

**BEFORE THE MANAWATU – WANGANUI REGIONAL COUNCIL (HORIZONS  
REGIONAL COUNCIL)**

*In the matter of*            **The Resource Management Act 1991; and**

*In the matter of*            **The Proposed One Plan: Consolidated Regional  
Policy Statement, Regional Plan and Regional  
Coastal Plan for the Manawatu - Wanganui Region**

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**SUPPLEMENTARY EVIDENCE BY DAVID RICHARD MURPHY  
FOR PALMERSTON NORTH CITY COUNCIL**

**CHAPTER 10**

**HAZARDS**

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Dated: 8 July 2009

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## Introduction

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1. My name is David Richard Murphy. I hold the position of Senior Policy Planner with the Palmerston North City Council. I have the tertiary qualification of Bachelor of Resource and Environmental Planning (honours) from Massey University and I am a full member of the New Zealand Planning Institute. I have seven and a half years planning experience, of which five years have been in local government with the Palmerston North City Council (PNCC).
2. I have read the One Plan Hearing Procedures and Directions and Requests from the Chairperson circulated to all submitters by Horizons Regional Council (Horizons) on 9 May 2008. I have read the Code of Conduct for Expert Witnesses (section 5 of the Environment Court Consolidated Practice Note 2006). I agree to comply with this Code of Conduct.
3. I have overseen PNCC's formal response to the Proposed One Plan: Consolidated Regional Policy Statement, Regional Plan and Regional Coastal Plan for the Manawatu - Wanganui Region (the One Plan) since the initial submission on the One Plan "Road Map" in October 2005. This work has included attendance at a number of meetings, including pre-hearing meetings, with Horizons officers; the preparation of PNCC's submissions on earlier One Plan working documents; and the preparation of PNCC's formal submission and further submission on the Proposed One Plan.
4. While PNCC has not commissioned specific hydraulic engineering evidence for this hearing, I have discussed the approach recommended by Mr. Phillip Percy with senior engineering officers at PNCC and Dr. Alastair Barnett, an experienced hydraulic engineering consultant used by PNCC.
5. In my role at PNCC I have been involved in a number of recent developments, including extensions to the City's urban limits, which have raised the flood hazard management issues that are the subject of Mr. Percy's s42A report and my evidence that follows. These developments have also involved significant communication with Horizons' planning and engineering staff.

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## Structure of Supplementary Evidence

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6. My evidence is structured in the following manner:
  - (a) Introduction (above)
  - (b) Structure of Supplementary Evidence (this section)
  - (c) Scope of Supplementary Evidence
  - (d) Planning Analysis
  - (e) Conclusions

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## Scope of Supplementary Evidence

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7. My supplementary evidence focuses on policies *10-2(a) Development in floodways* and *10-2(b) Other areas prone to flooding*. These policies are very significant to long term strategic land use planning within Palmerston North City. I will comment on the various policy options put forward to date and provide my preferred wording for the Panel's consideration.
8. My supplementary evidence covers the following matters:
  - Policy 10-2(b): Prescriptive approach versus non-prescriptive approach
  - Avoidance versus mitigation: What is the difference with respect to flood risk management?
  - Memorandum regarding Policy 10-2(a) dated 4 June 2009 and the Joint Memorandum regarding Policy 10-2(b), 10-3 and 10-4 dated 4 June 2009.
  - Jurisdictional issues surrounding policy 10-2(a), 10-2(b), 10-3 and 10-4.
  - When will Policy 10-2(b) be used?
  - The Caucusing Process
  - Supplementary Planning Evidence by Mr. Phillip Percy and speaking notes from 8 June 2009
  - Section 10 recommendations dated 20 May 2009 (post caucusing).
  - Chairperson's minute # 8 dated 29 June 2009.
  - Questions and issues from the panel during the officers report
  - Other matters
  - Policy 10(2)(a) - Floodways
  - Conclusions

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## Planning Analysis

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### **Policy 10-2(b): Prescriptive approach verses non-prescriptive approach**

14. I have been involved in ongoing discussions regarding the proposed flood hazard Policy 10-2(b) since prior to public notification of the Proposed One Plan.

