

2ND STREET NORTH FUNCTIONAL DESIGN STUDY

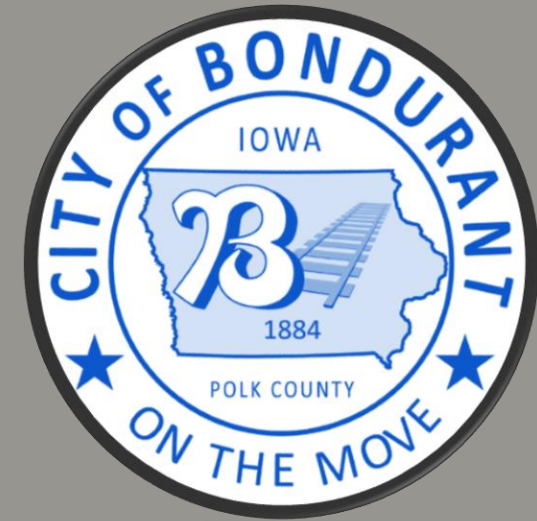


BACKGROUND

2nd Street N is the only east-west street spanning the width of the community and is found in the northern portion of Bondurant's corporate limits.

The City has seen continual development including educational, residential and commercial uses.

This study is the start of identifying the needed improvements to this corridor to improve traffic flow and control access.



CHARACTERISTICS

The west end of 2nd Street N at NE 64th Street is posted at 45 mph and transitions to 35 mph.

Open ditches with limited earthen shoulders are typical throughout.

Right of way varies near 70 feet up to over 90 feet in width.



CHARACTERISTICS

In the central portion of the City, 2nd Street N remains a rural section. Speed limits lower to 25 mph.

Grant Street is the only controlled intersection between NE 64th Street and US 65.

Right of way widths are narrower than to the west and various between 70 and 80 feet wide.



Central Bondurant



CHARACTERISTICS

Sidewalk or trail generally runs parallel on the north side of the street. Speed limit is 30 mph.

Power lines as well as other utilities may be impacted and require relocation. Coordination will be crucial.

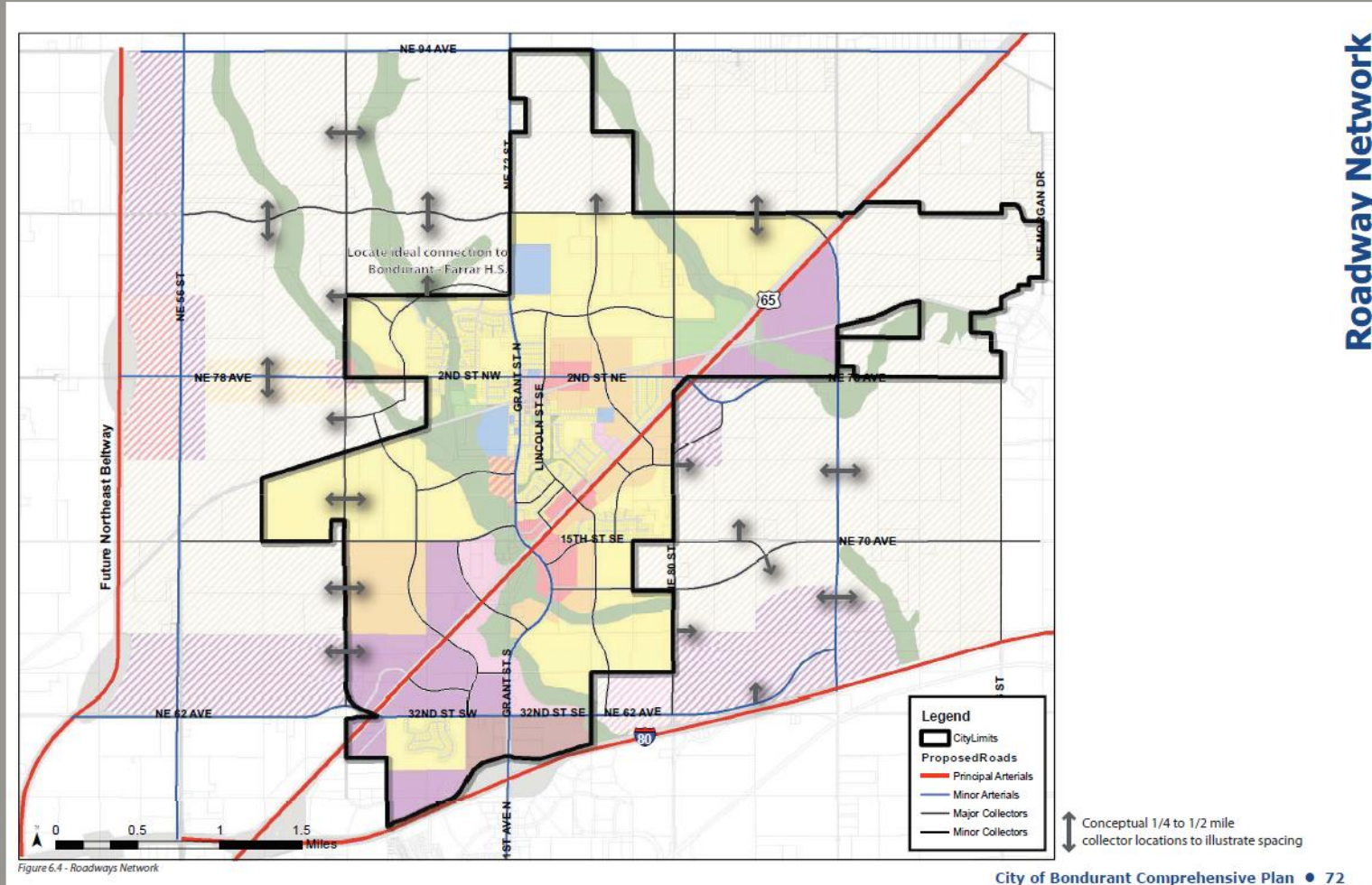
Efforts during preliminary design should review current design speeds, pavement conditions, and access along the route.



