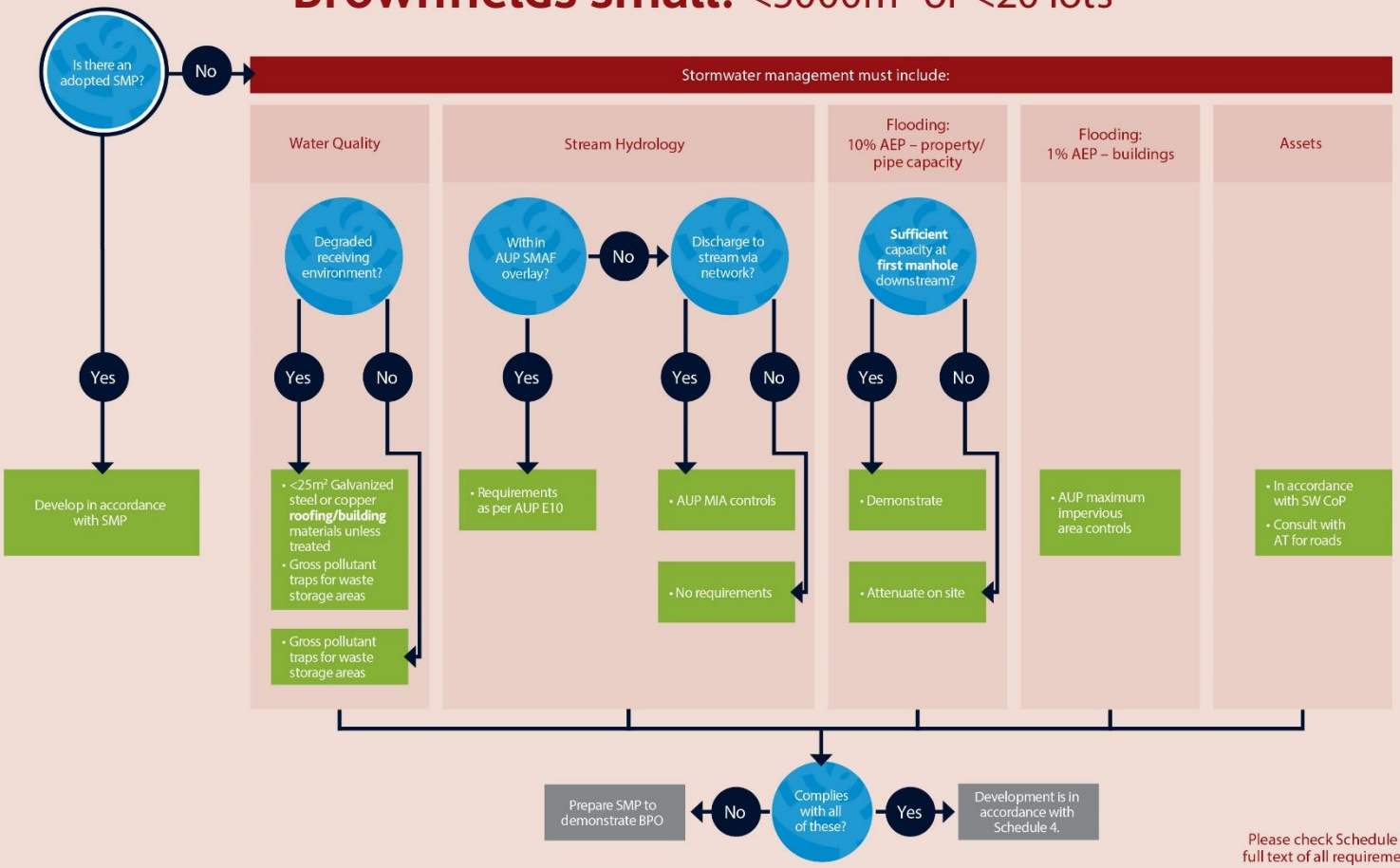
To provide feedback on the SMP template and this explanatory document please email Auckland Council at the following address: HWDevelopment@aucklandcouncil.govt.nz.

Is a Stormwater Management Plan required for your development?