15. On reflection, in my opinion, a key matter that has been overlooked with Policy 10-2(b) and its various iterations is an assessment of the optimum level of prescription for a flood hazards policy.
16. The following question needs to be carefully considered before reaching any conclusions on recommended Policy 10-2(b):

*Is the recommended prescriptive approach to Policy 10-2(b) the most efficient and effective means of giving effect to recommended objective 10-1: Effects of Natural Hazard Events?*

17. This matter is complicated by the reasonably new (2005) requirement for territorial authorities to “give effect to” the Regional Policy Statement (RPS) within their District Plans.
18. The recommended prescriptive approach for Policy 10-2(b), combined with the requirement for territorial authorities to “give effect to” the Regional Policy Statement will, in my opinion, essentially make recommended Policy 10-2(b) operate in a similar fashion to a District Plan rule.
19. To assist the Hearings Panel with this situation, I have prepared the following brief analysis on the optimum level of prescription for Policy 10-2(b):

Non-prescriptive approach - Introduction:

- a) The current operative RPS flood hazard policy falls within this non-prescriptive category. The PNCC submission on the Proposed One Plan supported the flexibility that is built into the current RPS flood hazard policy.
- b) While the notified version of Policy 10-2(b) is best described as a non-prescriptive approach its primary focus is on avoidance as opposed to avoidance or mitigation thus making it overly restrictive and unworkable, as noted in the PNCC submission.

Non-prescriptive approach - Pros:

- a) A non-prescriptive approach provides scope to enable the optimal flood risk management solution to be developed on a case by case basis through subsequent planning processes, e.g. plan changes (rezoning), subdivisions and building / resource consents.
- b) Like most resource management issues, flood risk management is a site specific process. A non-prescriptive approach allows for site specific considerations to be taken into account as part of each and every assessment. During caucusing, a number of example developments were taken through various iterations to Policy 10-2(b). This process highlighted that, generally speaking, no two developments are the same with regards to flood risk management.
- c) While it is not a strong reason to support a non-prescriptive approach, a quick analysis shows that a non-prescriptive approach is supported by other regional councils, e.g. Environment Waikato and Hawkes Bay Regional Council. The Hawkes Bay RPS simply states it will work with territorial authorities to avoid or mitigate the effects of flooding.

- d) District Plans manage the actual development of new structures and activities within the region. Regardless of whether or not the final version of the One Plan has a prescriptive or non prescriptive flood hazard policy, in my opinion, Horizons will need to continue to engage in District Plan reviews, Council initiated plan changes, private plan change requests, subdivisions, building consents and resource consents as part of its flood hazard information and advocacy roles. The planning processes that follow an RPS provide Horizons with sufficient opportunity to advocate for an appropriate outcome on a case by case basis.
- e) Substantial investment and new development can only occur within areas zoned for such a purpose within a District Plan. The rezoning of land is a significant and substantial planning process that involves full public notification, a requirement to consult Horizons at the earliest stage in the process (clause 3, 1<sup>st</sup> Schedule) and will in every case require a public hearing. The proposed flood mitigation or flood avoidance measures of any proposed rezoning in an area that is subject to any form of inundation is likely to be the one of the dominant resource management issues in question at the required public hearing. A non-prescriptive approach provides all parties with scope to reach an optimal solution as part of this process.
- f) A non-prescriptive approach reduces the risk of any unintended consequences that may result from a more prescriptive policy.

Non-prescriptive approach - Cons:

- a) The most significant weakness with the non-prescriptive flood hazard policy included in the current RPS is its lack of overall direction.
- b) A non-prescriptive flood hazards policy can be criticised as not offering anything over and above that provided in the RMA, i.e. the need to avoid or mitigate the effects of natural hazards.
- c) A non-prescriptive approach provides little certainty to the community, i.e. Horizons respond on a case by case basis.
- d) With a non-prescriptive flood hazard policy Horizons has to become involved in virtually all development proposals and advocate for an appropriate outcome. This can be a costly and time consuming process.
- e) Horizons has to repeat the same message across the region through the various lower level planning processes for all new developments that are subject to some form of inundation.
- f) Horizons technical response is subject to changes in staff meaning different approaches may be applied over time.

