March 2, 2023

City of Columbus, Department of Public Utilities
Division of Sewerage and Drainage
Attn: Mr. Greg Fedner, PE
Private Development Section Manager
910 Dublin Road
Columbus, OH 43215

Subject: Operation Safewalks-Grace Street, 3683-E, PID 113775
Type II Variance from Stormwater Drainage Manual

Dear Mr. Fedner:

The following is our application for a Type II Variance Request from Section 3.4.3.1.a of the 2021 City of Columbus Stormwater Drainage Manual (SWDM)for the proposed City of Columbus Operation Safewalks-Grace Street project, submitted on behalf of the City of Columbus Department of Public Service.

This project is located along Grace Street from Orel Avenue to the alley west of Roys Avenue (western portion of the project) and from Hague Avenue to Eureka Avenue (eastern portion of the project) in the Hilltop. The purpose of this state/federally funded project is to add a compliant sidewalk and improve existing curb ramps along the corridor to provide safe travel to West Broad Elementary school. A stormwater management system will be installed to provide appropriate stormwater quality and quantity controls to meet the requirements set forth in the City of Columbus 2021 Stormwater Drainage Manual and the Ohio EPA General Construction Permit OHC000005. Grace Street is uncurbed with drainage occurring along the edge of pavement to the existing storm inlets at the curbed intersections within the corridor.

A significant portion of the existing homes have terraced lawns with the homes sitting 2-3 feet above the roadway. There are multiple cases where the home, garage, or a permanent structure either encroach in the right-of-way or are located just outside the right-of-way limits. The right-of-way width for the eastern portion of the project is only 40’ which limits the available footprint for the sidewalk and does not permit space for stormwater control practices (SCP) within the right-of-way. For the western portion of the project the 50’ wide right-of-way, supplemented with additional takes, provides more space for the sidewalk and SCPs. Thus, the SCPs on the western half of the project will provide stormwater treatment for the entire project, including an additional 150% of treatment to mitigate for the eastern portion of the project that is untreated

During the preliminary design phase of the project, multiple practices were investigated for the stormwater design, including regional detention basins, land bank properties, green infrastructure (including permeable paver strips and bioretention in the form of rain gardens), and underground storage.

- The city does not have and is not planning on building a regional basin within the same

watershed as this project in near future.

- Vacant and city owned properties are present on adjacent streets, but none of them were technically viable options to construct a basin.
- A sidewalk with a permeable paver strip was not approved by DOSD due to maintenance concerns based on the pavers being outside of the roadway.
- This left the combination of rain gardens and underground storage as the only option for the treatment approach on the project.

SWDM Section 3.4.3.1.a permits underground storage within the right-of-way provided it is associated with a green infrastructure practice. SWDM Section 3.2.2 has five approved green infrastructure practices:

- Shallow constructed wetland – not practical for the project due to limited footprint
- Permeable pavement – previously rejected
- Green roof – not applicable
- Rainwater harvesting – not applicable
- Bioretention – proposed in the form of rain gardens

SWDM Section 3.4.3.1.a states, “Underground storage systems may not be placed in the public right-of-way unless the facility will be owned or operated by the City and the function of the facility is associated with a green infrastructure practice.” We are seeking a variance for approval of an underground storage system without an associated green infrastructure practice.

Exhibit Descriptions

Exhibits are provided to show a Full Compliance Alternative, Minimal Impact Alternative, and Preferred Alternative.

Full Compliance Alternative

The Full Compliance Alternative (Exhibit A) consists of an underground storage system with upstream rain gardens installed between the sidewalk and roadway. The rain gardens are a bioretention feature and would be an associated green infrastructure practice meeting SWDM Section 3.4.3.1.a. This approach results in significant impacts to the property owners and requires extensive right-of-way acquisition. Moreover, to limit the amount of acquisition, reduce property impacts, avoid impacts to roadway stability, and avoid impacts to structures, two retaining walls would need to be built - one between the road/rain garden and the walk, and one between the walk and the property.

- These rain gardens would be required in 11 locations within the western portion, extending up to 140 feet along the roadway to provide necessary treatment.
- Since the rain garden is between the roadway and the walk, the cast-in-place concrete retaining wall and footing in this location needs to be designed to support the earth loads behind the wall and walk (including houses) with the biosoil (extending approximately 4 feet below the walk elevation) in the rain gardens removed, making them a considerably large structural wall.
- The wall on the back of the walk would be in close proximity to permanent structures (houses and garages) raising a future maintenance concern when the wall needs replaced.
- Permanent right-of-way will need to be acquired to keep the proposed improvements within

the publicly owned space, further impacting the property owners.