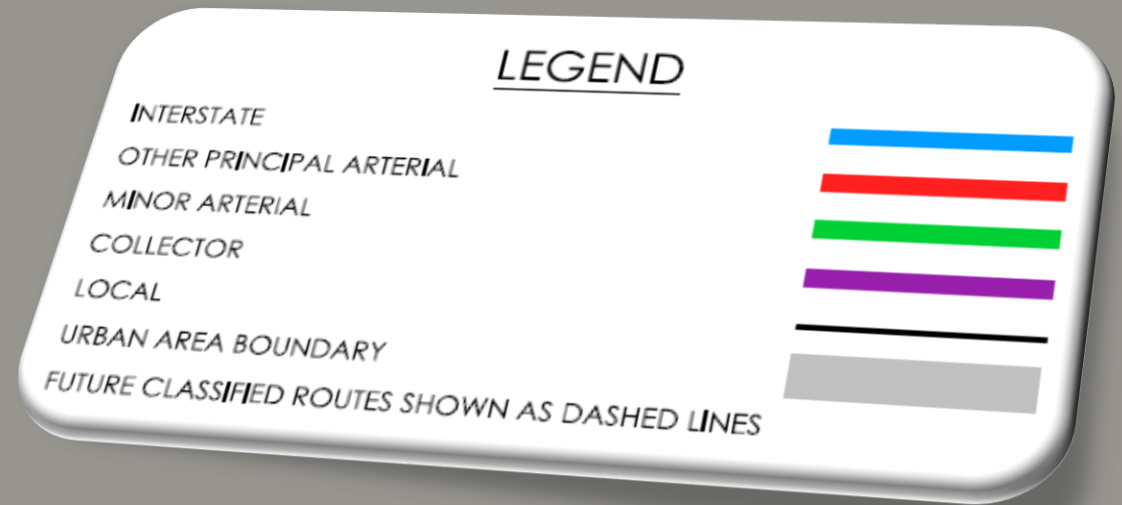
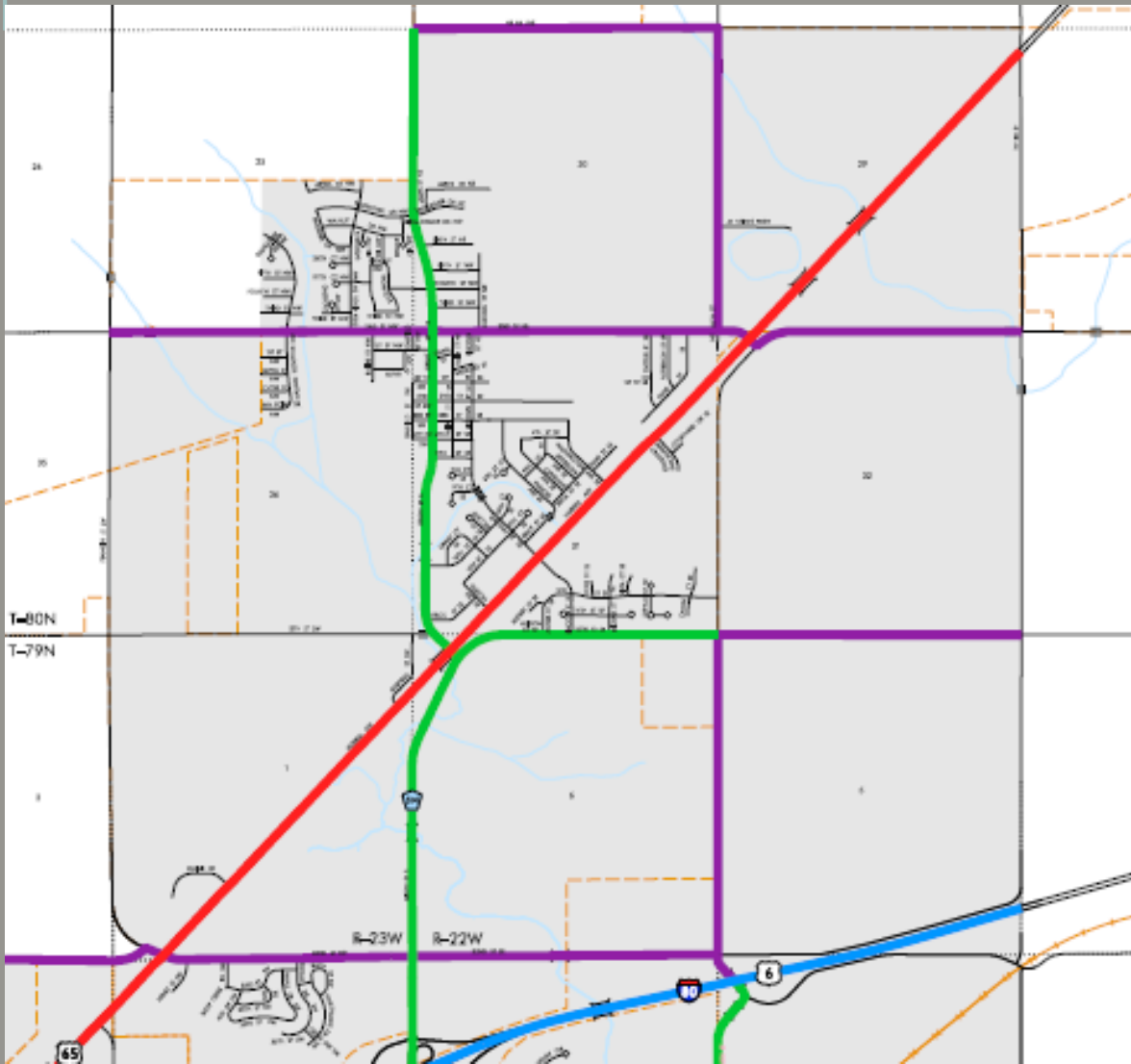
2nd Street N is locally identified as an arterial, federally is a collector.

