REPORT TO DISTRICT PLAN COMMITTEE

DATE: 22nd February 2017

ISSUES AND OPTIONS: Flood and Coastal Hazard Investigations and Mapping

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EXECUTIVE SUMMARY

Issue	*Confirmation of the scale, timing and cost of technical investigations relating to flood risk and coastal hazards necessary to support the district plan review, including mapping of hazard areas.*
Recommended Option	*Flood-risk – Option 2:* *Environment Canterbury to update the Lower Plains and Te Waihora/Lakes Ellesmere flood maps* *A programme of flood risk investigations for other at-risk areas, as guided by Environment Canterbury, plus an associated programme of plan changes to incorporate flood mapping into district plan* *Coastal hazards – Option 6:* *Incorporate coastal hazard lines contained in Appendix 5 to the Canterbury Regional Policy Statement into the district plan* *The district plan to manage development seaward of these coastal hazard lines instead of the Regional Coastal Environment Plan*
DPC Decision	*Flood-risk – Option 2:* *Environment Canterbury to update the Lower Plains and Te Waihora/Lakes Ellesmere flood maps* *A programme of flood risk investigations for other at-risk areas, as guided by Environment Canterbury, plus an associated programme of plan changes to incorporate flood mapping into district plan* *Coastal hazards – Option 6:* *Incorporate coastal hazard lines contained in Appendix 5 to the Canterbury Regional Policy Statement into the district plan* *The district plan to manage development seaward of these coastal hazard lines instead of the Regional Coastal Environment Plan*

1.0 Introduction to Issue

1.1 The Council needs to determine how much investigation it undertakes to understand flood and coastal hazards for the district plan review and to give effect to the Canterbury Regional Policy Statement (RPS) and New Zealand Coastal Policy Statement (NZCPS). A number of options are discussed in this report which involve varying levels of cost as well as varying amounts of time for the investigations to be completed.

1.2 The RPS and the NZCPS provide direction as to how natural hazard risk is to be manged at a region-wide level and within the coastal environment, with the District Plan required to give effect to the outcomes sought in those documents. A key method in the management of natural hazard risk can include the identification and mapping of areas subject to flood risk and coastal hazards. This needs to be done in the manner directed by the RPS and NZCPS, and requires up-to-date information and investigations. The RPS uses the following flood event levels for the management of subdivisions and land use:

- 0.2% AEP (1 in 500 years) event to determine 'high hazard'* areas
- 0.5% AEP (1 in 200 years) event to determine areas at risk of inundation

*High hazard areas are defined as

1. Flood hazard areas subject to inundation events where the water depth (metres) x velocity (metres per second) is greater than or equal to 1, or where depths are greater than 1 metre, in a 0.2% AEP flood event;
2. Land subject to coastal erosion over the next 100 years; and
3. Land subject to sea water inundation (excluding tsunami) over the next 100 years

1.3 Other RPS and NZCPS requirements include:

- The need to identify high hazard areas through provisions of the district plan (Method 7c to RPS Policy 11.3.1 – Note: this Method only applies to Christchurch City, Waimakariri and Selwyn districts)
- To ensure that flooding hazards are assessed before any new areas are zoned for more intensive uses or where development is likely to cause adverse effects (Method 5 to RPS Policy 11.3.2)
- In areas subject to inundation, new buildings have an appropriate floor level above the 0.5% AEP design flood level (RPS Policy 11.3.2)
- To take into account current projections on the effects of climate change (Method 1 to RPS Policy 11.3.8)
- Identify areas in the coastal environment that are potentially affected by coastal hazards, giving priority to identification of areas at high risk of being affected. Hazard risks over at least 100 years to be assessed (NZCPS Policy 24).

1.4 It is also worth noting that the Resource Legislation Amendment Bill 2015 (RLAB) seeks to make the management of significant risks from natural hazards a s6 RMA matter (matters of national importance). Alongside this a National Policy Statement on natural hazards is proposed to be developed. The RLAB is due to be reported back to the Select Committee in May and no timetable for Royal Assent is currently known. There is also no timetable for when the NPS will be introduced since this is dependent on the RLAB becoming law.

1.5 A key use of the information obtained from the modelling and mapping of flood hazard areas is in guiding urban growth and land supply. This information helps:

- Inform constraints and opportunities for rezoning,
- Help direct urban growth
- Provide more certainty for land supply in response to growth pressures and the new NPS on urban development capacity (NPS-UDC)
- To give effect to the RPS and to implement the NPS-UDC as part of the constraints analysis for development feasibility.

