DRAINAGE CONCEPT BRIEF for

Proposed Private Hospital
At Greenwich

1 – 8 NIELD AVENUE
GREENWICH

Project No 0508 0028

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Prepared For

Murlan
Suite 110 Jones Bay Wharf
26 Pirrama Road
PYRMONT NSW 2009
Telephone (9552 1400) Facsimile (9552 1100)

Prepared By

The LHO Group
25 Atchison Street, St Leonards, NSW 2065
PO Box 114, St Leonards, NSW 1590
Telephone (02) 9439 1422 Facsimile (02) 9438 1242
E-mail - sydney@lhogroup.com.au

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STORMWATER CONCEPT BRIEF

1 INTRODUCTION

This report has been prepared by LHO Group Pty Ltd for Murlan Consulting P/L with Marchese & Partners Architects to assist the Developer and Architect in the planning of the proposed development with regard to the Department of Planning's Director Generals requirements for Project Application MP 07_0167.

The proposal is to redevelop a site of approximately 0.76ha at 1 – 8 Nield Avenue, Greenwich.

The site is currently occupied by residential buildings at the end of Nield Avenue, which is a cul de sac. The site area is approximately 45% impervious.

The proposed development is a Private Hospital, consisting of 147 beds in a 7 level building including car park in two basement levels. The site impervious area in the post-development conditions will be approximately 60%.

This report addresses the stormwater quantity and quality issues and proposes the design of Stormwater Concept Plan for this development.

The Stormwater Concept Plan has been prepared in accordance with Lane Cove Municipal Council's requirements (DCP- Stormwater Management) and DECC requirements.

This report should be read in conjunction with the architectural and landscape drawings of the proposed development.

2 HYDROLOGY-CATCHMENT

The redeveloped site is within the Core Creek Catchment on a steep 20% slope descending from the Pacific Highway.

The site elevation ranges from 92.00m (AHD) at the top at Nield Avenue to 73.00m (AHD) at the lower west site boundary.

There is an external catchment inflow to the site from:

- Nield Ave,
- The upstream eastern properties (0.465ha) and
- The neighbouring northern development (0.603ha with OSD system).

The site's existing stormwater drainage is limited to the developed areas and consists of buildings' roof drainage and sparsely located surface inlet pits on pavement with discharge to the council's 450mm diameter drainage pipe at the low western site boundary. The capacity of the receiving 450mm diameter pipe is equal approximately the to 2 year ARI storm runoff rate.

3 PROPOSED REDEVELOPMENT

Private Hospital consisting of 147 beds in a 7 level building are proposed. The total site impervious area will be increased from 45% in pre-developed to 60% in post-developed conditions. Approximately 0.1ha along the west site boundary will remain intact in its natural conditions.

4 COUNCIL REQUIREMENTS

OSD is required to limit discharges from developments to pre-development conditions. Council's OSD requirements have been formulated to ensure there is no increase in discharges from a site for rainfall events having a 1 in 100 year ARI.

4.1 STORMWATER QUANTITY CONTROL

The Permissible Site Discharge (PSD) from development shall not exceed 140l/s/ha.
The Site Storage Requirement (SSR) shall be designed to provide for 0.025m^3 for each square metre of basin catchment.

BASIX's requirements are not applicable for this development (commercial). Re-use rainwater facilities are provided to achieve a 40% reduction in the usage rate of potable water for irrigation purposes.

4.2 STORMWATER QUALITY CONTROL

The 3 months ARI site runoff shall be captured for treatment, via a gross pollutant trap, prior to discharge to the Council's stormwater drainage system. The captured site runoff shall be treated to the following standards:

- Litter & Coarse Sediment – 80% reduction,
- Fine Sediment – 50% reduction,
- Free Oils & Greases – 90% reduction and
- Nutrients (total phosphorous and total nitrogen) 45% reduction.

5 STORMWATER CONCEPT PLAN

5.1 STORMWATER QUANTITY CONTROL

On Site Retention

A water balance analysis for the post-developed conditions has been carried out for a 7 year period (1997-2003), taking into account rainfall data and daily water demand for irrigation.

The daily water demand for irrigation (landscaped area during irrigation season 0.30hax2.8mm/day) has been determined as 8.4ML. It has been found that a 50m^3 rainwater tank will supply approximately 40% of demand for irrigation to the 0.30ha landscaped area, during an average year (1200 mm depth of rainfall annually).

On Site Detention

The existing Council's receiving drainage system (450mm diameter pipe) has capacity of approximately 0.400m^3/s.and such flow rate has been adopted as PSD from the developed site and external catchment (1.9ha).

Ilsax model has been used to estimate required OSD .The Ilsax model files are enclosed in Appendix 2.

It is proposed to provide On-Site Retention and Detention in one underground tank under building B with the following capacities:

- 50m3 of storage as On Site Retention and
- 320m3 of storage as On Site Detention with High Early Discharge – total OSD 320m3.