Grant Street is a street that is classified higher than 2nd Street N federally which will get more attention with the MPO.

Land use does not drive street classification.



FEDERAL CLASSIFICATION

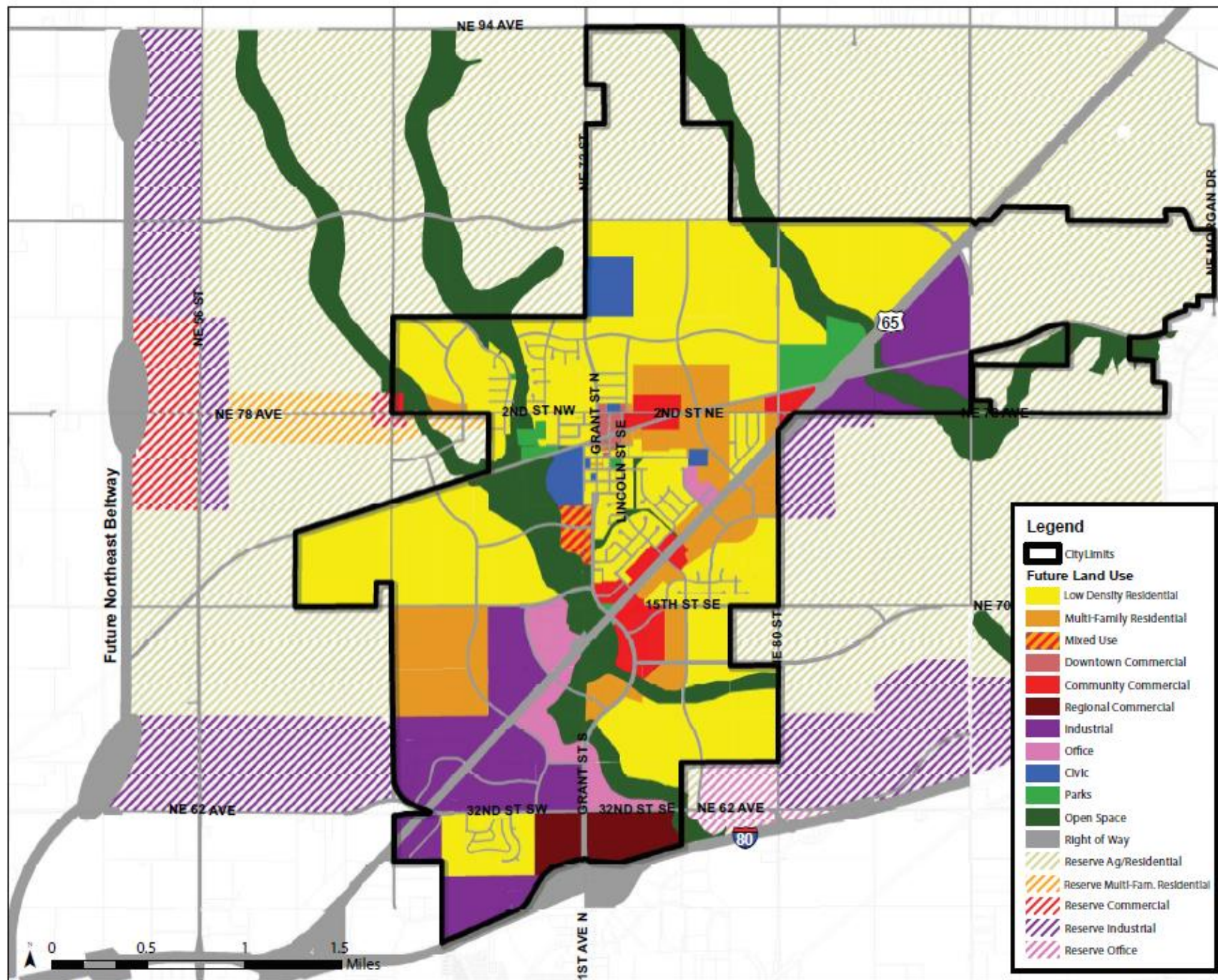


As such, 2nd Street needs to be studied for upgrades in lane additions, drainage accommodation if urbanized and signalization to enhance its safety as well as ability to deal with an increasing traffic load.

LAND USE PLAN

