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Date: October 5, 2022

RE: Supplementary shadow analysis memo for the 469 Stevenson Project shadow analysis detailing changes in shadow effects due to a revised project design.

Prevision Design previously completed a shadow analysis for the proposed 469 Stevenson Street Project (dated 3/5/2020) which was based on the project design depicted in a drawing set dated 6/26/2019 (the "2020 project"). The project sponsor has since modified the project design (the "2022 project") which is reflected in the plans dated 8/4/2022. Prevision Design has completed an update to the 3/5/2020 shadow analysis to address the shadow effects of these changes ("2022 updated analysis").

In consultation with the San Francisco Planning Department, this memo has been scoped to supplement (not supersede) the 2020 analysis and focuses specifically on the net changes in shadow effects between the 2020 and 2022 project proposals on affected publicly accessible open spaces.

A. ANALYSIS METHODOLOGY

The methodology and 3D base model used and described in the 3/5/2020 shadow analysis has been maintained for this updated analysis, with the following changes or clarifications as noted below:

1. Updates to the existing conditions 3D model prepared for the 3/5/2020 shadow analysis were made in response to public comments made during the public comment period for the previously circulated draft environmental impact report (EIR) for the 469 Stevenson Street Project. These changes to the existing conditions 3D model were documented in a set of updated shadow diagrams ("2020 subsequent analysis) and included:
    a. The boundaries of Mary Plaza (comprised of Mary Court East at 425 Minna Street and Mary Court West at 44 Mary Street), the proposed San Francisco Chronicle rooftop open space (457-475 Minna Street), and the internal courtyard of the Mint Building (88 5th Street)and an evaluation of the 469 Stevenson Street Projects' shadow effects on these publicly accessible privately owned open spaces.

   b. Inclusion of the 434 Minna Street and the 5M project (110 & 172 5th Street) as part of the existing condition scenario. These features were not included in the 3/5/2020 analysis but were added for the 2020 subsequent analysis and are included as part of the existing conditions for this 2022 updated analysis.

2. The 2020 subsequent analysis for Mary Plaza, the proposed San Francisco Chronicle rooftop open space, and the internal courtyard of the Mint Building consisted of a graphical study only (shadow diagrams/shadow fan), not quantitative (no calculations), and this scope of analysis has been used for this 2022 updated analysis.
3. A list of current cumulative condition projects was provided to Prevision and has been reviewed to determine if any proposed projects exist that are BOTH:
   a. Not included in the 3D model for the 3/5/2020 analysis or the 2020 subsequent analysis, AND
   b. Would cast shadow on the same publicly accessible open spaces affected by the proposed 469 Stevenson Street Project.

   The result of this review indicated no additional new cumulative projects met both these criteria. Therefore, the cumulative projects as reflected in the 3/5/2020 analysis and 2020 subsequent analysis remain unchanged.
4. The 3/5/2020 shadow analysis included a review of two project alternatives (Reduced Density Alternative and No Parking Alternative); however, as there have been no changes to these alternatives, they are not included as part of the updated analysis.

B. CHANGES BETWEEN 2020 & 2022 PROJECT DESIGN PROPOSALS

The overall building massing of the 2020 project and the 2022 project is similar, with the changes occurring at the rooftop level.

- The 2020 project had a uniformly tall 10' parapet screen that reached a total height 284'-0".
- The 2022 project design has a stepped parapet which, as compared to the 2020 project, is 6'-9" taller (290'-9") on the south side and 3'-11" shorter (280'-1") on the north side.
- The 2022 project design added a roof deck to provide common open space, requiring the addition of a penthouse + elevator overrun for access. The top of the penthouse is 14'-8" above roof level, and the elevator overrun is 20'-0" above roof level.

Exhibit A shows perspective views of the rooftop configurations of the 2020 and 2022 designs, highlighting how the building massing has changed.

C. PARKS AFFECTED BY NET NEW SHADOW FROM 2020 vs. 2022 PROJECT DESIGNS

The 3/5/2020 shadow study and 2020 subsequent analysis identified four publicly accessible open spaces that would be affected by net new shadow cast by the project: Mint Plaza, United Nations Plaza, Mary Plaza, and the proposed San Francisco Chronicle rooftop open space. None of these open spaces are under the jurisdiction of the Recreation and Parks Commission and would therefore not be subject to the provisions of Planning Code Section 295.

