

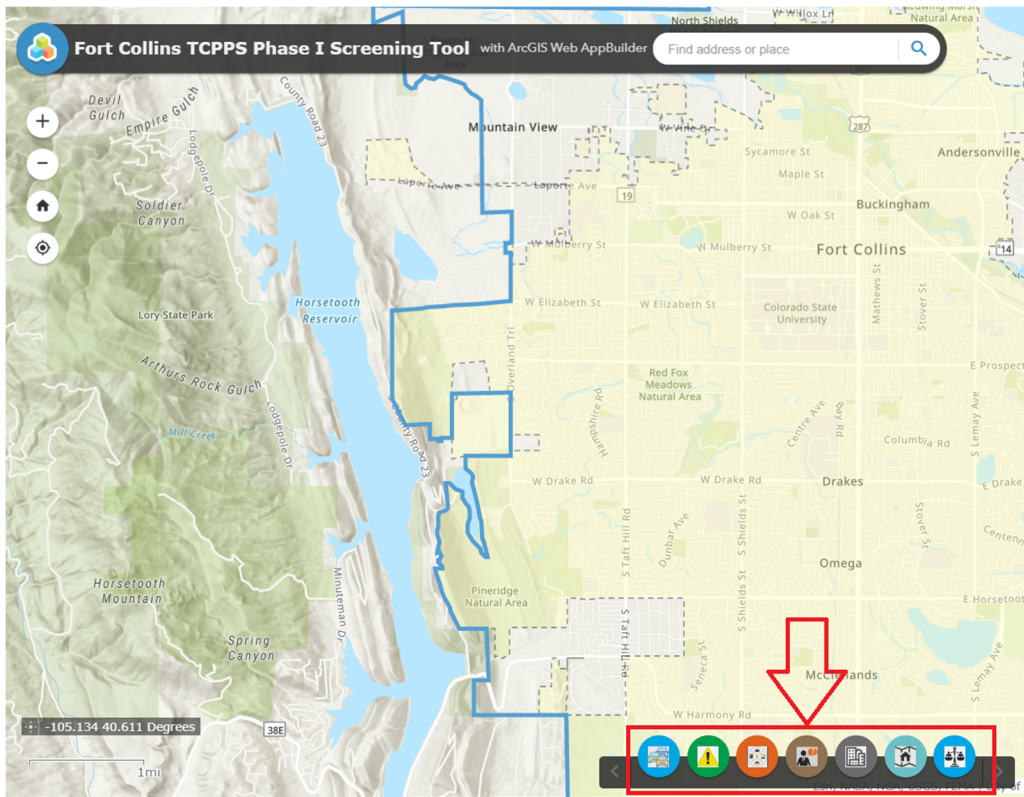
# **APPENDIX B**

# **GIS Users Manual**


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GIS Documentation

# City of Fort Collins TCPPS Phase I Screening Tool

1. To access the web map, go to:  
<https://olsson.maps.arcgis.com/apps/webappviewer/index.html?id=06f39e08758a4cb9bd4a50385a473b49>
2. The map will open with a disclaimer regarding the map and the data used to make the map. Read the disclaimer and select the OK button to proceed.
3. Once the web map opens, data layer viewing options can be found on the bottom of the screen. There are seven Layer widgets:



The widgets are categorized as follows:

- a.  **Congestion**
  - i. This includes Synchro data split by peak hour in the AM (Morning), MD (Mid-Day), and PM (Afternoon) and is displayed on the map as the Level of Service (LOS)
  - ii. The Level of Service (LOS) rating can be toggled on and off by peak hour, by the overall rating, and by specific directions of travel.



**b. Safety**

- i. Layers included are Level of Safety Service 3 and 4, Excess Crash Cost Trends, and the Excess Crash Costs. These were analyzed and produced by Fox-Tuttle and Olsson.



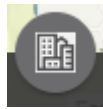
**c. Active Modes**

- i. The Active Modes layers are GIS shapefiles provided to Olsson by the City of Fort Collins. These layers were used in the Active Modes Plan.



**d. Public Input**

- i. Public Input layers were produced from the TCPPS Community Surveys and the Active Modes Plan Community Surveys. The comments from the TCPPS Community Surveys are categorized by mode of transportation: Driving Issue, Walking Issue, Biking Issue, and Transit Issue. The Active Modes Plan Public Input are categorized by concerns and destination by mode of transportation. These include Biking Concerns and Destinations, Skating/Scootering Concerns and Destinations, Walking/Wheelchair Concerns and Destinations, and Walking Concerns and Destinations.