Brownfields large: >5000m² or >20 lots
Is there an adopted SMP?
No
SMP required SMP must address all Schedule 4 matters.
Stormwater management must include:
Water Quality
Stream Hydrology
Flooding: 10% AEP – property/ pipe capacity
Flooding: 1% AEP – buildings
Assets
Within AUP SMAF overlay?
No
Discharge to stream via network?
Sufficient capacity in downstream network?
Yes
No
Develop in accordance with SMP
Demonstrate how adopted SMP requirements are met
• GD01 Treatment for all impervious areas
• Gross Pollutant Traps for waste storage areas
• Requirements as per AUP E10
• 5mm retention
• 95th %ile detention
• No requirements
• Demonstrate
• Attenuate on site or
• Demonstrate no increase in flooding downstream or
• Demonstrate no adverse effects downstream or
• Upgrade network
• Manage/mitigate to predevelopment
• In accordance with SW CoP
• Consult with AT for roads
Or
Alternative mitigation that:
• applies an Integrated Stormwater Management Approach
• meets NDC Schedule 2
• is the BPO
Please check Schedule 4 for full text of all requirements.

Brownfields small: <5000m² or <20 lots



Please check Schedule 4 for full text of all requirements.

Table of contents

Executive summary 16
1 Existing site appraisal 17
2 Development summary and planning context 26
3 Mana whenua: Te ao Māori and mātauranga 27
4 Stakeholder engagement and consultation 28
5 Proposed development 29
6 Stormwater management 31
7 Departures from regulatory or design codes 37
8 Conclusions and recommendations for future work 38
Appendix A – Plans of existing site features 39
Appendix B – Proposed development plans 40
Appendix C1 – Proposed stormwater management 41
Appendix C2 – Stormwater management selection process and assessment 42
Appendix C3 – Draft operation and maintenance 43

Executive summary

- *The summary should provide an overview of all relevant points within the main report body and appendices.*

The content of the executive summary should include, as a minimum, the following information:

- general site description and location plan, the stormwater catchment and the type of development proposed
- identify existing catchment management plans or stormwater management plans that have formed the basis of the SMP
- identify key existing site features on a plan
- the proposed development and how its layout incorporates the natural features into the urban design
- provide the overarching stormwater management principles, together with tabulated stormwater infrastructure, purpose and why this is required
- provide details of stormwater management works to protect and enhance the existing natural features in the final development layout
- outline how the principles and works will be applied to protect and enhance te mauri o te wai
- provide details of engagement with mana whenua and their position
- identify future work or investigations that are required to confirm the applicability of the proposed stormwater management.

1 Existing site appraisal

- *This existing site should inform the design of the development layout*
- *Appraising the existing site area is critical to determining:*
    - *potential stormwater management constraints and opportunities*
    - *water sensitive design approach*
    - *impact on cultural values and landscape*
    - *urban layout of the proposed development.*
- *Use relevant images within the text and include suitable scale plans within the Drawings & Plans section of the SMP*.

1.1 Summary of data sources and dates

This section will provide the reader with a summary of the data sources to confirm that an appropriate level of assessment has been completed by the applicant.

It is recognised that during the early stages of structure plans and large plan change development, it is not always possible to have site specific investigations completed; however, Auckland Council GeoMaps and Healthy Waters Catchment Managers can provide data to support the appraisal process.

Existing site appraisal item	Source and date of data used
	Example text:
Topography	• Auckland Council supplied LiDAR, 20XX • Third party topographic survey, Survey Ltd, 20XX • Applicant acquired drone survey, 20XX
Geotechnical / soil conditions	• Auckland Council GeoMaps data, 20XX • Catchment CMP, author, 20XX • Applicant acquired site testing, 20XX
Existing stormwater network	• Auckland Council GeoMaps data, 20XX • Catchment CMP, author, 20XX • Site specific survey, 20XX • CCTV investigation, 20XX
Existing hydrological features	• Auckland Council GeoMaps Stream Layer, 20XX • Catchment CMP, author, 20XX • Auckland Council GeoMaps Treatment Device Layer, 20XX

