

# Best Suited Low Impact Development Features for the City of Phoenix Landscape

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Internship for Science-Practice Integration



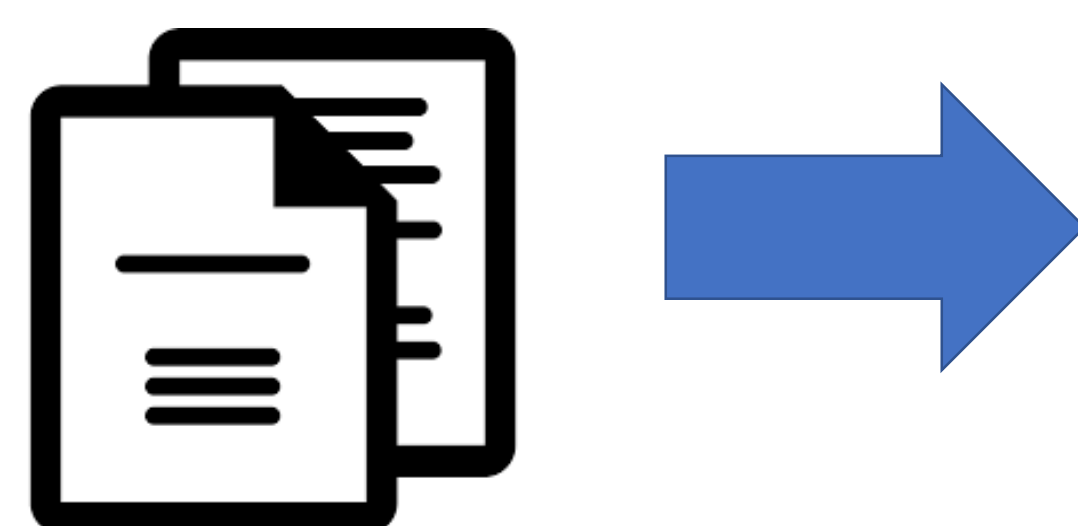
## Background

Although Phoenix, AZ is located in an arid environment, it suffers from stormwater runoff and flooding during extreme storm events because of its urban infrastructure. Low impact development (LID) features can be used to maximize infiltration and retention rates of stormwater runoff and flooding. The goal of this study is to identify LID features and locate areas in Phoenix to place those features to maximize these rates and mitigate flooding and runoff.

## Research Questions

1. What low impact development features are suitable to mitigate runoff and flooding for the City of Phoenix?
2. Where can we use low impact development features to maximize infiltration and retention rates in order to reduce runoff and flooding in the City of Phoenix?

## Methods



Literature review to determine LID features appropriate for Phoenix, AZ.



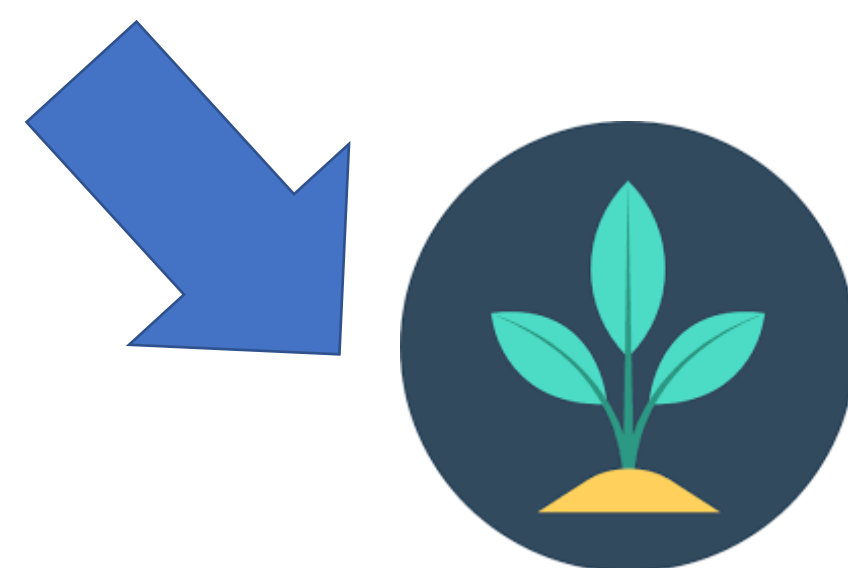
Researched news stories from major flooding/runoff events to determine 4 locations.



Determined flood zone for locations with Flood Control District of Maricopa County Floodplain maps.



Determined the zoning code for each location from the City of Phoenix website.



Determined which LID features are appropriate for locations and outline those areas.

## Results

LID Type	Infiltration or Retention - I or R	Scale
Permeable (porous) pavement	I	Local
Green roofs	I and R	Local
Downspout Disconnection	I	Local
Rainwater Harvest System	I	Local
Planters/tree box filter	I and R	Local
Vegetated swale/buffer	I and R	Intermediate
Infiltration Trench/Basin	I	Intermediate
Rain gardens	I and R	Intermediate
Green Street (Curb Cuts, etc.)	I	Intermediate
Bioretention basins	I and R	Intermediate
Detention Pond (Dry)	I	Catchment
Constructed wetland	I and R	Catchment

Fig. 1 Shows the LID feature type identified for the Phoenix landscape through research, the characteristics column identifies whether the features is good for infiltration, retention or both, and the scale of technique is looking at the area of land the feature will be best suited for.

