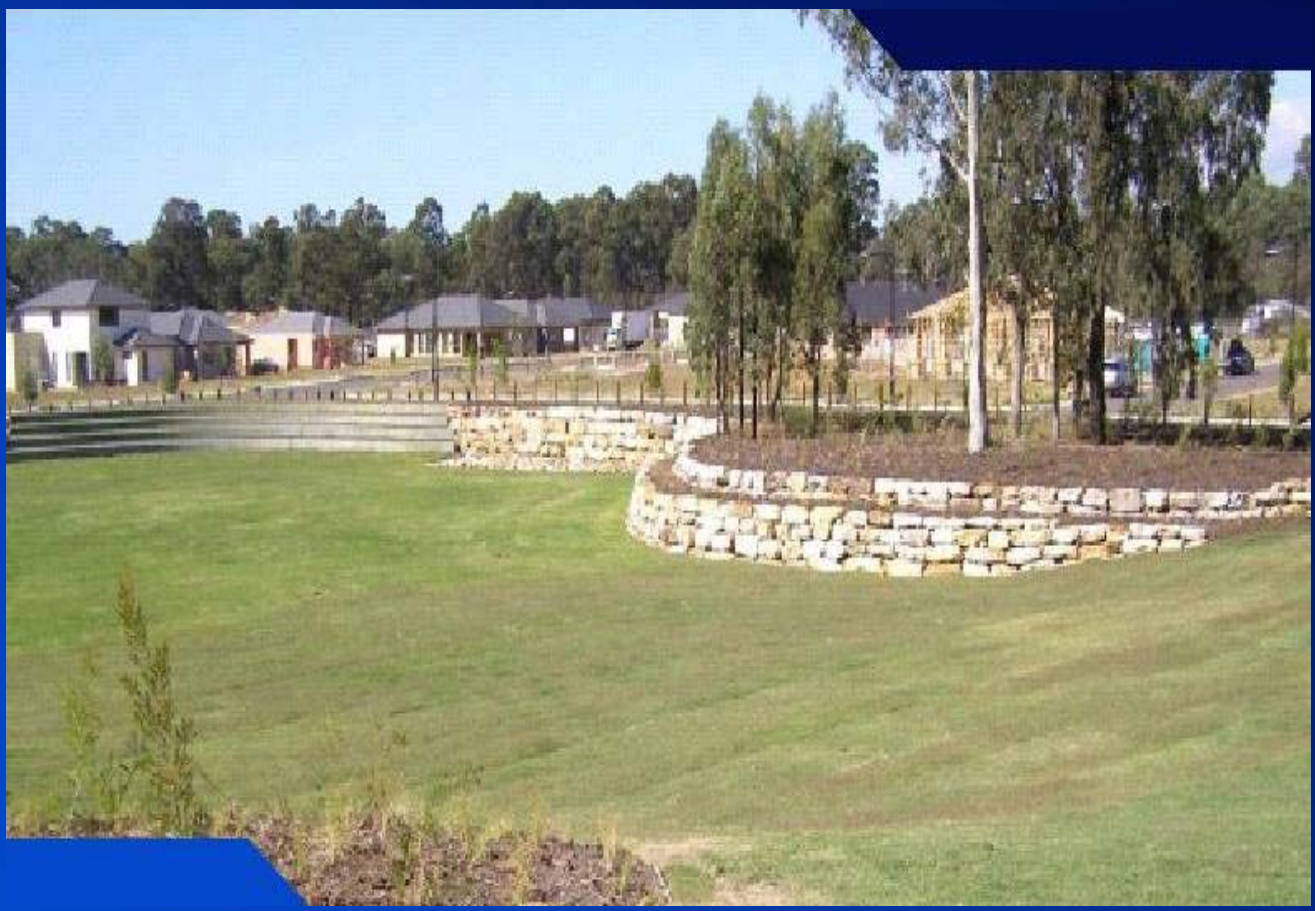
INFRASTRUCTURE REVIEW SECTION 75W MODIFICATION OF CONCEPT PLAN APPROVAL FOR NEWLEAF BONNYRIGG



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BONNYRIGG PARTNERSHIPS

NEWLEAF BONNYRIGG RENEWAL PROJECT

Infrastructure Review

Section 75W Modification of Concept Plan Approval

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1 INTRODUCTION

Hyder Consulting has been engaged by Bonnyrigg Partnerships to undertake a review of the proposed modification of the Concept Plan approval for the Newleaf Bonnyrigg Renewal Project (NBRP) Concept Plan variation.

This review will compare the approved Concept Plan documentation produced by Hughes Trueman (now Mott MacDonald) against the proposed modifications to the Concept Plan approval in order to ascertain any differences in the original assumptions, constraints and design criteria.

