AECOM

Peer Review of Infrastructural Services Assessment Related to an Application for a Change to the Selwyn District Plan

Broadfield Estates Limited Edward Street Lincoln

Selwyn District Council

25 September 2009

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Prepared for

Selwyn District Council

Prepared by

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Quality Information

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Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
1	31/08/2009	Draft for Client Review		
2	21/09/2009	Final draft for client review		
3	25/09/2009	Final	Brendan Bisley Acting Regional Manager	

Table of Contents

1.0 Purpose

The purpose of this report is to describe a review by AECOM New Zealand Limited (AECOM) of an infrastructural services assessment prepared by subdivision engineering firm Davie Lovell Smith (DLS). That assessment was provided by Broadfield Estates Ltd (BEL) as part of their application to the Selwyn District Council (Council) for a private plan change to the Selwyn District Plan. The plan change application is intended to enable subdivision and development of BEL's land in Lincoln. The legal description of the applicant's land is Lot 1 DP 388824 CT 355094. The block is currently zoned Rural (Outer Plains).

The stormwater proposal is also intended to provide for runoff from an adjoining block of Council-owned land known as the Zee Straten block. The Council-owned land is described as Lot 96 DP 354488.

2.0 Background

AECOM was briefed by the Council to review transportation, water supply, wastewater and stormwater infrastructure aspects of a private plan change application by BEL. A separate report has been provided by AECOM on transportation matters.

Bruce Apperley of AECOM visited the site in September 2008 with Mr David Hobbs of BEL, Mr Andrew Hall of DLS, an engineer acting for BEL, and Mr Hugh Blake–Manson, Asset Manager Utilities for the Council, to discuss stormwater treatment and flow attenuation. The stormwater proposal discussed below reflects that discussed on site in September 2008. Following the site discussion the stormwater proposal was incorporated as part of an alternative within Council's Lincoln Integrated Stormwater Management Plan (ISMP). BEL's 2006 stormwater consent application to Environment Canterbury has also been reviewed. That application is currently on hold pending a decision by BEL about whether to proceed with it or to rely on Council's ISMP consent process

AECOM has also been involved in the development of Council's Wastewater Strategy, Water and Wastewater Demand policy, Lincoln designations for Council activities, Lincoln Outline Plan criteria to help Council manage development, and Council's Lincoln ISMP. Mr Apperley is familiar with the core infrastructure laid out in Council's Lincoln Structure Plan. He has had a series of discussions since September 2008 with Mr Blake-Manson relating to Lincoln water supply, wastewater and stormwater services including the two blocks that are the subject of this application.

3.0 5 Waters - Sustainability and Integrated Planning

Council has developed a set of long term integrated forward plans for district water infrastructure including Lincoln. These water resources planning documents include a set of sustainability principles accepted by Council in 2008 and a 5 Waters strategy in August 2009.

The 5 Waters include:

- Potable water supplies
- Stock water supplies
- Wastewater
- Stormwater
- Land drainage

Council has also commissioned a number of more specific strategies and plans including:

- District wastewater strategy

- Eastern Selwyn Sewer Strategy (ESS)
- Lincoln Integrated Stormwater Management Plan (ISMP)

In 2004 Council adopted a policy of not allowing additional connections to the Lincoln wastewater system until additional discharge capacity had been secured. This is discussed in more detail below.

Further strategic and specific asset management planning and funding processes and requirements are reported in Council's 5 Waters Activity Management Plan, Long Term Community Council Plan and annual plans.

Council is currently preparing a draft policy for potable water and wastewater demand and loss control.

The Council is developing an Engineering Code of Practice and compliance with that code will be required.

Council has had water, wastewater and stormwater network models developed and maintained.

Potable water, wastewater and stormwater are all considered in the proposal. Land drainage considerations may also affect stormwater requirements, as discussed below.

4.0 District Plan Requirements

The proposed subdivision will be assessed under the Selwyn District Plan at the time of hearing any subdivision consent application. The application however generally satisfies the water-related objectives, policies and methods of the District Plan, as outlined below.