Existing site appraisal item	Source and date of data used
	Example text:
	• Client acquired site survey, 20XX • Auckland Council Unitary Plan Viewer, significant ecological area layer, 20XX
Stream, river, coastal erosion	• Catchment CMP, author, 20XX • Auckland Council supplied data, 20XX • Applicant acquired site survey, 20XX
Flooding and flowpaths	• Catchment CMP, author, 20XX • Auckland Council GeoMaps overland flowpath layer, 20XX • Auckland Council GeoMaps floodplain layer, 20XX • Healthy Waters Catchment Planner supplied data, 20XX • Applicant acquired modelling, 20XX
Coastal Inundation	• Auckland Council GeoMaps coastal inundation layer, 20XX
Ecological / environmental areas	• Auckland Council Unitary Plan Viewer, significant vegetation layer, 20XX • Auckland Council Unitary Plan Viewer, significant ecological area layer, 20XX • Catchment CMP, author, 20XX • Applicant acquired site survey, 20XX
Cultural and heritage sites	• Auckland Council GeoMaps, cultural heritage site, 20XX • Applicant acquired site survey, 20XX • Mana whenua advice
Contaminated land	• Auckland Council supplied contaminated land information, 20XX • Client acquired site investigation, 20XX

1.2 Location and general information

Description:

Use the following table to present the existing site data. This is the minimum information that should be provided.

Figures:

For the structure planning of relatively large areas, a single plan may be sufficient to convey the location within a catchment. For smaller development areas, two plans or more may be required to provide clarity of the site location in the region and catchment.

Existing site element	
Site address	•
Legal description	•
Current land use	• Use of applicant's knowledge of the site • Aerials from GeoMaps and/or Google Earth
Current building coverage	• Provide a description of the total area occupied by buildings and ancillary structures.
Historical land use	• Use of applicant's knowledge of the site • Existing site-specific investigation data • Aerials from GeoMaps and/or Google Earth

1.3 Topography

This section should be completed using contour information provided on GeoMaps and / or site-specific topographic level survey information. Appropriate design of some stormwater infrastructure, particularly WSD applications, can be dependent on ground slope. Also, steep slopes can provide guidance on the suitability for development and the location of potentially vulnerable soils.

Description:

The description of the topography can be relatively brief. Include details of general topography, any high points and any low points noted. Although not always the case, low points can indicate the presence of a wetland or flood prone area, which should be taken in consideration at the layout stage.

Figures:

- Provide a plan illustrating the relevant contour information across the site to provide information about the terrain
- Provide a plan to identify ground slopes to provide guidance on considerations that are needed for the management of stormwater flows to minimise impacts downstream:
    - greater than 9%
    - between 5% and 9%
    - less than 5%

1.4 Geotechnical

The geotechnical assessment should consider:

- prevailing soil conditions

- underlying geology
- presence of aquifers
- proximity of groundwater to the surface
- impact of all these factors on potential construction methodologies.

Site investigations should be conducted to confirm:

- soil make-up
- infiltration rates for hydrology mitigation
- soakage potential for stormwater disposal to assist in determining methods of stormwater management for the development.

Geotechnical information is a good source of data for identifying potential soakage disposal fields, or areas where soakage is unlikely to be viable.

The Auckland Unitary Plan (AUP) SMAF1 and SMAF2 rules have been set according to infiltration rates in clay soils. The presence of moderately expansive soils with low infiltration rates does not eliminate the opportunity for retention via infiltration. The presence of unstable ground, such as Oneroa Chaos soils will require alternate retention solutions.

Description:

- Provide a brief overview of the soil types that are present on the site and their locations.
- Include a description of the subsoil makeup to an appropriate depth that will provide the reader with a greater level of understanding.

Figures:

- Provide a plan of the underlying soils and geology throughout the development area, including:
  - locations of any borehole
  - soakage or infiltration testing undertaken as part of the development proposals. Also include any test results as an appendix.

1.5 Existing drainage features and stormwater infrastructure

Identifying existing site drainage is essential to understand how the proposed development will interact with the natural hydrology. This will inform the best practicable stormwater management solution and identify the receiving environment.

This section should be completed with Section 1.6, Receiving environment, to accurately assess the routing of runoff from the site.

The assessment should also consider how stormwater drains through the development area from adjacent sites.

