

AGENDA

- I. CALL TO ORDER**
- II. APPROVAL OF MINUTES FROM SEPTEMBER 25 AND OCTOBER 23**
- III. NEW BUSINESS**
 - 1. Case #23-22 Freeway Industrial Park Billboard Special Use Permit*
 - 2. Case #23-23 Popeye's Final Development Plan*
 - 3. Case #23-24 Popeye's Final Plat*
- IV. OLD BUSINESS**
- V. PLANNING COMMISSION COMMENTS**
- VI. STAFF UPDATES**

*Questions concerning this meeting may be addressed to the staff contact,
Karie Kneller, City Planner, at (913) 676-8366 or kkneller@missionks.org*



AT A GLANCE

Applicant:
Interstate Holdings, LLC

Case Number:
23-22

Location:
6650 West 47th Terrace

Project Name:
Freeway Industrial Park Billboard Special Use Permit

Property ID:
KP13000000 0002

Project Summary:
The applicant proposes a digital billboard sign on the subject property at 6650 West 47th Terrace. The site is currently developed with a light industrial warehouse building. The property lies in the 100-year floodplain.

Current Zoning:
M-1

Proposed Zoning:
N/A

Current Land Use:
Light Industrial

Staff Contact:
Karie Kneller, Planner

Proposed Land Use:
N/A

Public Hearing Required

Legal Notice:
November 7, 2023



PROPERTY BACKGROUND AND INFORMATION

The subject property is located at 6650 West 47th Terrace, on the north side of Interstate 35, west of the Lamar Street exit. The property is zoned M-1 “General Industrial.” Adjacent properties located within the City of Mission are also zoned M-1. The existing structure straddles the Mission and Kansas City, Kansas boundaries and currently houses an office/warehouse business, Bestdrive Tire Store, according to the Land Based Classification Standards (LBCS). The subject property and adjacent properties lie within the 100-year floodway (AE) of Turkey Creek as designated by the Federal Emergency Management Agency (FEMA). Developments on properties in the floodway are required to obtain a “No-Rise” certificate from a professional engineer.

PROJECT PROPOSAL

The applicant proposes a new digital billboard on a developed property, within the City of Mission boundary, that would be located in the green space fronting 47th Terrace. The applicant included a “No-Rise” certificate in its submittal that supports data that shows no impact on the 100-year flood elevations, floodway elevations, and floodway widths of Turkey Creek. The proposed sign face is 15 feet high by 50 feet wide and stands 60 feet in total height with the column pipe pole. The pole is set back from the property line by 25 feet and the sign face is completely within the property boundaries.

PLAN REVIEW AND ANALYSIS

Mission Comprehensive Plan (2007)

The Mission Comprehensive Plan (2007) future land use map identifies the subject property as “Business Park/Research: Sub-Urban,” defined as areas that contain high density office and service business, as well as some very limited light manufacturing typically in single-use suburban business park settings.

Analysis: The current land use is consistent with the Mission Comprehensive Plan (2007) future land use map and land use definition.

Mission Comprehensive Plan (2023 Draft Update)

The draft 2022 Comprehensive Plan identifies the subject property as Light Industrial/Warehouse. It is defined as typical medium- or large-scale office and light industrial uses.

Analysis: The current land use is consistent with the draft Mission Comprehensive Plan (2023).

Municipal Code

Under Article III, a digital billboard is defined in Mission’s municipal code at §430.020 as a billboard which has a computer-controlled board that displays an image through the use of light emitting diode

(LED) display, or similar technology. Mission's municipal code requires a special use permit for billboards according to §445.180 Designated Use. Billboard signs are permitted in any district except for residentially zoned districts with a special use permit. Special uses may be approved by action of the City Council after recommendation from the Planning Commission, and may be approved with conditions. Conditions may include, but are not limited to the following §445.190(C)(1-8):

1. Requirements for special yards, open spaces, density, buffers, fences, walls and screening.
2. The installation of landscaping and maintenance.
3. Provisions for erosion control.
4. Limitations on ingress and egress movements into and out of the site and traffic circulation.
5. Limitation on signage.
6. Limitation on hours of operation and other characteristics of operation.
7. Conditions specifically listed under the individual special use.
8. Other conditions deemed necessary to ensure compatibility with surrounding land uses.

Analysis: The property is currently developed as office/warehouse under the LBCS. Staff has not observed, nor made aware of, erosion control issues or limitations regarding ingress or egress into or out of the site. The billboard use on the site is considered a separate use not associated with the current land use. There is vegetated buffer in the right-of-way between I-35 and the frontage road (47th Terrace) of the property.

Additionally, under "Criteria for Considering Applications," §440.140(E), the Planning Commission and City Council shall give consideration to pertinent criteria, such as:

1. The character of the neighborhood.
2. The zoning and uses of nearby properties and the extent to which the proposed use would be in harmony with such zoning and uses.
3. The suitability of the property for the uses to which it has been restricted under the applicable zoning district regulations.
4. The extent to which approval of the application would detrimentally affect nearby properties.
5. The length of time the property has remained vacant as zoned.
6. The relative benefit to the public health, safety and welfare by retaining applicable restrictions on the property as compared to the destruction of the value of the property or hardship to the owner association with denying its request.

7. The Master Plan or Comprehensive Plan.
8. The extent to which the proposed use would adversely affect the capacity or safety of that portion of the road network influenced by the use or present parking problems in the vicinity of the property.
9. The recommendation of the professional staff.
10. The extent to which utilities and services, including, but not limited to, sewers, water service, police and fire protection and parks and recreation facilities, are available and adequate to serve the proposed use.
11. The extent to which the proposed use would create excessive stormwater runoff, air pollution, water pollution, noise pollution or other environmental harm.
12. The extent to which there is a need for the use in the community.
13. The economic impact of the proposed use on the community.
14. The ability of the applicant to satisfy any requirements applicable to the specific use imposed pursuant to the zoning district regulations.

Analysis: It is Staff's determination that the application for a special use permit meets all applicable criteria in §440.140 under the following circumstances: character and zoning of surrounding area is compatible with the use in an industrial/warehouse setting along a major interstate highway; the zoning restrictions are suitable for the current land use, as well as the proposed billboard land use under consideration; approval of the application would not conceivably detrimentally affect nearby properties, as there is precedent for billboards in nearby locations and along major interstate highways in the region that are consistent with the use in the proposed area; The property is not currently vacant, but additional build-out of buildings on property in the area would not be advisable due to the impact on the floodway, thereby restricting the owner's ability to generate additional revenue on the site; the Comprehensive Plan is compatible with the proposed use according to the 2007 Plan and the 2023 Draft Update; there are no anticipated safety issues beyond possible driver distractions along the interstate (see U.S Department of Transportation Federal Highway Administration study as part of the attached packet); electric utilities are in place on-site and the billboard would not create additional stormwater, air pollution, water pollution, noise pollution, or other environmental harm; staff does not identify a need or economic need for the use in the community; the required "No-Rise" certificate has been provided with the application.

Kansas State Statute Article 22, 68-2234 pertains to the sign standards as applicable for the proposed billboard sign. The statute covers configuration, size, spacing, and lighting in order to ensure the sign does not obscure traffic signs and signals or create safety hazards (see statute and Kansas Department of Transportation outdoor advertising guidelines as part of the attached packet).

Analysis: The proposed sign shall adhere to all applicable state statutes to maintain the special use permit.

Under Mission municipal code at §430.140 Removal of Obsolete or Abandoned Signs, if a structure or premise is abandoned for a six-month period of time signs shall be deemed obsolete and abandoned. The owner shall be responsible for removing any such signs.

Analysis: The billboard sign in this case is not associated with the building or structure on premises; however, should the sign be abandoned of its specific use as advertising or if it is abandoned due to lack of maintenance, the special use permit would cease to be valid after a six-month period.

Under §445.210 of the City's municipal code, Special Use Permits may be for a specified time period or continual. Revocation of a Special Use Permit may be granted if any of the following conditions are met:

- Non-compliance with any applicable requirement
- Non-compliance with any special conditions imposed at the time of approval
- Violation of any provisions of the Code
- Where conditions of the neighborhood have changed to the extent that approval would be unwarranted
- Violation of any State or Federal law or regulation

RECOMMENDATION

Staff recommends that the Planning Commission recommend approval of the electronic billboard to the City Council with the following conditions:

1. Applicant shall obtain a sign permit from the Kansas Department of Transportation as well as the City of Mission.
2. The Sign shall comply with all K.S.A 68-2231 et seq as well as the City of Mission Municipal Code.
3. The sign must display a static image for a minimum of (8) eight seconds and have an interval change time of (2) two seconds or less.
4. Erosion control during construction shall be sufficient to protect waterways and reduce runoff impact.
5. Maintenance and continued operation of the billboard shall be the responsibility of the property owner or owner's agent in perpetuity; the special use permit is transferrable.

6. Abandonment, including lack of maintenance or continued operation, shall nullify the special use permit within six months.

7. The special use permit shall be effective following City Council approval for a period not to exceed 10 years, at which time the property owner shall submit an application for continuation of the special use permit in perpetuity or until the property is redeveloped.

PLANNING COMMISSION ACTION

The Planning Commission will consider the application for Case #23-22 Freeway Industrial Park Billboard during a public hearing at its November 27, 2023 meeting.

CITY COUNCIL ACTION

Following Planning Commission recommendation, the City Council will hear Case #23-22 at its December 20, 2023 meeting.



Community Development Department
 6090 Woodson Street
 Mission, KS 66202
 913-676-8360

Development Application

Permit # _____

Applicant Name: JOHN DUGGAN	Company: INTERSTATE HOLDINGS, LLC
Address: 11341 BUENA VISTA ST	
City/State/Zip: LEAWOOD, KS 66211	
Telephone: 913-498-3536	
Email: JDUGGAN@KC-DSDLAW.COM	
Property Owner Name:	Company: same
Address:	
City/State/Zip:	
Telephone:	
Email:	
Firm Preparing Application:	Company: SCHLAGEL
Address: 14920 W 107TH STREET	
City/State/Zip: LENEXA, KS 6215	
Telephone: 913-492-5158	
Email: COMMENTS@SCHLAGELASSOCIATES.COM	
*All correspondence on this application should be sent to (check one) _____ Applicant _____ Owner <input checked="" type="checkbox"/> Firm	
Application Type	
Rezoning <input type="checkbox"/> Plat <input type="checkbox"/> Site Plan <input checked="" type="checkbox"/> SUP <input checked="" type="checkbox"/> Lot Split <input type="checkbox"/> Other (Specify): _____	
Description of Request	
Please provide a brief description of the request:	
INSTALLATION OF A MONOPOLE DIGITAL BILLBOARD	

Project Details

General Location or Address of Property: 6650 W 47TH TER

Present zoning of property: M-1

Present use of property: INDUSTRIAL

Agreement to Pay Expenses

Applicant intends to file an application with the Community Development Department of the City of Mission, Kansas (City). As a result of the filing of said application, City may incur certain expenses, such as but not limited to publication costs, consulting fee, attorney fee, and court reporter fees. Applicant hereby agrees to be responsible for and to reimburse City for all cost incurred by City as a result of said application. Said costs shall be paid within ten (10) days of the receipt of any bill submitted by City to Applicant. It is understood that no requests granted by City or any of its commissions will be effective until all costs have been paid. Costs will be owed whether or not Applicant obtains the relief requested in the application.

Affidavit of Ownership and/or Authorization of Agent

I, _____ certify that I am the owner or contract purchaser of the subject property. I give my permission for the undersigned to act as my agent on behalf of the application hereby being submitted.

X  Date 9.20.23

Signature (Owner)

X _____ Date _____

Signature (Owner's Agent)

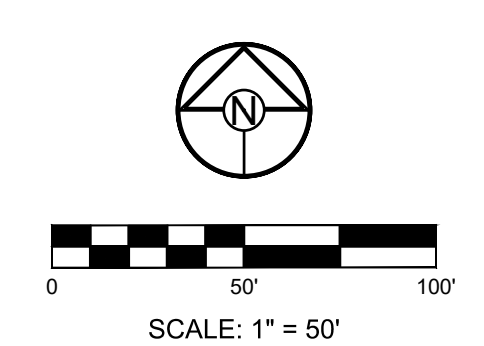
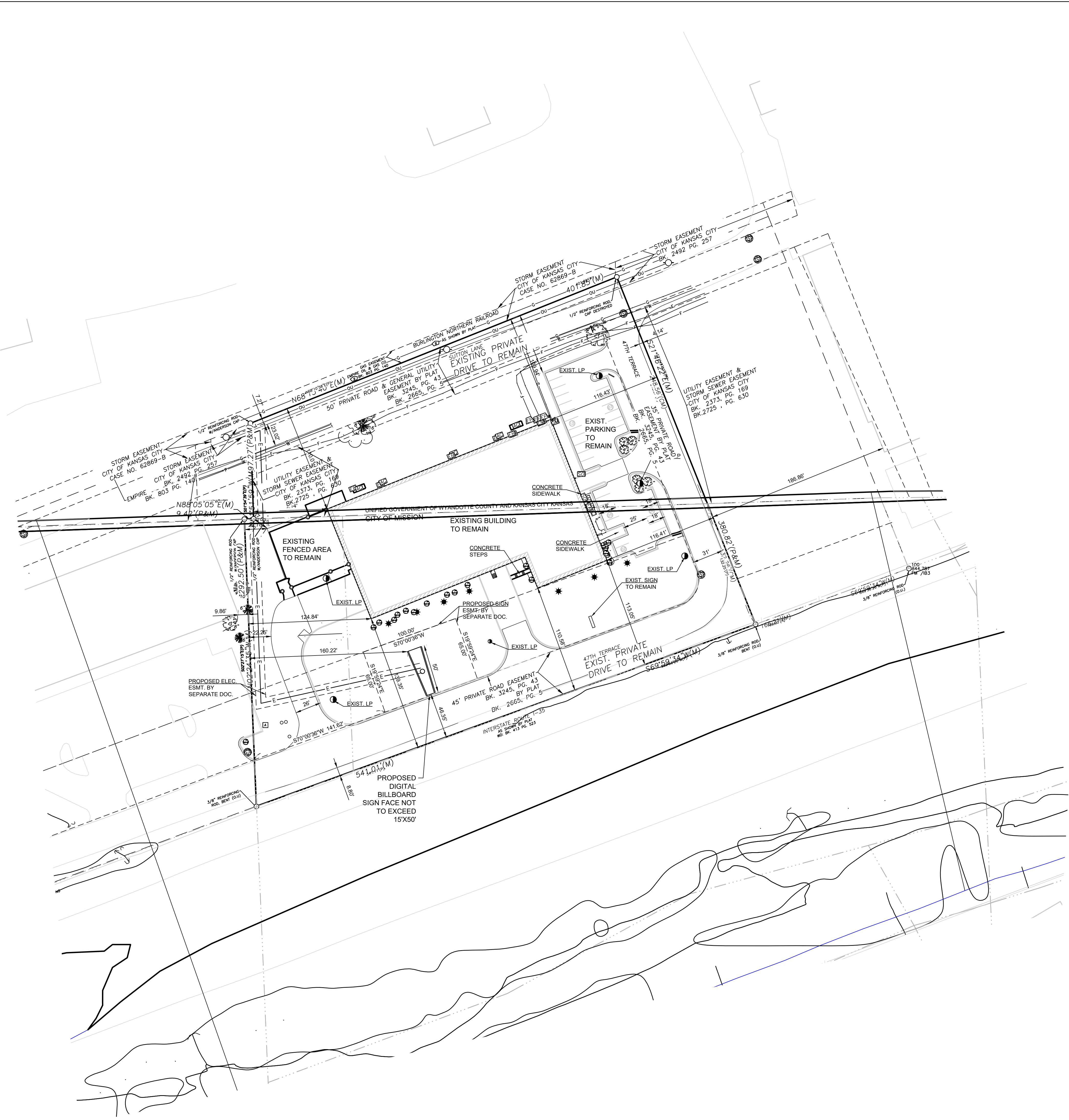
*****FOR OFFICE USE ONLY*****

File Fee: \$	Meeting Date
	PC CC
	Date Notices Sent
Total:	
Receipt #	Date Published
Notes:	
	Decision

PREPARED BY:

SCHLAGEL & ASSOCIATES, P.A.

**FREEWAY INDUSTRIAL PARK LOTS 2 & 7
 MONOPOLE DIGITAL BILLBOARD
 PRELIMINARY DEVELOPMENT PLAN & SUP
 6650 W 47TH TERRACE MISSION, KANSAS**



REVISION DATE	DESCRIPTION
	DESCRIPTION 1

VICINITY PLAN

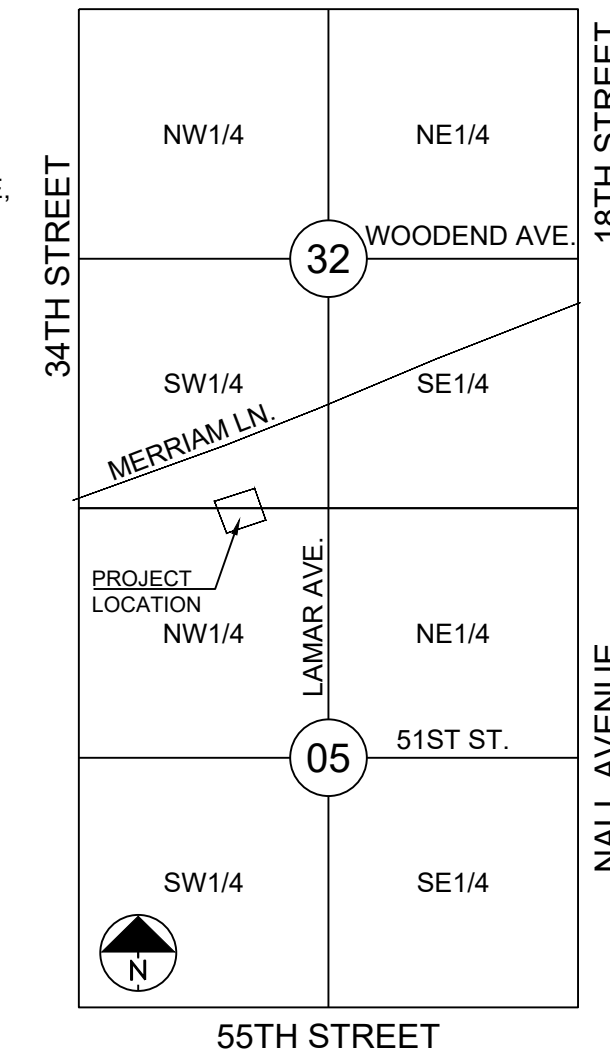
SHEET
C1.0

I:\PROJECTS\2023\23-187\3.0 Design\3.0 DWG Plans\2.0 FDP SUP.dwg, VICINITY PLAN, 9/21/2023 8:42:00 AM, 1:1

LEGAL DESCRIPTION FROM ALTA PROVIDED BY OWNER

ALL OF LOT 2, FREEWAY INDUSTRIAL PARK, A SUBDIVISION IN MISSION, JOHNSON COUNTY, KANSAS

LOT 7, FREEWAY INDUSTRIAL PARK, A SUBDIVISION IN THE CITY OF KANSAS CITY, WYANDOTTE, KANSAS



SECTION 05-12-25
SECTION 32-11-25
LOCATION MAP
SCALE 1" = 200'

SITE DATA

EXISTING ZONING M-1 MISSION M-2 UGWYCKOKK
SITE AREA FROM ALTA SURVEY PROVIDED BY OWNER 4.0686 ACRES (177,227 S.F.)
EXISTING BUILDING AREA 32,084 S.F.
EXISTING FAR 181
PARKING SPACES REQUIRED (SEC 410.130.H)(1 SPACE PER 500 S.F.) 64 SPACES
EXISTING PARKING SPACES 32 SPACES

SCHLAGEL & ASSOCIATES, P.A.

GENERAL NOTES:

- FLOOD NOTE:** The Johnson County portion of the site lies within Flood Zone AE Base Flood Elevations Determined with a Base Flood elevation of 854.0 feet as shown on FEMA Firm panel 20091C0008G Panel No. 8 of 161 dated August 3, 2009. The Wyandotte County a portion of the site lies within Other Flood Areas Zone "X" Areas of 0.2% annual chance flood: areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile and a portion of the site appears to lie within Other Areas Flood Zone "X" Areas determined to be outside the 0.2% annual chance floodplain or Flood Zone "D" Areas in which flood hazards are undetermined but possible as shown on FEMA Firm panel 20209C0170D panel 170 of 210 dated September 2, 2011. The FEMA HEC-RES MODEL indicates that all of the site is within Flood Zone AE Base Flood Elevations Determined with a Base Flood elevation of 854.0 feet.
- Boundary data from ALTA survey provided by owner.
- Adjacent property lines, buildings and paved surfaces from JOCO AIMS and DOTMAPS.
- Topography and adjacent plat and improvements from JOCO AIMS.
- Existing utilities have been shown to the greatest extent possible based upon ALTA survey provided by owner.
- All new on-site wiring and cable shall be placed underground per the city codes and ordinances.

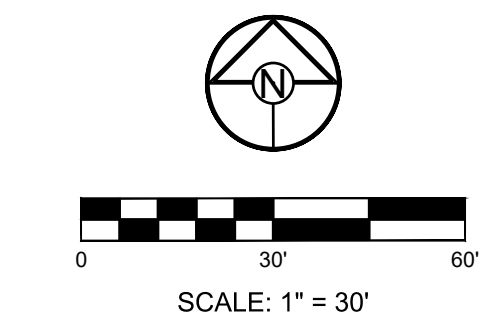
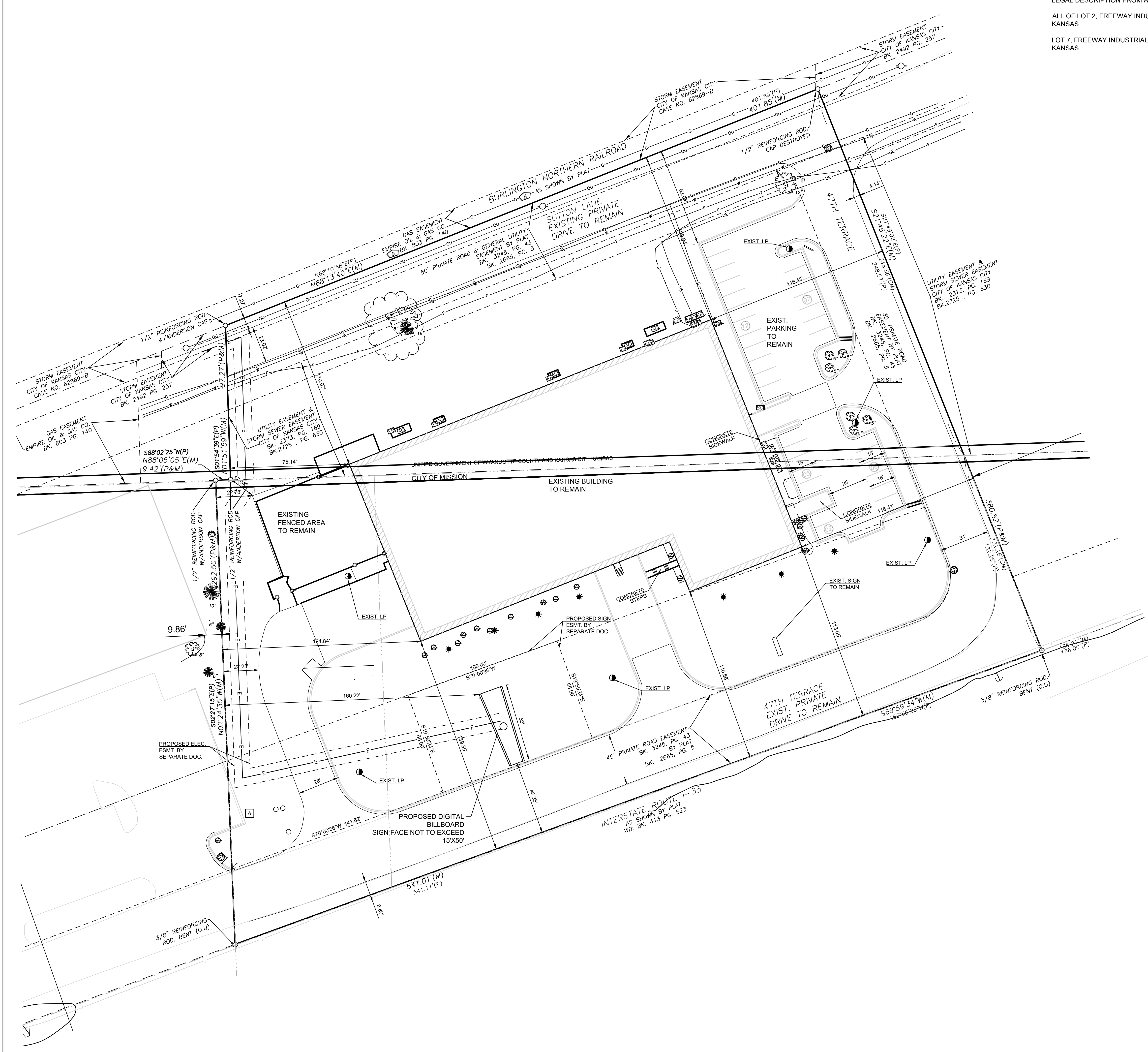
**FREEWAY INDUSTRIAL PARK LOTS 2 & 7
MONOPOLE DIGITAL BILLBOARD
PRELIMINARY DEVELOPMENT PLAN & SUP
6650 W 47TH TERRACE MISSION, KANSAS**

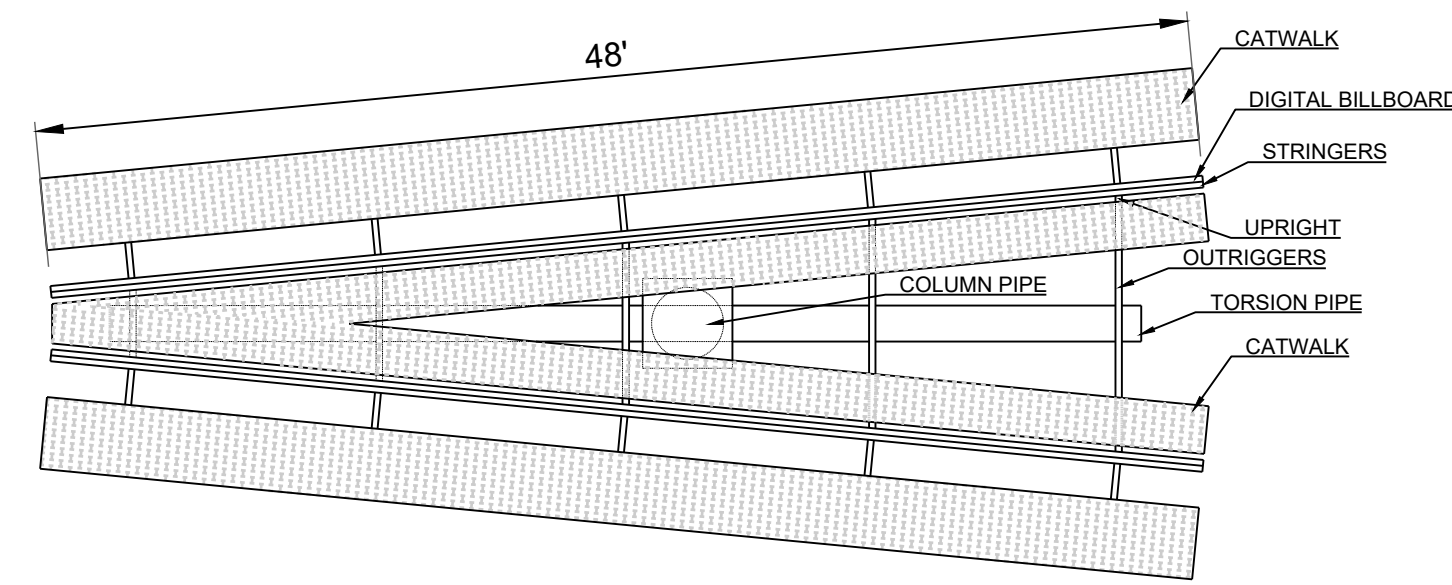
REVISION DATE	DESCRIPTION
	DESCRIPTION 1

DRAWN BY:	SCH
CHECKED BY:	SCH
DATE PREPARED:	9-21-2023
PROJ. NUMBER:	23-187

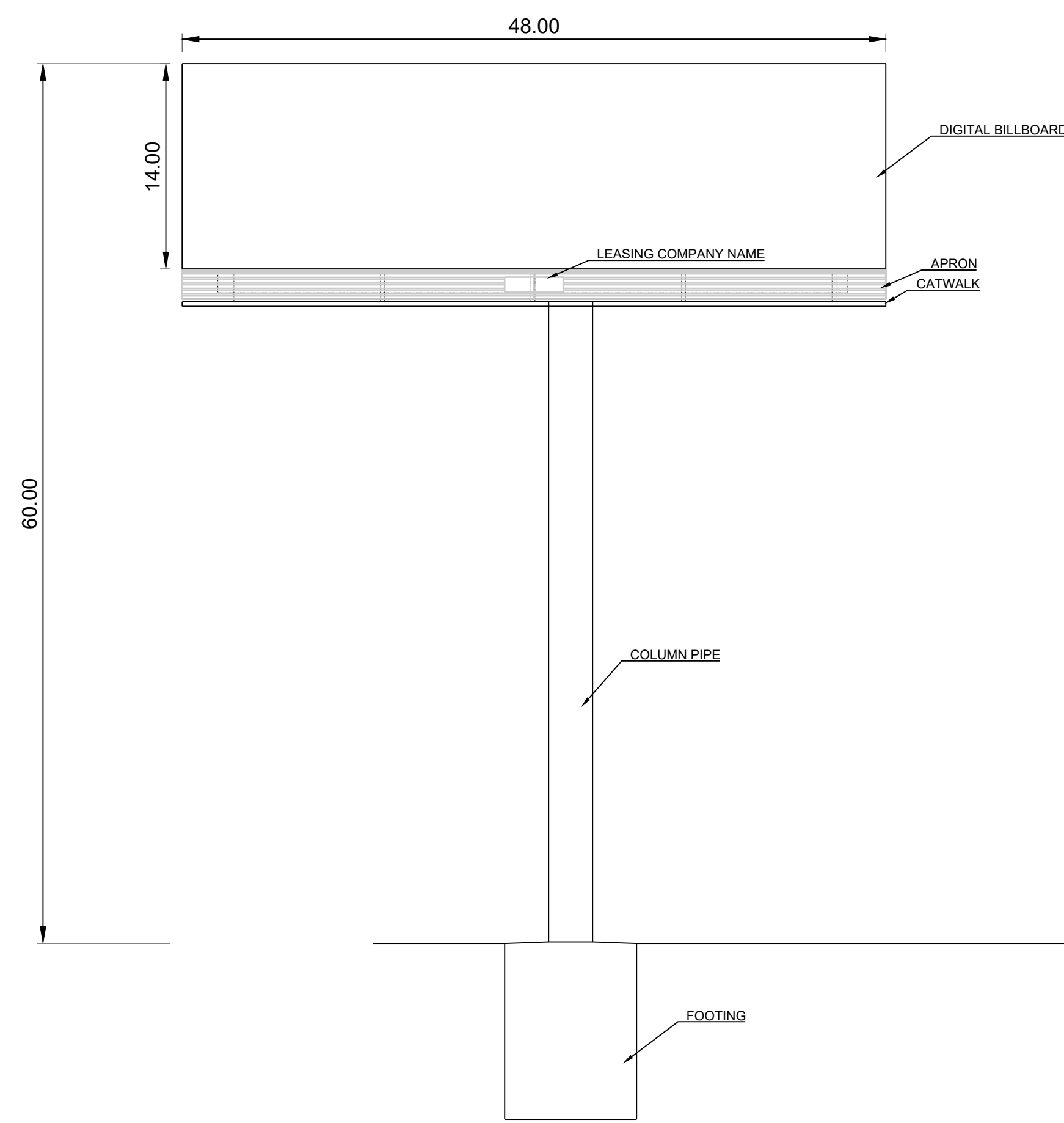
SITE PLAN

SHEET
C2.0

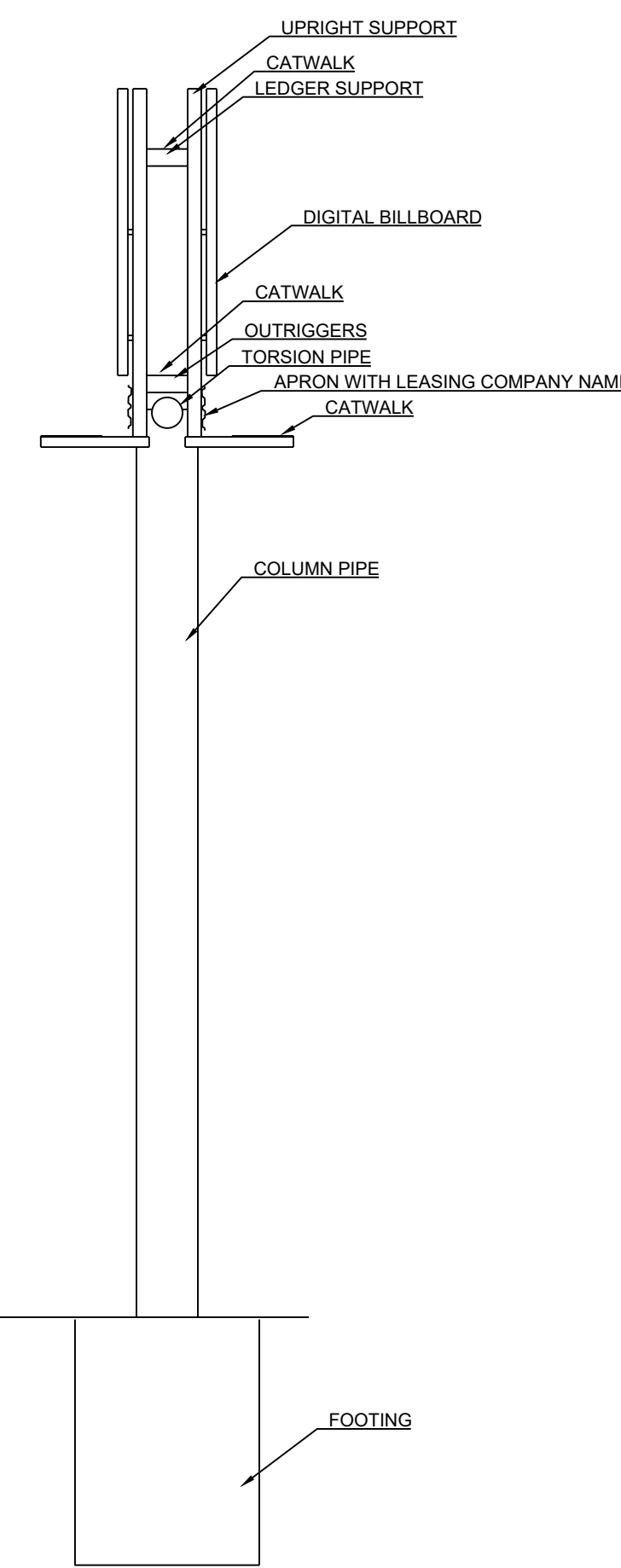




PLAN VIEW



FRONT VIEW



I-35 HIGHWAY SIDE VIEW

NOTE: THIS DRAWING IS TO ONLY SHOW GENERAL DESIGN AND IS NOT FOR PERMITS OR CONSTRUCTION.

