



Haxton Way Pedestrian Pathway Solar Lighting Project

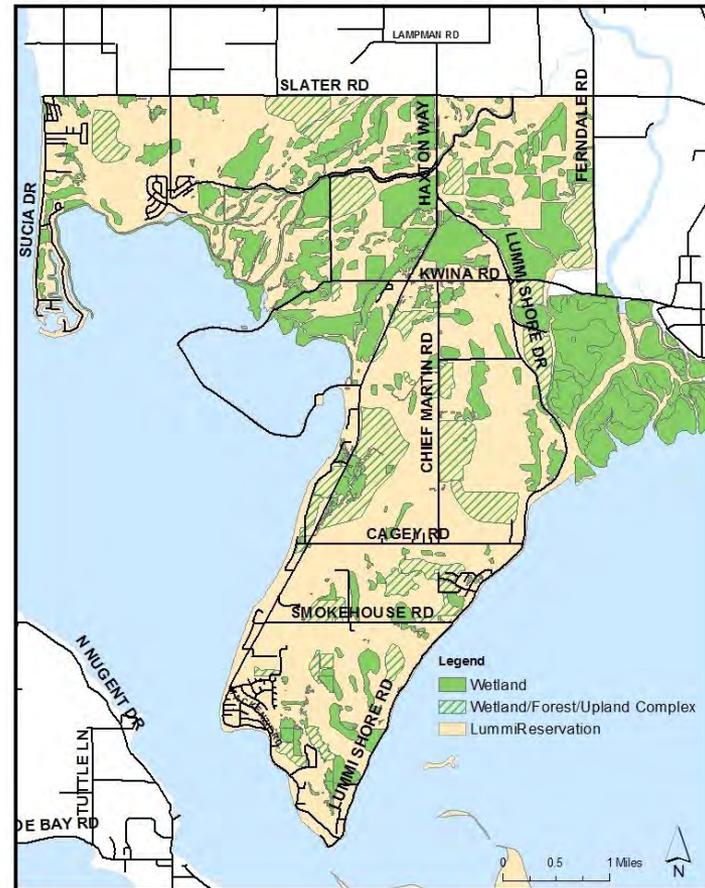
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Lummi Nation





Lummi Reservation

- 13,000 upland acres
- 43% of the reservation
- 105 roads totaling 65 miles
- 90% of reservation roads are County owned and maintained