Prescriptive approach - Introduction:

- a) A more prescriptive approach to Policy 10-2(b) appeared to be the preference of Horizons' officers once it was agreed that mitigation was a critical requirement of Policy 10-2(b). This is understandable given the shift from the avoidance based policy included in the Proposed One Plan.

- b) Recommended policy 10-2(b) dated 20 May 2009 and the Version 1 policy 10-2(b) in the Chairperson's Minute #8 dated 29 June 2009 are best described as prescriptive approaches, mainly due to the "residual inundation" standard incorporated within the policies, although it is noted that both iterations of Policy 10-2(b) include an out-clause in the form of well constructed and maintained stop-banks or some other combination of water depth and velocity that can be shown to result in no greater risk to human life, infrastructure and property.
- c) Like most of these types of assessments, the pros and cons of the prescriptive approach are virtually the opposite of the non-prescriptive approach.

Prescriptive approach – Pros:

- a) Greater regional direction and certainty to the community.
- b) Greater guidance provided to territorial authorities to give effect to in their respective District Plans.
- c) Possible reduction in Horizons' involvement in individual developments.
- d) Likely to reduce the need for Horizons to repeat the same message across the region.
- e) Likely to result in a more consistent approach to flood risk management in the long term (assuming all developments are capable of being managed in a consistent manner).

Prescriptive approach – Cons:

- a) Reduced scope to match the optimal solution to the situation
- b) A prescriptive approach is likely to operate in a similar fashion to a District Plan rule taking into account the need for territorial local authorities to give effect to the RPS in their respective District Plans. For example, it is my understanding that there are parts of Marton that are subject to inundation by a 0.5% AEP flood. In my opinion, a strict "give effect to" application of recommended policy 10-2(b) dated 20 May 2009 and the Version 1 policy in the Chairperson's Minute #8 within the relevant District Plan means restrictions would need to be put in place on all new development in these parts of Marton, including minor extensions to existing dwellings. How can you avoid or mitigate the effects of flooding if a landowner wants to add a small extension to an existing bedroom? Should such a development be restricted in the relevant District Plan?
- c) Reduced ability to take into account site specific considerations.
- d) Possible unintended consequences resulting from a prescriptive policy, e.g. despite general acceptance that 0.2% AEP protection is desirable for extensions to the Palmerston North City urban boundary, in particular residential extensions, under the recommended wording for Policy 10-2(b) a private plan change applicant could force the issue that it is only willing to give effect to the required 0.5% AEP protection.

Note: 0.2% AEP protection may not be suitable or required for all new structures and activities in all parts of Palmerston North City. For example, Horizons has recently advocated for 0.5% AEP protection for an industrial

development located on the north eastern edge of Palmerston North City where the overall risks are much lower (an unnamed tributary of the Mangaone Stream)

- e) Horizons will still need to be involved in lower level planning processes, in particular District Plan reviews and plan changes as these establish the provisions that control new structures and activities.

Prescriptive verses Non-Prescriptive: Is there a possible middle ground?

- a) In my opinion, the optimal solution is some form of middle ground. This is what has been sought by the various experts through the caucusing process.
- b) In my opinion, there are a number of other factors relevant to the optimal flood risk management solution for a particular area that have not been provided for within the various iterations of Policy 10-2(b). These include:
- Consequential effects of meeting the residual inundation standard, e.g. the filling or raising of land can create very flat urban environments with little distinguishing features or odd manufactured landscape features such as a series of raised accesses;
  - the ability of identified beneficiaries to be able to meet the immediate and long term costs of the flood mitigation measures;
  - The scale and type of development proposed, e.g. different tests may apply for small and large developments. Likewise for industrial and residential development;
  - The proposed responsibility (ownership) of the flood mitigation measures and the rigour of any associated maintenance regime.
  - The benefits to be derived from existing flood mitigation measures, e.g. the Mangaone Stream stop banks in Palmerston North City provide protection to large parts of Palmerston North but they also provide protection to adjoining rural areas that may be suitable to urban development in the future;
  - The outcome of comprehensive land use strategies prepared by territorial authorities that have been developed in consultation with Horizons; and
  - The effects of any proposed mitigation measures, in particular the raising of land, on overland stormwater flowpaths.
- c) I see a possible middle ground as a policy that clearly articulates Horizons' overall objectives / outcomes with regards to flood risk management, includes the residual inundation standard as a matter that needs to be taken into account along with a number of other factors that must be taken into account when developing District Plans. This middle ground approach is my preference, and later in this evidence I provide suggested wording to reflect this approach.

