NORTHROP

MULTIDISCIPLINE REPORT

Chapel Street Transformation

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PREPARED FOR
HASSELL
61 Little Collins Street
Melbourne VIC 3000

Multidiscipline Report

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1. Introduction

Northrop Engineers have been engaged as the civil engineering consultant as part of the Hassell team for the Chapel Street Transformation project. The City of Stonnington is embarking on a project to explore ways of improving Chapel Street now and into the future, whilst balancing the many existing uses for the space.

Working alongside the design team, Northrop have been engaged to provide civil engineering and flooding advice that will help shape the opportunities for improvements. This will involve looking at the opportunities across the whole project area and how these improvements may be delivered in smaller stages over time.

This report has been prepared as part of an overall return brief that is being prepared by Hassell as the lead consultant. This report is to be read in conjunction with other consultant's reports. It is intended to provide initial feedback on the following key aspects:

- Summarise the existing conditions, based on the information that is currently available
- Identify possible opportunities and constraints in relation to the possible future projects
- Identify areas / aspects of more detailed analysis that will be carried out in subsequent phases
- Identify further investigations that are required
- Identify statutory requirements or other external factors that could impact the future projects+
- Provide high level recommendations for project solutions

The return brief will be used to help inform the following Master planning phase of the project and identify potential next steps for the project.

2. Background

2.1 Context of Project

The City of Stonnington have identified their desire to look for opportunities to provide staged improvements to Chapel Street that will transform it into one of the great streets of the world.

The project scope has been identified as the zone of Chapel Street from Alexandra Avenue to the north and Dandenong Road to the south. Whilst the focus of the project is on the Chapel Street corridor, consideration may be given to improvements along connecting/adjacent areas to achieve associated benefits to Chapel Street.

Figure 1 – Scope of Project

Whilst Chapel Street is a recognisable precinct in Melbourne, there are several challenges that have been identified as areas that need to be addressed to achieve the desired outcomes. These include, however are not limited, to:

- Heavy congestion in the road corridor that is currently accommodating vehicles, trams, bicycles, and pedestrians

- Accommodating sufficient zones for pedestrian movements due to the high density of retail and hospitality venues and whilst maintain pedestrian safety
- Learnings from covid around the need for flexible spaces to help accommodate changes in the use of hospitality venues (e.g., outdoor dining and further impact on pedestrian movements and safety
- Significant localised flooding in various locations and a desire to improve water cycle management
- Increasing the amount of landscaping to 'green' the corridor

We understand a masterplan will be developed that will explore the opportunities for improvements and how these improvements could be separated into smaller individual projects. These projects should then be considered in order of priority and delivered over several years to reflect the available project funding.

2.2 Existing Conditions

As mentioned above, the existing road corridor is congested and is required to serve multiple uses and poses problems for vehicles and pedestrians alike. There are however several other existing conditions that need to be considered and addressed in the design of possible future projects. These include however are not limited to:

- Topography
    - The site levels vary along the length of Chapel Street with a general fall from south to north for most of the street, however there are several zones where there are localised depressions. There are also significant portions of the corridor that are relatively flat. These topography characteristics impact stormwater conveyance within the road corridor, either below ground in low flow events or above ground in high flow events, and will be critical in assessing as part of the concept and detailed designs

    - These low points include the junction with Commercial and Malvern Roads, as well as near Malcolm Street, which we understand have both experienced substantial flash flooding in the past

    - There are also significant portions where the local surrounding streets are grading towards Chapel Street. Whilst we haven't received detailed information on the existing drainage network, we would anticipate the Chapel Street corridor is relied upon for conveyance of minor and major flows in rain events

    - Whilst the topography has a significant effect on the flow of stormwater, there will be very limited opportunity to change topography to improve the overall conditions. There may be some opportunity to make minor improvements in localised streetscape zones, however in general, we anticipate the ability for significant or wholesale changes will be extremely unlikely/limited

    - Detailed consideration will be required for how localised changes in level could have wider impacts

- Road Reserve
    - The available Road Reserve is a key consideration for the project, as this is set and we understand it is unable to be altered. There is however the opportunity to consider the available width of the road corridor that is made available for pedestrians, parking and moving vehicles, through realignment of kerb lines and reapportioning for use

    - Any adjustment of kerb lines will however change the available width to convey overland flow in larger storm events with the potential increase depths of local flooding. Careful consideration and discussion with council will be required to determine whether there are any locations within the project where this may be acceptable. Consideration will also need to be given as to what strategies could be employed to prevent or limit this issue. This is described further below.