PREPARED BY:

FREeway INDUSTRIAL PARK LOTS 2 & 7
 MONOPOLE DIGITAL BILLBOARD
 PRELIMINARY DEVELOPMENT PLAN & SUP
 6650 W 47TH TERRACE MISSION, KANSAS

REVISION DATE	DESCRIPTION
	DESCRIPTION 1

DRAWN BY:

CHECKED BY:

DATE PREPARED: 9-21-2023

PROJ. NUMBER: 23-187

DIGITAL BILLBOARD DESIGN DETAILS

SHEET

1

September 20, 2023

Karie Kneller
City of Mission
6090 Woodson Street
Mission, Kansas 66202

**RE: STORMWATER MANAGEMENT STUDY
FREEWAY INDUSTRIAL PARK LOTS 2 & 7 MONOPOLE DIGITAL BILLBOARD
PRELIMINARY DEVELOPMENT PLAN & SUP**

Dear Karie:

Per City of Mission requirements, we are submitting the following storm water letter in support of the PDP & SUP application for Freeway Industrial Park Lots 2&7 Monopole Digital Billboard. The billboard is located at 6650 W. 47th Terrace Mission, KS 66203 on a 4.07-acre site. The Northwestern portion of the site does lie within the City of Kansas City limits.

The site currently drains from North to South with slopes ranging from 0% to 5% and eventually drains into KDOT ROW and across I-35 to Turkey Creek. With the construction of the proposed signage the drainage patterns will remain the same. A detailed map of the drainage patterns is in Appendix A. The proposed sign will be approximately 50' tall. However, the proposed pole that will hold the sign is proposed to be 3.0' in diameter. This equates to approximately 7 square feet of added impervious area.

There is FEMA identified floodplain located on the proposed property per Flood Insurance Rate Map Panel No. 20091C0008G. The proposed sign is to be located within the Zone AE floodplain. However, the sign is located within an ineffective flow location. Per city requirements a No-Rise certification letter is being submitted with this report.

After the sign has been constructed the site will have a 7 sq ft increase in impervious area on a total of 177,289 sq ft site. This correlates to a 0.003% increase in the impervious area. Given there is a minimal increase in impervious areas the proposed improvements can be considered negligible for stormwater and storm quality requirements.

In conclusion, there is a minimal increase in the impervious area between the existing site and after the proposed sign is constructed. We would request that the minimal increase be considered negligible, and that the stormwater management and storm water quality requirements not be applicable to the proposed project.

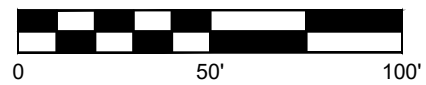
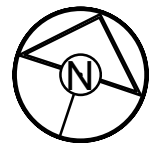
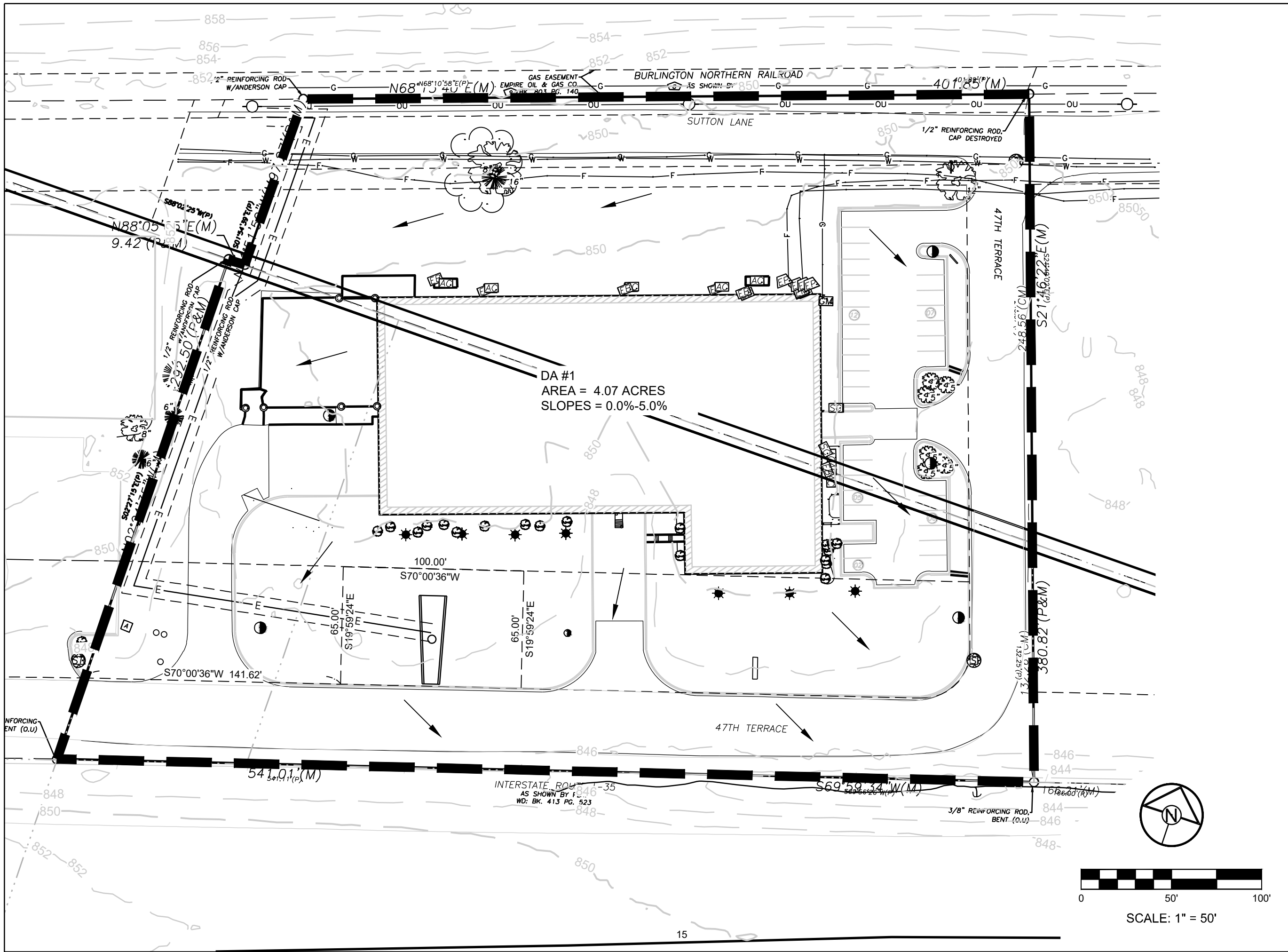
If you have any questions regarding the study or the information presented, please contact me. Thank You.

Sincerely,

SCHLAGEL & ASSOCIATES, P.A.



Jake A. Hattock, P.E.
Project Engineer
Direct Dial 913-322-7155



SCALE: 1" = 50'

SCHLAGEL
 ENGINEERS PLANNERS SURVEYORS LANDSCAPE ARCHITECTS
 14920 West 107th Street Lenexa, Kansas 66215
 (913) 492-5158 Fax: (913) 492-8400
 WWW.SCHLAGELASSOCIATES.COM
 Kansas State Certificates of Authority
 #E-296 #LA-29 #LS-54

**FREeway INDUSTRIAL PARK LOTS
 2 & 7 MONOPOLE DIGITAL
 BILLBOARD PRELIMINARY
 DEVELOPMENT PLAN & SUP**
 6650 W 47TH TERRACE MISSION, KANSAS

DRAWN BY:	JAH
DATE PREPARED:	09.20.2023
PROJ. NUMBER:	23-187

HYDRO MAP
 SHEET
1

ENGINEERING "NO-RISE" CERTIFICATION

This is to certify that I am a duly qualified engineer licensed to practice in the State of Kansas .

It is to further certify that the attached technical data supports the fact that proposed Freeway Industrial Park Billboard will
(Name of Development)
not impact the 100-year flood elevations, floodway elevations and floodway widths on Turkey Creek at published sections
(Name Of stream)
in the Flood Insurance Study for Merriam, City of ,
(Name of Community)
dated Aug 3, 2009 and will not impact the 100-year flood elevations, floodway elevations, and floodway widths at unpublished cross-sections in the vicinity of the proposed development.

 09/21/2023
(Date)

 Jake Hattock
(Signature)

 PROJECT ENGINEER
(Title)

seal:



 14920 W. 107TH STREET, LENEXA, KANSAS 66215
(Address)

**DRIVER VISUAL BEHAVIOR IN THE PRESENCE OF COMMERCIAL
ELECTRONIC VARIABLE MESSAGE SIGNS (CEVMS)**

SEPTEMBER 2012



FHWA-HEP-16-036

FOREWORD

The advent of electronic billboard technologies, in particular the digital Light-Emitting Diode (LED) billboard, has necessitated a reevaluation of current legislation and regulation for controlling outdoor advertising. In this case, one of the concerns is possible driver distraction. In the context of the present report, outdoor advertising signs employing this new advertising technology are referred to as Commercial Electronic Variable Message Signs (CEVMS). They are also commonly referred to as Digital Billboards and Electronic Billboards.

The present report documents the results of a study conducted to investigate the effects of CEVMS used for outdoor advertising on driver visual behavior in a roadway driving environment. The report consists of a brief review of the relevant published literature related to billboards and visual distraction, the rationale for the Federal Highway Administration research study, the methods by which the study was conducted, and the results of the study, which used an eye tracking system to measure driver glances while driving on roadways in the presence of CEVMS, standard billboards, and other roadside elements. The report should be of interest to highway engineers, traffic engineers, highway safety specialists, the outdoor advertising industry, environmental advocates, Federal policymakers, and State and local regulators of outdoor advertising.

Monique R. Evans
Director, Office of Safety
Research and Development

Nelson Castellanos
Director, Office of Real Estate
Services

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TECHNICAL DOCUMENTATION PAGE

1. Report No. FHWA-HRT-		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Driver Visual Behavior in the Presence of Commercial Electronic Variable Message Signs (CEVMS)				5. Report Date	
				6. Performing Organization Code	
7. Author(s) William A. Perez, Mary Anne Bertola, Jason F. Kennedy, and John A. Molino				8. Performing Organization Report No.	
9. Performing Organization Name and Address SAIC 6300 Georgetown Pike McLean, VA 22101				10. Work Unit No. (TRAIS)	
				11. Contract or Grant No.	
12. Sponsoring Agency Name and Address Office of Real Estate Services Federal Highway Administration 1200 New Jersey Avenue SE Washington, DC 20590				13. Type of Report and Period Covered	
				14. Sponsoring Agency Code	
15. Supplementary Notes The Contracting Officer's Technical Representatives (COTR) were Christopher Monk and Thomas Granda.					
16. Abstract This study was conducted to investigate the effect of CEVMS on driver visual behavior in a roadway driving environment. An instrumented vehicle with an eye tracking system was used. Roads containing CEVMS, standard billboards, and control areas with no off-premise advertising were selected. Data were collected on arterials and freeways in the day and nighttime. Field studies were conducted in two cities where the same methodology was used but there were differences in the roadway visual environment. The gazes to the road ahead were high across the conditions; however, the CEVMS and billboard conditions resulted in a lower probability of gazes as compared to the control conditions (roadways not containing off-premise advertising) with the exception of arterials in Richmond where none of the conditions differed from each other. Examination of where drivers gazed in the CEVMS and standard billboard conditions showed that gazes away from the road ahead were not primarily to the billboards. Average and maximum fixations to CEVMS and standard billboards were similar across all conditions. However, four long dwell times were found (sequential and multiple fixations) that were greater than 2,000 ms. One was to a CEVMS on a freeway in the day time, two were to the same standard billboard on a freeway once in the day and once at night; and one was to a standard billboard on an arterial at night. In Richmond, the results showed that drivers gazed more at CEVMS than at standard billboards at night; however, in Reading the drivers were equally likely to gaze towards CEVMS or standard billboards in day and night. The results of the study are consistent with research and theory on the control of gaze behavior in natural environments. The demands of the driving task tend to affect the driver's self-regulation of gaze behavior.					
17. Key Words Driver visual behavior, visual environment, billboards, eye tracking system, commercial electronic variable message signs, CEVMS, visual complexity				18. Distribution Statement No restrictions.	
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Unclassified		21. No. of Pages	22. Price

SI* (MODERN METRIC) CONVERSION FACTORS

APPROXIMATE CONVERSIONS TO SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
in	inches	25.4	millimeters	mm
ft	feet	0.305	meters	m
yd	yards	0.914	meters	m
mi	miles	1.61	kilometers	km
AREA				
in ²	square inches	645.2	square millimeters	mm ²
ft ²	square feet	0.093	square meters	m ²
yd ²	square yard	0.836	square meters	m ²
ac	acres	0.405	hectares	ha
mi ²	square miles	2.59	square kilometers	km ²
VOLUME				
fl oz	fluid ounces	29.57	milliliters	mL
gal	gallons	3.785	liters	L
ft ³	cubic feet	0.028	cubic meters	m ³
yd ³	cubic yards	0.765	cubic meters	m ³
NOTE: volumes greater than 1000 L shall be shown in m ³				
MASS				
oz	ounces	28.35	grams	g
lb	pounds	0.454	kilograms	kg
T	short tons (2000 lb)	0.907	megagrams (or "metric ton")	Mg (or "t")
TEMPERATURE (exact degrees)				
°F	Fahrenheit	5 (F-32)/9 or (F-32)/1.8	Celsius	°C
ILLUMINATION				
fc	foot-candles	10.76	lux	lx
fl	foot-Lamberts	3.426	candela/m ²	cd/m ²
FORCE and PRESSURE or STRESS				
lbf	poundforce	4.45	newtons	N
lbf/in ²	poundforce per square inch	6.89	kilopascals	kPa

APPROXIMATE CONVERSIONS FROM SI UNITS

Symbol	When You Know	Multiply By	To Find	Symbol
LENGTH				
mm	millimeters	0.039	inches	in
m	meters	3.28	feet	ft
m	meters	1.09	yards	yd
km	kilometers	0.621	miles	mi
AREA				
mm ²	square millimeters	0.0016	square inches	in ²
m ²	square meters	10.764	square feet	ft ²
m ²	square meters	1.195	square yards	yd ²
ha	hectares	2.47	acres	ac
km ²	square kilometers	0.386	square miles	mi ²
VOLUME				
mL	milliliters	0.034	fluid ounces	fl oz
L	liters	0.264	gallons	gal
m ³	cubic meters	35.314	cubic feet	ft ³
m ³	cubic meters	1.307	cubic yards	yd ³
MASS				
g	grams	0.035	ounces	oz
kg	kilograms	2.202	pounds	lb
Mg (or "t")	megagrams (or "metric ton")	1.103	short tons (2000 lb)	T
TEMPERATURE (exact degrees)				
°C	Celsius	1.8C+32	Fahrenheit	°F
ILLUMINATION				
lx	lux	0.0929	foot-candles	fc
cd/m ²	candela/m ²	0.2919	foot-Lamberts	fl
FORCE and PRESSURE or STRESS				
N	newtons	0.225	poundforce	lbf
kPa	kilopascals	0.145	poundforce per square inch	lbf/in ²

*SI is the symbol for the International System of Units. Appropriate rounding should be made to comply with Section 4 of ASTM E380.
(Revised March 2003)

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LIST OF ACRONYMS AND SYMBOLS

CEVMS	Commercial Electronic Variable Message Sign
EB	Empirical Bayes
DCZ	Data Collection Zone
ROI	Region of Interest
LED	Light-Emitting Diode
IR	Infra-Red
CCD	Charge-Coupled Device
MAPPS	Multiple-Analysis of Psychophysical and Performance Signals
GEE	Generalized Estimating Equations
FHWA	Federal Highway Administration
DOT	Department of Transportation

EXECUTIVE SUMMARY

This study examines where drivers look when driving past commercial electronic variable message signs (CEVMS), standard billboards, or no off-premise advertising. The results and conclusions are presented in response to the three research questions listed below:

1. Do CEVMS attract drivers' attention away from the forward roadway and other driving-relevant stimuli?
2. Do glances to CEVMS occur that would suggest a decrease in safety?
3. Do drivers look at CEVMS more than at standard billboards?

This study follows a Federal Highway Administration (FHWA) review of the literature on the possible distracting and safety effects of off-premise advertising and CEVMS in particular. The review considered laboratory studies, driving simulator studies, field research vehicle studies, and crash studies. The published literature indicated that there was no consistent evidence showing a safety or distraction effect due to off-premise advertising. However, the review also enumerated potential limitations in the previous research that may have resulted in the finding of no distraction effects for off-premise advertising. The study team recommended that additional research be conducted using instrumented vehicle research methods with eye tracking technology.

The eyes are constantly moving and they fixate (focus on a specific object or area), perform saccades (eye movements to change the point of fixation), and engage in pursuit movements (track moving objects). It is during fixations that we take in detailed information about the environment. Eye tracking allows one to determine to what degree off-premise advertising may divert attention away from the forward roadway. A finding that areas containing CEVMS result in significantly more gazes to the billboards at a cost of not gazing toward the forward roadway would suggest a potential safety risk. In addition to measuring the degree to which CEVMS may distract from the forward roadway, an eye tracking device would allow an examination of the duration of fixations and dwell times (multiple sequential fixations) to CEVMS and standard billboards. Previous research conducted by the National Highway Traffic Safety Administration (NHTSA) led to the conclusion that taking your eyes off the road for 2 seconds or more presents a safety risk. Measuring fixations and dwell times to CEVMS and standard billboards would also allow a determination as to the degree to which these advertising signs lead to potentially unsafe gaze behavior.

Most of the literature concerning eye gaze behavior in dynamic environments suggests that task demands tend to override visual salience (an object that stands out because of its physical properties) in determining attention allocation. When extended to driving, it would be expected that visual attention will be directed toward task-relevant areas and objects (e.g., the roadway, other vehicles, speed limit signs) and that other salient objects, such as billboards, would not necessarily capture attention. However, driving is a somewhat automatic process and conditions generally do not require constant, undivided attention. As a result, salient stimuli, such as CEVMS, might capture driver attention and produce an unwanted increase in driver distraction. The present study addresses this concern.

This study used an instrumented vehicle with an eye tracking system to measure where drivers were looking when driving past CEVMS and standard billboards. The CEVMS and standard billboards were measured with respect to luminance, location, size, and other relevant variables to characterize these visual stimuli extensively. Unlike previous studies on digital billboards, the present study examined CEVMS as deployed in two United States cities. These billboards did not contain dynamic video or other dynamic elements, but changed content approximately every 8 to 10 seconds. The eye tracking system had nearly a 2-degree level of resolution that provided significantly more accuracy in determining what objects the drivers were looking at compared to an earlier naturalistic driving study. This study assessed two data collection efforts that employed the same methodology in two cities.

In each city, the study examined eye glance behavior to four CEVMS, two on arterials and two on freeways. There were an equal number of signs on the left and right side of the road for arterials and freeways. The standard billboards were selected for comparison with CEVMS such that one standard billboard environment matched as closely as possible that of each of the CEVMS. Two control locations were selected that did not contain off-premise advertising, one on an arterial and the other on a freeway. This resulted in 10 data collection zones in each city that were approximately 1,000 feet in length (the distance from the start of the data collection zone to the point that the CEVMS or standard billboard disappeared from the data collection video).

In Reading, Pennsylvania, 14 participants drove at night and 17 drove during the day. In Richmond, Virginia, 10 participants drove at night and 14 drove during the day. Calibration of the eye tracking system, practice drive, and the data collection drive took approximately 2 hours per participant to accomplish.

The following is a summary of the study results and conclusions presented in reference to the three research questions the study aimed to address.

Do CEVMS attract drivers' attention away from the forward roadway and other driving relevant stimuli?

- On average, the drivers in this study devoted between 73 and 85 percent of their visual attention to the road ahead for both CEVMS and standard billboards. This range is consistent with earlier field research studies. In the present study, the presence of CEVMS did not appear to be related to a decrease in looking toward the road ahead.

Do glances to CEVMS occur that would suggest a decrease in safety?

- The average fixation duration to CEVMS was 379 ms and to standard billboards it was 335 ms across the two cities. The average fixation durations to CEVMS and standard billboards were similar to the average fixation duration to the road ahead.
- The longest fixation to a CEVMS was 1,335 ms and to a standard billboard it was 1,284 ms. The current widely accepted threshold for durations of glances away from the road ahead that result in higher crash risk is 2,000 ms. This value comes from a NHTSA

naturalistic driving study that showed a significant increase in crash odds when glances away from the road ahead were 2,000 ms or longer.

- Four dwell times (aggregate of consecutive fixations to the same object) greater than 2,000 ms were observed across the two studies. Three were to standard billboards and one was to a CEVMS. The long dwell time to the CEVMS occurred in the daytime to a billboard viewable from a freeway. Review of the video data for these four long dwell times showed that the signs were not far from the forward view while participant's gaze dwelled on them. Therefore, the drivers still had access to information about what was in front of them through peripheral vision.
- The results did not provide evidence indicating that CEVMS, as deployed and tested in the two selected cities, were associated with unacceptably long glances away from the road. When dwell times longer than the currently accepted threshold of 2,000 ms occurred, the road ahead was still in the driver's field of view. This was the case for both CEVMS and standard billboards.

Do drivers look at CEVMS more than at standard billboards?

- When comparing the probability of a gaze at a CEVMS versus a standard billboard, the drivers in this study were generally more likely to gaze at CEVMS than at standard billboards. However, some variability occurred between the two locations and between the types of roadway (arterial or freeway).
- In Reading, when considering the proportion of time spent looking at billboards, the participants looked more often at CEVMS than at standard billboards when on arterials (63 percent to CEVMS and 37 percent to a standard billboard), whereas they looked more often at standard billboards when on freeways (33 percent to CEVMS and 67 percent to a standard billboard). In Richmond, the drivers looked at CEVMS more than standard billboards no matter the type of road they were on, but as in Reading, the preference for gazing at CEVMS was greater on arterials (68 percent to CEVMS and 32 percent to standard billboards) than on freeways (55 percent to CEVMS and 45 percent to standard billboards). When a gaze was to an off-premise advertising sign, the drivers were generally more likely to gaze at a CEVMS than at a standard billboard.
- In Richmond, the drivers showed a preference for gazing at CEVMS versus standard billboards at night, but in Reading the time of day did not affect gaze behavior. In Richmond, drivers gazed at CEVMS 71 percent and at standard billboards 29 percent at night. On the other hand, in the day the drivers gazed at CEVMS 52 percent and at standard billboards 48 percent.
- In Reading, the average gaze dwell time for CEVMS was 981 ms and for standard billboards it was 1,386 ms. The difference in these average dwell times was not statistically significant. In contrast, the average dwell times to CEVMS and standard billboards were significantly different in Richmond (1,096 ms and 674 ms, respectively).

The present data suggest that the drivers in this study directed the majority of their visual attention to areas of the roadway that were relevant to the task at hand (e.g., the driving task). Furthermore, it is possible, and likely, that in the time that the drivers looked away from the forward roadway, they may have elected to glance at other objects in the surrounding environment (in the absence of billboards) that were not relevant to the driving task. When billboards were present, the drivers in this study sometimes looked at them, but not such that overall attention to the forward roadway decreased.

It also should be noted that, like other studies in the available literature, this study adds to the knowledge base on the issues examined, but does not present definitive answers to the research questions investigated.

INTRODUCTION

“The primary responsibility of the driver is to operate a motor vehicle safely. The task of driving requires full attention and focus. Drivers should resist engaging in any activity that takes their eyes and attention off of the road for more than a couple of seconds. In some circumstances even a second or two can make all the difference in a driver being able to avoid a crash.” – US Department of Transportation⁽¹⁾

The advent of electronic billboard technologies, in particular the digital Light-Emitting Diode (LED) billboard, has prompted a reevaluation of regulations for controlling outdoor advertising. An attractive quality of these LED billboards, which are hereafter referred to as Commercial Electronic Variable Message Signs (CEVMS), is that advertisements can change almost instantly. Furthermore, outdoor advertising companies can make these changes from a central remote office. Of concern is whether or not CEVMS may attract drivers’ attention away from the primary task (driving) in a way that compromises safety.

The current Federal Highway Administration (FHWA) guidance recommends that CEVMS should not change content more frequently than once every 8 seconds.⁽²⁾ However, according to Scenic America, the basis of the safety concern is that the “...distinguishing trait...” of a CEVMS “... is that it can vary while a driver watches it, in a setting in which that variation is likely to attract the drivers’ attention away from the roadway.”⁽³⁾ This study was conducted to provide the FHWA with data to determine if CEVMS capture visual attention differently than standard off-premise advertising billboards.

BACKGROUND

A 2009 review of the literature by Molino et al. for the FHWA failed to find convincing empirical evidence that CEVMS, as currently implemented, constitutes a safety risk greater than that of conventional vinyl billboards.⁽⁴⁾ A great deal of work has been focused in this area, but the findings of these studies have been mixed.^(4,5) A summary of the key past findings is presented here, but the reader is referred to Molino et al. for a comprehensive review of studies prior to 2008.⁽⁴⁾

Post-Hoc Crash Studies

Post-hoc crash studies use reviews of police traffic collision reports or statistical summaries of such reports in an effort to understand the causes of crashes that have taken place in the vicinity of some change to the roadside environment. In the present case, the change of concern is the introduction of CEVMS to the roadside or the replacement of conventional billboards with CEVMS.

The literature review conducted by Molino et al. did not find compelling evidence for a distraction effect attributable to CEVMS.⁽⁴⁾ The authors concluded that all post-hoc crash studies are subject to certain weaknesses, most of which are difficult to overcome. For example, the vast majority of crashes are never reported to police; thus, such studies are likely to underreport crashes. Also, when crashes are caused by factors such as driver distraction or inattention, the involved driver may be unwilling or unable to report these factors to a police investigator.

Another weakness is that police, under time pressure, are rarely able to investigate the true root causes of crashes unless they involve serious injury, death, or extensive property damage. Furthermore, to have confidence in the results, such studies need to collect comparable data before and after the change, and, in the after phase, at equivalent but unaffected roadway sections. Since crashes are infrequent events, data collection needs to span extended periods of time both before and after introduction of the change. Few studies are able to obtain such extensive data.

Two recent studies by Tantala and Tantala examined the relationship between the presence of CEVMS and crash statistics in Richmond, Virginia, and Reading, Pennsylvania.^(6,7) For the Richmond area, 7 years of crash data at 10 locations with CEVMS were included in the analyses. The study used a before-after methodology where most sites originally contained vinyl billboards (before) that were converted to CEVMS (after). The quantity of crash data was not the same for all locations and ranged from 1 year before/after to 3 years before/after. The study employed the Empirical Bayes (EB) method to analyze the data.⁽⁸⁾ The results indicated that the total number of crashes observed was consistent with what would be statistically expected with or without the introduction of CEVMS. The analysis approach for Reading locations was much the same as for Richmond other than there were 20 rather than 10 CEVMS and 8 years of crash statistics. The EB method showed results for Reading that were very similar to those of Richmond.

The studies by Tantala and Tantala appear to address many of the concerns from Molino et al. regarding the weaknesses and issues associated with crash studies.^(4,6,7) For example, they include crash comparisons for locations within multiple distances of each CEVMS to address concerns about the visual range used in previous analyses. They used EB analysis techniques to correct for regression-to-mean bias. Also, the EB method would better reflect crash rate changes due to changes in average daily traffic and the interactions of these with the roadway features that were coded in the model. The studies followed approaches that are commonly used in post-hoc crash studies, though the results would have been strengthened by including before-after results for non-CEVMS locations as a control group.

Field Investigations

Field investigations include unobtrusive observation, naturalistic driving studies, on-road instrumented vehicle investigations, test track experiments, driver interviews, surveys, and questionnaires. The following focuses on relevant studies that employed naturalistic driving and on-road instrumented vehicle research methods.

Lee, McElheny, and Gibbons undertook an on-road instrumented vehicle study on Interstate and local roads near Cleveland, Ohio.⁽⁹⁾ The study looked at driver glance behavior in the vicinity of digital billboards, conventional billboards, comparison sites (sites with buildings and other signs, including digital signs), and control sites (those without similar signage). The results showed that there were no differences in the overall glance patterns (percent eyes-on-road and overall number of glances) between the different sites. Drivers also did not glance more frequently in the direction of digital billboards than in the direction of other event types (conventional billboards, comparison events, and baseline events) but drivers did take longer glances in the direction of digital billboards and comparison sites than in the direction of conventional billboards and baseline sites. However, the mean glance length toward the digital billboards was less than

1,000 ms. It is important to note that this study employed a video-based approach for examining drivers' visual behavior, which has an accuracy of no better than 20 degrees.⁽¹⁰⁾ While this technique is likely to be effective in assessing gross eye movements and looks that are away from the road ahead, it may not have sufficient resolution to discriminate what specific object the driver is looking at outside of the vehicle.

