

From: [Dan Grove](#)
To: [Molly McGuire](#)
Subject: Existing Grade for permit 2207-019 SUB3
Date: Friday, June 9, 2023 9:00:14 AM
Attachments: [2207-019 Existing Grade - for SUB3.pdf](#)

Hi Molly-

I'd like to submit this document to provide enhanced information on the Existing Grade of permit 2207-019 SUB3.

Thank you,
Dan Grove

Molly McGuire
Mercer Island Community Planning and Development Department
RE: Permit 2207-019 SUB3 / 6950 SE Maker Street
Jun 9, 2023

Dear Ms. McGuire-

Submission SUB3 of Mercer Island Building Permit 2207-019 was recently filed for 6950 SE Maker Street.

The City's response to the prior SUB2 submission contained this request:

"Per our conversation on March 29, 2023, please provide existing grade meeting the definitions below: Existing grade: The surface level at any point on the lot prior to alteration of the ground surface. Alteration: Any human-induced action which impacts the existing condition of the area, including but not limited to grading, filling, dredging, draining, channeling and paving (including construction and application of gravel). "Alteration" does not include walking, passive recreation, fishing, or similar activities."

SUB3 does not contain any updates from the Applicant on Existing Grade. In this document, I'll demonstrate the Existing Grade of the Site clearly.

Section 1 of this document demonstrates 2 facts about this submission:

1. The current Finished Grade of the Lot is the result of significant Alteration of its Existing Grade.
2. The Existing Grade of the Lot can be accurately determined from numerous surveys.

These result in important violations of MICC, many of which are listed in Section 2.

I recognize that this is a lengthy document, but it is primarily made up of images used to show the evolution of the Site. These enable the determination of Existing Grade.

An important conclusion of Section 1 is that the Existing Grade of the Lot precisely matches the current Finished Grade upon which the current Structure's basement sits. The northeast quadrant of the proposed structure sits on top of that current Finished Grade.

Section 1 - Determining Existing Grade per MICC

MICC 19.16.010 defines the following:

- *Existing grade:* The surface level at any point on the lot prior to alteration of the ground surface.
- *Alteration:* Any human-induced action which impacts the existing condition of the area, including but not limited to grading, filling, dredging, draining, channeling and paving (including construction and application of gravel). "Alteration" does not include walking, passive recreation, fishing, or similar activities.
- *Lot:* A designated parcel, tract or area of land established by plat, subdivision, or as otherwise permitted by law to be used, developed or built upon as a unit.
- *Development proposal:* The application for a permit or other approval from the city of Mercer Island relative to the use or development of land.
- *Development proposal site:* The boundaries of the lot or lots for which an applicant has or should have applied for approval from the city of Mercer Island to carry out a development proposal.

This section walks through the gradual evolution of SE Maker Street and the 6950 Lot from 1936 to the present. The information presented enables determination of the Existing Grade of the Site.

Here is a high-level timeline of the data that is presented:

1936: Existing Grade in place at site
Between 1946 and 1952: Initial fill is put in place
1952-1955: 6950 SE Maker house is constructed
1960: Mercer Island incorporated, all legal sites and structures become legally nonconforming
1963: Survey of Mercer Island performed
1989: Survey and Geotechnical Survey of 7145 SE 35th performed
2004: Survey of 7075 SE Maker performed
2021: Survey of 6960 SE Maker performed
2022: Geotechnical Survey of 6950 SE Maker performed

Figure 0 shows the original condition of this area from King County Aerial photography in 1936, prior to any Alteration. The grade of the floor of this dense forest is the Existing Grade of the lot.

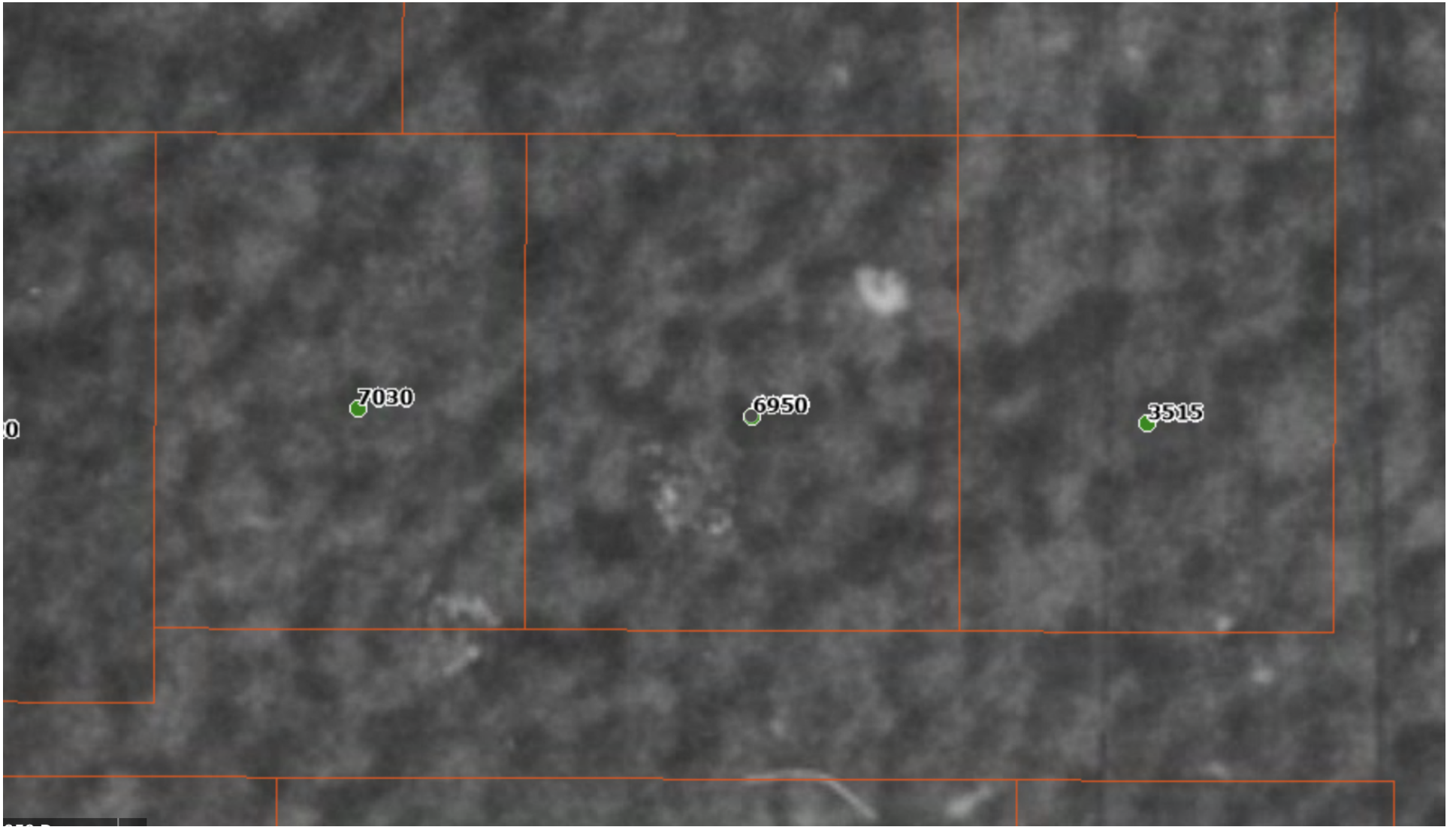


Figure 0: King County iMAP Aerial photo, 1936

Figure 1 shows the area in an aerial photo from 1946, with surrounding properties. It shows that in 1946:

- SE Maker Street existed, but in an unimproved state (it was not even a gravel road at this point)
- 6950 SE Maker had not been developed.
- 7145 SE 35th had not been developed.