- Requires significant maintenance and protection from the surrounding area and residents to maintain function and compliance.

Minimal Impact Alternative

The Minimal Impact Alternative (Exhibit B) consist of installing vegetated filter strips between the sidewalk and the street upstream of a vegetated swale leading to Hydrodynamic Separators (HDS) upstream of an underground detention system. Both the vegetated filter strips and HDS units meet the pretreatment requirement for underground storage but neither are considered green infrastructure in the SWDM. However, this alternative eliminates many of the concerns in the Full Compliance Alternative.

- Right-of-way acquisition will be limited to temporary takes.
- Vegetated filter strips are accepted as a green infrastructure practice by the Federal EPA.
- The Ohio EPA general construction permit encourages use of green infrastructure BMPs such as runoff reducing practices. Vegetated filter strips are one of the runoff reduction practices listed in the Ohio EPA Rainwater and Land Development Manual.
- Only curb walls behind the walk will be needed in limited locations to make up grade.
- Curb walls would be separated from structures eliminating any future maintenance concerns.
- Low maintenance with low potential of damage from the surrounding area and residents.

Preferred Alternative

The Preferred Alternative (Exhibit C) is very similar to the Minimal Impact Alternative but it does not provide vegetated filter strips. The HDS units will meet the pretreatment requirement for underground storage however without being associated with green infrastructure. This option will have very similar benefits as the Minimal Impact Alternative. The main difference is the HDS units will be the only pretreatment provided on the project with all runoff passing through an HDS unit prior to entering the underground system. DPS is willing to add in the vegetated filter strips to this alternative to provide additional pretreatment prior to the water entering the underground system.

Alternative	Sidewalk-attributed costs (walk, curb ramps, excavation, incidentals, etc.)	Stormwater Associated Costs	Right of Way Costs	Total Project Costs
Full Compliance	$1,150,000	$1,950,000	$100,000	$3,200,000
Minimal Impact	$1,150,000	$1,206,000	$20,000	$2,376,000
Preferred	$1,150,000	$1,300,000	$20,000	$2,470,000

Justification for Variance

Deviation from Section 3.4.3.1.a of the 2021 Stormwater Drainage Manual for the Preferred Alternative is justified by the following reasons:

