

Site 10 Redevelopment Ltd Partnership
Proposed Development – Site 10 North Kumutoto

This shading assessment has been prepared to support the application for resource consent as prepared by Urban Perspectives Ltd.

Assessment of Effects on Sunlight

1. The Proposal
 - 1.1 The proposal is for the construction of a new building on Site 10, North Kumutoto.
 - 1.2 The proposed building lies to the north of Kumutoto Plaza which is identified by the District Plan as an area to be protected from additional shading resulting from development of surrounding sites.
2. Scope of Assessment
 - 2.1 This sunlight study, completed using the sun transit method, has been prepared to determine the extent of general shading to the surrounding public spaces and additionally considers the shading effects to Kumutoto Plaza.
3. District Plan Policies
 - 3.1 In relation to building mass, in the explanation to Policy 12.2.5.2 it is noted that “..... access to direct sunlight is not an effect to be specifically considered except with respect to sunlight protection for identified public spaces under standard 13.6.3.4”.
 - 3.2 This leads on to the explanation to Policy 12.2.5.4 which refers to the “..... provision of sunlight to an identified public space, or any public space of prominence or space where people regularly congregate”.
 - 3.3 Policy 12.2.6.4 deals specifically with the protection of sunlight to identified public spaces during periods of high use.
 - 3.4 Policy 12.2.6.5 advocates for the design of new buildings to minimise overshadowing of other public spaces such as pocket parks, paved seating areas and places of civic importance during periods of high public use, whilst acknowledging that some overshadowing of public spaces is inevitable.
4. District Plan Rules
 - 4.1 Rule 13.6.3.4 relates to the protection of sunlight to listed public parks and malls as assessed between 12:00pm and 2:00pm at either equinox. Kumutoto Plaza is listed as one of the public spaces for protection under

this rule. The rule does not apply to the first 14.4 metres of development above ground level.

- 4.2 The District Plan (as amended by DPC 48) also makes additional provision where the permitted activity height standards are exceeded (Rule 13.3.8.4.A), with a focus on any effects associated with the additional building height on the amenity of surrounding streets and other public spaces; whereas Rule 13.3.8.7 looks specifically at the protection of sunlight to identified public spaces.
- 4.3 As noted, the District Plan lists Kumutoto Plaza on the Wellington Waterfront as a specified public space for the protection of sunlight. Its location is identified in Appendix 7 of the revised Central Area rules.
- 4.4 Rule 13.6.3.4 states that sunlight access to Kumutoto Plaza is to be protected between the times of 12:00pm and 2:00pm, New Zealand standard time, as calculated at either the autumn or spring equinox.
- 4.5 The following assessment confirms that this rule is not triggered because the proposed building does not cause any shading to the Kumutoto Plaza area.

5. Site Description

- 5.1 The development site is known as Site 10, North Kumutoto. It is bounded to the west by Waterloo Quay and to the east by land owned by CentrePort and Wellington Waterfront Ltd.
- 5.2 Shed 21 lies to the north. The surveyed parapet height at the southern end of Shed 21 is RL 21.0m.
- 5.3 The development site has been subject to a District Plan variation (Variation 11). The Environment Court decision [2012] NZEnvC 74 found that Variation 11 should not proceed but should be withdrawn. However, the Court nevertheless stated that it considered that development up to a height of 22m above mean sea level was appropriate.
- 5.4 The architectural plans confirm that main parapet level of the proposed building is at a height of some 22.4m with a centralised rooftop plant room adding further height.

6. Methodology

- 6.1 This shading assessment has then been completed using the Sun Transit method as it allows duration of sun loss, if any, to be quantified. The method is "point" specific and involves defining horizon lines for selected "viewpoints" then determining the effects on sunlight at those particular points over a solar year.
- 6.2 A sun transit diagram is akin to a photograph taken from a specific point and onto which can be superimposed an angular reference grid, the arc of the sun across the sky on selected days of the year and the extent of any relevant structures that may produce shading to that point. The key to this method is the angular reference grid which is defined in terms of azimuth (that is a direction or bearing measured in terms of true north)

and altitude (that is an angle of elevation measured above a level plane), both being quantities that can readily be calculated or surveyed.