**e. Community**

- i. Community layers include Schools/Attendance Zones, Activity Centers, Hospitals, and the Land Use Structure Plan. The Community Layers were provided by the City of Fort Collins and the Poudre School District. The Community Activity Centers layer was developed from the City of Fort Collins City Plan.



**f. Planning Area**

- i. The Planning Area layers include Adjacent Planning Areas outside of the City of Fort Collins, the Fort Collins Growth Management Area (GMA), as well as Fort Collins City Limits. These layers were provided by the City of Fort Collins.

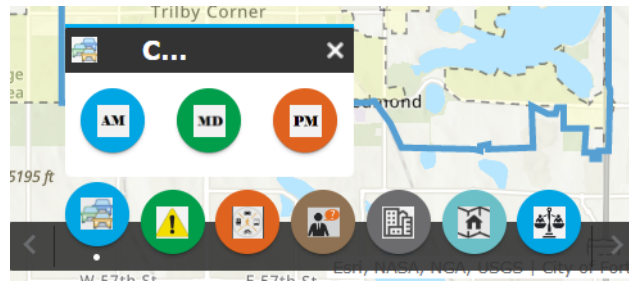


**g. Equity**

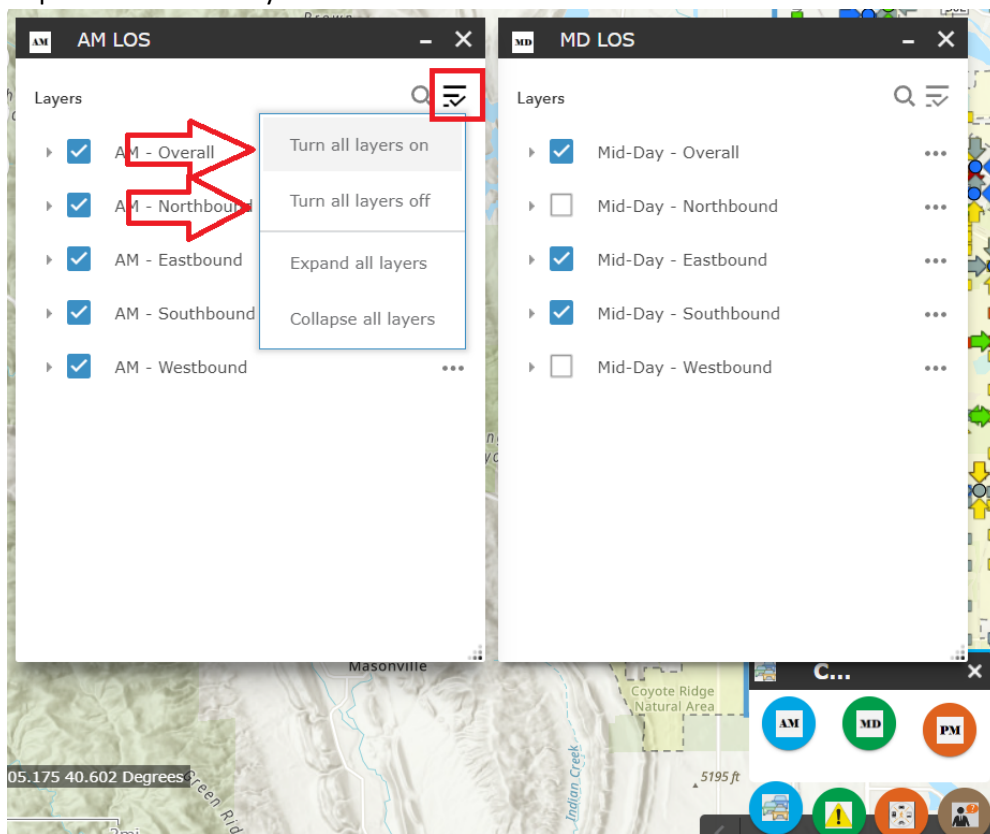
- i. The Health Equity Index displays compiled and ranked data and is intended to be used by decision makers as a tool to identify vulnerable communities. It is a weighted index, made up of two separately calculated scores to determine geographic areas of highest needs. This data was created and used in the Active Modes Plan.