The following page shows the 2030 Planned Land Use for the City of Bondurant as documented in the last Comprehensive Plan as approved by the City Council.

Waiting on a land use summary from the MPO that is being used for near future growth of Bondurant.



POPULATION

2010 POPULATION

3860

US Census Data

2019 ESTIMATE

6980

World Population Review

TRAFFIC COUNTS BY YEAR

IDOT SOURCE (2ND STREET N WEST AND EAST OF N GRANT)



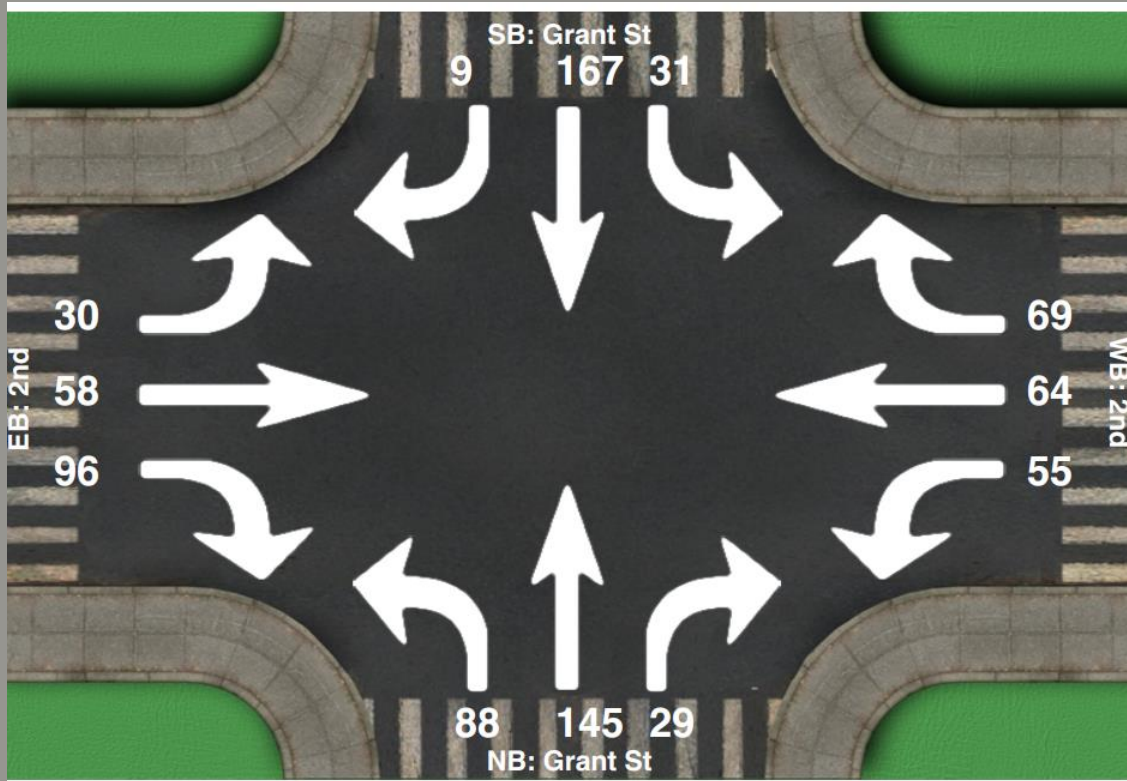
	West	East
2016	3600	3130
2008	3240	2370
2000	2350*	2550

*Western Edge of Bondurant
Average Daily Traffic (ADT)