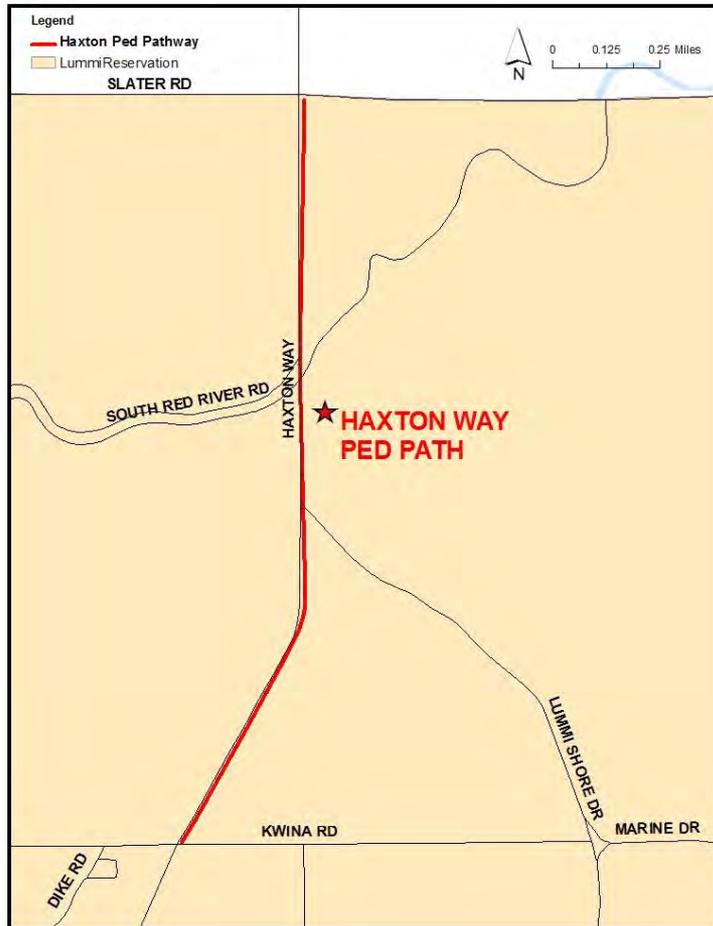


Haxton Way



- Rural Major Collector
- 6.6 mile long primary access route

Haxton Way Pedestrian Pathway



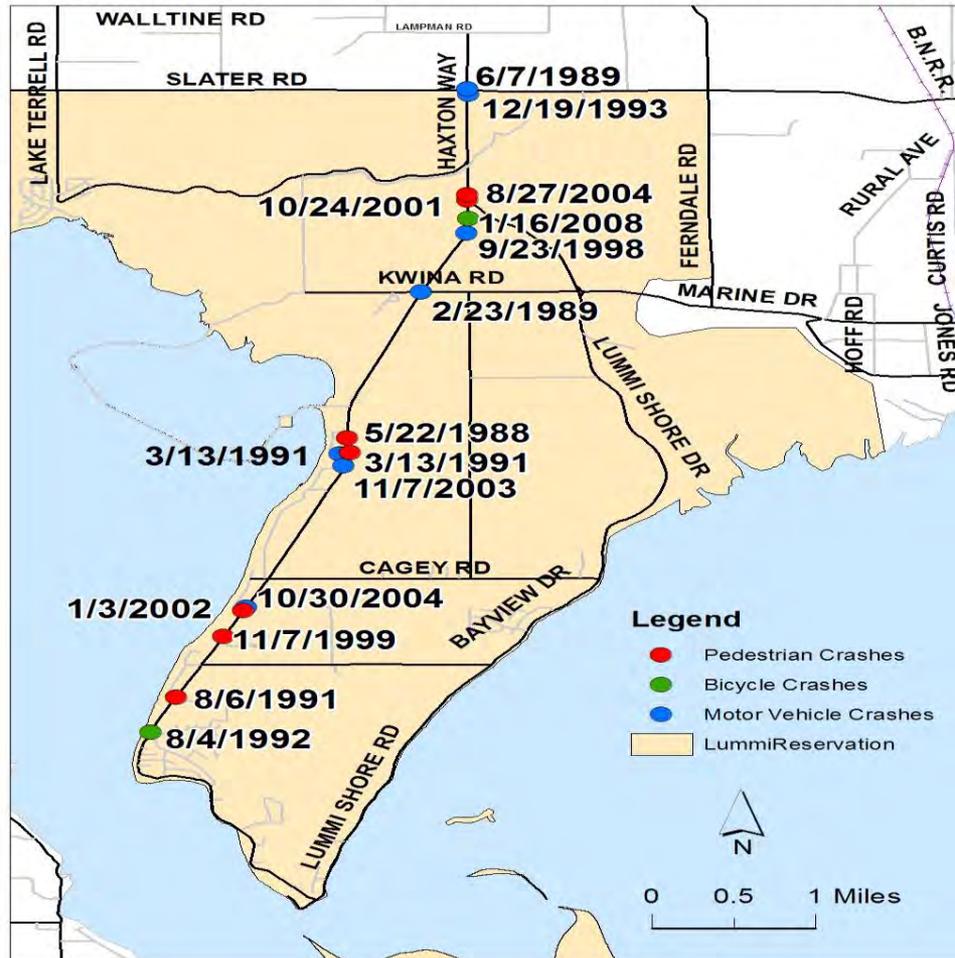
- Eastside
- Separated from main roadway
- Comprised of:
 - 1600 ft. raised boardwalk
 - 7000 ft. asphalt/limestone trail
 - 1000 ft. concrete path w/ curb and gutter
 - Two bridges (93 ft and 58 ft)
- Total Length- Approx. 9751 lineal ft

Why was the pathway constructed?