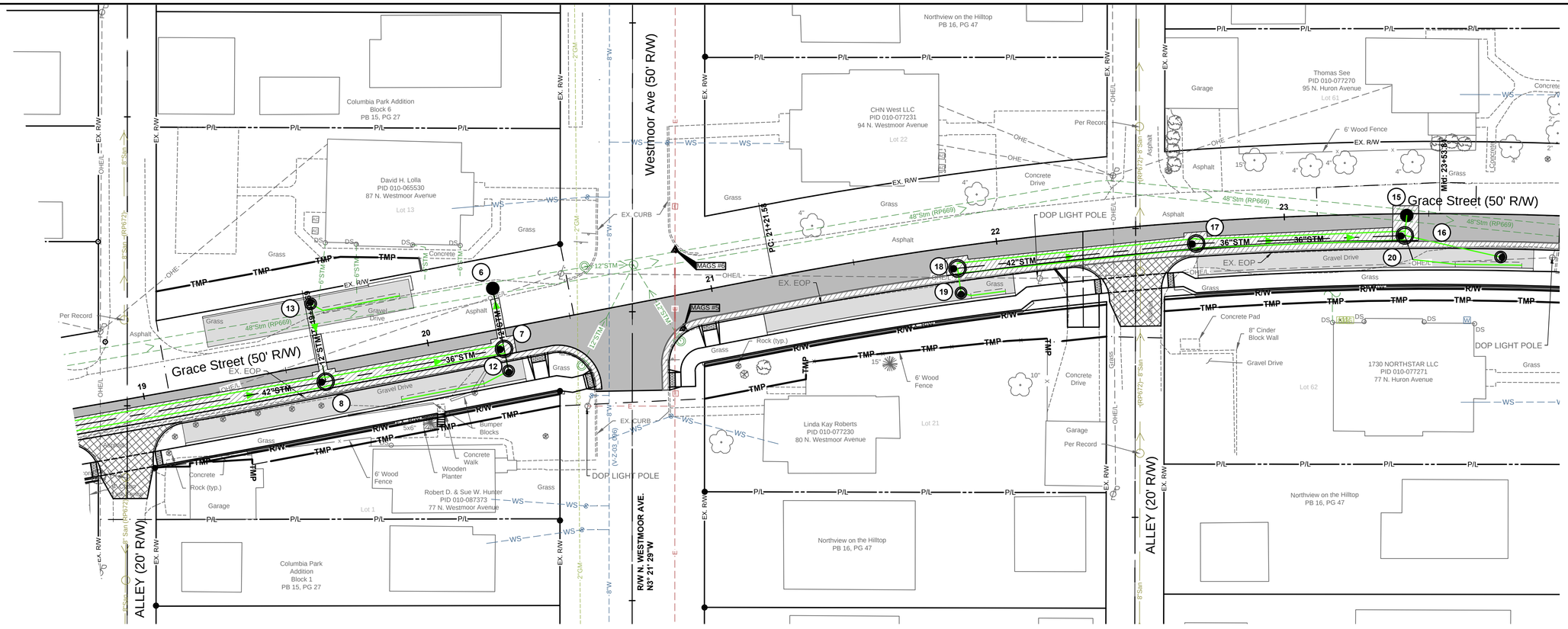
- The Full Compliance alternative is not practical due to increased impacts to the adjacent property owners, increased maintenance requirements, significantly increased costs, and future maintenance impacts to structures within the corridor. See the table below for a cost comparison.
- The Minimal Impact and Preferred Alternatives meet the requirements in the Ohio EPA General Construction Permit for Post-Construction Treatment using an underground detention system.
- Other agencies consider vegetated filter strips a green infrastructure practice.
- Underground detention systems are installed all over the city on private property without an association with green infrastructure.

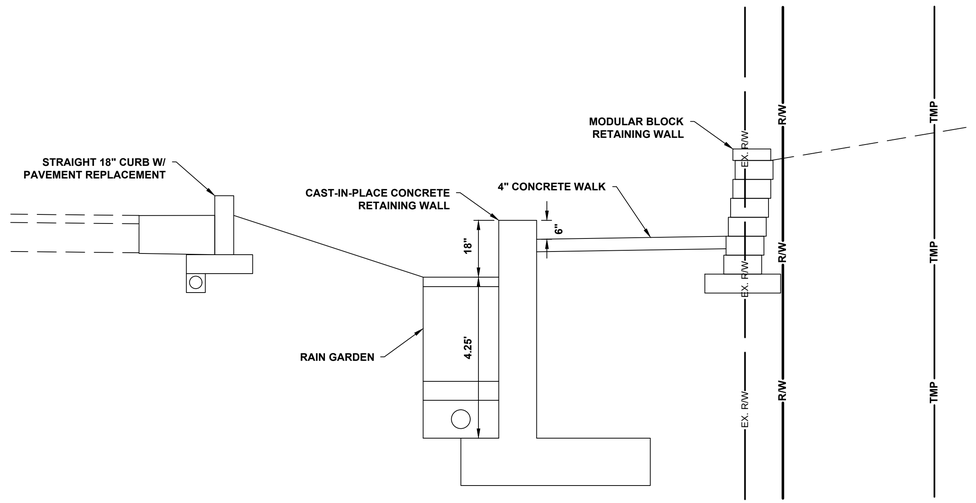
Please review this application and provide comments at your earliest convenience. If you have any questions, please contact our office at (614) 487-1650, or by email at cullen.zelachowski@korda.com.

Yours truly,

KORDA/NEMETH ENGINEERING, INC.
Consulting Engineers

Cullen Zelachowski, PE
Project Engineer





LEGEND

- PERMANENT PAVEMENT REPLACEMENT PER ITEM 259
- ASPHALT MILL AND OVERLAY
- RAIN GARDEN
- ALLEY APRON PAVEMENT REPLACEMENT PER DETAIL D ON SHEET 4