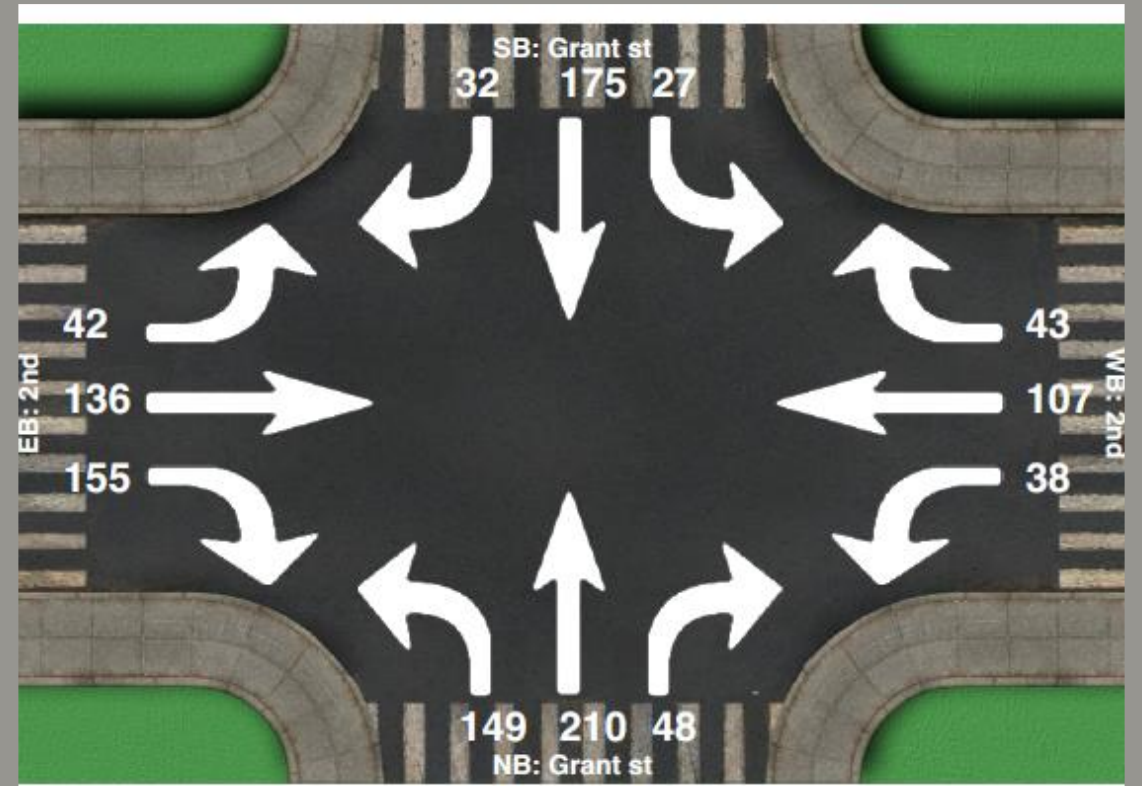
These volumes are well within the capacity for a 2 lane roadway.

2ND STREET N & N GRANT STREET

PEAK HOUR TRAFFIC COUNTS



AM PEAK 7:45 to 8:45



PM PEAK 4:30 to 5:30

INTERSECTION CAPACITY

2ND STREET N & N GRANT STREET

(PM PEAK HOUR TRAFFIC)

EXISTING CONDITION- 4 way stop

Intersection delay 44 seconds LOS E - poor

WITH TURN LANES- 4 way stop

Intersection delay 16 seconds LOS C - good

WITH SIGNALS- no turn lanes

v/c ratio 0.36 Under-capacity, not optimized

Grant
Street

3rd St NE

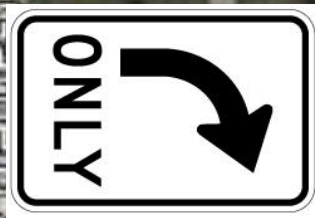
Add Left Turn Lanes
for EB & WB traffic

Lincoln St NE

2nd St NW

2nd

Add Right Turn Lane
for SB traffic



Bondur

FUTURE CAPACITY

(TRAFFIC INCREASED 50%)

TURN LANES ONLY- 4 way stop

Intersection delay 48 seconds LOS F - failure

TURN LANES & SIGNALS

v/c ratio 0.78 nearing optimization - good

ROUNDABOUT

v/c ratio 0.91 NB 0.49 WB 0.52 SB 0.85 EB

CRASHES (CITY STREETS)

2nd Street N & N Grant Street

6 crashes over 6 years & 8000 vpd entering

Rate 0.34/MEV State Average 0.75/MEV

2nd Street N (NE 64th Street to US 65/Hubbell Avenue)

23 crashes over 6 year period

Rate 123/100MVMT State Average 390/100MVMT

Crashes are below averages for City Streets in Iowa

BICYCLE TRAIL

The Chichaqua Valley Trail runs diagonally through Bondurant other than a short run that is north of 2nd Street N.