    - The trams are expected to remain a permanent feature of Chapel Street and therefore any future works will need to be coordinated around the trams. Works are also likely to require consultation and approval from Tarra Trams

    - The current road corridor incorporates several pedestrian crossings at intersections and within key retail areas. We understand improving pedestrian safety will be a key consideration in the project, and therefore adjustments to the type and locations of pedestrian crossings are likely to be considered. These adjustments will require consultation and approval by the Department of Traffic (DoT).

- Services
    - Further site survey and services investigations will be required, however it is understood there is a combination of live and redundant services throughout the road carriageway and footpaths. These will need to be investigated and coordinated with future projects and inground works

2.3 Lessons from Previous Projects

Based on information provided by Council and anecdotal feedback provided during the site walk, there have been several improvement projects that have been carried out in the precinct in recent years.

Although we have not carried out a detailed investigation of the various projects, Council expressed that the projects that have been delivered recently have had varied success in achieving the intended outcomes from a civil engineering and stormwater management perspective. These included, however are not limited, to the following:

- The use of Raingardens adjacent to the carriageway has been employed in some locations, however they have had varied success particularly in relation to maintaining the health and therefore effectiveness of the plant species within. Council expressed that these raingardens also require significant maintenance and are unlikely to be meeting the intended water quality objectives

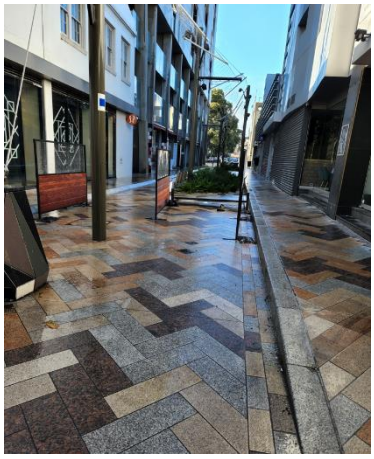
- We understand that Council is supportive of the use of passive irrigation strategies wherever practical throughout the precinct and commented that this had been employed successfully in

some of the recent projects. This can also be coupled with the use of mechanical filtration within overflow pits to achieve the water quality objectives

- To achieve suitable planting depths in landscape areas as well as below adjacent paving areas, we understand from Council that the use of structural soil to tree pits is considered acceptable

- The large amount of existing and redundant utility services within the road corridor have resulting in significant limitations on locations and depths of new tree pits and water collection and storage

- The road corridor in several locations experiences significant flash flooding. Whilst we have not been able to carry out any detailed analysis of the existing drainage system, as mentioned above there are several low points within the length of Chapel Street, and it was noted on site that the existing drainage appears to be quite shallow. This situation is likely to be contributing to the stormwater system regularly overflowing and therefore will be a key consideration in the development of the masterplan.


It is intended that further consultation with Council is held during the masterplan phase to obtain more detailed feedback regarding the previous projects and help address any concerns.

2.4 Constraints

In addition to the existing conditions, the following will also need to be considered in the development of options for the precinct and may provide some limitations on what can be achieved:

- The existing building and footpath levels, particularly considering Council's freeboard requirements, will be a key consideration in any proposed work. This will also include Council's approach to potential localised increase in flood levels due to desired urban design initiatives. For example, if there is a wholesale requirement that the flood level must not be increased in any location under any flood event, then this may prevent proposed urban design initiatives where they require a change existing footpath or road levels.