2.0 Statement of Operative Plan approach to issue

2.1 The Operative District Plan currently maps flood risk areas and a coastal hazard line. Within these mapped areas the use, development and subdivision of land is managed by way of standards for minimum floor levels for new buildings, controls on earthworks and assessment of natural hazard risk through consenting processes.

2.2 The mapped areas are:

- Waimakariri Flood Category A area
- Te Waihora/ Lake Ellesmere flood area
- Lower Plains flood area
- Coastal Hazard 1 line

2.3 These areas were incorporated into the operative district plan by way of submission from Environment Canterbury. Much of this mapping had been included in the 1995 notified version of the district plan before it was withdrawn and replaced by the current operative plan. The mapping is, therefore, based on information that is now over 15 years old and in several instances relies on information dating back to the 1970s. This mapping principally only identifies areas known to have flooded in the past rather than areas at risk of flooding in a 0.2% AEP (1 in 500 years) event or a 0.5% AEP (1 in 200 years) event as now required by the RPS.

2.4 The Coastal Hazard 1 line is based on that contained in the Regional Coastal Environment Plan, which was made operative in 2004. The mapping of this line and the information on which it is based are therefore over 10 years old and pre-date the requirements of the NZCPS, including taking into account the effects of climate change.

3.0 Summary of alternative management responses – Other Districts

Christchurch City Council – Christchurch Replacement District Plan

Flood Risk

3.1 Christchurch City has an on-going programme of modelling river catchments within its boundary and these were updated to inform its recent district plan review. This includes the Halswell River whose catchment lies within both Christchurch City and Selwyn district.

3.2 The flood risk modelling used the flood event levels contained in the RPS:

- 0.2% AEP (1 in 500 year event) to identify 'high hazard areas'; and
- 0.5% AEP (1 in 200 year event) to identify areas at risk of inundation.
- For climate change the modelling inputs included: a 1m rise in sea levels, a 16% increased rainfall over next 100 years as well as assumptions for high tide and storm events.

3.3 The modelling has been used to identify and map areas of 'high hazard' risk and areas at risk of inundation. These mapped areas are shown on the district plan maps and trigger differing land use and subdivision controls depending on the level of risk, with a greater degree of control within the 'high hazard' areas.

Coastal hazards

3.4 The City Council commissioned an independent study to identify at-risk areas. The study and its associated modelling was the subject of public concern and the proposed district plan provisions were withdrawn by an Order in Council to enable a standalone re-notification process. A Peer Review Report was also commissioned to investigate whether the study and associated modelling were fit for purpose. This found the study, overall, fit for purpose but recommended some process changes which are currently being implemented.

Waimakariri District Council – Proposed Plan Change

Flood Risk

3.5 WDC have prepared a draft plan change to their operative district plan for the management of natural hazard risk in the district. This incorporates detailed mapping developed as part of a district-wide programme for modelling flood risk which commenced back in 2009 and continued into 2014.

3.6 This modelling:

- Uses the flood event levels required by the RPS. Additionally for climate change the modelling inputs include: a 1m rise in sea level and a 16% increased rainfall over next 100 years; and
- Has been used to identify and map areas of 'high hazard' risk and areas at risk of inundation. These will be incorporated into the district plan maps and trigger differing land use and subdivision controls depending on the level of risk, with a greater degree of control within the 'high hazard' areas.

Coastal Hazard

3.7 The draft plan change proposes to use the Coastal Hazard lines identified in Appendix 5 to the RPS. There is the option to review the mapped coastal hazard areas if and when the proposed National Policy Statement on managing natural hazard risk comes into effect. Development and subdivision on the seaward side of the coastal hazard line is strictly controlled to restrict 'sensitive' activities such as residential.

Hurunui District Council – Hurunui Replacement District Plan

Flood Risk

3.8 HDC commissioned Environment Canterbury to help in identifying flood risk areas in the district. A report (*Flood Hazard mapping for Hurunui District Plan Review*) and associated mapping was prepared for HDC. This used historical records, topographic maps and aerial photographs rather than actual modelling, as used in Christchurch and Waimakariri district, to identify areas at risk of flooding. The draft maps were made available to affected landowners for comment and ECan/HDC staff subsequently visited 40 properties to 'ground-truth' the mapping in response to feedback from landowners.