AS water quality control measures are proposed:
- An Ingal's Enviropod Filter bags (200 micron) installed on inlets and
- StormFilters cartridges (2) installed in OSR chamber.

Roof Drainage

Internal roofed areas and box gutter drainage will be designed for the 100 year ARI to AS 3500.

Surface Drainage

Surface runoff is collected via a series of inlet pits in landscaped and paved areas and 150 diameter rainwater outlets on concrete slab areas.

The drainage system is designed to cope with the 100 year ARI storm event. The site discharge has been calculated using an ILSAX Model, and the size of the drainage line using the Hydraulic Grade Line procedure. The ILSAX Model input files are enclosed in Appendix 2.

Overland Flowpaths

Overland flowpaths are designed to cope with the 100year ARI flow rate and are provided over the main drainage lines (A, B & C).

Basement Drainage

A pumping station of 6.5m^3 storage capacity with dual pumping system is proposed for the basement to deal with the basement surface water and the building subsoil drainage system.

The basement drainage system is to be designed to AS 3500.

5.2 STORMWATER QUALITY CONTROL

Ingal's Enviropod filter bags (200micron) installed on inlets to tank will substitute for the first flush device and Stormfilter cartridges installed in the OSR part will adequately treat runoff to re-use quality for flushing toilets.

The proposed stormwater drainage is shown on drawings C00, C01, C02, C03, C04, C05, C06, C07, C08, C09, C10 and C11.

6 DRAINAGE EASEMENT

Drainage Easement 1.80m wide will be created over the drainage lines A, C and D.

7 SUBSOIL DRAINAGE

A 100mm diameter slotted PVC pipe system is to be laid beneath basement slab to collect any seepage from the surrounding substrata.

At this stage the proposed subsoil drainage shall be regarded as indicative only. At design stage when geotechnical data will be available, the subsoil drainage system will be further developed.

8 EROSION AND SEDIMENT CONTROL PLAN

During the construction phase a sediment and erosion control procedure will be implemented to follow the requirements of the NSW Department of Housing Soil and Water Management for Urban Development, August 1998.

Approximately 0.7ha will be disturbed during construction. To adequately treat run off for the 3 months ARI storm, a sediment basin with storage capacity of approximately 120m^3 will be required (Soil type D). It is proposed to use OSR/OSD tanks as temporary sediment retention basins.

Care will be taken to prevent uncontrolled discharge of any rubbish, soil and demolition wastes or other wastes arising from the site.

Further proposed elements controlling sediment within the construction site are:

- Catch drain,
- Sediment fences, and
- Stabilised site access.

The above measures as shown on drawings C00 (notes; Erosion & Sedimentation Control, Clay Soils and Maintenance Program) and details on H11, specifically address the requirements of the Department of Environment and Climate Change's recommended EA requirements as noted for Stormwater and surface water, Waste Management (stormwater) and Air Quality (spraying earthworks).

9 DRAFT STATEMENT OF COMMITMENTS

- Reduced stormwater discharge into Council's stormwater drainage system.
- Improved quality of stormwater discharge into Council's stormwater drainage system.
- Recycling of rainwater for landscape irrigation to reduce potable water consumption.
- Overland flow paths flow paths designed to convey exceptional stormwater flows safely around building.
- Council's existing stormwater drains to be diverted around the building in new easements.
- Subsoil drainage system to minimised possibility of ground water problems in site.
- Erosion and sediment runoff will be prevented during construction phase of project.
- Drainage will be located clear of the critical root zone of all retained trees and vegetation.

10 RECOMMENDATION

The proposed drainage system will adequately control the quantity and quality of the run off from the redevelopment.

We recommended the proposed design be implemented.

PIPE NETWORK - 1-8 Nield Ave, Greenich - St Leonards (Final) 19/03/07

```
* Post-developed conditions,
* Total catchment,
* Line A
* Driveway - 70m2 + Nield Ave 360m2,

A  1  -1  -1
 2  2  11  0.5  375  -1
0  0  0.8  0.6  0
A  2  0.1
0.0430  100.  6.0   0.   10.  0.0   0.0

* Site-driveway 300m2

A  2  -1  -1
 2  2  1  0.5  375  -1
0  0  0.8  0.6  0
A  3  0
0.030  100.  6.0   0.   0.  10.0   0.0

* 0.112ha-residential property,

B  1  -1  -1
 2  2  30  4  300  -1
0  0  0.8  0.6  0
A  3  0.5
0.112  90.  6.0   0.   10.  10.0   0.0

ADD B TO A

A  3  -1  -1
 2  2  33  0.5  375  -1
0  0  0.8  0.6  0
A  4  0.3
0.001  100.  6.0   0.   0.  10.0   0.0

* Site area 260m2,

A  4  -1  -1
 2  2  1  0.5  375  -1
0  0  0.8  0.6  0
A  5  0
0.0260  100.  6.0   0.   0.  10.0   0.0

* 0.106ha-residential property,

C  1  -1  -1
 2  2  30  4.0  300  -1
0  0  0.8  0.6  0
A  5  0.5
0.106  90.  6.0   0.   10.  10.0   0.0

ADD C TO A

A  5  -1  -1
 2  2  30  0.5  375  -1
0  0  0.8  0.6  0
A  6  0.3
0.001  100.  6.0   0.   0.  10.0   0.0

* Site area 390m2,

A  6  -1  -1
 2  2  15  1.0  375  -1
0  0  0.8  0.6  0
A  7  0.1
0.0390  50.  6.0   0.   50.  10.0   0.0

* Sitea area 350m2,

A  7  -1  -1
 2  2  25  1.0  375  -1
0  0  0.8  0.6  0
A  8  0.4
0.0350  50.  6.0   0.   50.  10.0   0.0
```

