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C101	SITE DISCHARGE, RIPRAP, RIVER MAT, AND ICE RINK DETAILS
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**BROADWAY PARK WEST**

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
**LOWER TOWN PARTNERS, LLC**

**SMITHGROUP**

201 DEPOT STREET  
SECOND FLOOR  
ANN ARBOR, MI 48104  
734.662.4457  
www.smithgroupjpr.com

HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

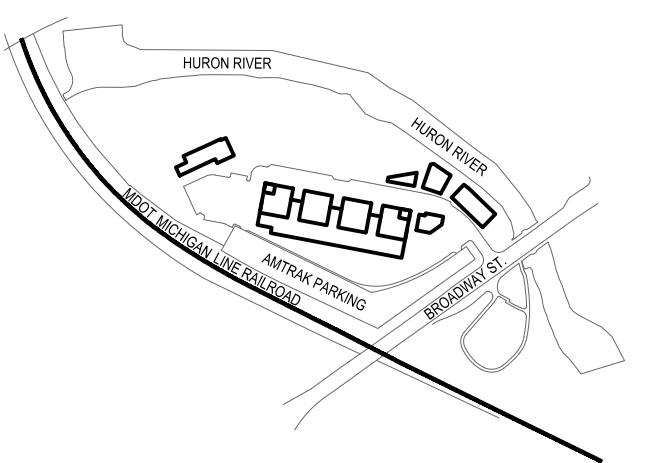
ISSUED FOR:                      REV:      DATE:

ISSUED FOR	REV	DATE

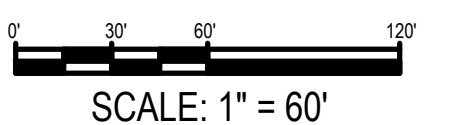
SEALS AND SIGNATURES

**NOT FOR CONSTRUCTION**

KEY PLAN



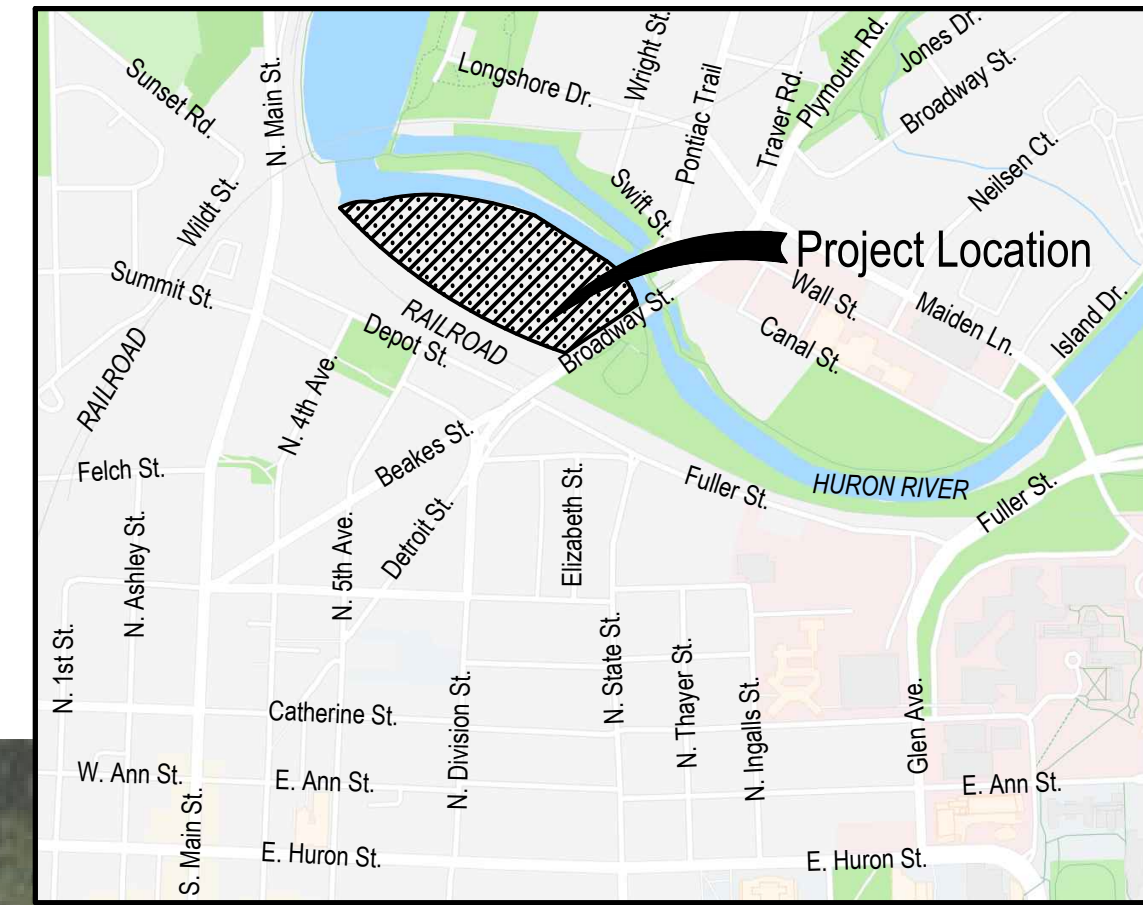
DRAWING TITLE:  
**SITE AERIAL AND LOCATION MAP**



SCALE: 10420

PROJECT NUMBER: **C000**

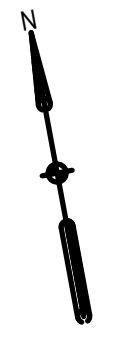
DRAWING NUMBER



**PROJECT LOCATION MAP**  
N.T.S.



**VICINITY MAP**  
SCALE: 1" = 120'



**LEGEND**

- - - - 05/22/20 LOMR FLOODPLAIN
- - - - 05/22/20 LOMR FLOODWAY
- - - - REVISED FLOODPLAIN BOUNDARY AS A RESULT OF CITY OF ANN ARBOR LOMR

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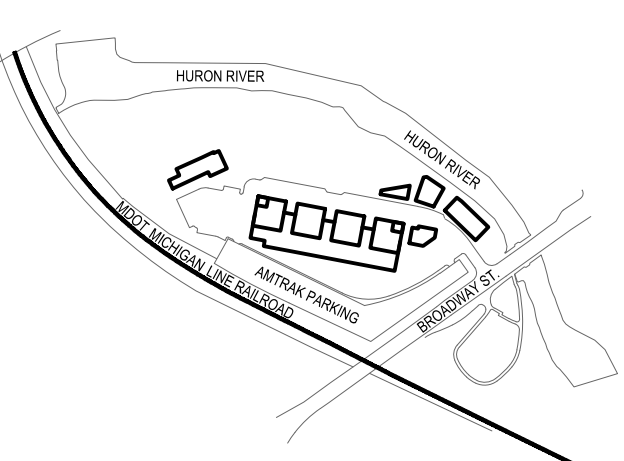
HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

ISSUED FOR	REV	DATE

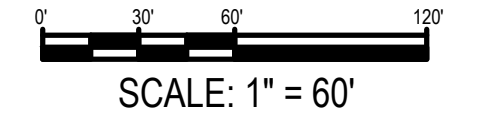
SEALS AND SIGNATURES

**NOT FOR CONSTRUCTION**

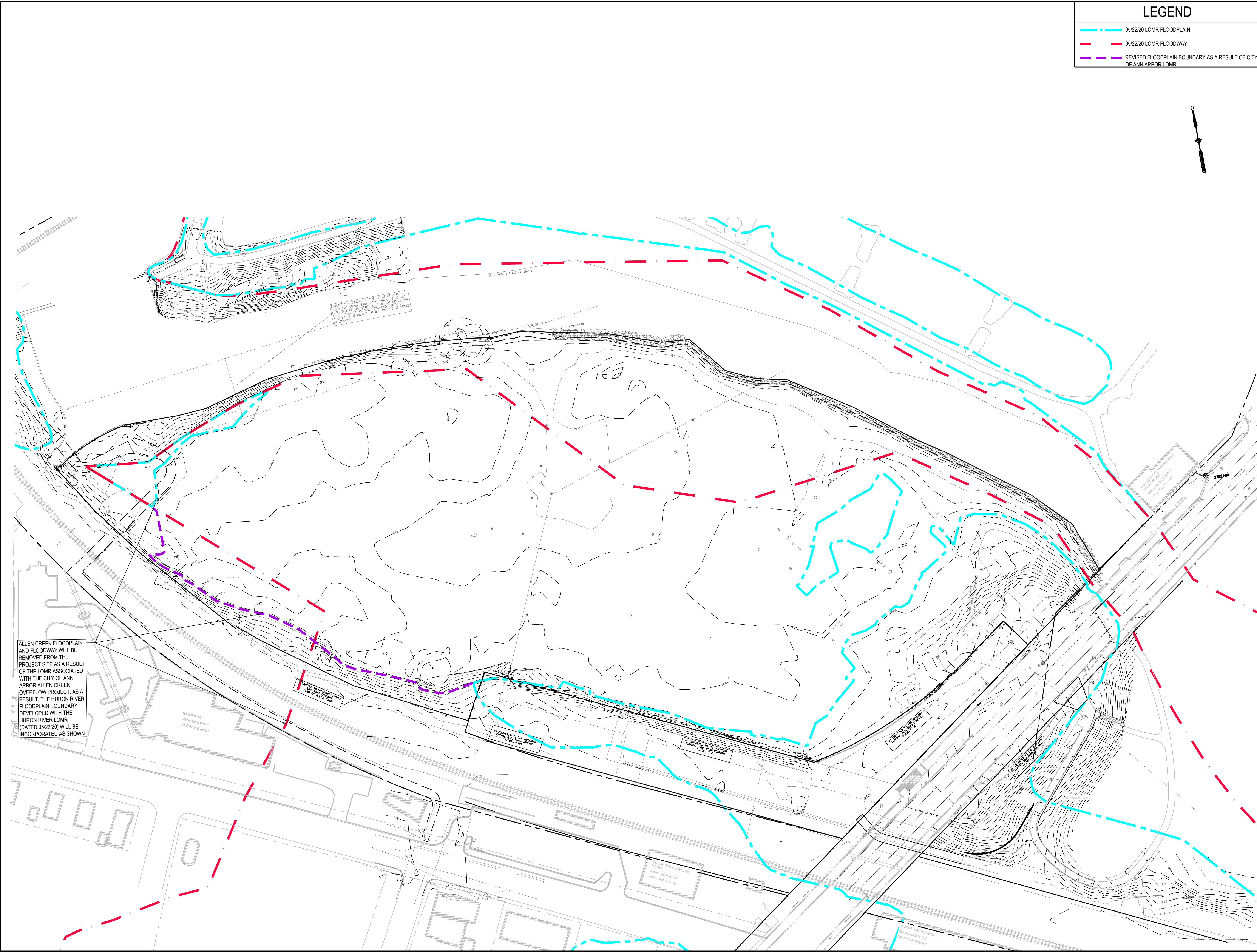
KEY PLAN



DRAWING TITLE  
**EXISTING CONDITIONS**



SCALE: 10420  
PROJECT NUMBER  
**C001**  
DRAWING NUMBER



ALLEN CREEK FLOODPLAIN AND FLOODWAY WILL BE REMOVED FROM THE PROJECT SITE AS A RESULT OF THE LOMR ASSOCIATED WITH THE CITY OF ANN ARBOR ALLEN CREEK OVERFLOW PROJECT. AS A RESULT, THE HURON RIVER FLOODPLAIN BOUNDARY DEVELOPED WITH THE HURON RIVER LOMR (DATED 05/22/20) WILL BE INCORPORATED AS SHOWN.

ESTIMATED LOCATION OF THE 10' RELEASE OF F.L.W. FOR STORM 2003-0.6" SHALL BE ON THE EAST FACE OF THE STRUCTURE OF THE DRAIN. THE EXACT LOCATION OF THE EXCESSIVE FLOWING FLOOD SHALL NOT BE PLOTTED BASED ON THE RECORDED INFORMATION.

APPROXIMATE EDGE OF WATER

PROPERTY TO BE INCORPORATED AS PART OF THE PARK

PROPERTY TO BE INCORPORATED AS PART OF THE PARK

PROPERTY TO BE INCORPORATED AS PART OF THE PARK

PROPERTY TO BE INCORPORATED AS PART OF THE PARK

PROPERTY TO BE INCORPORATED AS PART OF THE PARK

FILE:\syr-flic\projects\10420\10420-EGLE\_JOINT\_PERMIT.dwg USER:astron DATE: Mar 24 2021 TIME: 06:36 pm

### LEGEND

— 05/22/20 LOMR FLOODPLAIN  
- 05/22/20 LOMR FLOODWAY

# BROADWAY PARK WEST

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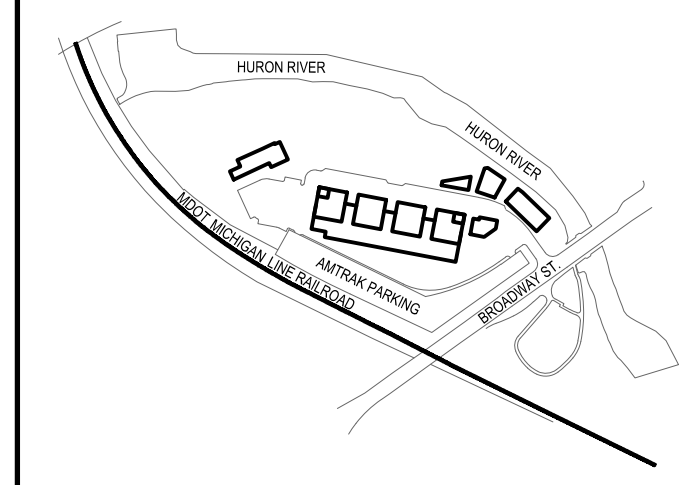
HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

ISSUED FOR	REV. DATE

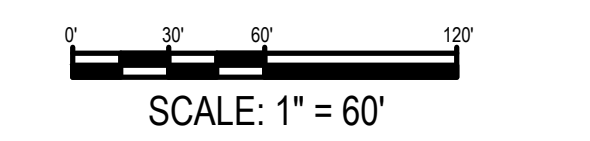
SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



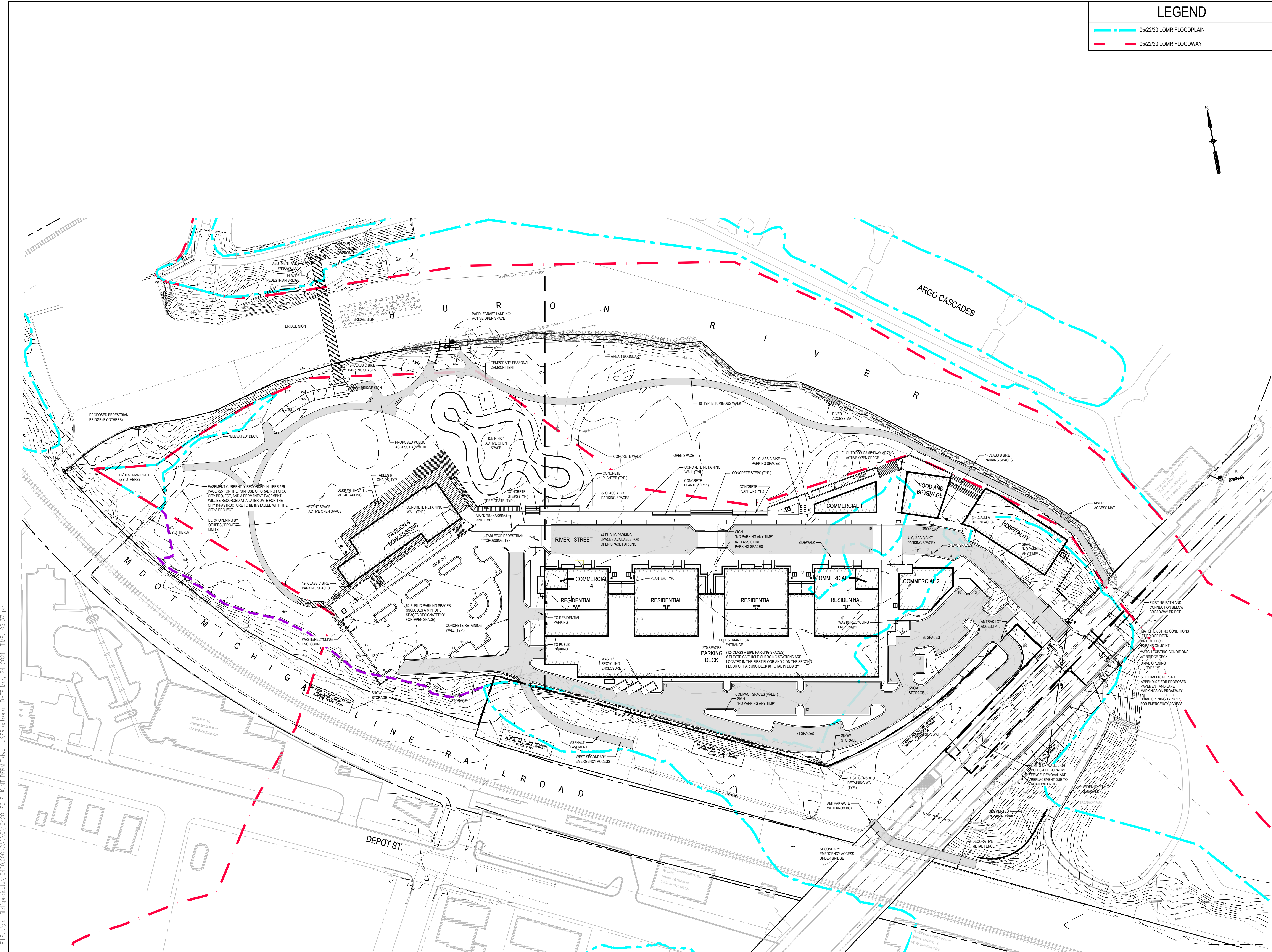
DRAWING TITLE  
**OVERALL LAYOUT PLAN**



SCALE: 10420

PROJECT NUMBER: **C002**

DRAWING NUMBER



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# BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

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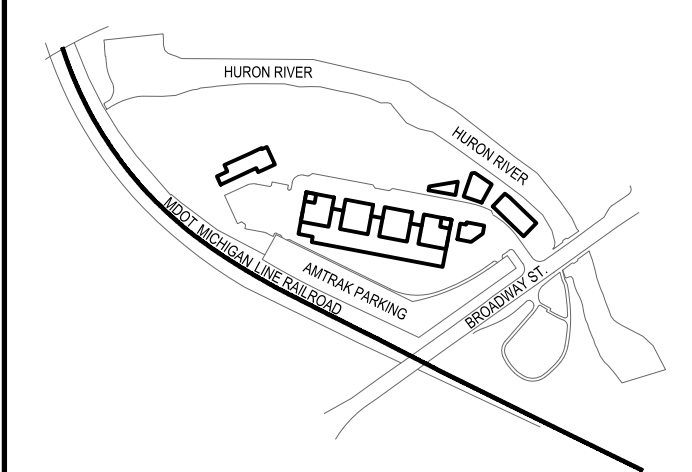
ISSUED FOR REV DATE

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
**OVERALL EGLE JOINT  
PERMIT APPLICATION PLAN**

SCALE: 1" = 60'

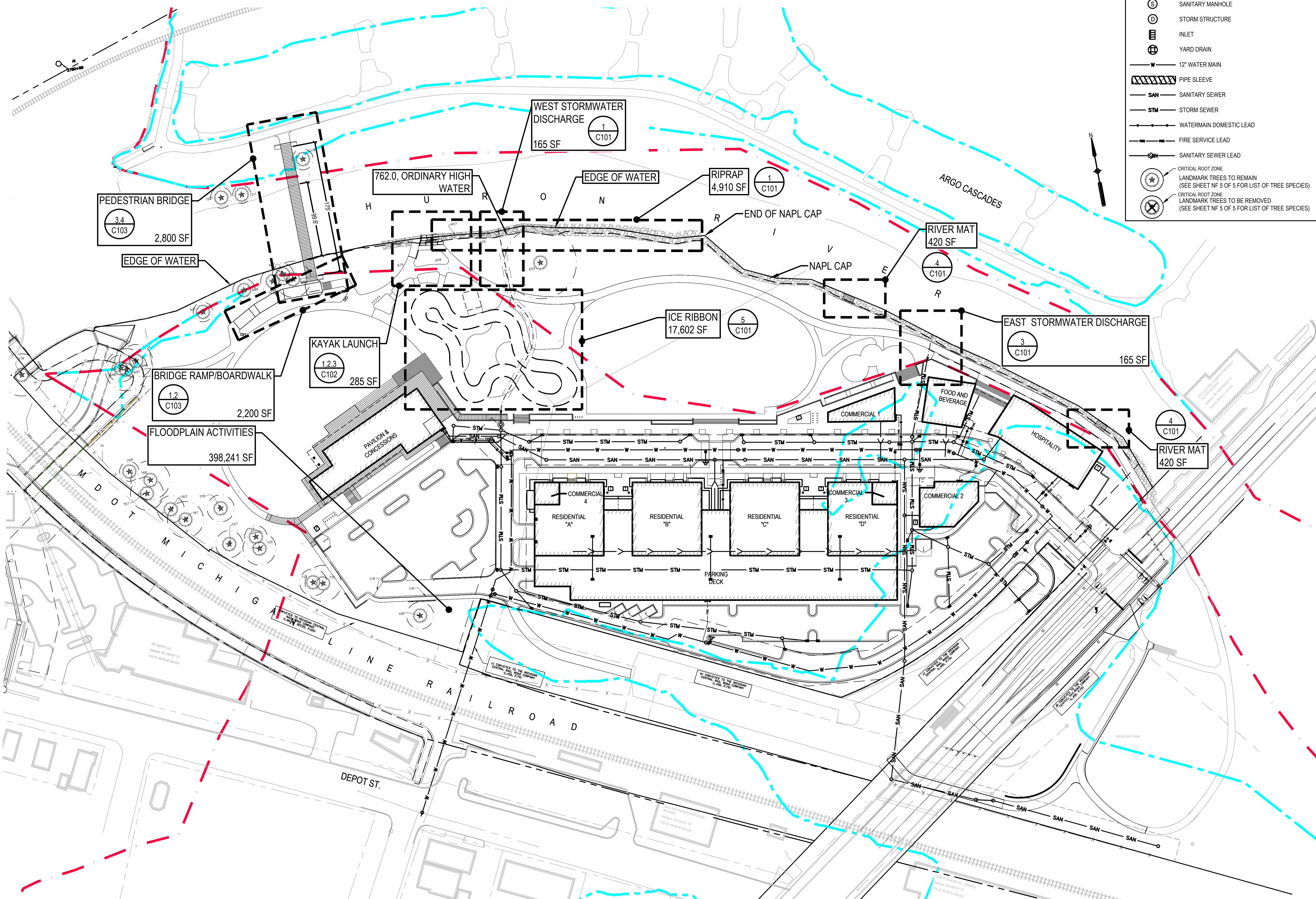
SCALE PROJECT NUMBER 10420

DRAWING NUMBER **C100**

EGLE-WRD  
W2021031242-v1.0  
Approved  
Issued On: 10/28/2021  
Expires On: 10/28/2021