3.9 The district plan manages flood risk by identifying Flood Assessment Zones, based on the Environment Canterbury flood report. Within these zones:

- Minimum floor levels are required, with compliance required to be demonstrated by a flood assessment from an organisation that has been certified by the Council's Chief Executive as being appropriately qualified and experienced.
- Subdivision is a discretionary activity.
- High hazard areas have not been specifically identified but the RPS does not require this outside of greater Christchurch.

Coastal hazard*

3.10 Coastal hazard lines 1 and 2 from the Canterbury Regional Coastal Environment Plan have been incorporated into the new district plan. Only subdivision seaward of the coastal hazard lines is managed by the district plan, with the use and development of land continuing to be managed under the RCEP.

The RPS, as amended in 2015, only requires territorial authorities outside of Greater Christchurch to manage subdivision in relation to coastal hazards. For all other activities the RCEP remains the statutory plan.

Ashburton District Council

Flood Hazard

3.11 The replacement Ashburton District Plan includes the following provisions:

- All Zones: Minimum floor level requirements set at 0.5% AEP (1 in 200 years) flood event levels, for new and extended buildings.
- Rural A & B zones: Zone standards require that no new structure or building is to be constructed on a site identified as being at high risk of flooding. A breach of a zone standard is a non-complying activity
- Subdivision: A critical subdivision standard requires that no subdivision is to occur in any area identified as being at risk from a 1 in 200 year flood event. A breach of this subdivision standard is a non-complying activity.

3.12 The district plan includes a series of maps showing floodable areas in the district. Unlike Christchurch and Waimakariri, these have been mapped at a high level only and are intended for guidance purposes only. They do not trigger any site specific floor level standards or resource consent requirements. The mapped areas also do not include Ashburton or Tinwald on the basis that these areas are protected by existing stopbanks designed to provide protection from a 1 in 200 year flood event. Consequently it falls to an applicant/landowner, when considering the development or subdivision of their land, to identify whether the land is at risk from a 1 in 200 year flood event and/or to determine minimum floor level requirements. This can be done by obtaining a flood assessment from Environment Canterbury or a "suitably qualified person".

Coastal hazard*

3.13 The Canterbury Regional Coastal Environment Plan continues to manage the use, development and subdivision of land in relation to coastal hazards.

**The RPS, as amended in 2015, only requires territorial authorities outside of Greater Christchurch to manage subdivision in relation to coastal hazards. For all other activities the RCEP remains the statutory plan.*

4.0 Options to address Issues

4.1 This section discusses 5 possible options to investigate and define flood risk in Selwyn District and two options in relation to management of coastal hazards. These options are summarised below and then described more fully in the following sections:

Issue A: Flood Risk

Flood Risk Options 1 to 4

4.2 These options continue the approach adopted in the operative district plan whereby flood risk areas are identified and shown on district plan maps. Within the mapped areas, land development would trigger a range of site specific management responses by way of plan rules depending on the susceptibility of the proposed development. The scale, type and timing of the flood investigations differ between each option.

Flood Risk Option 5

4.3 This option involves an approach that departs from the operative district plan and is more aligned to the management approach contained in the Ashburton District Plan, whereby flood risk areas would not be mapped in the district plan. Instead flood mapping and flood information would be held and managed on the Council's GIS system (plus Canterbury Maps) and district plan rules used to require flood assessments at the individual development project stage. It is the results of these individual flood assessments which trigger the consent pathway for the project and whether the adverse effects are to be mitigated or avoided.

Issue B: Coastal Hazards

4.4 Two options are discussed under this issue. These are identified as option 6 and option 7. In summary:

- Option 6 relies on the use of the coastal hazard lines identified in the RPS to identify coastal hazard areas
- Option 7 would involve commissioning a specific study and modelling of coastal processes to identify coastal hazard areas

ISSUE A – FLOOD RISK

OPTION 1

4.5 To identify and map flood risk areas in the district plan by:

- Rolling over the Lower Plains and Te Waihora/Lake Ellesmere flood areas from the operative district plan; and
- Using the results of Environment Canterbury's current flood investigation and mapping work for the lower Selwyn/Waikirikiri River and Waimakariri River