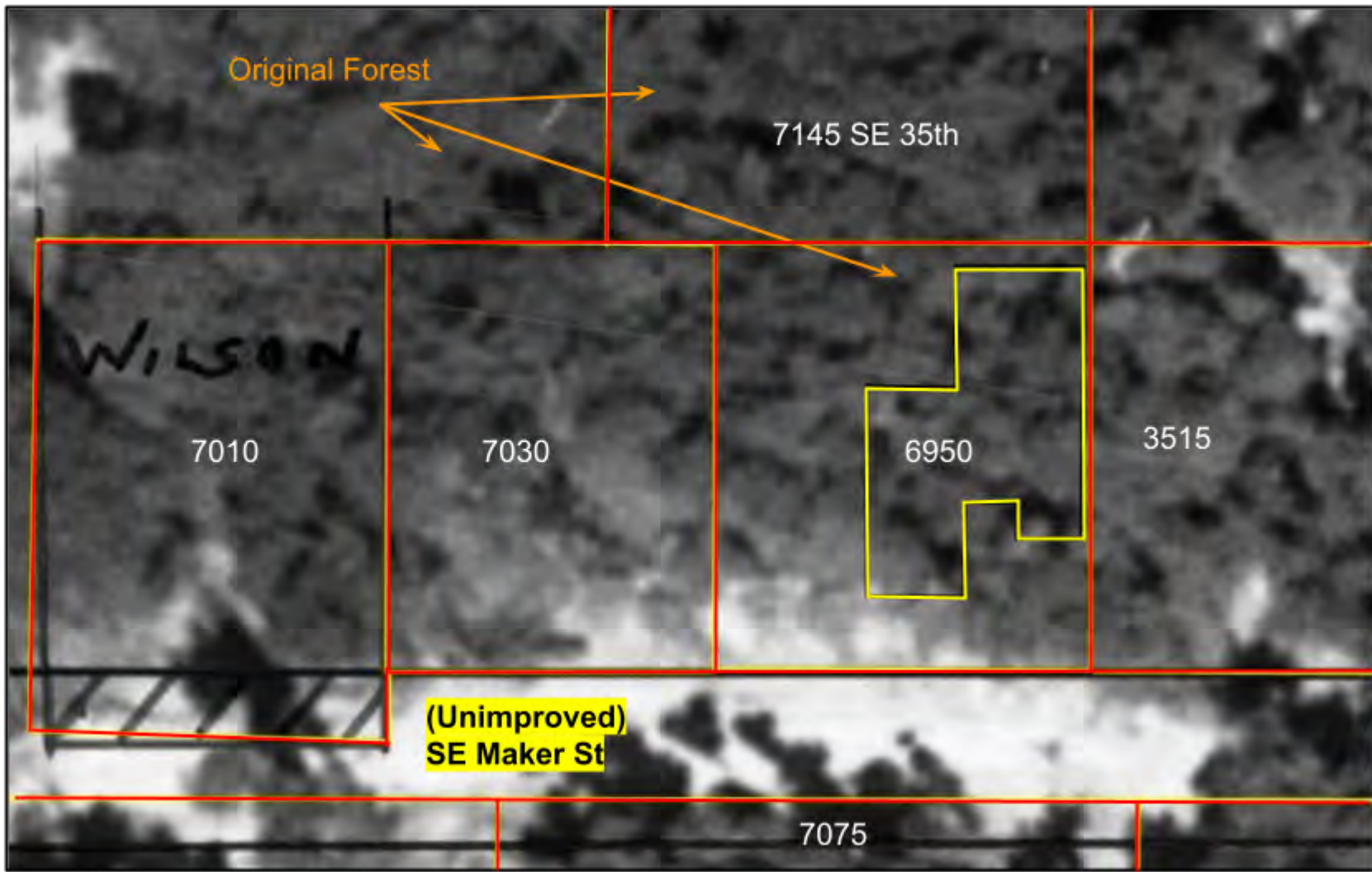


Figure 1. Overhead view of SE Maker Street, 1946

Figure 2 shows a photo of the Lot in 1955, after its initial Alteration.

When this photo was taken, the area directly in front of the house had approximately 10' of fill in place (based on the 1963 Survey and 2022 Geotechnical Survey, shown below). When this photo was taken, the grade of the site had already been significantly Altered from the Existing Grade by installing fill.

This fill installation is the first of at least 2 major fill installations that occurred on the site over its lifetime.

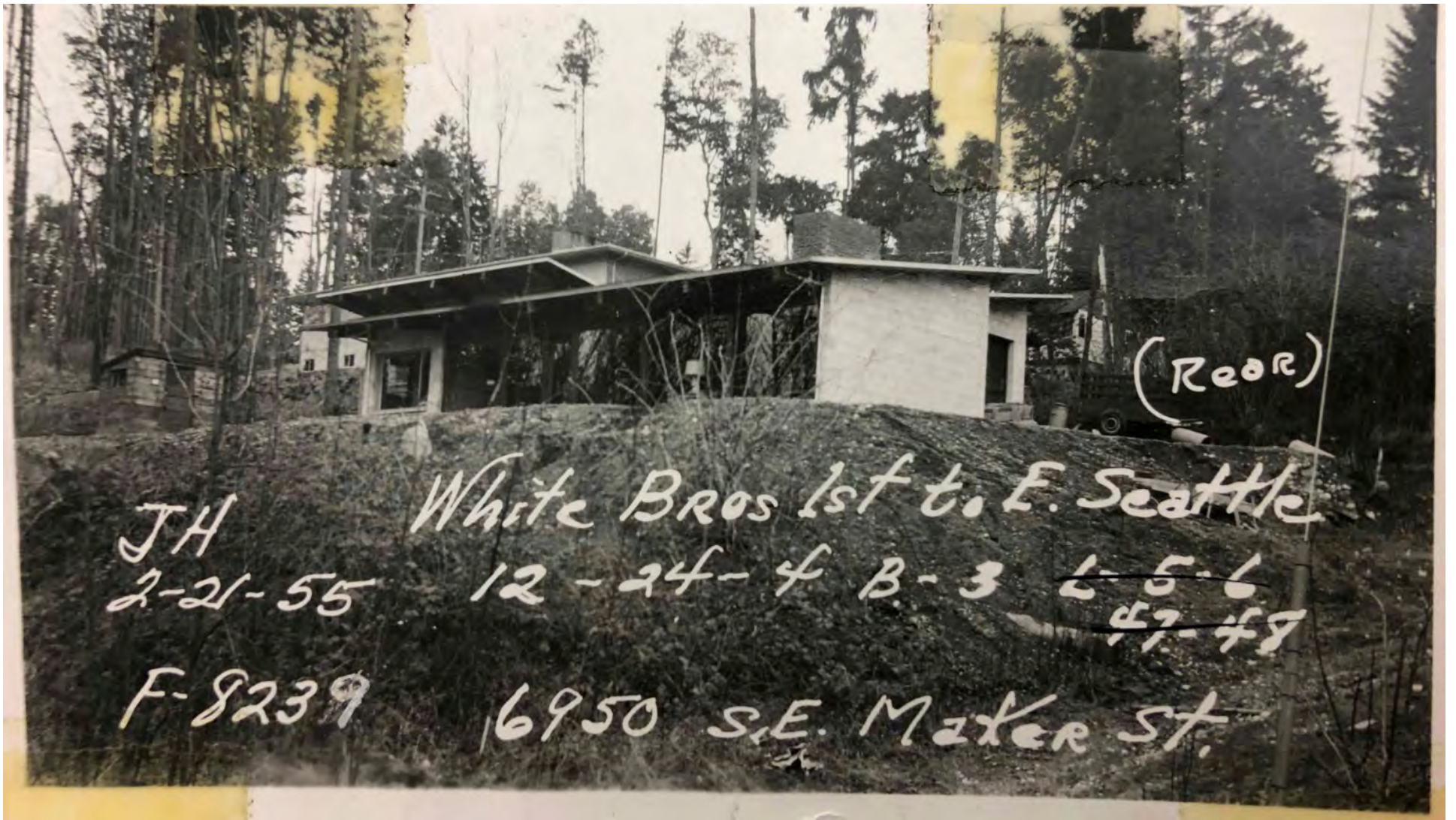


Figure 2. 1955 King County Assessor photo showing same hillside as 1963 Aerial Image in Figure 3b

Figure 3 is taken from a [Mercer Island 1963 survey](#) that shows the contours of the Lot and the SE Maker right-of-way after the 6950 house was completed in 1955, but before the rockery was put in place around 6950.