HORIZ. SCALE 0 20
VERT. SCALE 0 5

DESIGNED CMZ
CHECKED BMV

CIP 590955-100061
ODOT PID 113775

EXHIBIT A
FULL COMPLIANCE ALTERNATIVE

OPERATION SAFEWALKS - SCHOOL SIDEWALKS
GRACE STREET

3683-E

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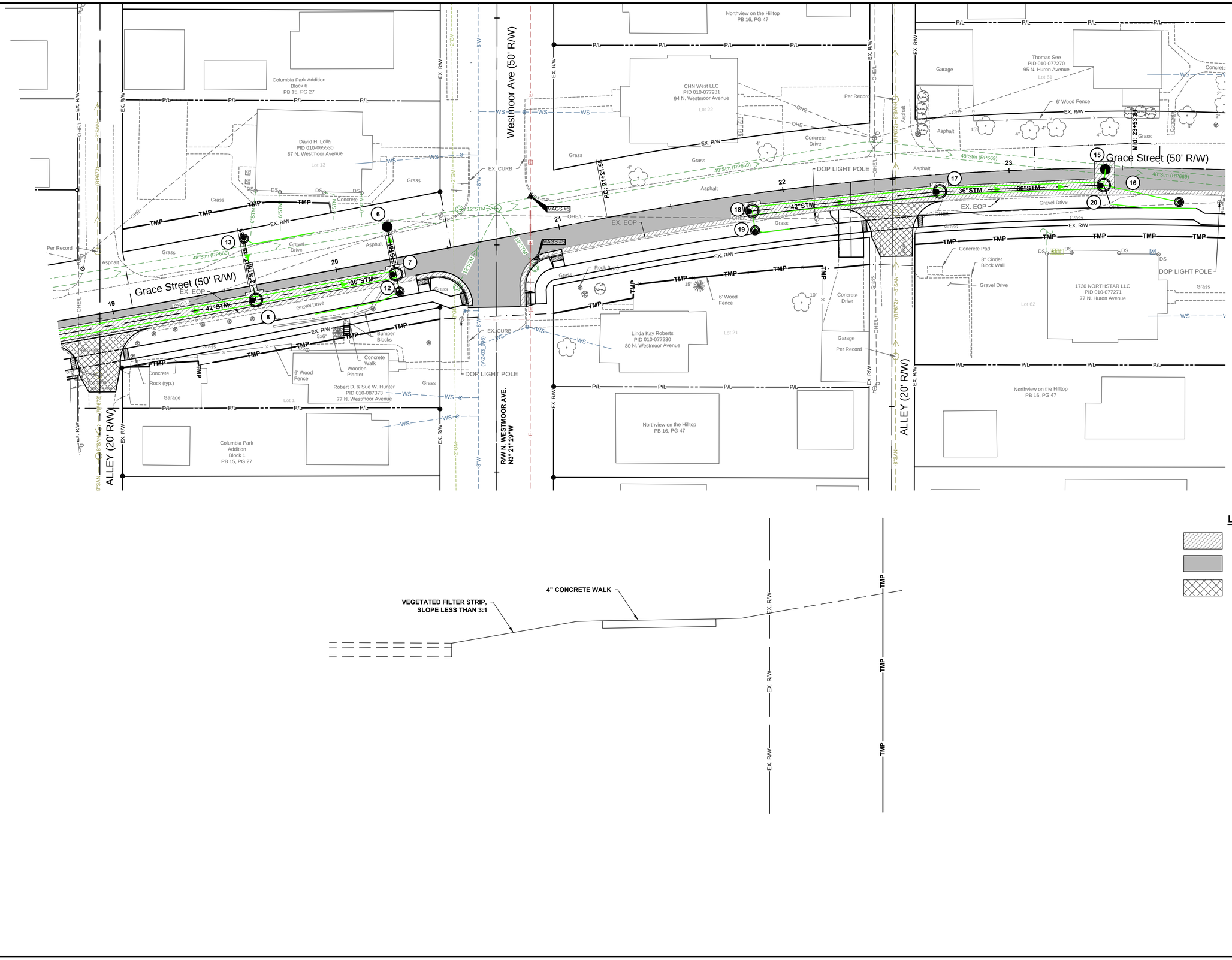

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HORIZ. SCALE 20 0
VERT. SCALE 5 0

