

Design Exception Request

CUY-77-11.21

PID: 105743; Request 01

Letting Type: ODOT-Let

Design Designation

CUY-77; 11.582-11.718

Current ADT (2023)	112,000	Td	.03
Design Year ADT (2043)	118,000	Design Speed	65
Design Hourly Volume (2043)	6,140	Legal Speed	60
Directional Distribution	.52	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	.06	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Matthew Wahl
on 2022-06-07 07:04:46 EST

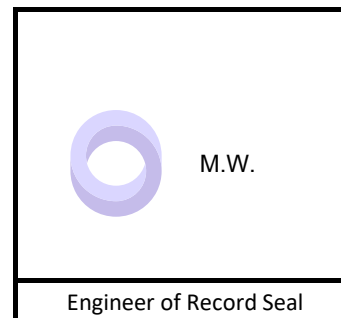
Matthew J. Wahl
(Engineer of Record)

Approved by:

E-SIGNED by Adam Koenig
on 2022-06-07 09:24:28 EST

Adam Koenig

Approval Date: 6/2/2022



Design Exception Request

CUY-77-11.21

PID: 105743; Request 01

Controlling Criteria Identification

Section: CUY-77; 11.582-11.718

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 ft (inside) 8 ft (outside)	3 ft (inside) 7.55 ft (outside)	10 ft (inside) Min. 4.58 ft (inside)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			
(a.) "Existing" may be N/A (i.e. New alignment or new ramp)			

Project Description

The CUY-77-11.21 project will replace the pavement and widen shoulders on I-77 from Grant Avenue in the south to Broadway Avenue (SR-14) in the north. In conjunction with the widening, the project will replace the drainage system and increase capacity to alleviate flooding. The project will also replace the I-77 bridge over the Morgana Run Trail extension, install new lighting facilities, and update traffic control along the corridor. The project is located in the city of Cleveland and the villages of Cuyahoga Heights and Newburgh Heights in Cuyahoga County, Ohio.

Section Description

Design exception request for outside shoulder width for northbound I-77 from Grant Avenue entrance ramp to Newburgh and South Shore Railroad bridge.

Proposed Mitigation

No mitigation is proposed.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The existing terminal for the Grant Avenue northbound entrance ramp to I-77 is approximately 770 feet. In the vicinity of the Grant Avenue northbound entrance ramp, the inside (median) shoulder on I-77 is approximately 3 feet, and the outside shoulder is approximately 7.6 feet. The proposed project will lengthen the entrance ramp terminal to 1,450 feet in accordance with the requirements for a high-speed entrance terminal as shown in Figure 503-2c of ODOT's Location and Design Manual, Volume 1. In addition, the inside shoulder will be widened to the standard 10 feet.

The required outside shoulder width along the entrance ramp terminal is 8 feet. However, northbound I-77 and the lengthened ramp terminal pass under two Newburgh & South Shore Railroad bridges that were replaced and lengthened in 2005. There is not sufficient width under Structure Nos. CUY-77-1169 and CUY-77-1171 to accommodate the northbound lanes, ramp terminal, and shoulders without impacting the abutments of these recently reconstructed railroad bridges.

To avoid impacting the railroad bridges, the ramp shoulder is proposed to transition from the standard 8.00 feet to a minimum of 4.58 feet over a length of 576 feet and then widen back to the standard 8.00 feet over a length of 143 ft as detailed below and shown in the attached plan sheet (Attachment A).

- Begin shoulder narrowing: 8.00 ft at STA 83+55.66 (MP 11.582)
- Minimum shoulder width: 4.58 ft at STA 89+32.15 (MP 11.691)
- End shoulder narrowing: 8.00 ft at STA 90+74.60 (MP 11.718)

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Between 2019 and 2021, there was only one crash within the area stretching from 250 feet in advance of and 250 feet past the proposed design exception location. The crash was a rear end that occurred in the middle lane and was not associated with shoulder width.