At this time, SE Maker consisted of a gravel driveway on its west end (towards 72nd Ave SE). The rest of SE Maker was still unimproved in 1963.

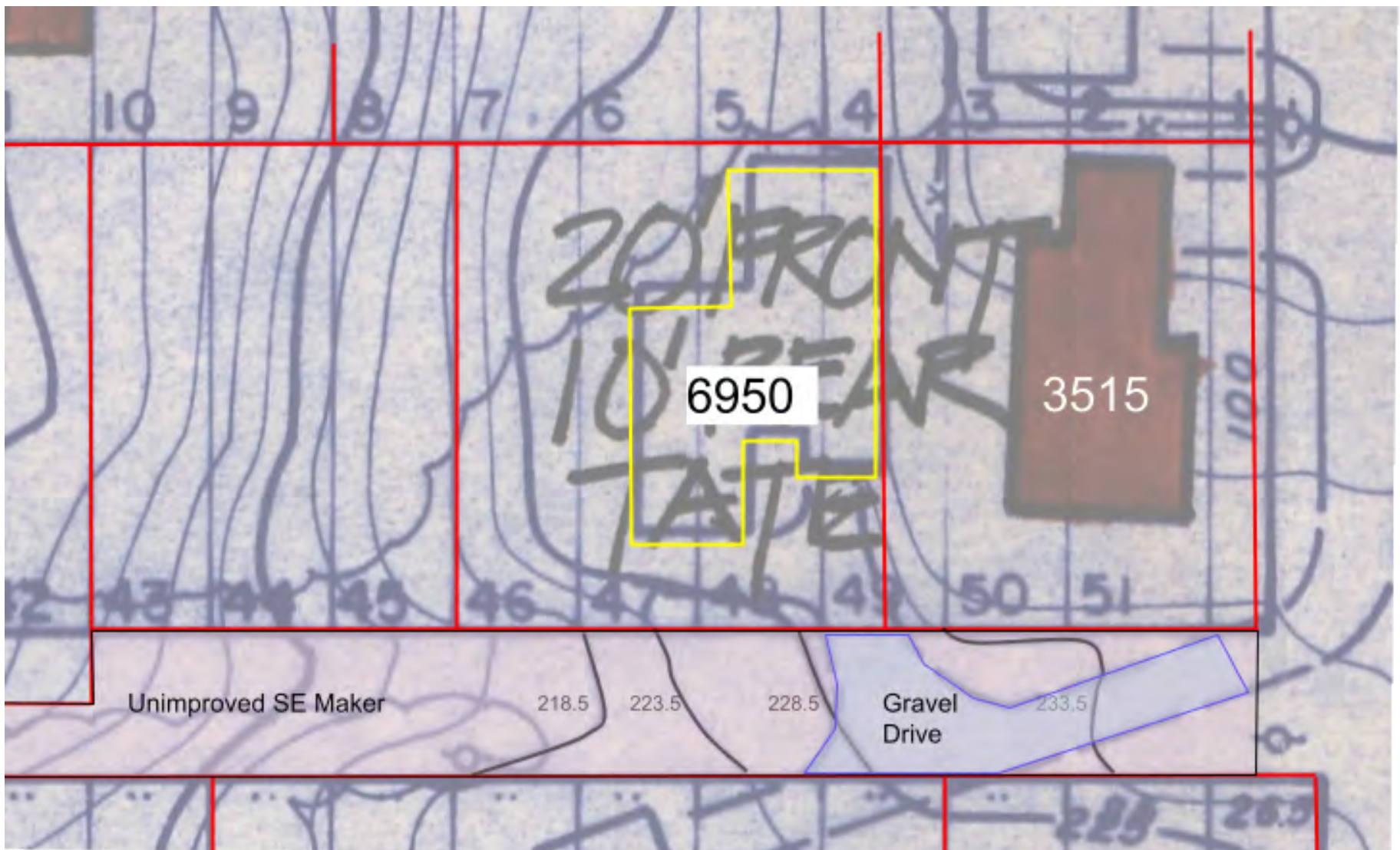


Figure 3. Survey showing original grade of SE Maker Street, 1963. The grade shown for 6950 is already Altered from the Existing Grade. ("1963 Survey")

Figure 4 shows (in blue) the contours of Existing Grade of 7145 SE 35th Street, immediately north of 6950, as established in the 1989 Survey. This is prior to Alteration of 7145, as is shown by the large trees in the 1989 Survey and 1989 Geotechnical Survey of 7145 SE 35th. Between the 1963 Survey and this 1989 Survey, we have clear Existing Grades for both the North and South boundary lines of 6950.

Note: the east-west portion of the 233.5 line is due to Alteration prior to any survey - the rockery on the south side of 3515 existed prior to the 1963 survey.