Beijer, Smiley, and Eizenman evaluated driver glances toward four different types of roadside advertising signs on roads in the Toronto, Canada, area.⁽¹¹⁾ The four types of signs were: (a) billboard signs with static advertisements; (b) billboard advertisements placed on vertical rollers that could rotate to show one of three advertisements in succession; (c) scrolling text signs with a minor active component, which usually consisted of a small strip of lights that formed words scrolling across the screen or, in some cases, a larger area capable of displaying text but not video; and (d) signs with video images that had a color screen capable of displaying both moving text and moving images. The study employed an on-road instrumented vehicle with a head-mounted eye tracking device. The researchers found no significant differences in average glance duration or the maximum glance duration for the various sign types; however, the number of glances was significantly lower for billboard signs than for the roller bar, scrolling text, and video signs.

Smiley, Smahel, and Eizenman conducted a field driving study that employed an eye tracking system that recorded drivers' eye movements as participants drove past video signs located at three downtown intersections and along an urban expressway.⁽¹²⁾ The study route included static billboards and video advertising. The results of the study showed that on average 76 percent of glances were to the road ahead. Glances at advertising, including static billboards and video signs, constituted 1.2 percent of total glances. The mean glance durations for advertising signs were between 500 ms and 750 ms, although there were a few glances of about 1,400 ms in duration. Video signs were not more likely than static commercial signs to be looked at when headways were short; in fact, the reverse was the case. Furthermore, the number of glances per individual video sign was small, and statistically significant differences in looking behavior were not found.

Kettwich, Kartsen, Klinger, and Lemmer conducted a field study where drivers' gaze behavior was measured with an eye tracking system.⁽¹³⁾ Sixteen participants drove an 11.5 mile (18.5 km) route comprised of highways, arterial roads, main roads, and one-way streets in Karlsruhe, Germany. The route contained advertising pillars, event posters, company logos, and video screens. Mean gaze duration for the four types of advertising was computed for periods when the vehicle was in motion and when it was stopped. Gaze duration while driving for all types of advertisements was under 1,000 ms. On the other hand, while the vehicle was stopped, the mean gaze duration for video screen advertisements was 2,750 ms. The study showed a significant difference between gaze duration while driving and while stationary: gaze duration was affected by the task at hand. That is, drivers tended to gaze longer while the car was stopped and there were few driving task demands.

The previously mentioned studies estimated the duration of glances to advertising and computed mean values of less than 1,000 ms. Klauer et al., in his analysis of the 100-Car Naturalistic Driving Study, concluded that glances away from the roadway for any purpose lasting more than 2,000 ms increase near-crash/crash risk by at least two times that of normal, baseline driving.⁽¹⁴⁾

Klauer et al. also indicated that short, brief glances away from the forward roadway for the purpose of scanning the driving environment are safe and actually decrease near-crash/crash risk.⁽¹⁴⁾ Using devices in a vehicle that draw visual attention away from the forward roadway for more than 2,000 ms (e.g., texting) is incompatible with safe driving. However, for external stimuli, especially those near the roadway, the evaluation of eye glances with respect to safety is less clear since peripheral vision would allow the driver to still have visual access to the forward roadway.

Laboratory Studies

Laboratory investigations related to roadway safety can be classified into several categories: driving simulations, non-driving-simulator laboratory testing, and focus groups. The review of relevant laboratory studies by Molino et al. did not show conclusive evidence regarding the distracting effects of CEVMS.⁽⁴⁾ Moreover, the authors concluded that present driving simulators do not have sufficient visual dynamic range, image resolution, and contrast ratio capability to produce the compelling visual effect of a bright, photo-realistic LED-based CEVMS against a natural background scene. The following is a discussion of a driving simulator study conducted after the publication of Molino et al.⁽⁴⁾ The study focused on the effects of advertising on driver visual behavior.

Chattington, Reed, Basacik, Flint, and Parkes conducted a driving simulator study in the United Kingdom (UK) to evaluate the effects of static and video advertising on driver glance behavior.⁽¹⁵⁾ The researchers examined the effects of advertisement position relative to the road (left, right, center on an overhead gantry, and in all three locations simultaneously), type of advertisement (static or video), and exposure duration of the advertisement. (The paper does not provide these durations in terms of time or distance. The exposure duration had to do with the amount of time or distance that the sign would be visible to the driver.) For the advertisements presented on the left side of the road (recall that drivers travel in the left lane in the UK), mean glance durations for static and video advertisements were significantly longer (approximately 650 to 750 ms) when drivers experienced long advertisement exposure as opposed to medium and short exposures. Drivers looked more at video advertisements (about 2 percent on average of the total duration recorded) than at static advertisements (about 0.75 percent on average). In addition, the location of the advertisements had an effect on glance behavior. When advertisements were located in the center of the road or in all three positions simultaneously, the glance durations were about 1,000 ms and were significantly longer than for signs placed on the right or left side of the road. For advertisements placed on the left side of the road, there was a significant difference in glance duration between static (about 400 ms) and video (about 800 ms). Advertisement position also had an effect on the proportion of time that a driver spent looking at an advertisement. The percentage of time looking at advertisements was greatest when signs were placed in all three locations, followed by center location signs, then the left location signs, and finally the right location signs. Drivers looked more at the video advertisements relative to the static advertisements when they were placed in all three locations, placed on the left, and placed on the right side of the road. The center placement did not show a significant difference in percent of time spent looking between static and video.

Summary

The results from these key studies offer some insight into whether CEVMS pose a visual distraction threat. However, these same studies also reveal some inconsistent findings and potential methodological issues that are addressed in the current study. The studies conducted by Smiley et al. showed drivers glanced forward at the roadway about 76 percent of the time in the presence of video and dynamic signs where a few long glances of approximately 1,400 ms were observed.⁽¹²⁾ However, the video and dynamic signs used in these studies portray moving objects that are not present in CEVMS as deployed in the United States. In another field study employing eye tracking, Kettwich et al. found that gaze duration while driving for all types of advertisements that they evaluated was less than 1,000 ms; however, when the vehicle was stopped, mean gaze duration for advertising was as high as 2,750 ms.⁽¹⁶⁾ Collectively, these studies did not demonstrate that the advertising signs detracted from drivers' glances forward at the roadway in a substantive manner while the vehicle was moving.

In contrast, the simulator study by Chattington et al. demonstrated that dynamic signs showing moving video or other dynamic elements may draw attention away from the roadway.⁽¹⁵⁾ Furthermore, the location of the advertising sign on the road is an important factor in drawing drivers' visual attention. Advertisements with moving video placed in the center of the roadway on an overhead gantry or in all three positions (right, left, and in the center) simultaneously are very likely to draw glances from drivers.

Finally, in a study that examined CEVMS as deployed in the United States, Lee et al. did not show any significant effects of CEVMS on driver glance behavior.⁽⁹⁾ However, the methodology that was used likely did not employ sufficient sensitivity to determine at what specific object in the environment a driver was looking.

None of these studies combined all necessary factors to address the current CEVMS situation in the United States. Those studies that used eye tracking on real roads had animated and video-based signs, which are not reflective of current off-premise CEVMS practice in the United States.

STUDY APPROACH

Based on an extensive review of the literature, Molino et al. concluded that the most effective method to use in an evaluation of the effects of CEVMS on driver visual behavior was the instrumented field vehicle method that incorporated an eye tracking system.⁽⁴⁾ The present study employed such an instrumented field vehicle with an eye tracking system and examined the degree to which CEVMS attract drivers' attention away from the forward roadway.

The following presents a brief overview and discussion of studies using eye tracking methodology with complex visual stimuli, especially in natural environments (walking, driving, etc.). The review by Molino et al. recommended the use of this type of technology and method; however, a discussion laying out technical and theoretical issues underlying the use of eye tracking methods was not presented.⁽⁴⁾ This background is important for the interpretation of the results of the studies conducted here.

Standard and digital billboards are often salient stimuli in the driving environment, which may make them conspicuous. Cole and Hughes define attention conspicuity as the extent to which a stimulus is sufficiently prominent in the driving environment to capture attention. Further, Cole and Hughes state that attention conspicuity is a function of size, color, brightness, contrast relative to surroundings, and dynamic components such as movement and change.⁽¹⁷⁾ It is clear that under certain circumstances image salience or conspicuity can provide a good explanation of how humans orient their attention.

At any given moment a large number of stimuli reach our senses, but only a limited number of them are selected for further processing. In general, attention can be focused on a stimulus because it is important for achieving some goal, or because the properties of the stimulus can attract the attention of the observer independent of their intentions (e.g., a car horn may elicit an orienting response). When the focus of attention is goal directed, it is referred to as top-down. When the focus of attention is principally a function of stimulus attributes, it is referred to as bottom-up.⁽¹⁸⁾

In general, billboards (either standard or CEVMS) are not relevant to the driving task but are presumably designed to be salient stimuli in the environment where they may draw a driver's attention. The question is to what degree CEVMS draw a driver's attention away from driving-relevant stimuli (e.g., road ahead, mirrors, and speedometer) and is this different from a standard billboard? In his review of the literature Wachtel leads one to consider CEVMS as stimuli in the environment where attention to them would be drawn in a bottom-up manner; that is, the salience of the billboards would make them stand out relative to other stimuli in the environment and drivers would reflexively look at these signs.⁽¹⁹⁾ Wachtel's conclusions were in reference to research by Theeuwes who employed simple letter stimulus arrays in a laboratory task.⁽²⁰⁾ Research using simple visual stimuli in a laboratory environment are very useful for testing different theories of perception, but often lack direct application to tasks such as driving. The following discusses research using complex visual stimuli and tasks that are more relevant to natural vision as experienced in the driving task.

A recent review of stimulus salience and eye guidance by Tatler et al. shows that most of the evidence for the capture of attention by the conspicuity of stimuli comes from research in which the stimulus is a simple visual search array or in which the target is uniquely defined by simple visual features.⁽²¹⁾ In other words, these are laboratory studies that use letters, arrays of letters, or simple geometric patterns as the stimuli. Pure salience-based models are capable of predicting eye movement endpoint in simple displays, but are less successful for more complex scenes that contain task-relevant and task-irrelevant salient areas.^(22,23)

Research by Henderson et al. using photographs of actual scenes showed that subjects looked at non-salient scene regions containing a search target and rarely looked at salient non-task-relevant regions of the scenes.⁽²⁴⁾ Salience of the stimulus alone was not a good predictor of where participants looked. Additional research by Henderson using photographs of real world scenes also showed that subjects fixated on regions of the pictures that provided task-relevant information rather than visually salient regions with no task-relevant information. However, Henderson acknowledges that static pictures have many shortcomings when used as surrogates for real environments.⁽²⁵⁾

Land's review of eye movements in dynamic environments concluded that the eyes are proactive and typically seek out information required in the second before each new activity commences.⁽²⁶⁾ Specific tasks (e.g., driving) have characteristic but flexible patterns of eye movement that accompany them, and these patterns are similar between individuals. Land concluded that the eyes rarely visit objects that are irrelevant to the task, and the conspicuity of objects is less important than the objects' roles in the task. In a subsequent review of eye movement and natural behavior, Land concluded that in a task that requires fixation on a sequence of specific objects, the capture of gaze by irrelevant salient objects would, in general, be an obtrusive nuisance.⁽²²⁾

The literature examining gaze control under natural behavior suggests that it is principally top-down driven, or intentional.^(24,25,26,22,21,27) However, top-down processing does not explain all gaze control or eye movements. For example, imagine driving down a two-lane country road and a deer jumps into the road. It is most likely that you will attend and react to this deer. Unplanned or unexpected stimuli capture our attention as we engage in complex natural tasks. Research by Jovancevic-Misic and Hayhoe showed that human gaze patterns are sensitive to the probabilistic nature of the environment.⁽²⁸⁾ In this study, participants' eye movement behavior was observed while walking among other pedestrians. The other pedestrians were confederates and were either safe, risky, or rogue pedestrians. When the study began, the risky pedestrian took a collision course with the participant 50 percent of the time, and the rogue pedestrian always assumed a collision course as he approached the participant, whereas the safe pedestrian never took a collision course. Midway through the study the rogue and safe pedestrians exchanged roles but the risky pedestrian role remained the same. The participants were not informed about the behavior of the other pedestrians. Participants were asked to follow a circular path for several laps and to avoid other pedestrians. The study showed that the participants modified their gaze behavior in response to the change in the other pedestrians' behavior. Jovancevic-Misic concluded that participants learned new priorities for gaze allocation within a few encounters and looked both sooner and longer at potentially dangerous pedestrians.⁽²⁸⁾

Gaze behavior in natural environments is affected by expectations that are derived through long-term learning. Using a virtual driving environment, Shinoda et al. asked participants to look for stop signs while driving an urban route.⁽²⁹⁾ Approximately 45 percent of the fixations fell in the general area of intersections during the simulated drive, and participants were more likely to detect stop signs placed near intersections than those placed in the middle of a block. Over time, drivers have learned that stop signs are more likely to appear near intersections and, as a result, drivers prioritize their allocation of gazes to these areas of the roadway.

The Tatler et al. review of the literature concludes that in natural vision, a consistent set of principles underlies eye guidance. These principles include relevance or reward potential, uncertainty about the state of the environment, and learned models of the environment.⁽²¹⁾ Salience of environmental stimuli alone typically does not explain most eye gaze behavior in naturalistic environments.

In sum, most of the literature concerning eye gaze behavior in dynamic environments suggests that task demands tend to override visual salience in determining attention allocation. When extended to driving, it would be expected that visual attention will be directed toward task-relevant areas and objects (e.g., the roadway, other vehicles, speed limit signs, etc.) and other

salient objects, such as billboards, will not necessarily capture attention. However, driving is a somewhat automatic process and conditions generally do not require constant undivided attention. As a result, salient stimuli, such as CEVMS, might capture driver attention and provide an unwarranted increase in driver distraction. The present study addresses this concern.

Research Questions

The present research evaluated the effects of CEVMS on driver visual behavior under actual roadway conditions in the daytime and at night. Roads containing CEVMS, standard billboards, and areas not containing off-premise advertising were selected. The CEVMS and standard billboards were measured with respect to luminance, location, size, and other relevant visual characteristics. The present study examined CEVMS as deployed in two United States cities. Unlike previous studies, the signs did not contain dynamic video or other dynamic elements. In addition, the eye tracking system used in this study has approximately a 2-degree level of resolution. This provided significantly more accuracy in determining what objects the drivers were looking at than in previous on-road studies examining looking behavior (recall that Lee et al. used video recordings of drivers' faces that, at best, examined gross eye movements).⁽⁹⁾

Two studies are reported. Each study was conducted in a different city. The two studies employed the same methodology. The studies' primary research questions were:

1. Do CEVMS attract drivers' attention away from the forward roadway and other driving relevant stimuli?
2. Do glances to CEVMS occur that would suggest a decrease in safety?
3. Do drivers look at CEVMS more than at standard billboards?

EXPERIMENTAL APPROACH

The study used a field research vehicle equipped with a non-intrusive eye tracking system. The vehicle was a 2007 Jeep® Grand Cherokee Sport Utility Vehicle. The eye tracking system used (SmartEye® vehicle-mounted infrared (IR) eye-movement measuring system) is shown in figure 1.⁽³⁰⁾ The system consists of two IR light sources and three face cameras mounted on the dashboard of the vehicle. The cameras and light sources are small in size, and are not attached to the driver in any manner. The face cameras are synchronized to the IR light sources and are used to determine the head position and gaze direction of the driver.



Figure 1. Eye tracking system camera placement.

As a part of this eye tracking system, the vehicle was outfitted with a three-camera panoramic scene monitoring system for capturing the forward driving scene. The scene cameras were mounted on the roof of the vehicle directly above the driver's head position. The three cameras together provided an 80-degree wide by 40-degree high field of forward view. The scene cameras captured the forward view area available to the driver through the left side of the windshield and a portion of the right side of the windshield. The area visible to the driver through the rightmost area of the windshield was not captured by the scene cameras.

The vehicle was also outfitted with equipment to record GPS position, vehicle speed, and vehicle acceleration. The equipment also recorded events entered by an experimenter and synchronized those events with the eye tracking and vehicle data. The research vehicle is pictured in figure 2.



Figure 2. FHWA's field research vehicle.

EXPERIMENTAL DESIGN OVERVIEW

The approach entailed the use of the instrumented vehicle in which drivers navigated routes in cities that presented CEVMS and standard billboards as well as areas without off-premise advertising. The participants were instructed to drive the routes as they normally would. The drivers were not informed that the study was about outdoor advertising, but rather that it was about examining drivers' glance behavior as they followed route guidance directions.

Site Selection

More than 40 cities were evaluated in the selection of the test sites. Locations with CEVMS displays were identified using a variety of resources that included State department of transportation contacts, advertising company Web sites, and a popular geographic information system. A matrix was developed that listed the number of CEVMS in each city. For each site, the number of CEVMS along limited access and arterial roadways was determined.

One criterion for site selection was whether the location had practical routes that pass by a number of CEVMS as well as standard off-premise billboards and could be driven in about 30 minutes. Other considerations included access to vehicle maintenance personnel/facilities, proximity to research facilities, and ease of participant recruitment. Two cities were selected: Reading, and Richmond.

Table 1 presents the 16 cities that were included on the final list of potential study sites.

Table 1. Distribution of CEVMS by roadway classification for various cities.

<i>State</i>	<i>Area</i>	<i>Limited Access</i>	<i>Arterial</i>	<i>Other</i> ⁽¹⁾	<i>Total</i>
VA	Richmond	4	7	0	11
PA	Reading	7	11	0	18
VA	Roanoke	0	11	0	11
PA	Pittsburgh	0	0	15	15
TX	San Antonio	7	2	6	15
WI	Milwaukee	14	2	0	16
AZ	Phoenix	10	6	0	16
MN	St. Paul/Minneapolis	8	5	3	16
TN	Nashville	7	10	0	17
FL	Tampa-St. Petersburg	7	11	0	18
NM	Albuquerque	0	19	1	20
PA	Scranton-Wilkes Barre	7	14	1	22
OH	Columbus	1	22	0	23
GA	Atlanta	13	11	0	24
IL	Chicago	22	2	1	25
CA	Los Angeles	3	71	4	78

(1) Other includes roadways classified as both limited access and arterial or instances where the road classification was unknown. *Source:* www.lamar.com and www.clearchannel.com

In both test cities, the following independent variables were evaluated:

- **The type of advertising.** This included CEVMS, standard billboards, and no off-premise advertising. (It should be noted that in areas with no off-premise advertising, it was still possible to encounter on-premise advertising; e.g., for gas stations, restaurants, and other miscellaneous stores and shops.)
- **Time of day.** This included driving in the daytime and at night.
- **The functional class of roadways in which off-premise advertising signs were located.** Roads were classified as either freeway or arterial. It was observed that the different road classes were correlated with the presence of other visual information that could affect the driver's glance behavior. For example, the visual environment on arterials may be more complex or cluttered than on freeways because of the close proximity of buildings, driveways, and on-premise advertising, etc.

READING

The first on-road study was conducted in Reading. This study examined the type of advertising (CEVMS, standard billboard, or no off-premise advertising), time of day (day or night) and road type (freeway or arterial) as independent variables. Eye tracking was used to assess where participants gazed and for how long while driving. The luminance and contrast of the advertising signs were measured to characterize the billboards in the current study.

METHOD

Selection of Data Collection Zone Limits

Data collection zones (DCZ) were defined on the routes that participants drove where detailed analyses of the eye tracking data were planned. The DCZ were identified that contained a CEVMS, a standard billboard, or no off-premise advertising.

The rationale for selecting the DCZ limits took into account the geometry of the roadway (e.g., road curvature or obstructions that blocked view of billboards) and the capabilities of the eye tracking system (2 degrees of resolution). At a distance of 960 ft (292.61 m), the average billboard in Reading was 12.8 ft (3.90 m) by 36.9 ft (11.25 m) and would subtend a horizontal visual angle of 2.20 degrees and a vertical visual angle of 0.76 degrees, and thus glances to the billboard would just be resolvable by an eye tracking system with 2 degrees of accuracy. Therefore 960 ft was chosen as the maximum distance from billboards at which a DCZ would begin. If the target billboard was not visible from 960 ft (292.61 m) due to roadway geometry or other visual obstructions, such as trees or an overpass, the DCZ was shortened to a distance that prevented these objects from interfering with the driver's vision of the billboard. In DCZs with target off-premise billboards, the end of the DCZ was marked when the target billboard left the view of the scene camera. If the area contained no off-premise advertising, the end of the DCZ was defined by a physical landmark leaving the view of the eye tracking systems' scene camera.

Table 2 shows the data collection zone limits used in this study.

Advertising Conditions

The type of advertising present in DCZs was examined as an independent variable. DCZs fell into one of the following categories, which are listed in the second column of table 2:

- **CEVMS.** These were DCZs that contained one target CEVMS. Two CEVMS DCZs were located on freeways and two were located on arterials. Figure 3 and figure 4 show examples of CEVMS DCZs with the CEVMS highlighted in the pictures.
- **Standard billboard.** These were DCZs that contained one target standard billboard. Two standard billboard DCZs were located on freeways and two were located on arterials. Figure 5 and figure 6 show examples of standard billboard DCZs; the standard billboards are highlighted in the pictures.

- **No off-premise advertising conditions.** These DCZs contained no off-premise advertising. One of these DCZs was on a freeway (see figure 7) and the other was on an arterial (see figure 8).

Table 2. Inventory of target billboards with relevant parameters.

<i>DCZ</i>	<i>Advertising Type</i>	<i>Copy Dimensions (ft)</i>	<i>Side of Road</i>	<i>Setback from Road (ft)</i>	<i>Other Standard Billboards</i>	<i>Approach Length (ft)</i>	<i>Type of Roadway</i>
1	CONTROL	N/A	N/A	N/A	N/A	786	Freeway
6	CONTROL	N/A	N/A	N/A	N/A	308	Arterial
3	CEVMS	10'6" x 22'9"	L	12	0	375	Arterial
5	CEVMS	14'0" x 48'0"	L	133	1	853	Freeway
9	CEVMS	10'6" x 22'9"	R	43	0	537	Arterial
10	CEVMS	14'0" x 48'0"	R	133	1	991	Freeway
2	Standard	14'0" x 48'0"	L	20	0	644	Arterial
7	Standard	14'0" x 48'0"	R	35	1	774	Freeway
8	Standard	10'6" x 22'9"	R	40	1	833	Arterial
4	Standard	14'0" x 48'0"	L	10	0	770	Freeway

**N/A indicates that there were no off-premise advertising in these areas and these values are undefined.*



Figure 3. DCZ with a target CEVMS on a freeway.



Figure 4. DCZ with a target CEVMS on an arterial.



Figure 5. DCZ with a target standard billboard on a freeway.



Figure 6. DCZ with a target standard billboard on an arterial.



Figure 7. DCZ for the control condition on a freeway.



Figure 8. DCZ for the control condition on an arterial.

Photometric Measurement of Signs

Two primary metrics were used to describe the photometric characteristics of a sample of the CEVMS and standard billboards present at each location: luminance (cd/m^2) and contrast (Weber contrast ratio).

Photometric Equipment

Luminance was measured with a Radiant Imaging ProMetric 1600 Charge-Coupled Device (CCD) photometer with both a 50 mm and a 300 mm lenses. The CCD photometer provided a method of capturing the luminance of an entire scene at one time.

The photometric sensors were mounted in a vehicle of similar size to the eye tracking research vehicle. The photometer was located in the experimental vehicle as close to the driver's position as possible and was connected to a laptop computer that stored data as the images were acquired.

Measurement Methodology

Images of the billboards were acquired using the photometer manufacturer's software. The software provided the mean luminance of each billboard message. To prevent overexposure of

images in daylight, neutral density filters were manually affixed to the photometer lens and the luminance values were scaled appropriately. Standard billboards were typically measured only once; however, for CEVMS multiple measures were taken to account for changing content.

Photometric measurements were taken during day and night. Measurements were taken by centering the billboard in the photometer's field of view with approximately the equivalent of the width of the billboard on each side and the equivalent of the billboard height above and below the sign. The areas outside of the billboards were included to enable contrast calculations.

Standard billboards were assessed at a mean distance of 284 ft (ranging from 570 ft to 43 ft). The CEVMS were assessed at a mean distance of 479 ft (ranging from 972 ft to 220 ft). To include the background regions of appropriate size, the close measurement distances required the use of the 50 mm lens whereas measurements made from longer distances required the 300 mm lens. A significant determinant of the measurement locations was the availability of accessible and safe places from which to measure.

The Weber contrast ratio was used because it characterizes a billboard as having negative or positive contrast when compared to its background area.⁽³¹⁾ A negative contrast indicates the background areas have a higher mean luminance than the target billboard. A positive contrast indicates the target billboard has a higher mean luminance than the background. Overall, the absolute value of a contrast ratio simply indicates a difference in luminance between an item and its background. From a perceptual perspective luminance and contrast are directly related to the perception of brightness. For example, two signs with equal luminance may be perceived differently with respect to brightness because of differences in contrast.

Visual Complexity

Regan, Young, Lee and Gordon presented a taxonomic description of the various sources of driver distraction.⁽³²⁾ Potential sources of distraction were discussed in terms of: things brought into the vehicle; vehicle systems; vehicle occupants; moving objects or animals in the vehicle; internalized activity; and external objects, events, or activities. The external objects may include buildings, construction zones, billboards, road signs, vehicles, and so on. Focusing on the potential for information outside the vehicle to attract (or distract) the driver's attention, Horberry and Edquist developed a taxonomy for out-of-the-vehicle visual information. This suggested taxonomy includes four groupings of visual information: built roadway, situational entities, natural environment, and built environment.⁽³³⁾ These two taxonomies provide an organizational structure for conducting research; however, they do not currently provide a systematic or quantitative way of classifying the level of clutter or visual complexity present in a visual scene.

The method proposed by Rozenholtz, Li, and Nakano provides quantitative and perhaps reliable measures of visual clutter.⁽³⁴⁾ Their approach measures the feature congestion in a visual image. The implementation of the feature congestion measure involves four stages: (1) compute local feature covariance at multiple scales and compute the volume of the local covariance ellipsoid, (2) combine clutter across scale, (3) combine clutter across feature types, and (4) pool over space to get a single measure of clutter for each input image. The implementation that was used employed color, orientation and luminance contrast as features. Presumably, less cluttered

images can be visually coded more efficiently than cluttered images. For example, visual clutter can cause decreased recognition performance and greater difficulty in performing visual search.⁽³⁵⁾

Participants

In the present study participants were recruited at public libraries in the Reading area. A table was set up so that recruiters could discuss the requirements of the experiment with candidates. Individuals who expressed interest in participating were asked to complete a pre-screening form, a record of informed consent, and a department of motor vehicles form consenting to release of their driving record.

All participants were between 18 and 64 years of age and held a valid driver's license. The driving record for each volunteer was evaluated to eliminate drivers with excessive violations. The criteria for excluding drivers were as follows: (a) more than one violation in the preceding year; (b) more than three recorded violations; and (c) any driving while intoxicated violation.

Forty-three individuals were recruited to participate. Of these, five did not complete the drive because the eye tracker could not be calibrated to track their eye movements accurately. Data from an additional seven participants were excluded as the result of equipment failures (e.g., loose camera). In the end, usable data was collected from 31 participants (12 males, $M = 46$ years; 19 females, $M = 47$ years). Fourteen participants drove at night and 17 drove during the day.

Procedures

Data were collected from two participants per day (beginning at approximately 12:45 p.m. and 7:00 p.m.). Data collection began on September 18, 2009, and was completed on October 26, 2009.

Pre-Data Collection Activities

Participants were greeted by two researchers and asked to complete a fitness to drive questionnaire. This questionnaire focused on drivers' self-reports of alertness and use of substances that might impair driving (e.g., alcohol). All volunteers appeared fit.

Next, the participant and both researchers moved to the eye tracking calibration location and the test vehicle. The calibration procedure took approximately 20 minutes. Calibration of the eye tracking system entailed development of a profile for each participant. This was accomplished by taking multiple photographs of the participant's face as they slowly rotate their head from side to side. The saved photographs include points on the face for subsequent real-time head and eye tracking. Marked coordinates on the face photographs were edited by the experimenter as needed to improve the real-time face tracking. The procedure also included gaze calibration in which participants gazed at nine points on a wall. These points had been carefully plotted on the wall and correspond to the points in the eye tracking system's world model. Gaze calibration relates the individual participant's gaze vectors to known points in the real world. The eye tracking system uses two pulsating infrared sources mounted on the dashboard to create two corneal glints that are used to calculate gaze direction vectors. The glints were captured at 60 Hz. A second set

of cameras (scene cameras), fixed on top of the car close to the driver's viewpoint, were used to produce a video scene of the area ahead. The scene cameras recorded at 25 Hz. A parallax correction algorithm compensated for the distance between the driver's viewpoint and the scene cameras so that later processing could use the gaze vectors to show where in the forward scene the driver was gazing.

If it was not possible to calibrate the eye tracking system to a participant, the participant was dismissed and paid for their time. Causes of calibration failure included reflections from eye glasses, participant height (which put their eyes outside the range of the system), and eyelids that obscure a portion of the pupil.

Practice

After eye-tracker calibration, a short practice drive was made. Participants were shown a map of the route and written turn-by-turn directions prior to beginning the practice drive. Throughout the drive, verbal directions were provided by a GPS device.

During the practice drive, a researcher in the rear seat of the vehicle monitored the accuracy of eye tracking. If the system was tracking poorly, additional calibration was performed. If the calibration could not be improved, the participant was paid for their time and dismissed.

Data Collection

Participants drove two test routes (referred to as route A and B). Each route required 25 to 30 minutes to complete and included both freeway and arterial segments. Route A was 13 miles long and contained 6 DCZs. Route B was 16 miles long and contained 4 DCZs. Combined, participants drove in a total of 10 DCZs. Similar to the practice drive, participants were shown a map of the route and written turn-by-turn directions. A GPS device provided turn-by-turn guidance during the drive. Roughly one half of the participants drove route A first and the remaining participants began with route B. A 5 minute break followed the completion of the first route.

During the drives, a researcher in the front passenger seat assisted the driver when additional route guidance was required. The researcher was also tasked with recording near misses and driver errors if these occurred. The researcher in the rear seat monitored the performance of the eye tracker. If the eye tracker performance became unacceptable (i.e., loss of calibration), then the researcher in the rear asked the participant to park in a safe location so that the eye tracker could be recalibrated. This recalibration typically took a minute or two to accomplish.

Debriefing

After driving both routes, the participants provided comments regarding their drives. The comments were in reference to the use of a navigation system. No questions were asked about billboards. The participants were given \$120.00 in cash for their participation.

DATA REDUCTION

Eye Tracking Measures

The Multiple-Analysis of Psychophysical and Performance Signals (MAPPSTM) software was used to reduce the eye tracking data.⁽³⁶⁾ The software integrates the video output from the scene cameras with the output from the eye tracking software (e.g., gaze vectors). The analysis software provides an interface in which the gaze vectors determined by the eye tracker can be related to areas or objects in the scene camera view of the world. Analysts can indicate regions of interest (ROIs) in the scene camera views and the analysis software then assigns gaze vectors to the ROIs.

Figure 9 shows a screen capture from the analysis software in which static ROIs have been identified. These static ROIs slice up the scene camera views into six areas. The software also allows for the construction of dynamic ROIs. These are ROIs that move in the video because of own-vehicle movement (e.g., a sign changes position on the display as it is approached by the driver) or because the object moves over time independent of own-vehicle movement (e.g., pedestrian walking along the road, vehicle entering or exiting the road).

Static ROIs need only be entered once for the scenario being analyzed whereas dynamic ROIs need to be entered several times for a given DCZ depending on how the object moves along the video scene; however, not every frame needs to be coded with a dynamic ROI since the software interpolates across frames using the 60-Hz data to compute eye movement statistics.