Description:

- Provide an overview of how runoff is conveyed through the existing site and interactions with adjacent sites and the immediate receiving environment
- Include descriptions of how runoff is conveyed and where it is conveyed
- Identify any constraints or opportunities in the stormwater network within the development boundary that should be considered and managed through the urban design process.

Figures:

- Provide a plan at an appropriate scale identifying the stormwater drainage network on the site and the immediate receiving environment. The plan should include location of drainage from adjacent sites conveyed through the development area.

1.6 Receiving environment

The receiving environment considers the location where runoff is discharged from the site all the way to the relevant Consolidated Receiving Environment (CRE), or the ultimate discharge from the wider catchment. The condition of the receiving environment will inform the most suitable methods of stormwater management for the proposed development.

To find out about the condition of the receiving environment check any Catchment Management Plans or Stormwater Management Plans and watercourse assessment reports. See page 9 for resources.

The watercourse assessment reports include:

- location of culverts / pipes in the main channel
- location where erosion is occurring and identify potential erosion sites
- results of any fish surveys and Stream Ecological Valuations (SEV)
- location of barriers to fish passage
- location and extent of stream enhancement opportunities.

The content of these reports can inform the development of the Best Practicable Option of stormwater management for the site.

If no report is available for the receiving environment of the development, a watercourse assessment will need to be undertaken.

Description:

- summarise the findings of the watercourse assessment report
- identify opportunities and constraints that may impact on the stormwater development for the site including factors such as
    - possible erosion risks
    - infrastructure upgrades
    - riparian planting or management.
- identify and describe any Significant Ecological Areas (SEA) adjacent to the site and downstream in the ultimate receiving environment.

- discuss the influence on the discharge criteria and the methods of stormwater management on site.

Figure:

- Include the location of stormwater discharge points from the site overlaid on the key results of the watercourse assessment report.
  Include location of SEA

1.7 Existing hydrological features

This section includes information about:

- natural streams
- wetlands and ponds in the development area
- significant stands of vegetation
- other site coverage that could impact on the generation of runoff.

For a subdivision application a specialist survey should be commissioned to classify any hydrological features on the site. However, at the structure planning level GeoMaps data extracts are likely to be sufficient.

GeoMaps does not currently show intermittent streams, but the overland flow path layer can help to determine likely locations of permanent and intermittent streams. A watercourse assessment report will identify the location and classification of streams on the site.

Intermittent streams form when there is a catchment of 1 to 2.5ha, depending on soil type (up to 5.5ha in sandy soils), so the 4,000m^2 to 3ha overland flow path is indicative of drainage features that require classification and represent a development constraint.

When using historic catchment management plans, be aware that the definition and naming conventions of the stream classifications have changed over time (e.g. intermittent / ephemeral, permanent / perennial).

Description:

- provide a description of the features that are located within the development boundary and beyond the boundary
- provide commentary on observations from on-site inspections
- discuss the quality of the existing features on the site and how these will inform the urban design and stormwater management.

Figure:

- provide a plan indicating the hydrology features of the site, including
  - extents of stream classification
  - wetland areas
  - other features that are relevant to the site assessment

- specific issues noted during the assessment (e.g. stock access and trampled banks, erosion, deposition of material).

1.8 Flooding and flowpaths

Flood plains and flowpaths should be reviewed within the site and upstream and downstream. This will inform the layout and urban design of the development and provide a high-level assessment of infrastructure required.

GeoMaps information shows the floodplain that could be expected during a 100-year design storm in the Maximum Probable Development (MPD) scenario. The information will identify areas that:

- may be suitable for incorporation into stormwater reserves or amenity aspects
- are not suitable for development or potentially limit activities that can be considered

GeoMaps provides graphical representation of the overland flowpaths divided into three categories:

- 3 ha and greater catchment area
- 4,000 m^2 to 3 ha catchment area
- 2,000 m^2 to 4,000 m^2 catchment area.

Management of overland flowpaths is critical for the long-term management of stormwater flows that exceed the capacity of the primary drainage network.

Pre-development flowpath entry and exit points must be maintained and must take into account the MPD upstream and downstream.

Major overland flowpaths should ideally be located on public land. The location should consider public safety and on-going maintenance access.

Flowpaths can be used to identify the alignment of historical and current watercourses and can be used to inform potential reinstatement and improvements.