WATER OBJECTIVES	Proposal	Compliance
Objective B1.2.1 Expansion of townships in Selwyn District maintains or enhances the quality of ground or surface water resources.	Reticulated water supply, wastewater and stormwater networks; water supply via secure wells; stormwater treatment by swales and wet ponds; improved riparian conditions; wastewater treatment and disposal via pipeline to upgraded Rolleston system; groundwater collection via new subsoil drains with disposal to surface water	Yes
Objective B1.2.2 Activities on land and the surface of water in Selwyn District:	Proposal as described in B 1.2.1 above.	
– Do not adversely affect ground or surface water resources;	Minor localised effects on groundwater resources	Yes
– Do not adversely affect waahi tapu or waahi taonga;	No known Maori cultural issues	Yes
– Maintain or enhance the ecological and habitat values of water bodies and their margins;	Benefits likely	Yes
– Maintain or enhance the water quality and ecological values of sites of mahinga kai (food gathering); and	Status quo or improvement	Yes

– Promote public access along rivers and streams, where appropriate. **POLICIES AND METHODS**	Would be achieved	Yes
General Policy B1.2.1 Ensure all activities in townships have appropriate systems for water supply, and effluent and stormwater treatment and disposal to avoid adverse effects on the quality of ground water or surface water bodies. Policy B1.2.2 Ensure land rezoned to a Living or Business zone can be serviced with a water supply and effluent and stormwater disposal without adversely affecting groundwater or surface water bodies.	Proposal as described in B 1.2.1 above Would be achieved Surface water (flooding) yet to be demonstrated)	Yes Expected, subject to demonstrating sufficient storage and sufficiently low outflow rate to avoid downstream flooding effects
Water Supplies Policy B1.2.3 Require the water supply to any allotment or building in any township to comply with the current New Zealand Drinking Water Standards and to be reticulated in all townships, except for sites in the existing Living 1 Zone at Doyleston.	As above	Yes
Policy B1.2.5 Require any sewage treatment and disposal to be reticulated in the townships of Castle Hill, Doyleston, Lake Coleridge Village, Leeston, Lincoln, Prebbleton, Rolleston, Southbridge, Springston, Tai Tapu and West Melton.	As above	Yes

5.0 Water Supply

Figure 1 below indicates the current Lincoln potable water network. Development is expected to include interconnections with that network and provision of new wells closer to the extremities of the overall development area.

