4-15-2019

Deer Flat and Linder Road Redesign

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Abstract

The Deer Flat and Linder road intersection in Kuna Idaho is in need of redesign. The purpose of this is to update the aging pavement, increase pedestrian and bicyclist connectivity, increase the capacity to handle future traffic flows, and to increase pedestrian, bicyclist, and motorist safety. To accomplish this, several forms of analyses will be performed. These include analyzing past crashes to identify and rectify roadway issues that contribute to the causes of crashes. Another analysis will look at the future development of the area to aid in determining how much and what type of traffic will be using the intersection. Finally, an analysis will be performed to determine the intersection's current level of service and the future required level of service following the Highway Capacity Manual's guidelines. From there, the information gained from the analysis and from current measurable data will be used to design the many aspects of the intersection. These aspects include a geometric design, pavement design, traffic operations design, stormwater design, and a construction plan including how to route traffic and keep local businesses and schools running during construction. These designs will be done following Ada County Highway District's requirements.

Deer Flat and Linder Road Redesign

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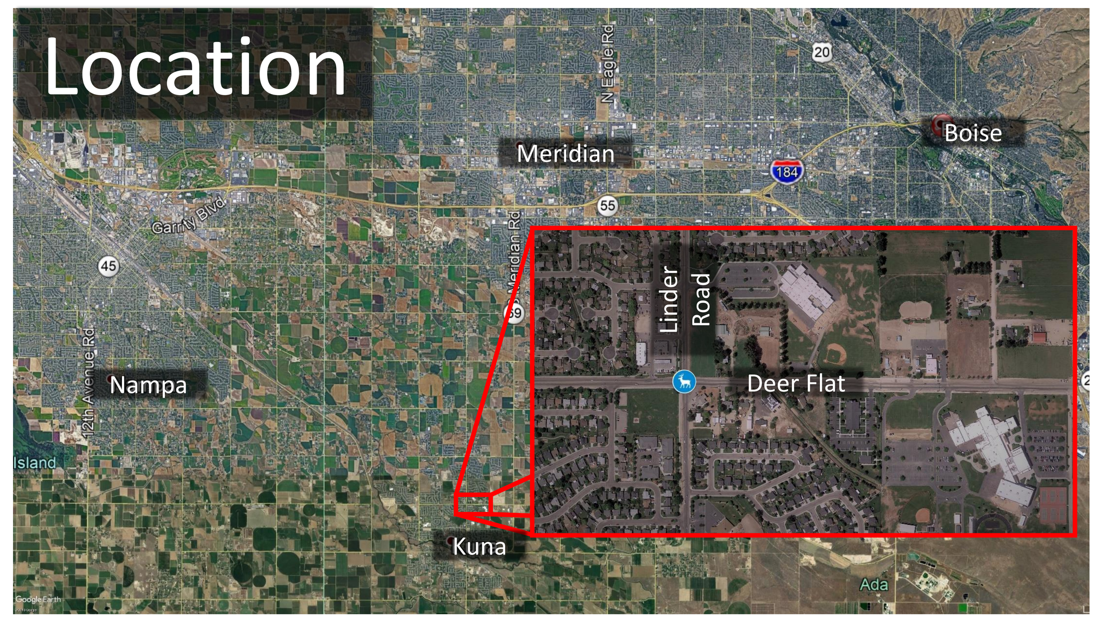
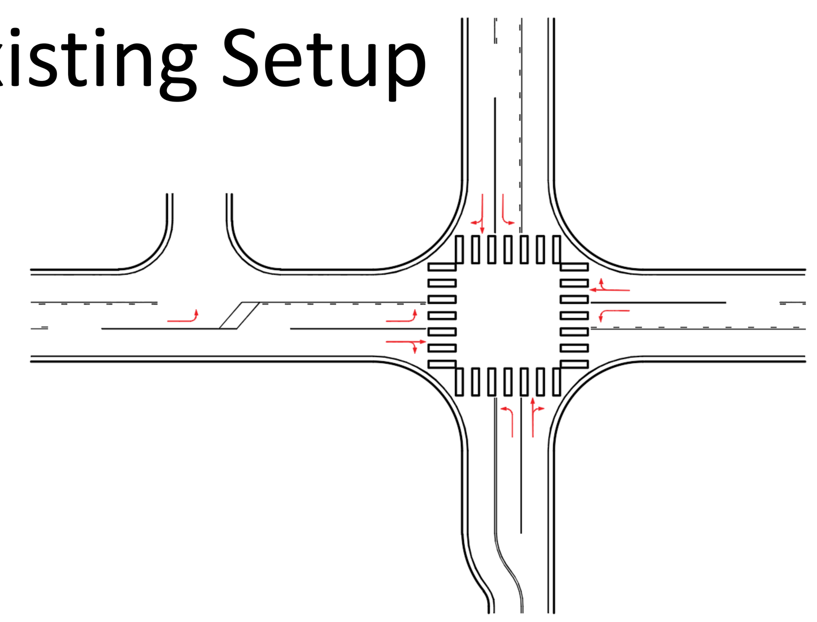
SIX POINT ENGINEERING