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The 2022 project design would still affect these same four open spaces but would not affect any other open spaces (such as the Mint Building Courtyard or Boeddeker Park).

Exhibit B shows the net new shadow fan diagram for the 2022 project design, showing the reach of the proposed project's shadow to the affected open spaces with the outer boundary of the 2020 project's shadow fan shown in red for comparison.

D. CHANGES IN QUANTITATIVE SHADING EFFECTS BETWEEN 2020 & 2022 PROJECT DESIGNS

As shown on Table 1 below, on an annual quantitative basis, the 2022 project design would result in slightly less overall shadow cast on Mint Plaza (net decrease of 0.004%) and slightly greater shadow cast on United Nations Plaza (net increase of 0.0002%) when compared to the shadow effects of the 2020 project design. With respect to the area of the largest net new shadow, the 2022 project design would result in minor increases relative to the 2020 project design: 181 square feet on Mint Plaza and 16 square feet on United Nations Plaza.

Affected Open Space	2020 Project Design		2022 Project Design	
	Annual SFH[1] (% of TAAS[2])	*Largest Shadow Area*	*Annual SFH (% of TAAS)*	*Largest Shadow Area*
Mint Plaza	325,407 (0.564%)	5,811 sf[3]	322,884 (0.560%)	5,992 sf
United Nations Plaza	9,693 (0.0025%)	1,649 sf	10,461 (0.0027%)	1,665 sf

[1] SFH = square foot hours
[2] Theoretical Annual Available Sunlight
[3] SF = square feet

TABLE 1: Quantitative Analysis Comparison

Shadow generated by the 2022 project design would affect both parks for similar durations on the same number of dates throughout the year and have the same dates of maximum net new shadow as shadows generated by the 2020 project's design.

Exhibit C includes the quantitative net new shadow summary for Mint Plaza for the 2020 and 2022 project designs.

Exhibit D includes the quantitative net new shadow summaries for United Nations Plaza for the 2020 and 2022 project designs.

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E. QUALITATIVE SHADING COMPARISON BETWEEN 2020 vs. 2022 PROJECT DESIGNS

While the net quantitative difference in shadow between the 2020 and 2022 project designs is small, the change in the rooftop configuration alters the locations where project shadow falls at certain times. This results in areas shaded by the 2020 project being unshaded by the 2022 project at specific moments in time, and vice versa. Different areas affected due to changes in shape, size, and locations of shadow cast by the 2022 project relative to the 2020 project would not persist beyond a few minutes nor cause different programmatic areas of either Mint or United Nations Plazas to be affected. As such, the qualitative effect of shadow cast by the 2022 project design could be characterized as substantially similar to the 2020 project design.

Exhibits E & F depict shadow diagrams overlaying the profiles of shadow of the 2020 and 2022 project designs taken at the time where the largest shadow occurs on each open space.

F. CHANGE IN SHADOW EFFECTS ON MARY PLAZA AND SF CHRONICLE ROOFTOP OPEN SPACE

Additional shadow fan graphics were prepared after the completion of the 3/5/2020 shadow analysis as part of the 2020 subsequent analysis to document the extents of net new shadow that would fall on Mary Plaza as well as the proposed San Francisco Chronicle rooftop open space.

As shown by the comparative shadow fan diagram (Exhibit B), the extents of shadow which would be cast on these two open spaces by the 2022 project design would be slightly increased, but very similar to those cast by the 2020 project design.

Please don't hesitate to reach out with additional comments or requests for further analysis.