**Avoidance versus mitigation: What is the difference with respect to flood risk management?**

20. There appears to be a level of confusion amongst the various experts, including myself, and other parties involved in flood risk management about what determines flood risk avoidance and flood risk mitigation.
21. Whatever the final makeup of the various flood risk policies included in the One Plan it is important that this point is clarified. It may require additional definitions to be added to the final version of the One Plan.
22. The PNCC submission was prepared on the basis that the filling (raising) of land was seen as a means of avoidance. More traditional stopbanking was seen as a form of mitigation.
23. Avoidance of areas subject to inundation may also be considered by some as requiring development to be restricted to areas that will *never* flood.
24. Various iterations of Policy 10-2(b) refer to a residual inundation standard that needs to be met as part of the required flood risk *mitigation*. This will generally require the filling or raising of land within areas subject to inundation within Palmerston North City.
25. Mr. Pete Blackwood refers to methods for *mitigation* in paragraph 13 of his evidence as including “filling”. Mr. Blackwood also provides a brief analysis on filling.
26. Clause (iii) of Version 1 of Policy 10-2(b) included in the Chairperson’s minute #8 reads as follows:
 

*The flood hazard is avoided by measures, that may include but are not limited to raising the natural ground level to a height above the 0.5% annual exceedence probability (1 in 200 year) flood.....*
27. The confusion appears to come from that fact that the filling of land to a certain height will avoid the effects of a specified AEP flood, in this case the 0.5% AEP flood, but it will not avoid the effects of a larger flood.
28. It appears filling is used in two different ways and therefore may be defined as either mitigation or avoidance. Where filling is used to manage the residual risk from failure of a stop-bank it is considered mitigation. Where land is filled / raised up to a certain AEP flood event it can be considered as avoidance (up to a certain AEP level).
29. I understand from a technical perspective that in some cases very well constructed and maintained stop banks may also be considered a means of avoidance.
30. As noted above, a possible solution is the inclusion of associated definitions, but this likely to be a difficult given the various scenarios described above. An alternative solution is to refer to both avoidance and mitigation measures into the various components of the final policy (see my recommended approach).



**Memorandum regarding Policy 10-2(a) dated 4 June 2009 and the Joint Memorandum regarding Policy 10-2(b), 10-3 and 10-4 dated 4 June 2009.**

31. A memorandum dated 4 June 2009 covering the scope to change Policy 10-2(a) was lodged with the Hearings Panel prior to the start of the Hearing.
32. A joint memorandum also dated 4 June 2009 covering the scope to change Policies 10-2(b), 10-3 and 10-4 was also lodged with the Hearings Panel prior to the start of the Hearing.
33. The two memoranda form part of the overall PNCC evidence provided to the Hearings Panel on this matter.
34. I have not attached the memoranda to my evidence as they have already been lodged with the Hearings Panel.

**Jurisdictional issues surrounding Policy 10-2(a), 10-2(b), 10-3 and 10-4**

35. PNCC considers there to be insufficient scope to make the amendments sought by Landlink to Policy 10-2(a) regardless of whether or not those amendments seek changes to the wording of Policy 10-2(a) or changes to the extent / inclusion of the Taonui basin in Schedule I.
36. PNCC considers there is significant scope to amend Policy 10-2(b). The PNCC submission provides the Hearings Panel with the option of adopting a non-prescriptive approach similar to that included in the current RPS or an approach consistent with those recommended by the reporting officer or myself.
37. Supporting legal submissions on these matters are to be presented by Matt Conway, Senior Associate, Simpson Grierson.

