Buschmann Road and Ranchette Drive Preliminary Design Presentation

December 4, 2023 City Council Meeting

Agenda

Collector Street vs. Local Street
Land Use
Maintaining City Streets
Safety
Lifecycle Cost Analysis – Local vs. Collector Design
Pros/Cons
Similar City Streets (operationally)

Collector vs. Local – FHWA Hierarchy

Collector Roads

- Definition - major and minor roads that connect local roads and streets with arterials. Collectors provide less mobility than arterials at lower speeds and for shorter distances. They balance mobility with land access. The posted speed limit on collectors is usually between 35 and 55 mi/hr.
- Used to get **places** and connects multiple local streets.
- Vehicle Types – Typically consist of higher amounts of passenger car traffic, commercial vehicles, and trucks.

Local Roads

- Definition - provide limited mobility and are the primary access to residential areas, businesses, farms, and other local areas. Local roads, with posted speed limits usually between 20 and 45 mi/hr, are the majority of roads in the U.S.
- Used to get to a **place.**
- Vehicle Types – Typically consist of passenger vehicles, light commercial use (garbage trucks, school buses, etc.), and occasional truck traffic.

- **Cities over 5,000 population are required to officially designate and keep up to date arterials, collectors, and local streets in communities for funding formulas. Cities under 5,000 are not required to perform this exercise, however, City officials and residents typically understand that roads around the City have different purposes.

Collector vs. Local

Collector Roads

Typical Section

- Typically wider, but don't have to be.
- Stronger road section due to increased traffic loading, commercial traffic, and commuter trips.
- Can be higher speed, but not typically over 40 mph in suburban/urban setting.
- Collectors support commercial traffic and are typically connecting destinations, thus the reason why you see increased commercial vehicle presence on the roadway (9 or 10-ton design strength).

Local Roads

Typical Section

- Narrower, and usually promotes on-street parking availability.
- Local road section typically consists of a 7-ton design. Don't need to account for increased traffic as these primarily serve as access to residences or businesses.
- Lower speed and is typical to be 30 mph in cities (or lower).
- Local roads are typically only built to support passenger vehicles with the occasional commercial vehicle (7-ton design strength).

Land Use

Roads do not dictate surrounding land use. Surrounding land use dictate how a roadway currently operates and is a good indicator on how a road will operate in the future.

City Councils have ultimate land use authority in their City within the bounds of their zoning and subdivision ordinances.

Maintaining City Streets

Once a city has acquired and opened a dedicated public street, it has a duty to maintain the street in a manner that is safe for public use and travel. The duty to maintain relates to both the actual physical condition of the street (for example: cracks, holes or pits) and to preventing and removing obstructions that may be placed upon the street (for example: carts, debris, signs or structures).

Cities may be found liable for damages to injured persons if the city had knowledge of a defect or dangerous condition on a city street, but failed to correct it within a reasonable amount of time.

Source: League of Minnesota Cities

Safety on Buschmann Road

Clear Zones – the establishment of a horizontal buffer between a travel lane and a fixed vertical object (signs, culvert ends, etc). With a reconstructed Buschmann Road, this distance would be 10-feet.

Pedestrian/Bicycle Safety – Providing adequate shoulder room on Buschmann to allow for safe passage for pedestrian and bike traffic will improve safety for those multi-modal users.

Site Distance – Design speed design of 40 mph will increase site distance, negate blind driveways and intersections, and allow users to anticipate upcoming hazards in the roadway.

Typical Roadway Maintenance Schedule

After New Construction or Reconstruction
Assumes 9- or 10-ton Pavement Design – Collector Roadway
Construction Cost Only in today's $$
Assumes 1% Annual Inflation over Life Cycle

Cumulative Pavement Age (Years)	Time Between Maintenance	Maintenance
0	0	New Construction
2	2 Years After New Construction	Initial Crack Seal
4	2 Years After Crack Seal	Crack Seal
5	1 Year After Crack Seal	Chip & Fog Seal
6-11	Every 3 to 6 Years	Crack Seal
12	1 Year After Final Crack Seal	Chip & Fog Seal
18-22	6-10 Years After Chip & Fog Seal	Mill and Overlay