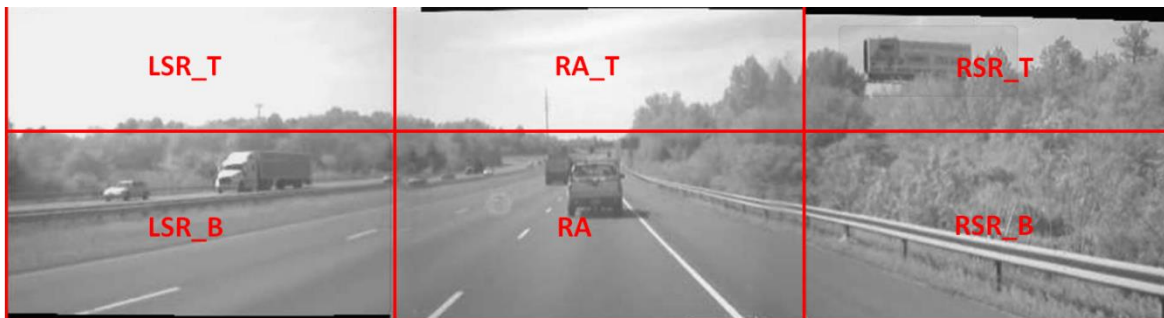


Figure 9. Screen capture showing static ROIs on a scene video output.

The following ROIs were defined with the analysis software:

Static ROIs

These ROIs were entered once into the software for each participant. The static ROIs for the windshield were divided into top and bottom to have more resolution during the coding process. The subsequent analyses in the report combines the top and bottom portion of these ROIs since it appeared that this additional level of resolution was not needed in order to address research questions:

- Road ahead: bottom portion (approximately 2/3) of the area of the forward roadway (center camera).

- Road ahead top: top portion (approximately 1/3) of the area of the forward roadway (center camera).
- Right side of road bottom: bottom portion (approximately 2/3) of the area to the right of the forward roadway (right camera).
- Right side of road top: top portion (approximately 1/3) of the area to the right of the forward roadway (right camera).
- Left side of road bottom (LSR_B): bottom portion (approximately 2/3) of the area to the left of the forward roadway (left camera).
- Left side of road bottom (LSR_T): top portion (approximately 1/3) of the area to the left of the forward roadway (left camera).
- Inside vehicle: below the panoramic video scene (outside of the view of the cameras, but eye tracking is still possible).
- Top: above the panoramic video scene (outside of the view of the cameras, but eye tracking is still possible).

Dynamic ROIs

These ROIs are created multiple times within a DCZ for stimuli that move relative to the driver:

- Driving-related safety risk: vehicle which posed a potential safety risk to the driver, defined as a car that is/may turn into the driver's direction of travel at a non-signalized or non-stop-controlled intersection (e.g., a car making a U-turn, a car waiting to turn right, or a car waiting to turn left). These vehicles were actively turning or entering the roadway or appeared to be in a position to enter the roadway.
- Target standard billboard: target standard billboard that defines the start and end of the DCZ.
- Other standard billboard: standard billboard(s) located in the DCZ, other than the target standard billboard or the target digital billboard.
- CEVMS: target digital billboard that defines the start and end of the DCZ.

The software determines the gaze intersection for each 60 Hz frame and assigns it to an ROI. In subsequent analyses and discussion, gaze intersections are referred to as gazes. Since ROIs may overlap, the software allows for the specification of priority for each ROI such that the ROI with the highest priority gets the gaze vector intersection assigned to it. For example, an ROI for a CEVMS may also be in the static ROI for the road ahead.

The 60 Hz temporal resolution of the eye tracking software does not provide sufficient information to make detailed analysis of saccade characteristics,¹ such as latency or speed. The analysis software uses three parameters in the determination of a fixation: a fixation radius, fixation duration, and a time out. The determination begins with a single-gaze vector intersection. Any subsequent intersection within a specified radius will be considered part of a fixation if the minimum fixation duration criterion is met. The radius parameter used in this study was 2 degrees and the minimum duration was 100 ms. The 2-degree selection was based on the estimated accuracy of the eye tracking system, as recommended by Recarte and Nunes.⁽³⁷⁾ The 100 ms minimum duration is consistent with many other published studies; however, some investigators use minimums of as little as 60 ms.^(37,38) Because of mini-saccades and noise in the eye tracking system, it is possible to have brief excursions outside the 2 degree window for a fixation. In this study, an excursion time outside the 2-degree radius of less than 90 ms was ignored. Once the gaze intersection fell outside the 2-degree radius of a fixation for more than 90 ms, the process of identifying a fixation began anew.

Other Measures

Driving Behavior Measures

During data collection, the front-seat researcher observed the driver's behavior and the driving environment. The researcher used the following subjective categories in observing the participant's driving behavior:

- **Driver Error:** signified any error on behalf of the driver in which the researcher felt slightly uncomfortable, but not to a significant degree (e.g., driving on an exit ramp too quickly, turning too quickly).
- **Near Miss:** signified any event in which the researcher felt uncomfortable due to driver response to external sources (e.g., slamming on brakes, swerving). A near miss is the extreme case of a driver error.
- **Incident:** signified any event in the roadway which may have had a potential impact on the attention of the driver and/or the flow of traffic (e.g., crash, emergency vehicle, animal, construction, train).

These observations were entered into a notebook computer linked to the research vehicle data collection system.

Level of Service Estimates

For each participant and each DCZ the analyst estimated the level of service of the road as they reviewed the scene camera video. One location per DCZ was selected (approximately halfway through the DCZ) where the number of vehicles in front of the research vehicle was counted. The procedure entailed (1) counting the number of travel lanes visible in the video, (2) using the

¹ During visual scanning, the point of gaze alternates between brief pauses (ocular fixations) and rapid shifts (saccades).

skip lines on the road to estimate the approximate distance in front of the vehicle that constituted the analysis zone, and (3) counting the number of vehicles present within the analysis zone. Vehicle density was calculated with the formula:

$$\text{Vehicle Density} = [(\text{Number of Vehicles in Analysis Zone})/(\text{Distance of Analysis Zone in ft}/5280)]/\text{Number of Lanes.}$$

Vehicle density is the number of vehicles per mile per lane.

Vehicle Speed

The speed of the research vehicle was recorded with GPS and a distance measurement instrument. Vehicle speed was used principally to ensure that the eye tracking data was recorded while the vehicle was in motion.

RESULTS

Results are presented with respect to the photometric measures of signs, the visual complexity of the DCZs, and the eye tracking measures. Photometric measurements were taken and analyzed to characterize the billboards in the study based on their luminance and contrasts, which are related to how bright the signs are perceived to be by drivers.

Photometric Measurements

Luminance

The mean daytime luminance of both the standard billboards and CEVMS was greater than at night. Nighttime luminance measurements reflect the fact that CEVMS use illuminating LED components while standard billboards are often illuminated from below by metal halide lamps. At night, CEVMS have a greater average luminance than standard billboards. Table 3 presents summary statistics for luminance as a function of time of day for the CEVMS and standard billboards.

Contrast

The daytime and nighttime Weber contrast ratios for both types of billboards are shown in table 3. Both CEVMS and standard billboards had contrast ratios that were close to zero (the surroundings were about equal in brightness to the signs) during the daytime. On the other hand, at night the CEVMS and standard billboards had positive contrast ratios (the signs were brighter than the surrounding), with the CEVMS having higher contrast than the standard billboards.

Table 3. Summary of luminance (cd/m^2) and contrast (Weber ratio) measurements.

<i>Day</i>	<i>Luminance (cd/m^2)</i>		<i>Contrast</i>	
	<i>Mean</i>	<i>St. Dev.</i>	<i>Mean</i>	<i>St.Dev.</i>
CEVMS	2126	798.81	-0.10	0.54
Standard Billboard	2993	2787.22	-0.27	0.84
<i>Night</i>				
CEVMS	56.00	23.16	73.72	56.92
Standard Billboard	17.80	17.11	36.01	30.93

Visual Complexity

The DCZs were characterized by their overall visual complexity or clutter. For each DCZ, five pictures were taken from the driver’s viewpoint at various locations within the DCZ. In Reading, the pictures were taken from 2:00 p.m. to 4:00 p.m. In Richmond, one route was photographed from 11:00 a.m. to noon and the other from 2:30 p.m. to 3:30 p.m. The pictures were taken at the start of the DCZ, quarter of the way through, half of the way through, three quarters of the way through, and at the end of the DCZ. The photographs were analyzed with MATLAB® routines that computed a measure of feature congestion for each image. Figure 10 shows the mean feature congestion measures for each of the DCZ environments. The arterial control condition was shown to have the highest level of clutter as measured by feature congestion. An analysis of variance was performed on the feature congestion measure to determine if the conditions differed significantly from each other. The four conditions with off-premise advertising did not differ significantly with respect to feature congestion; $F(3,36) = 1.25, p > 0.05$. Based on the feature congestion measure, the results indicate that the four conditions with off-premise advertising were equated with respect to the overall visual complexity of the driving scenes.

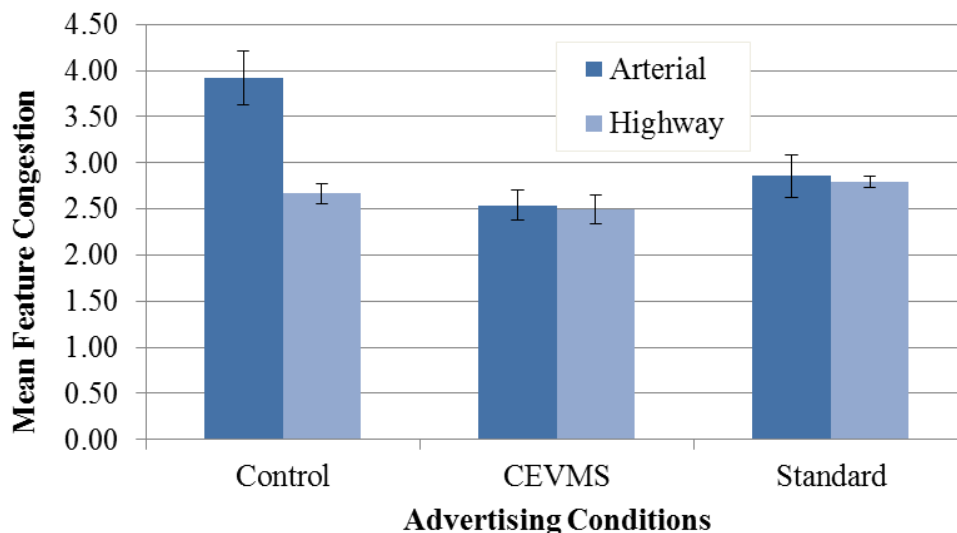


Figure 10. Mean feature congestion as a function of advertising condition and road type (standard errors for the mean are included in the graph).

Effects of Billboards on Gazes to the Road Ahead

For each 60 Hz frame, a determination was made as to the direction of the gaze vector. Previous research has shown that gazes do not need to be separated into saccades and fixations before calculating such measures as percent of time or the probability of looking to the road ahead.⁽³⁹⁾ This analysis examines the degree to which drivers gaze toward the road ahead across the different advertising conditions as a function of road type and time of day. Gazing toward the road ahead is critical for driving, and so the analysis examines the degree to which gazes toward this area are affected by the independent variables (advertising type, type of road, and time of day) and their interactions.

Generalized estimating equations (GEE) were used to analyze the probability of a participant gazing at driving-related information.^(40,41) The data for these analyses were not normally distributed and included repeated measures. The GEE model is appropriate for these types of data and analyses. Note that for all results included in this report, Wald statistics were the chosen alternative to likelihood ratio statistics because GEE uses quasi-likelihood instead of maximum likelihood.⁽⁴²⁾ For this analysis, road ahead included the following ROIs (as previously described and displayed in figure 9): road ahead, road ahead top, and driving-related risks. A logistic regression model for repeated measures was generated by using a binomial response distribution and Logit (i.e., log odds) link function. Only two possible outcomes are allowed when selecting a binomial response distribution. Thus, a variable (RoadAhead) was created to classify a participant's gaze behavior. If the participant gazed toward the road ahead, road ahead top, or driving-related risks, then the value of RoadAhead was set to one. If the participant gazed at any other object in the panoramic scene, then the value of RoadAhead was set to zero. Logistic regression typically models the probability of a success. In the current analysis, a success would be a gaze to road ahead information (RoadAhead = 1) and a failure would be a gaze toward non-road ahead information (RoadAhead = 0). The resultant value was the probability of a participant gazing at road-ahead information.

Time of day (day or night), road type (freeway or arterial), advertising condition (CEVMS, standard billboard, or control), and all corresponding second-order interactions were explanatory variables in the logistic regression model. The interaction of advertising condition by road type was statistically significant, $\chi^2(2) = 6.3, p = 0.043$. Table 4 shows the corresponding probabilities for gazing at the road ahead as a function of advertising condition and road type.

Table 4. The probability of gazing at the road ahead as a function of advertising condition and road type.

<i>Advertising Condition</i>	<i>Arterial</i>	<i>Freeway</i>
Control	0.92	0.86
CEVMS	0.82	0.73
Standard	0.80	0.77

Follow-up analyses for the interaction used Tukey-Kramer adjustments with an alpha level of 0.05. The arterial control condition had the greatest probability of looking at the road ahead ($M = 0.92$). This probability differed significantly from the remaining five probabilities. On

arterials, the probability of gazing at the road ahead did not differ between the CEVMS (M = 0.82) and the standard billboard (M = 0.80) DCZs. In contrast, there was a significant difference in this probability on freeways, where standard billboard DCZs yielded a higher probability (M = 0.77) than CEVMS DCZs (M = 0.73). The probability of gazing at the road ahead was also significantly higher in the freeway control DCZ (M = 0.86) than in either of the corresponding freeway off-premise advertising DCZs. The probability of gazing at road-ahead information in arterial CEVMS DCZs was not statistically different from the same probability in the freeway control DCZ.

Additional descriptive statistics were computed to determine the probability of gazing at the various ROIs that were defined in the panoramic scene. Some of the ROIs depicted in figure 9 were combined in the following fashion for ease of analysis:

- Road ahead, road ahead top, and driving-related risks combined to form *road ahead*.
- Left side of road bottom and left side of road top combined to form *left side of vehicle*.
- Right side of road bottom and right side of road top combined to form *right side of vehicle*.
- Inside vehicle and top combined to form *participant vehicle*.

Table 5 presents the probability of gazing at the different ROIs.

Table 5. Probability of gazing at ROIs for the three advertising conditions on arterials and freeways.

<i>Road Type</i>	<i>ROI</i>	<i>CEVMS</i>	<i>Standard Billboard</i>	<i>Control</i>
<i>Arterial</i>	<i>CEVMS</i>	0.07	N/A	N/A
	<i>Left Side of Vehicle</i>	0.06	0.06	0.02
	<i>Road ahead</i>	0.82	0.80	0.92
	<i>Right Side of Vehicle</i>	0.03	0.06	0.04
	<i>Standard Billboard</i>	N/A	0.03	N/A
	<i>Participant Vehicle</i>	0.03	0.05	0.02
<i>Freeway</i>	<i>CEVMS</i>	0.05	N/A	N/A
	<i>Left Side of Vehicle</i>	0.08	0.07	0.04
	<i>Road ahead</i>	0.73	0.77	0.86
	<i>Right Side of Vehicle</i>	0.09	0.02	0.05
	<i>Standard Billboard</i>	0.02*	0.09	N/A
	<i>Participant Vehicle</i>	0.04	0.05	0.05

* The CEVMS DCZs on freeways each contained one visible standard billboard.

The probability of gazing away from the forward roadway ranged from 0.08 to 0.27. In particular, the probability of gazing toward a CEVMS was greater on arterials (M = 0.07) than on freeways (M = 0.05). In contrast, the probability of gazing toward a target standard billboard was greater on freeways (M = 0.09) than on arterials (M = 0.03).

Fixations to CEVMS and Standard Billboards

About 2.4 percent of the fixations were to CEVMS. The mean fixation duration to a CEVMS was 388 ms and the maximum duration was 1,251 ms. Figure 11 shows the distribution of fixation durations to CEVMS during the day and night. In the daytime, the mean fixation duration to a CEVMS was 389 ms and at night it was 387 ms. Figure 12 shows the distribution of fixation durations to standard billboards. Approximately 2.4 percent of fixations were to standard billboards. The mean fixation duration to standard billboards was 341 ms during the daytime and 370 ms at night. The maximum fixation duration to standard billboards was 1,284 ms (which occurred at night). For comparison purposes, figure 13 shows the distribution of fixation durations to the road ahead (i.e., top and bottom road ahead ROIs) during the day and night. In the daytime, the mean fixation duration to the road ahead was 365 ms and at night it was 390 ms.

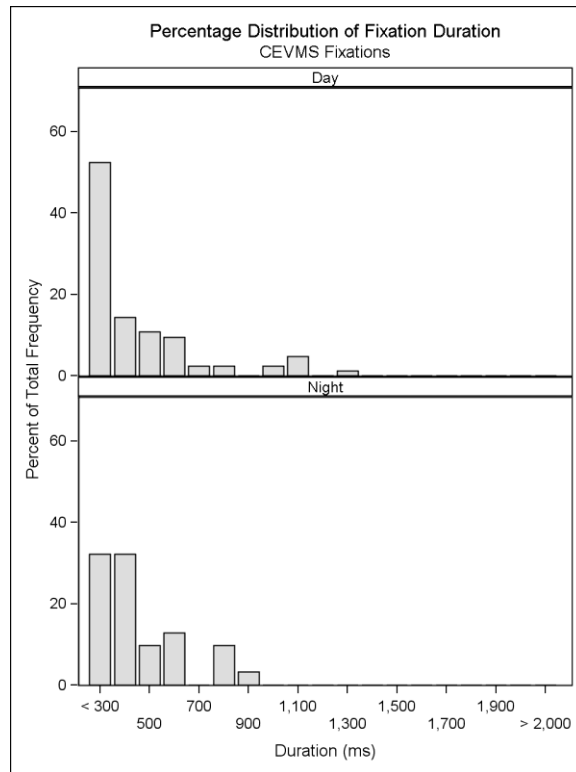


Figure 11. Distribution of fixation duration for CEVMS in the daytime and nighttime.

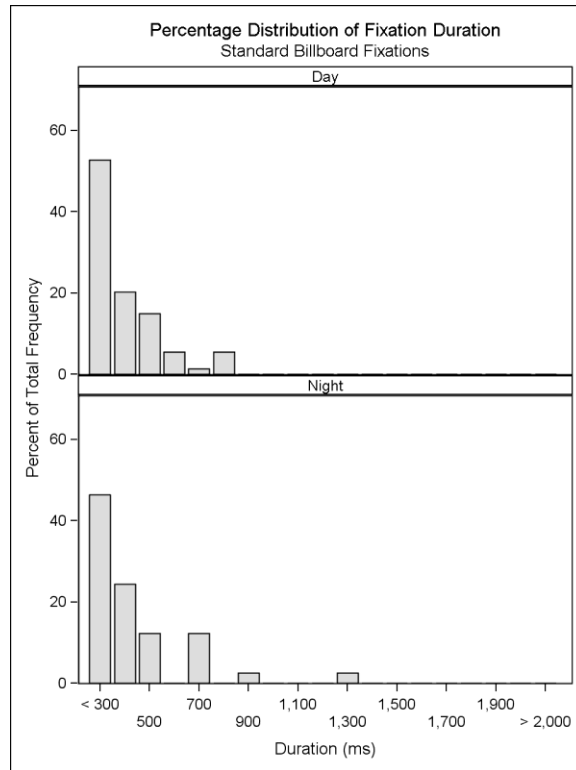


Figure 12. Distribution of fixation duration for standard billboards in the daytime and nighttime.

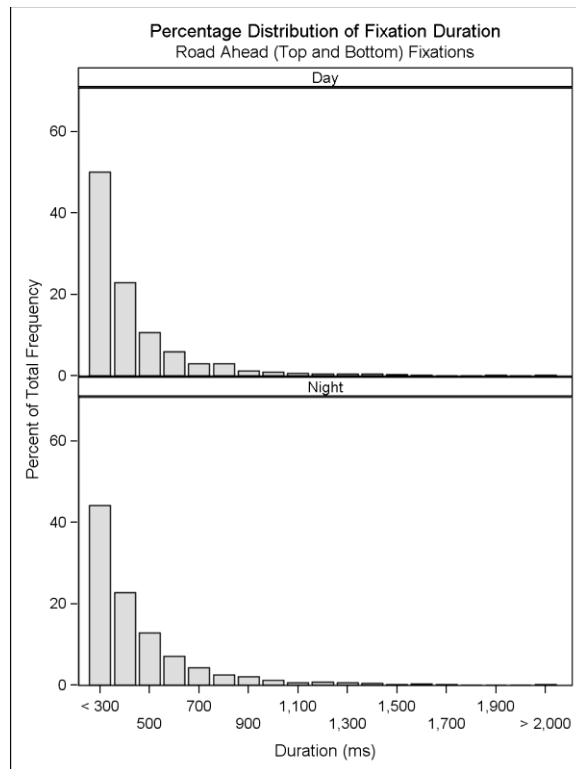


Figure 13. Distribution of fixation duration for road ahead (i.e., top and bottom road ahead ROIs) in the daytime and nighttime.

Dwell times on CEVMS and standard billboards were also examined. Dwell time is the duration of back-to-back fixations to the same ROI.^(43,44) The dwell times represent the cumulative time for the back-to-back fixations. Whereas there may be no long, single fixation to a billboard, there might still be multiple fixations that yield long dwell times. There were a total of 25 separate instances of multiple fixations to CEVMS with a mean of 2.4 fixations (minimum of 2 and maximum of 5). The 25 dwell times came from 15 different participants distributed across four different CEVMS. The mean duration of these dwell times was 994 ms (minimum of 418 ms and maximum of 1,467 ms).

For standard billboards, there were a total of 17 separate dwell times with a mean of 3.47 sequential fixations (minimum of 2 fixations and maximum of 8 fixations). The 17 dwell times came from 11 different participants distributed across 4 different standard billboards. The mean duration of these multiple fixations was 1,172 ms (minimum of 418 ms and maximum of 3,319 ms). There were three dwell-time durations that were greater than 2,000 ms. These are described in more detail below.

In some cases several dwell times came from the same participant. In order to compute a statistic on the difference between dwell times for CEVMS and standard billboards, average dwell times were computed per participant for the CEVMS and standard billboard conditions. These average values were used in a t-test assuming unequal variances. The difference in average dwell time between CEVMS ($M = 981$ ms) and standard billboards ($M = 1,386$ ms) was not statistically significant, $t(12) = -1.40$, $p > .05$.

Figure 14 through figure 23 show heat maps for the dwell-time durations to the standard billboards that were greater than 2,000 ms. These heat maps are snapshots from the DCZ and attempt to convey in two dimensions the pattern of gazes that took place in a three dimensional world. The heat maps are set to look back approximately one to two seconds and integrate over time where the participant was gazing in the scene camera video. The green color in the heat map indicates the concentration of gaze over the past one to two seconds. The blue line indicates the gaze trail over the past one to two seconds.

Figure 14 through figure 16 are for a DCZ on an arterial at night. The standard billboard was on the right side of the road (indicated by a pink rectangle). There were eight fixations to this billboard, and the single fixations were between 200 to 384 ms in duration. The dwell time for this billboard was 2,019 ms. At the start of the DCZ (see figure 14), the driver was directing his/her gaze to the forward roadway. Approaching the standard billboard, the driver began to fixate on the billboard. However, the billboard was still relatively close to the road ahead ROI.

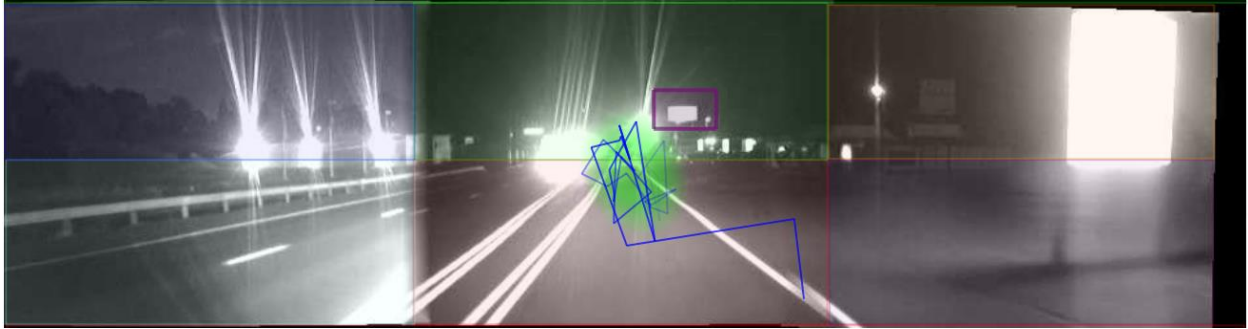


Figure 14. Heat map for the start of a DCZ for a standard billboard at night on an arterial.

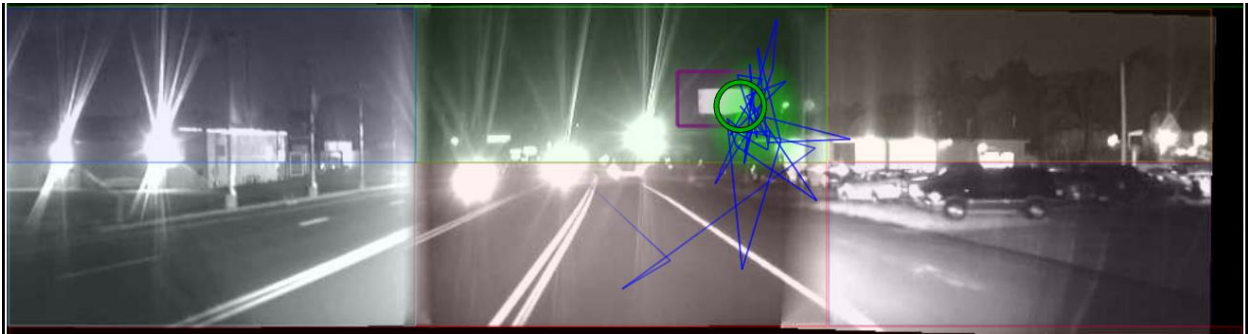


Figure 15. Heat map for the middle of a DCZ for a standard billboard at night on an arterial.



Figure 16. Heat map near the end of a DCZ for a standard billboard at night on an arterial.

Figure 17 through figure 19 are for a DCZ on a freeway at night. The standard billboard was on the right side of the road (indicated by a green rectangle). There were six consecutive fixations to this billboard, and the single fixations were between 200 and 801 ms in duration. The dwell time for this billboard was 2,753 ms. At the start of the DCZ (see figure 17), the driver was directing his/her gaze to a freeway guide sign in the road ahead and the standard billboard was to the left of the freeway guide sign. As the driver approached the standard billboard, his/her gaze was directed toward the billboard. The billboard was relatively close to the top and bottom road ahead ROIs. Near the end of the DCZ (see figure 19), the billboard was accurately portrayed as being on the right side of the road.

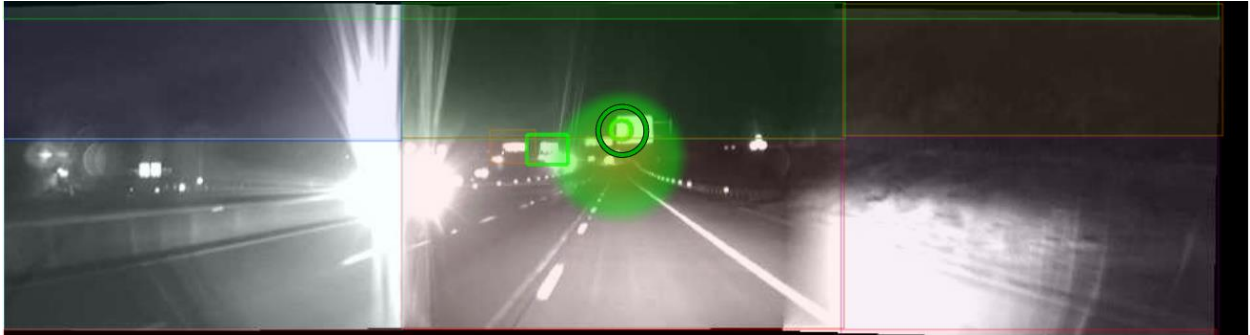


Figure 17. Heat map for start of a DCZ for a standard billboard at night on a freeway.

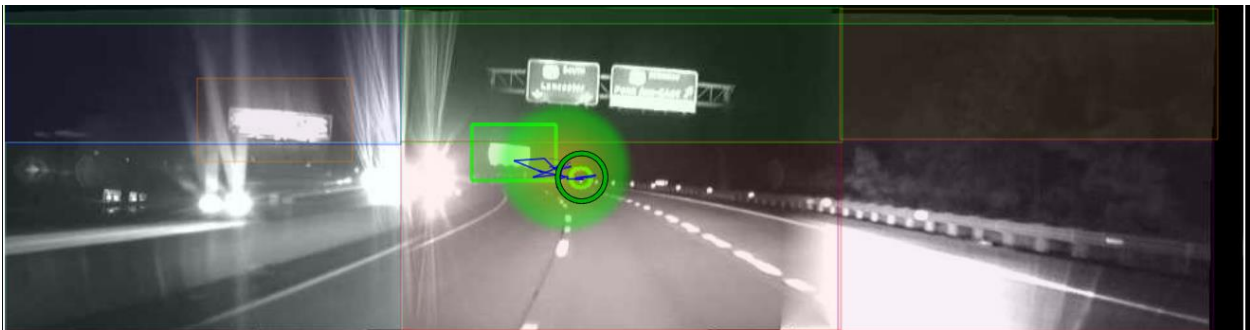


Figure 18. Heat map for middle of a DCZ for a standard billboard at night on a freeway.

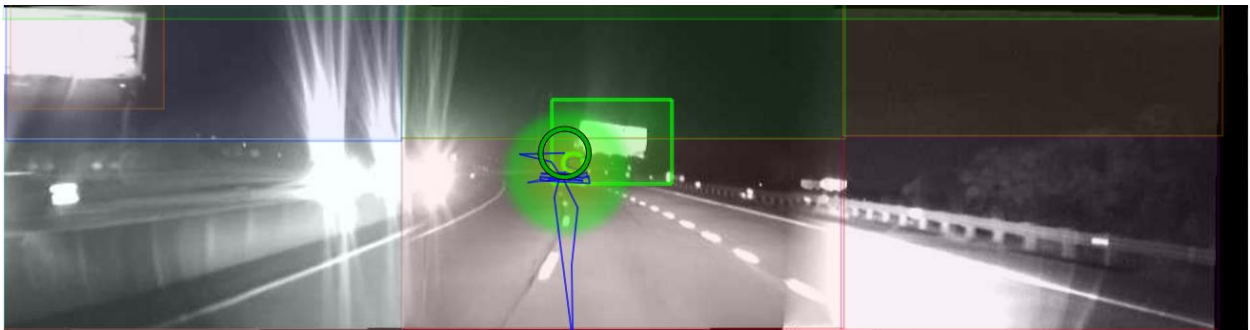


Figure 19. Heat map near the end of a DCZ for a standard billboard at night on a freeway.

Figure 20 through figure 23 are for a DCZ on a freeway during the day. The standard billboard was on the right side of the road (indicated by a pink rectangle). This is the same DCZ that was discussed in figure 17 through figure 19. There were six consecutive fixations to this billboard, and the single fixations were between 217 and 767 ms in duration. The dwell time for this billboard was 3,319 ms. At the start of the DCZ (see figure 20), the driver was principally directing his/her gaze to the road ahead. Figure 21 and figure 22 show the location along the DCZ where gaze was directed toward the standard billboard. The billboard was relatively close to the top and bottom road-ahead ROIs. As the driver passed the standard billboard, his/her gaze returned to the road ahead (see figure 23).

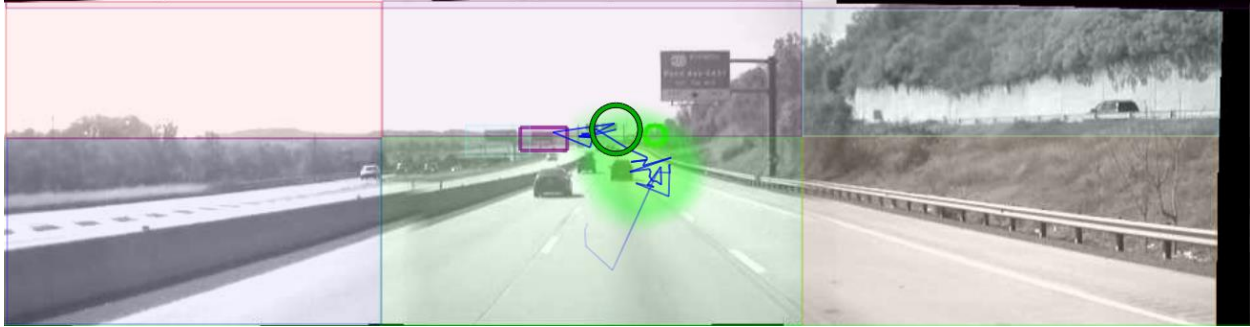


Figure 20. Heat map for the start of a DCZ for a standard billboard in the daytime on a freeway.