Adam Phillips, Principal
Prevision Design

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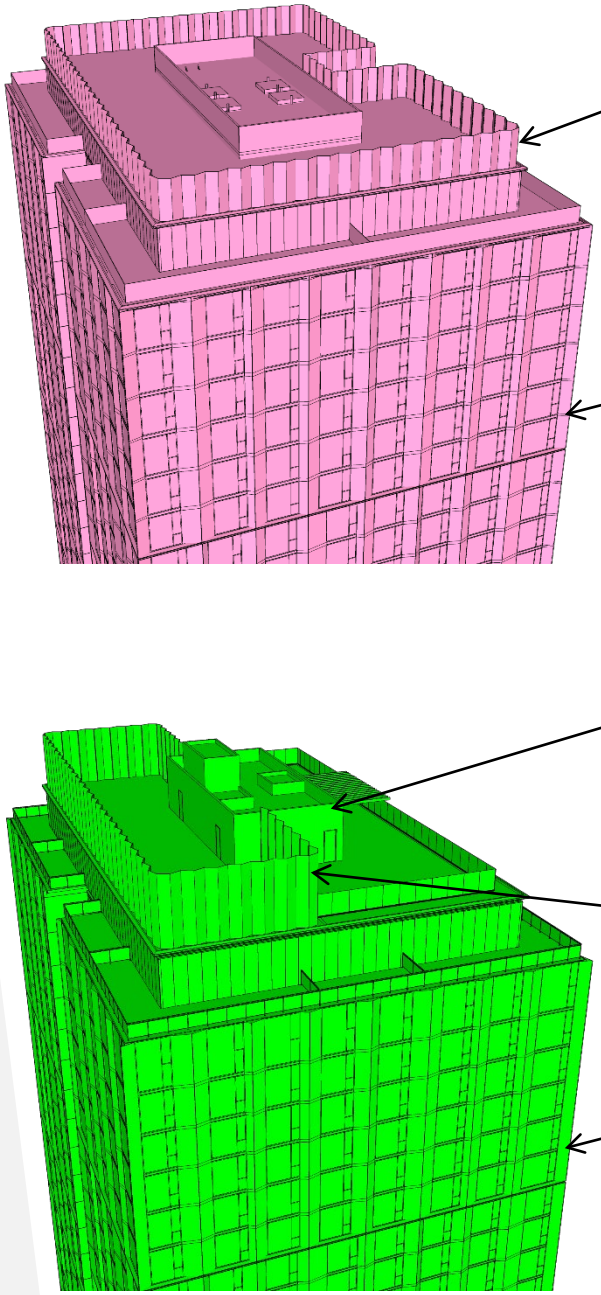
EXHIBIT A: ROOFTOP DESIGN CHANGES | 2020 VS. 2022 PROJECT DESIGNS



Parapet height along north side of rooftop 3′-11″ taller in 2020 project design than 2022 project design

Tower element below rooftop unchanged between 2020 and 2022 project designs

14′-8″ tall penthouse and 22′-0″ tall elevator overrun structure have been added to provide roof deck access

Parapet height along south side of rooftop 6′-9″ taller in 2022 project design than 2020 project design

Tower element below rooftop unchanged between 2020 and 2022 project designs

2020 Project Rooftop Massing (Pink) vs. 2022 Project Rooftop Massing (Green). Viewpoints looking west.

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EXHIBIT B: SHADOWFAN DIAGRAM | 2022 DESIGN vs. 2020 DESIGN