Cumulative Pavement Age (Years)	Time Between Maintenance	Maintenance
20-24	2 Years After Overlay	Initial Crack Seal
21-25	1 Year After Crack Seal	Chip & Fog Seal
24-34	Every 3 to 6 Years	Crack Seal & Patch
27-35	1 Year After Final Crack Seal	Chip & Fog Seal
33-45	6-10 Years After Chip & Fog Seal	Mill and Overlay
35-47	2 Years After Overlay	Initial Crack Seal
36-48	1 Year After Crack Seal	Chip & Fog Seal
39-56	Every 3 to 6 Years	Crack Seal & Patch
42-57	1 Year After Final Crack Seal	Chip & Fog Seal
52-75	10-20 Years After Chip & Fog Seal	Reclamation

Total Life Cycle Construction Cost
$13,900,000
Does not include potential grant funding sources.

Typical Roadway Maintenance Schedule

After Full Depth Reclamation
Assumes 7-Ton Design – Local Roadway
Construction Cost Only in today's $$
Assumes 1% Annual Inflation over Life Cycle

Cumulative Pavement Age (Years)	Time Between Maintenance	Maintenance
0	0	Reclamation
2	2 Years After New Construction	Initial Crack Seal
4	2 Years After Crack Seal	Crack Seal
5	1 Year After Crack Seal	Chip & Fog Seal
6-11	Every 3 to 6 Years	Crack Seal
12	1 Year After Final Crack Seal	Chip & Fog Seal
18-22	6-10 Years After Chip & Fog Seal	Reconstruction
20-24	2 Years After Overlay	Initial Crack Seal
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39-56	Every 3 to 6 Years	Crack Seal
42-57	1 Year After Final Crack Seal	Chip & Fog Seal
52-75	10-20 Years After Chip & Fog Seal	Mill/Overlay

Total Life Cycle Construction Cost
$11,200,000

Pros/Cons

Collector Road/9- or 10-ton Design

Pros

- Improved Safety – Site Distance/Clear Zone
- Built to handle Collector road traffic.
- Bike/Pedestrian Safety
- Improved Driving Surface
- Opportunities for future grant funding (roadway maintenance, constructed to state aid standard, abides by state rules)
- Wider road surface
- More opportunities for rehabilitation over time

Cons

- Higher initial cost
- Higher long-term life-cycle cost ($2,700,000 over 75 years) – Attributable to maintenance of a higher cost, wider collector route

Local Road/7-ton Design

Pros

- Lower Initial Cost
- Lower long-term life-cycle cost ($2,700,000 over 75 years) – Attributable to lower cost, narrower local roadway.
- Improved driving surface

Cons

- No safety improvements
- Not built to handle collector roadway traffic
- Road restrictions may need enforcement during times of soft subgrades
- No pedestrian/bicycle accommodations
- Narrower – safety risk for public works and law enforcement
- Very few opportunities for future grants (local street design not meeting state aid requirements)
- Not built for collector traffic loading, which is not anticipated to change.

Similar Roadway (Design and Operation)

Riverside Drive – Brainerd

- Serves as a collector for multiple, local residential streets.
- 2,200 veh/day
- Connects other collectors and arterials in the area (TH 210, Beaver Dam Road, Wise Road).
- Residential use dominates corridor.
- 30 – 45 mph design speed with 12-foot lanes and 4- to 6-foot shoulders for peds/bikes.

Similar Roadway (Design and Operation)

Knollwood Drive - Baxter

- Serves as a collector for multiple, local residential streets.
- 2,000 veh/day
- Connects other collectors and arterials in the area (TH 210, County Road 48).
- Residential use dominates corridor.
- 30 mph design speed with separated trail and one shoulder.

Similar Roadway (Design and Operation)

Memorywood Drive- Baxter

- Serves as a collector for multiple, local residential streets.
- 1,000 – 2,950 veh/day.
- Connects other collectors and arterials in the area (TH 210, Clearwater Road).
- Residential use dominates corridor.
- 30 mph design speed with 12-foot lanes and 4-foot shoulders.

THANK YOU