Figure 21. Heat map near the middle of a DCZ for a standard billboard in the daytime on a freeway.

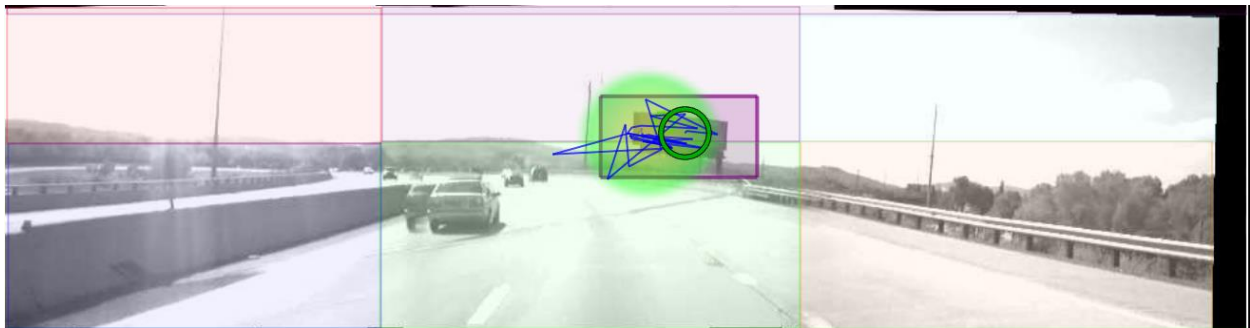


Figure 22. Heat map near the end of DCZ for standard billboard in the daytime on a freeway.

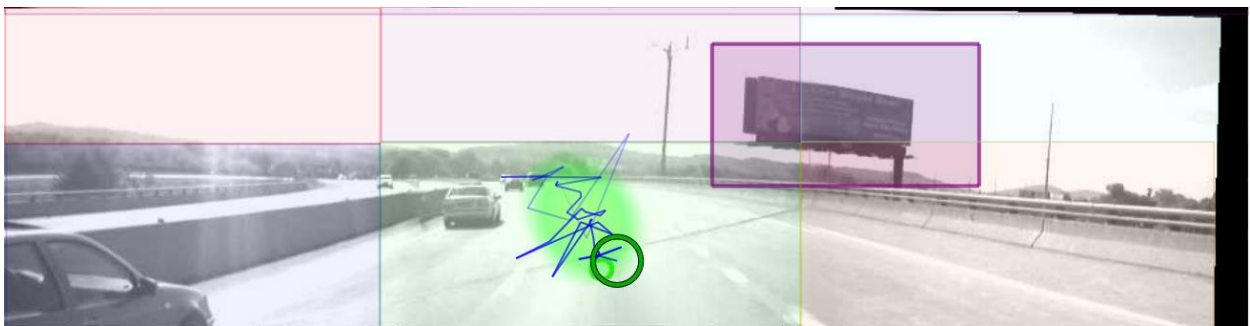


Figure 23. Heat map at the end of DCZ for standard billboard in the daytime on a freeway.

Comparison of Gazes to CEVMS and Standard Billboards

The GEE were used to analyze whether a participant gazed more toward CEVMS than toward standard billboards, given that the participant was gazing at off-premise advertising. With this analysis method, a logistic regression model for repeated measures was generated by using a binomial response distribution and Logit link function. First, the data was partitioned to include only those instances when a participant was gazing toward off-premise advertising (either to a CEVMS or to a standard billboard); all other gaze behavior was excluded from the input data set. Only two possible outcomes are allowed when selecting a binomial response distribution. Thus, a variable (SBB_CEVMS) was created to classify a participant's gaze behavior. If the participant gazed toward a CEVMS, the value of SBB_CEVMS was set to one. If the participant gazed toward a standard billboard, then the value of SBB_CEVMS was set to zero.

Logistic regression typically models the probability of a success. In the current analysis, a success would be a gaze to a CEVMS (SBB_CEVMS = 1) and a failure would be a gaze to a standard billboard (SBB_CEVMS = 0).² A success probability greater than 0.5 indicates there were more successes than failures in the sample. Therefore, if the sample probability of the response variable (i.e., SBB_CEVMS) was greater than 0.5, this would show that participants gazed more toward CEVMS than toward standard billboards when the participants gazed at off-premise advertising. In contrast, if the sample probability of the response variable was less than 0.5, then participants showed a preference to gaze more toward standard billboards than toward CEVMS when directing gazes to off-premise advertising.

Time of day (i.e., day or night), road type (i.e., freeway or arterial), and the corresponding interaction were explanatory variables in the logistic regression model. Road type was the only predictor to have a significant effect, $\chi^2(1) = 13.17, p < 0.001$. On arterials, participants gazed more toward CEVMS than toward standard billboards (M = 0.63). In contrast, participants gazed more toward standard billboards than toward CEVMS when driving on freeways (M = 0.33).

Observation of Driver Behavior

No near misses or driver errors were observed in Reading.

Level of Service

The mean vehicle densities were converted to level of service as shown in table 6.⁽⁴⁵⁾ As expected, less congestion occurred at night than in the day. In general, there was traffic during the data collection runs. Review of the scene camera data verified that all eye tracking data within the DCZs were recorded while the vehicle was in motion.

² Success and failure are not used to reflect the merits of either type of sign, but only for statistical purposes.

Table 6. Level of service as a function of advertising type, road type, and time of day.

	<i>Arterial</i>		<i>Freeway</i>	
	Day	Night	Day	Night
Control	B	A	C	B
CEVMS	C	A	B	A
Standard	A	A	B	A

DISCUSSION OF READING RESULTS

Overall the probability of gazing at the road ahead was high and similar in magnitude to what has been found in other field studies addressing billboards.^(11,9,12) For the DCZs on freeways, CEVMS showed a lower proportion of gazes to the road ahead than the standard billboard condition, and both off-premise advertising conditions had lower probability of gazes to the road ahead than the control. On the other hand, on the arterials, the CEVMS and standard billboard conditions did not differ from each other but were significantly different from their respective control condition. Though the CEVMS condition on the freeway had the lowest proportion of gazes to the road ahead, in this condition there was a lower proportion of gazes to CEVMS as compared to the arterials (see table 5 for the trade-off of gazes to the different ROIs). A greater proportion of gazes to other ROIs (left side of the road, right side of the road, and participant vehicle) contributed to the decrease in proportion of gazes to the road ahead. Also, for the CEVMS on freeways, there were a few gazes to a standard billboard located in the same DCZ and there were more gazes distributed to the left and right side of the road than in standard billboard and control conditions. The gazes to ROIs other than CEVMS contributed to the lower probability of gazes to the road ahead in this condition.

The control condition on the arterial had buildings along the sides of the road and generally presented a visually cluttered area. As was presented earlier, the feature congestion measure computed on a series of photographs from each DCZ showed a significantly higher feature congestion score for the control condition on arterials as compared to all of the other DCZs. Nevertheless, the highest probability for gazing at the road ahead was seen in the control condition on the arterial.

The area with the highest feature congestion, especially on the sides of the road, had the highest probability for drivers looking at the road ahead. Bottom-up or stimulus driven measures of salience or visual clutter have been useful in predicting visual search and the effects of visual salience in laboratory tasks.^(34,46) These measures of salience basically consider the stimulus characteristics (e.g., size, color, brightness) independent of the requirements of the task or plans that an individual may have. Models of visual salience may predict that buildings and other prominent features on the side of the road may be visually salient objects and thus would attract a driver's attention.⁽⁴⁷⁾ Figure 24 shows an example of a roadway photograph that was analyzed with the Salience Toolbox based on the Itti et al. implementation of a saliency based model of bottom-up attention.^(48,49) The numbered circles in figure 24 are the first through fifth salient areas selected by the software. Based on this software, the most salient areas in the photographs are the buildings on the sides of the road where the road ahead (and a car) is the fifth selected salient area.

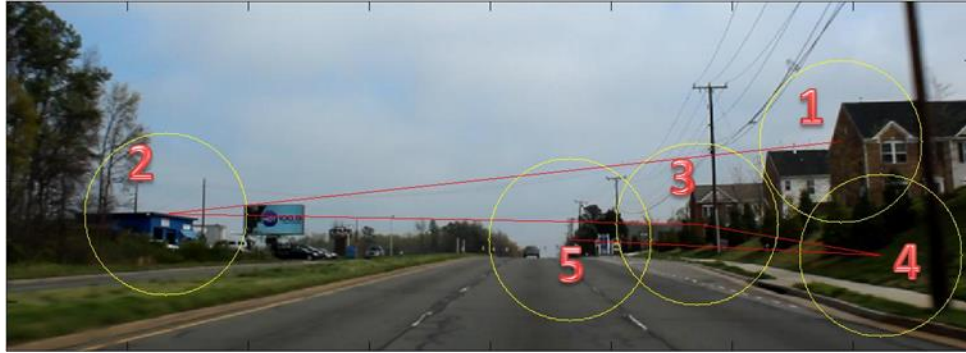


Figure 24. Example of identified salient areas in a road scene based on bottom-up analysis.

It appears that in the present study participants principally kept their eyes on the road even in the presence of visual clutter on the sides of the road, which supports the hypothesis that drivers tend to look toward information relevant to the task at hand.^(50,26,22) In the case of the driving task, visual clutter may be more of an issue with respect to crowding that may affect the driver's ability to detect visual information in the periphery.⁽⁵¹⁾ Crowding is generally defined as the negative effect of nearby objects or features on visual discrimination of a target.⁽⁵²⁾ Crowding impairs the ability to recognize objects in clutter and principally affects perception in peripheral vision. However, crowding effects were not analyzed in the present study.

Stimulus salience, clutter, and the nature of the task at hand interact in visual perception. For tasks such as driving, the task demands tend to outweigh stimulus salience when it comes to gaze control. Clutter may be more of an issue with the detection and recognition of objects in peripheral vision (e.g., detecting a sign on the side of the road) that are surrounded by other stimuli that result in a crowding effect.

The mean fixation durations to CEVMS, standard billboards, and the road ahead were found to be very similar. Also, there were no long fixations (greater than 2,000 ms) to CEVMS or standard billboards. The examination of multiple sequential fixations to CEVMS yielded average dwell times that were less than 1,000 ms. However, when examining the tails of the distribution, there were three dwell times to standard billboards that were in excess of 2,000 ms (the three dwell times came from three different participants to two different billboards). These three standard billboards were dwelled upon when they were near the road ahead area but drivers quit gazing at the signs as they neared them and the signs were no longer near the forward field of view. Though there were three dwell times for standard billboards greater than 2,000 ms, the difference in average dwell times for CEVMS and standard billboards was not significant.

Using a gaze duration of 2,000 ms away from the road ahead as a criterion indicative of increased risk has been developed principally as it relates to looking inside the vehicle to in-vehicle information systems and other devices (e.g., for texting) where the driver is indeed looking completely away from the road ahead.^(14,53,54) The fixations to the standard billboards in the present case showed a long dwell time for a billboard. However, unlike gazing or fixating inside the vehicle, the driver's gaze was within the forward roadway where peripheral vision could be used to monitor for hazards and for vehicle control. Peripheral vision has been shown to be important for lane keeping, visual search orienting, and monitoring of surrounding objects.^(55,56)

The results showed that drivers were more likely to gaze at CEVMS on arterials and at standard billboards on freeways. Though every attempt was made to select CEVMS and standard billboard DCZs that were equated on important parameters (e.g., which side of the road the sign was located on, type of road, level of visual clutter), the CEVMS DCZs on freeways had a greater setback from the road (133 ft for both CEVMS) than the standard billboards (10 and 35 ft). Signs with greater setback from the road would in a sense move out of the forward view (road ahead) more quickly than signs that are closer to the road. The CEVMS and standard billboards on the arterials were more closely matched with respect to setback from the road (12 and 43 ft for CEVMS and 20 and 40 ft for standard billboards).

The differences in setback from the road for CEVMS and standard billboards may also account for differences in dwell times to these two types of billboards. However, on arterials where the CEVMS and standard billboards were more closely matched there was only one long dwell time (greater than 2,000 ms) and it was to a standard billboard at night.

RICHMOND

The objectives of the second study were the same as those in the first study, and the design of the Richmond data collection effort was very similar to that employed in Reading. This study was conducted to replicate as closely as possible the design of Reading in a different driving environment. The independent variables included the type of DCZ (CEVMS, standard billboard, or no off-premise advertising), time of day (day or night) and road type (freeway or arterial). As with Reading, the time of day was a between-subjects variable and the other variables were within subjects.

METHOD

Selection of DCZ Limits

Selection of the DCZ limits procedure was the same as that employed in Reading.

Advertising Type

Three DCZ types (similar to those used in Reading) were used in Richmond:

- **CEVMS.** DCZs contained one target CEVMS.
- **Standard billboard.** DCZs contained one target standard billboard.
- **Control conditions.** DCZs did not contain any off-premise advertising.

There were an equal number of CEVMS and standard billboard DCZs on freeways and arterials. Also, there two DCZ that did not contain off-premise advertising with one located on a freeway and the other on an arterial.

Table 7 is an inventory of the target employed in this second study.

Table 7. Inventory of target billboards in Richmond with relevant parameters.

<i>DCZ</i>	<i>Advertising Type</i>	<i>Copy Dimensions (ft)</i>	<i>Side of Road</i>	<i>Setback from Road (ft)</i>	<i>Other Standard Billboards</i>	<i>Approach Length (ft)</i>	<i>Roadway Type</i>
5	CONTROL	N/A	N/A	N/A	N/A	710	Arterial
3	CONTROL	N/A	N/A	N/A	N/A	845	Freeway
9	CEVMS	14'0" x 28'0"	L	37	0	696	Arterial
13	CEVMS	14'0" x 28'0"	R	37	0	602	Arterial
2	CEVMS	12'5" x 40'0"	R	91	0	297	Freeway
8	CEVMS	11'0" x 23'0"	L	71	0	321	Freeway
10	Standard	14'0" x 48'0"	L	79	1	857	Arterial
12	Standard	10'6" x 45'3"	R	79	2	651	Arterial
1	Standard	14'0" x 48'0"	L	87	0	997	Freeway
7	Standard	14'0" x 48'0"	R	88	0	816	Freeway

* N/A indicates that there were no off-premise advertising in these areas and these values are undefined.

Figure 25 through figure 30 below represent various pairings of DCZ type and road type. Target off-premise billboards are indicated by red rectangles.



Figure 25. Example of a CEVMS DCZ on a freeway.



Figure 26. Example of CEVMS DCZ an arterial.



Figure 27. Example of a standard billboard DCZ on a freeway.



Figure 28. Example of a standard billboard DCZ on an arterial.

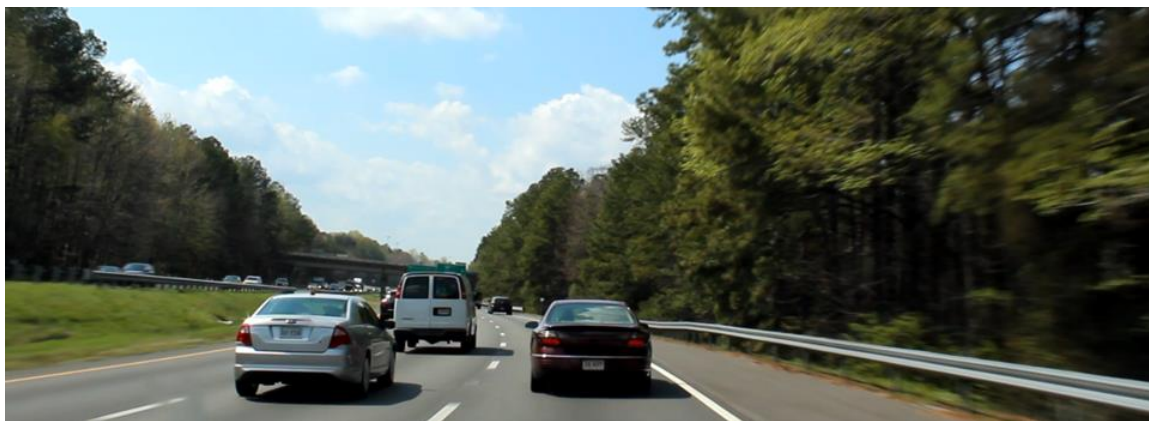


Figure 29. Example of a control DCZ on a freeway.



Figure 30. Example of a control DCZ on an arterial.

Photometric Measurement of Signs

The methods and procedures for the photometric measures were the same as for Reading.

Visual Complexity

The methods and procedures for visual complexity measurement were the same as for Reading.

Participants

A total of 41 participants were recruited for the study. Of these, 6 participants did not complete data collection because of an inability to properly calibrate with the eye tracking system, and 11 were excluded because of equipment failures. A total of 24 participants (13 male, $M = 28$ years; 11 female, $M = 25$ years) successfully completed the drive. Fourteen people participated during the day and 10 participated at night.

Procedures

Research participants were recruited locally by means of visits to public libraries, student unions, community centers, etc. A large number of the participants were recruited from a nearby university, resulting in a lower mean participant age than in Reading.

Participant Testing

Two people participated each day. One person participated during the day beginning at approximately 12:45 p.m. The second participated at night beginning at around 7:00 p.m. Data collection ran from November 20, 2009, through April 23, 2010. There were several long gaps in the data collection schedule due to holidays and inclement weather.

Pre-Data Collection Activities

This was the same as in Reading.

Practice Drive

Except for location, this was the same as in Reading.

Data Collection

The procedure was much the same as in Reading. On average, each test route required approximately 30 to 35 minutes to complete. As in Reading, the routes included a variety of freeway and arterial driving segments. One route was 15 miles long and contained two target CEVMS, two target standard billboards, and two DCZs with no off-premise advertising. The second route was 20 miles long and had two target CEVMS and two target standard billboards.

The data collection drives in this second study were longer than those in Reading. The eye tracking system had problems dealing with the large files that resulted. To mitigate this technical difficulty, participants were asked to pull over in a safe location during the middle of each data collection drive so that new data files could be initiated.

Upon completion of the data collection, the participant was instructed to return to the designated meeting location for debriefing.

Debriefing

This was the same as in Reading.

DATA REDUCTION

Eye Tracking Measures

The approach and procedures were the same as used in Reading.

Other Measures

The approach and procedures were the same as used in Reading.

RESULTS

Photometric Measurement of Signs

The photometric measurements were performed using the same equipment and procedures that were employed in Reading with a few minor changes. Photometric measurements were taken during the day and at night. Measurements of the standard billboards were taken at an average distance of 284 ft, with maximum and minimum distances of 570 ft and 43 ft, respectively. The average distance of measurements for the CEVMS was 479 ft, with maximum and minimum distances of 972 ft and 220 ft, respectively. Again, the distances employed were significantly affected by the requirement to find a safe location on the road from which to take the measurements.

Luminance

The mean luminance of CEVMS and standard billboards, during daytime and nighttime are shown below in table 8. The results here are similar to those for Reading.

Contrast

The daytime and nighttime Weber contrast ratios for both types of billboards are shown in table 8. During the day, the contrast ratios of both CEVMS and standard billboards were close to zero (the surroundings were about equal in brightness to the signs). At night, the CEVMS and standard billboards had positive contrast ratios. Similar to Reading, the CEVMS showed a higher contrast ratio than the standard billboards at night.

Table 8. Summary of luminance (cd/m^2) and contrast (Weber ratio) measurements.

<i>Day</i>	<i>Luminance (cd/m^2)</i>		<i>Contrast</i>	
	Mean	St. Dev.	Mean	St. Dev.
CEVMS	2134	798.70	-0.20	0.53
Standard Billboard	3063	2730.92	0.03	0.32
<i>Night</i>				
CEVMS	56.44	16.61	69.70	59.18
Standard Billboard	8.00	5.10	6.56	3.99

Visual Complexity

As with Reading, the feature congestion measure was used to estimate the level of visual complexity/clutter in the DCZs. The analysis procedures were the same as for Reading.

Figure 31 shows the mean feature congestion measures for each of the advertising types (standard errors are included in the figure). Unlike the results for Reading, the selected off-premise advertising DCZs for Richmond differed in terms of mean feature congestion; $F(3, 36) = 3.95, p = 0.016$. Follow up t-tests with an alpha of 0.05 showed that the CEVMS DCZs on arterials had significantly lower feature congestion than all of the other off-premise advertising conditions. None of the remaining DCZs with off-premise advertising differed from each other. The selection of DCZs for the conditions with off-premise advertising took into account the type of road, the side of the road the target billboard was placed, and the perceived level of visual clutter. Based on the feature congestion measure, these results indicated that the conditions with off-premise advertising were not equated with respect to level of visual clutter.

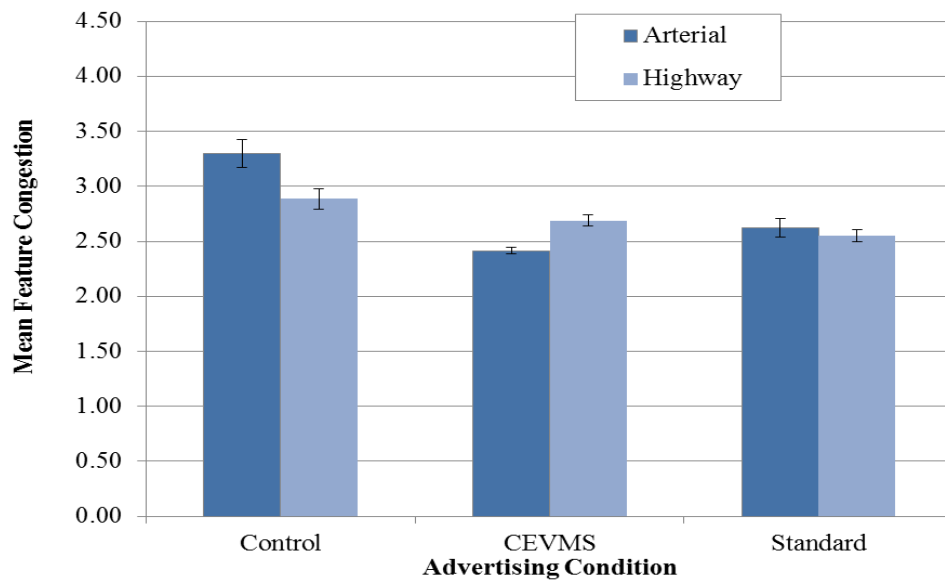


Figure 31. Mean feature congestion as a function of advertising condition and road type.

Effects of Billboards on Gazes to the Road Ahead

As was done for the data from Reading, GEE were used to analyze the probability of a participant gazing at the road ahead. A logistic regression model for repeated measures was generated by using a binomial response distribution and Logit link function. The resultant value was the probability of a participant gazing at the road ahead (as previously defined).

Time of day (day or night), road type (freeway or arterial), advertising type (CEVMS, standard billboard, or control), and all corresponding second-order interactions were explanatory variables in the logistic regression model. The interaction of advertising type by road type was statistically significant, $\chi^2(2) = 14.19, p < 0.001$. Table 9 shows the corresponding probability of gazing at the road ahead as a function of advertising condition and road type.

Table 9. The probability of gazing at the road ahead as a function of advertising condition and road type.

<i>Advertising Condition</i>	<i>Arterial</i>	<i>Freeway</i>
Control	0.78	0.92
CEVMS	0.76	0.82
Standard	0.81	0.85

Follow-up analyses for the interaction used Tukey-Kramer adjustments with an alpha level of 0.05. The freeway control had the greatest probability of gazing at the road ahead ($M = 0.92$). This probability differed significantly from the remaining five probabilities. On arterials, there were no significant differences among the probabilities of gazing at the road ahead among the three advertising conditions. On freeways, there was no significant difference between the probability associated with CEVMS DCZs and the probability associated with standard billboard DCZs.

Additional descriptive statistics were computed for the three advertising types to determine the probability of gazing at the ROIs that were defined in the panoramic scene. As was done with the data from Reading, some of the ROIs were combined for ease of analysis. Table 10 presents the probability of gazing at the different ROIs.

Table 10. Probability of gazing at ROIs for the three advertising conditions on arterials and freeways.

<i>Road Type</i>	<i>ROI</i>	<i>CEVMS</i>	<i>Standard Billboard</i>	<i>Control</i>
<i>Arterial</i>	<i>CEVMS</i>	0.06	N/A	N/A
	<i>Left Side of Vehicle</i>	0.03	0.05	0.04
	<i>Road ahead</i>	0.76	0.81	0.78
	<i>Right Side of Vehicle</i>	0.07	0.06	0.09
	<i>Standard Billboard</i>	N/A	0.02	N/A
	<i>Participant Vehicle</i>	0.07	0.06	0.09
<i>Freeway</i>	<i>CEVMS</i>	0.05	N/A	N/A
	<i>Left Side of Vehicle</i>	0.03	0.01	0.01
	<i>Road ahead</i>	0.82	0.85	0.92
	<i>Right Side of Vehicle</i>	0.04	0.04	0.03
	<i>Standard Billboard</i>	N/A	0.04	N/A
	<i>Participant Vehicle</i>	0.06	0.06	0.05

The probability of gazing away from the forward roadway ranged from 0.08 to 0.24. In particular, the probability of gazing toward a CEVMS was slightly greater on arterials ($M = 0.06$) than on freeways ($M = 0.05$). In contrast, the probability of gazing toward a standard billboard was greater on freeways ($M = 0.04$) than on arterials ($M = 0.02$). In both situations, the probability of gazing at the road ahead was greatest on freeways.

Fixations to CEVMS and Standard Billboards

About 2.5 percent of the fixations were to CEVMS. The mean fixation duration to a CEVMS was 371 ms and the maximum fixation duration was 1,335 ms. Figure 32 shows the distribution of fixation durations to CEVMS during the day and at night. In the daytime, the mean fixation duration to a CEVMS was 440 ms and at night it was 333 ms. Approximately 1.5 percent of the fixations were to standard billboards. The mean fixation duration to standard billboards was 318 ms and the maximum fixation duration was 801 ms. Figure 33 shows the distribution of fixation durations for standard billboards. The mean fixation duration to a standard billboard was 313 ms and 325 ms during the day and night, respectively. For comparison purposes, figure 34 shows the distribution of fixation durations to the road ahead during the day and night. In the daytime, the mean fixation duration to the road ahead was 378 ms and at night it was 358 ms.

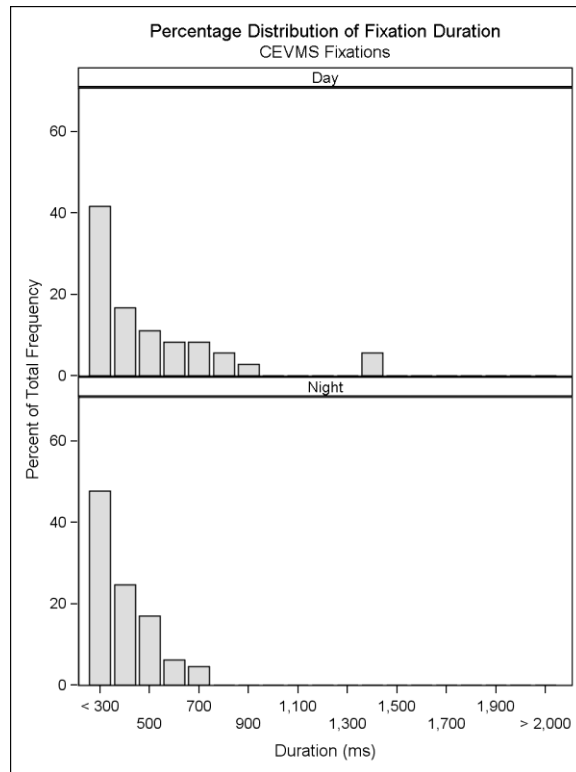


Figure 32. Fixation duration for CEVMS in the day and at night.

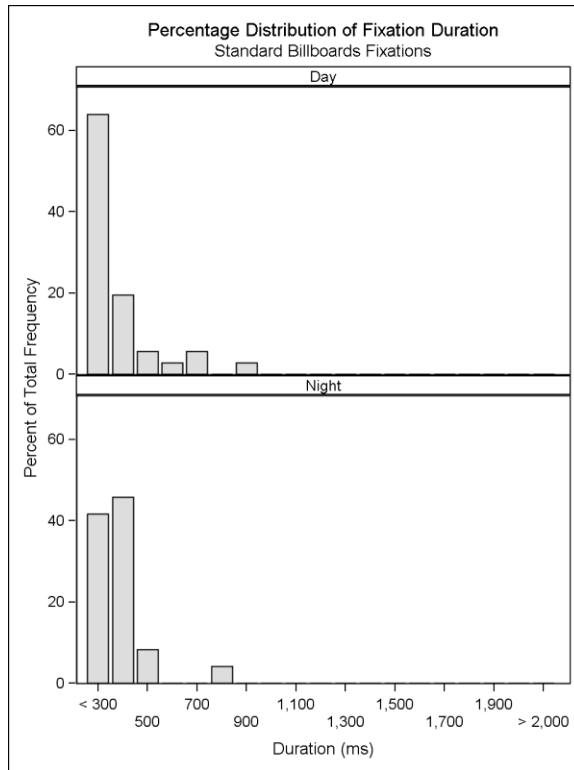


Figure 33. Fixation duration for standard billboards in the day and at night.

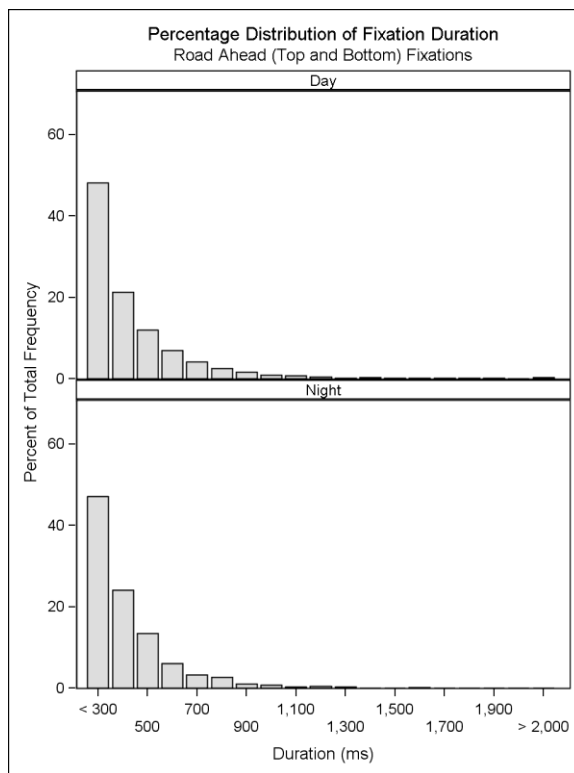


Figure 34. Fixation duration for the road ahead in the day and at night.

As was done with the data for Reading, the record of fixations was examined to determine dwell times to CEVMS and standard billboards. There were a total of 21 separate dwell times to CEVMS with a mean of 2.86 sequential fixations (minimum of 2 fixations and maximum of 6 fixations). The 21 dwell times came from 12 different participants and four different CEVMS. The mean dwell time duration to the CEVMS was 1,039 ms (minimum of 500 ms and maximum of 2,720 ms). There was one dwell time greater than 2,000 ms to CEVMS. To the standard billboards there were 13 separate dwell times with a mean of 2.31 sequential fixations (minimum of 2 fixations and maximum of 3 fixations). The 13 dwell times came from 11 different participants and four different standard billboards. The mean dwell time duration to the standard billboards was 687 ms (minimum of 450 ms and maximum of 1,152 ms). There were no dwell times greater than 2,000 ms to standard billboards.

In some cases several dwell times came from the same participant. To compute a statistic on the difference between dwell times for CEVMS and standard billboards, average dwell times were computed per participant for the CEVMS and standard billboard conditions. These average values were used in a *t*-test assuming unequal variances. The difference in average dwell time between CEVMS ($M = 1,096$ ms) and standard billboards ($M = 674$ ms) was statistically significant, $t(14) = 2.23$, $p = .043$.