The Lake Petocka connecting trail runs on the south side of 2nd Street N and crossing at Pleasant Street/NE 80th Street. The trail crosses 2nd Street N again where the CVT intersects.



COMPLETE STREETS

Cost and element selection and/or implementation are the usual concerns faced when planning out the character of the community.

Adjacent land uses and natural settings should be taken into account when different segments are under consideration for improvement.

Examples of Arterial and Collector Streets



A future condition representing a complete minor arterial street with auto, transit and bike/walk elements.



A good example of a minor arterial with an off-street trail. It could be enhanced with tree plantings and landscaping.



Example of a collector street with bike lanes, controlled access and enhanced landscaping treatments.



Example of a neighborhood collector street with sidewalks, well marked pedestrian crosswalks and controlled access. Street dimension is modified at intersection to enhance pedestrian safety.
Figure 6.5 - Street Section Examples

Minor Arterials



appx. 120' ROW

Four-lane minor arterial street with off-street trails - future condition



appx. 80' ROW

Two-lane minor arterial street with sidewalk (left) and off-street trail (right) - similar to existing condition

Collectors



appx. 80' ROW

Boulevard collector street with bike lanes and sidewalks. Boulevard area may become a left hand turn lane at intersections - future condition



appx. 66' ROW

Two-lane collector street with center turn lane, sidewalk (left) and off-street trail (right) - future condition

PARKING

On-street parking is **not expected to be allowed** on 2nd Street N as it is not allowed today.

The street will function and operate safer without parking.



RECOMMENDATIONS

- ❖ Add turn lanes at the N Grant Street intersection EB to SB and N-S left turn lanes (as soon as possible).
- ❖ Plan on signalization of this intersection at some point in future years (20 years+/-).
- ❖ Start planning for/preliminary design of 3 lane section on 2nd Street N west of Grant about 2,000 feet. Which side or both gets widened?
- ❖ It maybe that only turn lanes are needed at specific locations throughout the remainder of the length of 2nd street N (monitor traffic).
- ❖ Make a rural vs urban section decision (ditches v storm sewer). Attempt to be consistent on streets.
- ❖ Consider asking developments to contribute to construction costs or build third lane along frontage (Must have a plan in place if they construct portions of the improvements)



COST ESTIMATES AS PRESENTED

DO NOT INCLUDE...

City or franchise utility adjustments or relocations.

Additional Right of Way is not likely needed however
Construction Easements are likely to be needed.

Increases caused by future construction or phasing
over time.

The potential savings if existing pavement can be
used for Urban Section construction.



Grant
Street

3rd St NE

Add Left Turn Lanes
for EB & WB traffic

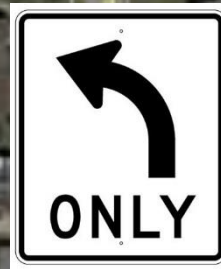
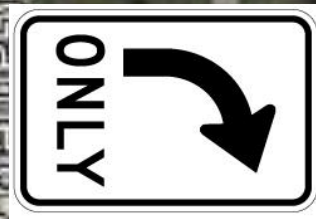
Lincoln St NE



2nd St NW

2nd

Add Right Turn Lane
for SB traffic



Bondur

COST FOR LANE ADDITIONS TO 2ND STREET N AND N GRANT STREET

Widen, Mill & Overlay, Rural Section

\$360K

ELA

\$ 55K

Total without R/W

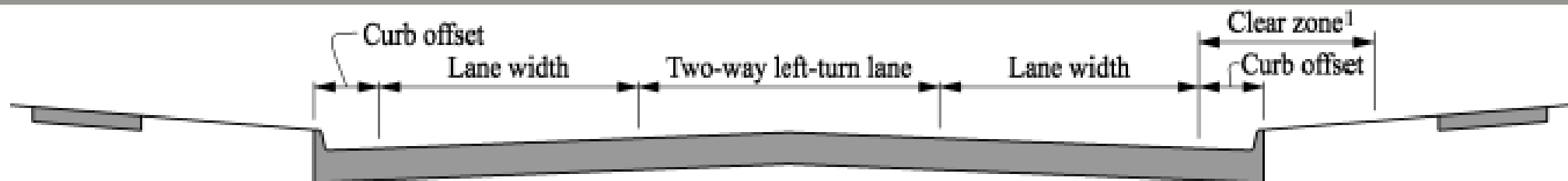
\$415K

3 LANE STREET

A 3-lane street can easily handle the traffic well into the future. Grant Street will also need to be widened to a 3 lane section in the future.



