

MANILDRA GROUP

**PROPOSED FLOUR MILL
MANILDRA STARCHES PLANT
OFF BOLONG ROAD, BOMADERRY**



HYDRAULIC ASSESSMENT

MARCH, 2007

WEBB, McKEOWN & ASSOCIATES PTY LTD



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Figure 1: Study Area

Figure 2: Existing and Proposed Development, Manildra Starches Plant

Figure 3: Aerial Photography, 1986, Manildra Starches Plant

Figure 4: Aerial Photography, Circa 1999, Manildra Starches Plant

Figure 5: Aerial Photography, Google, Manildra Starches Plant

1. BACKGROUND

The subject land (Figure 1) is located on the northern bank of the Shoalhaven River adjacent to Abernathys Creek and on the southern side of Bolong Road. The townships of Nowra, Bomaderry and Terara are all in close proximity to the subject site. The site is occupied by the Manildra Starches Plant and is within the 1% annual exceedance probability (AEP) floodplain of the Shoalhaven River as defined in the *Lower Shoalhaven River Flood Study* (April, 1990) which was prepared by Webb, McKeown & Associates (WM) for Public Works.

During major rainfall events, runoff from the Shoalhaven River catchment will enter the subject land from the south and from the Bomaderry Creek catchment to the west. Once the banks of the Shoalhaven River and Bomaderry Creek are overtopped, floodwaters will pass over the site, between the existing plant and associated buildings and towards Bolong Road. Once Bolong is overtopped, floodwaters will continue north, spreading out over the low-lying floodplain. Ultimately the floodwaters return back to the Shoalhaven River further downstream of the site. The northern floodplain is also inundated from local catchment runoff directly entering the floodplain. The main contributor is Broughton Creek.

The largest floods in recent times were in August 1974, June 1975, March 1978 and April 1988. These events would all have overtopped the river bank (in parts) and caused overbank inundation. Of the four, the largest was March 1978 which reached approximately 5.0 mAHd near the site.

In addition to the existing plant and associated buildings at the subject site, other development is evident on the Shoalhaven River floodplain in the vicinity. This includes a concrete batching plant (Cleary Bros), a paper mill, the Dairy Farmers complex (now closed), the 5 storage ponds opposite the paper mill, and on the opposite (southern) river bank, the Riverview Road and Terara village flood protection levees. These developments on the floodplain have resulted in a reduction in the available flow area and floodplain storage capacity during a major flood event.

It is currently proposed that a flour mill be constructed within the Manildra Starches Plant off Bolong Road, comprising (refer Figure 2 for location and plan extent):

- a 9 m diameter silo,
- a flour mill (approximately 23 m by 11 m).

This report investigates mainstream flooding resulting from Shoalhaven River or its major tributaries overtopping their banks. The impact of local catchment runoff within the site or from the nearby surrounds (such as Abernathys Creek) are not addressed. WM has not quantified the flood hazard, safety considerations or made comment on the suitability or otherwise of undertaking further development on the floodplain. These issues have been addressed by others.

2. DISCUSSION ON HYDRAULIC IMPACTS AND CUMULATIVE EFFECTS

2.1. Existing Development

Development at the subject site has continued progressively since at least the 1960's. Aerial photography showing the site in 1986 (Figure 3) indicates that from at least the early 1980's the extent of development along the immediate northern river bank has been intensive and extensive. A comparison between the available aerial photography shown on Figures 3 to 5 indicates that the majority of development within the Manildra Starches Plant over that time period has been concentrated around the northern boundary of the site, near Bolong Road.

Development approval for the existing plant and associated buildings within the subject site has, to date, not been subject to detailed hydraulic modelling. Previous assessments have been based upon local flood information and knowledge available at the time. (Development outside the site has required an investigation of hydraulic effects.) In consultation with the then DLWC (now DNR) and Council in 2000 (refer Report titled *"Further Development within the Manildra Starches Plant off Bolong Road, Bomaderry"*, dated October 2000), it was agreed that the Manildra Starches Plant should be regarded as 'existing and approved'. The hydraulic impacts and cumulative effects of any further development (within the site) should be compared to this existing state of development.