4.6 Plus:

- A programme of flood risk investigations for the Lower Plains and Te Waihora/Lake Ellesmere flood areas and other areas at risk of flooding including the wider Lower Plains area, the Rakaia River and upper Selwyn River catchment; and
- A programme of variations/plan changes to incorporate flood risk mapping into district plan

Effectiveness in Addressing Issue:

4.7 This option provides for the continued management of flood risk within the areas identified in the operative district plan as an interim measure, with a programme to undertake a wider review of flood risk in the district initiated, and ultimately replacing the interim provisions. It relies on using the existing but now dated district plan mapping as well as river modelling work currently being undertaken by Environment Canterbury. It is worth noting that the final river flood maps being prepared by Environment Canterbury would not be ready until October 2017, and in the case of the Waimakariri River, mid-2018.

4.8 This option seeks to implement the RPS by:

- Managing development in known flood hazard areas, as already provided for in the operative district plan but updated by the results of Environment Canterbury's river modelling work
- A staged process of flood investigations and mapping including reviews of the existing mapped areas.

4.9 This option relies on the Council committing to a programme, including funding, of flood investigations and subsequent plan changes to fully implement the requirements of the RPS. This will include reviewing the existing mapped flood hazard areas even if they have been 'rolled' over into the new district plan in the short term.

Risks:

4.10 This option raises a number of risks including:

- It relies on the use of 'rolled over' maps which are now dated and which do not use up-to-date information or knowledge

- The mapping principally only identifies areas known to have flooded in the past rather than areas at risk of flooding in a 0.2% AEP (1 in 500 years) event or a 0.5% AEP (1 in 200 years) event as now required by the RPS.
- The mapping lacks sufficient accuracy to identify 'high hazard' areas where inappropriate development is to be avoided under the RPS.

4.11 This leaves the mapping open to challenge in terms of robustness and validity as well as its integrity and usefulness for the purpose of informing the DPR. The 'rolled over' areas are largely contained within the UDS part of the district where good quality baseline information, including the identification of high hazard areas, is particularly needed to:

- Inform constraints and opportunities for rezoning,
- Help direct urban growth in this high growth part of the district
- Provide more certainty for land supply in response to growth pressures and the new NPS on urban development capacity (NPS-UDC)
- Contribute to constraints analysis for development feasibility under new NPS-UDC.

4.12 This option also risks removal of district plan controls from the current Lower Plains and Te Waihora/Lake Ellesmere flood areas ('rolled' over areas) if their validity is successfully challenged by way of submissions and evidence at hearings. This undermines the purpose of this option to provide for the short term management of flood risk whilst a wider and more in-depth programme for the review of flood risk in the district is developed.

Budget or Time Implications:

4.13 This option allows the DPR to proceed on the basis that the majority of the flood risk mapping would be available by October 2017, with only the updated mapping for the Waimakariri River flood area not available until 2018. Together with Option 2 it represents the least cost option to the Council over the short term as it relies on existing district plan maps together with mapping work currently underway (and provided) by Environment Canterbury. As such the current DPR budget and timelines would not be significantly impacted.

4.14 Over the longer term a programme of flood risk investigations and a rolling programme for associated plan changes would need to be budgeted for to ensure that the district plan gives effect to the RPS across the district. This would include a review of the 'rolled over' maps. Depending on the extent to which any flood investigations could be incorporated into Environment Canterbury's work programme the cost of these investigations alone could be significant (in excess of $100,000) and take years to complete.

Stakeholder and Community Interests:

4.15 The community has an interest and expectation regarding Council responsibilities to properly manage natural hazard risk to people and property. Reliance on flood risk maps which are dated and which do not reflect up to date information risks undermining the community's expectation and support for the new district plan.

4.16 In terms of stakeholders, SDC staff have been is discussion with Environment Canterbury in relation to the interpretation of the requirements of Method 7(c) to RPS Policy 11.3.1. At a staff level they agree that this RPS method requires Council to identify high hazard areas through provisions in the district plan across the entire district by 2018 (within 5 years of RPS Policy 11.3.1 becoming operative). This has implications for the new district plan and how it will give effect to the RPS. SDC staff have approached Environment Canterbury about the possibility of a change to the RPS to reduce this requirement. This is discussed under "Other" below.