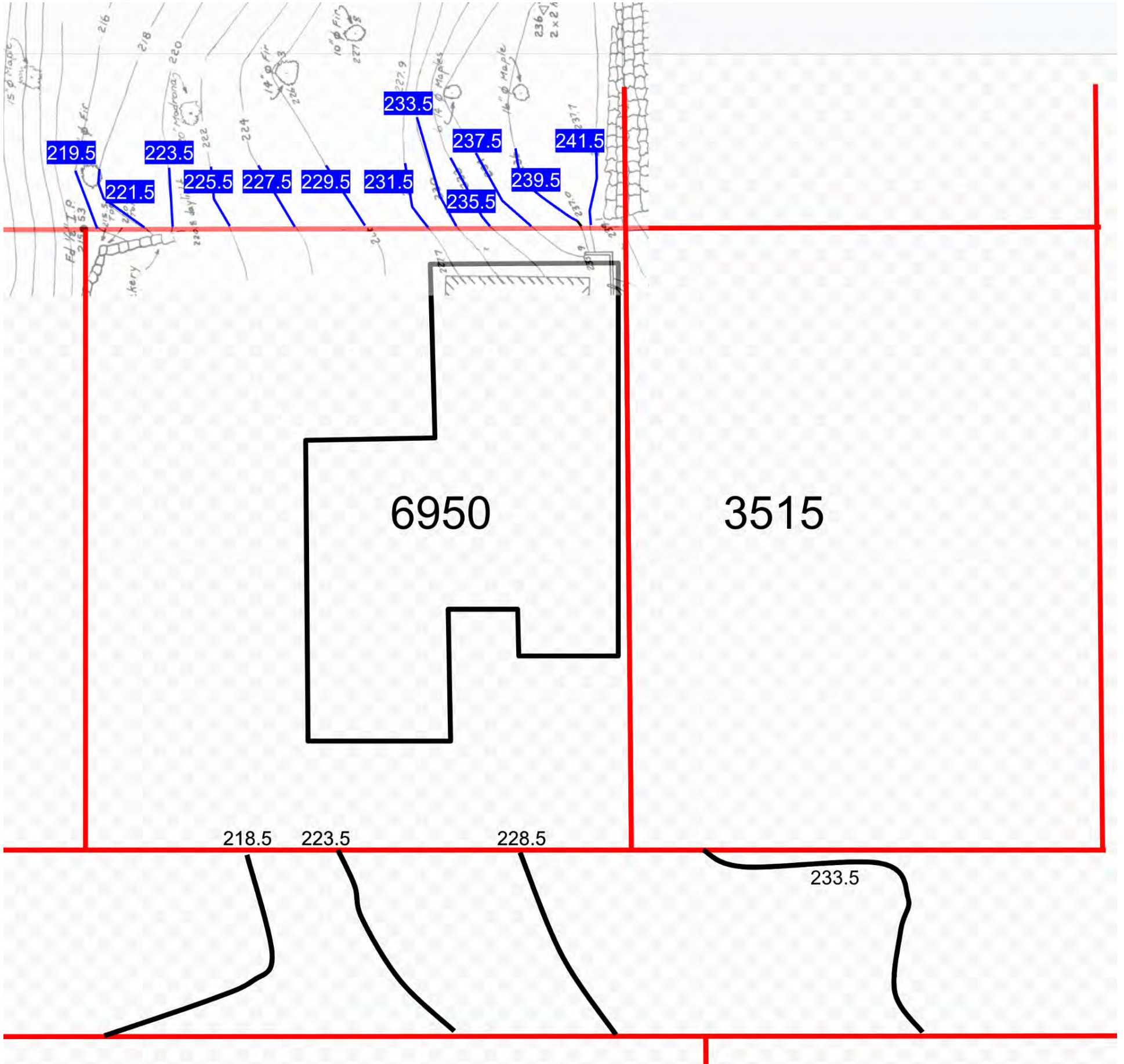


Figure 4. Existing Grade of from 1989 survey of 7145, immediately north of 6950 ("1989 Survey")

With knowledge of the Existing Grade immediately north and south of 6950, we can interpolate contour lines (shown as Dashed Black Lines), shown in Figure 5.

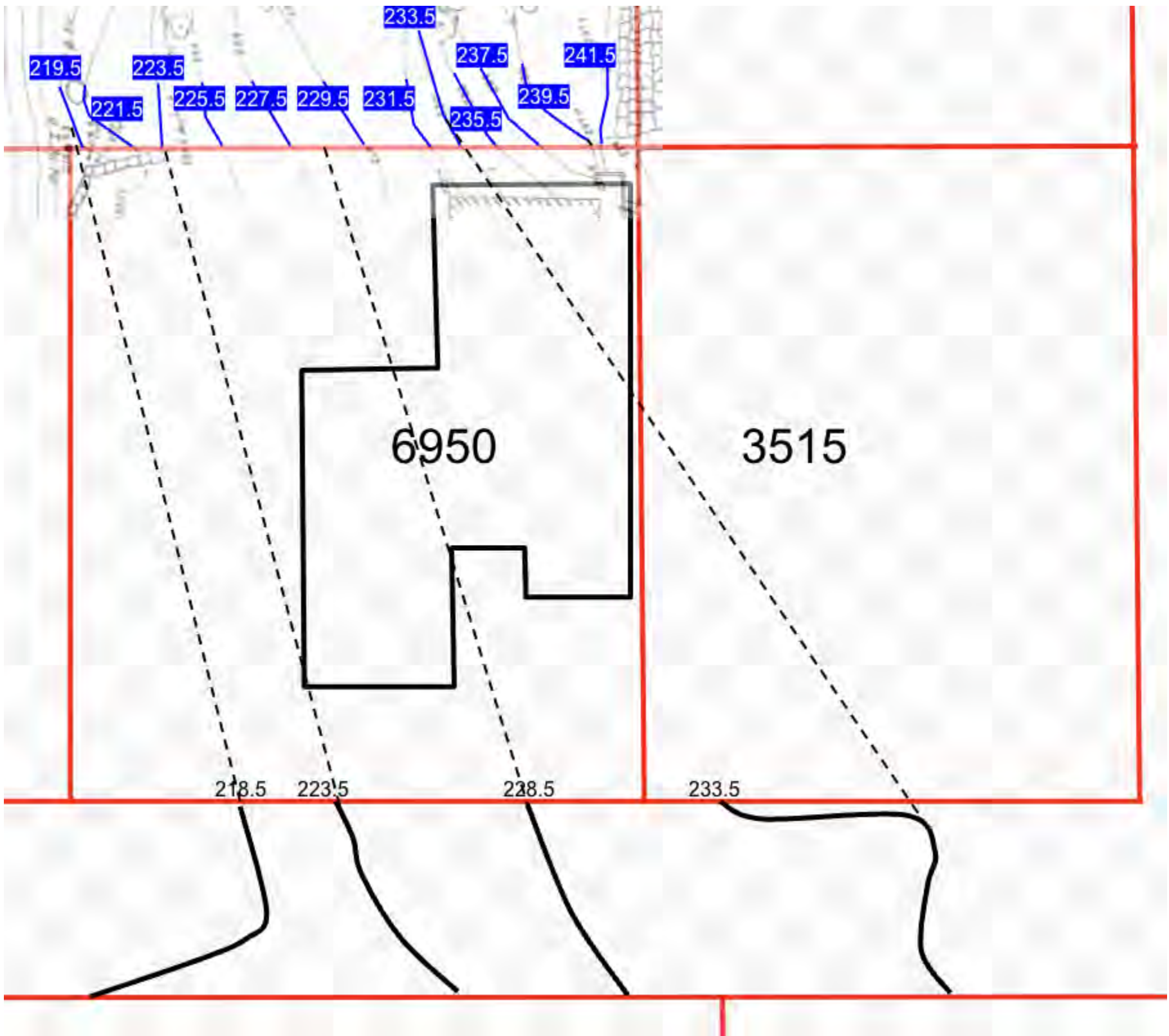


Figure 5. Interpolation of contours between the Existing Grade of SE Maker and the Existing Grade of 7145 SE 35 Street
Black Dashed Line: Interpolated between 1963 Survey (south side) and 1989 Survey (north side)

Between 1963 and 2004, Maker was paved (in 1965) and the rockery was built. It's clear that the elevation of the paved portion of Maker (surveyed in 2004, and shown in Green in Figure 6) didn't change appreciably from its 1963 elevations (in Black).

Note that the 2004 survey did not include the rockery - it only went as far north as the northern edge of the pavement on SE Maker Street.