Example 3 Lane Section



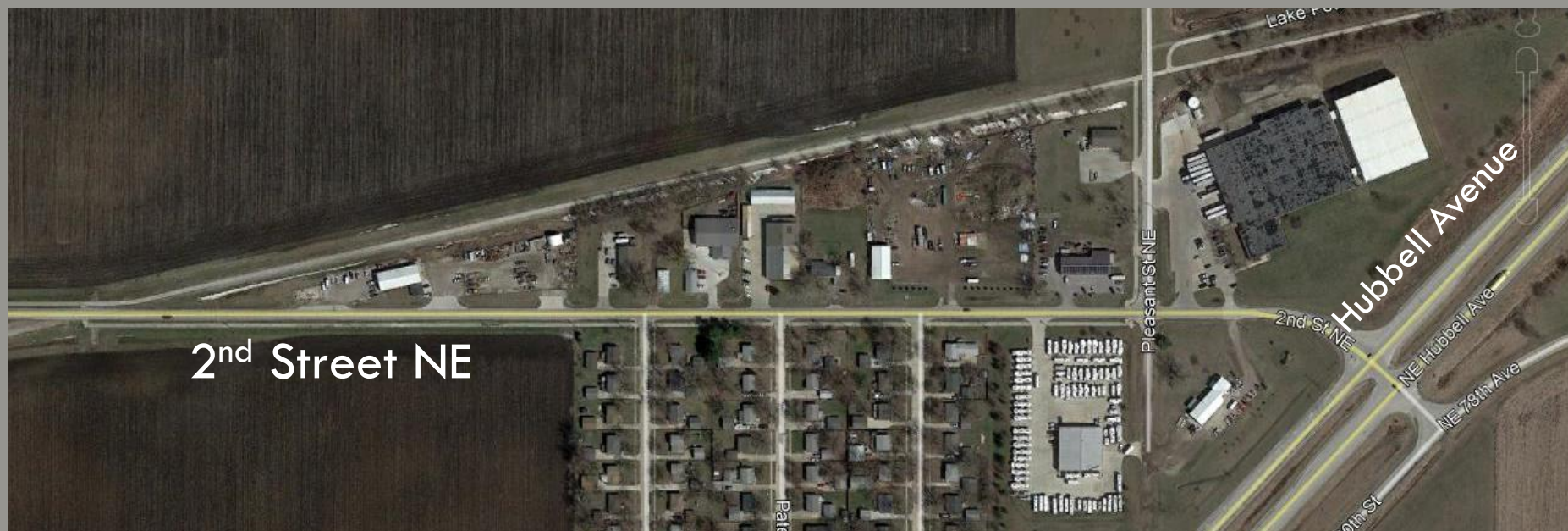


AREA MOSTLY LIKELY NEEDING A 3 LANE SECTION

2nd Street NW

COST FOR 3 LANE SECTION WEST OF N GRANT STREET

	Full	Likely Area
Widen, Mill & Overlay, Rural Section	\$1.89M	\$1.00M
ELA	\$.29M	\$.16M
Total without R/W	\$2.18M	\$1.16M
Reconstruction to Urban Section	\$3.35M	
ELA	\$.50M	
Total without R/W	\$3.85M	



3 LANE SECTION EAST OF N GRANT STREET

Not likely to be needed in the next 20 years.

Monitor the need for turn lanes.

PHASING

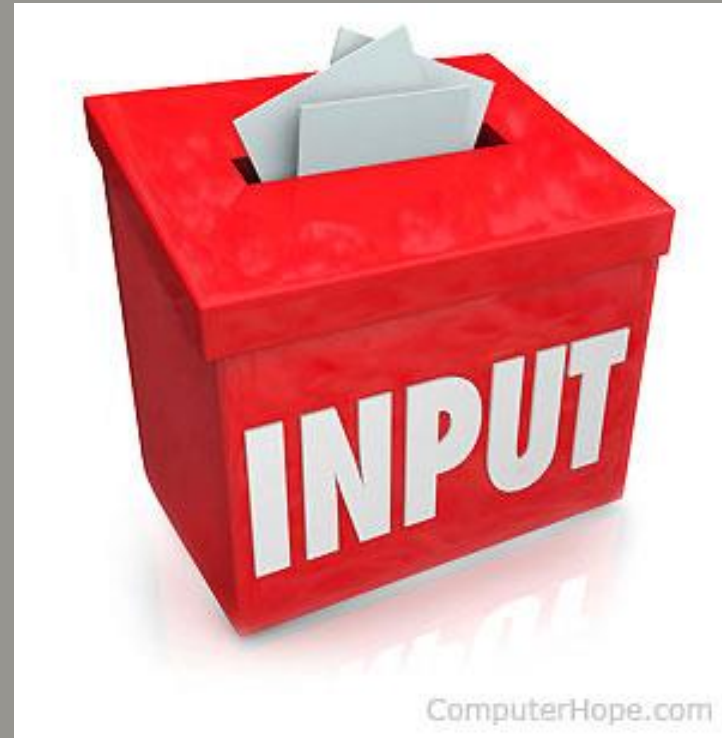
These improvements can be phased over time through coordinated multiple projects.

These projects can be implemented as traffic increases or development occurs in given areas.