**When will Policy 10-2(b) be used?**

38. It is important to consider the various stages in the overall planning cycle that Policy 10-2(b) will be used.
39. As previously discussed, the final makeup of Policy 10-2(b) will need to be given effect to as part of District Plan reviews and plan changes, which in turn will be given effect through subdivisions, buildings consents and resource consents.
40. Policy 10-2(b) will also be a critical policy for all urban (industrial, commercial, residential and rural-residential) growth strategies that are generally undertaken outside of the RMA but with an eye to the RMA processes that will follow. In this sense there will be no point in identifying an area for future growth that cannot "give effect to" the RPS through the required District Plan zoning. As per other evidence prepared by PNCC on the One Plan, growth strategies will also need to take into account and balance a wide range of constraints, in addition to flooding.

**The Caucusing Process**

41. In my opinion, the caucusing process carried out leading up to the hearing proved very useful in focusing the various experts involved on the key issues and key areas of uncertainty / dispute.

42. As mentioned at the beginning of my evidence, on reflection, what was lacking was an overall assessment on the optimum level of prescription.
43. In my opinion, the final version of the flood hazard policies, in particular Policy 10-2(b) will have benefited from the caucusing carried out.

**Supplementary Planning Evidence by Mr. Phillip Percy and speaking notes from 8 June 2009**

44. Mr. Percy's supplementary evidence is an accurate reflection of the discussions held during the recent caucusing meetings.
45. The remaining issues with Policy 10-2(b) appear to be more a policy drafting matter as opposed to significant disagreement between the respective experts.
46. I support the statements made in Mr. Percy's speaking notes.

**Section 10 recommendations dated 20 May 2009 (post caucusing).**

47. I am reasonably comfortable with the 20 May 2009 recommended wording of Policy 10-2(b) should the Hearings Panel decide that a more prescriptive approach is required.
48. I have some reservations with the requirement in the 20 May version to meet the inundation standard (or some other combination of water depth and velocity) but also avoid or mitigate any increase in risk to human life, infrastructure or property except where these effects are adequately avoided or mitigated in accordance with the inundation standard. The circular nature of this requirement ignores the fact a number of mitigation approaches will generally result in some increased risk to human life, infrastructure or property, albeit minor risks or a risk acceptable to the community having weighed up all the other costs and benefits.
49. As mentioned above, I see (and prefer) a possible middle ground as a policy that clearly articulates Horizons overall objectives / outcomes with regards flood risk management, includes the residual inundation standard as a matter that needs to be taken into account along with a number of other factors that must be taken into account when developing District Plans.

**Chairperson's minute # 8 dated 29 June 2009.**

50. I am also reasonably comfortable with the Version 1 wording of Policy 10-2(b) included in the chairperson's minute #8 should the Hearings Panel decide that a more prescriptive approach is required.
51. I prefer the Version 1 wording of Policy 10-2(b) included in the Chairperson's minute #8 over that of the 20 May version recommended by the reporting officer.
52. I strongly support the reference in Version 1 to that part of the Palmerston North City Council district that is protected by the Lower Manawatu River Flood Control Scheme. The protection afforded to Palmerston North City is distinct from that of the rest of the region and this should be clearly recognised within the final policy. Various iterations of the Policy have become confused as a result of trying to accommodate this situation but not specifically referring to it.