- 6.3 For any time of the day and for any day of the year, the position of the sun in the sky can be defined by angles of azimuth and altitude. Sun Transit Diagrams have been prepared for the Wellington area which shows the sun's path across the sky for each half of the solar year.
- 6.4 The "S" shaped time lines that appear on the diagrams generally at right angles to the sun's path indicate the time of day as the sun arcs across the sky. To simplify matters, and given that the sunlight study is intended to assess duration of sunlight loss, times shown are NZ Standard time with no allowance for daylight saving.
- 6.5 Separate charts are used for each half of the year because for any period of sun loss during Autumn, there is a corresponding loss in Spring. During the first half of the solar year from 23 December through to 23 June, the time lines appear as a reversed "S" whereas from 23 June through to 23 December they appear the other way around. For the purposes of this study, and for ease of interpretation, separate charts have been produced for each half of the year.
- 6.6 Duration of sun loss is read directly off the diagrams by choosing a day of the year and following the sun's path across the sky for that day noting the times at which relevant horizon lines are crossed. The duration of loss for that particular day is the difference between the times so read. Any such loss can be expressed as "x" minutes per day for "n" days (or weeks) of the year.
7. Selection Of Viewpoints
- 7.1 Five viewpoints have been selected for this assessment. A description of their locations is as follows :
- Viewpoint 01 – Northern end of Site 8, north of Kumutoto Plaza.
 - Viewpoint 02 – On the promenade adjacent to Lambton Harbour and opposite Whitmore Street.
 - Viewpoint 03 – In the landscaped area at the southern end of the proposed building (also referred to as the Whitmore Plaza).
 - Viewpoint 04 – Footpath area on the northern side of the Whitmore Street and Waterloo Quay intersection.
 - Viewpoint 05 – Footpath on the southern side of the Balance Street and Customhouse Quay intersection (outside Maritime Tower).
- 7.2 A survey was conducted to measure the position and height of the surrounding buildings together with the shape of the background hills. The extent of the proposed building was determined using the architectural plans. This information has been collated to provide a 3D mathematical model of the development site and surrounding areas for the assessment of shading effects.

8. Diagrams & Plans Produced

8.1 A3 coloured sun transit diagrams have been produced for each viewpoint covering both halves of the solar year. These diagrams allow duration of sun loss attributable to the existing and proposed buildings to be quantified.

8.2 Plan S13-0880-02/A shows the location of the viewpoints that has been assessed. The plans for the first half of the year (Autumn) are labelled as S13-0880-A1 to S13-0880-A5 referencing Viewpoints 1- 5 respectively. Similarly, the plans numbered S13-0880-S1 to S13-0880-S5 cover the second half of the year (Spring). The main difference between these two sets of plans is that the "S" shaped time lines are reversed.

8.3 Copies of these plans and diagrams are attached as Appendix 1.

9. Analysis of Sun Transit Diagrams

9.1 The sun transit diagrams are colour coded to assist with interpretation. The colours used for each of the relevant structures and height controls are as follows :

Description	Colour
Existing buildings	Blue
Proposed building	Red
Background skyline (line only)	Brown

9.2 The various components of the shading that result from the contributing buildings around the proposed building are represented by the areas of colour shading on each sun diagram.

10. Assessment of Effects

Site 8 & Kumutoto Plaza

10.1 Viewpoint 01 is located at the northernmost end of Site 8. The sun transit diagrams show that the proposed building will not cause any shading at this viewpoint. Given that Kumutoto Plaza lies further south of this viewpoint, it will not be subject to any shading effects from the proposed building.

The Promenade

10.2 Viewpoint 02 assesses the shading effects to the waterfront promenade walkway directly opposite Whitmore Street.

10.3 This area is not considered to be a pocket park or a place of civic importance, and accordingly it need only be given the same consideration as other similar general public spaces around the development.