- Safety
- No shoulders, sidewalks, or bike lanes in project area
- High rate of pedestrian/bicyclist/motor vehicle accidents
- Access to destinations
- Exercise
- Kwina Rd/Haxton Wy Master Planning



Fatalities on Haxton Way (1988-2008)



- 16 fatal accidents on Haxton Way
 - 7 pedestrians
 - 7 driver/passengers
 - 2 bicyclists
- 7 fatalities in project area
- 76 property damage accidents on Haxton Way during this same time period

2007 Interlocal Agreement between Whatcom County and Lummi Nation

- Phase 1:
 - 8-inch pavement edge striping
 - Rumble strips
- Phase 2:
 - Separated pedestrian/bicycle pathway



Funding Sources

- USDOT Federal Highways- IRR
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- WSDOT-Highways and Local Programs
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- Bureau of Indian Affairs-IRR
- Whatcom County
- Lummi Indian Business Council

Total Project Costs- Approx. \$4.2 million

Speed Limit Change

- The original speed limit on Haxton Way in the vicinity of the pathway was 50 mph
- Without a speed reduction guardrails would be required
- The ROW acquisition and design did not include guardrails
- Reduction of speed from 50 to 35 mph required County Council approval-Passed in May 2009

Project Cost Impacts

- Redesigns
- Stream Mitigation- WA Dept of Fish and Wildlife
- Wetland Mitigation- Army Corps of Engineers

Construction Timeline

- 8 month construction project (March-November 2010)

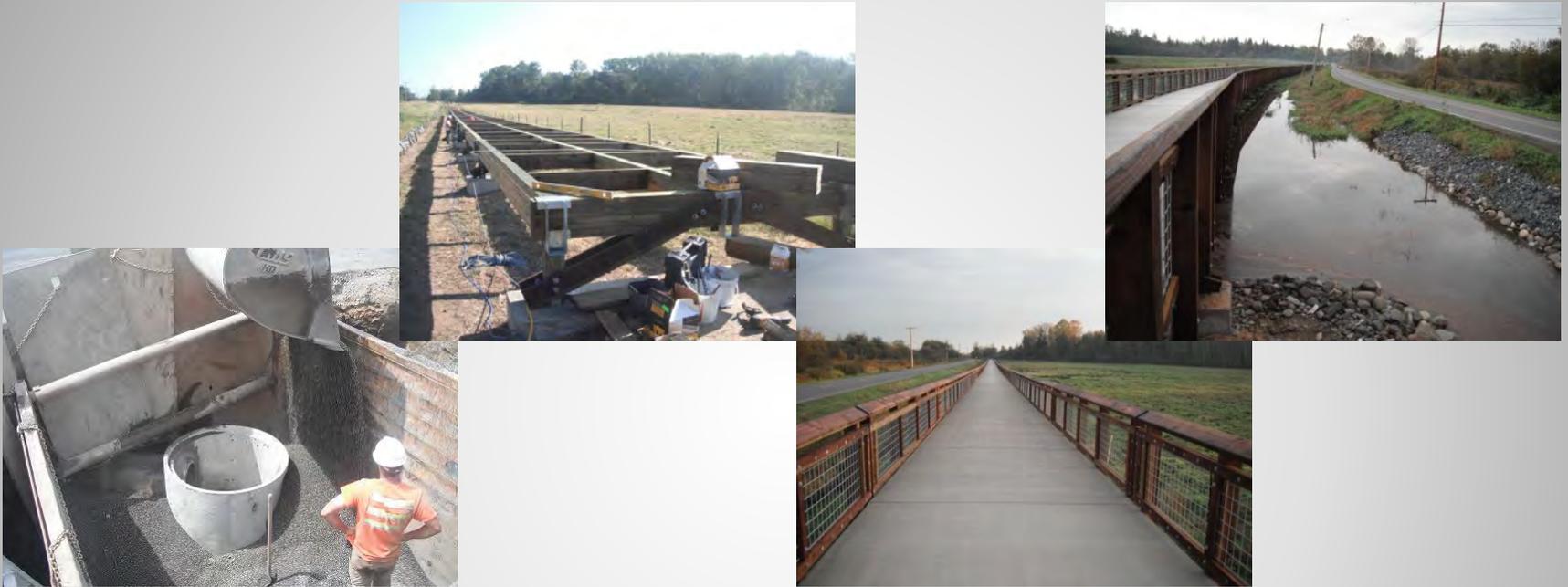


Construction Timeline



- Two bridges were installed over existing waterways
- Weathering steel material designed to minimize maintenance