### LEGEND

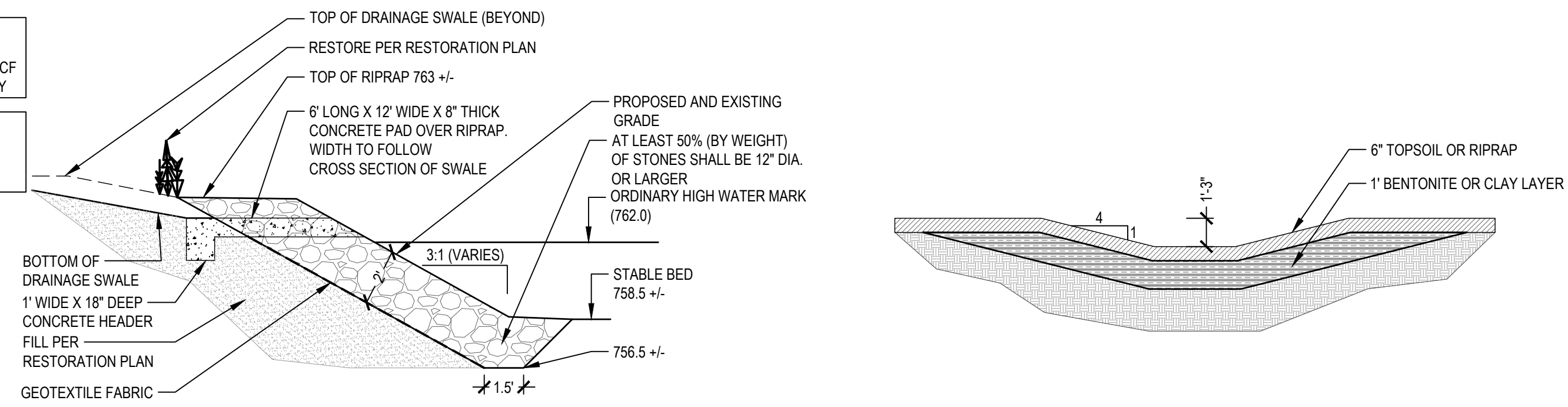
- PROPOSED TREE LINE / WOODLAND EDGE
- VALVE BOX
- WATER MAIN ISOLATION VALVE
- FIRE HYDRANT ASSEMBLY
- FDC
- SANITARY MANHOLE
- STORM STRUCTURE
- INLET
- YARD DRAIN
- 12" WATER MAIN
- PIPE SLEEVE
- SANITARY SEWER
- SAN
- STM
- WATERMAIN DOMESTIC LEAD
- FIRE SERVICE LEAD
- SANITARY SEWER LEAD
- CRITICAL ROOT ZONE  
LANDMARK TREES TO REMAIN  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE  
LANDMARK TREES TO BE REMOVED  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)



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AREA BELOW OHWM = 18 SF  
 LENGTH OF RIPRAP = 356 LF  
 VOLUME OF RIPRAP BELOW OHWM = 6,408 CF  
 VOLUME OF RIPRAP BELOW OHWM = 237 CY

TOTAL AREA OF RIPRAP = 25 SF  
 LENGTH OF RIPRAP = 356 LF  
 TOTAL VOLUME OF RIPRAP = 8,900 CF  
 TOTAL VOLUME OF RIPRAP = 330 CY



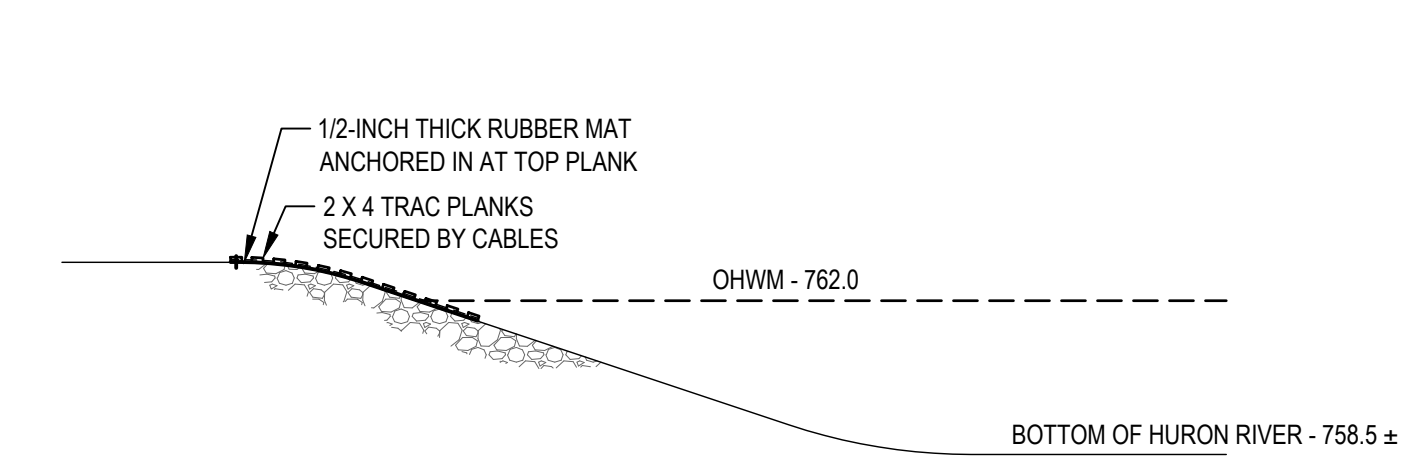
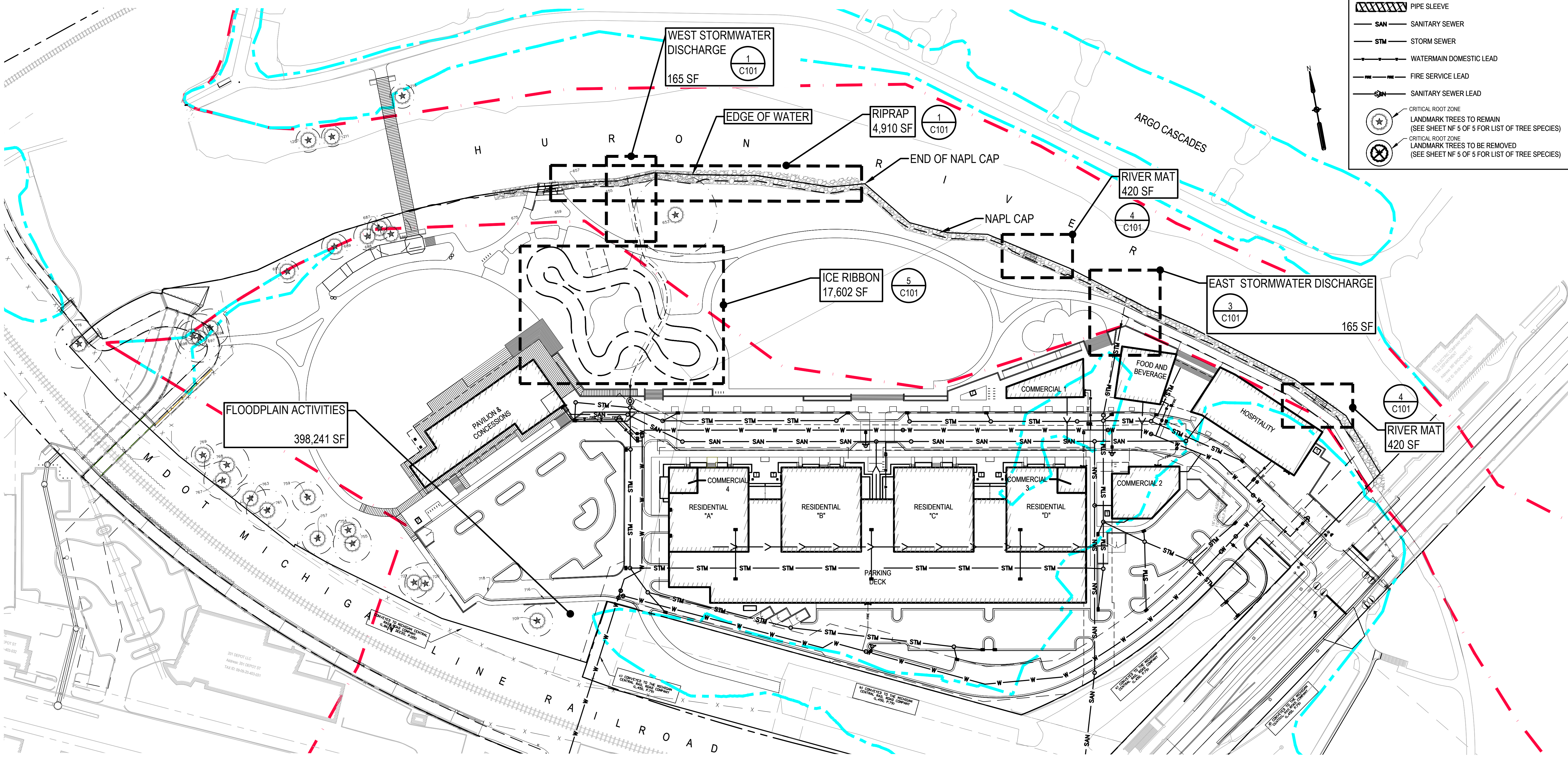
1 WEST DISCHARGE SWALE SCALE: NTS

2 SWALE CROSS SECTION SCALE: NTS

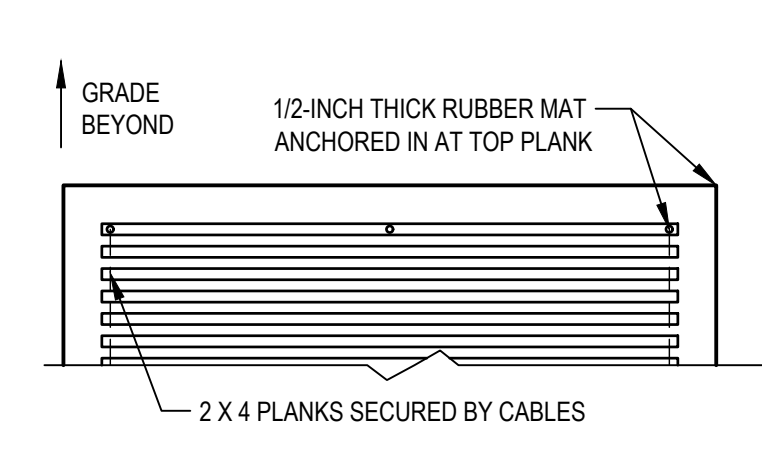
3 EAST DISCHARGE SWALE SCALE: NTS

### LEGEND

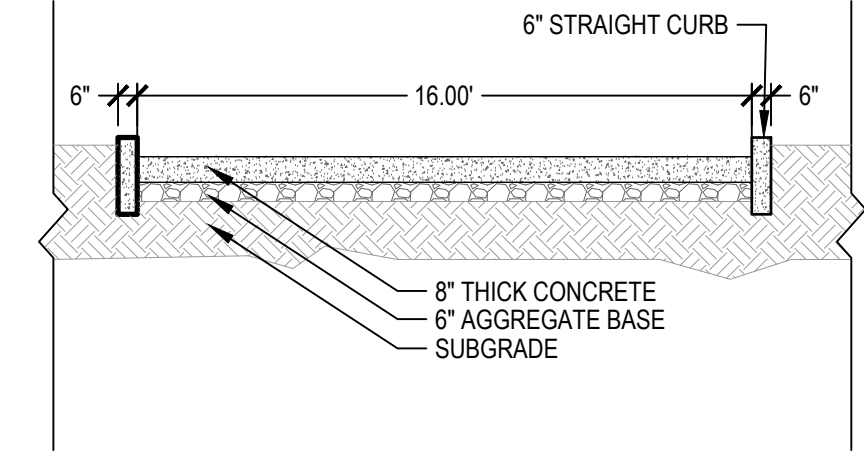
- 05/22/20 LOMR FLOODPLAIN
- 05/22/20 LOMR FLOODWAY
- PROPOSED TREE LINE / WOODLAND EDGE
- VALVE BOX
- WATER MAIN ISOLATION VALVE
- FIRE HYDRANT ASSEMBLY
- FDC
- SANITARY MANHOLE
- STORM STRUCTURE
- INLET
- YARD DRAIN
- 12" WATER MAIN
- PIPE SLEEVE
- SANITARY SEWER
- STM - STORM SEWER
- WATERMAIN DOMESTIC LEAD
- FIRE SERVICE LEAD
- SANITARY SEWER LEAD
- CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE LANDMARK TREES TO BE REMOVED (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)



4 RIVER MAT DETAILS SCALE: 1" = 5'



PLAN SCALE: 1" = 5'



5 ICE RINK SECTION SCALE: 1" = 5'

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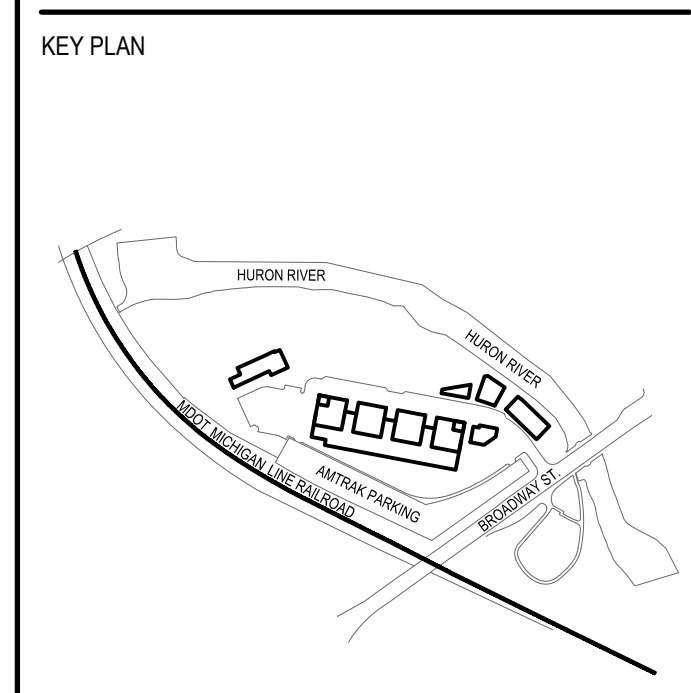
201 DEPOT STREET  
 SECOND FLOOR  
 ANN ARBOR, MI 48104  
 734.662.4457  
 www.smithgroupjr.com

HAMILTON ANDERSON  
 1435 RANDOLPH STREET, STE 200  
 DETROIT, MI 48226

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

*NOT FOR CONSTRUCTION*



DRAWING TITLE  
**SITE DISCHARGE, RIPRAP, RIVER MAT, AND ICE RINK DETAILS**

SCALE: 1" = 60'

SCALE: 10420  
 PROJECT NUMBER  
 DRAWING NUMBER **C101**

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# BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
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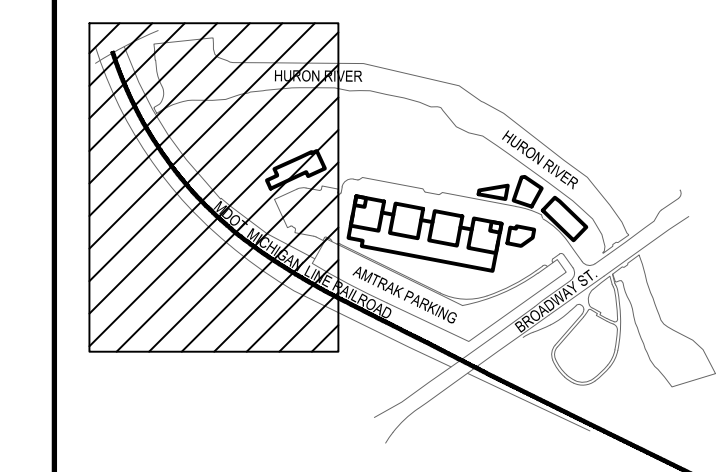
HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

ISSUED FOR: \_\_\_\_\_ REV: \_\_\_\_\_ DATE: \_\_\_\_\_

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
**STONE STEPS AND KAYAK LAUNCH ENLARGEMENTS AND SECTIONS**

SCALE: 1" = 40'

SCALE: 10420

PROJECT NUMBER

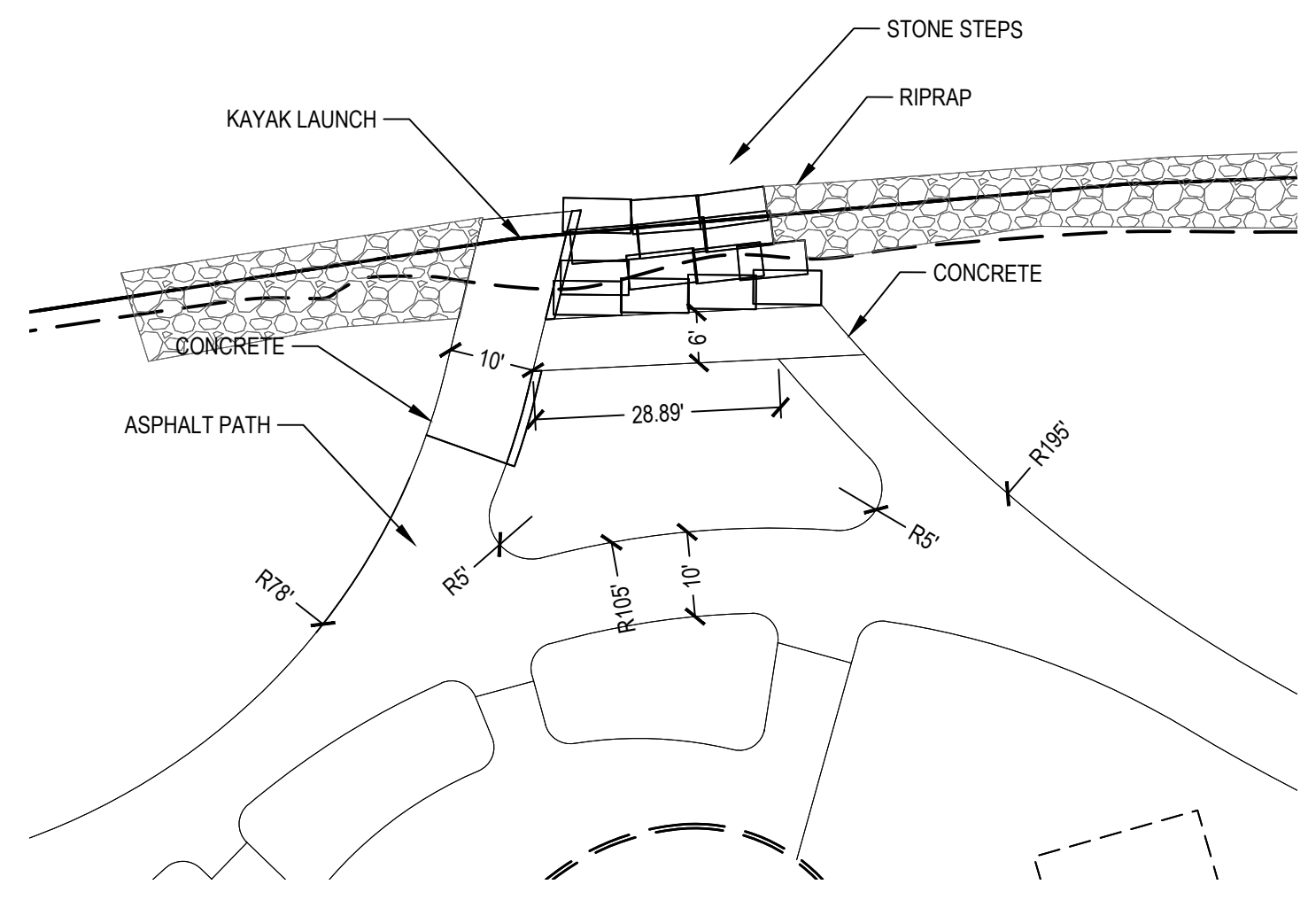
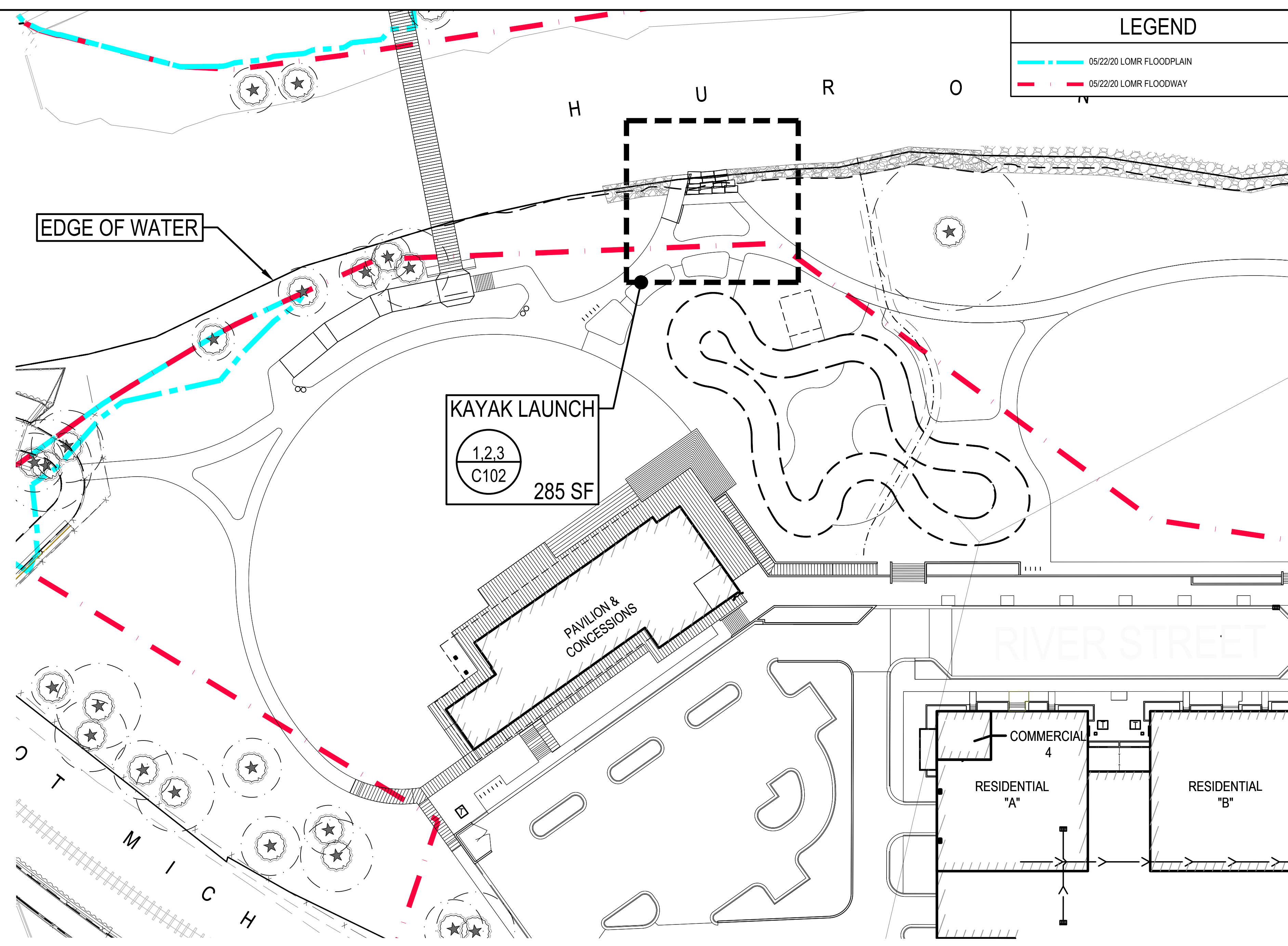
DRAWING NUMBER **C102**