I. Introduction

The Deer Flat and Linder road intersection in Kuna Idaho is in need of redesign. The purpose of this is to update the aging pavement, increase pedestrian and bicyclist connectivity and safety, and to increase intersection capacity to handle future traffic flows.

To accomplish this, several forms of analyses were performed. The information gained from the analyses and current measurable data were used to design the many aspects of the intersection. These aspects include a geometric design, pavement design, traffic operations design, storm water design, and a construction plan including how to route traffic and keep local businesses and schools running during construction. These designs will be done following Ada County Highway District requirements.





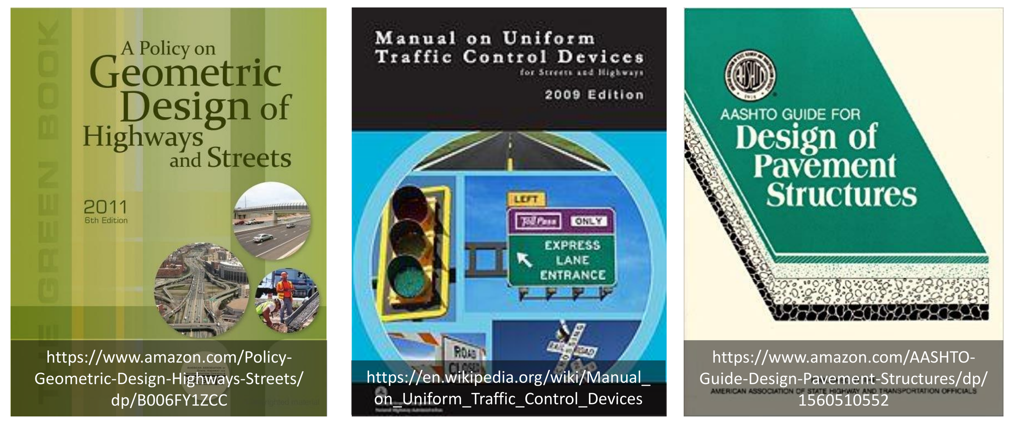
II. Methods

Geometric Design
To design the physical dimension of the intersection. Alternatives include adding needed lanes or installing a roundabout.
- Analysis involved considering future development to determine design vehicle and traffic patterns. The design vehicle is to determine the radius of the intersection corners.
- A Level of Service analysis was also performed to:
  - determine intersection performance based on vehicle delay.
  - determine the number, type and length of lanes needed.

Pavement Design
To determine the most cost effective and sustainable pavement option. Alternatives include flexible and ridged pavement.
- Analysis involved comparing layer thickness, cost and longevity.