An analysis of the existing condition using ODOT's Economic Crash Analysis Tool (ECAT) indicated a predicted crash frequency of 4.2 crashes/year. The proposed conditions have a predicted crash frequency of 3.8 crashes/year. Therefore, even with the narrowed outside shoulder, the proposed conditions are predicted to result in decreased crashes in the analysis section. This overall decrease is attributed to the substantially wider inside shoulder and the lengthened terminal for the Grant Avenue northbound entrance ramp.

Given the above, the project, even with the proposed design exception is anticipated to improve safety along I-77. The GCAT analysis is provided in Attachment B, and the ECAT analysis is provided in Attachment C.

Design Exception Request

CUY-77-11.21

PID: 105743; Request 02

Letting Type: ODOT-Let

Design Designation

CUY-77; 11.792-11.997

Current ADT (2023)	112,000	Td	.03
Design Year ADT (2043)	118,000	Design Speed	65
Design Hourly Volume (2043)	6,140	Legal Speed	60
Directional Distribution	.52	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	.06	Functional Class Area Type	Urban
		NHS Project	No



Submitted By:

E-SIGNED by Matthew Wahl
on 2022-06-07 07:08:06 EST

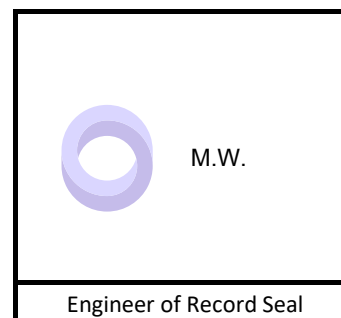
Matthew J. Wahl
(Engineer of Record)

Approved by:

E-SIGNED by Adam Koenig
on 2022-06-07 09:25:01 EST

Adam Koenig

Approval Date: 6/2/2022



Design Exception Request

CUY-77-11.21

PID: 105743; Request 02

Controlling Criteria Identification

Section: CUY-77; 11.792-11.997

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 ft (inside) 8 ft (outside)	3 ft (inside) 8 ft (outside)	10 ft (inside) Min. 4.48 ft (outside)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			
(a.) "Existing" may be N/A (i.e. New alignment or new ramp)			

Project Description

The CUY-77-11.21 project will replace the pavement and widen shoulders on I-77 from Grant Avenue in the south to Broadway Avenue (SR-14) in the north. In conjunction with the widening, the project will replace the drainage system and increase capacity to alleviate flooding. The project will also replace the I-77 bridge over the Morgana Run Trail extension, install new lighting facilities, and update traffic control along the corridor. The project is located in the city of Cleveland and the villages of Cuyahoga Heights and Newburgh Heights in Cuyahoga County, Ohio.

Section Description

Design exception request for outside shoulder width for southbound I-77 from Harvard Avenue entrance ramp to Newburgh and South Shore Railroad bridge.

Proposed Mitigation

No mitigation is proposed.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The existing terminal for the Harvard Avenue southbound entrance ramp to I-77 is approximately 1,075 feet. In the vicinity of the Harvard Avenue southbound entrance ramp, the inside (median) shoulder on I-77 is approximately 3 feet, and the outside shoulder is approximately 8 feet. The proposed project will lengthen the entrance ramp terminal to 1,450 feet in accordance with the requirements for a high-speed entrance terminal as shown in Figure 503-2c of ODOT's Location and Design Manual, Volume 1. In addition, the inside shoulder will be widened to the standard 10 feet.

The required outside shoulder width along the entrance ramp terminal is 8 feet. However, southbound I-77 and the lengthened ramp terminal pass under two Newburgh & South Shore Railroad bridges that were replaced and lengthened in 2005. There is not sufficient width under Structure Nos. CUY-77-1178 and CUY-77-1182 to accommodate the southbound lanes, ramp terminal, and shoulders without impacting the abutments of these recently reconstructed railroad bridges.