4. A list of layer options display when clicking on a widget.

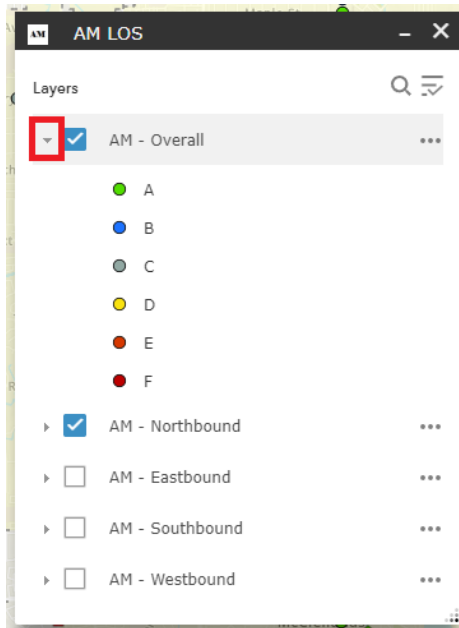
- a. Tip: multiple layer types can be opened simultaneously.



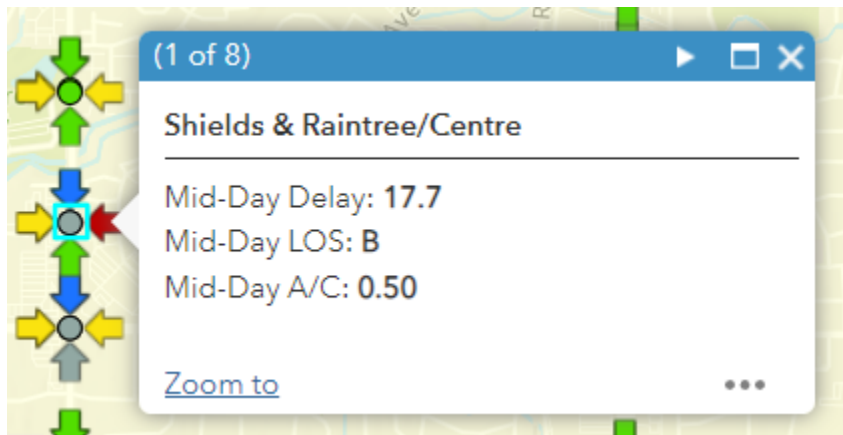
- 5. Once the group layer is open, each individual layer can be toggled on or off.
  - a. Tip: to turn all layers on or off, click on the upper right corner of the group and there are options to turn all layers on or off.



- b. To open and view the group layer, use the arrow drop down next to each individual layer to distinguish the symbology associated with the data.