53. One minor concern with Version 1 is that it is not clear what structures are included in the Lower Manawatu River Flood Control Scheme. Does it include the Mangaone Stream stop bank system that also protects significant areas within Palmerston North City from flooding? A definition may be required.
54. I support the addition of the *production land* clause in Version 1.
55. The key differences between my recommended policy 10-2(b) and the Version 1 wording of Policy 10-2(b) included in the Chairperson's minute #8 are:
- A different structure;
  - The overall objectives are outlined upfront;
  - Avoidance is identified as a preference;
  - 0.5% AEP is the minimum level of protection sought;
  - It is indicated that a higher level of protection may be appropriate in some parts of the region;
  - The extent to which a proposal achieves the preferred water depth and velocity is assessed along with a number of other factors relevant to any decision regarding the preferred method of flood risk avoidance or mitigation;
  - A number of new assessment factors have been introduced, e.g. the ability of identified beneficiaries to be able to meet the immediate and long term costs of the maintenance of any proposed flood mitigation measures; and
  - Clarity is provided around the Mangaone Stream stop bank system;
56. I cannot support the Version 2 wording of Policy 10-2(b) included in the chairperson's minute #8, largely for the reasons outlined within the PNCC submission and related evidence. Whilst *proposed mitigation measures* has been added to this version of the Policy, in my opinion, it still requires an unreasonable and unrealistic level of avoidance, i.e. despite the use of flood avoidance or mitigation measures, most forms of development located in areas subject to inundation are likely to result in increased risks to human life, infrastructure and property and will therefore be unable to pass the various tests included in the Version 2 policy. The argument for a policy that openly provides for mitigation is that the increased risks associated with the mitigation may be minimal (through well constructed and maintained stop banks or a low residual inundation) or could be a risk that the wider community is willing to accept having weighed up all the other relevant costs and benefits.

#### **Questions and issues from the panel during the officers report**

57. I was in attendance when Mr. Percy and Mr. Blackwood presented to the Hearings Panel on Hazards.
58. The matter of the recently completed NZ Standard on Flood Risk Management was raised. I concur with the response of the Horizons that the NZ Standard offers little assistance with the drafting of Policy 10-2(b). The NZ Standard is process oriented and ignores a number of the wider planning constraints that Policy 10-(2) has to balance.

### **Other matters**

59. Almost all versions of Policy 10-2(a) and (b) examined refer only to the Regional Council and Territorial Authorities. Private plan change applicants and resource consent applicants also have a role to play in the avoidance or mitigation of flood risks. This matter was discussed in caucusing and all experts were comfortable that an applicant's responsibility is picked up through the various planning processes administered by the Regional Council and Territorial Authorities, i.e. a private plan change request or resource consent has to be approved by a Territorial Authority. For this reason my recommended policy only includes reference to a Regional Council and Territorial Authority.

### **Policy 10(2)(a) - Floodways**

60. Outside of the submissions regarding the labelling of floodways, it seems all submissions received were in support of, or sought a strengthening of, Policy 10-2(a). Submitters in support included PNCC.
61. In this regard I support the recommended amendments to Policy 10-2(a) dated 20 May 2009.
62. Due to jurisdictional concerns I do not support the removal of the Taonui basin from Schedule I nor do I support amendments to the extent of the Taonui basin floodway.

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### **Conclusion**

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63. As mentioned earlier, I see a possible middle ground as a policy that clearly articulates Horizons' overall objectives / outcomes with regards to flood risk management, includes the residual inundation standard as a matter that needs to be taken into account along with a number of other factors that must be taken into account when developing District Plans.
64. PNCC could "live with" the Version 1 wording of Policy 10-2(b) included in the chairperson's minute #8 or the recommended wording included in the officers report dated 20 May 2009, however, in my opinion, a slightly more flexible approach than either of these is preferred for the reasons outlined within this evidence.
65. I do not support the Version 2 wording of Policy 10-2(b) included in the chairperson's minute #8 for the reasons outlined within this evidence.
66. I consider there is significant scope within the PNCC submission to amend Policy 10-2(b) in the manner I have suggested.
67. I do not consider that there is scope within the submissions received to make the amendments sought by Landlink, whether or not those amendments are amendments to the wording of Policy 10-2(a) or the extent / inclusion of the Taonui floodway within Schedule I itself.

68. In drafting a recommended policy I have attempted to include the matters from the “Version 1” Chairperson's minute policies and 20 May officer recommendations that I support. I have also drawn on my experiences from caucusing and the content of this evidence to refine the policy.
69. Taking into account the comments in paragraphs 20-28 of my evidence regarding what constitutes avoidance and mitigation, I have tentatively (note the shading) included avoidance and mitigation within the relevant clauses of my recommended policy.
70. In conclusion, I recommend that Policy 10-2(a) and (b) read as follows:

**Policy 10-2(a)**

The Regional Council and *Territorial Authorities* shall not allow the establishment of any new *structure* or activity, or any increase in the scale of any existing *structure* or activity, within a *floodway* mapped in Schedule I unless there is functional necessity to locate the *structure* or activity within such an area in which case the *structure* or activity shall be allowed provided that:

- (i) the *structure* or activity is designed so that the adverse *effects* of the flood event on it are avoided or mitigated; and
- (ii) the *structure* or activity is designed so that adverse *effects* on the environment arising from structure or activity during a flood event are avoided or mitigated.