To avoid impacting the railroad bridges, the ramp shoulder is proposed to transition from the standard 8.00 feet to a minimum of 4.48 feet over a length of 155 feet and then widen back to the standard 8.00 feet over a length of 925 ft as detailed below and shown in the attached plan sheet (Attachment A).

- Begin shoulder narrowing: 8.00 ft at STA 95+25.03 (MP 11.792)
- Minimum shoulder width: 4.48 ft at STA 96+81.19 (MP 11.822)
- End shoulder narrowing: 8.00 ft at STA 106+05.21 (MP 11.997)

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Between 2019 and 2021, there were three crashes within the area stretching from 250 feet in advance of and 250 feet past the proposed design exception location. The crashes included one rear end and one sideswipe that were not associated with shoulder width. One crash involved a vehicle striking the outside guardrail due to distracted driving. There was not an observed pattern of crashes that would be adversely impacted by the proposed design.

An analysis of the existing condition using ODOT's Economic Crash Analysis Tool (ECAT) indicated a predicted crash frequency of 3.8 crashes/year. The proposed conditions have a predicted crash frequency of 3.0 crashes/year. Therefore, even with the narrowed outside shoulder, the proposed conditions are predicted to result in decreased crashes in the analysis section. This overall decrease is attributed to the substantially wider inside shoulder and the lengthened terminal for the Harvard Avenue southbound entrance ramp.

Given the above, the project, even with the proposed design exception is anticipated to improve safety along I-77. The GCAT analysis is provided in Attachment B, and the ECAT analysis is provided in Attachment C.

Design Exception Request

CUY-77-11.21

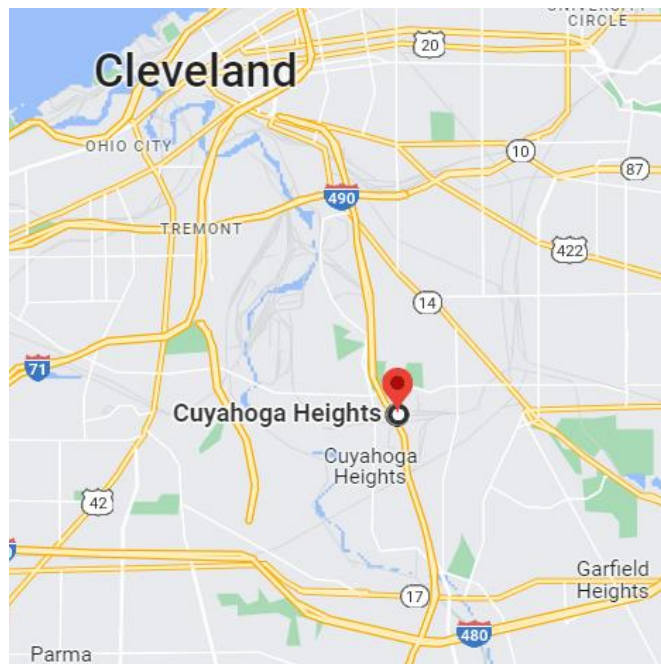
PID: 105743; Request 03

Letting Type: ODOT-Let

Design Designation

CUY-77; 12.822-12.858

Current ADT (2023)	118,000	Td	.03
Design Year ADT (2043)	126,000	Design Speed	60
Design Hourly Volume (2043)	6,300	Legal Speed	65
Directional Distribution	.5	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	.05	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Matthew Wahl
on 2022-06-07 07:09:06 EST

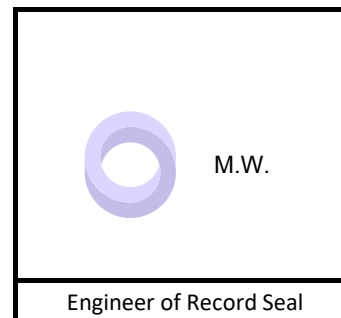
Matthew J. Wahl
(Engineer of Record)

Approved by:

E-SIGNED by Adam Koenig
on 2022-06-07 09:25:25 EST

Adam Koenig

Approval Date: 6/2/2022



Design Exception Request

CUY-77-11.21

PID: 105743; Request 03

Controlling Criteria Identification

Section: CUY-77; 12.822-12.858

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	6 ft (right) 3 ft (left)	Min. 3 ft (right) Min. 2 ft (left)	Min. 4 ft (right) 3 ft (left)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			
(a.) "Existing" may be N/A (i.e. New alignment or new ramp)			

Project Description

The CUY-77-11.21 project will replace the pavement and widen shoulders on I-77 from Grant Avenue in the south to Broadway Avenue (SR-14) in the north. In conjunction with the widening, the project will replace the drainage system and increase capacity to alleviate flooding. The project will also replace the I-77 bridge over the Morgana Run Trail extension, install new lighting facilities, and update traffic control along the corridor. The project is located in the city of Cleveland and the villages of Cuyahoga Heights and Newburgh Heights in Cuyahoga County, Ohio.

Section Description

Design exception request for outside shoulder width on exit ramp from I-77 southbound to Fleet Avenue.

Proposed Mitigation

No mitigation is proposed.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

The existing southbound I-77 exit ramp to Fleet Avenue is located immediately adjacent and parallel to E. 48th. The existing shoulder widths are slightly narrower than the current design standard. The existing right shoulder varies from 3 to 7 feet, and the existing left shoulder varies from 2 to 3.5 feet.

The proposed project will widen the I-77 mainline pavement and lower the exit ramp profile by approximately 3.2 feet (maximum). There is not sufficient room to accommodate the widening and profile changes without impacting the E. 48th Street roadway and potentially impacting residential structures situated to the west of E. 48th Street.

To avoid impacts, the ramp shoulder is proposed to narrow to 4.0 feet as detailed below and shown in the attached plan sheet (Attachment A):

- Begin shoulder narrowing: 4.00 ft at STA 203+00.00 (Ramp C2)
- Begin shoulder transition: 4.00 ft at STA 203+89.76 (Ramp C2)
- End shoulder narrowing: 8.00 ft at STA 204+89.76 (Ramp C2)

Due to the elevation difference between existing E. 48th Street and the reconstructed ramp, barrier on the right side of the ramp will be extended the full length of the design exception. However, existing barrier on the left side of the ramp will be removed.

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

No

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Between 2019 and 2021, there was not an observed pattern of crashes that would be adversely impacted by the narrowed shoulder on the I-77 southbound exit ramp to Fleet Avenue. No crashes occurred along the ramp segment. Four crashes occurred at the ramp intersection with Independence Road. These crashes included two rear ends and a sideswipe on the approach to the signal and one angle crash due to a vehicle running a red light.

A safety analysis of the existing and proposed ramp segment was conducted using ODOT's Economic Crash Analysis Tool (ECAT). Because the proposed design exception does not extend into the intersection area, the safety analysis was conducted for the ramp segment only. Because there were no observed crashes on the ramp segment during the analysis period, the safety analysis only considered predicted crashes.

Based on the analysis, the safety profile of the proposed condition is anticipated to be equivalent to the existing condition. The GCAT analysis is provided in Attachment B, and the ECAT analysis is provided in Attachment C.