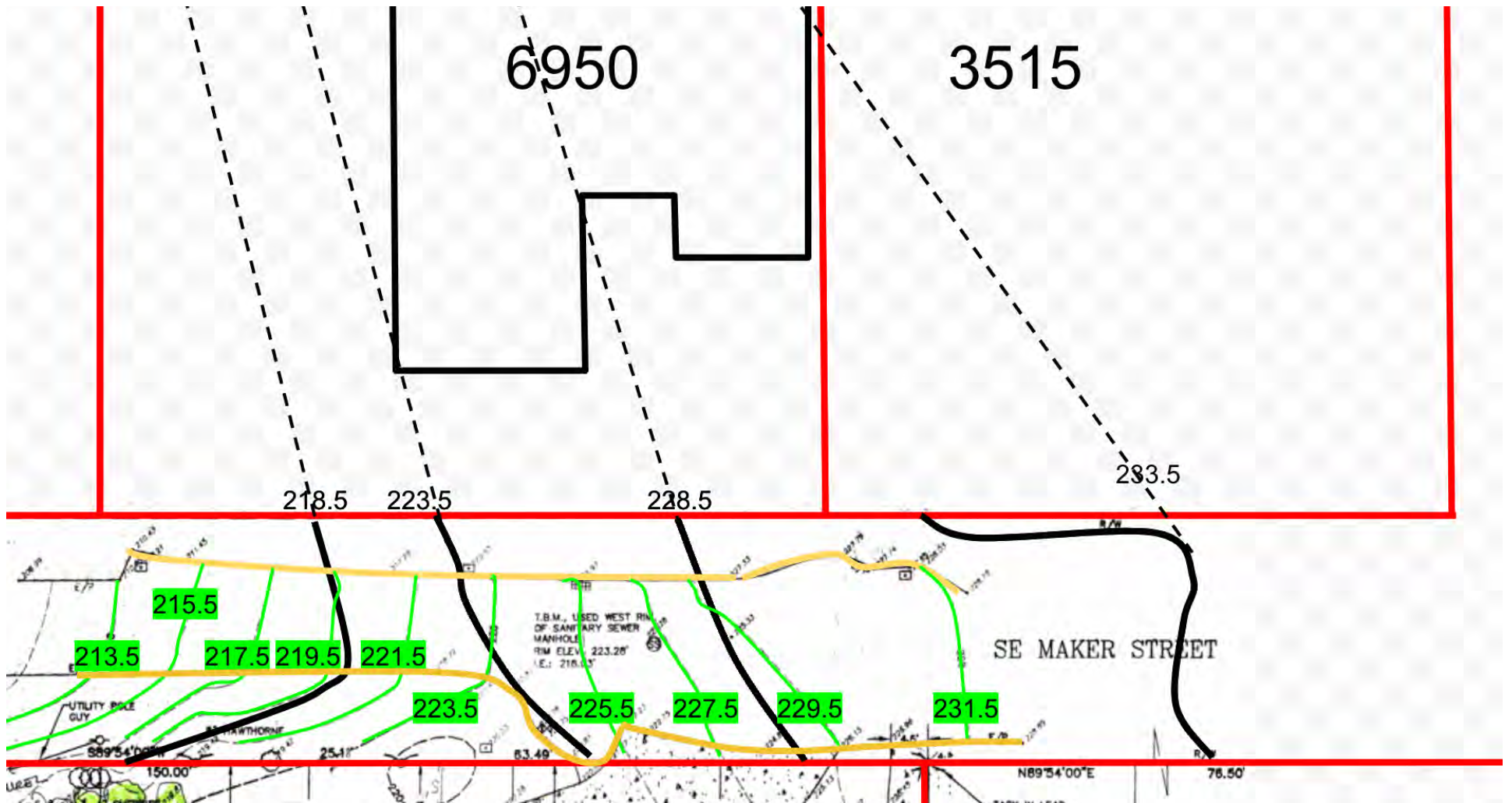


Figure 6. Overlay of 2004 Survey of the paved portion of Maker with contours from 1963 Survey

In Figure 7, interpolation based on both the 1963 Survey and the 2004 Survey shows that a near perfect match between the two sets of interpolated contours (Dashed Black Lines are interpolated based on the 1961 Survey, Dashed Green Lines are interpolated based on the 2004 Survey).

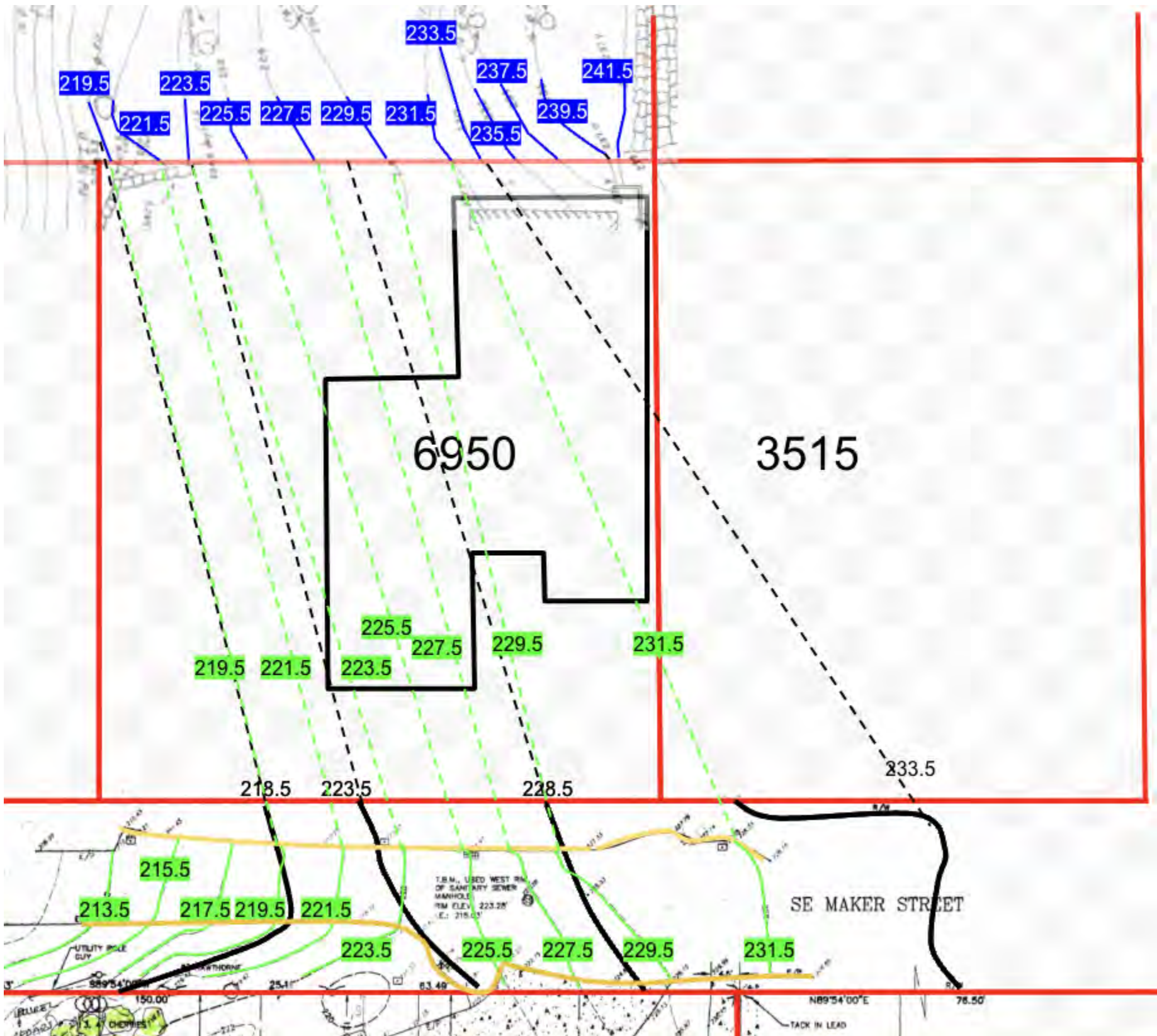


Figure 7. Interpolation of contours between the Existing Grade of SE Maker both the 1961 Survey and 2004 Survey
Black Dashed Line: Interpolated between 1963 Survey (south side) and 1989 Survey (north side)
Green Dashed Line: Interpolated between 2004 Survey (south side) and 1989 Survey (north side)

Another survey of SE Maker Street and 6950 SE Maker was done in 2021. The rockery installed after 1963 did not change the grade of the paved portion of SE Maker. In addition, the grade of the front and side yards of 6950 SE Maker (north and east of the rockery) changed significantly, as a second fill installation was done (to fill in the area behind the rockery, and to increase the grade of the front/side yards).