Other:

4.17 Other relevant matters arising from this option include:

- It enables the Council to approach Environment Canterbury about rectifying Method 7(c) to RPS Policy 11.3.1 to remove an apparent anomaly with the Method and to reduce its requirements from applying over the entire district to only the UDS area. SDC staff consider the current requirements to be onerous given the sparseness of population and physical assets across large areas of the district. There is also an apparent anomaly within the RPS in that it now contains two definitions of greater Christchurch one which is limited to the UDS part of the district whilst the second includes the entire district. Aligning the two back to the original definition, namely limiting it to the UDS part of the district, would better implement the outcomes of the RPS.
- The Council would be able to undertake a review of the wider Lower Plains flood area including in and around Leeston, Doyleston and Southbridge outside of the current DPR process and its time constraints. This area is not currently managed by District Plan flood risk provisions.
- The Council could consider the benefit of a joint study of the Halswell River catchment with Christchurch City Council, building on the modelling already completed by CCC as part of their district plan review process.

Recommendation:

4.18 That Option 1 is not adopted since the benefits of this option do not outweigh the risks. It relies on the use of out of date information particularly in the UDS area of the district where good quality baseline information is needed to inform growth and land supply issues in the DPR.

OPTION 2

4.19 To identify and map flood risk areas in the district plan by:

- Environment Canterbury updating the Lower Plains and Te Waihora/Lake Ellesmere flood areas based on up to date geophysical information, flood investigations and knowledge of flood risk; and
- Using the results of Environment Canterbury's current flood investigation and mapping work for the lower Selwyn/Waikrikiri River and Waimakariri River; and
- Requesting Environment Canterbury to recommend other areas in the district where additional investigations into flood risk could take place such as the upper Selwyn River catchment.

4.20 Plus:

- A programme of flood risk investigations for other areas at risk of flooding as guided by Environment Canterbury; and
- A programme of variations/plan changes to incorporate mapping into district plan

Effectiveness in Addressing Issue:

4.21 This option provides for the continued management of flood risk in the operative flood hazard areas, based on up-to-date mapping together with a programme for flood risk investigations in the rest of the district. This would be delivered by a staged approach to the investigations, consisting of:

- Stage 1 – updating the mapping of the operative flood hazard areas by end of 2017, with Waimakariri River flood available maps by mid-2018
- Stage 2 – a programme of flood risk investigations and mapping for the remainder of the district after 2018, based on the guidance provided by Environment Canterbury

4.22 In adopting this approach, flood mapping consistent with the requirements of the RPS, would be available for the UDS part of the district in project year 2017/2018. The risk of challenge to the validity of the mapping and subsequent delays to the district plan review would be reduced compared to option 1 since the maps would be up-to-date.

4.23 A scope of works for the update to the Lower Plains and Te Waihora/Lake Ellesmere flood areas has been agreed with Environment Canterbury and is aligned to its current modelling work for the lower Selwyn River and Waimakariri River. As such this information will be available from October 2017.

Risks:

4.24 This option raises a number of risks including:

- The updates to the mapping of the Lower Plains-Te Waihora flood areas would be based on LiDAR and other information sources such as such as recent flood risk reports, photographic records of flooding events and Environment Canterbury staff expertise rather than hydrological or other modelling.
- As such the robustness and validity of the work could still be open to challenge by way of submission or appeal during the district plan review process.
- This option better gives effect to the RPS than Option 1 but still requires a rolling programme for the review of flood risk elsewhere in the district and an associated programme of plan changes.

Budget or Time Implications:

4.25 This option provides for the majority of the stage 1 mapping to be available by October 2017 with only the outstanding flood maps for the Waimakariri River not available until 2018. Together with Option 1 it also represents the least cost option to the Council over the short

term. As such the current DPR budget and timelines would not be significantly impacted on by this option.

4.26 Over the longer term a programme of flood risk investigations and a rolling programme for associated plan changes would need to be budgeted for to ensure that the district plan gives effect to the RPS across the district. Depending on the extent to which any flood investigations could be incorporated into Environment Canterbury's work programme the cost of these investigations alone could be significant (in excess of $100,000) and take years to complete.

Stakeholder and Community Interests:

4.27 In terms of stakeholders see discussion in Option 1

Other:

4.28 See Option 1

Recommendation:

4.29 That Option 2 be adopted. It is considered a pragmatic option which provides for the updating of flood risk information in the UDS part of the district, which can be used to inform urban growth and land supply decisions. A programme of wider investigations for the remainder of the district would also be informed by guidance provided by Environment Canterbury to ensure a more targeted approach to this issue.