Construction Timeline



- Raised boardwalk and helical anchor foundation system installed to minimize impacts to wetland areas

Construction Timeline



- Installation of concrete, curb, gutter, and asphalt/limestone pavement occurred along different sections of the pathway

Solar Lighting



- Final piece of the puzzle
- Ensure pedestrians feel safe during dusk to dawn hours
- Not to interfere with main roadway users

Solar Lighting Specifications

- 70 solar lights installed by Late January 2011
- 100 foot intervals
- Posts to resist wind speeds of 110 miles/hr
- Lights were required to provide a minimum 0.2 foot-candles average from dusk to dawn and meet IESNA (Illuminating Engineering Society of North America) guidelines

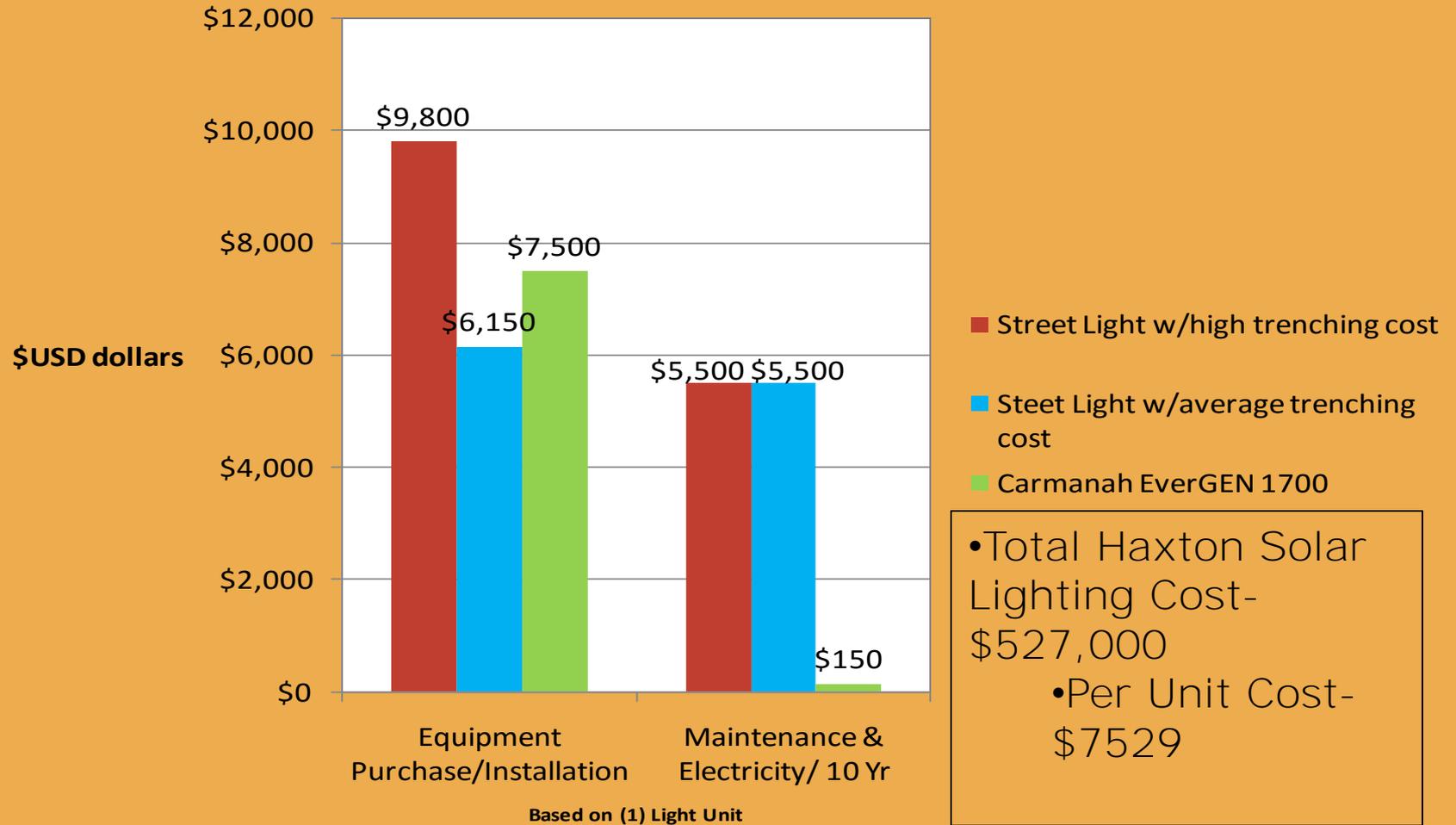
Why Solar Lighting?