Figure 35 through figure 37 show heat maps for the dwell-time durations to the CEVMS that were greater than 2,000 ms. The DCZ was on a freeway during the daytime. The CEVMS is located on the left side of the road (indicated by an orange rectangle). There were three fixations to this billboard, and the single fixations were between 651 ms and 1,335 ms. The dwell time for this billboard was 2,270 ms. Figure 35 shows the first fixation toward the CEVMS. There are no vehicles near the participant in his/her respective travel lane or adjacent lanes. In this situation, the billboard is relatively close to the road ahead ROI. Figure 36 shows a heat map later in the DCZ where the driver continues to look at the CEVMS. The heat map does not overlay the CEVMS in the picture since the heat map has integrated over time where the driver was gazing. The CEVMS has moved out of the area because of the vehicle moving down the road. However, visual inspection of the video and eye tracking statistics showed that the driver was fixating on the CEVMS. Figure 37 shows the end of the sequential fixations to the CEVMS. The driver returns to gaze directly in front of the vehicle. Once the CEVMS was out of the forward field of view, the driver quit looking at the billboard.

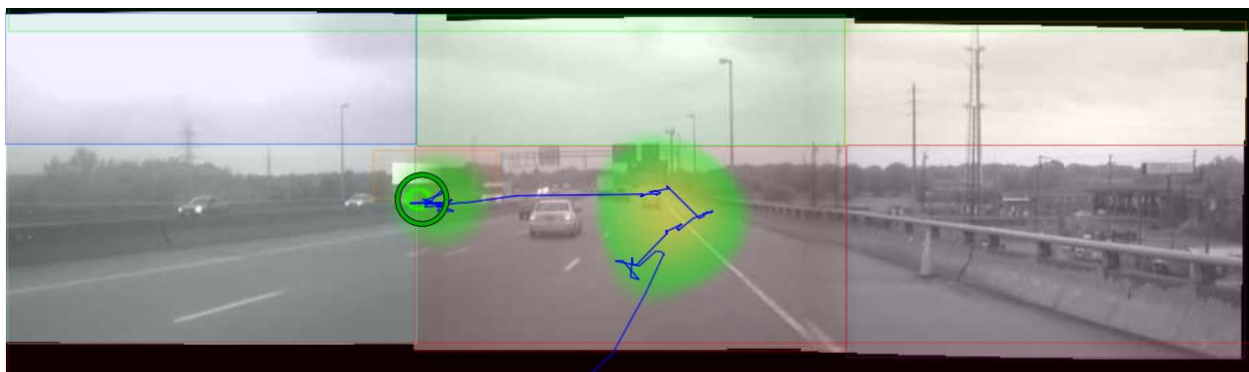


Figure 35. Heat map for first fixation to CEVMS with long dwell time.



Figure 36. Heat map for later fixations to CEVMS with long dwell time.

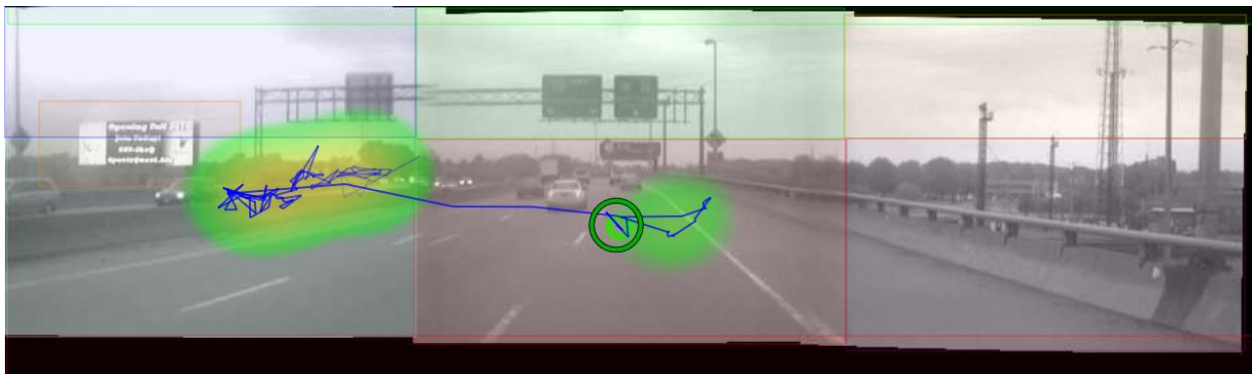


Figure 37. Heat map at end of fixations to CEVMS with long dwell time.

Comparison of Gazes to CEVMS and Standard Billboards

As was done for the data from Reading, GEE were used to analyze whether a participant gazed more toward CEVMS than toward standard billboards, given that the participant was looking at off-premise advertising. Recall that a sample probability greater than 0.5 indicated that participants gazed more toward CEVMS than standard billboards when the participants gazed at off-premise advertising. In contrast, if the sample probability was less than 0.5, participants showed a preference to gaze more toward standard billboards than CEVMS when directing visual attention to off-premise advertising.

Time of day (i.e., day or night), road type (i.e., freeway or arterial), and the corresponding interaction were explanatory variables in the logistic regression model. Time of day had a significant effect on participant gazes toward off-premise advertising, $\chi^2(1) = 4.46, p = 0.035$. Participants showed a preference to gaze more toward CEVMS than toward standard billboards during both times of day. During the day the preference was only slight ($M = 0.52$), but at night the preference was more pronounced ($M = 0.71$). Road type was also a significant predictor of where participants directed their gazes at off-premise advertising, $\chi^2(1) = 3.96, p = 0.047$. Participants gazed more toward CEVMS than toward standard billboards while driving on both types of roadways. However, driving on freeways yielded a slight preference for CEVMS over standard billboards ($M = 0.55$), but driving on arterials resulted in a larger preference in favor of CEVMS ($M = 0.68$).

Observation of Driver Behavior

No near misses or driver errors occurred.

Level of Service

Table 11 shows the level of service as a function of advertising type, type of road, and time of day. As expected, there was less congestion during the nighttime runs than in the daytime. In general, there was traffic during the data collection runs; however, the eye tracking data were recorded while the vehicles were in motion.

Table 11. Estimated level of service as a function of advertising condition, road type, and time of day.

	Arterial		Freeway	
	Day	Night	Day	Night
Control	B	A	C	B
CEVMS	B	A	B	A
Standard	C	A	C	C

DISCUSSION OF RICHMOND RESULTS

Overall the probability of looking at the forward roadway was high across all conditions and consistent with the findings from Reading and previous related research.^(11,9,12) In this second study the CEVMS and standard billboard conditions did not differ from each other. For the DCZs on arterials there were no significant differences among the control, CEVMS, and standard billboard conditions. On the other hand, while the CEVMS and standard billboard conditions on the freeways did not differ from each other, they were significantly different from their respective control conditions. The control condition on the freeway principally had trees along the sides of the road and the signs that were present were freeway signs located in the road ahead ROI.

Measures such as feature congestion rated the three DCZs on freeways as not being statistically different from each other. These types of measures have been useful in predicting visual search and the effects of visual salience in laboratory tasks.⁽³⁴⁾ Models of visual salience may predict that, at least during the daytime, trees on the side of the road may be visually salient objects that would attract a driver's attention.⁽⁴⁷⁾ However, it appears that in the present study, participants principally kept their eyes on the road ahead.

The mean fixations to CEVMS, standard billboards, and the road ahead were found to be similar in magnitude with no long fixations. Examination of dwell times showed that there was one long dwell time for a CEVMS greater than 2,000 ms and it occurred in the daytime on a sign located on the left side of the road on a freeway DCZ. Furthermore, when averaging among participants the mean dwell time for CEVMS was significantly longer than to standard billboards, but still under 2,000 ms. For the dwell time greater than 2,000 ms, examination of the scene camera video and eye tracking heat maps showed that the driver was initially looking toward the forward roadway and made a first fixation to the sign. Three fixations were made to the sign and then the

driver started looking back to the road ahead as the sign moved out of the forward field of view. On the video there were no vehicles near the subject driver's own lane or in adjacent lanes.

Only the central 2 degrees of vision, foveal vision, provide resolution sharp enough for reading or recognizing fine detail.⁽⁵⁷⁾ However, useful information for reading can be extracted from parafoveal vision, which encompasses the central 10 degrees of vision.⁽⁵⁷⁾ More recent research on scene gist recognition³ has shown that peripheral vision (beyond parafoveal vision) is more useful than central vision for recognizing the gist of a scene.⁽⁵⁸⁾ Scene gist recognition is a critically important early stage of scene perception, and influences more complex cognitive processes such as directing attention within a scene and facilitating object recognition, both of which are important in obtaining information while driving.

The results of this study do show one duration of eyes off the forward roadway greater than 2,000 ms, the duration at which Klauer et al. observed near-crash/crash risk at more than twice those of normal, baseline driving.^(14,53) When looking at the tails of the fixation distributions, few fixations were greater than 1,000 ms, with the longest fixation being equal to 1,335 ms.^(53,54) The one long dwell time on a CEVMS that was observed was a rare event in this study, and review of the video and eye tracking data suggests that the driver was effectively managing acquisition of visual information while driving and fixated on the advertising. However, additional work needs to be done to derive criteria for gazing or fixating away from the forward road view where the road scene is still visible in peripheral vision.

The results showed that drivers are more likely to look at CEVMS than standard billboards during the nighttime across the conditions tested (at night the average probability of gazing at CEVMS was $M = 0.71$). CEVMS do have greater luminance than standard billboards at night and also have higher contrast. The CEVMS have the capability of being lit up so that they would appear as very bright signs to drivers (for example, up to about $10,000 \text{ cd/m}^2$ for a white square on the sign.). However, our measurements of these signs showed an average luminance of about 56 cd/m^2 . These signs would be conspicuous in a nighttime driving environment but significantly less so than other light sources such as vehicle headlights. Drivers were also more likely to look at CEVMS than standard billboards on both arterials and freeways, with a higher probability of gazes on arterials.

In this second study, CEVMS and standard billboards were more nearly equated with respect to setback from the road. Gazes to the road ahead were not significantly different between CEVMS and standard billboard DCZs across conditions and the proportion of gazes to the road ahead were consistent with previous research. One long dwell time for a CEVMS was observed in this study; however, it occurred in the daytime where the luminance and contrast (affecting the perceived brightness) of these signs are similar to those for standard billboards.

³ "Scene gist recognition" refers to the element of human cognition that enables us to determine the meaning of a scene and categorize it by type (e.g., a beach, an office) almost immediately upon seeing it.

GENERAL DISCUSSION

This study was conducted to investigate the effect of CEVMS on driver visual behavior in a roadway driving environment. An instrumented vehicle with an eye tracking system was used. Roads containing CEVMS, standard billboards, and control areas with no off-premise advertising were selected. The CEVMS and standard billboards were measured with respect to luminance, location, size, and other relevant variables to characterize these visual stimuli. Unlike previous studies on digital billboards, the present study examined CEVMS as deployed in two United States cities and did not contain dynamic video or other dynamic elements. The CEVMS changed content approximately every 8 to 10 seconds, consistent within the limits provided by FHWA guidance.⁽²⁾ In addition, the eye tracking system used had nearly a 2-degree level of resolution that provided significantly more accuracy in determining what objects the drivers were gazing or fixating on as compared to some previous field studies examining CEVMS.

CONCLUSIONS

Do CEVMS attract drivers' attention away from the forward roadway and other driving relevant stimuli?

Overall, the probability of looking at the road ahead was high across all conditions. In Reading, the CEVMS condition had a lower proportion of gazes to the road ahead than the standard billboard condition on the freeways. Both of the off-premise advertising conditions had a lower proportion of gazes to the road ahead than the control condition on the freeway. The lower proportion of gazes to the road ahead can be attributed to the overall distribution of gazes away from the road ahead and not just to the CEVMS. On the other hand, for the arterials the CEVMS and standard billboard conditions did not differ from each other, but both had a lower proportion of gazes to the road ahead compared to the control. In Richmond there were no differences among the three advertising conditions on the arterials. However, for the freeways the CEVMS and standard billboard conditions did not differ from each other but had a lower proportion of gazes to the road ahead than the control.

The control conditions differed across studies. In Reading, the control condition on arterials showed 92 percent for gazing at the road ahead while on the freeway it was 86 percent. On the other hand, in Richmond the control condition for arterials was 78 percent and for the freeway it was 92 percent. The control conditions on the freeway differed across the two studies. In Reading there were businesses off to the side of the road; whereas in Richmond the sides of the road were mostly covered with trees. The control conditions on the arterials also differed across cities in that both contained businesses and on-premise advertising; however, in Reading arterials had four lanes and in Richmond arterials had six lanes. The reason for these differences across cities was that these control conditions were selected to match the other conditions (CEVMS and standard billboards) that the drivers would experience in the two respective cities. Also, the selection of DCZs was obviously constrained by what was available on the ground in these cities.

The results for the off-premise advertising conditions are consistent with Lee et al., who observed that 76 percent of drivers' time was spent looking at the road ahead in the CEVMS scenario and 75 percent in the standard billboard scenario.⁽⁹⁾ However, it should be kept in mind

that drivers did gaze away from the road ahead even when no off-premise advertising was present and that the presence of clutter or salient visual stimuli did not necessarily control where drivers gazed.

Do glances to CEVMS occur that would suggest a decrease in safety?

In DCZs containing CEVMS, about 2.5 percent of the fixations were to CEVMS (about 2.4 percent to standard billboards). The results for fixations are similar to those reported in other field data collection efforts that included advertising signs.^(12,11,9,13) Fixations greater than 2,000 ms were not observed for CEVMS or standards billboards.

However, an analysis of dwell times to CEVMS showed a mean dwell time of 994 ms (maximum of 1,467 ms) for Reading and a mean of 1,039 ms (maximum of 2,270 ms) for Richmond. Statistical comparisons of average dwell times between CEVMS and standard billboards were not significant in Reading; however, in Richmond the average dwell times to CEVMS were significantly longer than to standard billboards, though below 2,000 ms. There was one dwell time greater than 2,000 ms to a CEVMS across the two cities. On the other hand, for standard billboards there were three long dwell times in Reading; there were no long dwell times to these billboards in Richmond. Review of the video data for these four long dwell times showed that the signs were not far from the forward view when participants were fixating. Therefore, the drivers still had access to information about what was in front of them through peripheral vision.

As the analyses of gazes to the road ahead showed, drivers distributed their gazes away from the road ahead even when there were no off-premise billboards present. Also, drivers gazed and fixated on off-premise signs even though they were generally irrelevant to the driving task. However, the results did not provide evidence indicating that CEVMS were associated with long glances away from the road that may reflect an increase in risk. When long dwell times occurred to CEVMS or standard billboards, the road ahead was still in the driver's field of view.

Do drivers look at CEVMS more than at standard billboards?

The drivers were generally more likely to gaze at CEVMS than at standard billboards. However, there was some variability between the two locations and between type of roadway (arterial or freeway). In Reading, the participants looked more often at CEVMS when on arterials, whereas they looked more often at standard billboards when on freeways. In Richmond, the drivers looked at CEVMS more than standard billboards no matter the type of road they were on, but as in Reading the preference for gazing at CEVMS was greater on arterials (68 percent on arterials and 55 percent on freeways). The slower speed on arterials and sign placement may present drivers with more opportunities to gaze at the signs.

In Richmond, the results showed that drivers gazed more at CEVMS than standard billboards at night; however, for Reading no effect for time of day was found. CEVMS do have higher luminance and contrast than standard billboards at night. The results showed mean luminance of about 56 cd/m² in the two cities where testing was conducted. These signs would appear clearly visible but not overly bright.

SUMMARY

The results of these studies are consistent with a wealth of research that has been conducted on vision in natural environments.^(26,22,21) In the driving environment, gaze allocation is principally controlled by the requirements of the task. Consistent results were shown for the proportion of gazes to the road ahead for off-premise advertising conditions across the two cities. Average fixations were similar to CEVMS and standard billboards with no long single fixations evident for either condition. Across the two cities, four long dwell times were observed: one to a CEVMS on a freeway in the day, two to the same standard billboard on a freeway (once at night and once in the daytime), and one to a standard billboard on an arterial at night. Examination of the scene video and eye tracking data indicated that these long dwell times occurred when the billboards were close to the forward field of view where peripheral vision could still be used to gather visual information on the forward roadway.

The present data suggest that the drivers in this study directed the majority of their visual attention to areas of the roadway that were relevant to the task at hand (i.e., the driving task). Furthermore, it is possible, and likely, that in the time that the drivers looked away from the forward roadway, they may have elected to glance at other objects in the surrounding environment (in the absence of billboards) that were not relevant to the driving task. When billboards were present, the drivers in this study sometimes looked at them, but not such that overall attention to the forward roadway decreased.

LIMITATIONS OF THE RESEARCH

In this study the participants drove a research vehicle with two experimenters on board. The participants were provided with audio turn-by-turn directions and consequently did not have a taxing navigation task to perform. The participants were instructed to drive as they normally would. However, the presence of researchers in the vehicle and the nature of the driving task do limit the degree to which one may generalize the current results to other driving situations. This is a general limitation of instrumented vehicle research.

The two cities employed in the study appeared to follow common practices with respect to the content change frequency (every 8 to 10 seconds) and the brightness of the CEVMS. The current results would not generalize to situations where these guidelines are not being followed.

Participant recruiting was done through libraries, community centers and at a university. This recruiting procedure resulted in a participant demographic distribution that may not be representative of the general driving population.

The study employed a head-free eye tracking device to increase the realism of the driving situation (no head-mounted gear). However, the eye tracker had a sampling rate of 60 Hz, which made determining saccades problematic. The eye tracker and analyses software employed in this effort represents a significant improvement in technology over previous similar efforts in this area.

The study focused on objects that were 1,000 feet or less from the drivers. This was dictated by the accuracy of the eye tracking system and the ability to resolve objects for data reduction. In addition, the geometry of the roadway precluded the consideration of objects at great distances.

The study was performed on actual roadways, and this limited the control of the visual scenes except via the route selection process. In an ideal case, one would have had roadways with CEVMS, standard billboards, and no off-premise advertising and in which the context surrounding digital and standard billboards did not differ. This was not the case in this study, although such an exclusive environment would be inconsistent with the experience of most drivers. This presents issues with the interpretation of the specific contributions made by billboards and the environment to the driver's behavior.

Sign content was not investigated (or controlled) in the present study, but may be an important factor to consider in future studies that investigate the distraction potential of advertising signs. Investigations about the effect of content could potentially be performed in driving simulators where this variable could be systematically controlled and manipulated.

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68-2234. Highway advertising control; sign standards; zoning requirements. After March 31, 1972, and subject to the provisions of K.S.A. 68-2233, and amendments thereto, and to subsection (f), signs which are to be erected in a business area shall comply with the following standards: (a) *General.* Signs shall not be erected or maintained which:

- (1) Imitate or resemble any official traffic sign, signal or device; or
- (2) are erected or maintained upon trees or painted or drawn upon rocks or other natural features.

(b) *Configuration and size.* (1) Signs shall not be erected with sign faces which exceed 30 feet in height, 60 feet in length or 900 square feet in area, per facing, including border, trim and embellishments, but not including base or apron, supports, and other structural members;

- (2) the maximum size limitations shall apply to each sign facing;

(3) two sign displays not exceeding 450 square feet each may be erected in a facing, side by side or "double decked," and double-faced, back-to-back or V-type signs shall be permitted and shall be treated as one structure with a maximum area of 900 square feet permitted for each side or facing. To be classified as "back-to-back" there must not be more than 15 feet between structures or faces, to allow for crossbracing;

(4) the area of any sign structure shall be measured by the smallest square, rectangle, circle or combination thereof which will encompass the area of the sign display or displays;

(5) the height of any portion of the sign structure, excluding cutouts or extensions, as measured vertically from the adjacent edge of the road grade of the main traveled way shall not exceed 50 feet;

(6) cutouts or extensions shall be permitted on legal conforming signs at a size not to exceed 30% of the size of the main display area, with a maximum extension of five feet along the top edge, two feet along the sides and 1 1/2 feet along the bottom of the main display area. Cutouts or extensions shall not be permitted where the configuration and size requirements of this subsection will be exceeded.

(c) *Spacing.* (1) Signs shall conform to all applicable building codes and ordinances of the city, county or state, whichever is applicable by reason of the locations of the signs;

(2) signs shall not be erected or maintained in such a manner as to obscure or otherwise physically interfere with an official traffic sign, signal or device or to obstruct or physically interfere with a driver's view of approaching, merging or intersecting traffic;

(3) except for official and on-premise signs, as defined in 23 U.S.C. § 131(c) and as provided for in K.S.A. 68-2233, and amendments thereto, any signs or sign structures visible from any primary highway without fully controlled access:

(A) Shall not be spaced less than 300 feet apart outside of incorporated cities;

(B) shall not be spaced less than 200 feet apart within incorporated cities;

(4) any signs or sign structures visible from any interstate highway or freeway with fully controlled access:

(A) Shall not be spaced less than 500 feet apart, except for official and on-premise signs, as defined in 23 U.S.C. § 131(c), and as provided in K.S.A. 68-2233, and amendments thereto;

(B) outside the corporate limits of cities, shall not be located within 500 feet of an interchange, feeder, intersection at grade, safety rest area or information center regardless of whether the main traveled way is within or outside the city limits. The 500 feet spacing shall be measured from the point at which the pavement widens and the direction of measurement shall be along the edge of pavement away from the interchange, collector, intersection at grade, safety rest area or information center. In those interchanges where a quadrant does not have a ramp, the 500 feet for the quadrant at the edge of the intersection is located at the edge of the intersection;

(5) the minimum distance between two signs prescribed by paragraphs (3) and (4) of this subsection shall be measured along the nearest edge of the pavement between points directly opposite the signs along the same side of the highway. Such minimum distance shall not apply to signs described by subsection (a), (b) or (c) of K.S.A. 68-2233, and amendments thereto, nor shall such signs be counted or be used in measuring distances for the purpose of determining compliance with the spacing requirements of this subsection;

(6) the minimum distances between two signs prescribed by paragraphs (3) and (4) of this subsection shall not apply where such signs are separated by a building, structure, roadway or other obstruction which prevents a view of both signs at the same time by traffic proceedings on any one highway; and

(7) nothing in this subsection shall be construed as preventing the erection of double-faced, back-to-back or V-type signs with a maximum of two sign displays per sign facing, as permitted by subsection (b). Nothing in this subsection shall prevent the owner of a single face sign to change the position of the sign face to a different or opposite direction of traffic flow so long as an additional face or additional square feet are not added to the sign structure. No such change may be affected until approval is granted by the department.

(d) *Lighting.* (1) Signs shall not be erected which contain, include or are illuminated by any flashing, intermittent, revolving or moving light, except those giving public service information such as, but not limited to, time, date, temperature, weather or news; steadily burning lights in configuration of letters or pictures are not prohibited;

(2) signs shall not be erected or maintained which are not effectively shielded so as to prevent beams or rays of light from being directed at any portion of the traveled way of any interstate or primary highway and are of such intensity or brilliance as to cause glare or to

impair the vision of the driver of any motor vehicle or to otherwise interfere with any driver's operation of a motor vehicle; and

(3) signs shall not be erected or maintained which are so illuminated that they obscure any official traffic sign, device or signal, or imitate or may be confused with any official traffic sign, device or signal.

(e) *Automatic changeable facing signs.* (1) Automatic changeable facing signs shall be permitted within adjacent or controlled areas under the following conditions:

(A) The sign does not contain or display flashing, intermittent or moving lights, including animated or scrolling advertising;

(B) the changeable facing remains in a fixed position for at least eight seconds;

(C) if a message is changed electronically, it must be accomplished within an interval of two seconds or less;

(D) the sign is not placed within 1,000 feet of another automatic changeable facing sign on the same side of the highway, with the distance being measured along the nearest edge of the pavement and between points directly opposite the signs along each side of the highway;

(E) if the sign is a legal conforming structure it may be modified to an automatic changeable facing sign upon compliance with these standards and approval by the department. A nonconforming structure shall not be modified to create an automatic changeable facing sign;

(F) if the sign contains a default design that will freeze the sign in one position if a malfunction occurs; and

(G) if the sign application meets all other permitting requirements.

(2) The outdoor advertising license shall be revoked for failure to comply with any provision in this subsection.

(f) *Application to local zoning authorities.* Nothing in article 22 of chapter 68 of Kansas Statutes Annotated, and amendments thereto, shall be construed as prohibiting a local zoning authority from controlling the erection, maintenance, size, spacing and lighting of signs in all areas within its jurisdiction by adopting standards which may be consistent with, or more or less restrictive than the highway advertising control act, and amendments thereto, except that along interstate highways, the size and spacing requirements of subsections (b) and (c) of K.S.A. 68-2234, and amendments thereto, shall be met. The standards adopted by a local zoning authority shall include the regulation of size, of lighting and of spacing of all such signs and shall restrict the erection of new signs, other than signs described by subsections (a), (b) and (c) of K.S.A. 68-2233, and amendments thereto, to zoned commercial or industrial areas.

(g) *Prohibition against zoning to permit outdoor advertising.* Zoning action which is not part of comprehensive zoning and is created primarily to permit outdoor advertising structures, is not recognized as zoning for purposes of this act.

(h) *Unzoned commercial or industrial area qualifications for signs.*

(1) To qualify an area as unzoned commercial or industrial for the purpose of outdoor advertising control, one commercial or industrial activity shall meet all of the following criteria prior to submitting an outdoor advertising permit application:

(A) The activity shall maintain all necessary business licenses as may be required by applicable state, county or local law or ordinances;

(B) the property used for the activity shall be listed for ad valorem taxes with the county and municipal taxing authorities as required by law;

(C) the activity shall be served by utilities, power, telephone, water and sewer or septic and well;

(D) the activity shall have direct or indirect vehicular access;

(E) the activity must be visible from, and located within 660 feet of the nearest edge of the right-of-way of the controlled route;

(F) the commercial or industrial activity must be in operation for a period of 12 months prior to the date of submitting an application for an outdoor advertising permit and license;

(G) the activity shall be in operation for at least nine months per year; and

(H) the owner or employee shall be present at the site for 20 hours per week;

(2) the unzoned area shall include areas on both sides of any two-lane highway, but shall be limited to land on the same side as the commercial or industrial activity on any highway with four or more traffic lanes. All measurements shall begin from the outer edges of regularly used buildings, parking lots, storage or processing areas of the commercial or industrial activity, not from the property line of the activity and shall be along the nearest edge of the main traveled way of the controlled route. The proposed sign location must be within 600 feet of the commercial or industrial activity.

History: L. 1972, ch. 251, § 4; L. 1973, ch. 272, § 2; L. 1981, ch. 266, § 1; L. 2006, ch. 141, § 3; July 1.

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Advertising Signs In Kansas

Outdoor Advertising

State Regulations

Commercial Advertising

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— ATTENTION —

This brochure is only a guideline for outdoor advertising and is not intended to be inclusive of all applicable laws. Sign applicants and owners are responsible for knowing the laws and ordinances that control signage. If there is a conflict between this brochure and any federal, state, or local laws or ordinances, the law or ordinances will prevail. Please call KDOT if you have any questions.

Statutory Authority



Why is the Kansas Department of Transportation involved with outdoor advertising?

As part of the Highway Beautification Act (also known as the Lady Bird Johnson Act), federal law requires all states to provide continuing, effective control of outdoor advertising (Title 23, U.S. Code, Section 131). Failure to comply may result in a 10 percent reduction in Kansas's Federal Highway funds.

What is Outdoor Advertising?

Outdoor Advertising is signs, displays, and devices in areas visible from and adjacent to the federal-aid primary system in existence on June 1, 1991 and any highway which is not on such system but which is on the national highway system. These signs are controlled in order to protect the public investment on such highways, and to promote the safety and recreation value of public travel, and to preserve natural beauty.

What type of signs does this apply to in Kansas?

Kansas licenses three types of signs, legal conforming, direction, and official. Each has its own specific rules that apply.

- ◇ Legal conforming signs are signs that are in commercial or industrial zoned areas. These signs require an application and fee, and an additional biennial licensing fee.



- ◇ Directional and official signs require a sign application and fee but are exempt from licensing fee. Owned by official agencies.



Sign Application

Why do I need a sign application (permit to build) and license?

As part of Kansas law K.S.A. 68-2231 et seq revised in 2006 you are required to submit an application and be approved before you can erect a sign adjacent to a controlled route in Kansas.

Who needs to obtain an application to build a sign?

Anyone who wants to build a sign adjacent to controlled routes in Kansas.

Where do I get an application form?

You can either call one of the numbers listed on Page 11 or by accessing the Internet at www.ksdot.org/bureaus/burRow/beaut/ just click on Sign Application.

How much does it cost?

The fee to submit an application is \$250.00 per sign. In addition, a sign license fee is required once your application and sign location have been approved by KDOT. This fee is \$20.00 for signs with total square feet up to 32. \$75.00 for signs with a total of 33 to 300 square feet and \$150.00 for signs over 301 square feet. This fee is good for a two year period.

What do I need to do to apply for an application to build a sign?

In additional to filling out your sign application you will need to:

- ◇ send in a sketch or photo of the proposed sign

- ◇ send in photo(s) of the staked location
- ◇ send in a sketch or map of the sign location
- ◇ send in zoning authority approval documentation
- ◇ send in the \$250 Application Fee
- ◇ send in the Certificate of Title for signs over 300 square feet

How long do I have to build a sign?

You have 180 days to build your sign following the approval of your application and the issuance of your sign license.

Why do I need to have a green sign tag attached to my sign structure?

This green sign tag is also your license tracking number. This number allows easy viewing knowledge that your sign complies with state regulations.

**Kansas Department of Transportation
Sign Application
(Application to Build a Sign)**

Sign Owner Information Classification of Sign Applying for: _____

Applicants Name (Sign Owner Name) _____
 Business Name (if different from above) Name of Contact _____
 Address _____
 City _____ State _____ Zip Code _____
 Telephone No. () _____ Fax () _____ Email Address _____

Location of Sign Site Is new sign location located within city limits, Yes ___ No ___ Nearest City _____
 Highway Number _____ Side of Highway (circle one) N, S, E, W, Nearest Mile Marker Reference _____
 GPS, GPS Reference _____ County _____ Location must be staked with name of owner displayed.

Physical Description of Sign Type of Construction _____

Dimensions: Height of Facing _____ ft. Width of Facing _____ ft. Overall Height Above Road Grade _____ ft.
 Type of Sign (Check all that apply): Single face _____ Double faced _____ Side by Side _____ Stacked _____ V-Type _____
 Back-to-Back _____ Top-Vision _____
 Number of Faces _____ Will Sign Be Illuminated, Yes ___ No ___ IF Yes, will it be LED Display Yes ___ No ___

Legend: ***Attach a photo of the placement of sign and a sketch or photo of the proposed sign.