OPTION 3

4.20 To identify and map flood risk areas in the district plan by:

- Commissioning full hydrological and flood investigation studies of the Lower Plains and Te Waihora/Lake Ellesmere flood areas identified in the operative district plan; and
- Using the results of Environment Canterbury's current flood investigation and mapping work for the lower Selwyn/Waikirikiri River and Waimakariri River

4.21 Plus:

- A programme of flood risk investigations for remaining areas at risk of flooding in the district including the wider Lower Plains area, the Rakaia River and upper Selwyn River catchment; and
- A programme of variations/plan changes to incorporate mapping into district plan

Effectiveness in Addressing Issue:

4.22 This option provides for a more robust evidence base than Options 1 and 2 to inform the DPR in relation to identifying and mapping flood risk in the UDS part of the district. Such work would help to inform urban growth and land-supply options within this high growth part of the district, as well as the management of development within the operative flood hazard areas.

Additionally information from the hydrological and flood investigations would be capable of use by the Council in support of its wider statutory responsibilities and planning for lifeline utilities. However it is likely that this level of technical investigation is not necessary to give effect to the RPS.

4.23 As with Options 1 and 2 an on-going programme of flood risk investigations and associated plan changes would still be necessary to give full effect to the RPS across the remainder of the district.

Risks:

4.24 In addition to the likely cost of this option, which is discussed in the next section, a key risk is that it may be difficult to isolate a hydrological study of the area of land encompassed within the operative Lower Plains flood area from the actual geographic extent of the wider Lower Plains catchment. This brings with it risks in terms of study 'creep' and increased costs. This work is also likely to be dependent on the river modelling work currently being undertaken by Environment Canterbury.

Budget or Time Implications

4.25 This option is likely to take in excess of 12 months and could be closer to 24 months when the tendering and methodology development processes are taken into consideration. It would also be dependent on the river modelling work currently being undertaken by Environment Canterbury. As a result flood risk mapping for the district, including the UDS area, is unlikely to be available before project year 2018/2019 at the earliest.

4.26 The cost of such a study for the Lower Plains and Te Waihora/Lake Ellesmere flood areas is likely to be in excess of $100,000. This needs to be considered alongside the likely cost of a programme of flood risk investigations and associated plan changes for the wider district which is also likely to be in excess of $100,000.

Stakeholder and Community Interests:

4.27 The majority of the flood risk areas in the district are rural, containing only a limited population and network of physical assets. This raises the issue of the benefits of undertaking costly technical flood investigation and mapping exercises versus the budgetary cost to the community.

Other:

4.28 This option is dependent on Environment Canterbury's flood modelling work for the Selwyn/Waikirikiri River and Waimakariri River. It is also likely to rely on information held by Environment Canterbury and Selwyn District Council, and as such may not have any meaningful advantages over Option 2 in terms of the new district plan. Any advantage derived from this option is likely to be in the level of information that would be available to support the Council's wider statutory functions including planning for lifeline utilities*.

**Lifeline utilities are defined in the Civil Defence Emergency Management Act 2002 and include roads, drinking water, waste water and stormwater networks.*

Recommendation:

4.29 That Option 3 is not adopted. This option would be costly to implement and cause delay to the DPR process. It is also considered unnecessary for the purposes of the DPR. Option 2 provides for a more efficient pathway to obtaining technical information required to inform other DPR policy areas such as urban growth and land supply.

OPTION 4

4.30 To identify and map flood risk areas in the district plan by:

- Commissioning full hydrological and flood investigation studies of all areas known to have been affected by flooding. This would include the areas already identified in the operative district plan, the Rakaia River, the wider Lower Plains area and the upper Selwyn River/Waikirikiri catchment.

Effectiveness in Addressing Issue:

4.31 This option would be very effective in meeting the requirements of the RPS and in providing the Council with a robust evidence base to inform the review of the district plan.

Risks:

4.32 This options give rise to key budgetary and time implications which are discussed below.

Budget or Time Implications:

4.33 A full scale flood investigation and mapping study across the district is likely to take several years. By way of example Waimakariri District Council began a similar mapping exercise in 2009 and this has continued into 2014 with community engagement carried out in 2016. This option is also likely to be very costly, in excess of $200,000.