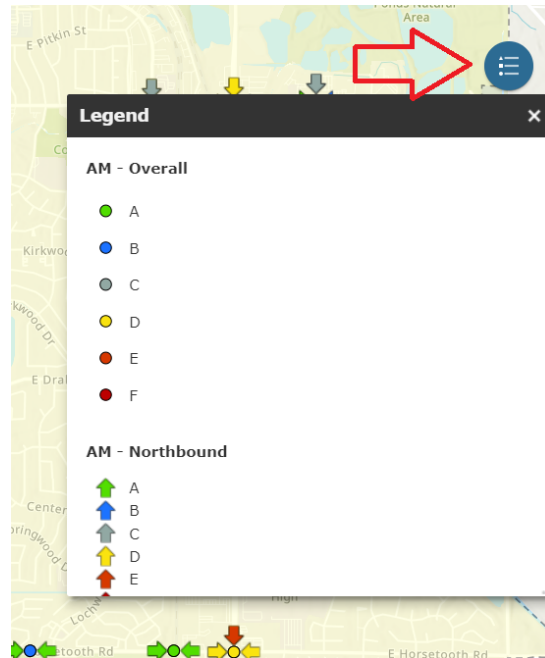


6. Click on points on the map to see the associated attributes for layers displayed.

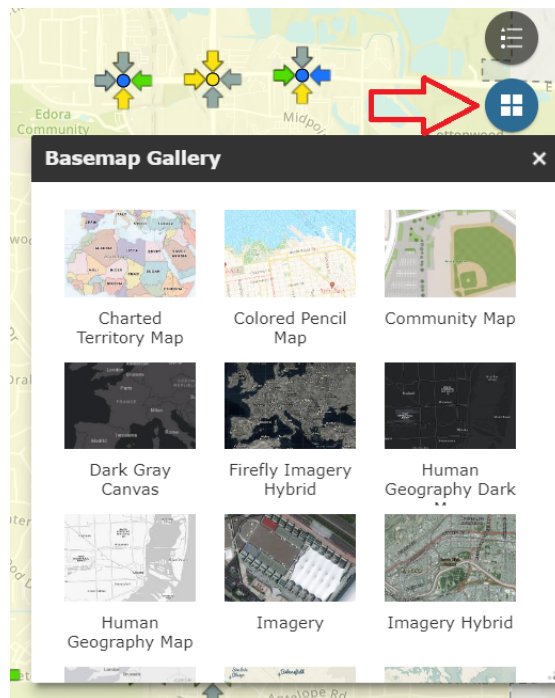


### Other Widgets

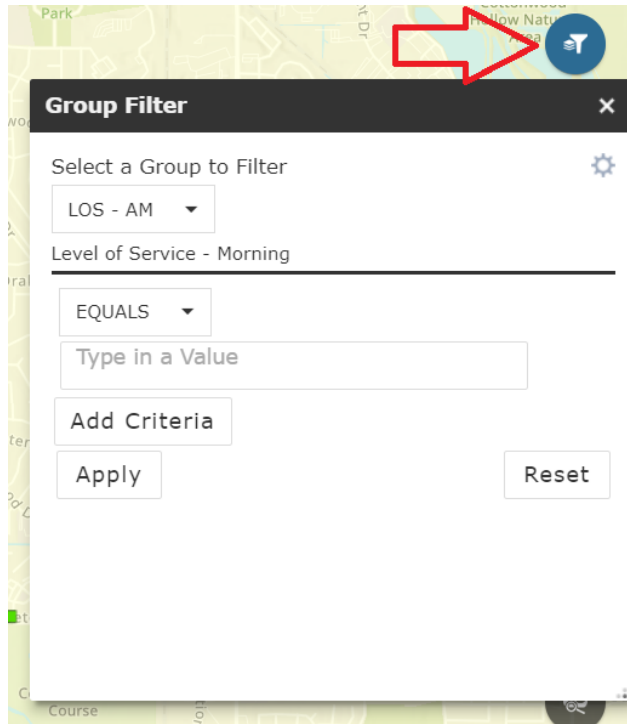
**Legend Widget** – Top button on the upper right side of the screen. The legend will only display the current layers that are turned on in the map.



**Base Map Widget** – Middle button on the upper right side of the screen. The Base Map widget allows users to switch between base maps. The default will always be set to Topographic.



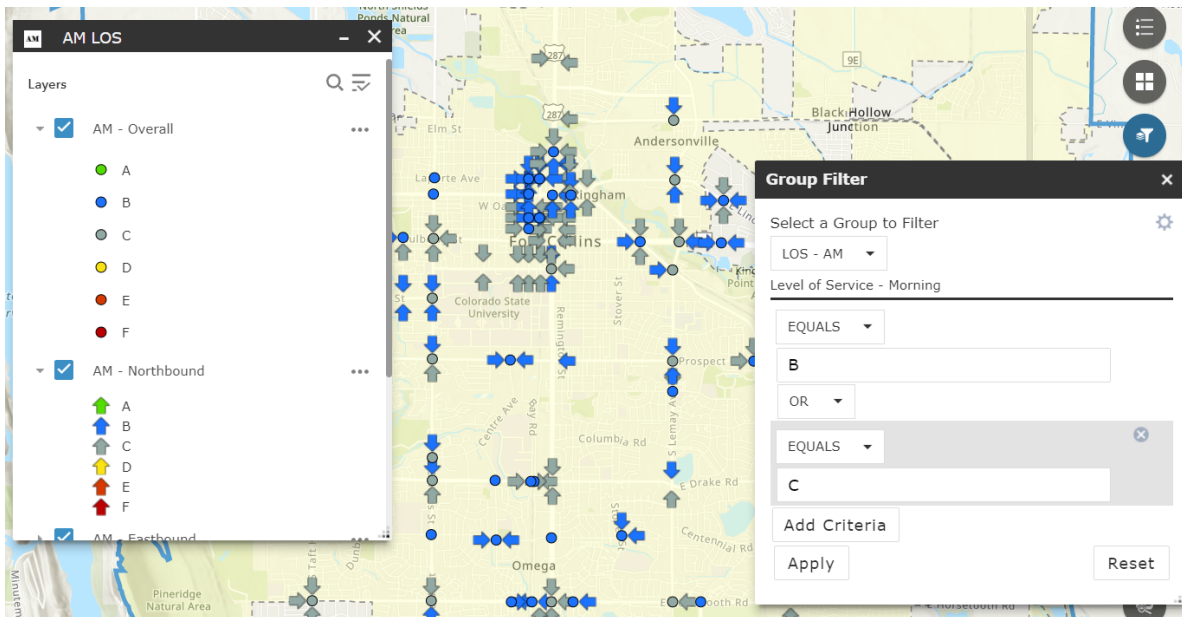
**Group Filter Widget** – Bottom button on upper right side of the screen. The Group Filter Widget is configured to filter on various Congestion and Safety layers. Congestion and Safety layers can be selected on the drop down and a filter can be applied based on the user's needs. Click the Apply button to filter the values. If the filter needs to be cleared, click the Reset button.