A coordinated master planning approach between the NSW Housing, Bonnyrigg Partnerships and Fairfield City Council (FCC) aims to renew the existing Bonnyrigg Estate by demolishing 833 existing residential dwellings in order to redevelop the land at increased density to provide private and social housing to the area. This will include a review of the infrastructure that services the area and an enhancement of the open space and community facilities serving the community.

The NBRP is proposed to be broken into 18 stages with the first two stages already constructed and the third stage under construction.

Staging boundaries for demolition and construction have been assessed to suit the proposed Concept Plan modifications and identify existing dwellings and services to be demolished whilst retaining services to existing dwellings to remain.

A review of the increased density (from 2332 lots to 2500 dwellings) will inform servicing provisions to the Concept Plan modifications.

2 EXISTING SITE DESCRIPTION

The NBRP site area is approximately 80 hectares in size and is located 40 km west of the Sydney CBD. It is adjacent to the suburbs of Edensor Park, St Johns Park, Bonnyrigg Heights and Mt Pritchard and lies within the Fairfield municipally. The master plan area is generally defined by Edensor Road to the north, Elizabeth Drive and Cabramatta Road to the south, Humphries Road to the east and Bonnyrigg Avenue to the west, excluding the privately owned dwellings.

The topography of the existing site typically consists of NSW Housing owned dwellings, some medium density housing and open space areas, which are scattered throughout the site. The upgrade of the area into a new community is consequently classified as a “brown field” development.

The existing site also has a number of features that adjoin or are found within the development area. These including a mix of low and high density residential housing, a shopping centre, schools, temples, an electrical substation, a petrol station, a Croatian soccer club, a number of privately owned properties and a large private estate found in the centre of the Newleaf Bonnyrig site.

In terms of the geology of the site, the area sits on Bringelly Shale comprising of carbonaceous claystone, claystone, and laminate, fine to medium grained lithic sandstone, rare coal and tuff. Sub surface strata encountered during intrusive investigations comprised of a variety of clay samples suggesting, given the nature of the materials and the site location, that the sub surface strata is likely to be residual soil that developed over Bringelly Shale. Geotechnical investigations conducted by Parsons Brinckerhoff indicate there was no evidence of contamination within the site and no free groundwater was encountered (JBS Environmental 2007).

3 PROPOSED SITEWORKS

3.1 Staging

It is proposed to develop the NBRP over 18 stages. The proposed modified stages have been reviewed against the approved demolition boundaries to minimise changes in these extents and reduce the impact of the proposed modifications to the Concept Plan on existing home owners and tenants. Continuous vehicular reticulation was prioritised to remove the need for temporary turning heads where possible and retain access to existing dwellings to remain in future stages. The staging design was also coordinated with gravity services (stormwater and sewer) to ensure that those stages in upper catchment areas could drain through lower lying stages, connecting to existing infrastructure where possible. The existing services reticulation throughout the development will be retained where possible and utilised for the proposed staging with minimal lead in works and upgrades required.

3.2 Earthworks

An earthworks review was undertaken for the approved Concept Plan so as to generally provide a balance across the whole development. Hyder has not undertaken a review of earthworks for the proposed modifications due to several factors (including lack of grading design information & inadequate / basic survey contours) but can comment that the approach adopted in the approved Concept Plan will be adopted for the proposed modifications.

We recommend that a new site grading exercise be undertaken at the detailed development phase for each stage in the modified Concept Plan with more accurate site survey in order to better ascertain likely earthworks volumes. The original earthworks volumes from the detailed design of Stages 1 and 2 have proven to be different to the original Concept Plan earthworks volumes (likely due to the basic level of survey / contours used for the initial grading exercise). The proposed site grading review can be used to better identify where material will need to be stockpiled, reused or borrowed across the entire development site. We also note that the anticipated earthworks might reveal areas of unsuitable or contaminated material that will need to be disposed of off-site.

Approximately 41% of the road, drainage and services can be retained due to the layout and road hierarchies. This will dictate many of the constraints for grading between existing site boundaries, existing roads and existing dwellings to remain

The stormwater, detention and water quality works within Stage 1 was identified as an area of major earthworks as was Stage 18 in order to ensure overland flow path for stormwater runoff. Our recent review of Stage 4b for the purpose of DA has identified steep terrain (up to 8%) which will require benching and retaining walls to establish building platforms. This is likely to continue across the eastern side of the site.

3.3 ROADWORKS

The proposed modifications include a reconfigured road network to provide access throughout. This reconfigured road network sees a reduction in the total pavement area however retains the same percentage ratio of existing pavement to remain versus proposed pavement. Proposed roads will require full pavement construction where existing roads will utilise as much of the pavement structure as possible and be resurfaced where required. The road upgrading works will include provisions for the replacement or improvement of pavements, kerbs and gutter, traffic control devices and intersection upgrades.

