

Report of Summer 2021 Curb Ramp Field Data Collection

In total there were 1,120 curb ramps updated during the summer of 2021 by ISU's GIS TRcC. Of the 4,131 ramps currently in inventory, 112 of these met the 2010 ADA compliance test. This test used an SQL expression executed against the ramps table as follows:

```
TurningSpaceWidth >= 4.0 And TurningSpaceLength >= 4.0 And  
Running_Slope <= 8.3 And Left_Flare_Slope <= 10 And Right_Flare_Slope  
<= 10 And CounterSlope <= 5 And DetectableWarningWidth >= 2.0 And  
Ramp_Width >= 4.0 And TruncatedDome = 1 And ContrastingColor = 1
```

The result of only 112 ramps meeting ADA compliance is misleading however as the majority of curb ramps ($n = 3,011$) were not updated during the summer of 2021 and most of the previous mapping of curb ramps did not include the attribution necessary to determine compliance. In addition, the compliance test used rules set in 2010. Sidewalk ramps built prior to 2010 should not be expected to comply with these rules. Re-evaluating ADA compliance for only those curb ramps updated during the summer of 2021 shows 111 ramps met the 2010 ADA compliance test. This is a compliance rate of 10% based upon the SQL expression. The remaining curb ramps have been assigned a compliance property of unknown.

Ten (10) new sidewalk lines were collected totaling 1.4 km (4,593 feet) in length.

Map of Compliant Curb Ramps

The areas with the highest concentration of compliant and non-compliant ramps are shown in **figure 1**, below. Based on these data the Old Town and in general, southern parts of Pocatello appear to have the highest concentration of non-compliant curb ramps.

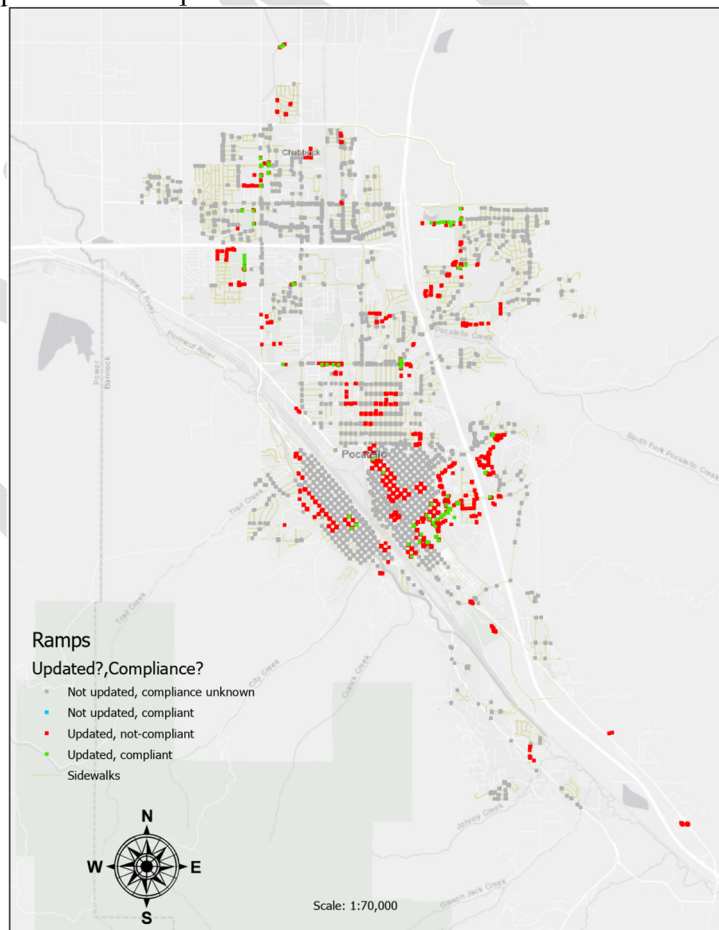


Figure 1. Areas with compliant/non-compliant curb ramps based upon summer 2021 field collection

Summary of Compliance factors

To better understand curb ramp compliance factors, a series of independent SQL expressions were executed generating the following results (Table 1).