Traffic Operations Design
To increase capacity and safety for vehicles and pedestrians. The alternatives for this include adding lanes, sidewalks and/or bike lanes.
- Currently, 19,200 cars use intersection daily.
- In 2040, 37,500 cars will use intersection daily.
- Analysis involved counting pedestrians and bicyclists.

Stormwater Design
To provide a path to get stormwater off road. Alternatives included tree cells and bio-swells.
- Analysis involved calculating the runoff volume and flow rate.



III. Results and Conclusions

Geometric Design
A roundabout large enough to accommodate all traffic types would not fit in the space available. Thus the "add needed lanes" option was selected. The final design is shown in the center.

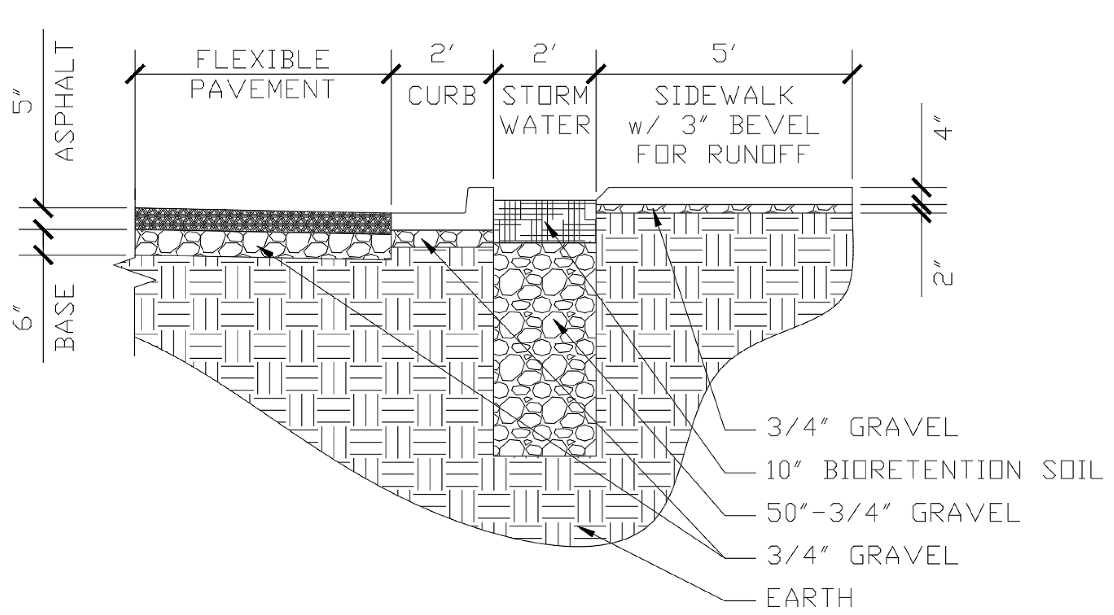
Pavement Design
Flexible pavement was chosen because of its initial low cost and needed lifespan of 20 years.

Traffic Operations Design
With two schools near by, sidewalks are a must for safety reasons. Sidewalks are shown in the center diagram. Due to a very low quantity of bicyclist, bike lanes will not be needed.

Storm Water Design
Bio-swales were chosen because they require less space and cost.

Level of Service Results

		Current	Future
Morning	Score	D	C
	Delay (s/veh)	40.2	27.6
Evening	Score	C	C
	Delay (s/veh)	23.1	22.8



IV. Cost and Construction

Material/Service	Unit Price	Units	Cost
Asphalt	$75	2509 tons	$188,175
3/4" Base	$30	2076 tons	$62,280
Concrete/ Sidewalk	$6	7550 SF	$45,300
Excavation	$15	5829 CY	$87,435
Stoplight Installation	$300,000	LUMP	$300,000
Right of Way	$400,000	LUMP	$400,000
Bioretention Soil	$10	5805 SF	$58,050
Open Graded Gravel	$35	155 tons	$5,425
Miscellaneous			$67,500
Total Cost			$1,214,165