EGLE-WRD 10/28/2021 v1.0

Approved

Issued On: 10/28/2021

Expires On: 10/28/2021



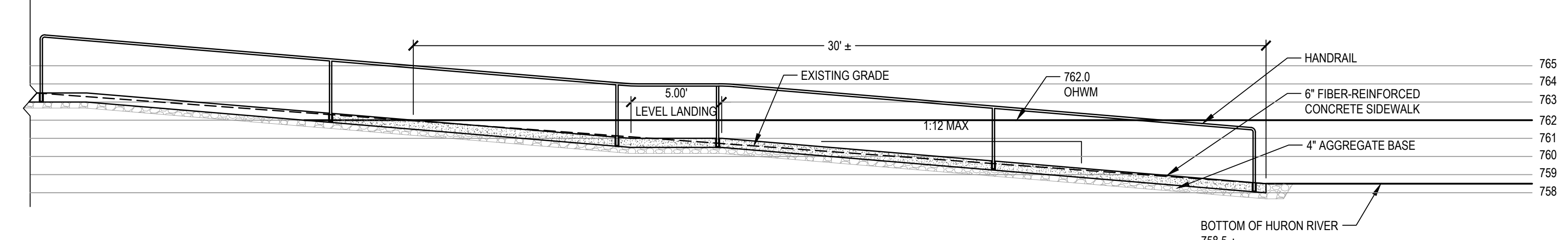
1 KAYAK LAUNCH ENLARGEMENT SCALE: 1" = 20'

AREA OF EXCAVATION BELOW OHWM = 16 SF  
AVERAGE STEP WIDTH = 25 LF  
VOLUME OF EXCAVATION BELOW OHWM = 400 CF  
VOLUME OF EXCAVATION BELOW OHWM = 15 CY

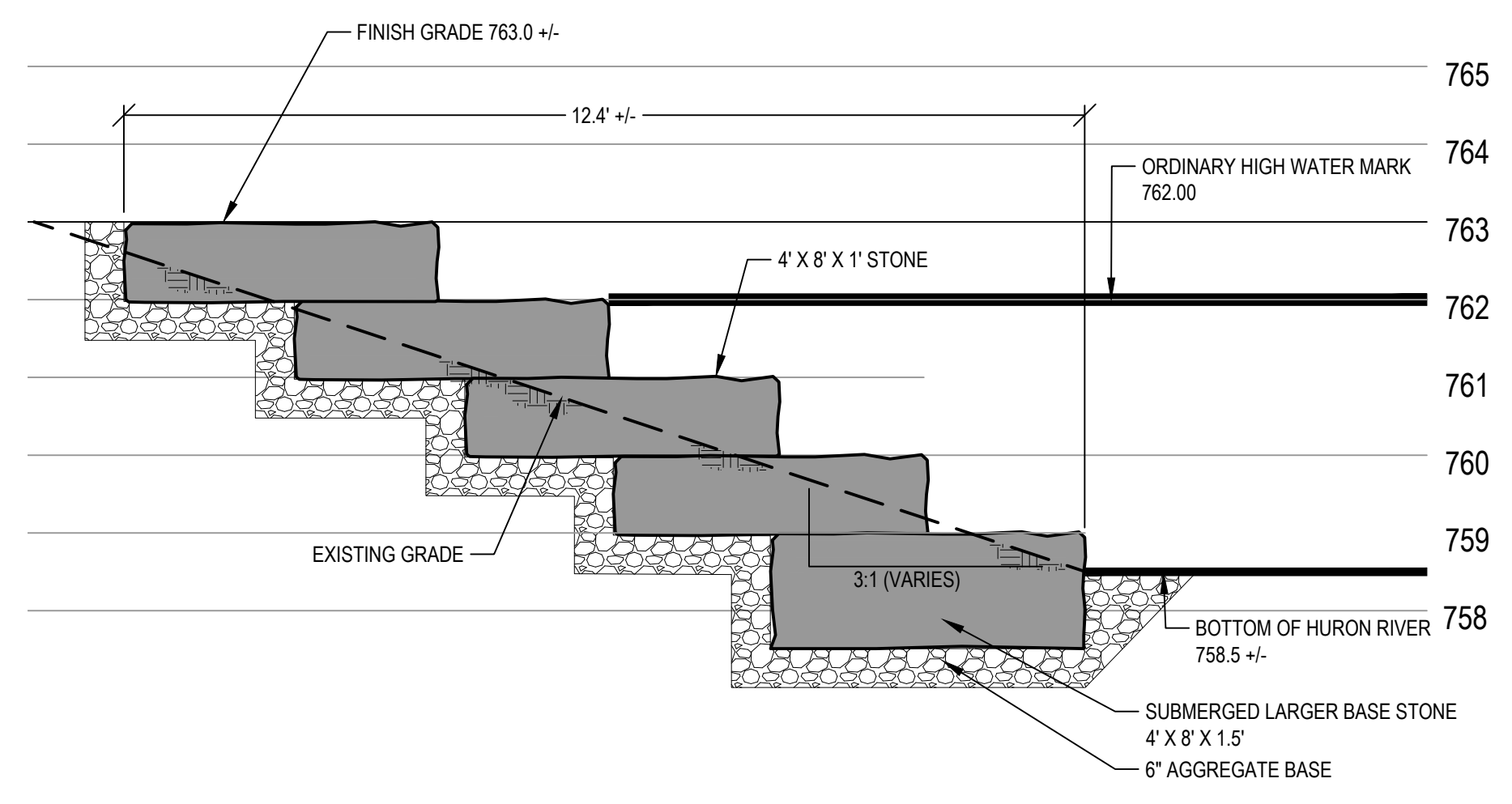
AREA OF FILL BELOW OHWM = 28 SF  
AVERAGE STEP WIDTH = 25 LF  
VOLUME OF FILL BELOW OHWM = 700 CF  
VOLUME OF FILL BELOW OHWM = 26 CY

AREA OF EXCAVATION BELOW OHWM = 40 SF  
VOLUME OF EXCAVATION BELOW OHWM = 33 CF  
VOLUME OF EXCAVATION BELOW OHWM = 1.25 CY

AREA OF FILL BELOW OHWM = 45 SF  
VOLUME OF EXCAVATION BELOW OHWM = 38 CF  
VOLUME OF EXCAVATION BELOW OHWM = 1.5 CY

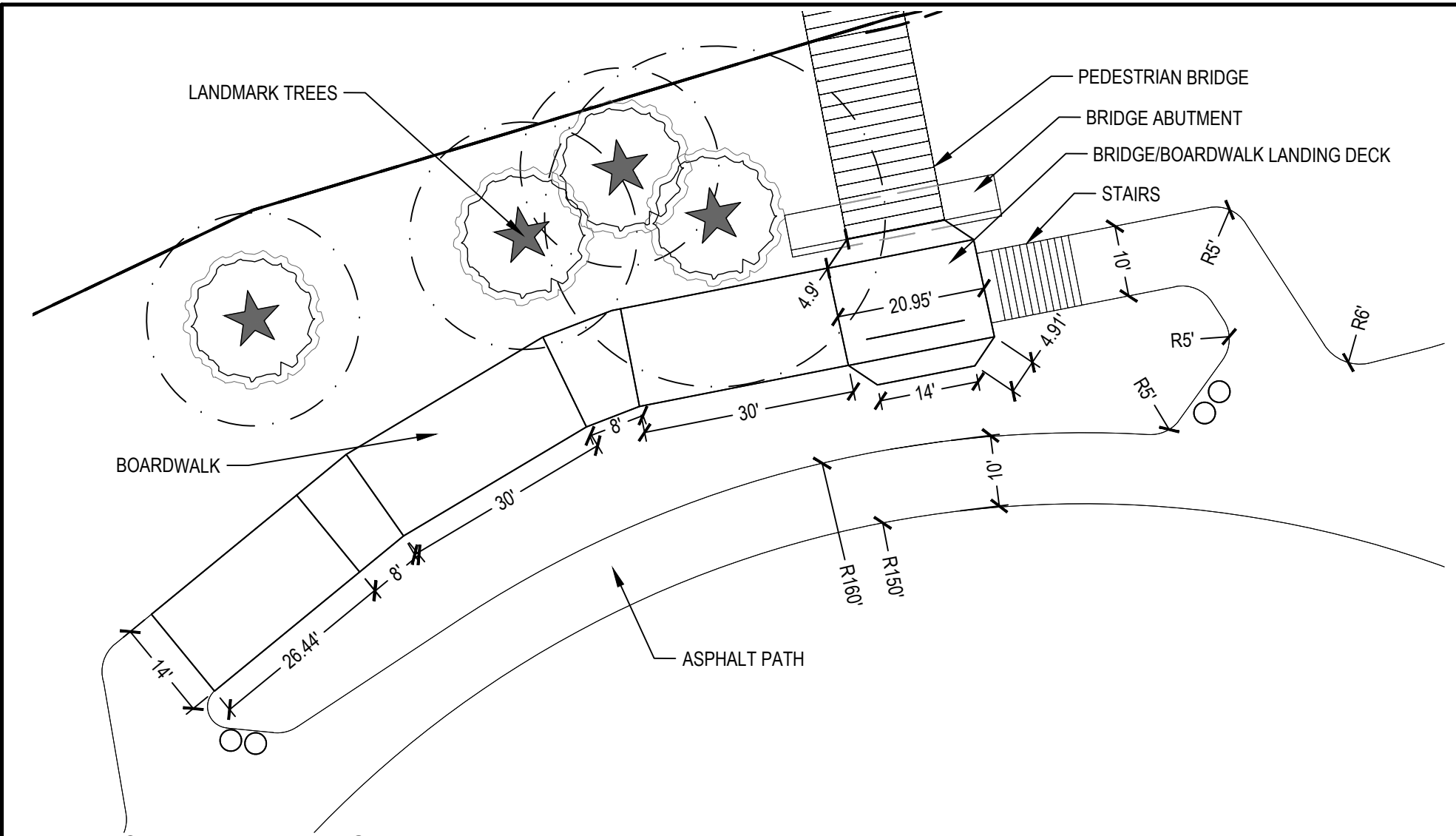


2 KAYAK LAUNCH SECTION SCALE: N.T.S.

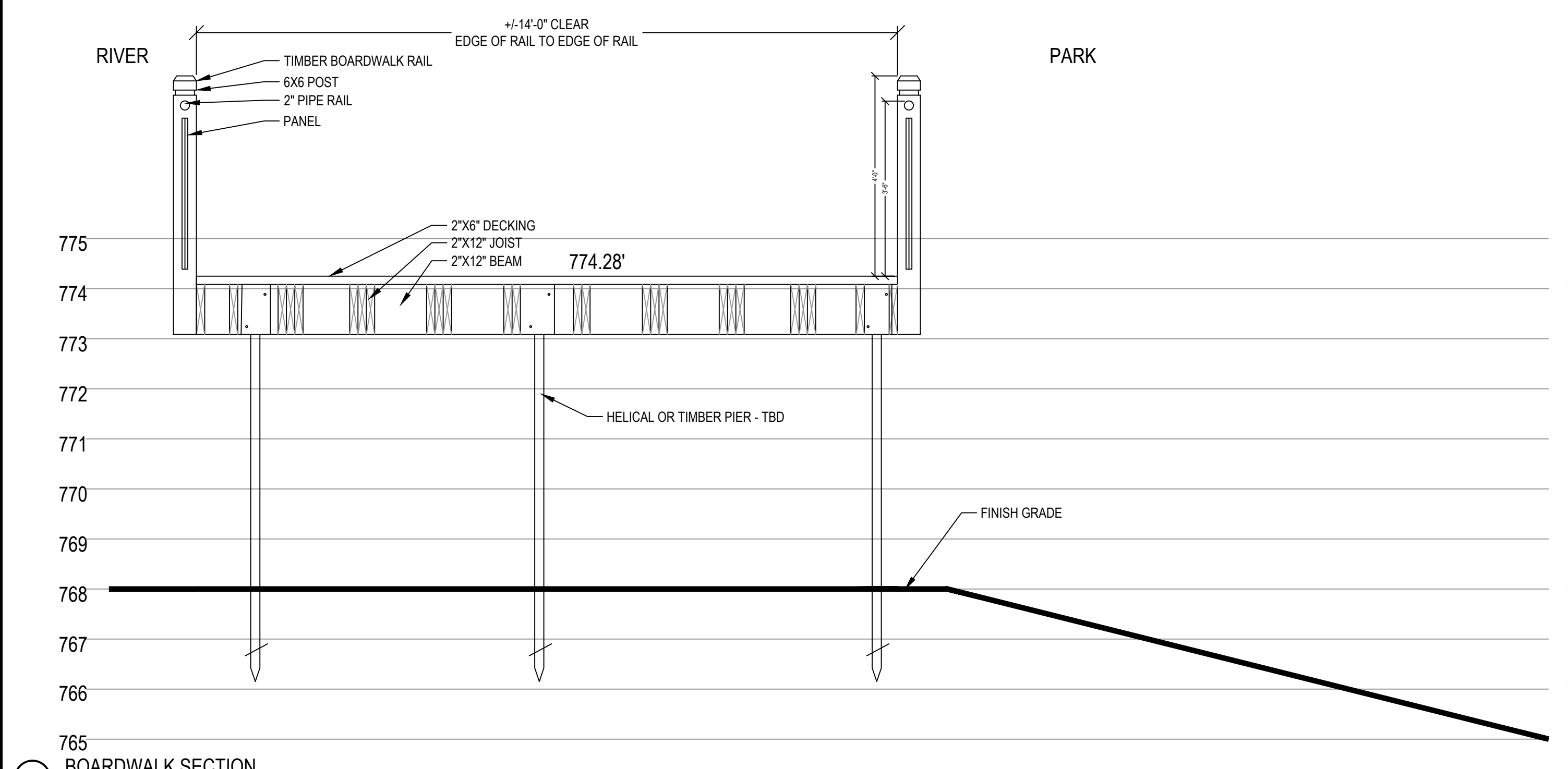


3 KAYAK LAUNCH STONE STEP SECTION SCALE: 6" = 1'

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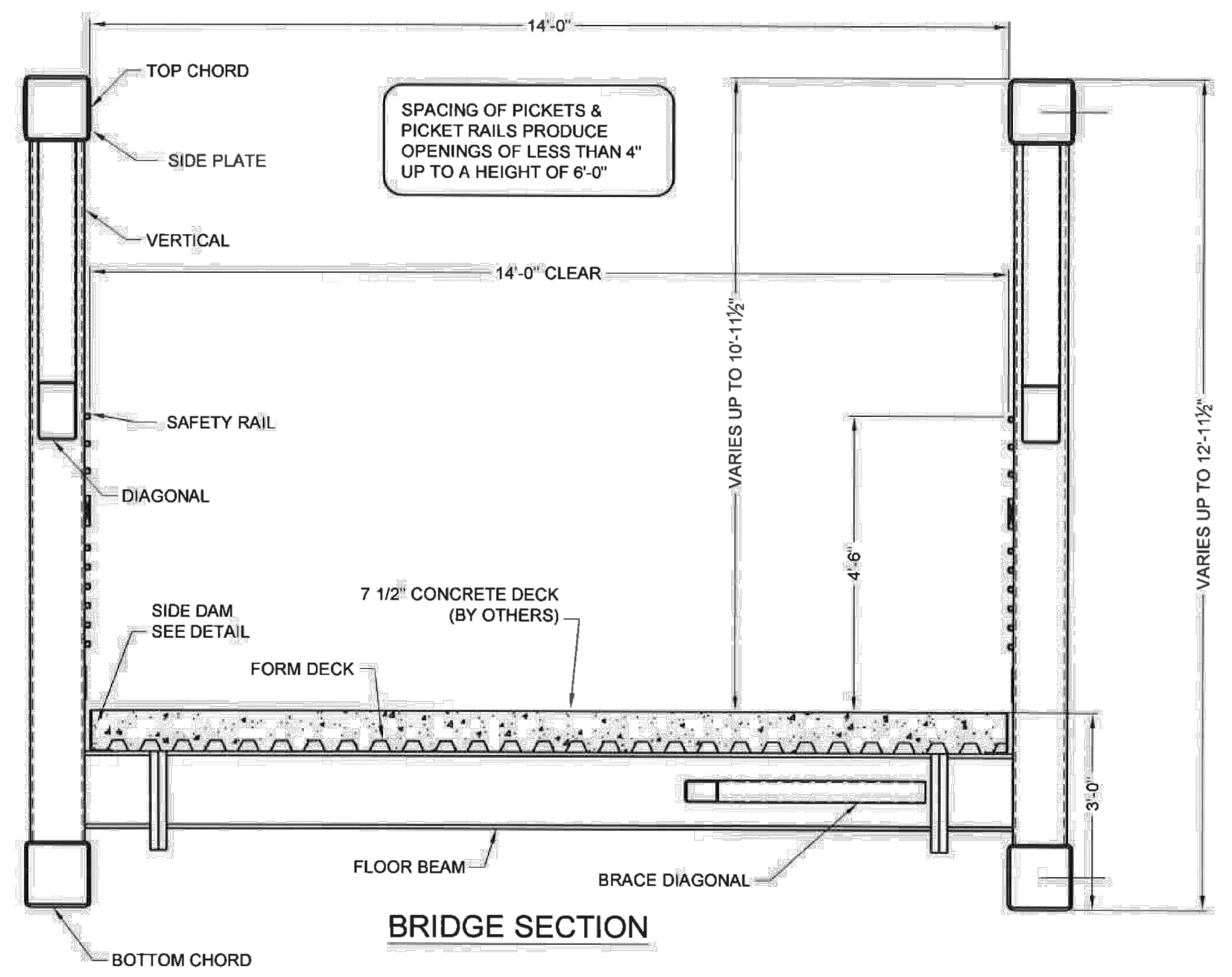
1 BOARDWALK ENLARGEMENT