**Policy 10-2(b)**

- (i) The Regional Council and *Territorial Authorities* shall prevent the establishment of any new *structure* or activity, or an increase in the scale of any existing *structure* or activity in an area that, in the absence of any flood mitigation measures, is likely to be inundated in a 0.5% annual exceedence probability (1 in 200 year) flood event unless either:
  - (a) the flood hazard is avoided or mitigated; or
  - (b) there is a functional necessity to locate the *structure* or activity within such an area provided that:
    - 1. the *structure* or activity is designed so that the adverse *effects* of the flood event on it are avoided or mitigated; and
    - 2. the *structure* or activity is designed so that adverse *effects* on the environment arising from structure or activity during a flood event are avoided or mitigated; or
  - (c) the *structure* or activity involves *production land*

in which case the structure or activity may be allowed
- (ii) Flood hazard avoidance shall be preferred to flood hazard mitigation.
- (iii) Avoidance or mitigation of the 0.5% annual exceedence probability (1 in 200 year) flood event shall be the minimum level of protection for any new occupied *structure*

or activity, or an increase in the scale of any existing occupied structure and activity. A higher level of protection may be appropriate in some parts of the region.

- (iv) Within that part of the Palmerston North City Council district that is protected by the Lower Manawatu River Flood Control Scheme, including the Mangaone Stream stop bank system, the establishment of any new *structure* or activity, or an increase in the scale of any existing *structure* or activity shall be allowed.
- (v) Where flood hazard **avoidance or mitigation** measures are to be utilised by the Regional Council and *Territorial Authorities*, the appropriateness of the proposed avoidance or mitigation measures shall be assessed taking into account the following matters:
  - (a) the risk of the flood hazard **avoidance or mitigation** measures failing;
  - (b) In the event of a failure of any flood hazard mitigation measures or during a 0.2% annual exceedence probability (1 in 500 year) flood event, the extent to which the inundation of occupied *structures* and access from occupied *structures* achieves a water depth and velocity no greater than the following, or some other combination of water depth and velocity that can be shown to result in no greater risk to human life, infrastructure or property:
 

Water Depth: 0.5m above finished ground level

Water Velocity: 1.0m/s
  - (c) The significance of any consequential *effects* that may result from meeting the water depth and velocity outlined in (b) above.
  - (d) The ability of identified beneficiaries to be able to meet the immediate and long term costs of the maintenance of any proposed flood mitigation measures.
  - (e) The proposed responsibility (ownership) of the flood **avoidance or mitigation** measures and the rigour of any associated maintenance regime.
  - (f) The scale and type of *structure* or activity proposed.
  - (g) The benefits to be derived from existing flood mitigation measures.
  - (h) The recommendations of any comprehensive land use strategies prepared by *Territorial Authorities* that have been developed in consultation with the Regional Council
  - (i) The *effect* of any proposed flood hazard **avoidance or mitigation** measures on overland stormwater flowpaths.
  - (j) The significance of any increase in risk to human life, *infrastructure* or property
- (vi) In circumstances where a structure or activity is allowed in accordance with Policy 10-2(a) or (b), the following effects shall be avoided or mitigated:
  - (a) Any reduction in the effectiveness of existing works or *structures*, including works and *structures* within River and Drainage Schemes, or natural landforms for avoiding or mitigating the effects of flood hazard events.

This policy relates to Issue 10-1 and Objective 10-1

A handwritten signature in black ink, appearing to read 'DMurphy', with a stylized, sweeping underline.

David Murphy  
**Senior Policy Planner**  
*City Future*  
PALMERSTON NORTH CITY COUNCIL