Example of the Group Filter use:

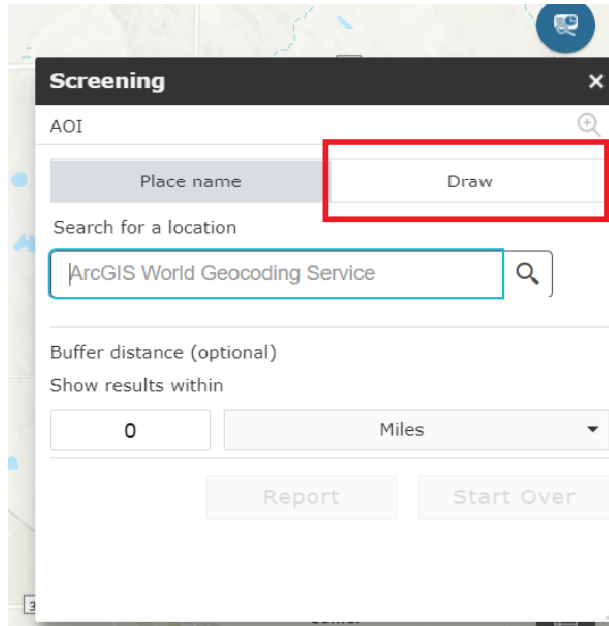
Engineer Joe wants to see all the morning Level of Service ratings of “B” and “C”. Joe chooses “LOS – AM” from the Group Filter dropdown. Then chooses “EQUALS”, types “B”, chooses “OR”, chooses “EQUALS”, types in “C” and click on “Apply”. The map now only shows the LOS values that are rated “B” or “C”.

Note: The Filter widget only works on the layers that are currently turned on in the map.

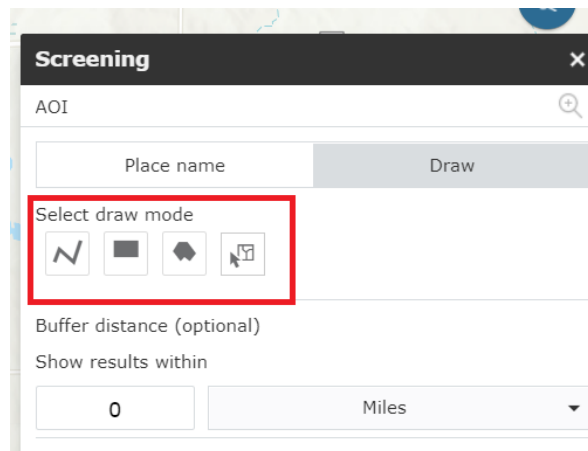


**Screening Widget** – Bottom button on lower right side of the screen. The Screening widget can be used to select portions of the city and create a summarized report of all the mapped layers within the selection. Tip: Layers must be turned on to be included in the screening report.

To use the Screening widget, click on the widget button to open it. Click the Draw button to draw an area around a section of the map.