In Figure 8, black lines show the 1963 survey, green lines show the 2004 survey, and cyan lines show the 2021 survey. The extent to which cyan lines cross the black lines shows that the grade of rockery area in the SE Maker Street ROW changed significantly when the rockery was installed.



Figure 8. 1963 Survey, 2004 Survey, and 2021 Survey of SE Maker Street overlaid.

Shown in Figure 9, the 2021 Survey allows for more interpolations (Black Dashed Lines based on the 1963 Survey, Green Dashed Lines based on the 2004 Survey, and Cyan Dashed Lines based on the 2021 Survey). The degree to which these interpolations match is unmistakable.

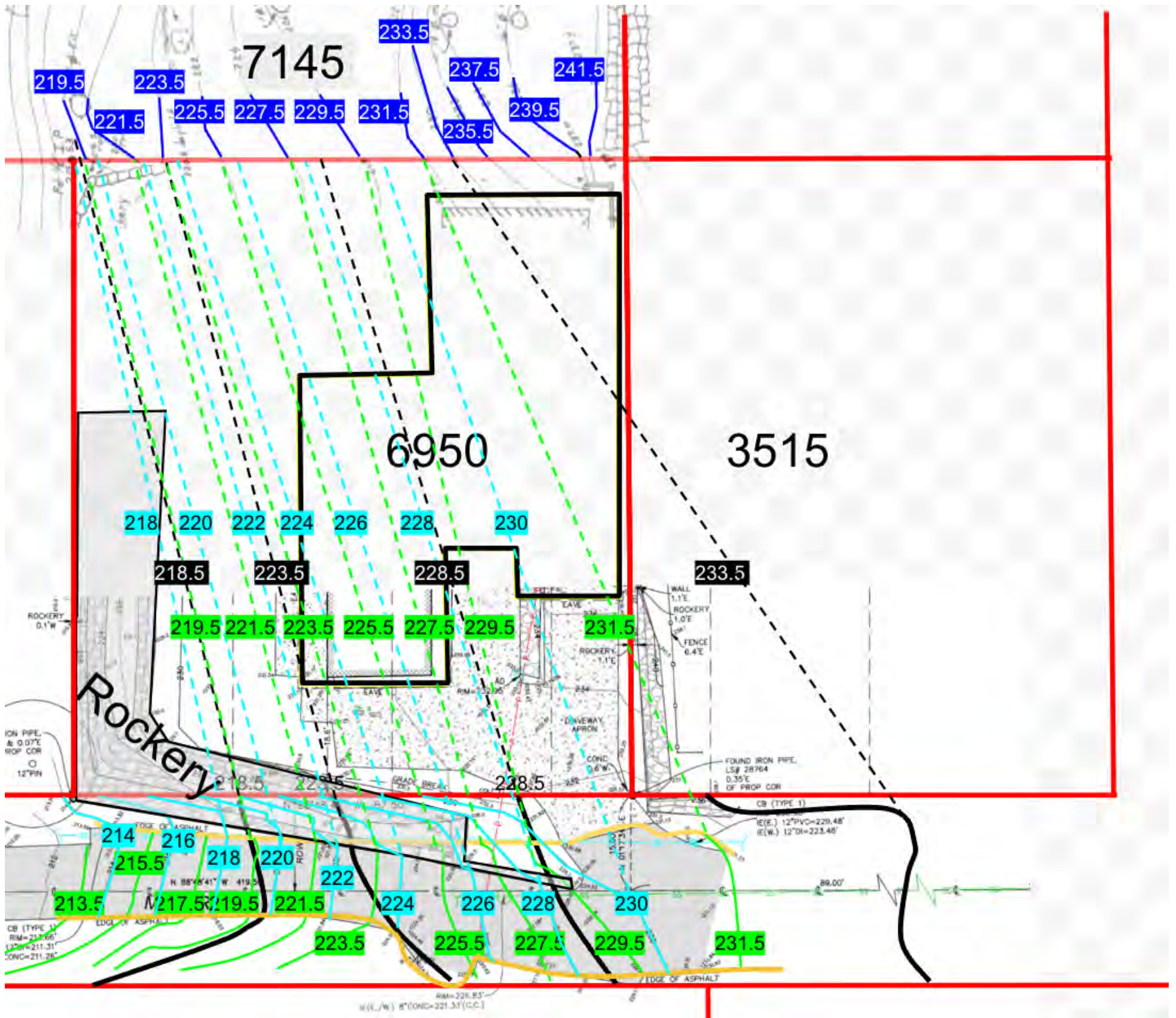


Figure 9. Interpolated contour lines based on 1963 Survey, 1989 Survey, 2004 Survey, and 2021 Survey.
 Black Dashed Line: Interpolated between 1963 Survey (south side) and 1989 Survey (north side)
 Green Dashed Line: Interpolated between 2004 Survey (south side) and 1989 Survey (north side)
 Cyan Dashed Line: Interpolated between 2021 Survey (south side) and 1989 Survey (north side)

Finally, we can add in the latest LIDAR data to capture original contours of SE Maker southeast of 6950 (Black Dashed lines based on the 1963 Survey, Green Dashed Lines based on the 2004 Survey, and Cyan Dashed Lines based on the 2021 Survey and LIDAR data for the eastern end of Maker Street). These interpolations are shown in Figure 10.