- Lower initial installation costs compared to hard wired lighting
 - Environmental Constraints
 - Distance from grid
 - High trenching costs
- Lower lifetime costs
 - Less Maintenance
 - No monthly electric bills
- Environmentally Friendly
- Availability of government funding for renewable technology
- Copper theft is a concern



Solar Lighting Costs

Cost Comparison of Solar vs. Hardwired Street Lights



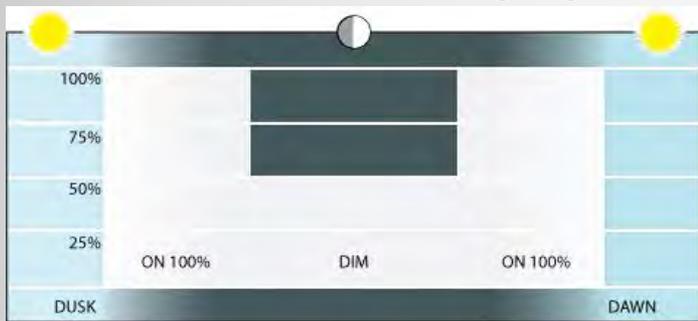
Solar Panels



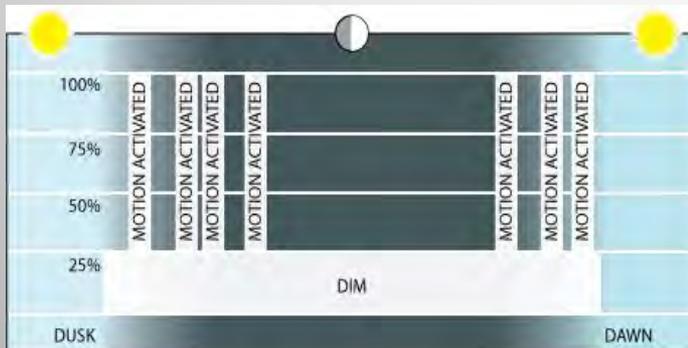
- Solar panel efficiency- the percentage of power converted from absorbed light to electrical energy. The performance and dependability of the entire system relies upon the energy collected from the panel
- There are three types of solar panels:
 - 1) Monocrystalline: 14-19% efficient
 - 2) Polycrystalline: 10-14 % efficient
 - 3) Thin Film: 5-11 % efficient
- EverGEN 1700 are monocrystalline panels with an efficiency of 19%
- **Both solar panels and LED's estimated to last 20+ years**

Operating Profile

- Allows owner to specify how and when light should be applied to reduce size and cost of solar lighting system
- Operating profiles can be either:
 - Conservative-dimming light during times the facility usage is less



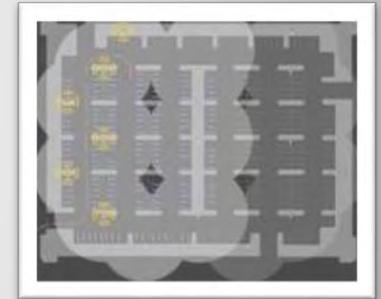
- Progressive- using occupancy sensing to apply light as needed