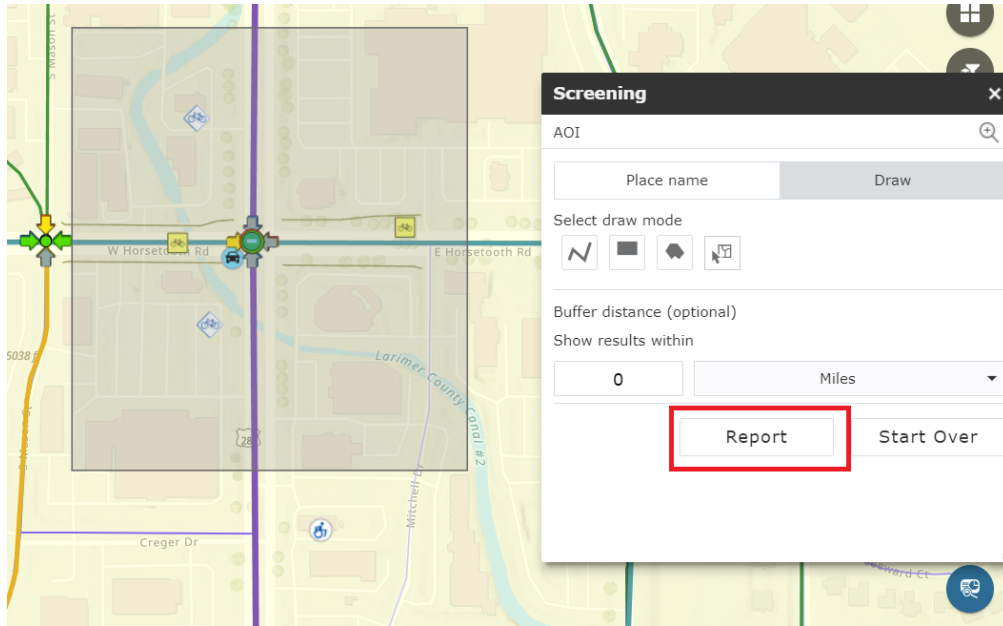


Under the “Select Draw Mode”, choose the draw type.

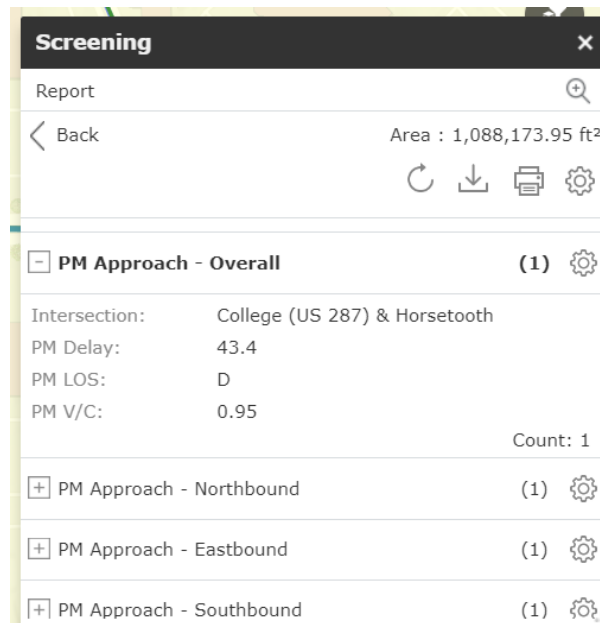


Draw a box/area over the area of interest by clicking and dragging the cursor across the screen. Then click on the “Report” button. If the area needs to be redrawn, click the “Start Over” button.

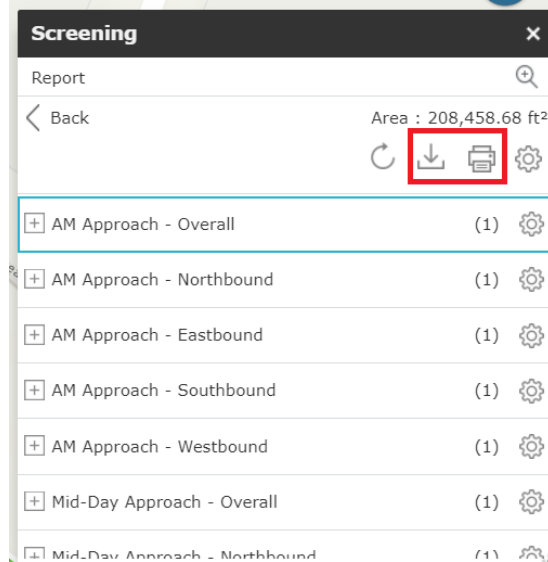




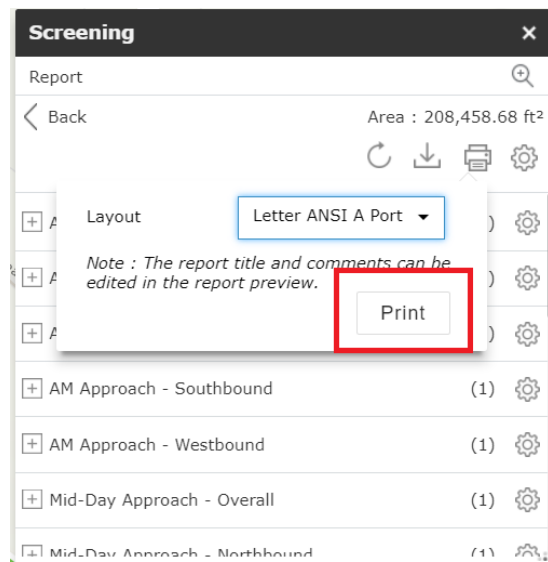
After clicking on the Report button, a list will appear of all the selected features within the area that was drawn. Click on the '+' and '-' icons to maximize or minimize the selected information.