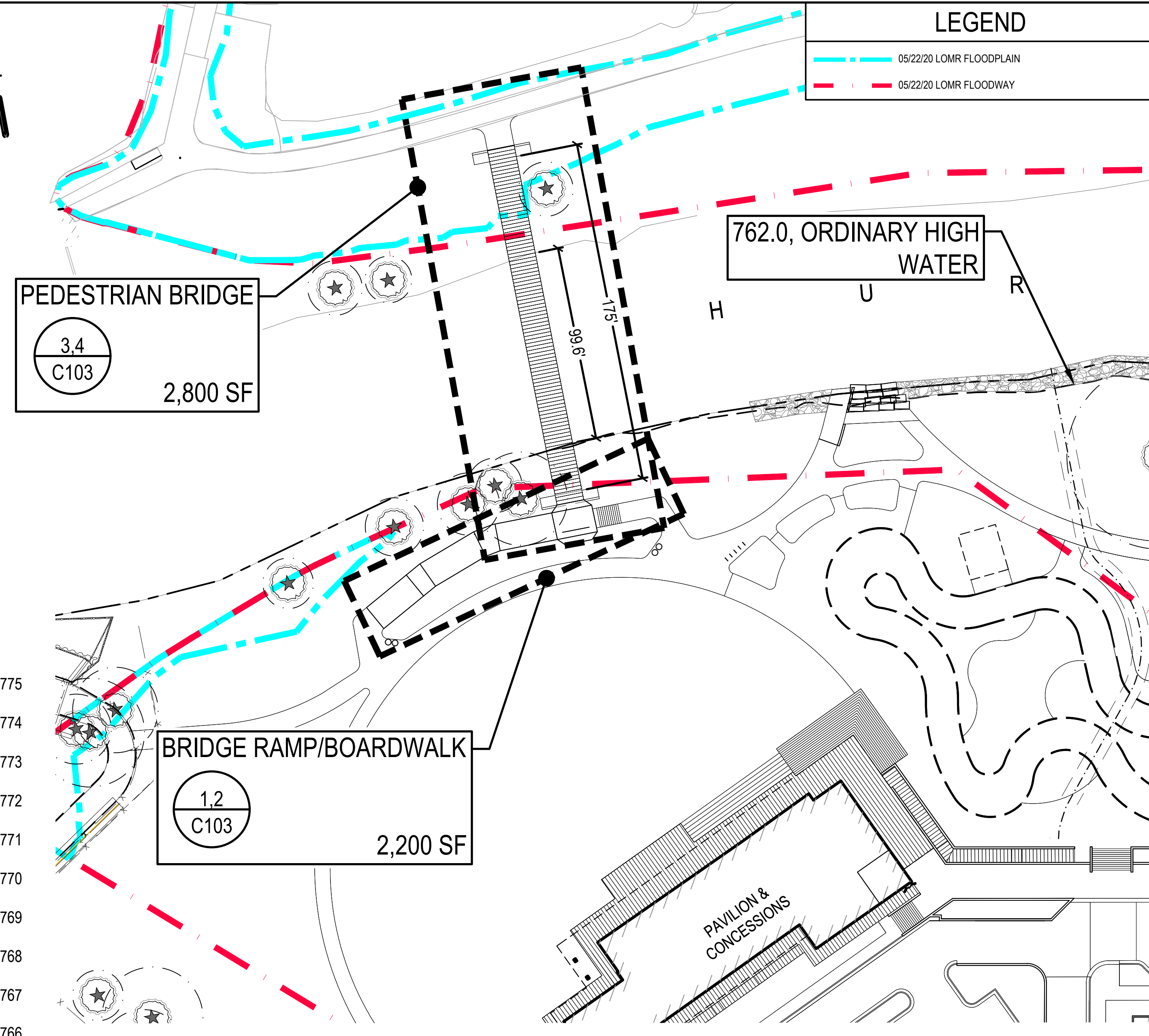
2 BOARDWALK SECTION

- GENERAL NOTES**
- DESIGN IS IN ACCORDANCE WITH "LRFD BRIDGE DESIGN SPECIFICATIONS" 4TH EDITION & GUIDE SPECIFICATIONS FOR DESIGN OF PEDESTRIAN BRIDGES" BY THE AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO), LATEST EDITIONS.
  - BRIDGE MEMBERS ARE FABRICATED FROM HIGH STRENGTH, LOW ALLOY, ENHANCED ATMOSPHERIC CORROSION RESISTANT ASTM A647 COLD-FORMED WELDED SQUARE AND RECTANGULAR TUBING, AND ASTM A588, ASTM A606, OR ASTM A242 PLATE AND STRUCTURAL SHAPES (F<sub>y</sub>=50,000 PSI).
  - CONCRETE DECK: GALVANIZED FORM DECK SUPPLIED BY CONTECH. CONCRETE, REINFORCING AND EXPANSION MATERIAL SUPPLIED BY OTHERS. SEE CONCRETE DECK SHEET.
  - THE GAS METAL ARC WELDING PROCESS OR FLUX CORED ARC WELDING PROCESS WILL BE USED.
  - ALL TOP AND BOTTOM CHORD SHOP SPLICES TO BE COMPLETE PENETRATION TYPE WELDS. WELD BETWEEN TOP CHORD AND END VERTICAL SHALL BE AS DETAILED.
  - UNLESS OTHERWISE NOTED, WELDED CONNECTIONS SHALL BE FILLET WELDS (OR HAVE THE EFFECTIVE THROAT OF A FILLET WELD) OF A SIZE EQUAL TO THE THICKNESS OF THE LIGHTEST GAGE MEMBER IN THE CONNECTION. WELDS SHALL BE APPLIED AS FOLLOWS:
    - BOTH ENDS OF VERTICALS, DIAGONALS, AND FLOOR BEAMS SHALL BE WELDED ALL AROUND.
    - BRACE DIAGONALS WILL BE WELDED ALL AROUND.
    - MISCELLANEOUS NON-STRUCTURAL MEMBERS WILL BE SEAL WELDED TO THEIR SUPPORTING MEMBERS.
  - BRIDGE DESIGN WAS ONLY BASED ON COMBINATIONS OF THE FOLLOWING LOADS WHICH WILL PRODUCE MAXIMUM CRITICAL MEMBER STRESSES:
    - 90 PSF UNIFORM LIVE LOADING ON THE FULL DECK AREA OR ONE 20,000 POUND VEHICLE LOAD. THE VEHICLE LOAD SHALL BE DISTRIBUTED AS A FOUR-WHEEL VEHICLE WITH 80% OF THE LOAD ON THE REAR WHEELS. THE WHEEL TRACK WIDTH OF THE VEHICLE SHALL BE 6'-0" AND THE WHEEL BASE SHALL BE 14'-0". THE VEHICLE SHALL BE POSITIONED SO AS TO PRODUCE THE MAXIMUM STRESS IN EACH MEMBER, INCLUDING DECKING.
    - 35 PSF WIND LOAD ON THE FULL HEIGHT OF THE BRIDGE, AS IF ENCLOSED.
    - 20 PSF UPWARD FORCE APPLIED AT THE WINDWARD QUARTER POINT OF THE TRANSVERSE BRIDGE WIDTH (AASHTO 3.15.3).
  - CLEANING: ALL EXPOSED SURFACES OF STEEL SHALL BE CLEANED IN ACCORDANCE WITH STEEL STRUCTURES PAINTING COUNCIL SURFACES PREPARATION SPECIFICATIONS NO. 10 NEAR WHITE BLAST CLEANING. SSPC-SP7-LATEST EDITION.

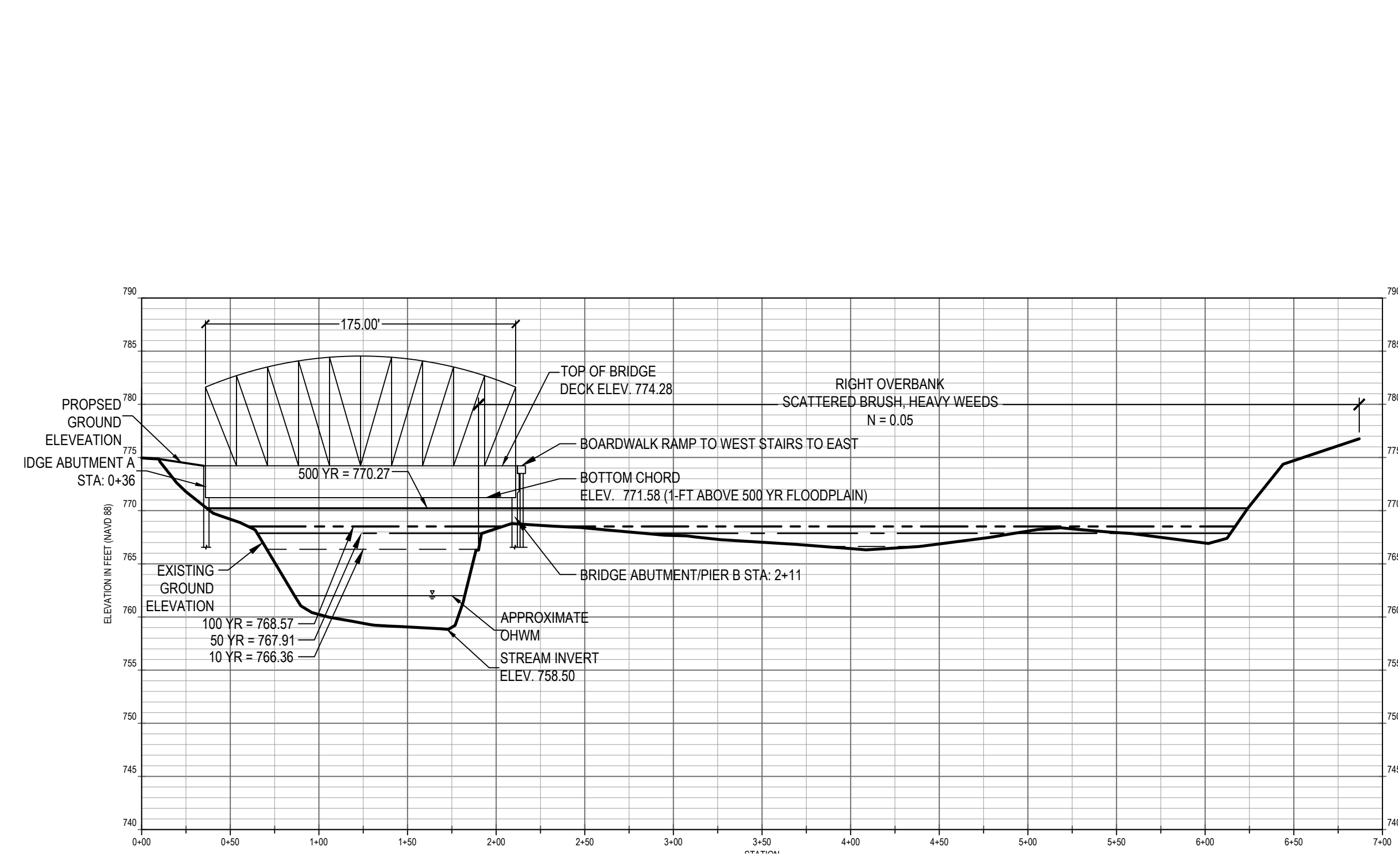
3 BRIDGE DETAILS



4 BRIDGE SECTION



5 BRIDGE SECTION



6 KEY PLAN

**BROADWAY PARK WEST**  
841 BROADWAY STREET  
ANN ARBOR, MI 48104

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SEALS AND SIGNATURES

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KEY PLAN

DRAWING TITLE  
**PEDESTRIAN BRIDGE AND BOARDWALK DETAILS**

SCALE  
PROJECT NUMBER 10420

DRAWING NUMBER **C103**

SCALE: 1" = 40'

SCALE: N.T.S.

EGLE-WRD  
W202011242 v1.0  
Approved  
Expires On: 10/28/2021

SHEET NOTES

1. SEE ARCHITECTURE SHEETS FOR CROSS SECTIONS.

FLOODPLAIN CUT / FILL SUMMARY  
FLOODPLAIN STORAGE WAS COMPUTED USING AUTOCAD CIVIL 3D SOFTWARE, COMPARING THE TRIANGULATED TIN SURFACE FOR BOTH THE EXISTING AND PROPOSED SURFACES.

CUT AND FILL QUANTITIES  
12,512 CY CUT  
11,315 CY FILL

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LEGEND

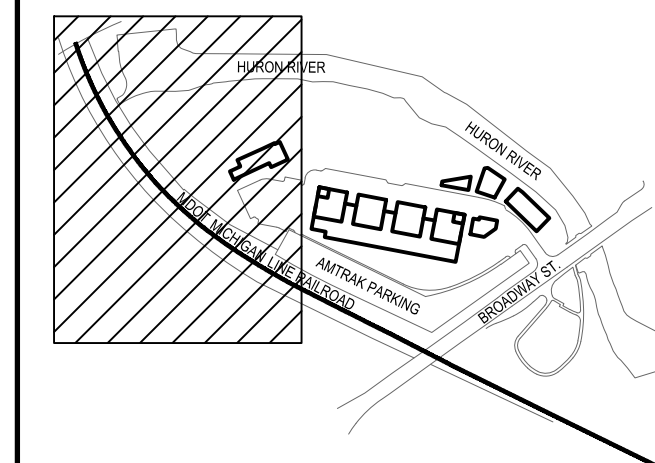
- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STORM SEWER
- CRITICAL ROOT ZONE  
LANDMARK TREES TO REMAIN  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE  
LANDMARK TREES TO BE REMOVED  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
GRADING PLAN -  
AREA A



SCALE: 1" = 40'

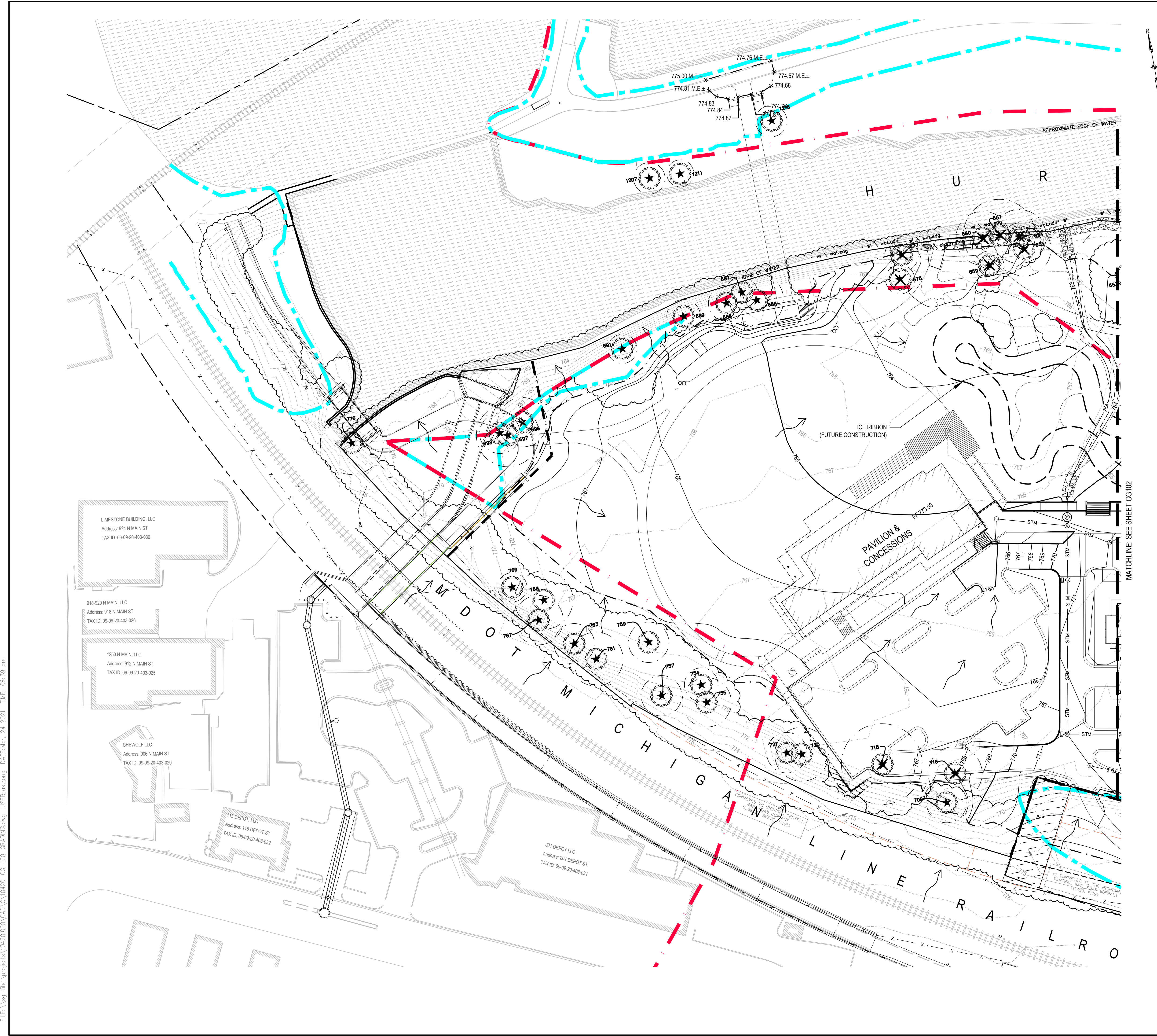
SCALE 10420

PROJECT NUMBER

CG101

DRAWING NUMBER

EGLE-WRD  
W202011210 v1.0  
Approved  
Issued On: 10/28/2021  
Expires On: 10/28/2022



MATCHLINE SEE SHEET CG102

- LIMESTONE BUILDING, LLC  
Address: 924 N MAIN ST  
TAX ID: 09-09-20-403-030
- 918-920 N MAIN, LLC  
Address: 918 N MAIN ST  
TAX ID: 09-09-20-403-026
- 1250 N MAIN, LLC  
Address: 912 N MAIN ST  
TAX ID: 09-09-20-403-025
- SHEWOLF, LLC  
Address: 905 N MAIN ST  
TAX ID: 09-09-20-403-029
- 115 DEPOT, LLC  
Address: 115 DEPOT ST  
TAX ID: 09-09-20-403-032
- 201 DEPOT, LLC  
Address: 201 DEPOT ST  
TAX ID: 09-09-20-403-031

FILE: \\egle-wrd\projects\10420\10420\CG101-GRADING.dwg USER: gstrcong DATE: Mar 24, 2021 TIME: 06:39 pm



SHEET NOTES

1. SEE ARCHITECTURE SHEETS FOR CROSS SECTIONS.

BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
LOWER TOWN  
PARTNERS, LLC

SMITHGROUP

201 DEPOT STREET  
SECOND FLOOR  
ANN ARBOR, MI 48104  
734.662.4457  
www.smithgroupjir.com

HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

LEGEND

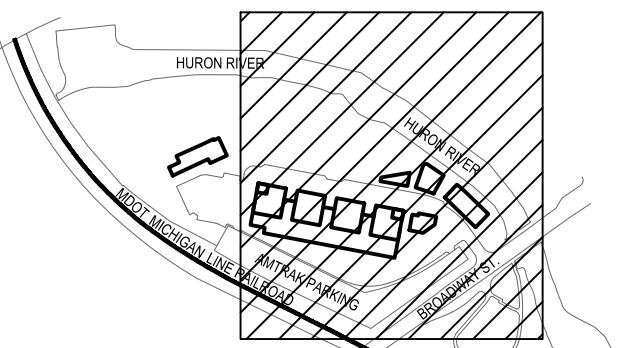
- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STORM SEWER
- CRITICAL ROOT ZONE  
LANDMARK TREES TO REMAIN  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE  
LANDMARK TREES TO BE REMOVED  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)

ISSUED FOR	REV	DATE

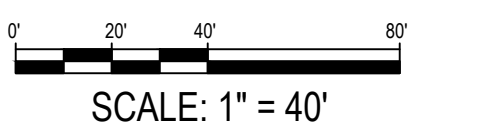
SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
**GRADING PLAN  
- AREA B**



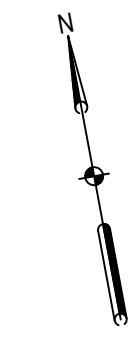
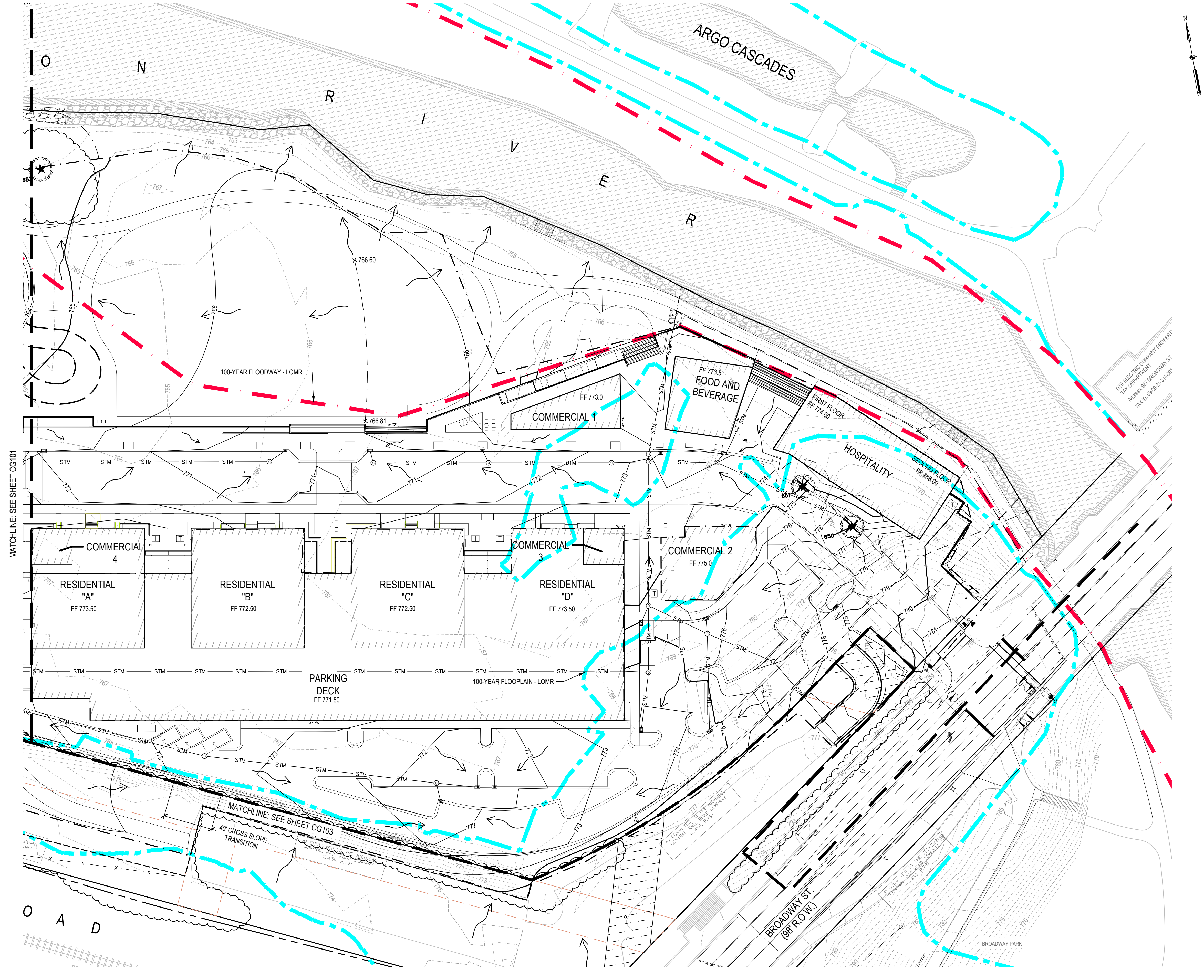
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PROJECT NUMBER 10420