* Haxton Way utilized a combination of both types

Advanced Occupancy Sensing

- Types:
 - *Full Network Activation*- One light senses motion triggering all the other lights in the network to switch from low to high, or from on to off
 - *Set Distance Activation (utilized on Haxton Way Path)*- One light senses motion triggering other lights within a specified distance to switch from low to high, or from off to on, to follow motion through a site
 - 100% lumen output when motion detected, otherwise on at 25% during dusk to dawn
- Self-contained unit which utilizes GPS and wireless radio waves to communicate
- Benefits
 - Conserves energy when lights do not need to remain on for long durations
 - Increases lifespan of solar lighting system



Batteries

- The most important characteristic of the battery is the number of charge-discharge cycles it can deliver rather than the initial battery capacity.
- The number of cycles a battery can provide is determined by:
 - Depth of discharge-determined by how lighting system is configured including the operating profile
 - Ambient Temperature-high temperatures overcharge the battery while low temperatures undercharge
- EverGEN 1700 utilizes (2) batteries that are rated for 4,000 cycles to 20% depth of discharge regulated at 20 degrees C.
- Batteries estimated to last 10 years

Installation

1) Stage and assemble



2) Lift into place



3) Orient and adjust



Miscellaneous Benefits

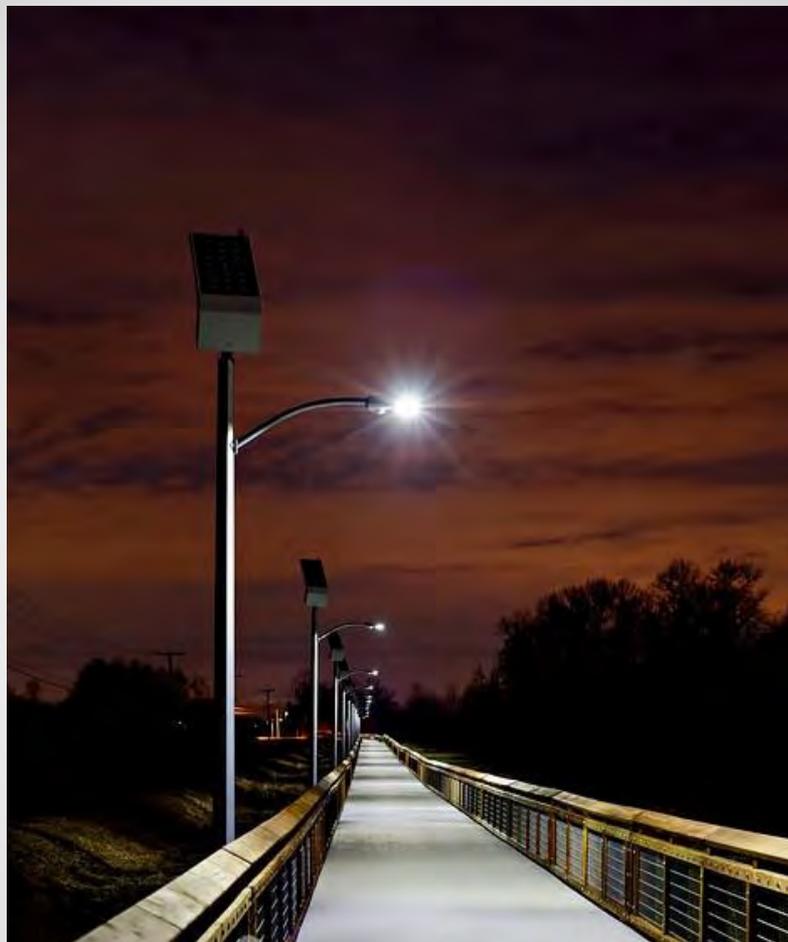
- All components of solar lighting unit are recyclable including battery
- LED's are "Dark-Sky friendly" helping to reduce light pollution

Public Satisfaction

- Since the new pathway has opened there overwhelming support
- The end result has been a highly used, multi-purpose trail system which provides safe travel for pedestrians and bicyclists and eliminates the source of much of the accident history along Haxton Way

Awards

- Awarded “**Best Safety Project 2010**” by the Northwest Region Bureau of Indian Affairs Indian Reservation Road Program
- Nominated for the 2011 Federal Highway Administration (FHWA) and Washington State Department of Transportation (WSDOT)- Best Special Project Award



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Hy'shqe, Thank You
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