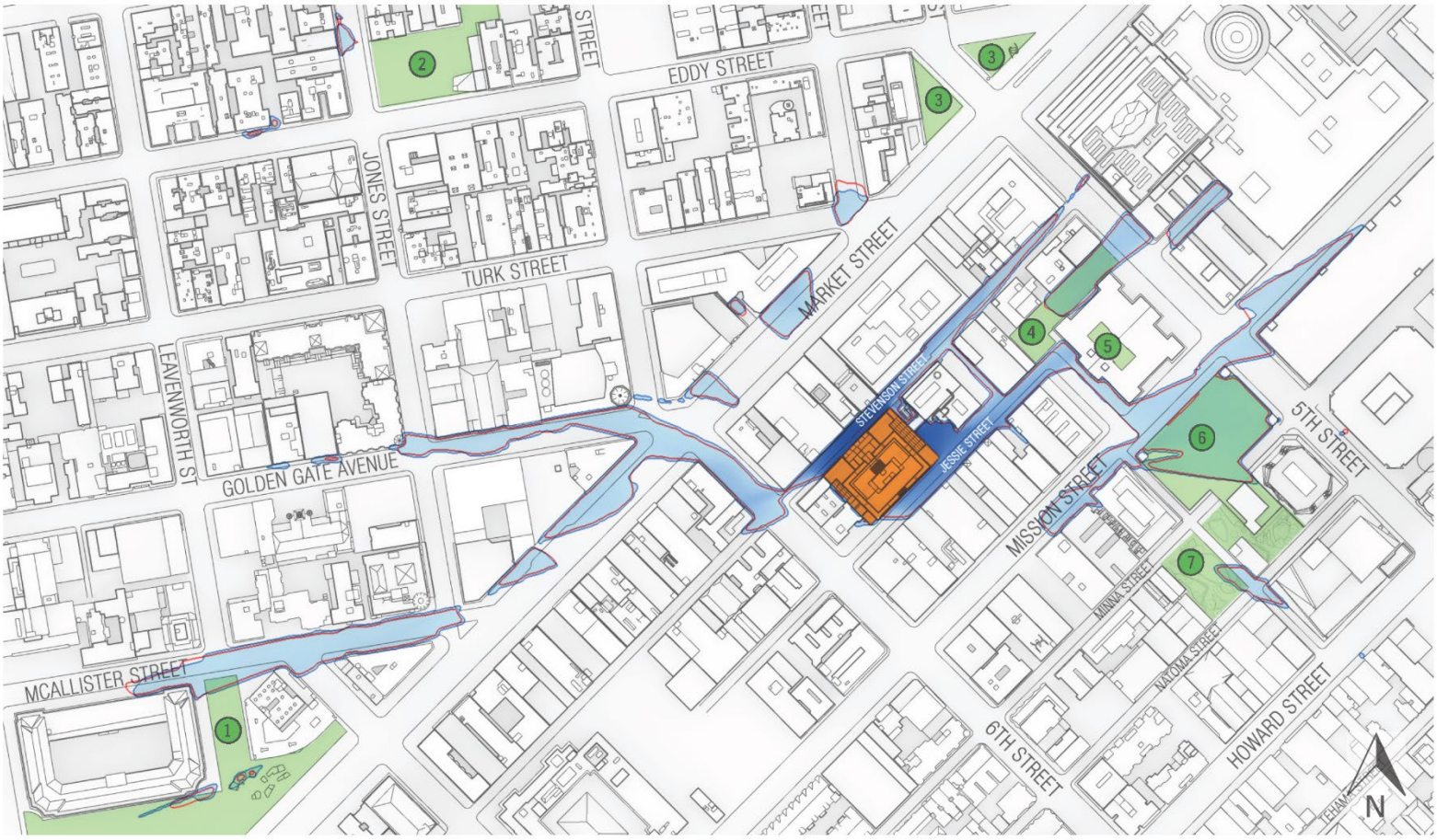

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EXHIBIT C: MINT PLAZA QUANTITATIVE SUMMARY | 2020 vs. 2022

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS) CALCULATION	MINT PLAZA
Total plan area of Mint Plaza	0.36 acres (15,496 sf)
Total hours of annual sunlight from 1-hr after sunrise through 1-hr before sunset	3721.4 hrs
Theoretical Annual Available Sunlight (plan area x hours of annual sunlight)	57,665,807 sfh

EXISTING SHADOW CONDITIONS SUMMARY (INCLUDES 5M)	MINT PLAZA
Total annual existing shadow load (existing shadow sfh ÷ TAAS sfh)	68.82%
Total annual existing shadow in square-foot-hours (sfh)	39,688,451 sfh
Range in existing shadow area coverage throughout the year	Between 11% - 100%
Time of year / time of day most affected by existing shadow	Winter / Late Afternoon (after 4:00 PM)

469 STEVENSON NET NEW SHADOW SCENARIO SUMMARY - 2020 PROJECT DESIGN	MINT PLAZA
Annual net new 2020 Project-only shadow load / total existing + 2020 Project shadow load	0.564% / 69.38%
Annual net new sfh 2020 Project shadow / total existing + 2020 Project sfh	325,407 sfh / 40,013,859 sfh
Number of days annually when new shading from 2020 Project would occur	Up to 182 days a year
Dates when net new shadow from 2020 Project would be cast annually	September 21 - March 21
Date(s) with most annual sfh net new 2020 Project shadow (shadow load / net new sfh)	October 25 & February 15
Time of year / time of day most affected by 2020 Project net new shadow overall	Winter / Afternoon (1:00-4:00 PM)
Date(s) with largest shadow area from the 2020 Project (area and time shadow occurs)	Nov 1/Feb 8 (5,811 sf @ 2:30 PM)
Range in 2020 Project net new shadow percentage coverage (area range)	Between 0% - 37% (0 - 5,811 sf)
Average 2020 Project net new shadow coverage on affected dates (shadow area)	11.96% (1,854 sf)
Date(s) with the longest duration of net new shadow (duration)	Oct 18/Feb 22 (1 hr 30 min +/- 14 min)
Range in daily 2020 Project net new shadow duration (margin of error)	Between zero minutes up to 1 hr 30 min (+/- 14 min)
Average daily 2020 Project net new shadow duration on affected dates	60.0 minutes