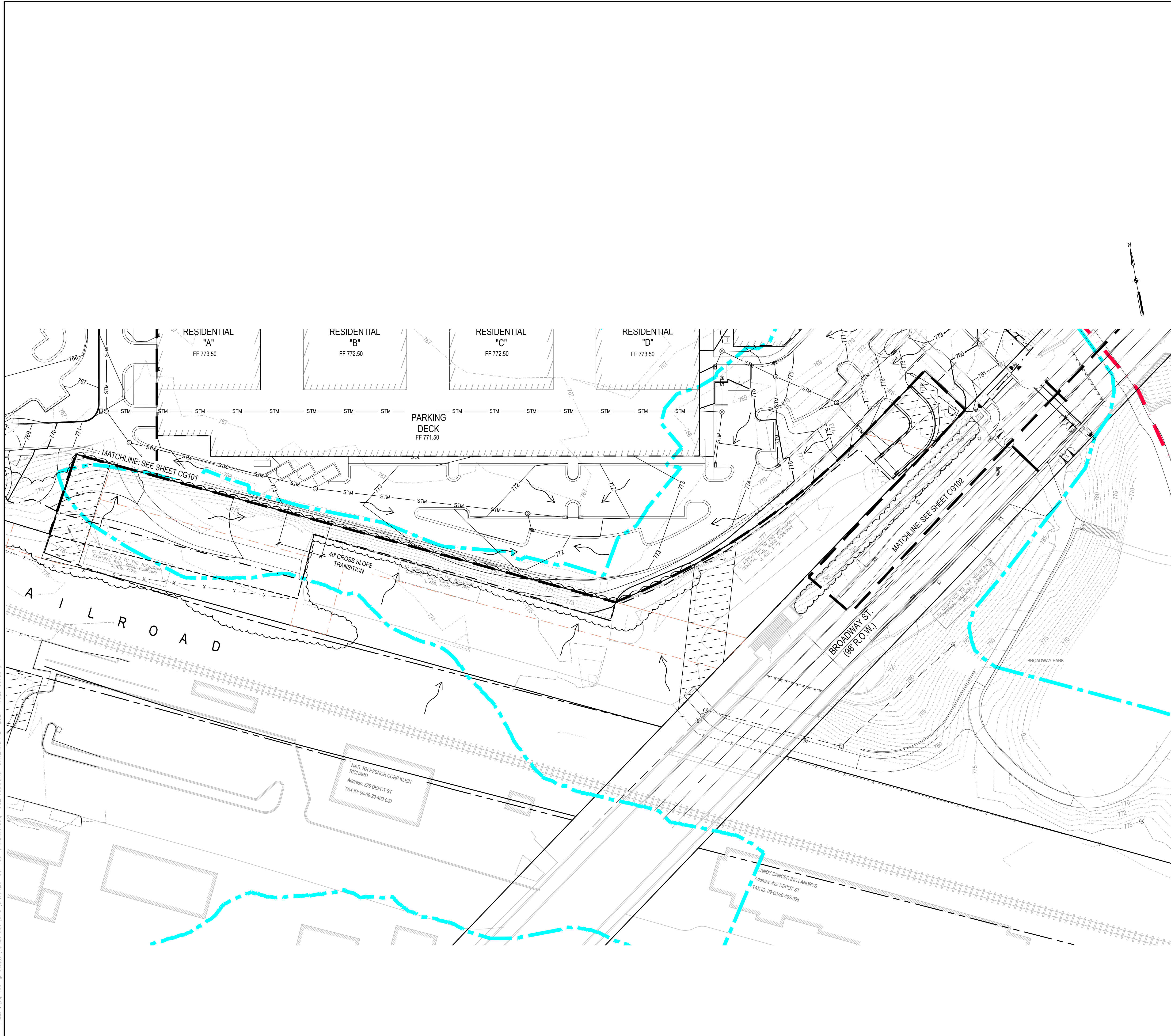
DRAWING NUMBER **CG102**

EGLE-WRD  
WRD001242 v1.0  
Approved  
Issued On: 10/28/2021  
Expires On: 10/28/2024

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FILE: \\sg-fnc\projects\10420\10420-CG-100-CRADING.dwg USER: rstrcong DATE: Mar. 24, 2021 TIME: 06:39:39 am



### SHEET NOTES

1. SEE ARCHITECTURE SHEETS FOR CROSS SECTIONS.

## BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
LOWER TOWN  
PARTNERS, LLC

## SMITHGROUP

201 DEPOT STREET  
SECOND FLOOR  
ANN ARBOR, MI 48104  
734.662.4457  
www.smithgroupjlr.com

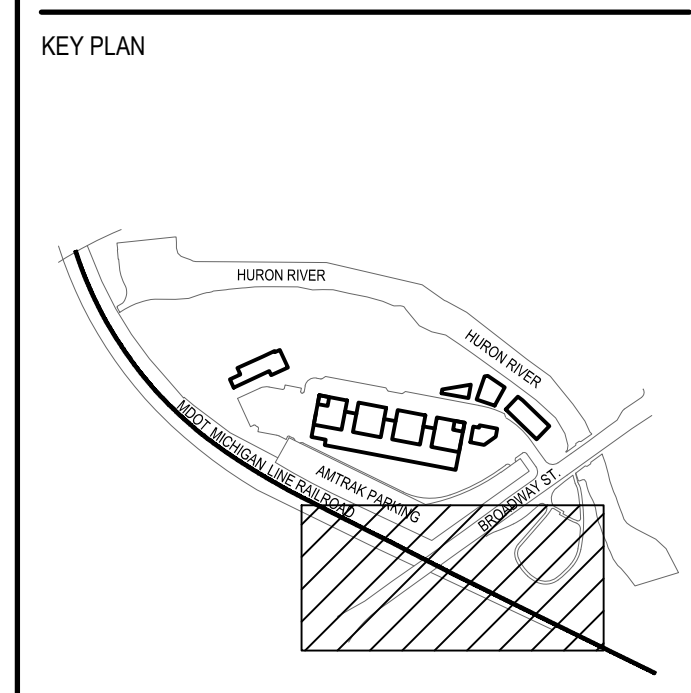
HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

### LEGEND

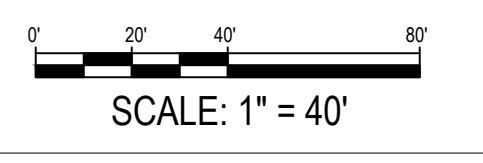
- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STORM SEWER
- CRITICAL ROOT ZONE  
LANDMARK TREES TO REMAIN  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE  
LANDMARK TREES TO BE REMOVED  
(SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES  
*NOT FOR CONSTRUCTION*



DRAWING TITLE  
**GRADING PLAN - AREA C - OFFSITE**



SCALE \_\_\_\_\_ 10420  
PROJECT NUMBER \_\_\_\_\_  
DRAWING NUMBER **CG103**

	PAVILLION	RESIDENTIAL "A"	RESIDENTIAL "B"	RESIDENTIAL "C"	RESIDENTIAL "D"	PARKING STRUCTURE	COMMERCIAL 1	COMMERCIAL 2	FOOD AND BEVERAGE	HOSPITALITY
0.2% ANNUAL CHANCE ELEVATION (500 YEAR FLOODPLAIN)	770.18	770.30	770.34	770.30	770.24	770.30	770.24	770.24	770.24	770.24
1% ANNUAL CHANCE ELEVATION (BASE FLOOD ELEVATION, BFE)	768.60	768.60	768.50	768.60	768.01	768.01	767.94	767.74	767.76	767.71
PROPOSED FIRST FLOOR ELEVATION, FF	773.00	773.50	772.50	772.50	773.50	771.50	773.00	775.00	773.50	774.00
PROPOSED LOWEST ADJACENT GRADE, LAG	764.60	772.11	770.04	770.23	771.15	770.16	772.5	775.77	772.5	772.5
BUILDING USES	Banquet facility	Commercial space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Commercial space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Residential parking on ground level; commercial and hotel parking on second level	Commercial retail space	Commercial retail space	Food and Beverage space	Hotel

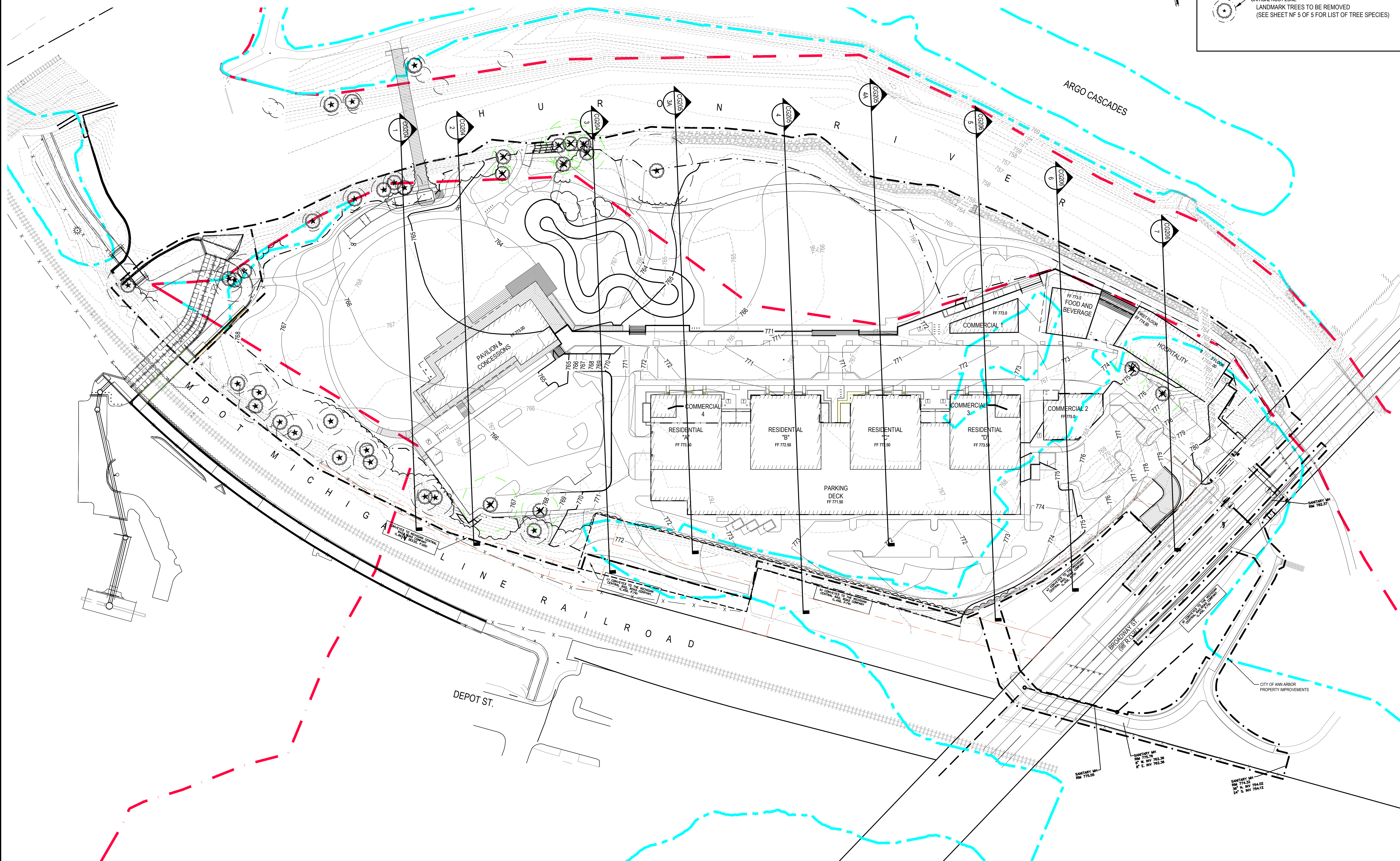
1 FLOODPLAIN AT BUILDINGS CHART

**NOTES**

- AN EGLE PERMIT FOR FILL WITHIN THE NON-FLOODWAY PORTION OF THE 100-YEAR FLOODPLAIN WILL BE REQUIRED BEFORE CONSTRUCTION (FILL AND CUT) ACTIVITIES WITHIN THE 100-YEAR FLOODPLAIN CAN BEGIN.
- AFTER CONSTRUCTION ACTIVITIES (FILL AND CUT OPERATIONS) ARE COMPLETED, A LETTER OF MAP REVISION BASED ON FILL (LOMR-F) WILL BE REQUIRED PER NATIONAL FLOOD INSURANCE PROGRAM (NFIP) REGULATIONS. THE CITY WILL NOT ISSUE CERTIFICATES OF OCCUPANCY UNTIL THE LOMR-F IS OBTAINED.

**LEGEND**

- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STM - STORM SEWER
- CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE LANDMARK TREES TO BE REMOVED (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)



**BROADWAY PARK WEST**  
 841 BROADWAY STREET  
 ANN ARBOR, MI 48104

Applicant:  
 THE ROXBURY GROUP  
 ON BEHALF OF:  
 LOWER TOWN PARTNERS, LLC

**SMITHGROUP**

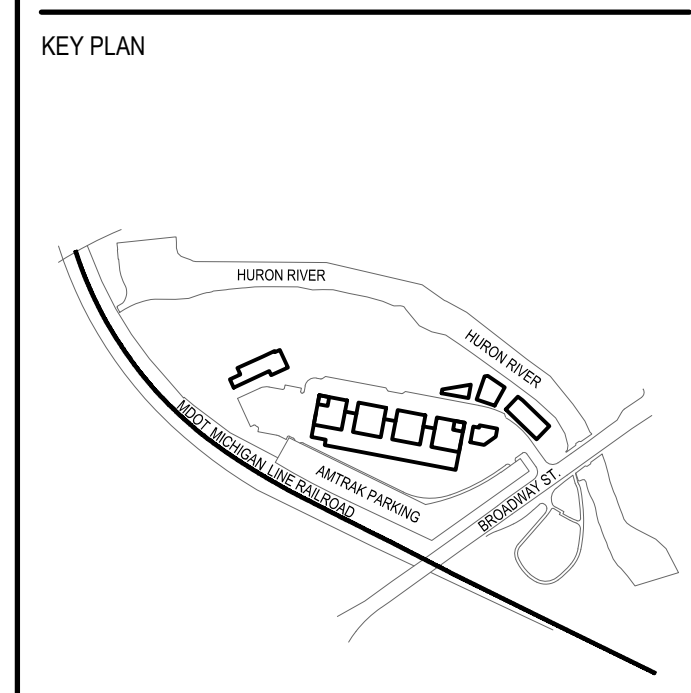
201 DEPOT STREET  
 SECOND FLOOR  
 ANN ARBOR, MI 48104  
 734.662.4457  
 www.smithgroupjpr.com

HAMILTON ANDERSON  
 1435 RANDOLPH STREET, STE 200  
 DETROIT, MI 48226

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

*NOT FOR CONSTRUCTION*



DRAWING TITLE  
**FLOOD PLAIN GRADING PLAN**

SCALE: 1:60

SCALE

PROJECT NUMBER  
**10420**

DRAWING NUMBER  
**CG200**

FILE: \\syr-fic\projects\10420\000\CAD\C\10420-CG-200-FLOOD-PLAN-GRADING-PLAN.dwg USER: astrong DATE: Mar 24, 2021 TIME: 06:40 pm

	PAVILLION	RESIDENTIAL "A"	RESIDENTIAL "B"	RESIDENTIAL "C"	RESIDENTIAL "D"	PARKING STRUCTURE	COMMERCIAL 1	COMMERCIAL 2	FOOD AND BEVERAGE	HOSPITALITY
0.2% ANNUAL CHANCE ELEVATION (500 YEAR FLOODPLAIN)	770.18	770.30	770.34	770.30	770.24	770.30	770.24	770.24	770.24	770.24
1% ANNUAL CHANCE ELEVATION (BASE FLOOD ELEVATION, BFE)	768.60	768.60	768.50	768.60	768.01	768.01	767.94	767.74	767.76	767.71
PROPOSED FIRST FLOOR ELEVATION, FF	773.00	773.50	772.50	772.50	773.50	771.50	773.00	775.00	773.50	774.00
PROPOSED LOWEST ADJACENT GRADE, LAG	764.60	772.11	770.04	770.23	771.15	770.16	772.5	775.77	772.5	772.5
BUILDING USES	Banquet facility	Commercial space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Commercial space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Residential parking on ground level; commercial and hotel parking on second level	Commercial retail space	Commercial retail space	Food and Beverage space	Hotel

**NOTES**

- AN EGLE PERMIT FOR FILL WITHIN THE NON-FLOODWAY PORTION OF THE 100-YEAR FLOODPLAIN WILL BE REQUIRED BEFORE CONSTRUCTION (FILL AND CUT) ACTIVITIES WITHIN THE 100-YEAR FLOODPLAIN CAN BEGIN.
- AFTER CONSTRUCTION ACTIVITIES (FILL AND CUT OPERATIONS) ARE COMPLETED, A LETTER OF MAP REVISION BASED ON FILL (LOMR-F) WILL BE REQUIRED PER NATIONAL FLOOD INSURANCE PROGRAM (NFIP) REGULATIONS. THE CITY WILL NOT ISSUE CERTIFICATES OF OCCUPANCY UNTIL THE LOMR-F IS OBTAINED.

**LEGEND**

- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STM - STORM SEWER
- CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
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**BROADWAY PARK WEST**  
 841 BROADWAY STREET  
 ANN ARBOR, MI 48104

Applicant:  
 THE ROXBURY GROUP  
 ON BEHALF OF:  
 LOWER TOWN PARTNERS, LLC

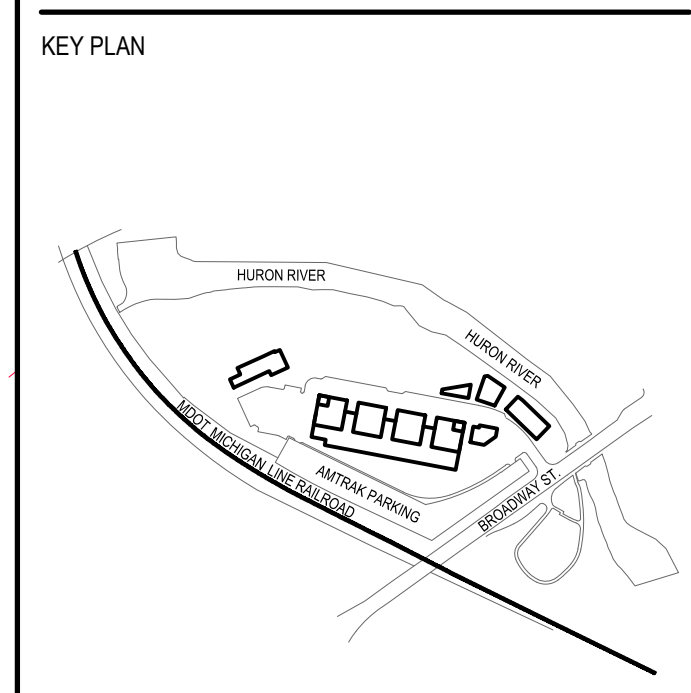
**SMITHGROUP**  
 201 DEPOT STREET  
 SECOND FLOOR  
 ANN ARBOR, MI 48104  
 734.662.4457  
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HAMILTON ANDERSON  
 1435 RANDOLPH STREET, STE 200  
 DETROIT, MI 48226

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

**NOT FOR CONSTRUCTION**



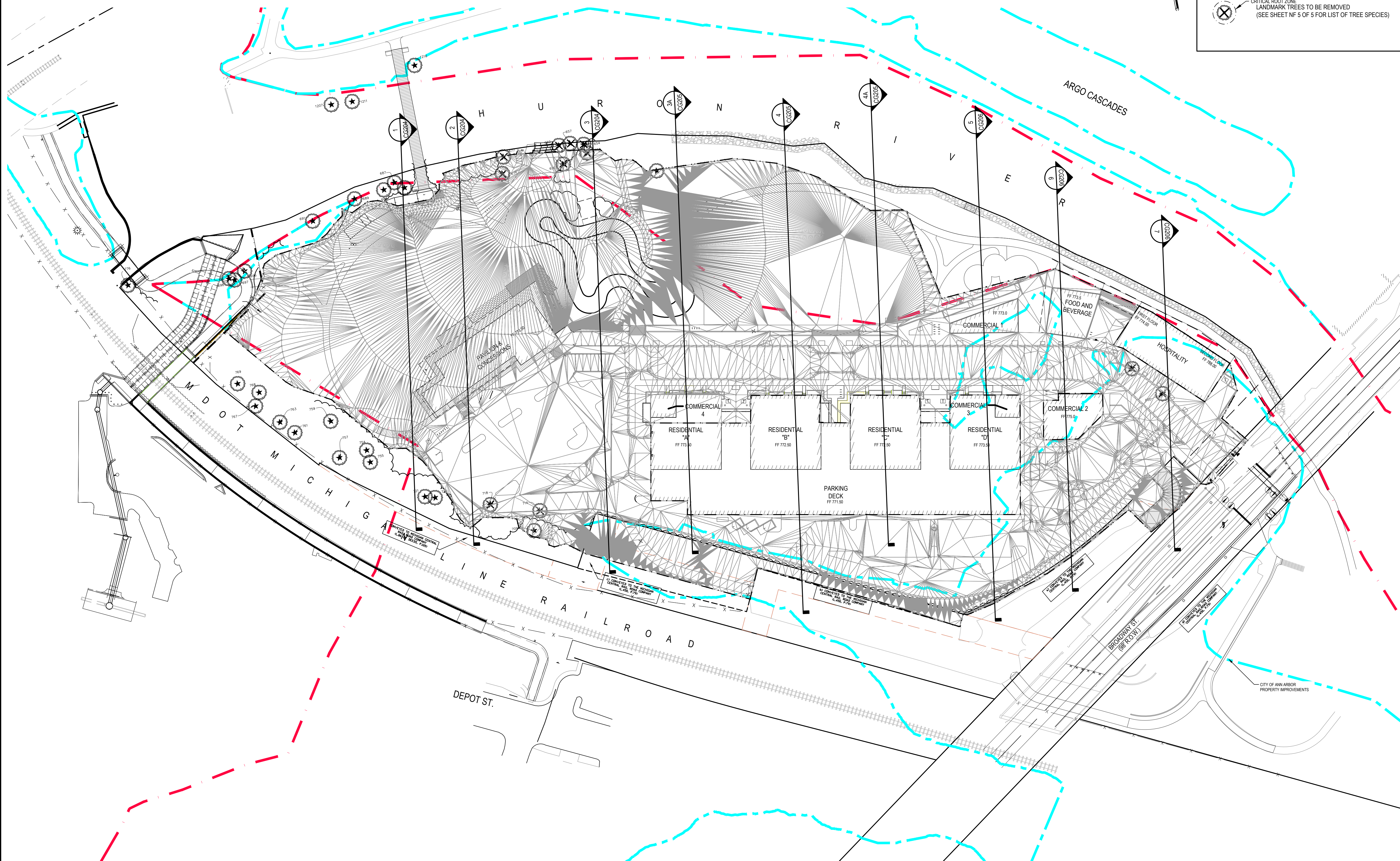
DRAWING TITLE  
**FLOOD PLAIN PROPOSED GRADE DIGITAL MODEL**

SCALE: 1:60

PROJECT NUMBER: 10420

DRAWING NUMBER: **CG201**

1 FLOODPLAIN AT BUILDINGS CHART



FILE:\eg\proj\projects\10420\CG201\FLOOD\_PLAIN\_PROPOSED.DWG USER:astroj DATE:Mar\_24\_2021 TIME: 06:40 pm