* Sitea area 265m2,

```
A   8   -1  -1
 2   2   3   1.0   375  -1
0   0   0.8   0.6   0
A   9   0
0.0265   50.   6.0    0.    50.   10.0    0.0
```

* Line B
* 0.1250ha-residential property and 480m2 of council's land,

```
D   1   -1  -1
 2   2   25   5   300  -1
0   0   0.8   0.6   0
D   2   0.3
0.1730   70.   6.0    0.    30.   10.0    0.0
```

* Site area 645m2 and Council's 420m2,

```
D   2   -1  -1
 2   2   30   1.0   300  -1
0   0   0.8   0.6   0
D   3   0.3
0.1065   55.   6.0    0.    45.   10.0    0.0
```

* Site area 660m2 and Council's 370m2,

```
D   3   -1  -1
 2   2   20   0.5   375  -1
0   0   0.8   0.6   0
D   4   0.1
0.1030   45.   6.0    0.    55.   10.0    0.0
```

* Site area 260m2,

```
D   4   -1  -1
 2   2   18   0.5   375  -1
0   0   0.8   0.6   0
D   5   0.1
0.0260   25.   6.0    0.    75.   10.0    0.0
```

* Site area 1260m2,

```
D   5   -1  -1
 2   2   23   0.5   375  -1
0   0   0.8   0.6   0
D   6   0.2
0.1260   75.   6.0    0.    25.   10.0    0.0
```

* Site area 2170m2,

```
D   6   -1  -1
 2   2   10   0.5   375  -1
0   0   0.8   0.6   0
D   7   0.1
0.2170   70.   6.0    0.    30.   10.0    0.0


D   7   -1  -1
 2   2   10   0.5   375  -1
0   0   0.8   0.6   0
A   9   0.1
0.0001   70.   6.0    0.    30.   10.0    0.0
```

ADD D TO A

```
A   9   -1  -1
 2   2   1   0.5   600  -1
0   0   0.8   0.6   0
A   10   0
0.0001   70.   6.0    0.    30.   10.0    0.0
```

* OSR/OSD Tank with HED
* Orifice 230mm dia,

```
A   10   -1  -1
 10   4    10    0.5    300    -1
A   11  0
4
  75.00    0.0      0.0000   0.000
  79.65    2.0      0.2340   0.000
  79.80  200.0      0.2380   0.000
  80.00  320.0      0.2430   0.000
  80.10  325.0      0.2460   0.500
0
0.001  0   6   0   100   10   0

A   11   -1  -1
 2  2  1  0.5  600 -1
0  0  0.8  0.6  0
A  12  0
0.0001  70.  6.0   0.   30.  10.0   0.0
```

* Neighbour property with OSD system-outlet connected to commont existing 450 outlet,
* Branch E
* Residential develop-0.603ha-80% impervious-with OSD,
* PSD = 0.603ha x 140l/s/ha = 84l/s,
* SSR = 0.603ha x 255m3/ha = 154m3
* Overflow by-passing site,

```
E   1   -1  -1
 10   4    10    0.5    300    -1
E   2  0.3
4
 2.00    0.0      0.0000   0.000
 2.95   20.0      0.0800   0.000
 3.05  250.0      0.0840   0.000
 3.10  260.0      0.1000   3.000
0
0.603  80  6   0   20   10   0

E   2   -1  -1
 2  2  70  1  375 -1
0  0  0.8  0.6  0
E  3  0.5
0.0230  50.  6.0   0.   50.  10.0   0.0

E   3   -1  -1
 2  2   1  1  375 -1
0  0  0.8  0.6  0
A  12  0
0.0001  50.  6.0   0.   50.  10.0   0.0
```

ADD E TO A

```
A   12   -1  -1
 2  2  1  5  450 -1
0  0  0.8  0.6  0
A  13  0
0.1040  5.  6.0   0.   85.  10.0   0.0

A   13   -1  -1
 2  0    1   2   900. -1
0.001  87  6.0   0.  13   10.  0.0
```

END