For example:

- ❖ Local = buildings, parking lots, etc.
- ❖ Intermediate = Residential block, schools, streets, etc.
- ❖ Catchment = residential subdivision, entire runoff catchment, etc.

Red Lining – Potential implementation areas  
Flood Zone X = Moderate flood hazard or 0.2% annual chance flood



Fig. 2 Monterey Park located on the corner of E. Oak St and N. 3<sup>rd</sup> St, Zoning = R1-6 Acres = 12.93 Flood zone = X

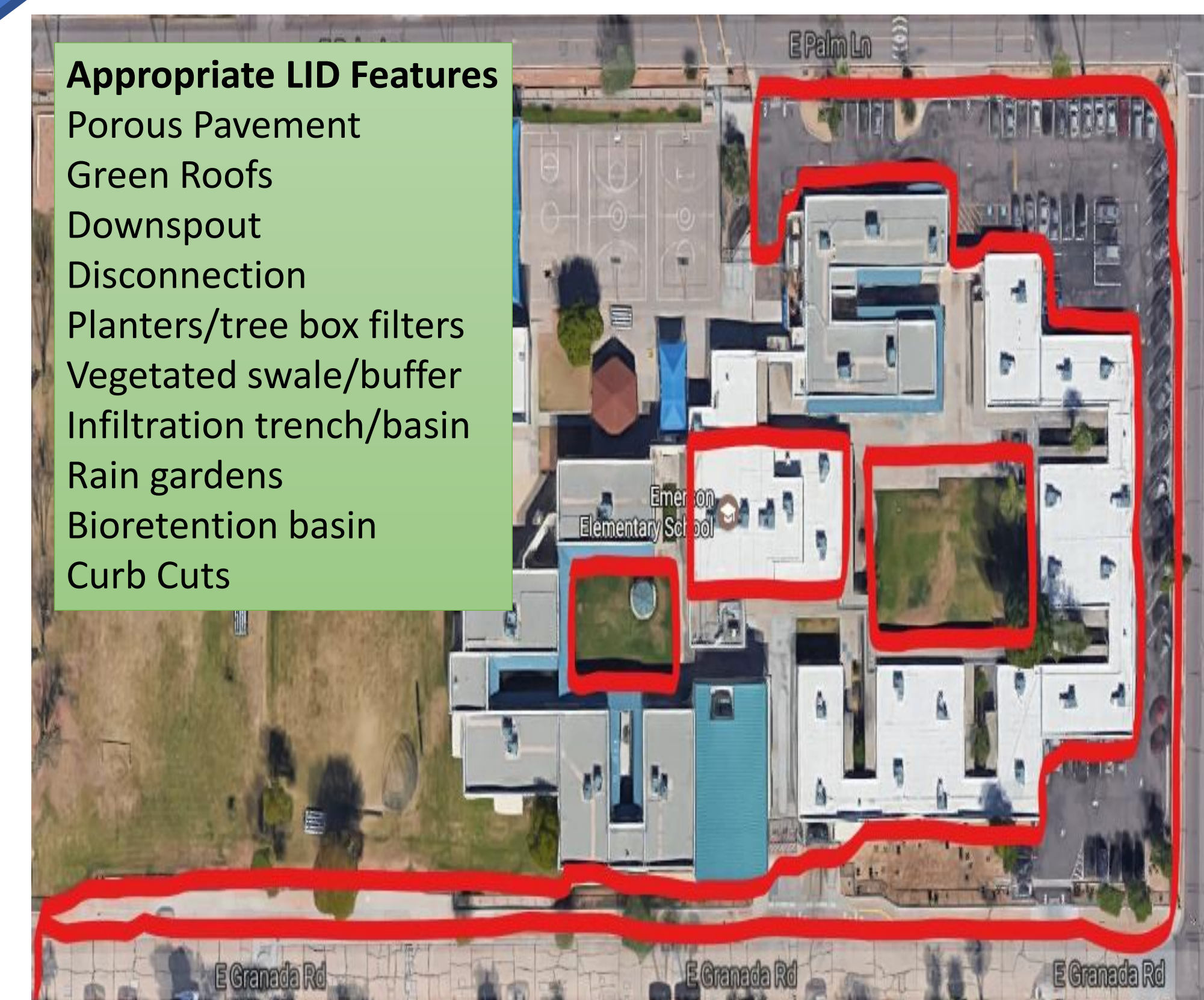


Fig. 3 Emerson Elementary School located at 915 E Palm Ln, Phoenix Zoning = R-3 HP Acres = 71.85 Flood zone = X



Fig. 4 Neighborhood located on N. and E. Alvarado Road, Zoning = R1-10 HP Flood zone = X