0.2% ANNUAL CHANCE ELEVATION (500 YEAR FLOODPLAIN)	770.18	770.30	770.34	770.30	770.24	770.24	770.30	770.24	770.24	770.24	770.24
1% ANNUAL CHANCE ELEVATION (BASE FLOOD ELEVATION, BFE)	768.60	768.60	768.50	768.60	768.01	767.71	768.01	767.94	767.74	767.76	767.71
PROPOSED FIRST FLOOR ELEVATION, FF	773.00	773.50	772.50	772.50	773.50	774.00	771.50	773.00	775.00	773.50	774.00
PROPOSED LOWEST ADJACENT GRADE, LAG	764.60	772.11	770.04	770.23	771.15	770.16	772.5	772.5	775.77	772.5	772.5

BUILDING USES	Banquet facility	Commercal space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Commercal space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Residential parking on ground level; commercial and hotel parking on second level	Commercial retail space	Commercial retail space	Food and Beverage space	Hotel
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1 FLOODPLAIN AT BUILDINGS CHART

ELEVATION TABLE					
NUMBER	MIN. ELEVATION	MAX. ELEVATION	COLOR	AREA (SF)	VOLUME (CY)
1	-5.395 EL. VARIES, 764.1 TO 762.7	-4.000 EL. VARIES, 765.1 TO 763.7	[Color 1]	1845*	59
2	-4.000 EL. VARIES, 765.1 TO 763.7	-3.000 EL. VARIES, 766.1 TO 764.7	[Color 2]	28163	1043
3	-3.000 EL. VARIES, 766.1 TO 764.7	-2.000 EL. VARIES, 767.1 TO 765.7	[Color 3]	106977	3962
4	-2.000 EL. VARIES, 767.1 TO 765.7	-1.000 EL. VARIES, 768.1 TO 766.7	[Color 4]	230943	8553
5	-1.000 EL. VARIES, 768.1 TO 766.7	0.000 (100-YR FLOOD EL.) EL. VARIES, 769.1 TO 767.7	[Color 5]	367126**	6425

\* DUE TO THE FLUCTUATION IN GROUND ELEVATION, THE STORAGE DEPTH IN THIS INTERVAL VARIES FROM 0 TO 1 FOOT.  
 \*\* DUE TO FLUCTUATION IN GROUND ELEVATION AT TIE-IN TO EXISTING, THE STORAGE DEPTH IN THIS INTERVAL VARIES FROM 0 TO 1 FOOT.

3 CUT/FILL BENEATH 100-YR FLOOD ELEVATION

THE COMPUTER COMPARED THE EXISTING GRADE ELEVATION TO BASE FLOOD ELEVATION AND CALCULATES THE CUT/FILL VOLUME BETWEEN THE TWO SURFACES TO DETERMINE THE EXISTING FLOOD ELEVATION.

NOTE THAT THE SURFACE SHOWN GRAPHICALLY ON THIS SHEET REPRESENTS THE FLOOD STORAGE COMPARISON FOR THE 100-YEAR FLOOD ELEVATION (1% ANNUAL CHANCE ELEVATION).

THE TOTAL FLOOD STORAGE AVAILABLE FOR EACH FLOOD SCENARIO IS LISTED BELOW.

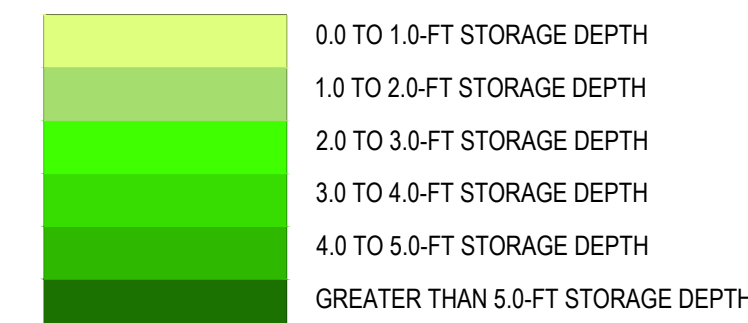
**EXISTING FLOOD STORAGE (FROM SURFACE MODELING)**  
 100-YEAR FLOOD EVENT: 20,020 CY  
 50-YEAR FLOOD EVENT: 10,642 CY  
 10-YEAR FLOOD EVENT: 770 CY

2 FLOOD STORAGE VOLUME CALCULATIONS

LEGEND

- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- 865 --- EXISTING MAJOR CONTOUR
- 865 --- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STM --- STORM SEWER
- ⊗ CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
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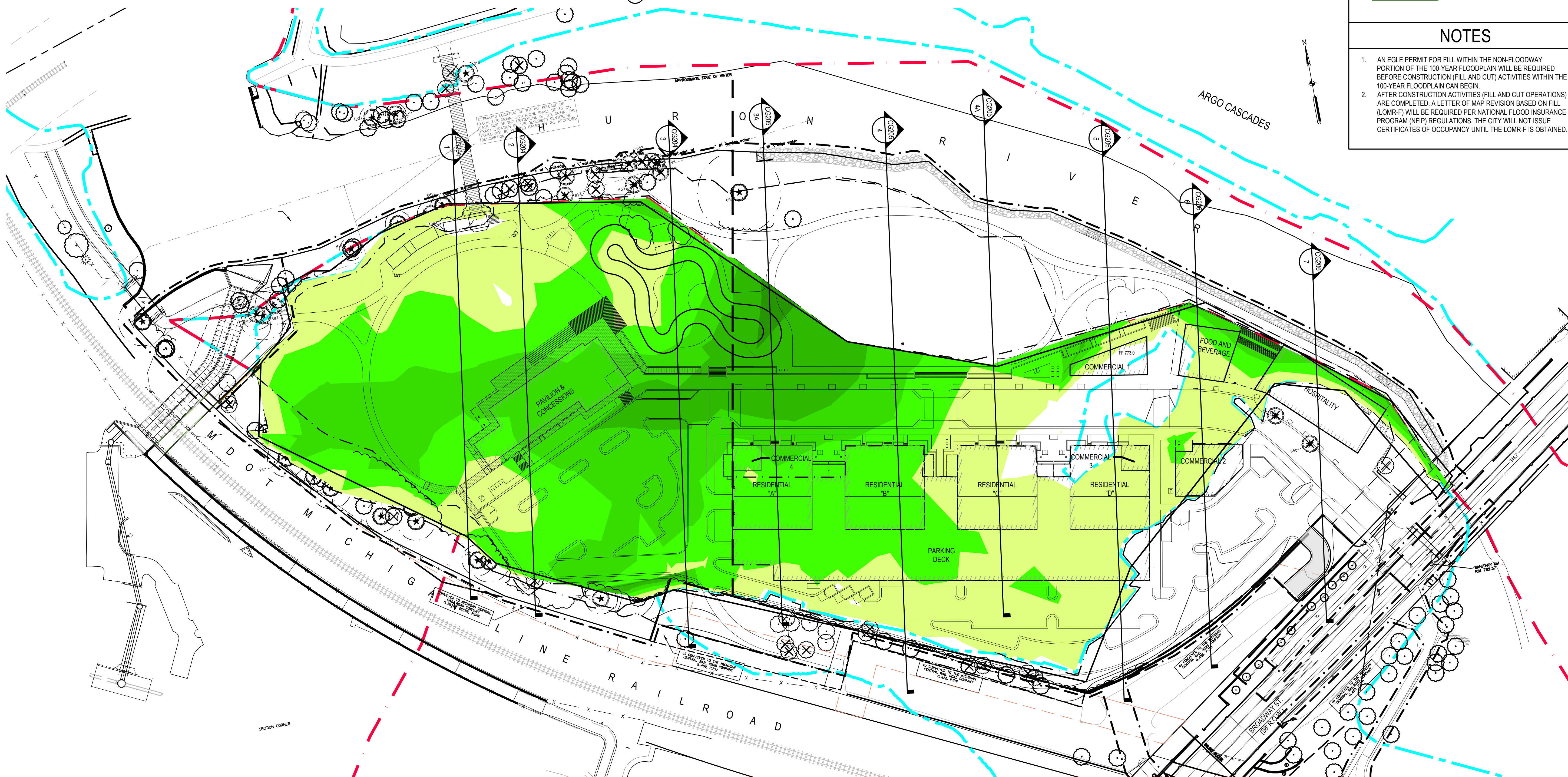
STORAGE DEPTH KEY



NOTES

1. AN EGLE PERMIT FOR FILL WITHIN THE NON-FLOODWAY PORTION OF THE 100-YEAR FLOODPLAIN WILL BE REQUIRED BEFORE CONSTRUCTION (FILL AND CUT) ACTIVITIES WITHIN THE 100-YEAR FLOODPLAIN CAN BEGIN.
2. AFTER CONSTRUCTION ACTIVITIES (FILL AND CUT OPERATIONS) ARE COMPLETED, A LETTER OF MAP REVISION BASED ON FILL (LOMR-F) WILL BE REQUIRED PER NATIONAL FLOOD INSURANCE PROGRAM (NFIP) REGULATIONS. THE CITY WILL NOT ISSUE CERTIFICATES OF OCCUPANCY UNTIL THE LOMR-F IS OBTAINED.

FILE: \\log-fac-proj\projects\10420.000\CG202-FLOOD-PLAN-STORAGE-EXISTING.dwg USER: castrogon DATE: Mar, 24, 2021 TIME: 06:41 pm



**BROADWAY PARK WEST**  
 841 BROADWAY STREET  
 ANN ARBOR, MI 48104

Applicant:  
 THE ROXBURY GROUP  
 ON BEHALF OF:  
**LOWER TOWN PARTNERS, LLC**

**SMITHGROUP**

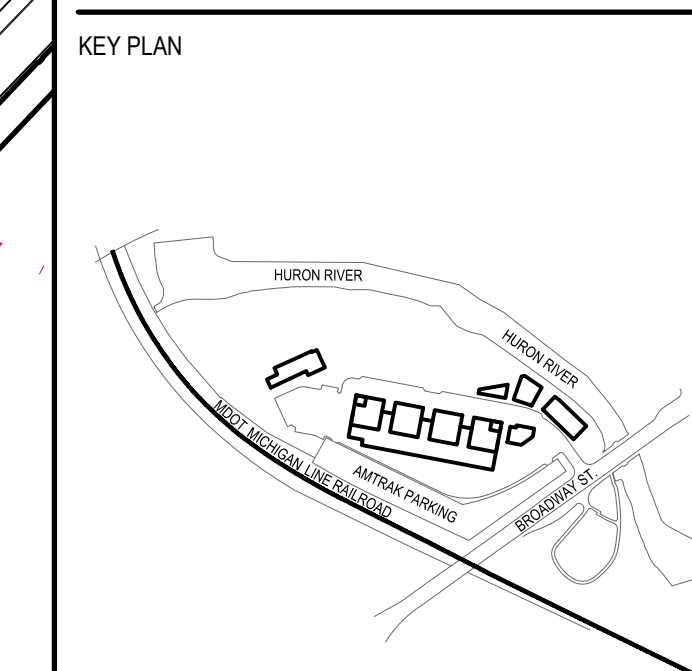
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HAMILTON ANDERSON  
 1435 RANDOLPH STREET, STE 200  
 DETROIT, MI 48226

ISSUED FOR	REV	DATE

SEALS AND SIGNATURES

NOT FOR CONSTRUCTION



DRAWING TITLE  
**FLOOD PLAIN STORAGE ANALYSIS EXISTING CONDITIONS**

SCALE: 1:60

SCALE 10420

PROJECT NUMBER  
**CG202**

DRAWING NUMBER

	PAVILLION	RESIDENTIAL "A"	RESIDENTIAL "B"	RESIDENTIAL "C"	RESIDENTIAL "D"	PARKING STRUCTURE	COMMERCIAL 1	COMMERCIAL 2	FOOD AND BEVERAGE	HOSPITALITY
0.2% ANNUAL CHANCE ELEVATION (500 YEAR FLOODPLAIN)	770.18	770.30	770.34	770.30	770.24	770.30	770.24	770.24	770.24	770.24
1% ANNUAL CHANCE ELEVATION (BASE FLOOD ELEVATION, BFE)	768.60	768.60	768.50	768.60	768.01	768.01	767.94	767.74	767.76	767.71
PROPOSED FIRST FLOOR ELEVATION, FF	773.00	773.50	772.50	772.50	773.50	771.50	773.00	773.00	773.50	774.00
PROPOSED LOWEST ADJACENT GRADE, LAG	764.60	772.11	770.04	770.23	771.15	770.16	772.5	775.77	772.5	772.5
BUILDING USES	Banquet facility	Commerical space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	First floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Commerical space and first floor of townhome on ground floor, townhome bedrooms on second floor, condominiums on levels 3 thru 5.	Residential parking on ground level; commercial and hotel parking on second level	Commercial retail space	Commercial retail space	Food and Beverage space	Hotel

THE COMPUTER COMPARED THE PROPOSED GRADE ELEVATION TO BASE FLOOD ELEVATION AND CALCULATES THE CUT/FILL VOLUME BETWEEN THE TWO SURFACES TO DETERMINE THE PROPOSED FLOOD ELEVATION.

NOTE THAT THE SURFACE SHOWN GRAPHICALLY ON THIS SHEET REPRESENTS THE FLOOD STORAGE COMPARISON FOR THE 100-YEAR FLOOD ELEVATION (1% ANNUAL CHANCE ELEVATION).

THE TOTAL FLOOD STORAGE AVAILABLE FOR EACH FLOOD SCENARIO IS LISTED BELOW.

**PROPOSED FLOOD STORAGE (FROM SURFACE MODELING)**  
 100-YEAR FLOOD EVENT: 20,520 CY  
 50-YEAR FLOOD EVENT: 14,876 CY  
 10-YEAR FLOOD EVENT: 4,763 CY

**100-YR FLOOD STORAGE CALCULATIONS FOR FUTURE ICE RINK**  
 FLOOD STORAGE REMOVED FOR FUTURE ICE RINK = 304 CY  
 FINAL FLOOD STORAGE FOR PROPOSED 100-YR FLOOD EVENT CONDITIONS = 20,216 CY

**FINAL FLOOD STORAGE CALCULATIONS**  
 EXISTING 100-YR FLOOD STORAGE = 20,020 CY  
 DIFFERENCE IN FLOOD STORAGE = 196 CY ADDITIONAL STORAGE IN PROPOSED

### LEGEND

- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- 865 PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STORM SEWER
- CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE LANDMARK TREES TO BE REMOVED (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)

# BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
LOWER TOWN PARTNERS, LLC

### 1 FLOODPLAIN AT BUILDINGS CHART

### ELEVATION TABLE

NUMBER	MIN. ELEVATION	MAX. ELEVATION	COLOR	AREA (SF)	VOLUME (CY)
1	-5.395 EL. VARIES, 764.1 TO 762.7	-4.000 EL. VARIES, 765.1 TO 763.7		33285*	637
2	-4.000 EL. VARIES, 765.1 TO 763.7	-3.000 EL. VARIES, 766.1 TO 764.7		90849	3365
3	-3.000 EL. VARIES, 766.1 TO 764.7	-2.000 EL. VARIES, 767.1 TO 765.7		149645	5542
4	-2.000 EL. VARIES, 767.1 TO 765.7	-1.000 EL. VARIES, 768.1 TO 766.7		176383	6533
5	-1.000 EL. VARIES, 768.1 TO 766.7	0.000 (100-YR FLOOD EL.) EL. VARIES, 769.1 TO 767.7		190116**	4510

\* DUE TO THE FLUCTUATION IN GROUND ELEVATION, THE STORAGE DEPTH IN THIS INTERVAL VARIES FROM 0 TO 1 FOOT.

\*\* DUE TO FLUCTUATION IN GROUND ELEVATION AT TIE-IN TO EXISTING, THE STORAGE DEPTH IN THIS INTERVAL VARIES FROM 0 TO 1 FOOT.

### 2 FLOOD STORAGE VOLUME CALCULATIONS

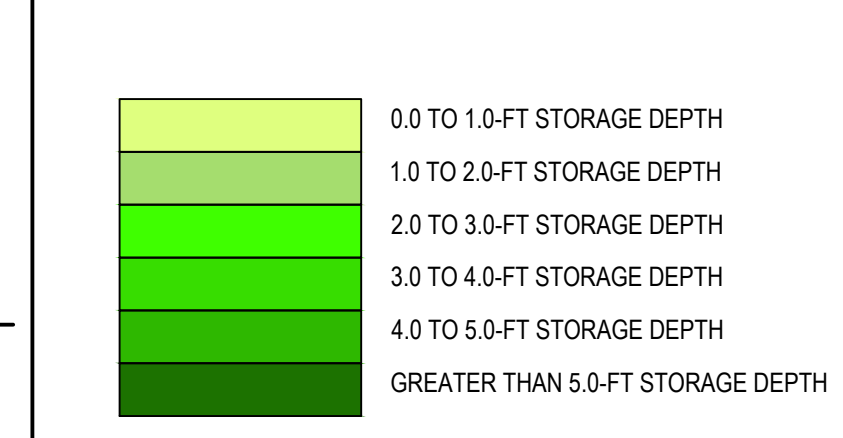
CUT IN FLOODWAY (SEE SHEET CG203A) = 1,277 CY  
 FILL IN FLOODWAY (SEE SHEET CG203A) = 470 CY  
 NET CUT/FILL IN FLOODWAY = 807 CY OF CUT +/-

CUT BELOW 100-YR FLOOD ELEVATION = 10,416 CY  
 FILL BELOW 100-YR FLOOD ELEVATION = 9,105 CY  
 NET CUT/FILL BELOW 100-YR FLOOD ELEVATION = 1,311 CY OF CUT +/-

ADDITIONAL STORAGE IN PROPOSED CONDITION - CUT/FILL DIFFERENCE IN FLOODWAY = (1,277 - 470) + (20,520 - 20,020) = 1,307 CY +/-

1,307 CY +/- FALLS WITHIN ACCEPTABLE THRESHOLD TO CONFIRM CHECK ON THE TOTAL CUT/FILL UNDERNEATH 100-YR FLOOD ELEVATION OF 1,311 CY +/-

### STORAGE DEPTH KEY

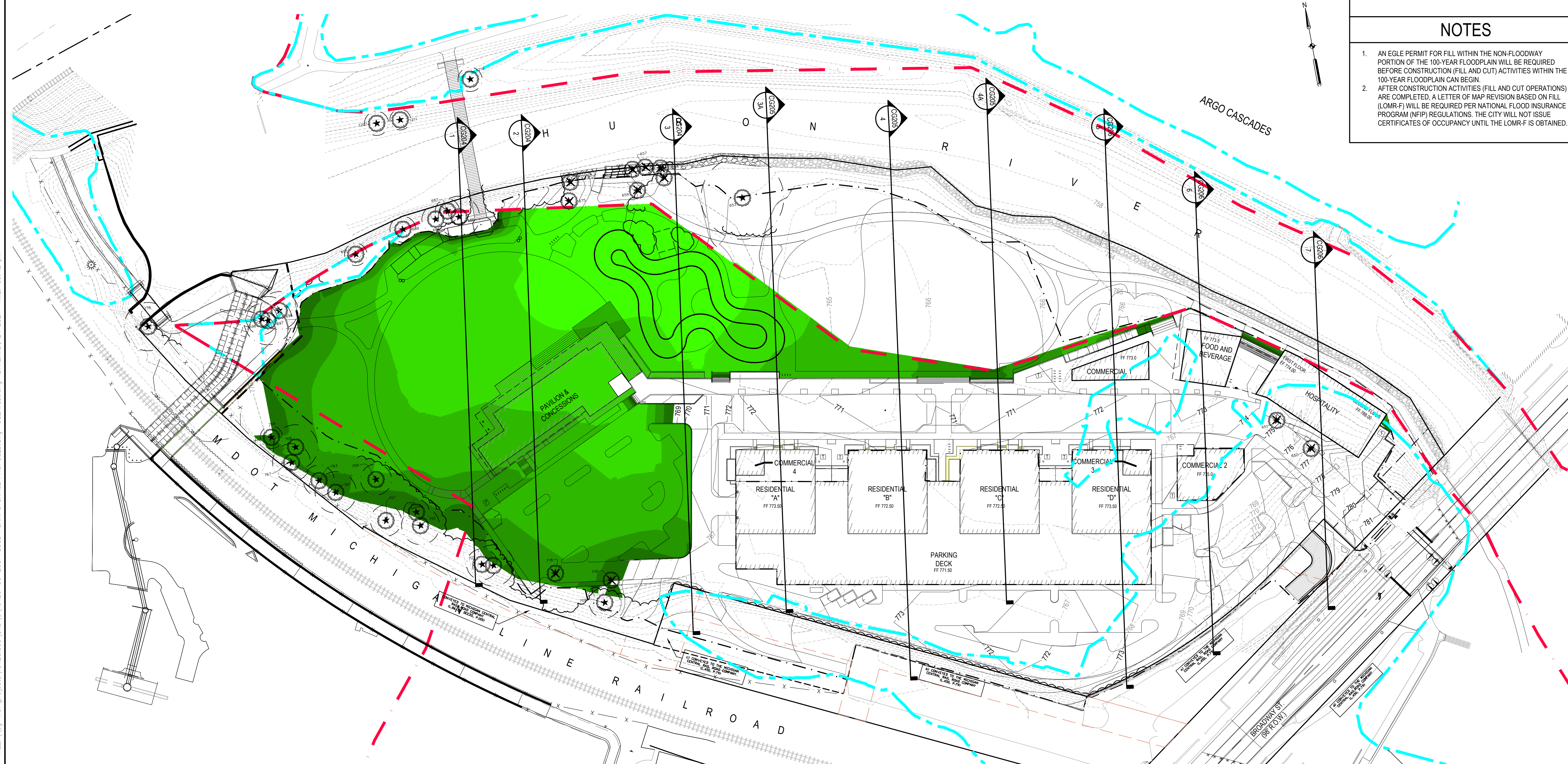


### 3 PROPOSED STORAGE VOLUMES - 1' DEPTH INTERVALS, 100-YEAR STORM

### 4 CUT/FILL BENEATH 100-YR FLOOD ELEVATION

### NOTES

1. AN EGLE PERMIT FOR FILL WITHIN THE NON-FLOODWAY PORTION OF THE 100-YEAR FLOODPLAIN WILL BE REQUIRED BEFORE CONSTRUCTION (FILL AND CUT) ACTIVITIES WITHIN THE 100-YEAR FLOODPLAIN CAN BEGIN.
2. AFTER CONSTRUCTION ACTIVITIES (FILL AND CUT OPERATIONS) ARE COMPLETED, A LETTER OF MAP REVISION BASED ON FILL (LOMR-F) WILL BE REQUIRED PER NATIONAL FLOOD INSURANCE PROGRAM (NFIP) REGULATIONS. THE CITY WILL NOT ISSUE CERTIFICATES OF OCCUPANCY UNTIL THE LOMR-F IS OBTAINED.