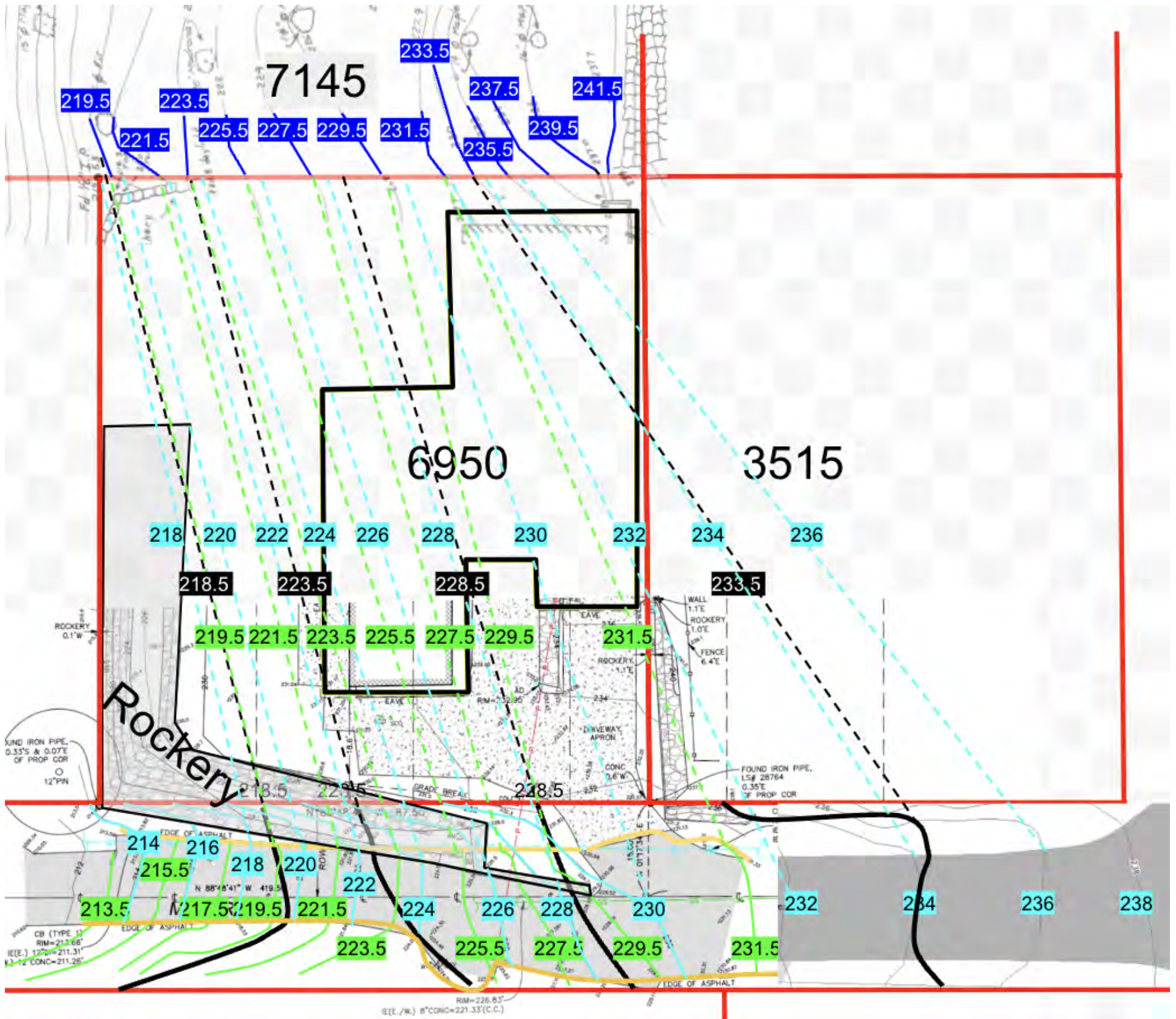


Figure 10. Interpolated contour lines based on 1963 Survey, 1989 Survey, 2004 Survey, 2021 Survey, and current LIDAR.

The interpolated contours based on all of these surveys and LIDAR data reach the same conclusion: the 6950 lot was extensively Altered, and it is straightforward to determine the Existing Grade of the lot.

We can validate the interpolations by comparing them with data from the 2022 Geotechnical survey of the 6950 property. In Figure 11, the depth of original topsoil in the 5 bore/test holes drilled in 2022 matches the interpolated contours within a few inches.

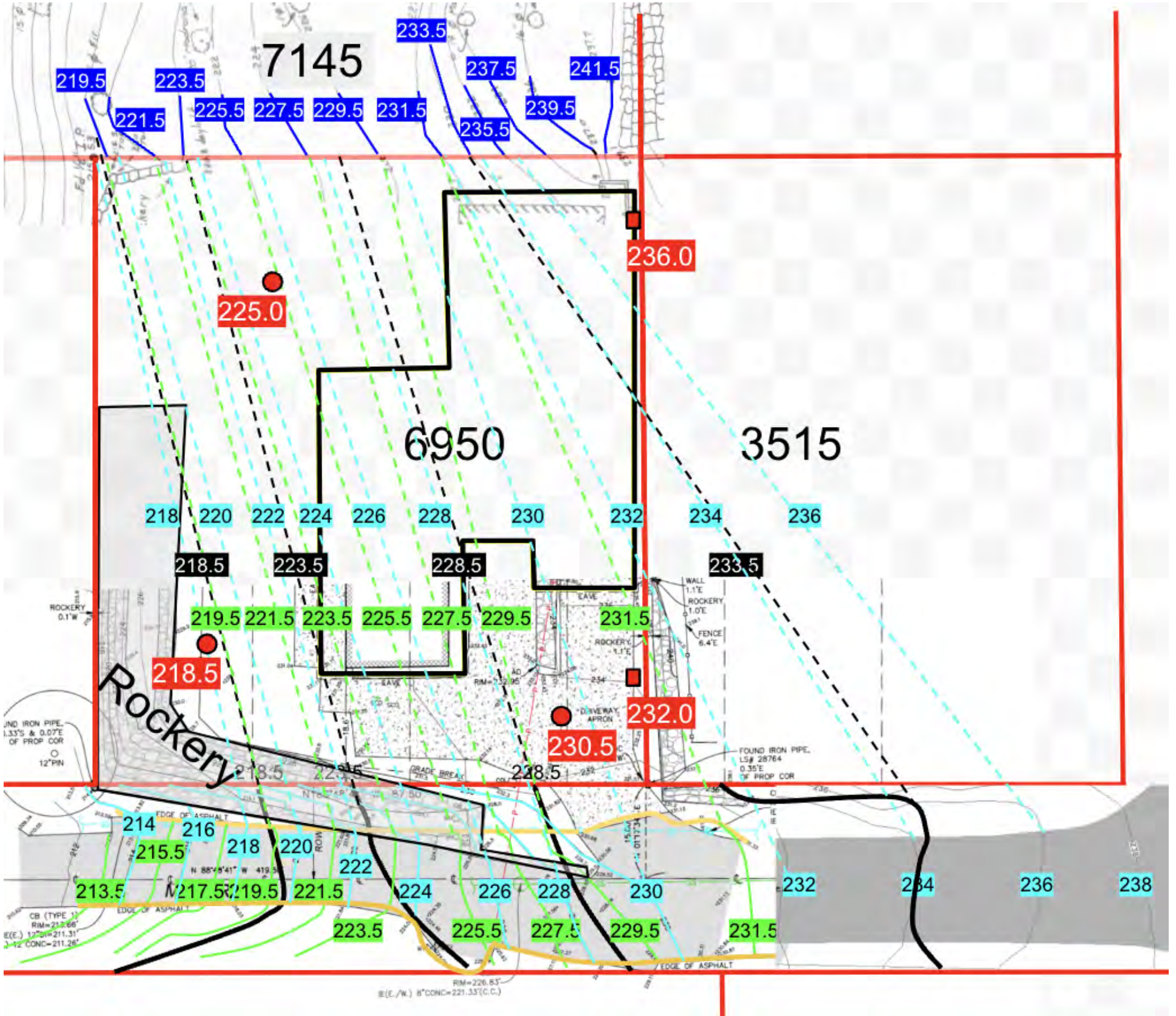


Figure 11. 2022 Geotechnical data overlaid with Interpolated contour lines based on 1963 Survey, 1989 Survey, 2004 Survey, 2021 Survey, and current LIDAR.

With all of this data, it's straightforward to compute the Existing Grade of the proposed structure, shown in Figure 12.

- Elevations in blue show corner and midpoint Existing Grade based on averaging the interpolated data from 3 surveys (1963, 2004, 2021)
- The +/- figures correspond to the range of elevations computed from each survey. It's clear that the 3 different survey interpolations yield essentially identical results.