4 PROPOSED SERVICES

The site renewal process must cater for the existing services and residents in the estate. As part of this underlying commitment, the retention of services to all residents is crucial to the development process. A review of the proposed demolition and construction boundaries has identified some areas where lead-in works will be required in order to retain service connections to the existing dwellings to remain within a construction stage or dwellings to remain in adjacent future construction stages.

4.1 Stormwater

The NBRP is basically divided into 3 primary catchments; western, central (which also incorporate areas outside the site boundary of the NBRP) and eastern catchments, which occupy a combined area of 90 ha. The two smaller catchments (western and eastern) occupy approximately 4 and 19 hectares respectively while the larger, central catchment contributes to the remaining area.

The Central catchment is defined by the two natural ridgelines that run through the renewal site. Typically the catchment area grades towards a central reserve which runs south to north through the middle of the existing site. Grades within the catchment vary between 1% and 5%. The central reserve carries both minor and major events via low flow pipes and overload flow paths. The stormwater works for the central catchment were designed and constructed as part of Stage 1 works and included trunk stormwater mains, on-site-detention measures (noted as 7860m^3 in the approved Concept Plan) and water quality measures.

Hyder proposes to retain all aspects of the central catchment design (on-site-detention and water quality) through ensuring that the criteria used for this design are replicated in the Concept Plan modification. This will require the retention of stormwater pipe discharge locations to the central creek, no increase to the impervious fraction throughout the central catchment and generally direct overland flows as per the approved Concept Plan intention.

The Eastern catchment falls to the east with grades varying at 2 - 8%, until it reaches Humphries Road (which runs parallel to the ridgeline). Both minor flow pipes and overland flow paths within roadways then direct flow towards Green Valley Creek which runs north east of the development. Hyder has identified as part of the Concept Plan review that there will be increased flows coming from the NBRP being directed to Green Valley Creek which have the potential to flood those existing dwellings to remain east of Humphries Road. We have also identified that the existing street stormwater system may not have sufficient capacity to cater

for existing stormwater runoff from the site and that those houses east of Humphries Road may already experience flooding. On-site-detention for the eastern catchment (identified in the approved Concept Plan as 1000m^3 to be provided within Green Valley Creek) needs to be provided within the eastern catchment or the existing stormwater system upgraded / augmented in order to avoid impacting downstream lands with increased flows from the NBRP. On-site-detention will be reviewed on a per stage basis with measures implemented to detain flows so that stormwater discharge from the NBRP eastern catchment is no greater than the current developed state. Water quality also needs review as the approved Concept Plan location of treatment measures at crests does not allow treatment of water leaving the site (water quality measures should ideally be located at the low point of the site). Water quality measures will be reviewed on a stage by stage basis so that the ultimate discharge from each catchment is considered.

The Western catchment grades towards Bonnyrigg Avenue from the western ridgeline (which runs in a north-south orientation) at grades of 3 – 5%. Runoff is collected via the low flow pipe system, and also makes use of the spaces and road corridors that direct flow out of the catchment. On-site-detention is required at the lowest point of the site (identified as 390m^3 in the approved Concept Plan) to control stormwater flows from the western catchment to match the existing developed state. Water quality can be included at the same location as the on-site-detention to treat stormwater runoff.

The proposed modifications will match or better the pervious / impervious distribution of the approved Concept Plan in order to retain the design principles set therein.

Where possible, existing stormwater drainage infrastructure is to be retained and be augmented by proposed stormwater systems within the proposed roads.

4.2 Water

A 450mm diameter trunk main runs through the development from Edensor Road to Elizabeth Drive. This main is located within the central reserve and will not be re- located as part of the renewal works. The water main is located within a 5m wide easement and is of regional importance as it supplies water to the surrounding suburbs.

100mm diameter mains and larger are present across the site and will be retained where possible, however some re-locations will be unavoidable. It is intended to retain all of the mains present in the roads bordering the site; these however may require adjustment, particularly where affected by proposed roads. Table 4.2 from the approved Concept Plan indicates the location of mains 150mm diameter or larger within the development area or on the side of the external roads fronting the development.

Street Name	Water Main Size (mm)
Edensor Road	50 (x2), 150
Bonnyrigg Avenue	150
Elizabeth Drive	375
Cabramatta Road	375, 200
Humphries Road	200 (northern end only)
Bishop Crescent	200
Bunker Parade	150, 200
Reeves Crescent	150, 225
Palisade Crescent	150
Tarlington Parade	250 (southern end only)
Bradfield Crescent	450
Monash Place	450

Table 4.2 - Location of Water Mains

The approved Concept Plan included a feasibility study through Sydney Water which would still be applicable to the proposed modifications. This feasibility study found that there would be an adverse impact on supply to neighbouring areas but indicated that a pumping station and reservoir would not be required to service the development. Amplification of the water reticulation may be required to service the site but the precise nature and location of the amplification will need to be determined during the detailed design stage. It is noted that the use of recycled water or rainwater re-use may have an impact on the amount of amplification required.