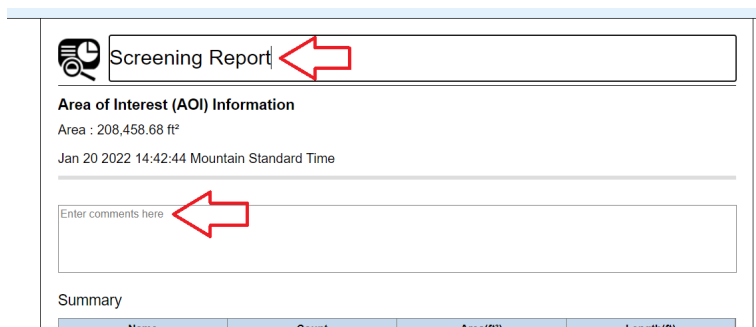
There are options to download or print a summary of the selected features. If the selected features are downloaded, they will download as a CSV file. Note: each layer will download as a separate CSV.



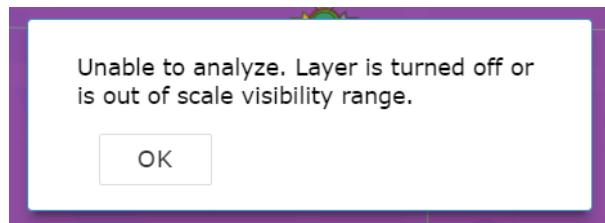
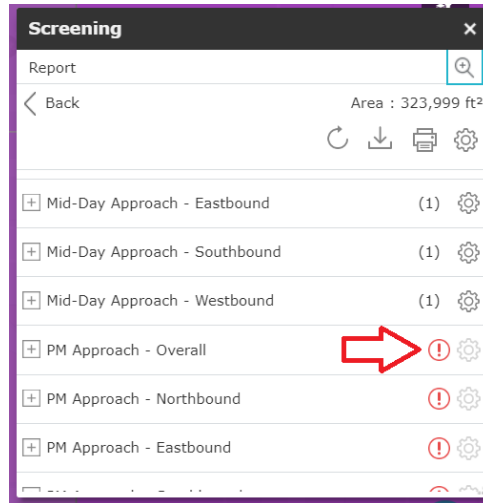
To see a PDF version of the report, click the Printer icon, then click the Print button once a layout is selected.



A PDF report will be generated. Custom text can be added to the title box and additional comment text can be added.



Note: The Screening widget only works on layers that are currently turned on. If a layer is not turned on, a red exclamation point will be displayed and error message saying the layer is unable to be analyzed.



### Screening Tool Data Layer Sources

- **Signalized Level of Service (LOS);** Fox-Tuttle and Olsson, 2021
- **Level of Service of Safety (LOSS);** Fox-Tuttle and Olsson, 2021
- **Excess Crash Cost and Trends;** Olsson, 2021
- **Delay Cost Rank;** Olsson, 2021
- **Master Street Plan: Intersections;** City of Fort Collins; 2019 Fort Collins City Plan.
- **Master Street Plan: Roads;** City of Fort Collins; 2019 Fort Collins City Plan
- **Bus Routes;** City of Fort Collins; 2019 Fort Collins City Plan
- **Bicycle Network – Full Build Plan;** City of Fort Collins; 2019 Fort Collins City Plan
- **Multiuse Trail–** City of Fort Collins; 2019 Fort Collins City Plan
- **Planned Trail;** City of Fort Collins; 2019 Fort Collins City Plan
- **Pedestrian Priority Areas;** City of Fort Collins; 2019 Fort Collins City Plan
- **Poudre School District – Schools;** Poudre School District, 2022
- **Community Activity Centers;** Olsson. Created from 2019 Fort Collins City Plan
- **Hospitals;** U.S. Homeland Infrastructure Foundation Level Data (HIFLD), 2021.
- **Structure Plan – Land Use;** City of Fort Collins; 2019 Fort Collins City Plan
- **Elementary School Attendance Zones;** Poudre School District, 2022
- **Middle School Attendance Zones;** Poudre School District, 2022
- **High School Attendance Zones;** Poudre School District, 2022
- **Adjacent Planning Areas;** City of Fort Collins; 2019 Fort Collins City Plan