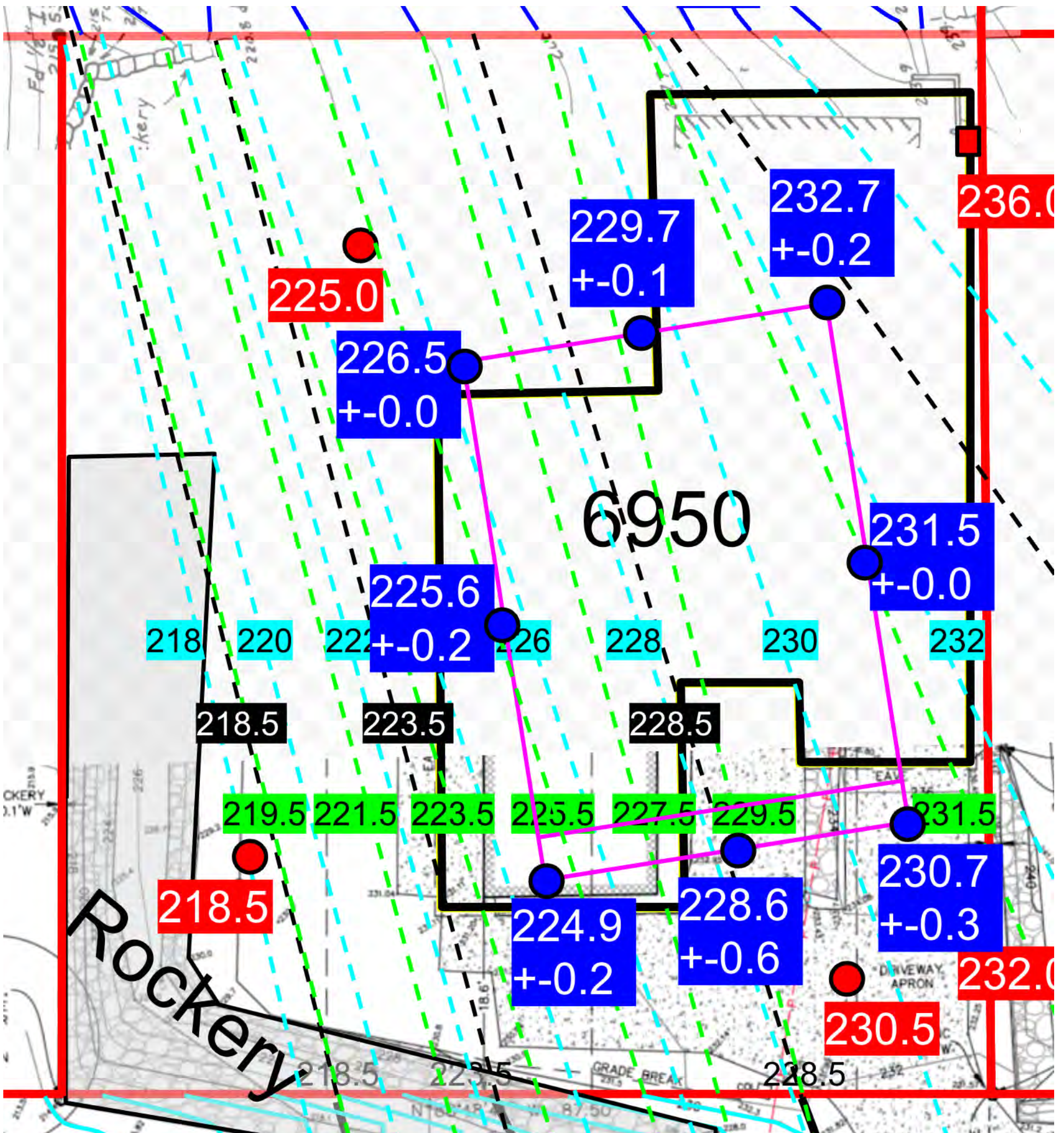


Figure 12. Computed corner and midpoint elevations of proposed structure
 Proposed structure shown in Magenta
 Corner/midpoints and elevations of proposed structure shown in Dark Blue

Overall, we have 5 pieces of data that are almost perfectly correlated:

- 1963 Survey
- 1989 Survey
- 2004 Survey
- 2021 Survey
- 2022 Geotechnical Survey

It's unusual to have such well-correlated data over a 60-year period, and the tightness of that correlation provides extremely high confidence in determining the Existing Grade.

The correctly-determined Existing Grade for the proposed structure can now be used to correctly calculate Basement Coverage and Average Building Elevation. For SUB3, the results of using the correct Existing Grade are as follows:

For Basement Coverage (using the plan's Basement FF of 226.7')

- West Basement Wall Coverage: $0\% * 46'$
- North Basement Wall Coverage = $37.5\% * 35'$
- East Basement Wall Coverage = $60\% * 46'$
- South Basement Wall Coverage = $0\% * 35'$

Therefore, Basement Coverage is 25.1%.

For Average Building Elevation:

- West: $225.6' * 50' = 11280$
- North: $229.7' * 35' = 8040$
- East: $231.5' * 50' = 11575$
- South: $226.7' * 35' = 7934$

Therefore, the ABE is $(11280 + 8040 + 11575 + 7934) / 170 = 228.4'$.

It is worth noting that the Existing Grade of 228.4' matches the grade of the current Basement in the 2021 Survey precisely - the 2021 Basement Finished Floor elevation was surveyed at 228.7'. With a standard 4-inch slab depth, the grade basement currently sits on a 228.4' grade.

Section 2 - MICC Violations

As a result of the findings in Section 1, the planned structure violates a number of aspects of MICC, including:

- 19.2.020(C)(1.c.iii) - The top of the facade on the East Side Yard is more than 25 feet above the lower of Finished Grade or Existing Grade. Therefore, the East Side Yard must have a depth of 10 feet. "Yard depth" is not defined in MICC, but has a [common definition](#) of "The shortest horizontal dimension of a yard on a lot between a lot line and the nearest wall of the nearest main building or structure on the lot".
 - Yard depth of the East Side Yard is 7.5' in this submission.
- 19.02.020(D)(1)-(2) - Because Existing Grade is computed incorrectly, the Basement Exclusion is computed incorrectly. As a result, the computed GFA is incorrect.
 - The correct calculation for ADU square footage is $586 * (1.0 - .251) = 438$ square feet, which is 100% of the allowed ADU square footage.
 - The correct calculation for non-ADU Basement Square Footage is $1024 * (1.0 - .251) = 767$ square feet. As a result, the non-ADU square footage is $767 + 1669 + 1529 + 66 = 4031$ square feet, which is 531 square feet larger than the 3500 square feet permitted.
- 19.02.020(E) - Because Existing Grade was computed incorrectly, the house structure exceeds ABE + 30' (ABE should be correctly computed as 228.4', and the rooftop rails are at 260.5', which is 2.1' higher than the ABE permits.
- 19.02.020(E)(3) - Downhill facade is computed from Existing Grade of 224.9' in the Southwest Corner of the structure. The rooftop railings at 260.5' exceed the allowable downhill facade by 5.6'
 - MICC defines facade as follows, which clearly includes the rooftop railings:
 - **Facade:** Any exterior wall of a structure, including projections from and attachments to the wall. Projections and attachments include balconies, decks, porches, chimneys, unenclosed corridors and similar projections.

In the end, the majority of the problems with the proposed structure are due to Alterations to the Development Site, and incorrect determination of the Existing Grade, per MICC.

Thank you for your careful attention to this matter.

Dan Grove
3515 72nd Ave SE
Mercer Island, WA 98040

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Appendix - Sources and Methods

<https://www.seattle.gov/dpd/codes/dr/DR2012-4.pdf> - page 7, showing City of Seattle's documented best practices for interpolation of lot elevations when the lot has been altered prior to its survey.

Figure 0: King County iMAP 1936 Aerial Photography layer

Figure 1: [1946 photo of SE Maker Street](#) (from 7020 SE Maker GIS records)

Figure 2: 1955 photo of 6950 SE Maker and environs (from Puget Sound Regional Archives)

Figure 3: [January 1963 survey](#) (from Mercer Island GIS)

Figure 4: [1989 Survey](#) (from 7145 SE 35th Street GIS records)

Figure 6: [2004 Survey](#) (from 7075 SE Maker Street GIS records)

Figure 8: [2021 Survey](#) (from 6950 SE Maker Street permit application)

Figure 10: Current 2023 LIDAR data from City of Mercer Island GIS

Figure 11: [2022 Geotechnical Survey](#) of 6950 SE Maker Street

In this document, elevations from the 1963, 1989 and 2004 surveys are normalized from their original NGVD29 elevations to current NAVD88 elevations by adding 3.5 feet to the NGVD29 elevations (for more details, [see this document](#) from the City of Seattle).