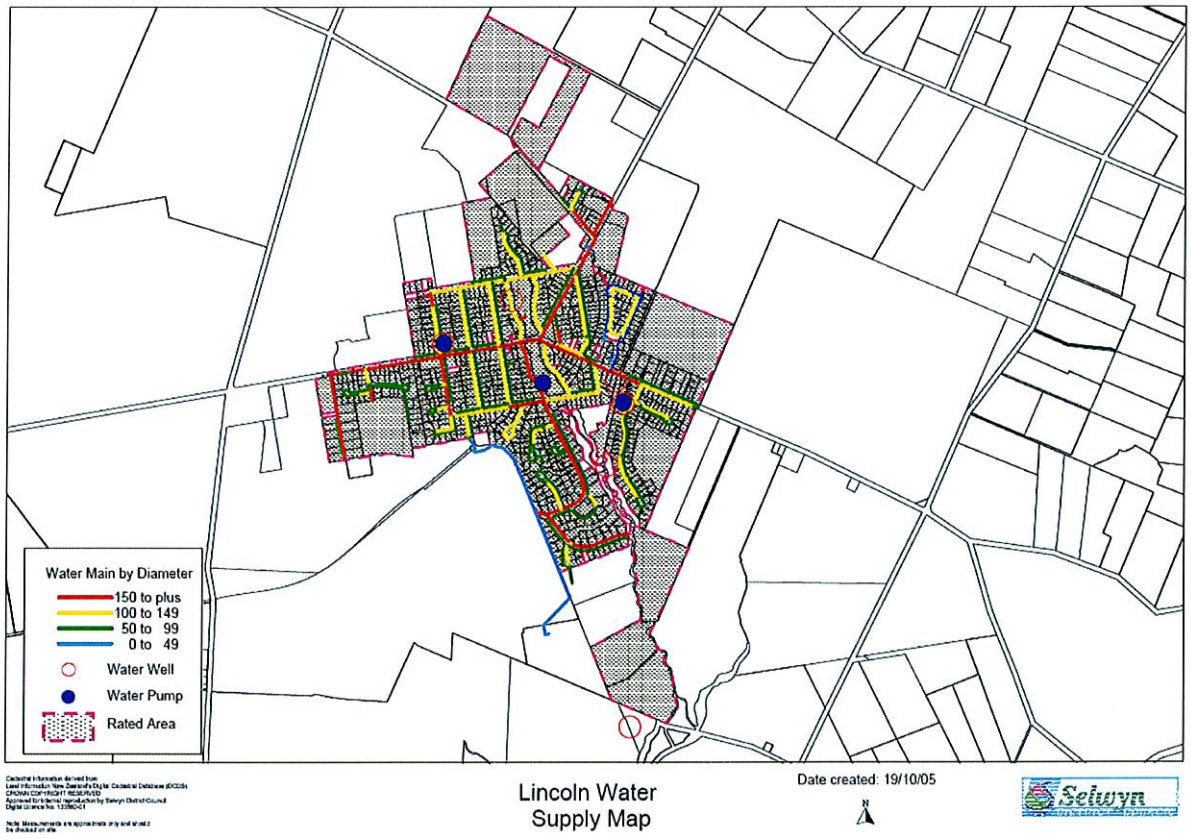

Figure 1 Lincoln Water Supply Layout

Upgrading and funding of the water supply network to provide for development, including that proposed in this plan change application, is expected to be relatively straightforward provided the necessary resource consents can be obtained for any new wells. Information is considered adequate at this plan change stage.

We recommend that further information be provided ahead of any subdivision consent application to allow for the expected substantial lead time for consenting of any additional well or wells. That information should include:

- Confirming the capacity of Council's current and proposed network to provide for peak summer and fire flow demands related to the proposal
- Defining any requirements brought about by the proposal for an additional well or wells, including where any such wells would be situated, and how and when they would be provided and consented, together with information on expected capital, operating and monitoring costs.

Updating of Council's water supply network model at the applicant's expense is expected to be required.

6.0 Wastewater

The current Lincoln wastewater network is shown in Figure 2 below.

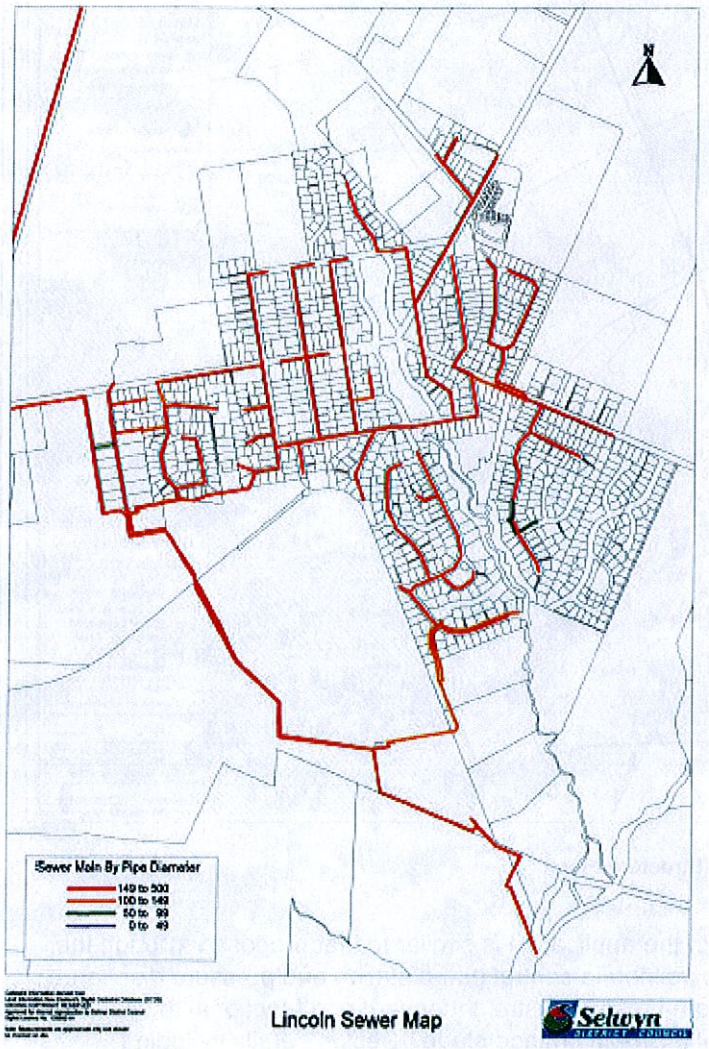

Figure 2 Lincoln Wastewater Network

The proposed wastewater network layout developed as part of the Structure Plan process is indicated in Figure 3 below.