The floodplain and flowpath information shown on GeoMaps can be used to prepare an SMP for a Structure Plan or Plan Change.

For detailed design for subdivision applications check with Healthy Waters Catchment Planning for the latest floodplain and flowpath modelling information. Auckland Council is continuously updating this include the latest guidance on climate change and AUP land uses and building coverage.

Description:

- describe areas impacted by flooding and flowpaths
- describe of flowpath and floodplain interactions including downstream of the site.

Figure:

- Show on a plan or plans:

- the floodplain
- flood sensitive area
- flood prone areas
- overland flowpaths.

1.9 Coastal inundation

The potential risk of coastal inundation and its extent will inform appropriate stormwater management and the levels of service that can feasibly be provided.

It should be noted that the extent of coastal inundation as shown on GeoMaps does not include any catchment rainfall.

Description:

- describe the extent, frequency and depth of coastal inundation
- discuss how this may alter with the potential effects of climate change.

Figure:

- Provide a figure setting out the extent of coastal inundation for each of the design events.

1.10 Biodiversity

Stormwater management needs to consider environmental and ecological areas:

- within the development boundary
- downstream of the site
- areas that could be impacted by stormwater discharges from the development area (e.g. natural wetlands).

The AUP Significant Ecological Area (SEA) overlay will help to identity potential sites.

Land features and vegetation that are not classified as SEAs can also be critical for biodiversity and stream health. These could include:

- mature riparian planting.
- mature and established stands of trees and / or shrubs.
- rock formations / bluffs.

Description:

- describe SEA or environmental areas that are located within the site or downstream of the site, including in the ultimate receiving environment
- describe ecological values of areas of mature vegetation or other potential environmental areas. This discussion should be based on ecological advice from a suitably qualified ecologist.

Figure:

- provide a plan of the development with the SEAs and other environmental areas indicated.

1.11 Cultural and heritage sites

Development should protect, enhance and incorporate sites of cultural and heritage value into the urban form. This not only protects the site but can also be a feature of the development.

Early discussion with mana whenua is strongly encouraged to inform this assessment. Many features are not publicly disclosed but may represent a significant development constraint; for example, koiwi tangata (human remains, particularly bones).

Where mana whenua has indicated the feature should remain protected, ensure the feature is within an area that will not be developed.

Description:

- describe any cultural or heritage site that has been identified including its significance in the local area.

Figure:

- provide a plan showing the location of the cultural and heritage sites.

1.12 Contaminated land

Contaminated land has significant impacts on the type of stormwater management devices that are practical. Unless remediation is carried out, it is unlikely that infiltration or soakage will be considered appropriate methods to dispose of stormwater. Contaminated soils and the method of remediation may have impacts on the ability to provide hydrology mitigation in SMAF areas.

Auckland Council holds a register of known contaminated land.

A review of historic aerial imagery can also provide indicators of past land use and the potential risk of contamination (e.g. market gardens / horticultural use, timber yard). These areas will need further investigation. Refer to the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS).

Description:

- describe known contaminated areas
- describe current or former land use and the potential for contamination to be present.

Figure:

- provide a plan showing the known contaminated areas and type of contamination
- include the location of potentially contaminated areas that require additional investigation.

2 Development summary and planning context

- *This section provides a high-level summary of the proposed development, together with the specific planning and regulatory requirements.*

2.1 Regulatory and design requirements

The purpose of this section is to communicate the minimum stormwater requirements for the development area.

This includes the relevant regulatory, technical and design requirements that the stormwater management for the development must meet.

Requirement	Relevant regulatory / design to follow
SMAF hydrology mitigation	• AUP Chapter E10 requirements • identify areas within the SMAF overlay
High Contaminant Generating Areas (HCGA)	• AUP Chapter E9 requirements ○ identify any proposed HCGA
Natural Hazards	• AUP Chapter E36 requirements • identify the hazards and approximate location
AUP Precinct	• Precinct chapter number • Summarise the policies and objectives of the Precinct that are related to stormwater management.
Existing Catchment Management Plan	• State the CMP name, Author and date. • Confirm the growth scenario land use (e.g. residential housing at maximum 60% impervious) • Identify any specific stormwater management requirements • Confirm if the CMP covers the entire proposed development area or only part.
Auckland Council regionwide Network Discharge Consent	• Relevant matters from schedule 4 • Any existing adopted SMP for the catchment.