4.34 This option would result in the district plan review extending over 2 election cycles (including the 2016-2019 cycle) and significant budgetary implications.

Stakeholder and Community Interests:

4.35 N/A

Other:

4.36 N/A

Recommendation:

4.37 That Option 4 is not adopted. As with Option 3 this would be costly to implement and cause significant delay to the DPR process.

OPTION 5

4.38 The key features of this approach include:

- Council held flood risk information would be placed on its GIS system and not included in District Plan maps.
- The use of district plan rules to require a flood investigation to be undertaken for any proposed development located on land susceptible to flood risk to determine:
- If the land is at risk of inundation in a 0.5% AEP flood event; or
- Is otherwise within a high hazard area

4.39 The outcomes of the flood investigations would trigger differing consent pathways requiring:

- Mitigation of appropriate development from a 0.5% AEP flood event; or
- Avoidance of inappropriate development within high hazard areas

4.40 Any flood risk information held on the Council's GIS system would be used to guide whether a flood investigation is required through the following processes:

- S91 requests for further information for resource consents
- S106 requirements for subdivisions
- Pre-application guidance to prospective applicants

Effectiveness in Addressing Issue:

4.41 At an individual project level this option would give effect to the RPS by ensuring that before a development took place the level of flood risk for that project was identified by the applicants. District Plan rules introduced through a private plan change or the imposition of conditions on resource consents would then avoid or mitigate the adverse effects of the flooding. Furthermore the flood mapping information held by the Council on its GIS system could be updated without the need for a plan change, unlike District Plan flood maps. This means they can be updated more regularly as new information becomes available and remain relevant on an on-going basis.

4.42 This option also passes the full cost of the flood investigation work to the applicant rather than the Council, unlike options 1-4.

Risks:

4.43 The community has expectations regarding Council responsibilities to properly manage natural hazard risk to people and property. This option, by placing the cost burden onto applicants and removing the certainty derived by mapping flood risk areas on the district plan maps, is unlikely to be supported by the community. Additionally it runs contrary to the Council's strategic leadership in these matters including managing urban growth and land supply in the district. Overall Option 5 risks undermining the community's expectation in this matter and support for the new district plan.

Budget or Time Implications:

4.44 This option does not involve any specific flood risk investigations or mapping as part of the district plan review and consequently raises no budget or time implications.

Stakeholder and Community Interests:

4.45 N/A

Other:

4.46 N/A

Recommendation:

4.47 That Option 5 is not adopted. This option passes all the costs onto landowners and is also contrary to the Council's approach of showing strategic leadership in matters such as managing natural hazard risk and urban growth. Information would also not be available to inform urban growth and land supply matters including the issue of development feasibility under the NPS-UDC.

ISSUE B: COASTAL HAZARD

OPTION 6

4.48 This option involves:

- Incorporating the coastal hazard lines contained in Appendix 5 to the RPS into the district plan.
- That the use, development and subdivision of land seaward of the coastal hazard line is managed by the district plan, replacing the provisions of the RCEP, as directed by the RPS.
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Effectiveness in Addressing Issue:

4.49 This option would give effect to the RPS including directing the management of the use, development and subdivision of land within the coastal environment to the district plan and away from the RCEP. This is a change made to the RPS in 2015 and only applies to the Greater Christchurch territorial authorities. In the remainder of the region the RCEP remains the principal statutory plan.

Risks:

4.50 The RPS coastal hazard lines were incorporated from the existing Regional Coastal Environment Plan under LURP Action 46. As part of this they were updated with some additional survey information that had been gathered in-between the development of the original mapping prior to 2004 and the LURP Action 46 work in 2014/15. The updates assume that contemporary erosion processes continue unaltered for the next 50 years and 100 years. This includes the effects of climate change, storm surges and wave height under storm conditions.

4.51 However, the assumption that contemporary processes continue unaltered does not accord with best practice nor with the requirements of the New Zealand Coastal Policy Statement. For example the Parliamentary Commissioner for the Environment* has recommended that use should be made of the Intergovernmental Panel on Climate Change (IPCC) guidance when considering sea-level rise. The independent hearing panels for the Proposed Auckland Unitary Plan and the replacement district plan for Christchurch also both used the latest IPCC guidance on projected sea level rise in their determinations of those plans. The coastal hazard mapping might, therefore, be different if the IPCC guidance is used in the modelling.