Viewpoint 02 Promenade opposite Whitmore St			Duration of Sun Loss at Selected Viewpoint on Nominated Days (Expressed as h:mm)		
Dec – June	Time of day	Duration	June - Dec	Time of day	Duration
23 Dec	-	-	23Dec	-	-
01 Jan	-	-	15 Dec	-	-
15 Jan	-	-	01 Dec	-	-
01 Feb	-	-	15 Nov	-	-
15 Feb	-	-	01 Nov	-	-
01 Mar	-	-	15 Oct	-	-
15 Mar	-	-	01 Oct	-	-
01 Apr	-	-	15 Sep	-	-
15 Apr	-	-	01 Sep	-	-
01 May	10:30-11:00	0:30	15 Aug	10:40-11:00	0:20
15 May	10:15-11:40	1:25	01 Aug	10:30-11:40	1:10
01 Jun	10:10-12:20	2:10	15 Jul	10:20-12:20	2:00
15 Jun	10:10-12:20	2:10	01 Jul	10:15-12:25	2:10
23 Jun	10:10-12:20	2:10	23 Jun	10:10-12:20	2:10

Tabulated shading effects at Viewpoint 02

10.4 The assessed sun loss at Viewpoint 02 ranges from 0 minutes up to a maximum of about 2hr 10 minutes in the late morning during the months of May, June, July and the first half of August.

10.5 It is inevitable that this general area will be subject to shading of some description as it lies to the south of and relatively close to the development site.

Proposed Whitmore Plaza Area

10.6 The development proposal includes an open space area at the southern end of the proposed building. A viewpoint has been included for this general location for completeness of the shading assessment.

10.7 The proposed building will shade this area from mid-morning through to the early afternoon for all but for a few weeks through December and January.

Viewpoint 03 Proposed Whitmore Plaza to the south of the proposed building			Duration of Sun Loss at Selected Viewpoint on Nominated Days (Expressed as h:mm)		
Dec - June	Time of day	Duration	June - Dec	Time of day	Duration
23 Dec	-	-	23Dec	-	-
01 Jan	-	-	15 Dec	-	-
15 Jan	9:50-10:20	0:30	01 Dec	9:30-9:55	0:25
01 Feb	9:35-11:05	1:30	15 Nov	9:10-10:25	1:15
15 Feb	9:20-11:40	2:40	01 Nov	8:50-11:00	2:10
01 Mar	9:20-12:20	3:00	15 Oct	8:50-11:50	3:00
15 Mar	9:20-13:00	3:30	01 Oct	9:00-12:30	3:30
01 Apr	9:10-13:20	4:10	15 Sep	9:00-13:10	4:10
15 Apr	9:10-13:20	4:10	01 Sep	9:10-13:20	4:10
01 May	9:10-12:30	3:20	15 Aug	9:10-12:40	3:30
15 May	9:10-12:20	3:10	01 Aug	9:20-12:40	3:20
01 Jun	8:50-12:00	3:00	15 Jul	9:00-12:20	3:10
15 Jun	8:50-12:30	3:40	01 Jul	9:00-12:00	3:00
23 Jun	8:50-12:30	3:40	23 Jun	9:00-12:00	3:00

Tabulated shading effects at Viewpoint 03

- 10.8 It is understood that the architects and landscape designers have considered the proximity of the proposed building when considering this space for development as a plaza area as the shading effects are not insignificant. The relationship of this area to the proposed building means that a degree of shading is inevitable.
- 10.9 The old Eastbourne Ferry Building and the wharf building behind both contribute to early morning shading of this area. There is a clear window from 8:00am through to around 9:00am being a time when pedestrian traffic passing through this area might be expected to increase as the public walk along the promenade to and from the Railway Station.
- 10.10 The surrounding buildings to the west are set back some distance from Site 10 which ensures that this plaza area will receive good afternoon sunlight for most of the year excepting for the winter months when the sun is low in the sky.

Corner of Whitmore Street and Waterloo Quay

- 10.11 The majority of the shading at this viewpoint will occur very in the morning up to about 8:00am. In the summer months when daylight saving is in place, this would be more like 9:00am.
- 10.12 It is considered that such effects so early in the day to an area of footpath will not result in any tangible loss of amenity to the public passing by this street corner. There are any number of similar public street corners throughout the city which would be affected to a much greater degree than this particular corner.