DESIGNED CMZ
CHECKED BMV

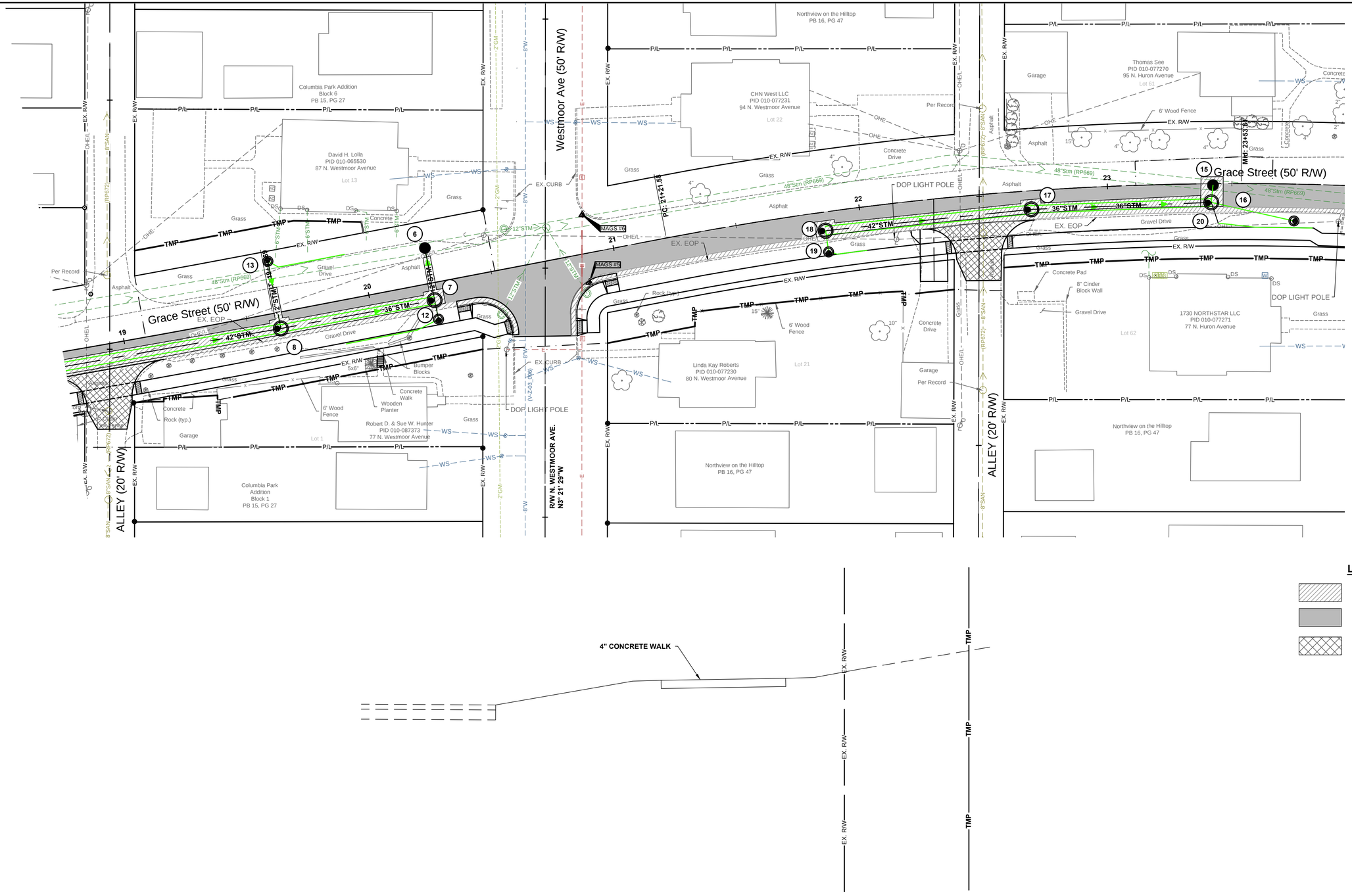
CIP 590955-100061
ODOT PID 113775

EXHIBIT B
MINIMUM IMPACT ALTERNATIVE

OPERATION SAFEWALKS - SCHOOL SIDEWALKS
GRACE STREET

27
123

3683-E



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HORIZ. SCALE 20 0
VERT. SCALE 5 0

DESIGNED CMZ
CHECKED BMV

CIP 590955-100061
ODOT PID 113775

EXHIBIT C
PREFERRED ALTERNATIVE

OPERATION SAFEWALKS - SCHOOL SIDEWALKS
GRACE STREET

27
123

3683-E

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