**PCE report - Preparing New Zealand for rising seas: Certainty and Uncertainty, November 2015*

Budget or Time Implications:

4.52 This option involves incorporating mapping that is already available and consequently raises no budget or time implications.

Stakeholder and Community Interests:

4.53 Department of Conservation – comments awaited

- Environment Canterbury – recommend that Selwyn District Council should commission a study of coastal processes to identify areas of coastal hazard risk rather than rely on the hazard lines contained in the RPS. It considers that this would better give effect to the RPS and better suit long term planning.

Other:

4.54 The Department of Conservation is due to publish guidance on how to implement the NZCPS requirements for the identification of coastal hazards. This was due to be published at the end of 2016 but is still not available.

4.55 Option 6 leaves open the opportunity for Council to undertake specific coastal hazard modelling at a later date when the above guidance and NPS have been published and provide direction on this matter. Learnings can also be taken from current modelling processes such as in Christchurch.

Recommendation:

4.56 That Option 6 is adopted. This option is very efficient and causes no delay to the DPR process. It is also proportionate to the issue for Selwyn, which only has a limited coastline and a small population or other physical assets in the relevant areas. Further studies of risk can be done, as and when, more detailed guidance on this matter becomes available.

OPTION 7

4.57 To identify and map coastal hazard areas by:

- Commissioning a specific study and modelling of coastal processes based on the requirements of Policy 24 to the NZCPS.
- That the use, development and subdivision of land in coastal hazard areas are managed by the district plan, replacing the provisions of the RCEP, as directed by the RPS.

Effectiveness in Addressing Issue:

4.58 This option would give effect to the RPS and NZCPS including relocating the management of the use, development and subdivision of land within the coastal environment from the Regional Coastal Environment Plan to the district plan. The information from the study could also be used to support other Council responsibilities such as infrastructure planning and lifeline utilities.

Risks:

4.59 In the absence of guidance from the Department of Conservation on the implementation of Policy 24 to the NZCPS, a methodology for such a study would need to be independently developed. The recent experience in Christchurch highlights the lack of clear direction for Councils trying to implement the requirements of the NZCPS. This option involves greater costs and time implications than Option 6 as well as carrying with it a reputational risk for the Council if the methodology is challenged.

4.60 The Council may also need to commission and undertake additional studies should the adopted methodology not be in line with the requirements of any future NPS on natural hazards or DoC guidance when they are published.

4.61 The above costs and risks of this option need to be weighed against the largely undeveloped nature of the coastline in Selwyn, the sparseness of the coastal population and lack of physical assets in this area.

Budget or Time Implications:

4.62 This option could result in the district plan review extending over 2 election cycles including undertaking community engagement as well as significant budgetary implications depending on the approved methodology. It also risks additional budgetary requirements if new studies are required post an NPS on natural hazard risk and/or Department of Conservation guidance on this matter.

Stakeholder and Community Interests:

4.63 Department of Conservation – comments awaited

- Environment Canterbury – see comments under Option 6

Other:

4.64 None

Recommendation:

4.65 That Option 7 is not adopted. This option could be costly to implement and cause delay to the DPR particularly given the current lack of clear guidance on the identification of coastal hazard areas. Given the limited extent of coastline in the district a full scale modelling exercise is not warranted until the guidance becomes available.

5.0 Conclusion

5.1 The investigation of flood and coastal hazard risk to inform the district plan review is influenced by the requirements of higher order planning documents, together with the cost and timing such investigations involve. Uncertainties in the implementation of these documents have also been identified in relation to the scale and extent of technical investigations they anticipate.

5.2 Recommended Option 2 for flood-risk investigations and Option 6 for coastal hazard investigations provide a pragmatic response to the requirements of the higher order documents and the associated uncertainties identified in this report. Overall they:

- Appropriately implement the RPS, NZCPS and the NPS-UDC.
- Achieve the least cost and time implication for the district plan review.

5.3 They also enable a programme for flood risk investigations to be established and allow time for further guidance and/or direction to become available in relation to investigating coastal hazard risk. These would inform future district plan work programmes.

6.0 Recommendation to DPC

6.1 The Project Team recommends that:

1. For flood-risk investigations, Option 2 be adopted
2. For coastal hazard investigations, Option 6 be adopted