3 Mana whenua: Te ao Māori and mātauranga

This section is in draft and will continue to be updated with mana whenua.

3.1 Identification and incorporation of mana whenua values

Consultation with mana whenua must be undertaken throughout the development process. This will allow for early identification of aspirations, culturally significant sites, possible protected areas and opportunities to provide cultural education.

This section of the SMP should:

- document interactions with mana whenua
- discuss outcomes from engagement activities
- discuss how mana whenua values and aspirations have been provided for have provided for
- show how the management approach protects and enhances te mauri o te wai
- show how these have been incorporated into the urban layout and proposed stormwater outcomes and management.

4 Stakeholder engagement and consultation

- *It is important that stakeholder engagement be undertaken to ensure that all potentially affected and interested parties can feed into the design process which needs to consider more than the physical and natural attributes of the site but also the cultural and community outcomes.*

Stakeholders	What is the reason for interest?	What engagement has been completed?	Feedback and response
For example: Mana whenua			
Auckland Transport			
Auckland Council - Healthy Waters			
Auckland Council – Community Facilities			
Watercare			
Local community groups			
Private landowners			
Neighbours			
NZTA			
Historic Places Trust			
Local Board			

5 Proposed development

- *This section describes the proposed development and how it integrates with the site and surrounds.*
- *The proposed development should recognise and incorporate the existing hydrological features and seek to enhance ecological and environmental outcomes.*

5.1 Location and area

- provide a plan of the location and size of the development
- identify the stormwater catchment(s) that the development area is within.

5.2 Purpose of the development

- identify the proposed land use
- provide a plan of the development
- discuss if the project is part of a wider master plan
- identify if there are multiple stages proposed.

5.3 Site layout and urban form

- Provide a plan detailing the proposed layout, including
    - roads
    - reserves
    - riparian margins
    - other land use that impacts on the urban form.

5.4 Earthworks

Earthworks are part of development but minimising the extent of disturbance must be a key outcome of the design process. This approach will minimise the impact on overland flowpaths and general site hydrology.

Provide plans and descriptions on the following:

- Earthworks
    - cut and fill locations
    - cut and fill balances
    - drainage sub-catchment to each discharge point
    - staging plan for both the development and earthworks
    - justification for earthworks and any alterations to sub-catchments.
- Overland flowpaths
    - existing and proposed flow path entry and exit points
    - alignment of flow paths through the site
    - earthwork areas required to support the proposed flowpath alignment.
- Flooding

- pre and post development floodplain extents
- proposed earthwork extent within the floodplain.

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6 Stormwater management

- *The development of a Best Practicable Option for stormwater management relies on the use of appropriate infrastructure and controls that work with the proposed development.*
- *This is an iterative process that starts with establishing core management principles at a high level, confirming proposed management through site testing and finally designing appropriate devices.*
- *In this section, applicants should provide a summary of the decision-making process and final proposed solution.*
- *Details of the device selection process should be included in the relevant appendix to this SMP.*

6.1 Principles of stormwater management

6.1.1 Original principles

The stormwater management plan must take an holistic approach which incorporates water sensitive design principles, as well as environmental and community outcomes.

Design and regulatory requirements set out in these guidance notes establish the minimum standards for stormwater management. Developers should aim beyond these to incorporate wider benefits for the receiving environment and improved amenities and outcomes for future residents.

General water sensitive design principles are provided within the Auckland Council GD04 guidance document.

This section should:

- describe in detail the stormwater management principles and objectives for the development
- provide a description of how the GD04 principles have influenced the proposed stormwater management
- demonstrate how the proposed stormwater management is the BPO.
- how the proposed sw management will meet objectives of ndc including enhancing te mauri o te wai.

6.1.2 Updated principles

At the start of the structure plan phase, the principles are likely to be high level, potentially identifying large scale management areas to meet the outcomes. As the design process continues and new data becomes available, the principles will need to be reviewed to ensure they are still feasible.

- document any amendments to the original principles and the reason for the alteration.