Design Exception Request

CUY-77-11.21

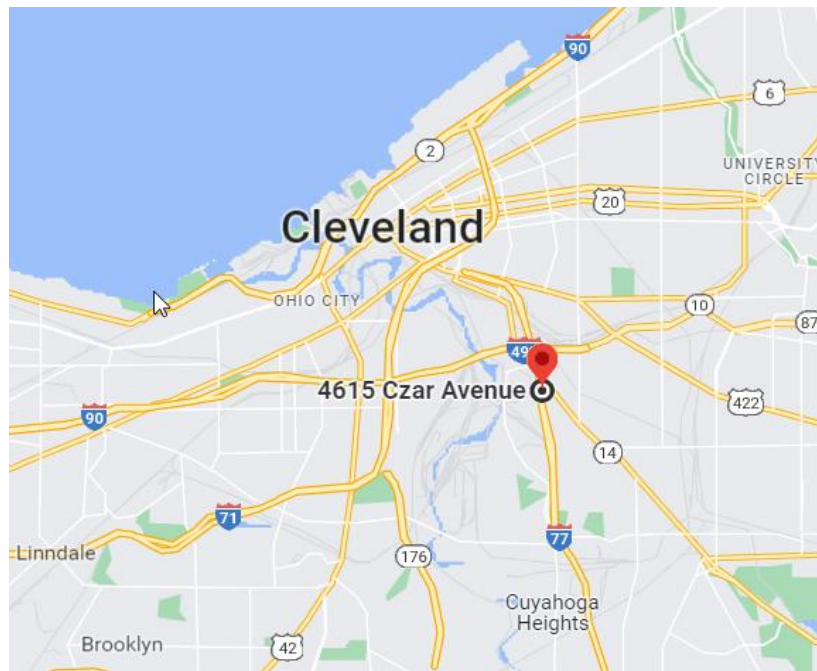
PID: 105743; Request 04

Letting Type: ODOT-Let

Design Designation

CUY-77; 13.871-14.181

Current ADT (2023)	118,000	Td	0.03
Design Year ADT (2043)	126,000	Design Speed	60
Design Hourly Volume (2043)	6,300	Legal Speed	50
Directional Distribution	0.50	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	0.05	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Matthew Wahl
on 2022-06-09 08:06:58 EST

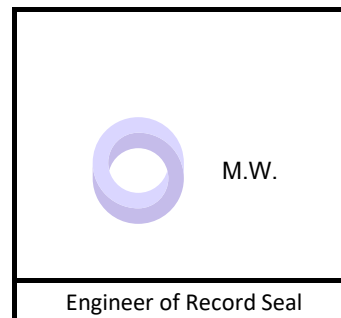
Matthew J. Wahl
(Engineer of Record)

Approved by:

E-SIGNED by Adam Koenig
on 2022-06-09 12:50:49 EST

Adam Koenig

Approval Date: 6/2/2022



Design Exception Request

CUY-77-11.21

PID: 105743; Request 04

Controlling Criteria Identification

Section: CUY-77; 13.871-14.181

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 ft (inside) 10 ft (outside)	Min. 3.4 ft (inside) 12 ft (outside)	Min. 6.82 ft (inside) 10 ft (outside)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			
(a.) "Existing" may be N/A (i.e. New alignment or new ramp)			

Project Description

The CUY-77-11.21 project will replace the pavement and widen shoulders on I-77 from Grant Avenue in the south to Broadway Avenue (SR-14) in the north. In conjunction with the widening, the project will replace the drainage system and increase capacity to alleviate flooding. The project will also replace the I-77 bridge over the Morgana Run Trail extension, install new lighting facilities, and update traffic control along the corridor. The project is located in the city of Cleveland and the villages of Cuyahoga Heights and Newburgh Heights in Cuyahoga County, Ohio.

Section Description

Design exception request for inside shoulder width for northbound I-77 from Broadway Avenue exit ramp to I-490 exit ramp.

Proposed Mitigation

No mitigation is proposed.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

In 2020, ODOT completed CCG6A (CUY-77-14.35|PID 13567), which replaced the existing I-77 bridge over I-490 and added a third lane to the northbound and southbound pavement. Under an approved design exception for inside shoulder width, that project constructed 6-foot inside shoulders on northbound I-77 from approximately 500 feet north of the Broadway Avenue exit ramp to the I-490 exit ramp. To the south, the project transitioned back to an existing inside shoulder width of approximately 4.75 feet.