### **Other Data References**

- Fort Collins City Plan Document: [city-plan.pdf \(fcgov.com\)](#)
- Fort Collins Active Modes Plan Health Equity Index, provided by Toole Design
- Fox-Tuttle TCPPS LOS Summary and Tier One Prioritization Screening Tabular Data

# City of Fort Collins TCPPS Congestion and Safety GIS Layers

Olsson performed various GIS analysis with datasets provided by Fox Tuttle and the City of Fort Collins. These datasets were in tabular and spatial format which included information regarding traffic volumes, City streets, and intersections.

## Datasets

Dataset	Format	Source
TCPPS_LOS_Summary_Revised for GIS_07222021	Tabular	Fox-Tuttle
Top 50 Locations – Tier One Prioritization Screening	Spatial (shapefile)	Fox-Tuttle
TCPPS_1 <sup>st</sup> Tier High Level Summary_DRAFT 08_17_21	Tabular	Fox Tuttle
AM 2020_UTDF full file_AEL	Tabular	Fox Tuttle

The tabular datasets were cleaned and organized and brought into GIS on a 1:1 join. The tables generated from this join and production within GIS are listed below:

## GIS Join Tables

Dataset	Associated Table	Source
Signalized Level of Service (LOS)	210819_TFTC_TCPPS Crash and LOSS data	Olsson
Tier 1 Intersection Screening	210817_TFTC_TCPPS Tier 1 rank sheets	Olsson
Excess Crash Cost	210819_TFTC_TCPPS Crash and LOSS data	Olsson
Delay Cost Rank	210907_TFTC_TCPPS Delay Cost Rank.xlsx	Olsson
2020 UTDT Nodes	210624_2020_UTDT_Nodes.csv	Olsson

## GIS Processes

### ***2020 UTDT Nodes (Syncro Intersection Nodes)***

- The Node Data was taken from the AM 2020\_UTDF full file, which is raw Syncro data. The Node fields were extracted out, including: "INTID", "TYPE", "X", and "Y". Next, those extracted nodes were put into a new Excel file and saved as 2020\_UTDT\_Nodes.csv.
- Imported 2020 UTDT Nodes table into GIS.
- Plotted the points based on the "X" and "Y" field.
- Created a new shapefile called FtCollins\_2020\_IntersectionNodes\_210902.

Dataset Created: FtCollins\_2020\_IntersectionNodes\_210902

Note: There are more intersections in this feature class than was used in this Study.

### ***Level of Service***

Datasets Used:

- TCPPS\_LOSS\_Summary\_Revised for GIS\_07222021
- FtCollins\_2020\_IntersectionNodes\_210902

GIS Process:

1. Join Tabular LOSS data with points shapefile
2. Export as new point feature class in .gdb
3. Query into separate layers by Peak Hour: AM, MD, and PM
4. Symbolize based on provided color ranking scale
5. Create polygon feature class and section dataset to provide series extents

Dataset Created: FtCollins\_LOSSummary\_210902

Associated Layer files:

- Approach LOS\_All
- Approach LOS\_EB
- Approach LOS\_NB
- Approach LOS\_SB
- Approach LOS\_WB

Associated Maps:

- 210819\_TFTC\_AM Peak Hour LOS figure series
- 210819\_TFTC\_MD Peak Hour LOS figure series
- 210819\_TFTC\_PM Peak Hour LOS figure series

### ***Tier One Intersection Screenings***

Datasets Used:

- 210817\_TFTC\_TCPPS Tier 1 rank sheets
- FtCollins\_2020\_IntersectionNodes\_210902

GIS Process:

1. Join Tabular LOSS data with Intersection Nodes point shapefile
2. Export as new point feature class in .gdb
3. Query into separate maps by screening factor: 1:1, 1:2, and 1:5
4. Create figures that reflect rank by number and color scale

Dataset Created:

- FtCollins\_ExcessCrash\_210902
- FtCollins\_TCPPSWeightingExample\_210902

Associated Layer files:

- Excess Crash
- TCPPS Weighting

Associated Maps:

- 210818\_Tier1 Intersection Screening\_1to1
- 210818\_Tier1 Intersection Screening\_1to2
- 210818\_Tier1 Intersection Screening\_1to5