469 STEVENSON NET NEW SHADOW SCENARIO SUMMARY - 2022 PROJECT DESIGN	MINT PLAZA
Annual net new 2022 Project condition shadow load / total existing + 2022 Project shadow load	0.560% / 69.38%
Annual net new sfh 2022 Project shadow / total existing + 2022 Project sfh	322,884 sfh / 40,011,335 sfh
Number of days annually when new shading from 2022 Project would occur	Up to 182 days a year
Dates when net new shadow from 2022 Project would be cast annually	September 21 - March 21
Date(s) with most annual sfh net new 2022 Project shadow (shadow load / net new sfh)	October 25 & February 15
Time of year / time of day most affected by 2022 Project net new shadow overall	Winter / Afternoon (1:00-4:00 PM)
Date(s) with largest shadow area from the 2022 Project (area and time shadow occurs)	Oct 25/Feb 15 (5,992 sf @ 2:30 PM)
Range in 2022 Project net new shadow percentage coverage (area range)	Between 0% - 39% (0 - 5,992 sf)
Average 2022 Project net new shadow coverage on affected dates (shadow area)	12.10% (1,876 sf)
Date(s) with the longest duration of net new shadow (duration)	Oct 18/Feb 22 (1 hr 30 min +/- 14 min)
Range in daily 2022 Project net new shadow duration (margin of error)	Between zero minutes up to 1 hr 30 min (+/- 14 min)
Average daily 2022 Project net new shadow duration on affected dates	58.8 minutes

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EXHIBIT D: UN PLAZA QUANTITATIVE SUMMARY | 2020 vs. 2022

THEORETICAL ANNUAL AVAILABLE SUNLIGHT (TAAS) CALCULATION	UNITED NATIONS PLAZA
Total plan area of United Nations Plaza	2.35 acres (102,227 sf)
Total hours of annual sunlight from 1-hr after sunrise through 1-hr before sunset	3721.4 hrs
Theoretical Annual Available Sunlight (plan area x hours of annual sunlight)	380,427,255 sfh

EXISTING SHADOW CONDITIONS SUMMARY (INCLUDES 5M)	UNITED NATIONS PLAZA
Total annual existing shadow load (existing shadow sfh ÷ TAAS sfh)	37.0537%
Total annual existing shadow in square-foot-hours (sfh)	140,962,491 sfh
Range in existing shadow area coverage throughout the year	Between 3% - 100%
Time of year / time of day most affected by existing shadow	Winter / Early Morning (before 8:00 AM)

469 STEVENSON NET NEW SHADOW SCENARIO SUMMARY - 2020 PROJECT DESIGN	UNITED NATIONS PLAZA
Annual net new 2020 Project-only shadow load / total existing + 2020 Project shadow load	0.0025% / 37.0562%
Annual net new sfh 2020 Project shadow / total existing + 2020 Project sfh	9,693 sfh / 140,972,184 sfh
Number of days annually when new shading from 2020 Project would occur	Up to 97 days a year
Dates when net new shadow from 2020 Project would be cast annually	May 4 - August 8
Date(s) with most annual sfh net new 2020 Project shadow (shadow load / net new sfh)	June 21
Time of year / time of day most affected by 2020 Project net new shadow overall	Summer / Early Morning (before 8:00 AM)
Date(s) with largest shadow area from the 2020 Project (area and time shadow occurs)	June 21 (1,649 sf @ 6:46 AM)
Range in 2020 Project net new shadow percentage coverage (area range)	Between 0% - 2% (0 - 1,649 sf)
Average 2020 Project net new shadow coverage on affected dates (shadow area)	1.38% (1,412 sf)
Date(s) with the longest duration of net new shadow (duration)	June 21 (21 min +/- 7 min)
Range in daily 2020 Project net new shadow duration (margin of error)	Between zero minutes up to 21 min (+/- 7 min)
Average daily 2020 Project net new shadow duration on affected dates	10.9 minutes