4.3 Sewer

There are two main sewer carriers servicing the development:-

- The central system is a 400mm diameter main located within the Central reserve (servicing Stages 1, 2, 3, 4a, 5, 6a, 6b, 6c, 7, 11b, 12, 13, 14, 15, 16a, 16b, 17 & 18) and
- The eastern system is a 225mm diameter main crossing Humphries Road (servicing Stages 4b, 8, 9, 10 & 11a).

The existing sewer reticulation through the site consists mainly of 150mm diameter pipes and follows the same gravity driven principles as for stormwater drainage; dictated by the natural ridgelines through the site.

The Concept Plan report notes that Sydney Water has carried out detailed analysis of the existing sewer system. The result of this analysis is that no augmentation or upgrade of downstream infrastructure is required.

There is a calculated increase in equivalent population of 9.4% as a result of the site renewal (from 6608 EP to 7232EP). This increase will need to be coordinated with Sydney Water but should not have an impact on the previous detailed analysis carried out for the approved Concept Plan.

Some coordination with the proposed staging boundaries will be required to allow Stage 8 to drain through Stage 9 and Stage 11b to drain through Stage 12. Our initial review has identified the need to upgrade at least a 60m length of sewer from 150mm diameter to 225mm diameter where Stage 12 connects to the existing central system and to provide an additional 150mm diameter road crossing at Humphries Road which will connect into the existing sewer within an existing lot to the east of Humphries road.

4.4 Electrical

The existing low voltage electrical supply servicing the NBRP is primarily an underground reticulation network with some high voltage overhead cables traversing the site from the Integral Energy zone substation in Monash Place, north to Edensor Road on the northern boundary of the development.

Much of the overhead electrical cables have been relocated underground during the Stage 1 works and the remainder will be relocated underground in future stages.

Any new electrical reticulation will be provided in a shared trenching arrangement within proposed roads and will connect to the existing electrical supply system. The new reticulation will consist of both low and high voltage conduits / cables and associated pad-mount substations & switching gear.

There is insufficient capacity in the existing electrical reticulation requiring additional substations to be installed throughout the NBRP. Hyder has reviewed the proposed number of substations in the proposed modifications and confirm that the number proposed is consistent with other projects we have worked on of a similar nature.

The original Environmental Assessment noted Integral Energy is proposing to put plans in place to augment their zone substation in Monash Place and intend to construct a new zone substation at Abbotsbury over the next three years (from 2010), these upgrade measures and the connection between these sites with high voltage transmission lines will ensure that the NBRP can be serviced adequately throughout the staged process. Until this infrastructure is constructed the current electrical supply can support 1,400 dwellings. As the expected development program will not create more than 1,400 dwellings until 2013, it is expected that Integral Energy's current program is suitable. However, further discussion with Integral Energy should take place leading up to, and during the detailed design stage of the project.

4.5 Telecommunications

The existing telecommunications network consists of a below ground reticulated service. There is currently no exchange, major through route or broadband provisions on site.

Telecommunications will be installed for each stage in a shared trench arrangement and in accordance with the requirements of Telstra and the NBN. Existing conduits will be retained where possible and shared between Telstra and NBN (subject to their agreement on this).

Telstra were contacted during the Concept Planning and the Access Planning division indicated that Telstra have no future upgrades planned for the area and that no servicing issues are apparent.
Future long term and additional provision of Telstra and Optus services for the area will need to be reviewed with the service providers.

4.6 Gas

Existing gas mains are located in isolated areas of Newleaf Bonnyrigg. The majority of the existing gas mains within the estate are to be retained. The retained services are located in;

- Bonnyrigg Avenue (110mm PE);
- Cabramatta Road (50mm PE);
- Edensor Road (110mm PE);
- Elizabeth Drive (110mm PE);
- Hebblewhite Place (40mm PE);
- Monash Place (63mm PE); and
- Tarlington Parade (63mm PE).

Presently, only the central private properties and social housing to the north west of the site (situated between the playing fields and the shopping centre) have the provision of gas reticulation. Stages 1 and 2 were constructed with gas reticulation and an ability to extend the gas into the future stages as part of the shared trenching of services throughout the NBRP.

Gas supply to the future stages will be supplied from the retained mains and extension of the gas mains installed in previous stages. The existing mains are of various sizes with the 110mm PE supply feed main being located in Edensor Road.

The gas supplier, Jemena (formerly Alinta) was consulted at the original Concept Plan stage and has indicated that there is sufficient capacity to supply gas to the entire development area in a shared trench arrangement.