6.2 Proposed stormwater management

6.2.1 General

This section of the SMP presents the detail of the proposed stormwater management approach and demonstrates why each element is the BPO for the development.

Background assessment of each element and the devices identified in the development of the BPO should be documented and included in Appendix C2.

Include a plan with:

- land use types and urban form
- location, sizing and function of stormwater management devices
- location and sizing of stormwater pipe networks
- location of outlets from the networks
- location of secondary / overland flowpath networks
- location of 100-year floodplains across the development area
- differentiation shown for private and public stormwater infrastructure.

6.2.2 Water quality

Provide commentary and a plan outlining the potential impact on water quality within the receiving environment and how this is proposed to be avoided or mitigated.

This should include discussion of proposed treatment devices including:

- locating higher risk activities away from sensitive receiving environments
- use of treatment trains
- location of devices and the contributing catchment area
- reason for treatment is required (e.g. a High Contaminant Generating Area, discharge to a Significant Ecological Area)
- proposed treatment standard (e.g. 75% Total Suspended Solids removal, heavy metal removal).

6.2.3 Stream hydrology

Provide commentary and a plan outlining the potential effect of the development on the receiving stream environment in the context of the characteristics of the specific stream(s).

Provide a plan of the hydrology mitigation devices for the proposed development.

Information should include:

- location of devices and the contributing catchment area.
- discussion around if these are to be private onsite devices or if elements of the mitigation will be provided communally

- performance of the proposed device and how this meets the required mitigation minimal requirements
- improvements to existing planting or amenity space that can assist with reducing the impacts of development
- proposed instream works to prevent erosion and/or rectify past erosion stream.

6.2.4 Flooding 10 percent AEP event (Network Capacity)

Where there is existing pipe network downstream of the site, provide an assessment of the capacity of the downstream pipe network to convey flows generated in the 10 percent AEP flood event (MPD scenario).

Where capacity is exceeded either:

- Demonstrate to the satisfaction of the consent holder there will be no adverse flooding effects to properties; or
- Include in the SMP a proposal for attenuation of flows to pre development levels; or
- Include in the SMP a proposal for upgrading of the relevant pipe network to a size that can cater for the additional flows from the development.

Provide commentary and a plan of any detention or attenuation for the proposed development, considering a range of storm events.

Information should include:

- location of any devices and the contributing catchment area
- design rainfall events that the devices will be required to manage.

6.2.5 Flooding 1 percent AEP event (Habitable floors)

Provide an assessment of flooding, from flows generated in a 1 percent AEP event (MPD scenario), to properties downstream of any overland flow path/flood plain exiting the development.

Where potential for flooding, or increase to existing flooding of habitable floors of downstream properties is identified, include a proposal for mitigation.

Provide commentary and a plan of any attenuation for the proposed development, considering a range of storm events.

Information should include:

- location of any devices and the contributing catchment area
- design rainfall events that the devices will be required to manage.

6.2.6 Overland flowpath and floodplain management

Provide commentary and a plan of the proposed overland flowpaths and 100-year floodplain within the development area.

Where a development is within the 1 percent AEP flood plain or in an overland flow path the information and assessment requirements of chapter E36 of the Auckland Unitary Plan must be included in an application for resource consent.

Information should include:

- entry and exit points of flowpaths catering for maximum probable development upstream and downstream
- flowpath alignments through the development area
- identification of the 100-year floodplain within the development area.

6.2.7 Development staging

Provide commentary on the stormwater infrastructure to manage development staging. In particular, any proposed management for formed, but undeveloped lot areas, to ensure downstream devices are not overwhelmed.

The staging of development should also identify where downstream constraints need to be resolved (e.g. a culvert needs to be upgraded) to facilitate the comprehensive development of the site.

6.3 Hydraulic connectivity

Hydraulic connectivity with the receiving environment of components like roofs, lots and roads is often overlooked at the design stage. This information is part of the assessment of the best practicable option to optimise the connectivity of impervious surfaces.

Provide information to:

- confirm the hydraulic connectivity
- show where there are significant alterations to natural flowpaths or disconnected impervious surfaces and discuss the mitigation proposed.