Also in 2020, ODOT completed CCG6B (CUY-77-13.80|PID 82388), which removed and rebuilt a new longer bridge for Broadway Avenue over I-77. That project rebuilt the piers and replaced the I-77 median barrier under Broadway Avenue. The inside shoulder widths on northbound I-77 were reduced to a minimum of 3.4 feet in some locations to accommodate median widening for the new bridge piers.

The proposed project will reconstruct and widen the I-77 pavement to provide standard 12-foot lanes, 10-foot outside shoulders, and 10-foot inside shoulders. In the northbound direction, only the inside two lanes and shoulder will be reconstructed from the I-490 exit ramp (STA 208+08) to the project's end (STA 220+83.5). However, the entire width of the pavement will be resurfaced and restriped to match the section to the south. North of the project limits, approximately 225 feet of northbound I-77 will be resurfaced and restriped to transition back to the existing section.

The required inside shoulder width along northbound I-77 is 10 feet. However, a design exception is required in the vicinity of the Broadway Avenue bridge to avoid impacting the bridge piers and median barrier that were recently constructed as part of CCG6B. As a result, the inside shoulder is proposed to taper from 10 feet to 8 feet approximately 750 feet north of the Broadway Avenue exit ramp and remain 8 feet until the project's end, where it will match the existing shoulder width of the I-77 bridge over I-490. Under the Broadway Avenue bridge, the minimum shoulder width will be 6.82 feet to accommodate the existing median barrier/bridge piers. The proposed design exception is detailed below and shown in the attached plan sheet (Attachment A):

- Begin NB inside shoulder taper: 10.0 ft at STA 204+50.00
- End NB inside shoulder taper: 8.0 ft at STA 206+00.00
- Minimum NB inside shoulder width: 6.82 ft at STA 215+28.92
- End NB inside shoulder width: 8.0 ft at STA 220+83.50 (end project)
- 225-foot transition to existing 6-foot shoulder width (not included in analysis)

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Due to active construction zones in the project area in 2019, the crash analysis was conducted only for the years 2020 and 2021. In addition, the crash analysis extended from approximately 150 feet in advance of the proposed design exception (the Broadway Avenue exit ramp) to the project terminus. The crash analysis did not extend beyond the project limits because the existing conditions were poorly defined in this area.

Between 2020 and 2021, 28 crashes occurred on northbound I-77 in the analysis section. The majority of these were rear end (15) and sideswipe (8) crashes. The remaining five crashes were fixed object crashes. However, only two of these crashes involved a vehicle striking the inside median.

An analysis of the existing condition using ODOT's Economic Crash Analysis Tool (ECAT) indicated a predicted crash frequency of 3.8 crashes/year. The proposed conditions are anticipated to slightly improve the safety profile of the roadway, with a predicted crash frequency 3.7 crashes/year. It should be noted that the expected crash frequency in the analysis section is 5.6 crashes/year, which indicates a potential for safety improvement. Therefore, an additional ECAT analysis was prepared to examine the safety profile of the freeway with standard 10-foot shoulders. That analysis indicated predicted crashes would fall to 3.5 crashes/year if standard 10-foot inside shoulders were provided.

Although the expected crash frequency in this area shows potential for safety improvement, the predominant crash types (rear end and sideswipe) are only minimally affected by inside shoulder width. During the analysis period, only two crashes involved vehicles striking the inside barrier. The proposed conditions will provide wider inside shoulders than exist today, which will slightly improve safety. Furthermore, the ECAT analysis shows that constructing standard 10-foot inside shoulders would only minimally reduce crashes by 0.2 crashes per year. Given the above, the proposed design exception is not anticipated to negatively impact safety along northbound I-77.

The GCAT analysis is provided in Attachment B, the ECAT analysis for the narrow shoulders is provided in Attachment C, and the ECAT analysis for standard shoulders is included in Attachment D.