Discussions could/should be held with developers on cost sharing for additional lanes.

Traffic congestion and number of access points near Grant is likely to drive initial improvements.

CITY COUNCIL



DETAILED ESTIMATE FOR TURN LANES

Bid Items	Unit	Unit Price	Turn Lanes with Mill/Overlay	
			quantity	extended
Removal, shoulders	LF	\$ 3	1800	\$ 5,400
Removal, Pavement	SY	\$ 10	0	
Grading	LS	\$ 35,000	1	\$ 35,000
Subdrains	LF	\$ 10	2000	\$ 20,000
Mod Subbase	CY	\$ 18	160	\$ 2,880
PCC Pavement	SY	\$ 100	900	\$ 90,000
Mill Existing	SY	\$ 8	700	\$ 5,250
Overlay, entire width	TN	\$ 125	475	\$ 59,375
Traffic Control	LS	\$ 20,000	1	\$ 20,000
Mobilization	LS	\$ 20,000	1	\$ 20,000
Erosion Mgmt	LS	\$ 5,000	1	\$ 5,000
Erosion Control	LS	\$ 5,000	1	\$ 5,000
Storm Sewer	LF	\$ 100	150	\$ 15,000
Intakes	EA	\$ 3,000	5	\$ 15,000
Storm Outlet	EA	\$ 7,500	1	\$ 7,500
Drives	EA	\$ 3,000	5	\$ 15,000
Sidewalk Ramps	EA	\$ 1,500	4	\$ 6,000
Unaccounted Costs	%	10		\$ 32,641
Subtotal				\$ 359,046
ELA	%	15		\$ 53,857
Total				\$ 412,902

Detailed Estimates for 3 Lane Sections

Bid Items	Unit	Unit Price	West Rural UAC Existing		East Rural UAC Existing		West Urban Reconstruction		East Urban Reconstruction	
			quantity	extended	quantity	extended	quantity	extended	quantity	extended
Removal, shoulders	LF	\$ 3	11140	\$ 33,420	11140	\$ 33,420	\$ -	\$ -	\$ -	\$ -
Removal, Pavement	SY	\$ 10	0		0		15000	\$ 150,000	15000	\$ 150,000
Grading	LS	\$ 25,000	1	\$ 25,000	1	\$ 25,000	2.8	\$ 70,000	2.8	\$ 70,000
Subdrains	LF	\$ 10	11000	\$ 110,000	11000	\$ 110,000	11000	\$ 110,000	11000	\$ 110,000
Mod Subbase	CY	\$ 12	2300	\$ 27,600	2300	\$ 27,600	4800	\$ 57,600	4800	\$ 57,600
PCC Pavement	SY	\$ 70	8800	\$ 616,000	8800	\$ 616,000	24500	\$ 1,715,000	24500	\$ 1,715,000
Mill Existing	SY	\$ 4	15000	\$ 60,000	15000	\$ 60,000	0	\$ -	0	\$ -
Overlay, entire width	TN	\$ 100	3200	\$ 320,000	3200	\$ 320,000	0	\$ -	0	\$ -
Traffic Control	LS	\$ 35,000	1	\$ 35,000	1	\$ 35,000	1	\$ 35,000	1	\$ 35,000
Mobilization	LS	\$ 100,000	1	\$ 100,000	1	\$ 100,000	2	\$ 200,000	2	\$ 200,000
Erosion Mgmt	LS	\$ 10,000	1	\$ 10,000	1	\$ 10,000	1	\$ 10,000	1	\$ 10,000
Erosion Control	LS	\$ 25,000	1	\$ 25,000	1	\$ 25,000	1	\$ 25,000	1	\$ 25,000
Storm Sewer	LF	\$ 75	1000	\$ 75,000	800	\$ 60,000	4000	\$ 300,000	4000	\$ 300,000
Intakes	EA	\$ 3,000	10	\$ 30,000	8	\$ 24,000	34	\$ 102,000	30	\$ 90,000
Storm Outlet	EA	\$ 10,000	4	\$ 40,000	4	\$ 40,000	5	\$ 50,000	4	\$ 40,000
Drives	EA	\$ 3,000	42	\$ 126,000	28	\$ 84,000	42	\$ 126,000	28	\$ 84,000
Intersections	EA	\$ 10,000	6	\$ 60,000	7	\$ 70,000	6	\$ 60,000	7	\$ 70,000
Sidewalk Ramps	EA	\$ 1,500	20	\$ 30,000	28	\$ 42,000	20	\$ 30,000	28	\$ 42,000
Unaccounted Costs	%	10		\$ 172,302		\$ 168,202		\$ 304,060		\$ 299,860
Subtotal				\$ 1,895,322		\$ 1,850,222		\$ 3,344,660		\$ 3,298,460
ELA	%	15		\$ 284,298		\$ 277,533		\$ 501,699		\$ 494,769
Total				\$ 2,179,620		\$ 2,127,755		\$ 3,846,359		\$ 3,793,229