ZONING AND COMMERCIAL/INDUSTRIAL QUALIFICATIONS (Only needed for Commercial Advertising)
 Zoned Area _____ Use-Zoned _____
 Is Area Zoned? Yes ___ No ___ Is location within 600 ft. of a qualifying business Yes ___ No ___

What is the zoning designation? _____ Name of Business _____
 (Must be same type of commercial, industrial or business designation)
 Zoning Authority _____ Phone Number _____
 Do you have local approval of Sign Structure and Location Yes ___ No ___ Not Needed

Land Owner Information
 Land Owners Name _____ Business Name (if different) _____
 Name of Contact _____ Address _____
 City _____ State _____ Zip Code _____
 Telephone No. () _____ Fax () _____ Email Address _____

Legal Location Description
 Do you have permission from the land owner (if different than sign owner) to place your sign on this land? Yes ___ No ___
 Have you read all of the statutes and regulations pertaining to Outdoor Advertising Control? Yes ___

Signature of Applicant _____ Date _____

Failure to complete this Application or giving false and/or misleading information will revoke and disqualify this permit. If you need further assistance please call Toll Free 1 (877) 864-6817 or email us at KDOT@DOT.ks.gov Fax: 785-296-6109

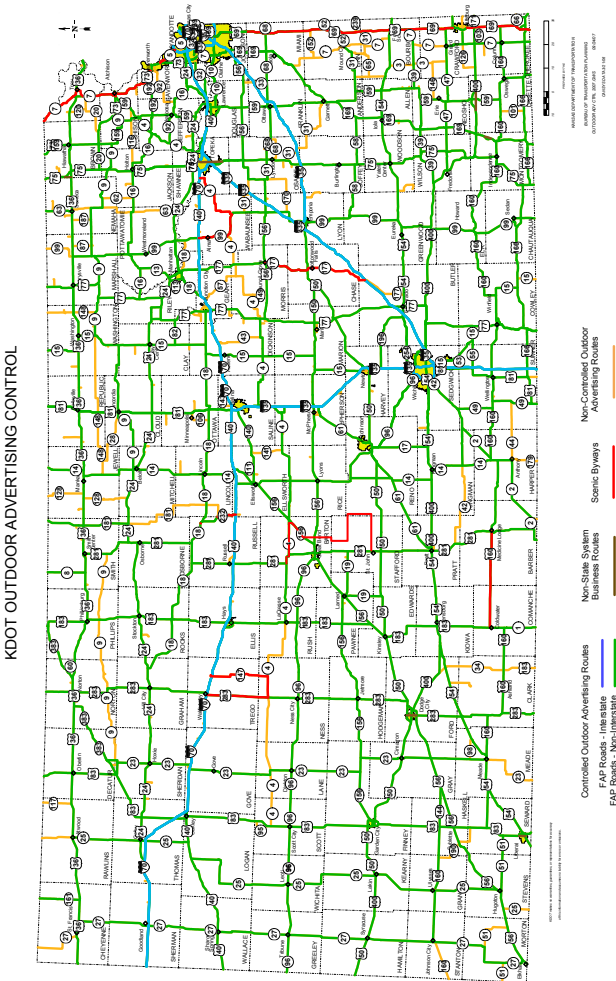
Return: a) Application to Build Form
 b) Sketch or Photo of Proposed Sign
 c) Photos of Staked location
 d) Sketch or Map of Sign Location
 e) Zoning Authority Approval Documentation
 f) \$250 Application Fee

Mailing Address:
 Kansas Department of Transportation,
 Bureau of Right of Way, Outdoor Advertising
 700 SW Harrison Street, 14th Floor
 Topeka, Kansas 66603-3745

D.O.T. Form No. 1950-09 16

What roads require a sign to be licensed?

In Kansas this applies to all Interstate roads along with most State routes. For a map of controlled roads go to www.ksdot.org/bureaus/burRow/beaut/ and click on KDOT Outdoor Advertising Control map. All highways designated as part of the National Highway System (NHS) are subject to control. The NHS includes all interstate and many of the former primary highways. Most primary highways that are subject to control are not a part of the NHS.



Where can I put a sign?

You can put a sign on property zoned as commercial or industrial that is off the right-of-way. (See prohibited signs and areas)

Can I put a sign on my property?

Signs advertising the products and activities conducted on the property on which they are located are referred to as “on premise” signs and are not subject to this act. A KDOT license is not required but you may need local government approval.

Can I put a sign on someone else’s property?

You can put a sign for your business or someone else’s business along a state highway. This is called outdoor advertising. You must submit an application and be approved to build a sign.

- ◇ The sign must follow local ordinance and, if required, you must have a local permit.
- ◇ The sign site must be on zoned or unzoned commercial or industrial property.
- ◇ You must have the owner’s permission.
- ◇ There must be a visible, licensed business or industry that has been in operation for at least six months on the property (if the area is unzoned).



What are some of the restrictions that apply to outdoor advertising?

Outdoor advertising signs placed along state highways:

- ◇ Can be no larger than 900 total square feet. Directional signs cannot exceed 150 square feet.
- ◇ Can have a sign face no more than 30 feet high and no wider than 60 feet.
- ◇ Can not exceed 50 feet above the road grade. This includes border, trim and embellishment, but does not include base or apron, supports or other structural members.
- ◇ Must comply with spacing standards
- ◇ The sign cannot contain flashing, intermittent, or moving lights, including animated or scrolling advertising.

What are the restrictions that apply specifically to Electronic (LED) signs?

The signs must display a static image for a minimum of eight seconds, and have an interval change time of two seconds or less. Electronic signs must be at least 1,000 feet apart. Only sign structures that are classified Legal Conforming may be modified to LED/ACF with approval.



Where are outdoor advertising signs prohibited?

There are certain signs prohibited by law. The following is a partial listing of some of the areas signs are not allowed, such as:

- ◇ Along scenic byways
- ◇ In the right-of-way of any highway
- ◇ In any location that hinders the clear, unobstructed view of approaching or merging traffic, or obscures from view any traffic sign or other official sign.
- ◇ Within a stream or drainage canal.
- ◇ In any location that obscures the view of any connecting highway or intersection.

Are there signs that are exempt from this program?

Yes, some signs that are visible from controlled highways are exempt from this program. They include:

- ◇ Signs advertising the sale or lease of property on which they are located.
- ◇ Signs advertising the products and activities conducted on the property on which they are located. These signs are referred to as “on premise” signs.
- ◇ LOGO and TODS signs authorized under the Motorist Information Signs Act.

Sign Licenses and Renewals

How much do they cost?

Once the initial sign license fee is paid, a license fee will be due every 2 years. This fee is \$20.00 for signs with total square feet up to 32. \$75.00 for signs with a total of 33 to 300 square feet and \$150.00 for signs over 301 square feet. An invoice will be sent to each sign owner, of the structure, 60 days prior to the expiration date. A \$50 past due fee will be assessed 30 days after the expiration date for unpaid invoices. The \$50 late fee will be assessed each month for the first two months. Once an invoice is 60 days past due the license will be terminated and the sign will be subject to removal.

What if I lose a tag or my tag is stolen?

If you lose a tag or if your tag is stolen, a Sign License Replacement Plate Application form along with a \$25.00 fee shall be submitted. The license fee must be current prior to submitting a replacement plate application.



Can a sign be transferred to another owner?

Yes almost all signs can be transferred to another owner. A Sign Transfer Application form must be filled out and submitted to KDOT to process a sign owner transfer. There is no fee for transfers.

TODS (Tourist Oriented Directional) and LOGO (Business Activities) Signs

- ◇ TODS signs are available along the state highway system to provide directional information to tourist-oriented businesses, seasonal agricultural products, services, and attractions that cannot be seen from the highway. TODS signs are not allowed along interstate highways.



- ◇ LOGO signs are available to eligible businesses who's activities include gas, food, lodging, camping, and other attractions at eligible interchanges on the Interstate system.



If you are interested in a TODS or a LOGO sign please contact: www.kansas.interstatelogs.com

How do we apply for a Vegetation Permit?

If you would like to get more information regarding a vegetation permit, please contact our office or go to www.ksdot.org/bureaus/burRow/VegMan for more information.

Who do I contact?

Kansas Department of Transportation
Bureau of Right of Way, Outdoor Advertising
700 SW Harrison Street
Topeka KS 66603-3745
Toll Free: 1-877-461-6817
Email: KDOT#ROW.Signs@ks.gov
Fax: 785-296-6946
Hearing Impaired - 711
www.ksdot.org/bureaus/burRow/beaut/



www.ksdot.org

April 2019

KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF RIGHT OF WAY
DWIGHT D. EISENHOWER STATE OFFICE BUILDING
700 S.W. HARRISON STREET, TOPEKA, KS 66603-3745
PUBLIC ACCESS AT NORTH ENTRANCE OF BUILDING
VOICE 785-296-3501 TTY 711

FAX 785-296-6946 <http://www.ksdot.org>

Toll Free Number 1-877-461-6817



AT A GLANCE

Applicant:
CSM Groups, DBA Popeye's Louisiana
Kitchen

Location:
6821 Johnson Drive

Property ID:
KF251208-2052

Current Zoning:
C-2B

Proposed Zoning:
N/A

Current Land Use:
Drive-Through Restaurant/Vacant

Proposed Land Use:
N/A

N/A Public Hearing Required

Legal Notice:
N/A

Case Number:
23-23

Project Name:
Popeye's Final Development Plan

Project Summary:
The applicant proposes a tear-down and rebuild of an existing drive-through restaurant with improvements, including closed entrance on Johnson Drive, two-lane drive-through vehicular stacking, landscaping, and pedestrian realm activation.

Staff Contact:
Karie Kneller, Planner



PROPERTY BACKGROUND AND INFORMATION

The applicant, CSM Groups, dba Popeye's Louisiana Kitchen, submitted an application for a preliminary development plan for a fast food drive-through restaurant located at 6821 Johnson Drive, on the southeast corner of Johnson Drive and Broadmoor Street. The property is in the Form Based Code (FBC) overlay district and it is zoned C-2B "Retail and Service District." Surrounding properties are zoned C2-B on the east and south, and M-1 on the west across Broadmoor Street. The property north of Johnson Drive is also zoned C2-B. The property is currently a half-acre (21,918 square feet), with a proposed re-plat associated with Case #23-18 that reduces the lot with additional dedicated right-of-way to under a half-acre. All necessary utilities are available on-site. The former Popeye's drive through restaurant suffered fire damage in January of 2023 and will be completely rebuilt on the current site.

PROJECT PROPOSAL

The Planning Commission recommended approval of the preliminary development plan (Case #23-16) to the City Council in August 2023. The City Council approved the preliminary development plan in September 2023. The proposal includes an existing structure that will be razed, and the redevelopment of a one-story Popeye's fast-food drive-through restaurant with parking lot, landscaping, and pedestrian realm improvements. The one-story structure will have a maximum parapet height of 26 feet with awnings and glass spandrel details. Surface parking is screened from street and pedestrian view by a 6–7-foot brick wall with materials consistent with the main structure and in accordance with the Johnson Drive Design Guidelines. Amenities such as benches, bike racks, outdoor seating, street and pedestrian lighting, vegetated planters, storefront glazing, and new signage are also proposed to enhance the public realm.

Included in the final development plan is a demolition plan, site plan, as well as plans for truck turns, grading, utilities, erosion control, landscaping, and photometrics. Elevations of each façade, wall sections, color and material specifications, and a perspective streetscape rendering are also included in the final development plan. All required plans and specifications were submitted with the final development plan application.

Landscaping consists of trees and shrubs native to northeast Kansas, and lighting will be full cut-off per International Dark Sky standards. Street and pedestrian lighting consistent with specifications along Johnson Drive frontage will be installed in two locations in the right-of-way; details are forthcoming with construction permitting.

PLAN REVIEW AND ANALYSIS

The conditions as part of the approval of the preliminary development plan carry over to the final development plan and remain part of staff recommendations herein. The plans have not significantly changed with the final development plan.

RECOMMENDATION

Staff recommends that the Planning Commission approve the preliminary development plan and non-conforming situation permit for Popeye's redevelopment with the following conditions:

1. Public amenities shall be provided in accordance with City Standards and the site design of adjacent improved properties on Johnson Drive, including but not limited to park benches, bike racks, and pedestrian streetlights; once installed, the City agrees to maintain amenities that are fully within the public right-of-way; details shall be submitted with construction documents prior to permit issuance.
2. A demolition permit application for the existing structure is required within three months of City Council approval of the Development Plan.
3. The applicant will provide a two (2) year warranty bond on any public infrastructure installed as part of this Development Plan. Said bond(s) will be placed on file with the City of Mission Community Development Department.
4. Construction permitting documents shall be submitted to the Community Development Department and approved by the Community Development Committee prior to the issuance of any building permits.
5. This Development Plan approval shall lapse in five (5) years from its effective date if construction on the project has not begun, or if such construction is not being diligently pursued; provided, however, that the applicant may request a hearing before the City Council to request an extension of this time period. The City Council may grant an extension for a maximum of 12 months for good cause.
6. The applicant shall obtain all approvals from Johnson County Wastewater and Johnson County Water District #1 prior to building permit issuance.
7. The applicant shall obtain all necessary reviews, inspections, and approvals from Consolidated Fire District #2 prior to final occupancy permit being issued.
8. The applicant shall be responsible for all damage to existing City infrastructure, including roads, curbs, and sidewalks. Repairs shall be of a quality like or better than existing conditions before final Certificate of Occupancy issuance.
9. Maintenance agreement for all site improvements, including but not limited to structures, improved infrastructure, landscaping, parking, and pedestrian connections on the property shall be provided and signed by the applicant and the appropriate City officials prior to construction permitting.



PLANNING COMMISSION ACTION

The Planning Commission will consider Case #23-23 Popeye's Final Development Plan at its November 27, 2023 meeting.

CITY COUNCIL ACTION

No Action.



Community Development Department
 6090 Woodson Street
 Mission, KS 66202
 913-676-8360

Development Application

Permit # _____

Applicant Name: Popeye's Louisiana Kitchen	Company: CSM Groups / Attn: Faizan Yousuf
Address: 10190 Katy Freeway Suite 350	
City/State/Zip: Houston, Texas 77043	
Telephone: 713.266.8799 ext 201	
Email: f.yousuf@csmgroup.org	
Property Owner Name:	Company: WELLS FAMILY TRUST
Address: 1008 VALENTINE RD	
City/State/Zip: KANSAS CITY, MO 64111	
Telephone: 816-561-2555	
Email: coult@devries-law-kc.com	
Firm Preparing Application: Daniel Finn, P.E.	Company: Phelps Engineering, Inc.
Address: 1270 N. Winchester	
City/State/Zip: Olathe, KS 66061	
Telephone: 913-393-1155	
Email: dfinn@phelpsengineering.com	
*All correspondence on this application should be sent to (check one) _____ Applicant _____ Owner <u>X</u> Firm	
Application Type	
Rezoning <input type="checkbox"/> SUP <input type="checkbox"/> Plat <input checked="" type="checkbox"/> Site Plan <input type="checkbox"/> PDP <input type="checkbox"/> FDP <input checked="" type="checkbox"/> Lot Split <input type="checkbox"/> Other (Specify): _____	
Description of Request	
Please provide a brief description of the request:	
Final Plan and Final Plat for Popeye's Louisiana Kitchen at 6821 Johnson Drive.	

Project Details

General Location or Address of Property: 6821 Johnson Drive

Present zoning of property: C-2B

Present use of property: Commercial

Agreement to Pay Expenses

Applicant intends to file an application with the Community Development Department of the City of Mission, Kansas (City). As a result of the filing of said application, City may incur certain expenses, such as but not limited to publication costs, consulting fee, attorney fee, and court reporter fees. Applicant hereby agrees to be responsible for and to reimburse City for all cost incurred by City as a result of said application. Said costs shall be paid within ten (10) days of the receipt of any bill submitted by City to Applicant. It is understood that no requests granted by City or any of its commissions will be effective until all costs have been paid. Costs will be owed whether or not Applicant obtains the relief requested in the application.

Affidavit of Ownership and/or Authorization of Agent

I, M. Ali Latchony / LB POP VS, LLC certify that I am the owner or ~~contract purchaser~~ ^{TENANT} of the subject property. I give my permission for the undersigned to act as my agent on behalf of the application hereby being submitted.

X  Date 9/21/2023
 Signature (Owner) ~~Owner~~ ^{TENANT}

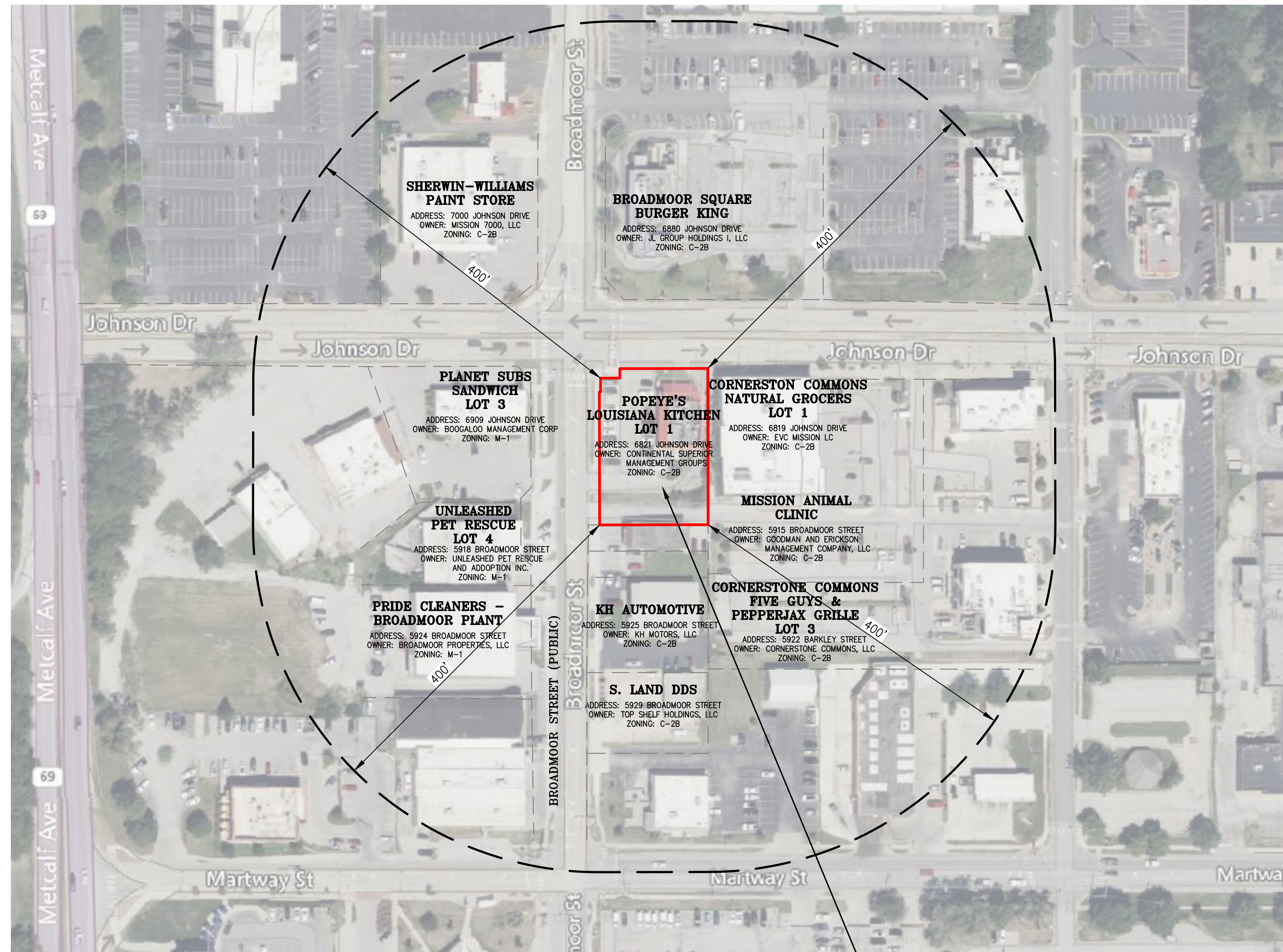
X _____ Date _____
 Signature (Owner's Agent)

*****FOR OFFICE USE ONLY*****

File Fee: \$	Meeting Date
	PC CC
Total:	Date Notices Sent
Receipt #	Date Published
Notes:	Decision

SITE DEVELOPMENT PLANS FOR POPEYE'S LOUISIANA KITCHEN ADDRESS: 6821 JOHNSON DRIVE IN THE CITY OF MISSION, JOHNSON COUNTY, KANSAS

INDEX	
C0	COVER SHEET
C1	DEMOLITION PLAN
C2	OVERALL SITE PLAN
C2.1	SITE PLAN
C2.2	TRUCK TURN PLAN
C3	GRADING PLAN
C4	UTILITY PLAN
C5-C5.1	EROSION CONTROL PLANS
C5.2	EROSION CONTROL DETAILS
	LANDSCAPE PLANS
	PHOTOMETRIC PLAN
	ARCHITECTURE PLANS



OVERALL SITE PLAN

PROJECT LOCATION

UTILITY COMPANIES:

- | | |
|--|---------------------------------------|
| EVERGY
AMANDA KAUER (Amanda.Kauer@evergy.com)
16215 W. 108TH STREET
LENEXA, KANSAS 66219 | (816) 652-1852
(605) 321-6121-CELL |
| ATMOS ENERGY
CAMERON PARKS (cameron.parks@atmosenergy.com)
25090 W. 110TH TER.
OLATHE, KS 66061 | (913) 254-6344
(913) 768-4924 FAX |
| COMCAST CABLE CO.
JIM DUFF
(james_duff@cable.comcast.com)
3400 W. DUNCAN ROAD
BLUE SPRINGS, MISSOURI 64015 | (816) 795-2257
(816) 795-0346 FAX |
| CITY OF MISSION
CELIA DURAN
4775 LAMAR AVE
MISSION, KS, 66208
(cduran@missionks.org) | (913) 676-8381 |
| CONSOLIDATED COMMUNICATIONS
MELISSA STRINGER
(melissa.stringer@consolidated.com)
14859 W. 95TH STREET
LENEXA, KS 66215 | (913) 322-9622 |
| AT&T
CLAYTON ANSPAUGH (ca4089@att.com)
9444 NALL AVENUE
OVERLAND PARK, KANSAS 66207 | (913) 383-4929
(913) 383-4849 FAX |
| SPECTRUM CABLE
450 N. ROGERS RD.
OLATHE KS. 66062 | (913) 440-4189 |
| GOOGLE FIBER
MS. TERESA ERB (TERESAERB@GOOGLE.COM)
908 BROADWAY BLVD.
KANSAS CITY, MO 66105 | (913) 551-4492 |

OWNER/DEVELOPER:

CONTINENTAL SUPERIOR MANAGEMENT GROUPS
10190 KATY FREEWAY, SUITE 350
HOUSTON, TX 77043
713-266-8799 OFFICE
713-266-2703 FAX
CONTACT: FAIZAN YOUSUF

ARCHITECT

WARMAN ARCHITECTURE+DESIGN
1735 SWIFT AVE.
NORTH KANSAS CITY, MO 64116
816-474-2233 OFFICE
816-474-1051 FAX
CONTACT: KATHLEEN A. WARMAN, AIA, NCARB

CIVIL ENGINEER & SURVEYOR:

PHELPS ENGINEERING, INC.
1270 N. WINCHESTER
OLATHE, KS 66061
913-393-1155 OFFICE
913-393-1166 FAX
CONTACT: JUDD CLAUSSEN, P.E.

FINAL PLAT LEGAL DESCRIPTION:

PLAT DESCRIPTION

ALL THAT PART OF THE SOUTHWEST QUARTER OF SECTION 8, TOWNSHIP 12 SOUTH, RANGE 25 EAST, IN THE CITY OF MISSION, JOHNSON COUNTY, KANSAS, BEING MORE PARTICULARLY DESCRIBED BY SCOTT G CHRISMAN, LS-1306, ON JUNE 19, 2023, FOR PROJECT 230238, AS FOLLOWS:

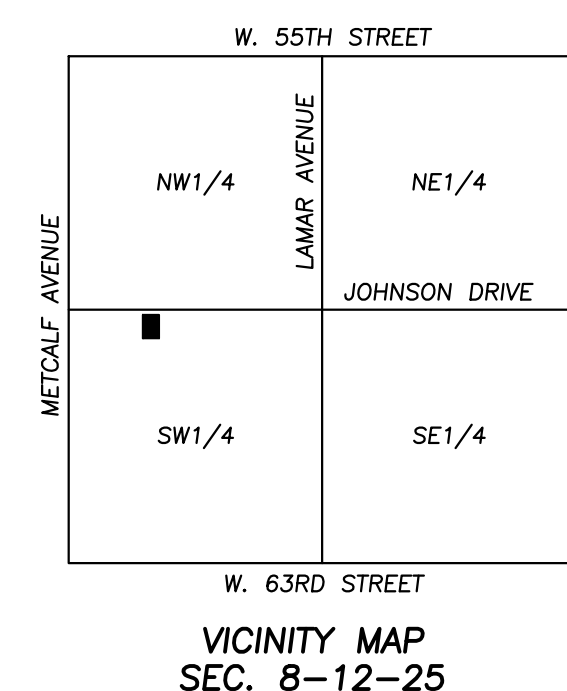
COMMENCING AT THE NORTHWEST CORNER OF THE SOUTHWEST QUARTER OF SAID SECTION 8; THENCE N 89°53'00" E, ALONG THE NORTH LINE OF SAID SOUTHWEST QUARTER OF SAID SECTION 8, A DISTANCE OF 590.00 FEET, TO THE POINT OF INTERSECTION OF THE NORTH LINE OF THE SOUTHWEST QUARTER OF SAID SECTION 8, AND THE CENTERLINE OF BROADMOOR STREET, AS NOW ESTABLISHED, SAID POINT ALSO BEING THE POINT OF BEGINNING; THENCE, CONTINUING ALONG SAID NORTH LINE, N 89°53'00" E, A DISTANCE OF 155.00 FEET, TO THE NORTHWEST CORNER OF CORNERSTONE COMMONS, A PLATTED SUBDIVISION OF LAND IN THE CITY OF MISSION, JOHNSON COUNTY, KANSAS; THENCE S 0°07'00" E, A DISTANCE OF 215.00 FEET; THENCE S 89°53'00" W, A DISTANCE OF 155.00 FEET, TO A POINT ON THE CENTERLINE OF BROADMOOR STREET, AS NOW ESTABLISHED; THENCE N 0°07'00" W, ALONG SAID CENTERLINE OF SAID BROADMOOR STREET, A DISTANCE OF 215.00 FEET, TO THE POINT OF BEGINNING, CONTAINING 0.7650 ACRES, MORE OR LESS, OF UNPLATTED LAND.

BENCHMARK:

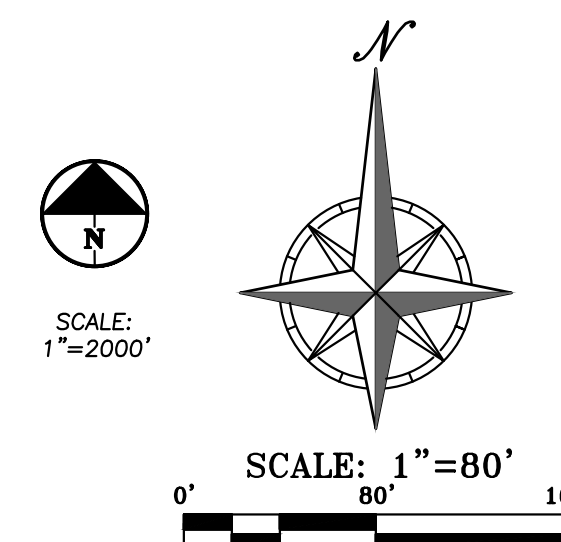
VERTICAL DATUM = NAVD88 BASED ON GPS OBSERVATION USING SMARTNET GPS NETWORK
1. SET "I" CUT IN BACK OF CURB NW CORNER OF PARKING LOT
ELEVATION = 1020.60

FLOOD NOTE:

THIS PROPERTY LIES WITHIN ZONE X, DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE CITY OF MISSION, COMMUNITY NO. 200170, JOHNSON COUNTY, KANSAS, MAP NO. 20091C00236, AND DATED AUGUST 3, 2009.



VICINITY MAP
SEC. 8-12-25

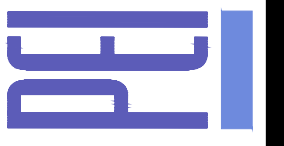


Know what's below.
Call before you dig.

UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

PHELPS ENGINEERING, INC.
1270 N. Winchester
Olathe, Kansas 66061
(913) 393-1155
Fax (913) 393-1166
www.phelpsengineering.com

PLANNING
ENGINEERING
IMPLEMENTATION

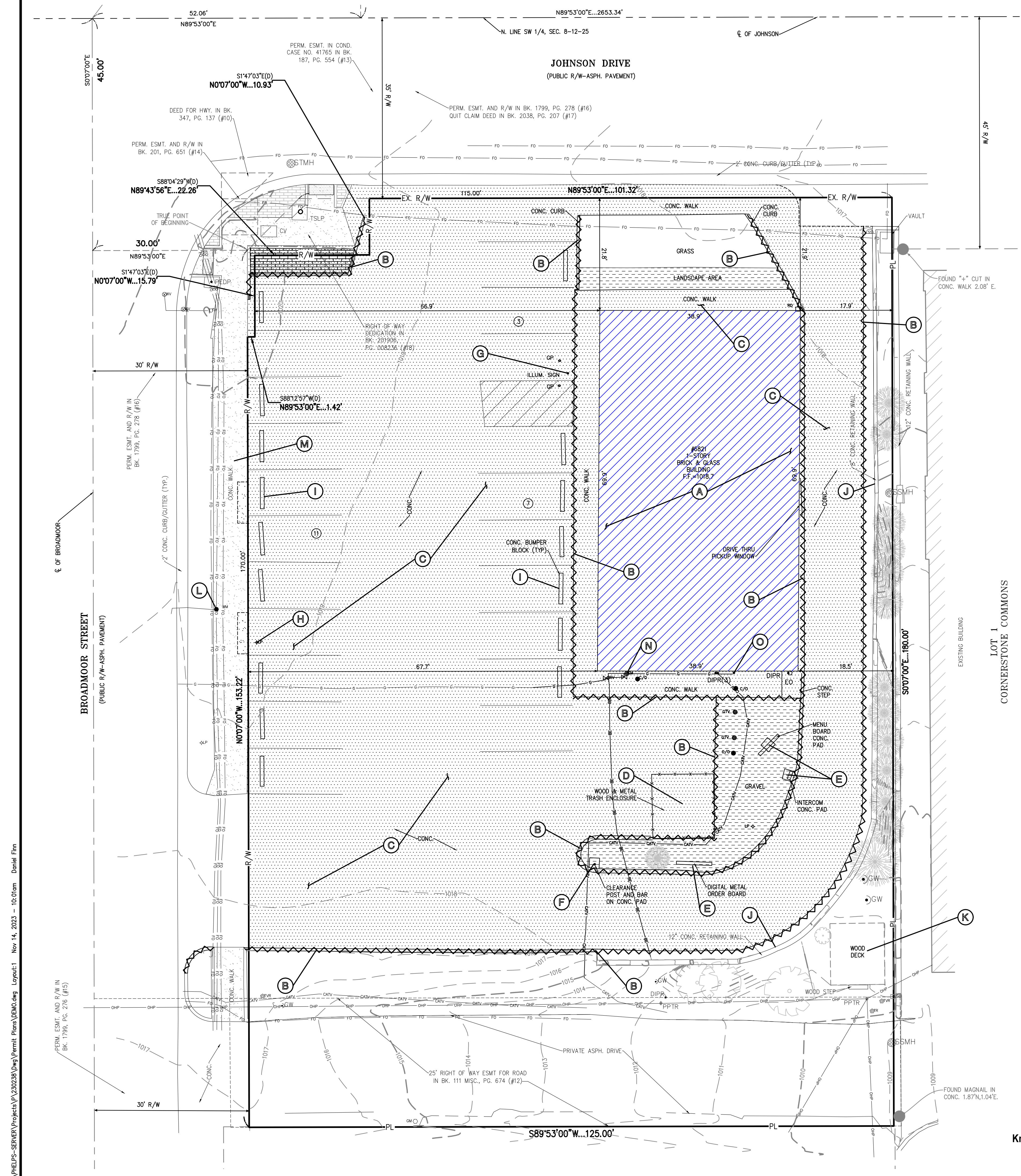


COVER SHEET
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	230238	Date	10-30-2023	By	App.
DATE	09-21-2023	DATE	11-14-2023	By <td>App. </td>	App.
CHECKED	DAF	REVISIONS	REVISED PER STAFF COMMENTS	AEB	DAF
DATE OF AUTHORIZATION	08-01-2023		REVISED PER STAFF COMMENTS	AEB	DAF
ENGINEERING	E-SB				
DATE OF AUTHORIZATION	08-01-2023				
ENGINEERING	20070128				
ENGINEERING	20070128				

SHEET

C0



DEMOLITION KEY NOTES:

(A) THE CONTRACTOR SHALL REMOVE ALL PRE-EXISTING STRUCTURES, FOUNDATIONS, FOOTINGS, PIERS, WATER WELLS, SEPTIC TANKS, LATERAL LINES, BURIED DEBRIS, MISCELLANEOUS CONCRETE, ETC. WHICH MAY BE ENCOUNTERED DURING DEMOLITION ACTIVITIES. THE CONTRACTOR SHALL DISPOSE OF THESE MATERIALS IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES.