Plans are required that include the following:

- location of each outlet from the primary and secondary stormwater networks to the receiving environment
- primary and secondary contributing catchments to each outlet
- location and function of the stormwater management devices for each outlet's catchment
- impervious surfaces that are directly connected to the stormwater management devices
- impervious surfaces that are not directly connected to the stormwater management devices
- pervious surfaces that have had the natural flowpaths altered through earthworks
- comparison plan of pre and post development flowpaths through the area.

6.4 Asset ownership

Provide information about the proposed ownership of stormwater assets. Ensure that necessary consultation and agreements are obtained.

6.5 Ongoing maintenance requirements

Summarise the operation and maintenance activities that are associated with each type of stormwater infrastructure to be constructed within the development.

Draft operations and maintenance manuals for all proposed devices should be included in Appendix C3.

The manuals need to describe:

- design objectives of the device
- all major features
- operations such as recommended means of sediment removal and disposal
- key design criteria
- on-going management and maintenance requirements such as plant establishment, vegetation control and nuisance control
- accurate design calculations.

6.6 Implementation of stormwater network

Provide an outline of the anticipated timeline for development and detail how the stormwater management will develop along with the relevant stages.

Where on-lot management plays a critical role in the long-term stormwater management, the greatest risk of contamination, erosion and flooding in the downstream environment occurs when the roads are laid but the lots are empty or under construction. Where earthworks have been completed to shape lots, even with grass coverage, the runoff from these areas will be significantly higher than in the natural condition.

- provide information on the design of appropriate temporary, or potentially permanent, stormwater management to cover this intermediate development time frame.

6.7 Dependencies

Information should be included on any stormwater projects, or standard operation and maintenance actions that need to be completed beyond the development boundary in order to realise the full benefits of this SMP, along with the risks of not completing these.

Where this SMP needs to be implemented before an external project can start, an assessment needs to be made of the consequences and associated risks of not implementing all elements.

6.8 Risks

This section should identify risks to the proposed stormwater management for the area, together with mitigation or management of these risks through the design and construction process.

What is the risk to the proposed stormwater management?	How can this be mitigated / managed?	What other management / mitigation could be used?	When does this risk need to be addressed?	What is the resultant level of risk?
Examples only				
Infiltration	Design using minimum regional rate as set out in the AUP Chapter E10 of 2mm/hr	On-site testing	During the design and construction phases	Low
Flowpaths on GeoMaps are not correct to on-site topography	Complete site specific topographic survey		During the design phase	Medium
Floodplain extents are larger than shown on GeoMaps due to updated MPD	Update modelling of the local catchment to confirm extents of floodplain in accordance with land use in the AUP		During the planning and design phases	Medium
Streams and watercourses on the site are different to GeoMaps	Undertake site investigation and stream classification study		During the planning and design phase	Medium

7 Departures from regulatory or design codes

- *The Auckland Council regulatory and design standards for stormwater infrastructure provide minimum requirements for long-term sustainable development, focused on protecting the natural environment and enhancing the ecosystems provided by our watercourses.*
- *There will be instances where it is not possible for a development to meet the minimum standards due to factors outside of the developer's control.*

Although greenfield developments should always meet the minimum Auckland Council requirements, redevelopment or intensification of brownfield sites can provide unique challenges, particularly when connections are made to an existing piped stormwater network.

- note departures from the regulatory and design codes
- discuss why it is considered that these cannot be met
- record and discuss any departures from previous versions of SMPs that have been prepared for the development area.

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8 Conclusions and recommendations for future work

- The conclusion will summarise the stormwater management principles and requirements that form the BPO
- This section should also provide guidance to developers in the future on any work that is likely to be required and considerations that need to be factored in during future design phases.

8.1 Conclusions

Provide a summary conclusion on the SMP that has been produced to support the development area.

8.2 Recommendations

This section should set out the recommendations for further investigations required to

- confirm the principles of stormwater management
- establish development controls
- identify requirements for land in the development area that will be developed outside of the current proposed works.

For developments where houses are being built in stages after the construction of the road network, recommendations could include establishing stormwater management at a lot level.

Appendix A – Plans of existing site features

Appendix B – Proposed development plans

Appendix C1 – Proposed stormwater management

Appendix C2 – Stormwater management selection process and assessment

Appendix C3 – Draft operation and maintenance

Find out more:
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