469 STEVENSON NET NEW SHADOW SCENARIO SUMMARY - 2022 PROJECT DESIGN	UNITED NATIONS PLAZA
Annual net new 2022 Project condition shadow load / total existing + 2022 Project shadow load	0.0027% / 37.0564%
Annual net new sfh 2022 Project shadow / total existing + 2022 Project sfh	10,461 sfh / 140,972,951 sfh
Number of days annually when new shading from 2022 Project would occur	Up to 97 days a year
Dates when net new shadow from 2022 Project would be cast annually	May 4 - August 8
Date(s) with most annual sfh net new 2022 Project shadow (shadow load / net new sfh)	June 21
Time of year / time of day most affected by 2022 Project net new shadow overall	Summer / Early Morning (before 8:00 AM)
Date(s) with largest shadow area from the 2022 Project (area and time shadow occurs)	June 21 (1,778 sf @ 6:46 AM)
Range in 2022 Project net new shadow percentage coverage (area range)	Between 0% - 2% (0 - 1,778 sf)
Average 2022 Project net new shadow coverage on affected dates (shadow area)	1.63% (1,665 sf)
Date(s) with the longest duration of net new shadow (duration)	June 21 (21 min +/- 7 min)
Range in daily 2022 Project net new shadow duration (margin of error)	Between zero minutes up to 21 min (+/- 7 min)
Average daily 2022 Project net new shadow duration on affected dates	11.1 minutes

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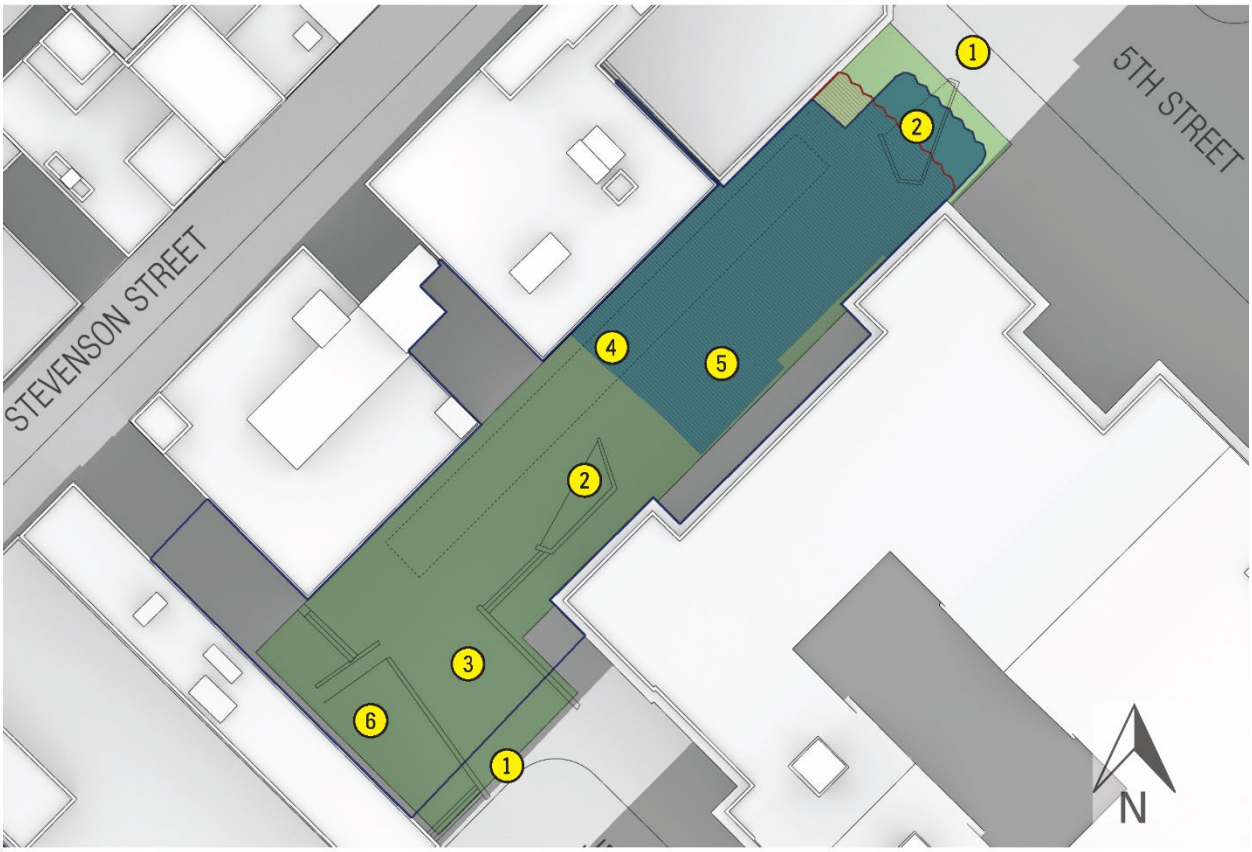
EXHIBIT E: MINT PLAZA PARK DETAIL SHADOW COMPARISON | 2022 vs. 2020