Table 1. Breakdown of individual compliance factors evaluated in this study

Compliance factor	Ramps in compliance (n =)
Turning space length/width	491
Running slope	1,779
Left/Right Flare slope	1,261
Counter slope	958
Detectable warning width	453
Ramp width	2,423
Truncated dome present	453
Contrasting color present	350

When comprehensively evaluated, only 112 curb ramps were found to be fully compliant. By looking at each individual factor it appears the presence of a truncated dome detectable warning with contrasting color is the primary bottle neck or limiting factor. This may also be a low-hanging fruit type of scenario as these results suggest complete replacement of curb ramps may not be necessary in many instances but rather it might be possible to increase compliance by installing truncated dome detectable warnings with contrasting color. This is not necessarily a simple process but is certainly less difficult and less costly than replacing the entire curb return area.

A summary of descriptive statistics of various measurements made for each curb ramp (Table 2) show mean values for each criterion have been satisfied (n = 1,120). Additional details are given in the RampMeasurementStatistics table found in the project geodatabase.

Table 2. Statistics describing measurements made for all curb ramps updated in 2021 (n = 1,120)

Compliance factor	Mean measured value	Compliance value
Turning space length/width	6.42	≥ 4.0
Running slope	4.19	≤ 8.3
Left/Right Flare slope	5.13/5.37	≤ 10.0
Counter slope	2.58	≤ 5.0
Detectable warning width	2.05	≥ 2.0
Ramp width	6.35	≥ 4.0

Similarly, statistics were calculated for the curb ramps that were not considered compliant under the 2010 guidelines (Table 3) (n = 1,009). Additional details are given in the RampMeasurementStatistics_UNK_Compliant table found in the project geodatabase.

Table 3. Statistics describing measurements made for curb ramps that did not satisfy all 2010 compliance criteria (n = 1,009)

Compliance factor	Mean measured value	Compliance value
Turning space length/width	6.17	≥ 4.0
Running slope	4.30	≤ 8.3
Left/Right Flare slope	5.34/5.64	≤ 10.0
Counter slope	2.69	≤ 5.0
Detectable warning width	2.07	≥ 2.0
Ramp width	6.24	≥ 4.0

Both table 2 and table 3 suggest that the majority of curb ramps should be considered compliant. However, it was brought to my attention that while the presence of a left and right flare is not required, the presence of a null value in the geodatabase table might invalidate that SQL query and return as non-compliant. To address this, the SQL query was executed again in a step-wise fashion allowing null values to be retained as potentially compliant.

Beginning with all ramps updated in 2021 (n = 1,120):

```
TurningSpaceWidth >= 4.0 Or TurningSpaceWidth IS NULL (n = 1,113)
TurningSpaceLength >= 4.0 Or TurningSpaceLength IS NULL (n = 1,103)
Running_Slope <= 8.3 Or Running_Slope IS NULL (n = 1,052)
Left_Flare_Slope <= 10 Or Left_Flare_Slope IS NULL (n = 1,014)
Right_Flare_Slope <= 10 Or Right_Flare_Slope IS NULL (n = 983)
CounterSlope <= 5 Or CounterSlope IS NULL (n = 862)
DetectableWarningWidth >= 2.0 Or DetectableWarningWidth IS NULL (n = 862)
Ramp_Width >= 4.0 Or Ramp_Width IS NULL (n = 855)
```

As a result of this analysis, the majority of ramps reviewed in 2021 (855 of 1,120 or 76%) were found to be compliant with the 2010 standard. It was also noted that many of the sidewalks and ramps in Pocatello and Chubbuck, Idaho were constructed before 2010. Those curb ramps are not expected to comply with the 2010 standard. Instead, curb ramps need to comply with the standard set in 1991 (if the curb ramp was constructed on or after 1991). A modified SQL query was executed resulting in 908 records found to be compliant with the 1991 standard (81%).

```
Updated = 1 And Ramp_Width >= 3 And Detectable_Warnings >= 2 And
Left_Flare_Slope <= 10 Or Left_Flare_Slope IS NULL And
Right_Flare_Slope <= 10 Or Right_Flare_Slope IS NULL And Running_Slope
<= 8.3
```

Note: the SQL queries shown in this report are provided as a project deliverable for your convenience.

Horizontal Positional Accuracy

Throughout the summer 2021 field collection, an external Trimble R1 GNSS receiver was used to improve the positional accuracy of these data. The GNSS metadata was evaluated, showing median horizontal positional accuracy was sub-meter for all 1,120 ramps (0.746 meters), median vertical positional accuracy was 1.02 meters, and the median number of positions used for each collection was five. Additional details are given in the Ramps_GNSS_Statistics table found in the project geodatabase.