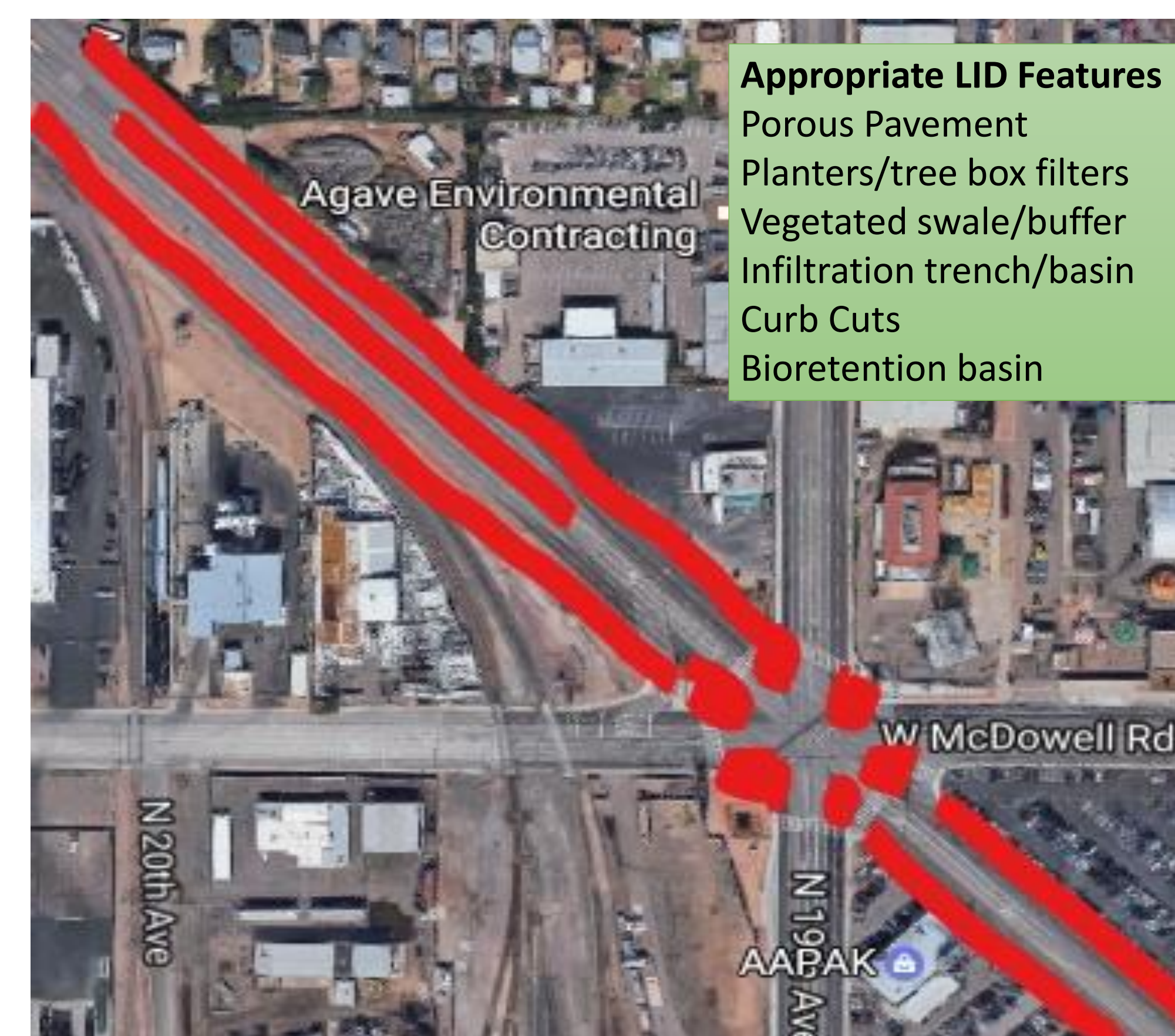


Fig. 5 Grand Avenue at the intersection of W. McDowell Rd. and N. 19<sup>th</sup> Ave. Flood zone = X

## Conclusion

Many of the LID features identified in Fig. 1 were viable options in all 4 locations, including

- ❖ Porous Pavement
- ❖ Planters/tree box filters
- ❖ Vegetated swale/buffer
- ❖ Infiltrated trench/basin
- ❖ Curb Cuts
- ❖ Bioretention basins

Some of the LID features were not viable options for any of the 4 locations mainly due to the area of land needed to implement the feature, these included

- ❖ Detention Pond (Dry)
- ❖ Constructed wetland

Overall, many of the LID features are suitable for many different areas and zoning codes with a flood zone X status. Further research can be done to determine actual infiltration and retention rates for the locations based on flood zone, slope, soil type, etc.

## Collaborative Potential

- ❖ The City of Phoenix has a Tree and Shade Master Plan with the goal to achieve an average of 25% shade canopy coverage for the entire city by 2030. In the future, this research could be used as a way to add to the overall tree canopy.

- ❖ Currently, The Nature Conservancy is in collaboration with the City of Phoenix and other organizations with regards to a LID Catchment Study. This study has the potential to be used in that study and furthering research.



## Acknowledgments

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