The majority of the subject site now comprises an extensive built-up arrangement of plant and associated buildings which would almost completely obstruct the movement of overbank floodwaters through the site. The intensively built-up area is shown on Figures 2 and 4 and comprises approximately 60% of the subject site lying east of Abernathys Creek, south of Bolong Road and to the car park in the east. From examination of the available plans and current aerial photography (Figures 2 and 5), it is estimated that approximately 80% to 90% of the area within the intensively built-up area provides a total barrier to the movement of floodwaters from the river northwards.

The only opportunity for floodwaters to pass through this built-up area is through the limited number of gaps or openings between the existing plant and associated buildings. These "gaps" or openings generally satisfy trafficability requirements within the site. The capacity of these "gaps" to convey overbank floodwaters through the site would be low due to their meandering path (see Figure 2). In addition, the existing fence along the northern site boundary fronting Bolong Road further obstructs the movement of any floodwaters able to pass from the river northwards through the site.

2.2. Proposed Development

The hydraulic impacts of any proposed development on the floodplain are typically quantified by the use of an appropriate hydraulic model. In this case, the hydraulic impacts and cumulative effects of the proposed development within the intensively built-up area of the Manildra Starches Plant are considered insignificant for the reasons detailed below.

The locations of the proposed development is shown on Figure 2. The extent and density of the existing built-up area (as detailed in the previous section and shown on Figures 2, 4 and 5) is such that the remaining space available for additional development is so limited that the additional hydraulic restrictions provided by the development would be very minor. Hence it follows that it would have only a very minor adverse hydraulic impact and would only add marginally to the overall cumulative effect of the total development. For our October 2000 study it was decided in consultation with Council and the then DLWC, that provided the proposed development was within the intensively built-up area shown on Figures 2 and 4, hydraulic modelling to quantify the hydraulic impacts and cumulative effects would not be required.

A qualitative assessment of each component of the proposed development is detailed below to further confirm that the hydraulic impacts and cumulative effects are insignificant.

- The proposed 9 m diameter silo is to be located largely in the “shadow” of an approved 10 m diameter silo (this silo has been slightly relocated to accommodate development constraints) and will therefore have only minor impacts on existing flood flow paths.
- The proposed flour mill is located so as to minimise any hydraulic impacts as it is largely in the “shadow” of the existing adjoining building. However the eastern section of the building does “close off” a 7 m wide flow path. However it should be noted that there are several other flow paths through the site (refer Figure 2).

3. CONCLUSIONS

3.1. Conclusion from our October 2000 Report

The following text is taken from our October 2000 report.

“In consultation with Council and the DLWC, it is agreed that any future development of the Manildra Starches Plant within the intensively built-up area, as defined on Figures 2 and 4, will not require hydraulic modelling to quantify the hydraulic impacts and cumulative effects. The hydraulic impacts and cumulative effects of such developments are considered to be insignificant given the intensive development already present. As mentioned in previous sections, the only opportunity for floodwaters to pass through the intensively built-up area of the site is through the limited number of gaps or openings between the plant and associated buildings. Although these gaps or openings may be relocated to accommodate any future development, the movement of overland floodwaters will never be completely blocked, as gaps or openings similar to those which currently exist will always be maintained for trafficability requirements.

Any proposed future development is not exempt from flood hazard and structural assessment.”

3.2. Proposed Development

For the reasons detailed above, hydraulic modelling of the proposed development has not been undertaken and the hydraulic impacts and cumulative effects of this proposal are considered to be insignificant given the intensive development already present. There is a need however, to consider (amongst other things) the flood hazard and structural assessment (with regard to velocity of floodwaters and impact by flood debris) of the proposed development. In quantifying the flood hazard, some important issues for consideration include:

- damage to the plant, including as a result of flood debris or structural failure,
- damage to the plant due to the possible buoyancy of equipment,
- malfunction of the plant (or any services on which the plant relies for operation) as a result of inundation and the associated risk of such malfunction to other users of the floodplain,
- access and evacuation of workers from the site during floods.

These issues need to be addressed at the detailed design stage and submitted as part of the Construction Certificate.

FIGURES