Design Exception Request

CUY-77-11.21

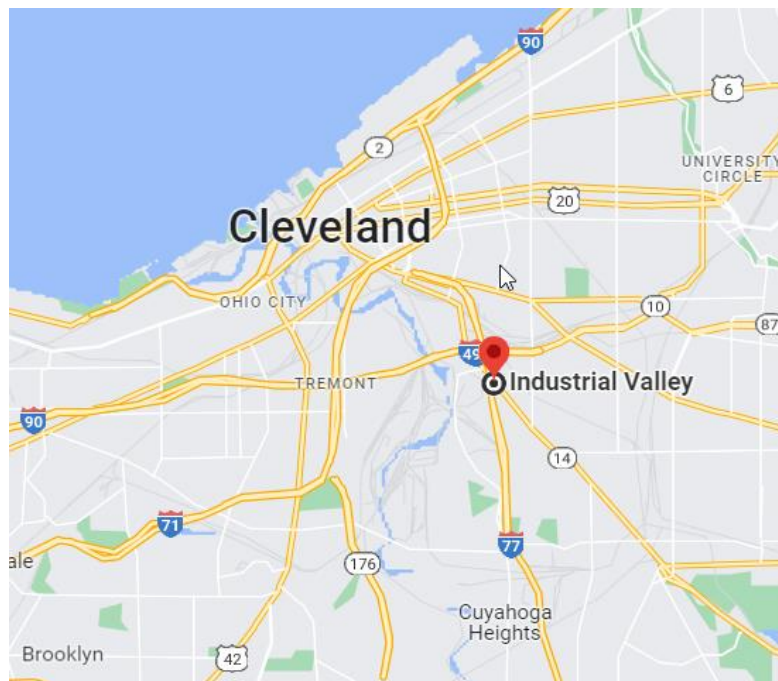
PID: 105743; Request 05

Letting Type: ODOT-Let

Design Designation

CUY-77; 13.99-14.181

Current ADT (2023)	118,000	Td	0.03
Design Year ADT (2043)	126,000	Design Speed	60
Design Hourly Volume (2043)	6,300	Legal Speed	50
Directional Distribution	0.50	Design Functional Class	1 - Interstates
Trucks (24hr B&C)	0.05	Functional Class Area Type	Urban
		NHS Project	Yes



Submitted By:

E-SIGNED by Matthew Wahl
on 2022-06-07 07:10:09 EST

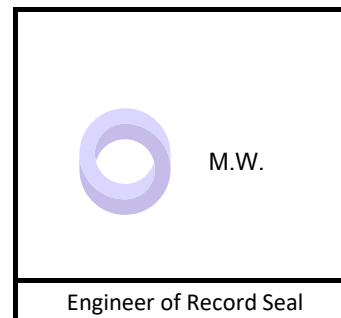
Matthew J. Wahl
(Engineer of Record)

Approved by:

E-SIGNED by Adam Koenig
on 2022-06-07 09:25:50 EST

Adam Koenig

Approval Date: 6/2/2022



Design Exception Request

CUY-77-11.21

PID: 105743; Request 05

Controlling Criteria Identification

Section: CUY-77; 13.99-14.181

Controlling Criteria	Standard	Existing (a.)	Proposed
Lane Width			
Shoulder Width	10 ft (inside) 10 ft (outside)	Min. 5.6 (Inside) 10 ft (outside)	Min. 4.53 (inside) 10 ft (outside)
Horizontal Curve Radius			
Maximum Grade			
SSD (Horizontal & Crest Vertical)			
Pavement Cross Slope			
Superelevation Rate			
Vertical Clearance			
Design Loading Structural Capacity			

(a.) "Existing" may be N/A (i.e. New alignment or new ramp)

Project Description

The CUY-77-11.21 project will replace the pavement and widen shoulders on I-77 from Grant Avenue in the south to Broadway Avenue (SR-14) in the north. In conjunction with the widening, the project will replace the drainage system and increase capacity to alleviate flooding. The project will also replace the I-77 bridge over the Morgana Run Trail extension, install new lighting facilities, and update traffic control along the corridor. The project is located in the city of Cleveland and the villages of Cuyahoga Heights and Newburgh Heights in Cuyahoga County, Ohio.