- Authority Works that may be proposed within the precinct – for example the Melbourne Water upgrade project that has been proposed in the northern end of the corridor

- Yarra Trams and any requirements/conditions they may place on works within the road corridor

- Coordination with Department of Traffic and their requirements

- Whilst a Masterplan will be developed for the site, as the projects are being delivered in a piecemeal approach, detailed consideration will need to be given to identifying and managing potential cumulative impacts on the existing conditions, both positive and negative.

- Further considerations on the design outcomes include:
    - Council conditions on proposed projects; including:
    - Council's design standards that are to be applied
    - Sustainability requirements (Council's Integrated Water Management)
    - Others that we are not aware of

2.5 Opportunities for improvement

Further to the above and with consideration given to local and global trends in redefining and redeveloping the flexibility for use of public spaces, it is likely that some of the following strategies could be implemented in the future projects:

- Increasing the amount of space available for pedestrians. This may involve permanent or temporary kerb alignments. This potentially creates opportunities for:
    - Increasing the space available for temporary or permanent outdoor dining
    - Increasing available space for safe pedestrian movement
    - Improvements to pedestrian safety and providing additional refuge/break out spaces for pedestrians
    - Increasing the amount of space available landscaping and furniture
    - Increase opportunities for public exhibition, artwork, gathering spaces, etc

- Improvements to existing stormwater drainage network, noting it is not expected that wholesale upgrades of the existing drainage network will form part of this project

- Sustainability improvements (better Water Cycle Management), for example:

    - Implementation of raingardens to improve water quality outcomes, improve visual aesthetics, partition spaces, etc
    - employing synergies of passive irrigation, water quality improvement, plant health improvements, visual amenity, etc
    - opportunities to infuse visible education outcomes within engineering infrastructure and landscape areas

Throughout the development of the masterplan, Northrop will work with Hassell and the wider team to explore the above and further opportunities for improvements to the space and the potential impacts on the existing conditions.

2.6 Strategies of minimising impact

It is expected that any change within the road corridor will have an impact on the existing conditions, including the management of stormwater. It is vital that the magnitude of such impact is assessed and understood, and this assessment will be undertaken during the future design phases.

To help minimise the potential negative impacts within the precinct, several strategies could be implemented. Some of the mitigative strategies include:

- Review existing flood modelling from Council and adjusting to suit the possible changed conditions. This flood modelling will be aimed at identifying the following:
    - Determining existing floor levels and the potential impact with proposed adjustments within the road corridor
    - Exploring opportunities for capturing water in areas adjacent to Chapel Street to help slow or reduce the amount of water that is entering the Chapel Street corridor. This may be used to help reduce the risk of flash flooding in small to medium storm events. Note this may require additional survey beyond Chapel Street

- opportunities for upgrades to the local inground drainage infrastructure to increase its capacity and reduce overland reliance

- Implementing raised lightweight structures in areas where it is desired to widen the footway (e.g., for improved outdoor dining opportunities, increased pedestrian zones, etc). This may help minimise the impact on stormwater flows and flood levels, as permanent solid structures may reduce the available width for conveyance of flood waters and therefore could increase flood depths

- Potential for compensatory conveyance capacity to overcome potential localised flood impacts to support localised urban outcomes

- Detailed services scanning and searches to help identify opportunities for planting zones or whether existing services may require adjustment

We also expect that further strategies will be considered and developed during the masterplan phase and the design of the individual projects.

3. Next Steps / further information required

The following is a list of information and consultation aspects that is required to complete to the Masterplan phase.

- Detailed flooding models from Council (in a working model format)
- Consultation with Council regarding specific conditions that may need to be addressed in the localised design
- Feedback from Council regarding any proposed future authority asset upgrades / works within the project boundary
- Detailed services survey information
- Possible additional survey beyond Chapel Street, depending upon how far the Masterplan and mitigative options extend
- Engagement with services authorities, Yarra Trams and Department of Traffic as required