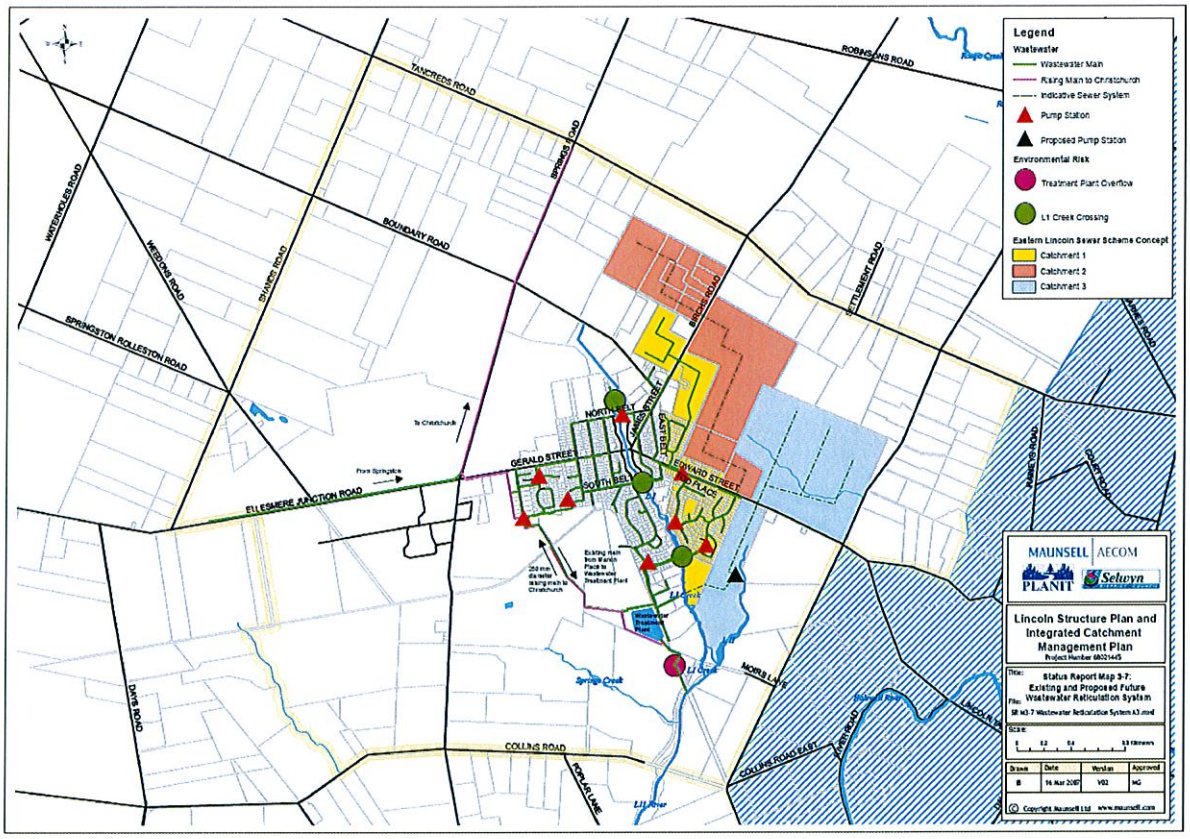

Figure 3 Proposed Wastewater Network Layout for Structure Plan

The local wastewater network as proposed in the application is similar to that proposed through the Structure Plan process. It includes gravity pipelines, a central pump station and pressure discharge offsite to Council's network. It is expected to be relatively straightforward and functional to design and build. Information is considered adequate at this plan change stage. Design details including connections with adjacent blocks can be defined closer to subdivision consent stage.

The "Deferred" status of the application relates to the availability of capacity in the Council's Lincoln wastewater system. The timing of capacity becoming available in the Council's wastewater system will be a key issue for this proposal proceeding. It will not prevent the planned development from proceeding to design stage, but it will constrain the date of first use of Council's system.

The Council's current discharge from Lincoln relies on connection to the Christchurch City Council's wastewater network. The capacity of that connection has been reached. To overcome the capacity constraints, the Council is planning to pipe Lincoln's wastewater to Rolleston for treatment and discharge there. The date of that system becoming fully operational, so additional wastewater for Lincoln can be accepted, depends on consenting and other processes. Current indications are mid 2012 at the earliest.