Section Description

Design exception request for inside shoulder width for southbound I-77 at I-490 entrance ramp.

Proposed Mitigation

No mitigation is proposed.

Support for Deviation (Benefit-cost, R/W, Environmental, Constructability, Coordination with Other Projects, Relationship between any crash patterns and proposed design exception, etc.):

In 2020, ODOT completed CCG6A (CUY-77-14.35|PID 13567), which replaced the existing I-77 bridge over I-490 and added a third lane to the northbound and southbound pavement. Under an approved design exception for inside shoulder width, that project constructed 8-foot inside shoulders on southbound I-77 over I-490. To the south, the project transitioned back to an existing inside shoulder width of approximately 4.75 feet.

Also in 2020, ODOT completed CCG6B (CUY-77-13.80|PID 82388), which removed and rebuilt a new, longer bridge for Broadway Avenue over I-77. That project rebuilt the piers and replaced the I-77 median barrier under Broadway Avenue. The inside shoulder widths on southbound I-77 were reduced to a minimum of 5.6 feet in some locations to accommodate median widening for the new bridge piers.

The proposed project will reconstruct and widen the I-77 pavement to provide standard 12-foot lanes, 10-foot outside shoulders, and 10-foot inside shoulders. In the southbound direction, only the inside two southbound lanes and shoulder will be reconstructed from the I-490 entrance ramp (STA 204+03.9) to the project's end (STA 220+83.5). However, the entire width of the pavement will be resurfaced and restriped to match the section to the south.

The required inside shoulder width along southbound I-77 is 10 feet. However, a design exception is required in the vicinity of the Broadway Avenue bridge to avoid impacting the bridge piers and median barrier that were recently constructed as part of CCG6B. As a result, the southbound inside shoulder is proposed to taper from 10 feet to 8 feet approximately 400 feet south of the Broadway Avenue bridge and remain 8 feet until the project's end, where it will match the existing shoulder width of the I-77 bridge over I-490. Under the Broadway Avenue bridge, the minimum shoulder width will be 4.53 feet to accommodate the existing median barrier/bridge piers. The proposed design exception is detailed below and shown in the attached plan sheet (Attachment A):

- Begin SB inside shoulder taper: 10.0 ft at STA 210+75.00
- End SB inside shoulder taper: 8.0 ft at STA 212+05.00
- Minimum SB inside shoulder width: 4.53 ft at STA 217+53.50
- Match existing SB inside shoulder width: 8.0 ft at STA 220+83.50

Does the requested Design Exception location fall within a Safety Integrated Project (SIP) Map Location?

Yes, Red Location

Does the crash analysis (GCAT and CAM Tool) show any patterns that would be adversely impacted by the proposed Design Exception?

Due to active construction zones in the project area in 2019, the crash analysis was conducted only for the years 2020 and 2021. In addition, the crash analysis extended from approximately 250 feet in advance of the proposed design exception to the project terminus. The crash analysis did not extend beyond the project limits because the existing conditions were poorly defined in this area.

Between 2020 and 2021, four crashes occurred on southbound I-77 in the analysis section. These included two fixed object, one rear end, and one animal crash. Only one of the fixed object crashes involved a vehicle striking the inside median.

An analysis of the existing condition using ODOT's Economic Crash Analysis Tool (ECAT) indicated a predicted crash frequency of 2.2 crashes/year. In addition, the existing crashes are in line with expectations, with an expected average crash frequency of 2.3 crashes/year. The proposed conditions are anticipated to preserve the safety profile of the roadway, with an equivalent predicted crash frequency of 2.2 crashes/year.

Given the above, there is not an existing safety problem associated with the inside shoulder width on southbound I-77 in the analysis section. Furthermore, the proposed design exception is not anticipated to negatively affect safety along southbound I-77.

The GCAT analysis is provided in Attachment B, and the ECAT analysis is provided in Attachment C.