Viewpoint 04 Corner of Whitmore St & Waterloo Quay			Duration of Sun Loss at Selected Viewpoint on Nominated Days (Expressed as h:mm)		
Dec - June	Time of day	Duration	June - Dec	Time of day	Duration
23 Dec	5:20-7:20	2:00	23Dec	5:20-7:20	2:00
01 Jan	5:20-7:30	2:10	15 Dec	5:20-7:20	2:00
15 Jan	5:40-7:40	2:00	01 Dec	5:20-7:20	2:00
01 Feb	5:50-7:50	2:00	15 Nov	5:20-7:20	2:00
15 Feb	6:10-8:00	1:50	01 Nov	5:40-7:30	1:50
01 Mar	6:20-8:10	1:50	15 Oct	6:00-7:40	1:40
15 Mar	6:40-8:10	1:30	01 Oct	6:20-7:50	1:30
01 Apr	7:00-8:20	1:20	15 Sep	6:40-8:10	1:30
15 Apr	7:10-8:20	1:10	01 Sep	7:00-8:20	1:20
01 May	7:20-8:30	1:10	15 Aug	7:30-8:30	1:00
15 May	8:20-8:30	0:10	01 Aug	8:20-8:40	0:20
01 Jun			15 Jul		
15 Jun			01 Jul		
23 Jun			23 Jun		

Tabulated shading effects at Viewpoint 04

Corner of Balance Street and Customhouse Quay

- 10.13 The ample horizontal separation between this particular street corner and the development site serves to mitigate shading effects to this area. Once again, any shading will be early in the day over the winter months with no tangible loss of public amenity.

Viewpoint 05 Corner of Ballance St & Customhouse Quay			Duration of Sun Loss at Selected Viewpoint on Nominated Days (Expressed as h:mm)		
Dec - June	Time of day	Duration	June - Dec	Time of day	Duration
23 Dec			23Dec		
01 Jan			15 Dec		
15 Jan			01 Dec		
01 Feb			15 Nov		
15 Feb			01 Nov		
01 Mar			15 Oct		
15 Mar			01 Oct		
01 Apr	7:20-8:00		15 Sep	7:10-7:40	0:30
15 Apr	7:30-8:20		01 Sep	7:30-8:20	0:50
01 May	7:30-8:30		15 Aug	7:30-8:40	1:10
15 May	7:40-8:30		01 Aug	7:50-8:40	0:50
01 Jun	8:00-8:40		15 Jul	8:00-8:50	0:50
15 Jun	8:05-8:45		01 Jul	8:10-8:50	0:40
23 Jun	8:05-8:45		23 Jun	8:10-8:50	0:40

Tabulated shading effects at Viewpoint 05

11. 22.4m Building Height

11.1 The roof line of the proposed building is set to a height of 22.4m above mean sea level. The Environment Court decision recognised that a building height in the order of 22m above mean sea level could be appropriate for the site.

11.2 Consideration was given to introducing the 22m limit to the shading assessment. However the change in shading effect attributable to an additional 0.4m of building height is around 5 minutes. In other words, the tabulated results above would to all intents and purposes be the same.

11.3 With respect to shading, the additional 0.4m of height is therefore inconsequential.

12. Roof Top plant Room

12.1 The roof top plant room has been set back from the roof edge such that it is not readily visible when looking up from the ground. It has no effect at any of the assessed viewpoints as is it is not visible above the main roof line of the building.

13. Conclusions

13.1 The proposed building will not generate any shading on Kumutoto Plaza.

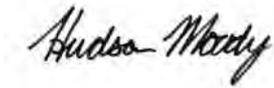
13.2 The proposed Whitmore Plaza area is immediately to the south of the proposed building and shading is therefore inevitable.

13.3 The public promenade area to the south will also be affected but to a lesser degree. Whilst being a public area, it is not a place of civic importance which would be subject to periods of high public use. It is instead part of a public thoroughfare along the waterfront.

13.4 The 22.4m building height results in shading which is consistent with a 22m high building.

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- 13.5 The District Plan recognises that some shading of public spaces is inevitable when development occurs.
- 13.6 I am therefore able to conclude that, all things considered, the shading effects are less than minor.

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Appendix 1

Site Plan S13-0880-02 & Sun Transit Diagrams