Further information will be required ahead of any subdivision consent application, to allow the Council to decide on connections to the Council's network and any network upgrading that is required. That information should include a review of capacity of Council's network to provide for peak wet weather and summer low flows related to the proposal. Information on any flushing or other requirements to cover low flows during staged development will also be required. Updating of the Council's wastewater network model at the applicant's expense is expected to be necessary.

7.0 Stormwater and Groundwater

7.1 Stormwater

Stormwater treatment and flow attenuation from this proposed development and other adjacent connected areas were initially proposed to be via a wetland to be constructed at the southern end of the block. The applicant's proposed stormwater treatment and flow attenuation system using a sediment pond and wet pond, with discharge to the L2 stream at the southern boundary, are as discussed on site with Council staff and the applicant in September 2008. The sediment pond and wet pond system was subsequently included by the Council as an alternative in the Council's ISMP. While this system is acceptable in principle at this Plan Change stage, there are a number of matters discussed below that will require further information to be provided before Council would consider adopting part or all of the system.

Resource consents have been applied for to allow construction and operation of the proposed stormwater system. That consent process is on hold pending the outcome of the Plan Change process that is the subject of this report and pending the outcome of Council's own consent applications for the ISMP that includes the BEL proposal.

The consent documents, as submitted to Environment Canterbury and including additional information provided to ECan under Section 92 of the Resource Management Act, described the following:

- 3,000 litre stormwater tanks on each property discharging via pipes to the streets
- Kerb and channel and piped systems in the streets
- Central swales in the main streets
- The first flush basin and secondary retention pond discussed above

While the proposed rainwater storage tank systems on private properties could mitigate peak flows to the public stormwater system, they would have a number of potential drawbacks as discussed below. Further information is required to demonstrate whether these or other private systems would be more practical and cost effective in the long term than other alternatives including the developer providing additional capacity in the public system for adoption by the Council.

AECOM's concerns include but are not limited to:

- The ability of property owners to modify or remove tanks and associated pipe work
- Possible insect nuisance and hazards
- The ability and costs for Council to monitor on-property systems and to require work on them
- Their effectiveness in major storms where their capacity may have been used before the most intense rainfall occurs
- Lack of a clear benefit/cost analysis, including life cycle costs, to all contributing ratepayers compared to other alternatives

In the absence of clear justification for the proposed private systems, we recommend that they be disregarded as part of stormwater mitigation from the proposed development.

The discharge from the proposed stormwater system will enter the L2, be carried through to Te Waihora (Lake Ellesmere) and eventually discharge to the sea. There are concerns about potential flooding effects, not only from the post-development peak flow but from the extended duration of that flow resulting from the additional discharge volume and possible worsening of downstream effects. In the absence of detailed and well calibrated modelling, current best practice[1] is to limit peak post-development flow to no more than 80% of pre-development peak flow and provide storage as required

[1] NZ Transport Agency Stormwater Treatment Standard for State Highway Infrastructure Draft March 2009

to meet that. This is more stringent than BEL's proposal that post-development flow should not exceed pre-development flow. Providing sufficient storage while retaining pond design depths may require additional earthworks and take up more site area. That may affect the layout shown on the applicant's outline development plan.

We understand the proposal includes infiltration media within the first flush pond to trap contaminants before the main detention pond. Before this could be considered for adoption by Council further details should be provided to demonstrate long term performance and maintenance requirements.

We recommend that the applicant be asked to confirm that the capacity of the proposed pond system will be sufficient for both the BEL block and the adjacent Zee Straten block, and that the proposed discharge rate will be constrained, to avoid any increase in flooding effects downstream up to and including the following:

- At least 50 year average return interval storm
- Critical duration to include downstream effects as far as the Lake Ellesmere outlet
- Rainfall intensity/duration data to include for climate change to at least 2090 as provided in Council's 2009 rainfall rates review

The applicant should also be asked to provide a development and maintenance plan for Council to review before subdivision consent stage. Information should include how the proposed stormwater ponds are to be laid out, planted and managed in the short, medium and long term. Issues to cover include avoiding or mitigating infestation by nuisance or noxious weeds and bird species including ducks and geese. Confirmation of ease and safety of ongoing truck access for maintenance including sediment and excess plant matter removal will be required. Confirmation of design, operation and maintenance of the proposed first flush infiltration system should also be provided.