# SMITHGROUP

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SECOND FLOOR  
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HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

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SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN

DRAWING TITLE  
**FLOOD PLAIN STORAGE ANALYSIS PROPOSED CONDITIONS**

SCALE: 1:60

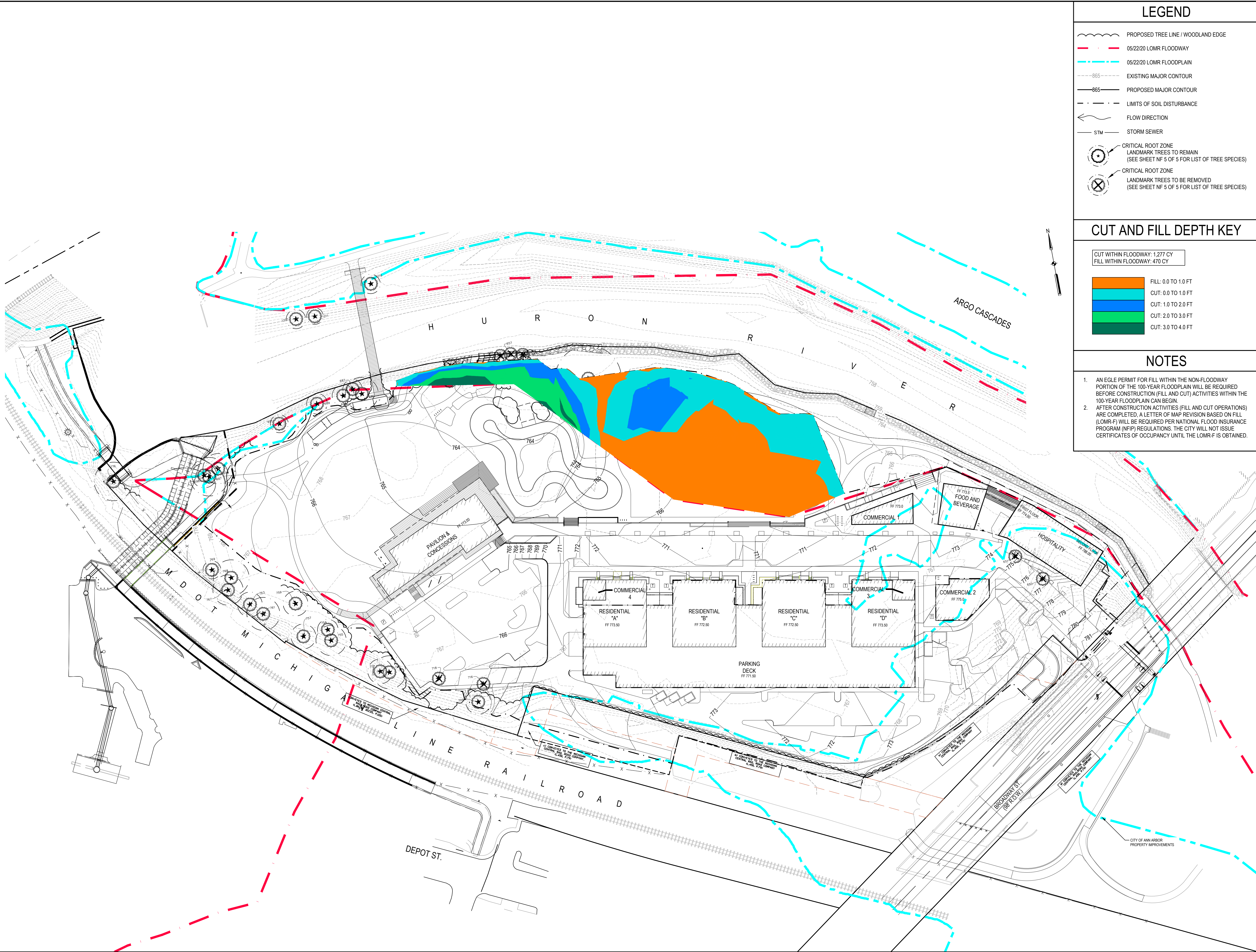
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PROJECT NUMBER: CG203

DRAWING NUMBER

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### LEGEND

- PROPOSED TREE LINE / WOODLAND EDGE
- 05/22/20 LOMR FLOODWAY
- 05/22/20 LOMR FLOODPLAIN
- EXISTING MAJOR CONTOUR
- PROPOSED MAJOR CONTOUR
- LIMITS OF SOIL DISTURBANCE
- FLOW DIRECTION
- STORM SEWER
- CRITICAL ROOT ZONE LANDMARK TREES TO REMAIN (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)
- CRITICAL ROOT ZONE LANDMARK TREES TO BE REMOVED (SEE SHEET NF 5 OF 5 FOR LIST OF TREE SPECIES)

### CUT AND FILL DEPTH KEY

CUT WITHIN FLOODWAY: 1,277 CY  
FILL WITHIN FLOODWAY: 470 CY

- FILL: 0.0 TO 1.0 FT
- CUT: 0.0 TO 1.0 FT
- CUT: 1.0 TO 2.0 FT
- CUT: 2.0 TO 3.0 FT
- CUT: 3.0 TO 4.0 FT

### NOTES

1. AN EGLE PERMIT FOR FILL WITHIN THE NON-FLOODWAY PORTION OF THE 100-YEAR FLOODPLAIN WILL BE REQUIRED BEFORE CONSTRUCTION (FILL AND CUT) ACTIVITIES WITHIN THE 100-YEAR FLOODPLAIN CAN BEGIN.
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## BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
LOWER TOWN  
PARTNERS, LLC

## SMITHGROUP

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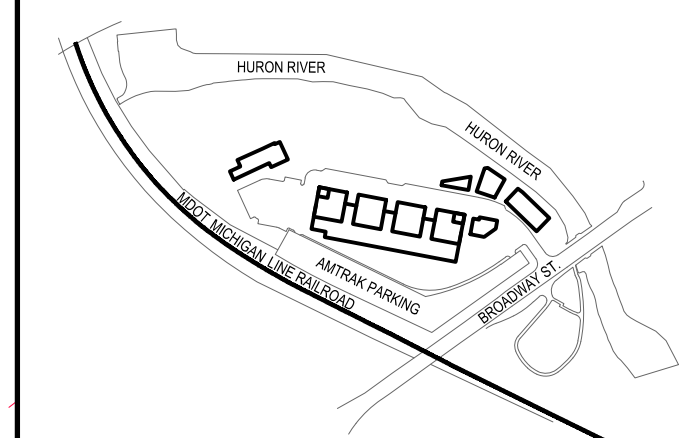
HAMILTON ANDERSON  
1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

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SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
PROPOSED CUT AND FILL  
WITHIN FLOODWAY

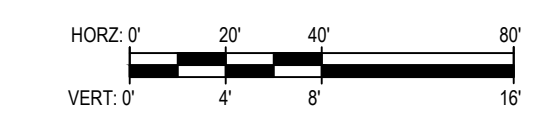
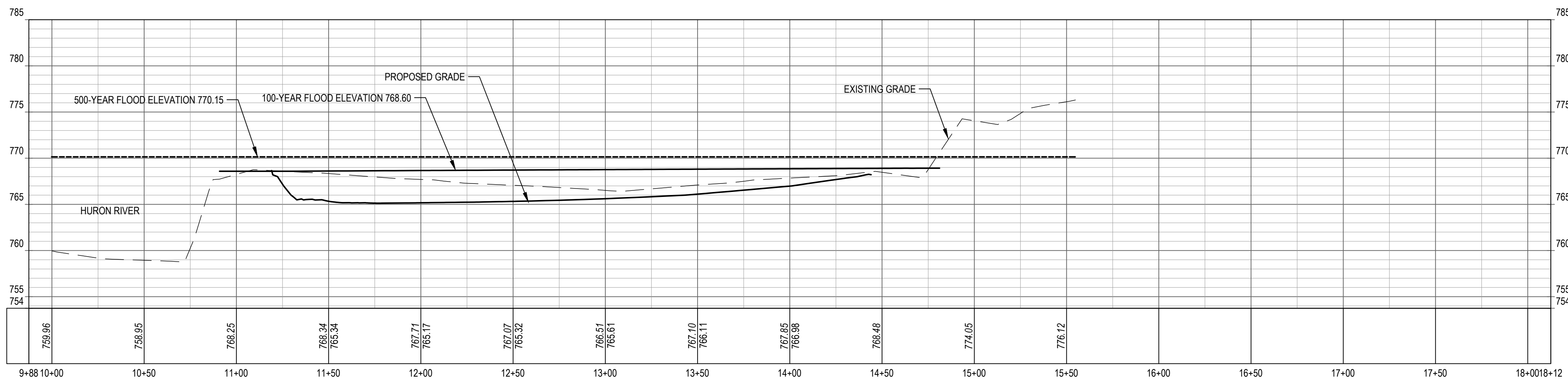
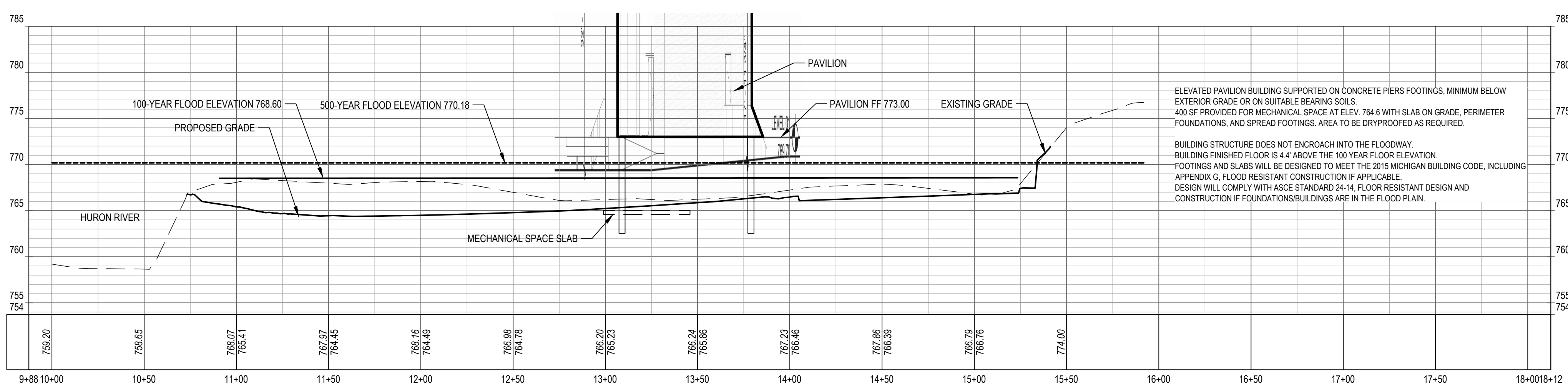
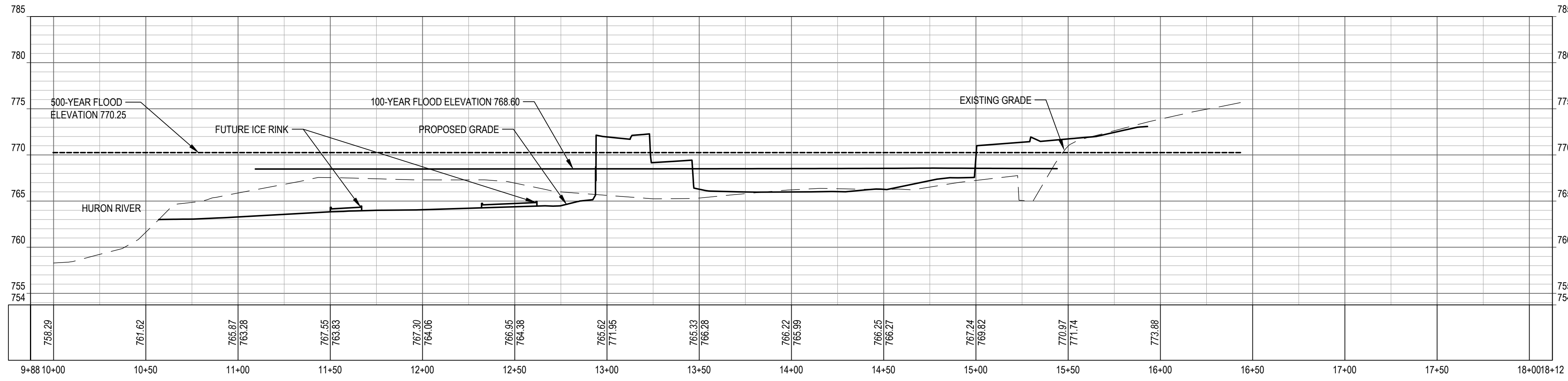


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PROJECT NUMBER 10420

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**SHEET NOTES**

**BROADWAY PARK WEST**  
841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
**LOWER TOWN PARTNERS, LLC**

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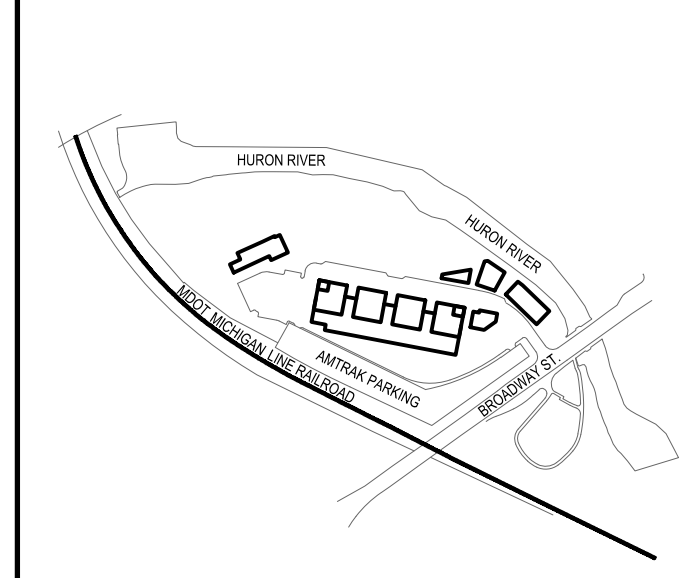
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SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
**FLOOD PLAIN CUT AND FILL SECTIONS 1 THRU 3**

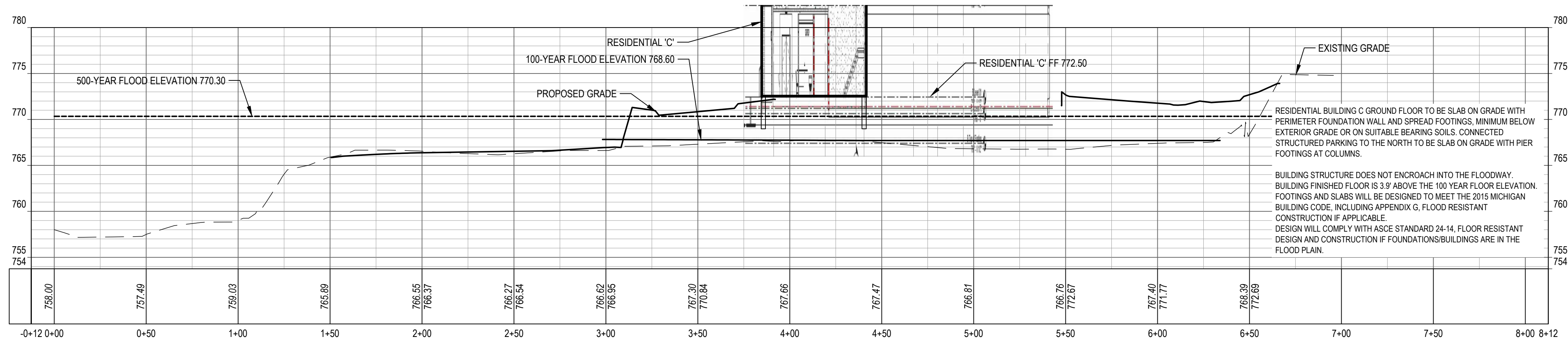
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**CG204**

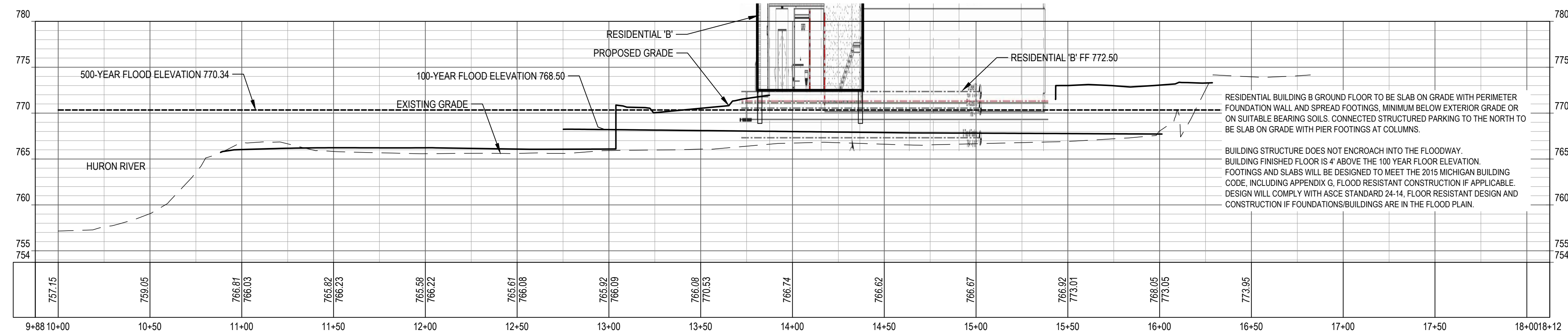
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Approved  
Issued On: 10/28/2021  
Expires On: 10/28/2021



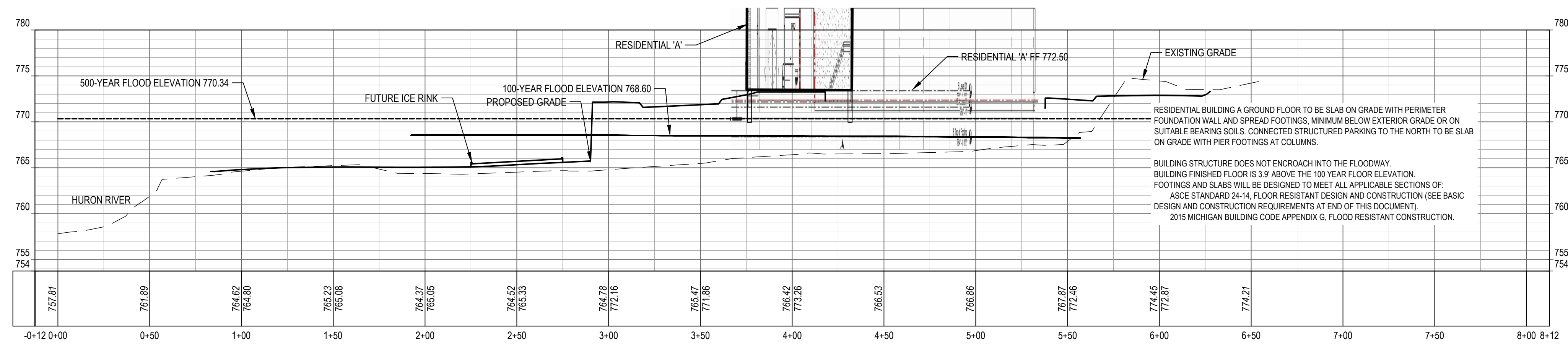
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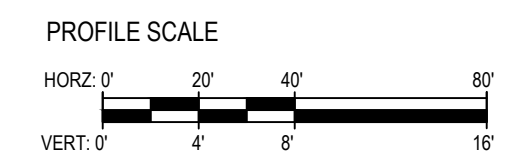
SECTION 4A