LARGEST NET NEW PROJECT SHADOW
OCTOBER 25 & FEBRUARY 15

2:30 PM

Existing (current) Shadow
Net new shadow from 2022 Project Design
Net new shadow from 2020 Project Design

1. Public Entries
2. Landscape Planters/Seating Wall
3. Tree Wells (6 trees)
4. Vine Trellis Structure
5. Hardscape / Non-fixed Seating Areas
6. Cafe Seating

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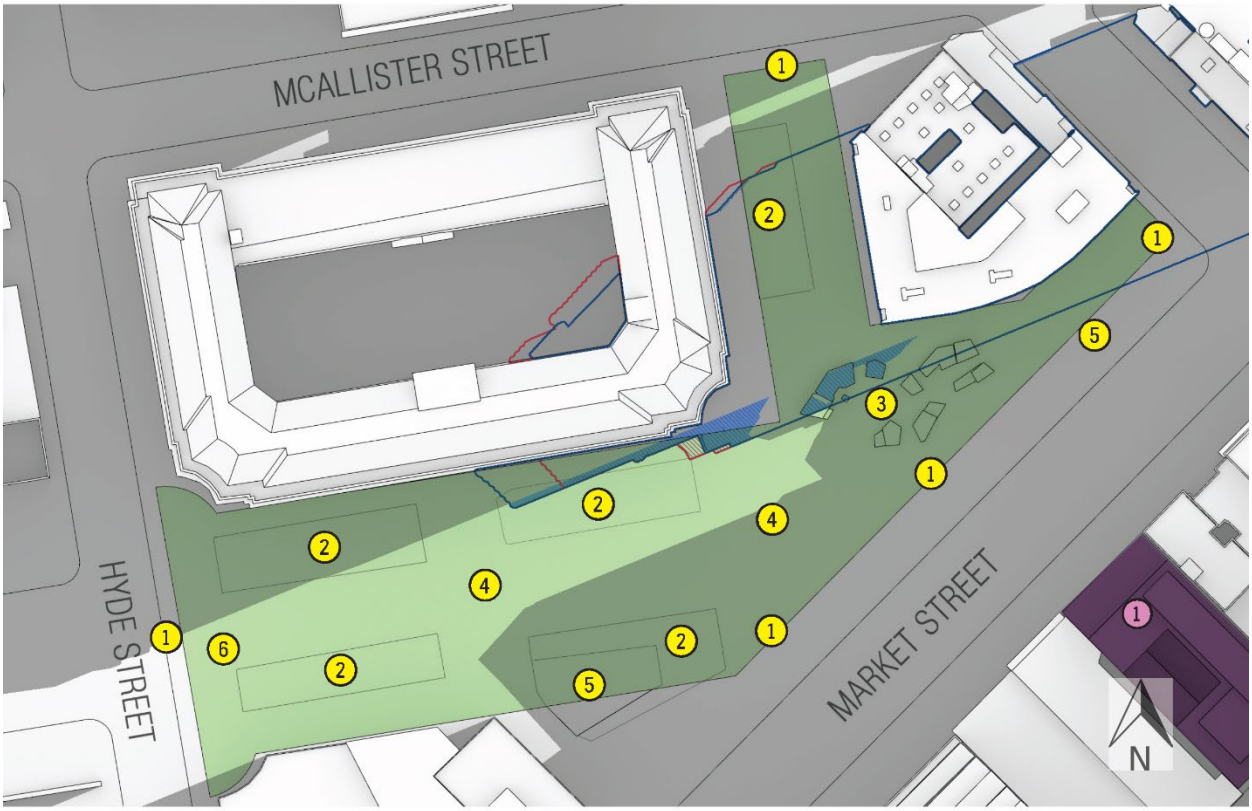
EXHIBIT F: UN PLAZA PARK DETAIL SHADOW COMPARISON | 2022 vs. 2020



LARGEST NET NEW PROJECT SHADOW
JUNE 21

6:46 AM

- Existing (current) Shadow
- Net new shadow from 2022 Project Design
- Net new shadow from 2020 Project Design
- Cumulative Projects
  - (1) 1125 Market Street

1. Public Entries
2. Landscape/Planter Areas
3. Water Feature
4. Hardscape Plaza
5. BART/MUNI entry
6. Equestrian Sculpture