The layout of riparian plantings, walkways etc to allow ecological continuity with nearby stormwater facilities are reasonably similar to those indicated in the Structure Plan and ISMP. Details can be confirmed at subdivision consent stage.

7.2 Groundwater

The applicant has indicated that groundwater drainage will be installed where required, discharging to the stormwater system, but has not provided any details on how or where that might be done, effects on groundwater levels and groundwater outflows.

Groundwater drainage is considered technically feasible at this conceptual Plan Change stage. Detailed information will however be required at subdivision consent stage to enable Council to determine acceptable criteria for any groundwater system to be adopted. Concerns will include expected lifecycle, location of components to enable maintenance and replacement and ease of maintenance and monitoring. Groundwater and land use consents may also be required.

7.3 Resource Consents

The matters discussed above may be included in or superseded by any conditions of any resource consents to be granted by Environment Canterbury either to BEL or to Council.

8.0 Submissions

Submitters have indicated concerns about:

- Certainty that adequate provision will be made for services
- Providing an integrated planning approach
- Taking of land for stormwater purposes

Sections 3 and 4 above confirm that Council has ensured adequate service provision and integrated planning.

As noted above, the applicant's water, wastewater and stormwater proposal are also sufficient at this plan change stage to demonstrate an integrated services planning approach and that adequate provision will be made for services.

The applicant's stormwater proposal is included as an alternative in Council's ISMP. The ISMP indicates that Council expects to site a wetland on a block of land off Ellesmere Road north of Moirs Lane. Practicalities dictate that this entire low lying block should be set aside, rather than attempting to split off part of it for ongoing pastoral grazing when soil conditions permit. The effects of the applicant's proposal on that block will therefore be minor. AECOM consider that extended use of that block is more sustainable than carrying out substantial earthworks to place larger stormwater facilities on the applicant's block.

Submitters have also asked that blocks to the west be considered for inclusion in the proposed plan change along with the BEL proposal. Those blocks are on the other bank of the L1 creek. Water supply linkages across the creek could be established. Linkages with the existing system to the north and to the west (Lincoln Land Developments) would however be required in any case. It would be logical for wastewater to flow directly to the existing pond site rather than be pumped under the creek then pumped back again. Stormwater requirements would be quite different and it would be very difficult to link into the proposed BEL wet pond system. Roading requirements would also be different. From an infrastructure viewpoint, we recommend that those blocks be considered separately.

Details of water and wastewater connections with and through adjoining blocks can be decided at subdivision consent stage.

9.0 Conclusions and Recommendations

The applicant's proposal for water supply, wastewater and stormwater systems is sufficiently developed at this proposed plan change stage to confirm that there are no fundamental reasons related to those systems for the plan change not to proceed.

It is recommended that:

- Further information on water supply is provided ahead of any subdivision consent application to allow for the expected substantial lead time for consenting of any additional well or wells. That information should include:
  - Confirming the capacity of Council's current and proposed network to provide for peak summer and fire flow demands related to the proposal
  - Defining any requirements brought about by the proposal for an additional well or wells, including where any such wells would be situated, and how and when they would be provided and consented, together with information on expected capital, operating and monitoring costs. Updating of Council's water supply network model at the applicant's expense is expected to be required.
- The proposed private stormwater storage systems should be disregarded as part of stormwater mitigation from the proposed development
- Further details of the proposed infiltration media within the first flush pond to trap contaminants before the main detention pond should be provided to demonstrate satisfactory long term performance and including maintenance requirements and costs.
- The capacity of the proposed pond system be confirmed as sufficient for both the BEL block and the adjacent Zee Straten block, and that the proposed discharge rate will be constrained to avoid any increase in flooding effects downstream up to and including the following:
  - At least 50 year average return interval storm

  - Critical duration to include downstream effects as far as the Lake Ellesmere outlet
  - Rainfall intensity/duration data to include for climate change to at least 2090 as provided in Council's 2009 rainfall rates review
- The applicant provides a development and maintenance plan for Council to review before subdivision consent stage. Information should include how the proposed stormwater ponds are to be laid out, planted and managed in the short, medium and long term. Issues to cover include avoiding or mitigating infestation by nuisance or noxious weeds and bird species including ducks and geese. Confirmation of ease and safety of ongoing truck access for maintenance including sediment and excess plant matter removal will be required. Confirmation of design, operation and maintenance of the proposed first flush infiltration system should also be provided.
- Other properties should not be included in the proposed plan change along with the BEL proposal