SECTION 4



SECTION 3A



**SHEET NOTES**

**BROADWAY PARK WEST**

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
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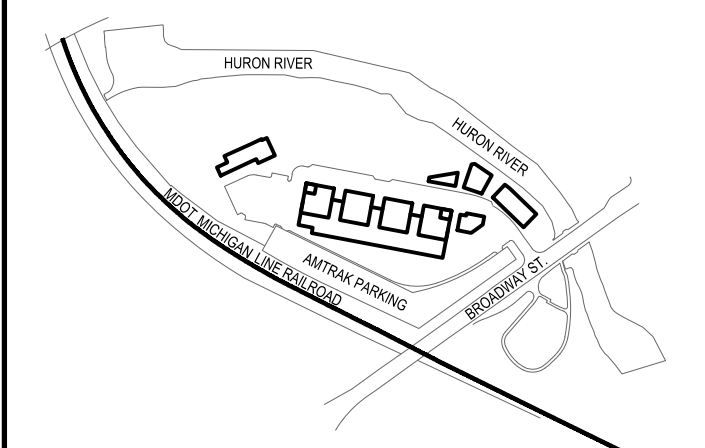
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SEALS AND SIGNATURES

**NOT FOR CONSTRUCTION**

KEY PLAN



DRAWING TITLE  
**FLOOD PLAIN CUT AND FILL  
SECTIONS 3A THRU 4A**

SCALE  
PROJECT NUMBER **10420**

DRAWING NUMBER  
**CG205**

SHEET NOTES

BROADWAY PARK WEST

841 BROADWAY STREET  
ANN ARBOR, MI 48104

Applicant:  
THE ROXBURY GROUP  
ON BEHALF OF:  
LOWER TOWN PARTNERS, LLC

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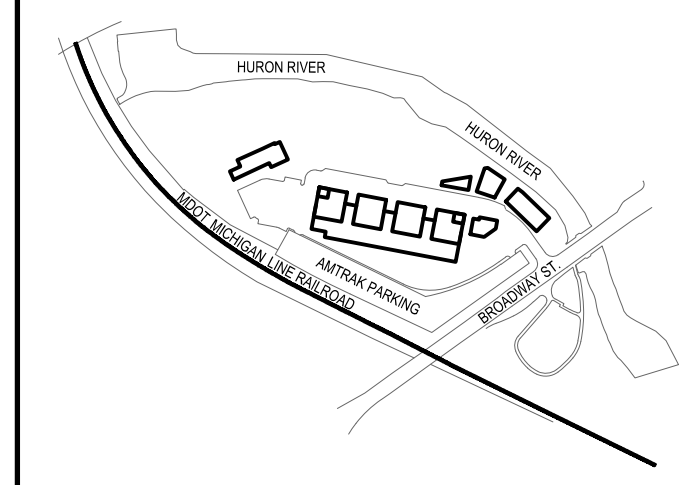
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1435 RANDOLPH STREET, STE 200  
DETROIT, MI 48226

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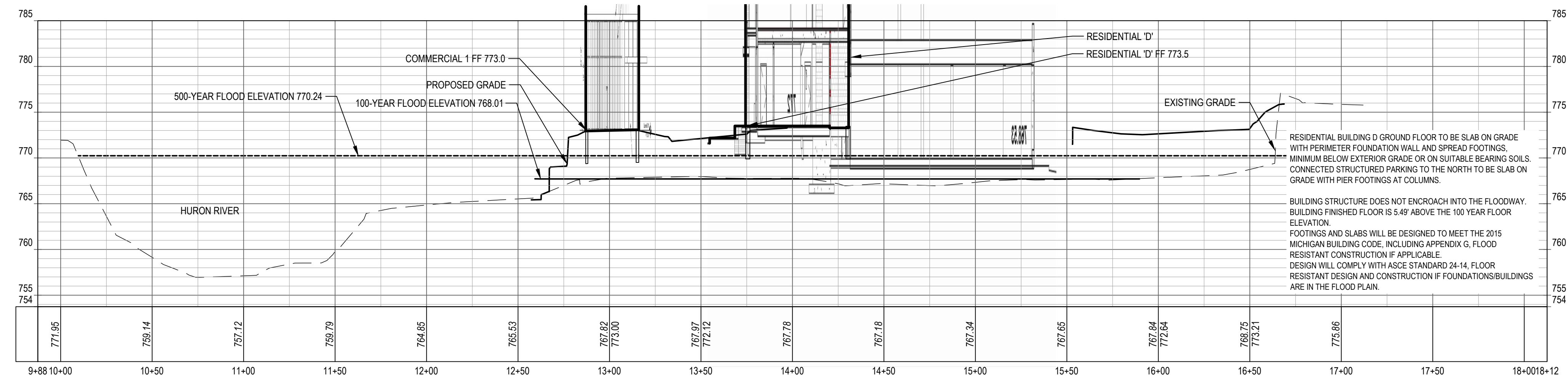
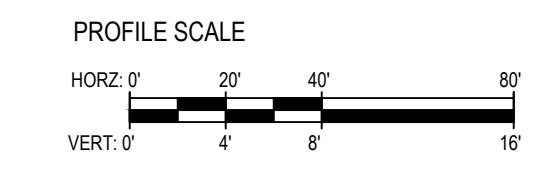
KEY PLAN



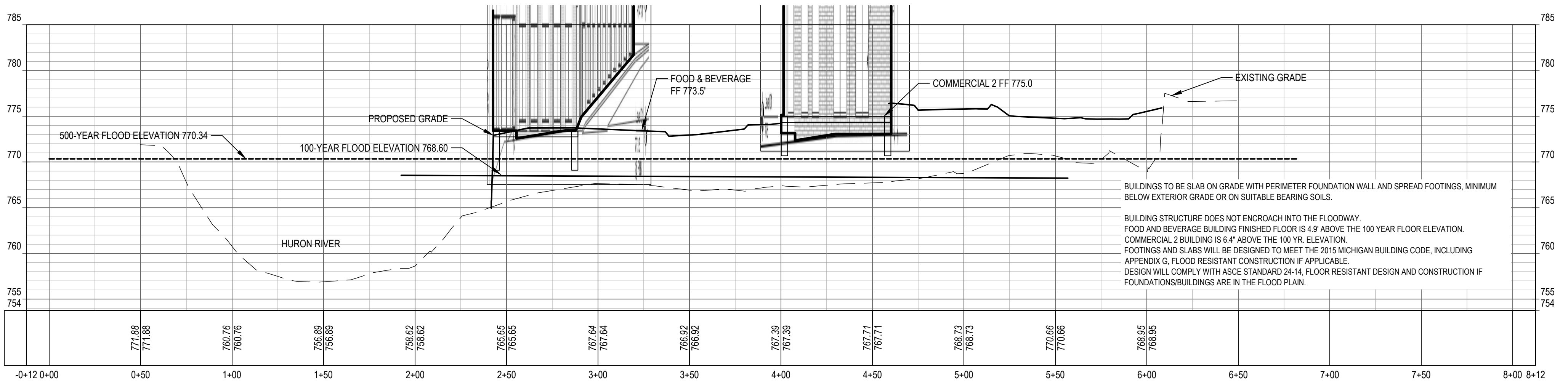
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**FLOOD PLAIN CUT AND FILL  
SECTION 5**

SCALE  
PROJECT NUMBER 10420

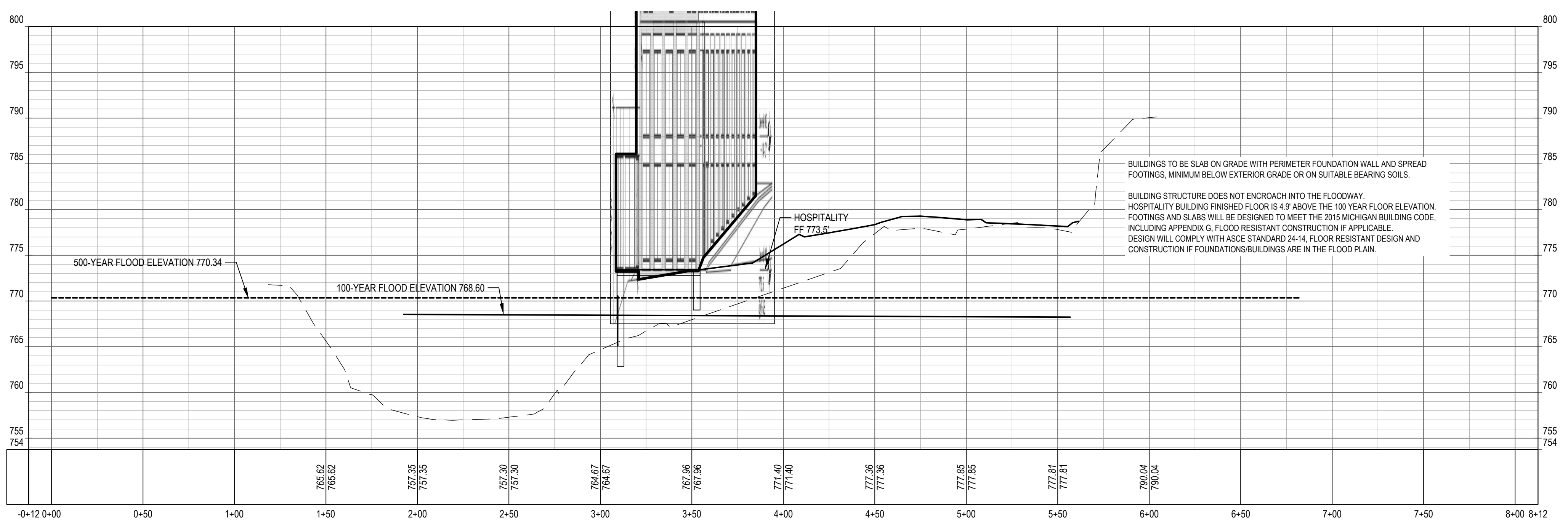
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SECTION 5



SECTION 6



SECTION 7

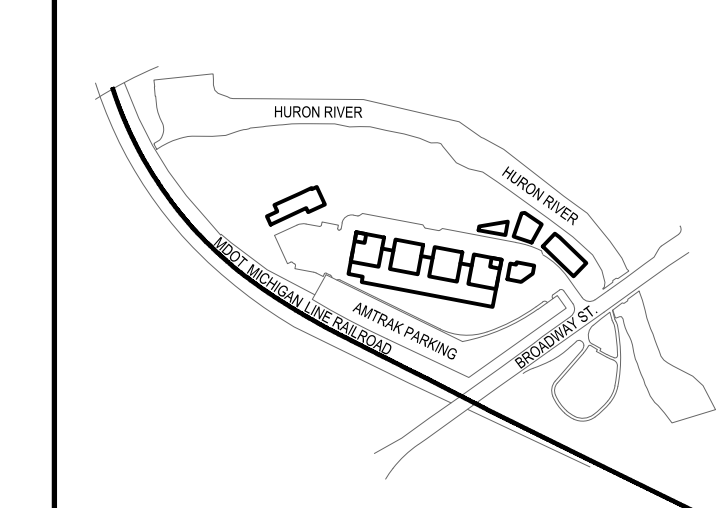
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SEALS AND SIGNATURES

NOT FOR CONSTRUCTION

KEY PLAN



DRAWING TITLE  
**BUILDING FLOOD CODE INFORMATION**

SCALE	10420
PROJECT NUMBER	
DRAWING NUMBER	<b>CG207</b>

New construction adjacent to flood protective works shall not (1) damage, endanger, or otherwise harm the flood protective works, (2) be in conflict with maintenance and repair operations of the entity responsible for the flood protective works, or (3) significantly increase the potential for trapping of rainfall, runoff, and other waters behind the flood protective works.

**1.4.3 Assignment of Flood Design Class to Buildings and Structures** For the purpose of applying this standard, each building and structure shall be assigned a Flood Design Class based on the risk to human life, health, and welfare associated with damage or failure due to flooding, and by nature of their occupancy or use, according to Table 1-1. Each building or other structure shall be assigned to the highest applicable Flood Design Class or Classes.

**1.4.3.1 Multiple Flood Design Classes** Where buildings or other structures are divided into portions with independent structural systems, the Flood Design Class assignment for each portion shall be permitted to be determined independently.

Where building systems, such as required egress, HVAC, or electrical power, for a portion with a higher Flood Design Class pass through or depend on other portions of the building or other structure having a lower Flood Design Class, those portions shall be assigned to the higher Flood Design Class.

**1.5 BASIC DESIGN AND CONSTRUCTION REQUIREMENTS**

**1.5.1 General** New construction and substantial improvements shall be designed, constructed, connected, and anchored to resist flotation, collapse, or permanent lateral movement resulting from the action of hydrostatic, hydrodynamic, wind, and other loads during design flood, or lesser, conditions in accordance with requirements of this standard if specified, or if not specified in this standard then in accordance with requirements approved by the authority having jurisdiction. Design shall include the loads and load combinations described in Section 1.6.

Design and construction in flood hazard areas shall account for each of the following in accordance with this standard:

1. Elevation of the structure,
2. Foundation types and site-specific geotechnical factors,
3. Resistance of structures to damage up to and during the design flood,
4. Obstructions or enclosures below elevated structures,
5. Structural members and connections required to resist design loads,
6. Use of flood damage-resistant materials,
7. Floodproofing,
8. Utilities,
9. Means of egress, and
10. Adverse impacts to other structures and property.

**1.5.2 Elevation Requirements** New construction and substantial improvements shall have the lowest floors (including basements) elevated to or above the DFE in conformance with the requirements of the chapter applicable to the specific flood hazard area.

Enclosed areas that are used solely for parking of vehicles, building access, or storage are not the lowest floor and shall be allowed below the DFE, provided the enclosed areas meet the requirements for enclosed areas applicable to the specific Flood Hazard Area. Structures that are used solely for parking of vehicles, building access, or storage shall be allowed below the DFE, provided the structures meet the requirements of Section 9.4.

Nonresidential structures and nonresidential portions of mixed-use structures shall be allowed to have the lowest floor (including basements) below the DFE, provided the structures meet the dry floodproofing requirements in Chapter 6.

**1.5.3 Foundation Requirements** Foundations of structures shall be designed and constructed to support the structures during design flood conditions and shall provide the required support to prevent flotation, collapse, or permanent lateral movement under the load combinations specified in Section 1.6.2. Any part of the foundation that is below the minimum elevations specified by Table 2-1 or Table 4-1, as applicable, and that provides structural support to the structure shall meet applicable foundation requirements in this standard.

**1.5.3.1 Geotechnical Considerations** Foundation design shall be based on the geotechnical characteristics of the soils and strata below the structure and on interactions between the soils and strata and the foundation. Foundation design shall account for instability and decreased structural capacity associated with soil consolidation, expansion, or movement; erosion and local scour; liquefaction; and subsidence, as applicable.

Geotechnical information necessary to complete the foundation design shall be obtained through geotechnical investigations of the site or from existing available data, such as investigations conducted at nearby project sites, regional studies conducted by government agencies, or other reliable sources.

**1.5.3.2 Foundation Depth** The foundation shall extend to a depth based on geotechnical considerations to provide the support described in Sections 1.5.3 and 1.5.3.1, taking into account the erosion and local scour of the supporting soil based on an erosion analysis.

**1.5.3.3 Foundation Walls and Wall Footings** Foundation walls extending below the minimum elevations specified by Table 2-1 or Table 4-1, as applicable, and foundation wall footings shall be designed and constructed to account for (1) hydrostatic, hydrodynamic, flood-borne debris impact, soil, wind, and other lateral loads acting during design flood conditions, and (2) buoyancy, dead load, live load, and other vertical loads acting during design flood conditions.

Foundation walls, foundation wall footings, and connections between the elevated building and the foundation walls, and between the foundation walls and the foundation wall footings, shall have the strength and stability to resist applied loads and to transfer applied loads to the underlying soils.

**1.5.3.4 Piers, Posts, Columns, or Piles** Piers, posts, columns, or piles used to elevate a structure above the DFE in flood hazard areas shall comply with all applicable foundation requirements of this standard. In Coastal High Hazard Areas and Coastal A Zones, piers, posts, columns, or piles used to elevate a structure shall be designed and constructed in accordance with Chapter 4. Connections between footings, mat, or raft foundations and piers, posts, and columns shall meet all applicable requirements of this standard.

**1.5.4 Use of Fill** Fill shall be designed to be stable under conditions of flooding, including rapid rise and rapid drawdown of floodwaters, prolonged inundation, and flood-related erosion and scour. Use of fill in flood hazard areas other than High Risk Flood Hazard Areas shall be in accordance with Section 2.4. Use of fill in Coastal High Hazard Areas and Coastal A Zones shall be in accordance with Section 4.5.4.

**1.5.5 Anchorage and Connections** The structure, including anchorage and connections, shall be designed to resist effects of

**Table 1-1 Flood Design Class of Buildings and Structures**

Use or Occupancy of Buildings and Structures	Flood Design Class
Buildings and structures that normally are unoccupied and pose minimal risk to the public or minimal disruption to the community should they be damaged or fail due to flooding. Flood Design Class 1 includes (1) temporary structures that are in place for less than 180 days, (2) accessory storage buildings and minor storage facilities (does not include commercial storage facilities), (3) small structures used for parking of vehicles, and (4) certain agricultural structures. <sup>1</sup>	1
Buildings and structures that pose a moderate risk to the public or moderate disruption to the community should they be damaged or fail due to flooding, except those listed as Flood Design Classes 1, 3, and 4. Flood Design Class 2 includes the vast majority of buildings and structures that are not specifically assigned another Flood Design Class, including most residential, commercial, and industrial buildings.	2
Buildings and structures that pose a high risk to the public or significant disruption to the community should they be damaged, be unable to perform their intended functions after flooding, or fail due to flooding. Flood Design Class 3 includes (1) buildings and structures in which a large number of persons may assemble in one place, such as theaters, lecture halls, concert halls, and religious institutions with large areas used for worship; (2) museums; (3) community centers and other recreational facilities; (4) athletic facilities with seating for spectators; (5) elementary schools, secondary schools, and buildings with college or adult education classrooms; (6) jails, correctional facilities, and detention facilities; (7) healthcare facilities not having surgery or emergency treatment capabilities; (8) care facilities where residents have limited mobility or ability, including nursing homes but not including care facilities for five or fewer persons; (9) preschool and child care facilities not located in one- and two-family dwellings; (10) buildings and structures associated with power generating stations, water and sewage treatment plants, telecommunication facilities, and other utilities which, if their operations were interrupted by a flood, would cause significant disruption in day-to-day life or significant economic losses in a community; and (11) buildings and other structures not included in Flood Design Class 4 (including but not limited to facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, hazardous waste, or explosives) containing toxic or explosive substances where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction and is sufficient to pose a threat to the public if released. <sup>2</sup>	3
Buildings and structures that contain essential facilities and services necessary for emergency response and recovery, or that pose a substantial risk to the community at large in the event of failure, disruption of function, or damage by flooding. Flood Design Class 4 includes (1) hospitals and health care facilities having surgery or emergency treatment facilities; (2) fire, rescue, ambulance, and police stations and emergency vehicle garages; (3) designated emergency shelters; (4) designated emergency preparedness, communication, and operation centers and other facilities required for emergency response; (5) power generating stations and other public utility facilities required in emergencies; (6) critical aviation facilities such as control towers, air traffic control centers, and hangars for aircraft used in emergency response; (7) ancillary structures such as communication towers, electrical substations, fuel or water storage tanks, or other structures necessary to allow continued functioning of a Flood Design Class 4 facility during and after an emergency; and (8) buildings and other structures (including, but not limited to, facilities that manufacture, process, handle, store, use, or dispose of such substances as hazardous fuels, hazardous chemicals, or hazardous waste) containing sufficient quantities of highly toxic substances where the quantity of the material exceeds a threshold quantity established by the authority having jurisdiction and is sufficient to pose a threat to the public if released. <sup>3</sup>	4

<sup>1</sup> Certain agricultural structures may be exempt from some of the provisions of this standard; see Section C1.4.3.

<sup>2</sup> Buildings and other structures containing toxic, highly toxic, or explosive substances shall be eligible for assignment to a lower Flood Design Class if it can be demonstrated to the satisfaction of the authority having jurisdiction by a hazard assessment as described in Section 1.5.3 of *Minimum Design Loads for Buildings and Other Structures* that a release of the substances is commensurate with the risk associated with that Flood Design Class.

vertical loads, including uplift and lateral loads in accordance with the load combinations specified in Section 1.6.2.

Stringers or beams shall be attached to the substructure or directly to piles, columns, piers, and walls with bolted or welded connections such that a continuous load path is maintained.

Washers shall be used under all nuts and bolt heads bearing directly on wood. All nuts, bolts, and washers shall be corrosion resistant. Notches at the tops of timber posts and piles shall not exceed 50% of the cross section of the post or pile.

Adequate anchorage shall be provided for storage tanks, sealed conduits and pipes, lined pits, sumps, and all other similar structures that are subject to flotation or lateral movement during the design flood.

**1.6 LOADS IN FLOOD HAZARD AREAS**

**1.6.1 General** Design of structures within flood hazard areas shall be governed by the loading provisions of ASCE 7 *Minimum Design Loads for Buildings and Other Structures* (ASCE/SEI 2010).

Design and construction of structures located in flood hazard areas shall consider all flood-related loads and conditions, including the following: hydrostatic loads, hydrodynamic loads, wave action; debris impact; rapid rise and rapid drawdown of floodwaters; prolonged inundation; alluvial fan flooding; wave-induced and flood-related erosion and local scour; deposition of sediments; ice flows and ice jams; and mudslides in accordance with requirements of this standard if specified, or if not specified in this standard then in accordance with requirements approved by the authority having jurisdiction. Design considerations shall be documented and shall take into account the applicable flood-related loads and conditions, and load combinations that will act on the foundation and the structure.

**1.6.2 Combination of Loads** Flood loads shall be combined with other loads as specified in ASCE 7 *Minimum Design Loads for Buildings and Other Structures* (ASCE/SEI 2010), either by using the allowable stress design method load combinations or by using the strength design method load combinations.