SHADED AREAS INDICATE MAIN STRUCTURES AND OUTBUILDINGS TO BE DEMOLISHED. IN ADDITION TO SHADED DEMOLITION AREAS, ALL MISCELLANEOUS CONCRETE, STONE STRUCTURES, OUTBUILDINGS, PRIVATE SIDEWALKS, RETAINING WALLS, SIGNS, PATIOS, FOUNDATION WALLS AND FOOTINGS ASSOCIATED WITH THE STRUCTURES SHALL BE REMOVED UNLESS OTHERWISE NOTED ON THE PLANS. TYPICAL LOCATION.

THE CONTRACTOR SHALL BE REQUIRED TO BACKFILL ALL EXCAVATIONS/DEPRESSIONS CREATED BY THE REMOVAL OF STRUCTURES, FOUNDATIONS, FOOTINGS, PAVING, SEPTIC TANKS, WELLS, PIPES, TREE ROOTS, DEBRIS AND UTILITY STRUCTURES, ETC. ALL EXCAVATIONS SHALL BE BACKFILLED TO EXISTING GROUND ELEVATIONS ON ALL SIDES OF THE EXCAVATION.

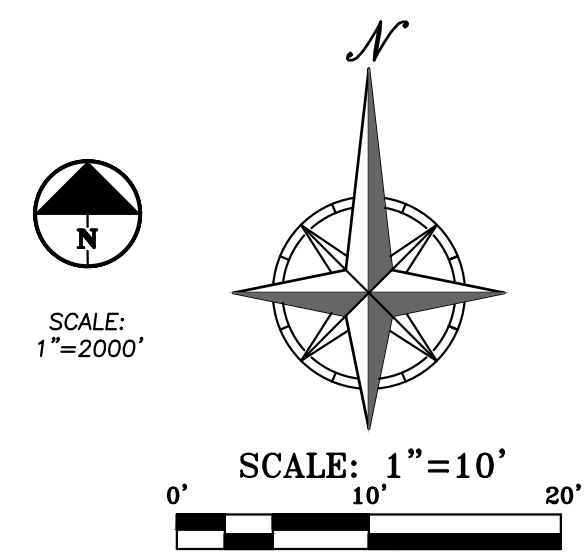
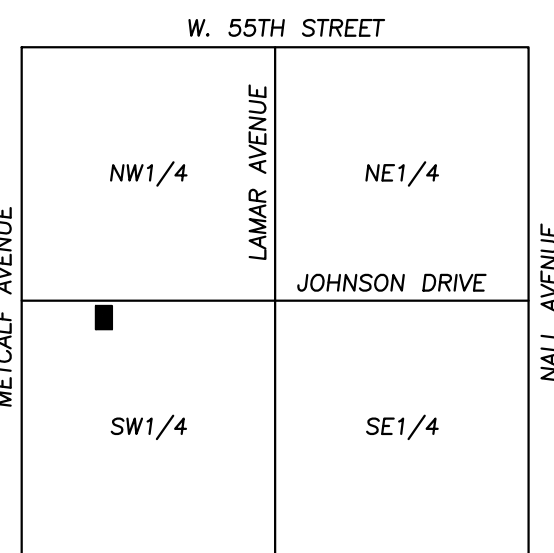
- (B)** REMOVE EXISTING CURB.
- (C)** REMOVE EXISTING CONCRETE PAVEMENT.
- (D)** REMOVE EXISTING TRASH ENCLOSURE.
- (E)** REMOVE EXISTING MENU BOARDS.
- (F)** REMOVE EXISTING CLEARANCE BAR, POST AND CONCRETE PAD.
- (G)** REMOVE EXISTING POLE SIGN AND CONCRETE BASE.
- (H)** REMOVE EXISTING LIGHT POLE AND 2' SQUARE CONCRETE BASE.
- (I)** REMOVE EXISTING CONCRETE STOP BLOCKS (TYPICAL).
- (J)** EXISTING CONCRETE RETAINING WALL TO REMAIN. DO NOT DISTURB.
- (K)** REMOVE EXISTING WOOD DECK.
- (L)** EXISTING WATER METER PIT TO REMAIN.
- (M)** EXISTING CONCRETE SIDEWALK TO REMAIN.
- (N)** EXISTING ELECTRIC METER TO BE REMOVED (COORDINATE WITH EVERGY).
- (O)** EXISTING GAS METER TO BE REMOVED (COORDINATE WITH KANSAS GAS).

LEGEND

- PL — PROPERTY LINE
- LL — LOT LINE
- R/W — RIGHT-OF-WAY
- — — REMOVE EXISTING CURB & GUTTER
- ▨ EXISTING BUILDING TO BE REMOVED
- ▩ EXISTING ASPHALT PAVEMENT TO BE REMOVED
- ▧ EXISTING CONCRETE PAVEMENT/SIDEWALK TO BE REMOVED
- ▦ EXISTING GRAVEL TO BE REMOVED
- ⊙ EXISTING TREE TO REMAIN
- ⊗ REMOVE TREE
- BT — EXISTING BURIED TELEPHONE
- CATV — EXISTING CABLE TELEVISION LINE
- FO — EXISTING FIBER OPTIC LINE
- W — EXISTING WATER LINE
- G — EXISTING GAS LINE
- BE — EXISTING BURIED ELECTRIC
- OMP — EXISTING OVERHEAD POWER LINE
- SS — EXISTING SANITARY SEWER
- — — EXISTING STORM SEWER
- ⊕ EXISTING FIRE HYDRANT
- LP ⊕ EXISTING LIGHT POLE
- — — EXISTING CHAIN LINK FENCE

DEMOLITION NOTES:

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DEMOLITION, REMOVAL, AND DISPOSAL (IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES) ALL CURBS, PARKING, DRIVES, DRAINAGE STRUCTURES, UTILITIES, ETC., SUCH THAT THE IMPROVEMENTS SHOWN ON THE REMAINING PLANS CAN BE CONSTRUCTED. ALL FACILITIES TO BE REMOVED SHALL BE UNDERCUT TO SUITABLE MATERIAL AND BROUGHT TO GRADE WITH SUITABLE COMPACTED FILL MATERIAL.
2. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND DISPOSING THE DEBRIS IN A LAWFUL MANNER. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR DEMOLITION AND DISPOSAL.
3. DAMAGE TO ALL EXISTING CONDITIONS TO REMAIN WILL BE REPLACED AT CONTRACTOR'S EXPENSE.
4. CONTRACTOR MUST COORDINATE WITH OWNER PRIOR TO ANY CONSTRUCTION TO ESTABLISH CUSTOMER ACCESS AND TRAFFIC FLOW DURING ALL PHASES.
5. REFER TO THE BUILDING PLANS FOR SITE LIGHTING ELECTRICAL MODIFICATIONS (IF ANY) TO THE EXISTING SYSTEM.



UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

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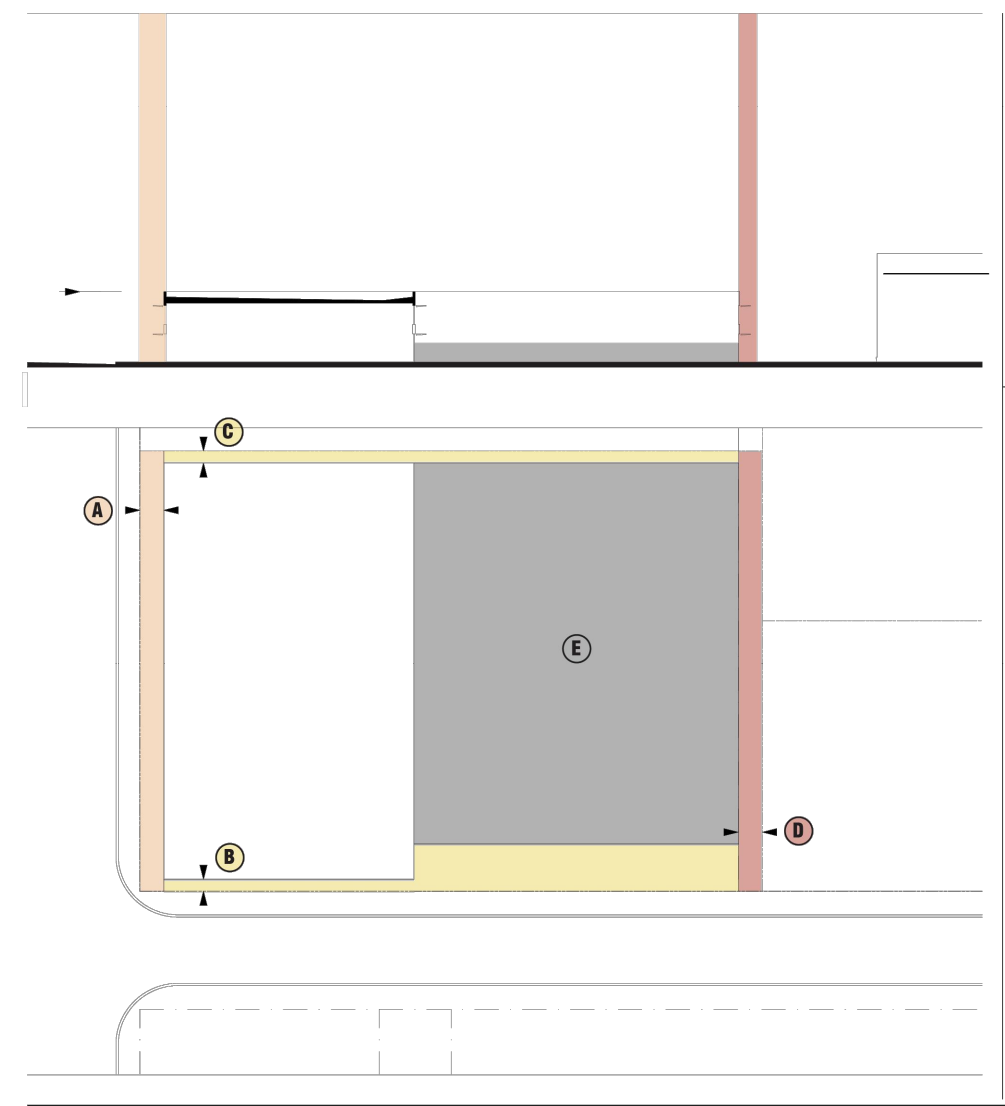
DEMOLITION PLAN
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	Date	By	App.
230238	10-30-2023	REVISOR	PER STAFF COMMENTS
230238	11-14-2023	REVISOR	PER STAFF COMMENTS

SHEET
C1



MISSION WEST GATEWAY FORM BASED CODE



LOW-RISE BUILDINGS

Low-rise buildings are single-story buildings under single tenancy or divided into multiple storefronts. Low-rise buildings are permitted in the West Gateway District under the following conditions:

- Low-rise buildings may be developed in any sector, provided the total site area does not exceed 1/2 acre.
- Low-rise buildings, built according to low-rise building guidelines, may be developed as up to 60% of the gross square feet of development (in one or multiple buildings) in any sector provided the total site area does not exceed 3 acres.
- Low-rise buildings, built according to low-rise building guidelines, may be developed as up to 20% of the gross square feet of development or 20,000 square feet, whichever is less (in one or multiple buildings) in any sector provided the site area exceeds 3 acres.

Low-rise buildings may include commercial retail and support uses only. Low-rise buildings are typically parked in surface lots, but may utilize structured parking. Low-rise buildings are either 1 or 2 stories tall and must be no less than 26 in height from grade. A mezzanine level may be built inside the building, but must include windows facing streets. Entrances to Low-rise buildings shall be direct (rather than through a lobby), from both street side and parking lots. Parking must be provided in either a well-designed surface lot or a structured garage, not to exceed the height of the building, behind the building (away from the street).

A FRONT SETBACK 0' - 10'
The Front Setback is measured from the property line along the principal frontage to the main facade of the building. Elements which contribute to the Public Realm may encroach into the Front Setback. These elements may include balconies, porches, stoops, and cornice and eave details.

B SIDE STREET SETBACK 0' - 10'
Side Street Setback applies to lots at the intersections of streets. Side Street Setback is measured from the property line along the secondary frontage to the facade of the building. Encroachments that contribute to the Public Realm may be considered, based on architectural merit.

C SIDE LOT SETBACK 0' MIN
Side Lot Setback is measured from the side lot line to the side elevation of the building. No encroachments in the Side Setback are permitted. The 0' minimum dimension is intended to encourage continuous facades along the street. Building Code requirements must still be met.

D REAR SETBACK 0' MIN
Rear Setback is measured from the rear property line to the rear elevation of the nearest building. Encroachments in the Rear Setback are limited to eave overhangs and cornices. Parking is permitted in the rear of lots only and may be accessed on side streets as dictated by the Regulating Plan. For interior or non-corner lots, parking is permitted along the full width of the property in the rear up to the rear of the building. For corner lots, parking must be set back 10-20' from a side street. A minimum 20' is required when property landscaped and minimum 10' when screened from view through the use of a 4' high wall, fence or evergreen hedge, installed in the side street setback. Parking lots set back 40' or more from a side street do not require the wall, fence or hedge, but all must be landscaped as per the Landscape Guidelines.

E PARKING

07.29.14

URBAN GUIDELINES BY BUILDING TYPE
CHAPTER 4: PAGE 2

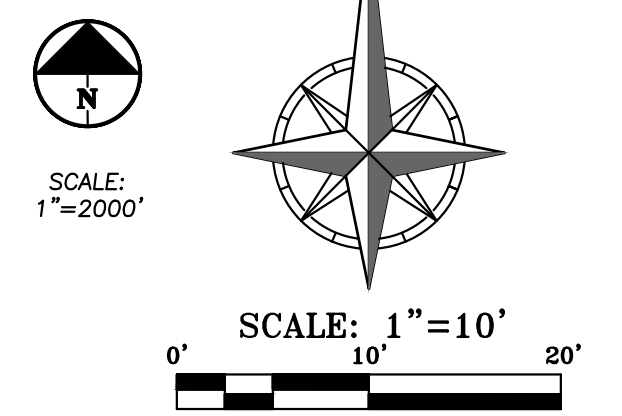
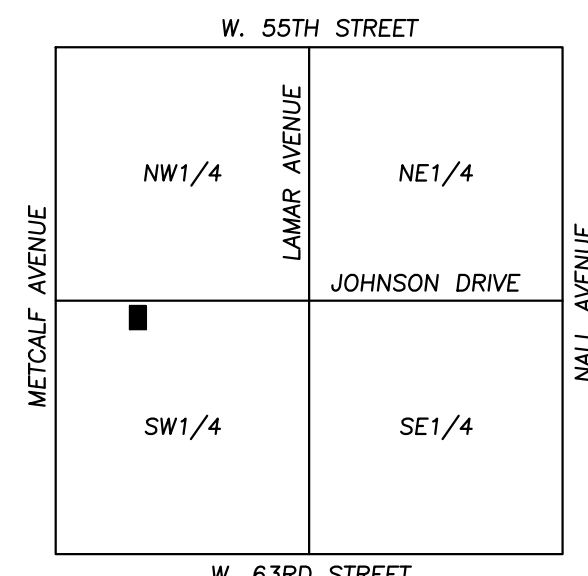


Know what's below.
Call before you dig.

UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

LEGEND

— PL —	PROPERTY LINE
— LL —	LOT LINE
— R/W —	RIGHT-OF-WAY
— 2' —	2' CURB & GUTTER
— 6" —	6" CURB
— B/L —	BUILDING SETBACK LINE
— P/S —	PARKING SETBACK LINE
— L/S —	LANDSCAPE SETBACK LINE
[Pattern]	STANDARD DUTY ASPHALT PAVEMENT
[Pattern]	PROPOSED BUILDING
[Pattern]	CONCRETE PAVEMENT
[Pattern]	CONCRETE SIDEWALK



V:\PHILIPS-SERVER\Projects\1330228\Drawings\Site\Aerial.dwg Layout:1 Nov 14, 2023 - 10:01am Daniel Finn

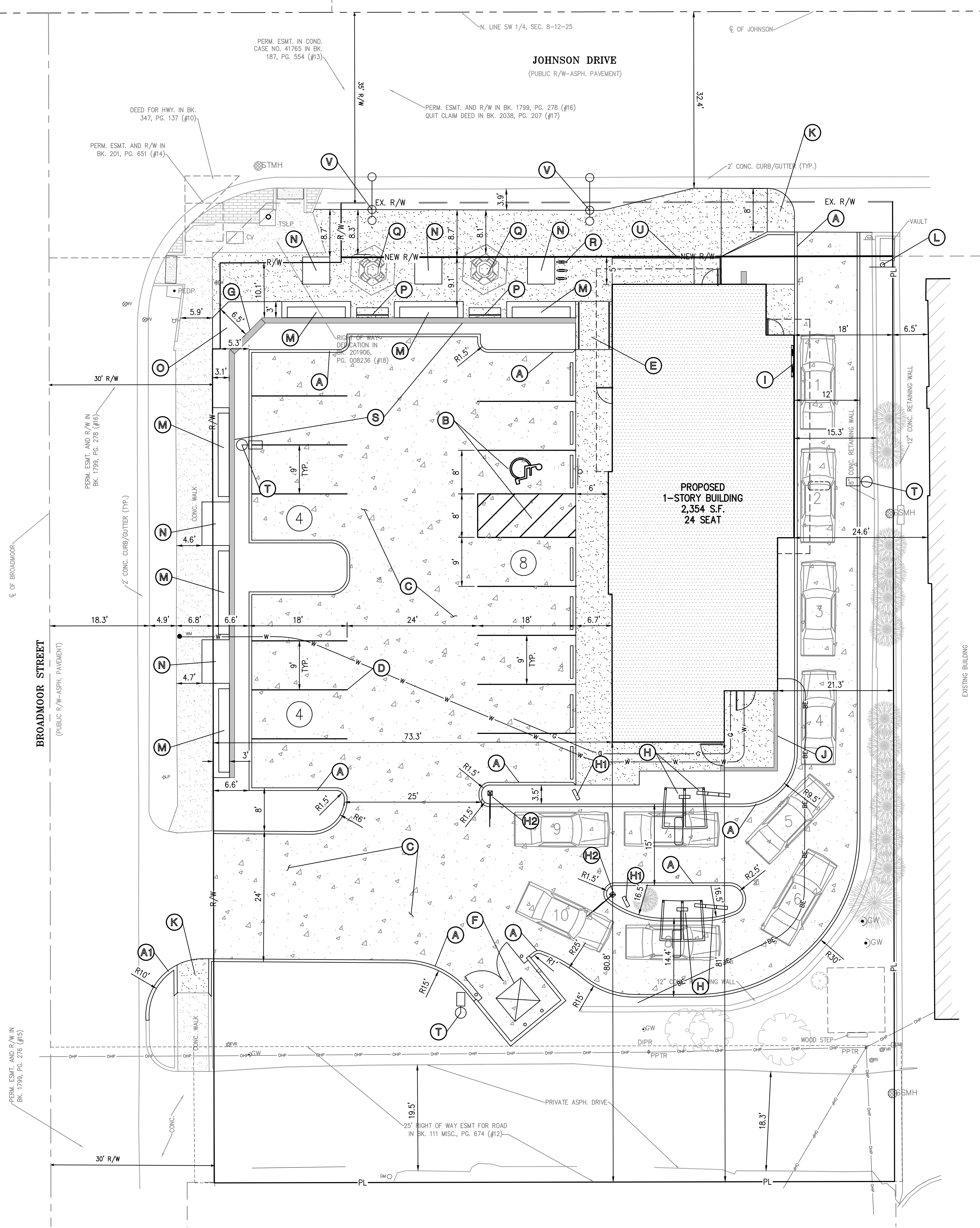
PHILIPS ENGINEERING, INC.
1370 N. Winchester
Olathe, Kansas 66060
(913) 993-1155
Fax (913) 993-1165
www.philipsengineering.com

PLANNING ENGINEERING IMPLEMENTATION

SITE PLAN - AERIAL
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	Date	By	App.
230228	10-30-2023	AEB	DAF
DATE: 09-21-2023	DATE: 10-30-2023	REVISIONS:	
CHECKER: DAF	APPROVED: JJC	1. 11-14-2023	REVISIONS PER STAFF COMMENTS
CORPORATE AUTHORIZATION	DATE: 11-14-2023	2. 11-14-2023	REVISIONS PER STAFF COMMENTS
LAND SURVEYING - LS-82			
LAND ENGINEERING - E-361			
CERTIFICATE OF AUTHORIZATION			
LAND SURVEYING: 20070128			
LAND ENGINEERING: 20050028			

SHEET
C2



SITE PLAN NOTES:

- All construction materials and procedures on this project shall conform to the latest revision of the following governing requirements, incorporated herein by reference:
 - A) City ordinances & O.S.H.A. Regulations.
 - B) The City of Mission Technical Specifications and Municipal Code.
 - C) The Project Specifications.
- The contractor shall have one (1) signed copy of the plans (approved by the City) and one (1) copy of the appropriate Design and Construction Standards and Specifications at the job site at all times.
- The contractor will be responsible for securing all permits, bonds and insurance required by the contract documents, City of Mission, Kansas, and all other governing agencies (including local, county, state and federal authorities) having jurisdiction over the work proposed by these construction documents. The cost for all permits, bonds and insurance shall be the contractors' responsibility and shall be included in the bid for the work.
- The contractor is responsible for coordination of his and his sub-contractor's work. The contractor shall assume all responsibility for protecting and maintaining his work during the construction period and between the various trades/sub-contractors constructing the work.
- The demolition and removal (or relocation) of existing pavement, curbs, structures, utilities, and all other features necessary to construct the proposed improvements, shall be performed by the contractor. All waste material removed during construction shall be disposed off the project site. The contractor shall be responsible for hauling and disposing of waste material. The disposal of waste material shall be in accordance with all local, state and federal regulations.
- Contractor shall be responsible for all relocations, including but not limited to, all utilities, storm drainage, sanitary sewer services, signs, traffic signals & poles, etc. as required. All work shall be in accordance with governing authorities specifications and shall be approved by such. All cost shall be included in base bid.
- All existing utilities indicated on the drawings are according to the best information available to the Engineer; however, all utilities actually existing may not be shown. The contractor shall be responsible for contacting all utility companies for an exact field location of each utility prior to any construction. All utilities, shown and unshown, damaged through the negligence of the contractor shall be repaired or replaced by the contractor at his expense.
- The contractor will be responsible for all damage to existing utilities, pavement, fences, structures and other features not designated for removal. The contractor shall repair all damages at his expense.
- The contractor shall verify the flow lines of all existing storm or sanitary sewer connections and utility crossings prior to the start of construction. Notify the engineer of any discrepancies.
- SAFETY NOTICE TO CONTRACTOR:** In accordance with generally accepted construction practices, the contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. Any construction observation by the engineer of the contractor's performance is not intended to include review of the adequacy of the contractor's safety measures, in, on or near the construction site.
- Refer to the building plans for site lighting electrical requirements, including conduits, pole bases, pull boxes, etc.

SITE DIMENSION NOTES:

- BUILDING TIES SHOWN ARE TO THE OUTSIDE FACE OF PROPOSED WALLS. THE SUBCONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR SPECIFIC DIMENSIONS AND LAYOUT INFORMATION FOR THE BUILDINGS.
- ALL DIMENSIONS SHOWN FOR THE PARKING LOT AND CURBS ARE MEASURED FORM BACK OF CURB TO BACK OF CURB.

PAVEMENT MARKING AND SIGNAGE NOTES:

- PARKING STALL MARKING STRIPES SHALL BE FOUR INCH (4") WIDE WHITE STRIPES. DIRECTIONAL ARROW AND HANDICAP STALL MARKINGS SHALL BE FURNISHED AT LOCATIONS SHOWN ON PLANS.
- HANDICAP PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO ALL FEDERAL (AMERICANS WITH DISABILITIES ACT) AND STATE LAWS AND REGULATIONS.
- TRAFFIC CONTROL DEVICES AND PAVEMENT MARKINGS SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES".
- STOP SIGNS SHALL BE PROVIDED AT ALL LOCATIONS AS SHOWN ON PLANS AND SHALL CONFORM TO THE "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES". SIGNS SHALL BE 18" X 12", 18 GAUGE STEEL AND SHALL BE ENGINEER GRADE REFLECTIVE.
- TRAFFIC CONTROL AND PAVEMENT MARKINGS SHALL BE PAINTED WITH A WHITE SHERWIN WILLIAMS S-W TRAFFIC MARKING SERIES B-29Y2 OR APPROVED EQUAL. THE PAVEMENT MARKING SHALL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS. APPLY ON A CLEAN, DRY SURFACE AND AT A SURFACE TEMPERATURE OF NOT LESS THAN 70F AND THE AMBIENT AIR TEMPERATURE SHALL NOT BE LESS THAN 60F AND RISING. TWO COATS SHALL BE APPLIED.

SITE KEY NOTES:

- (A) CONSTRUCT PRIVATE 6" CURB (TYPICAL).
- (A1) CONSTRUCT PUBLIC 6" CURB (TYPICAL).
- (B) CONSTRUCT ACCESSIBLE PARKING SPACE. INSTALL MARKINGS PER STD. DETAIL. INSTALL VAN ACCESSIBLE PARKING SIGN. (1 TOTAL).
- (C) INSTALL CONCRETE PAVEMENT (TYPICAL).
- (D) INSTALL PAVEMENT STRIPPING (TYPICAL).
- (E) INSTALL SIDEWALK RAMP WITH HANDRAIL ON BOTH SIDES.
- (F) INSTALL TRASH ENCLOSURE WITH HEAVY DUTY CONCRETE PAVEMENT (RE: ARCHITECT PLANS FOR ENCLOSURE DETAILS).
- (G) PROPOSED MONUMENT SIGN INTEGRATED W/ WALL (RE: ARCHITECT PLANS).
- (H) INSTALL MENU BOARD AND ORDER BOX (RE: ARCHITECT PLANS).
- (H1) INSTALL PRE-ORDER MENU BOARD (RE: ARCHITECT PLANS).
- (H2) INSTALL CLEARANCE BAR (RE: ARCHITECT PLANS).
- (I) PICK-UP WINDOW (RE: ARCHITECT PLANS).
- (J) CONSTRUCT SCREEN WALL (RE: ARCHITECT PLANS).
- (K) CONSTRUCT PUBLIC CONCRETE SIDEWALK RAMP.
- (L) INSTALL STOP SIGN (TYPICAL).
- (M) PROPOSED PLANTER BED (RE: LANDSCAPE PLANS).
- (N) PROPOSED TREE WELL (RE: LANDSCAPE PLANS).
- (O) PROPOSED LANDSCAPE BED (RE: LANDSCAPE PLANS).
- (P) PROPOSED BENCH (RE: ARCHITECT PLANS).
- (Q) PROPOSED TABLE W/ CHAIRS AND UMBRELLA (RE: ARCHITECT PLANS).
- (R) PROPOSED BIKE RINGS (RE: ARCHITECT PLANS).
- (S) PROPOSED 6 FOOT SCREEN WALL (RE: ARCHITECT PLANS).
- (T) PROPOSED PARKING LOT LIGHT PE BED (RE: LIGHTING PLANS).
- (U) INSTALL TURNDOWN CONCRETE SIDEWALK. REFER TO GRADING PLAN FOR SIDEWALK ELEVATIONS ALONG RIGHT OF WAY AND OUTSIDE BUILDING. INSTALL HANDRAIL ALONG SIDEWALK FROM BUILDING EXIT TO LANDING AT BOTTOM OF RAMP.
- (V) INSTALL DUAL STREETLIGHT / PEDESTRIAN LIGHT POLES ALONG MISSION ROAD. FINAL LOCATIONS AND SPECIFICATIONS TO BE COORDINATED WITH CITY AT TIME OF BUILDING PERMIT.

SITE DATA

PROPERTY AREA	21,198 S.F. / 0.49 AC.
ZONING	C2-B
PROPOSED BUILDING (1-STORY)	2,354 S.F.
FLOOR AREA RATIO (FAR)	0.111 S.F.

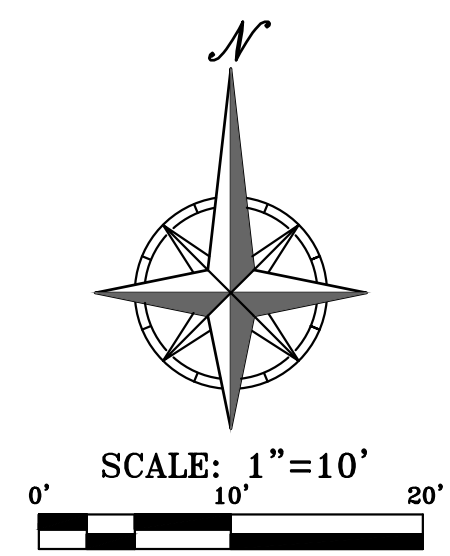
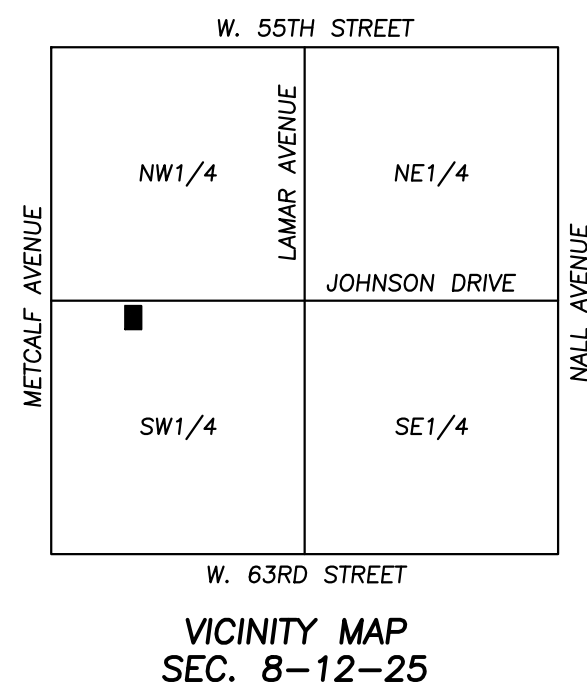
PARKING SUMMARY

PROVIDED PARKING	
STANDARD STALLS (9'-0" X 18'-0")	15
ACCESSIBLE STALLS	1
PROVIDED STALLS	16
REQUIRED PARKING STALLS	
1 STALL / 4 SEATS (24 SEATS)*	6
REQUIRED ACCESSIBLE STALLS	
TOTAL STALLS	1-25
REQUIRED ACCESSIBLE STALLS	1
PARKING LOT % LANDSCAPED	9%

* OWNER ANTICIPATES UP TO 15 EMPLOYEES WORKING DURING MAX SHIFT

LEGEND

- PL — PROPERTY LINE
- LL — LOT LINE
- R/W — RIGHT-OF-WAY
- 6" CURB
- B/L — BUILDING SETBACK LINE
- P/S — PARKING SETBACK LINE
- L/S — LANDSCAPE SETBACK LINE
- [Pattern] PROPOSED BUILDING
- [Pattern] CONCRETE PAVEMENT
- [Pattern] CONCRETE SIDEWALK



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PLANNING
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SITE PLAN
 POPEYE'S LOUISIANA KITCHEN
 6821 JOHNSON DRIVE
 MISSION, KANSAS 66202

Project No.	Date	By	App.
2302238	10-30-2023	DAF	AEB
1302238-01	11-14-2023	DAF	AEB

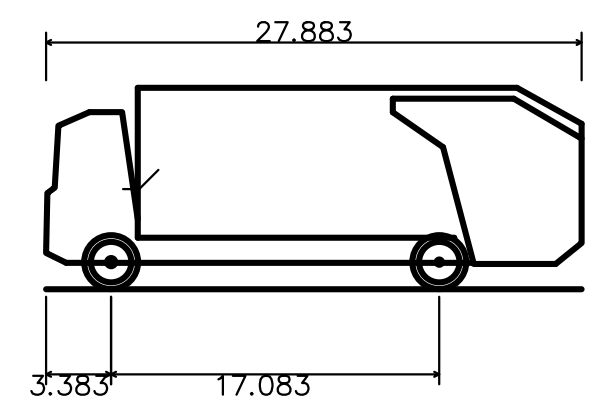
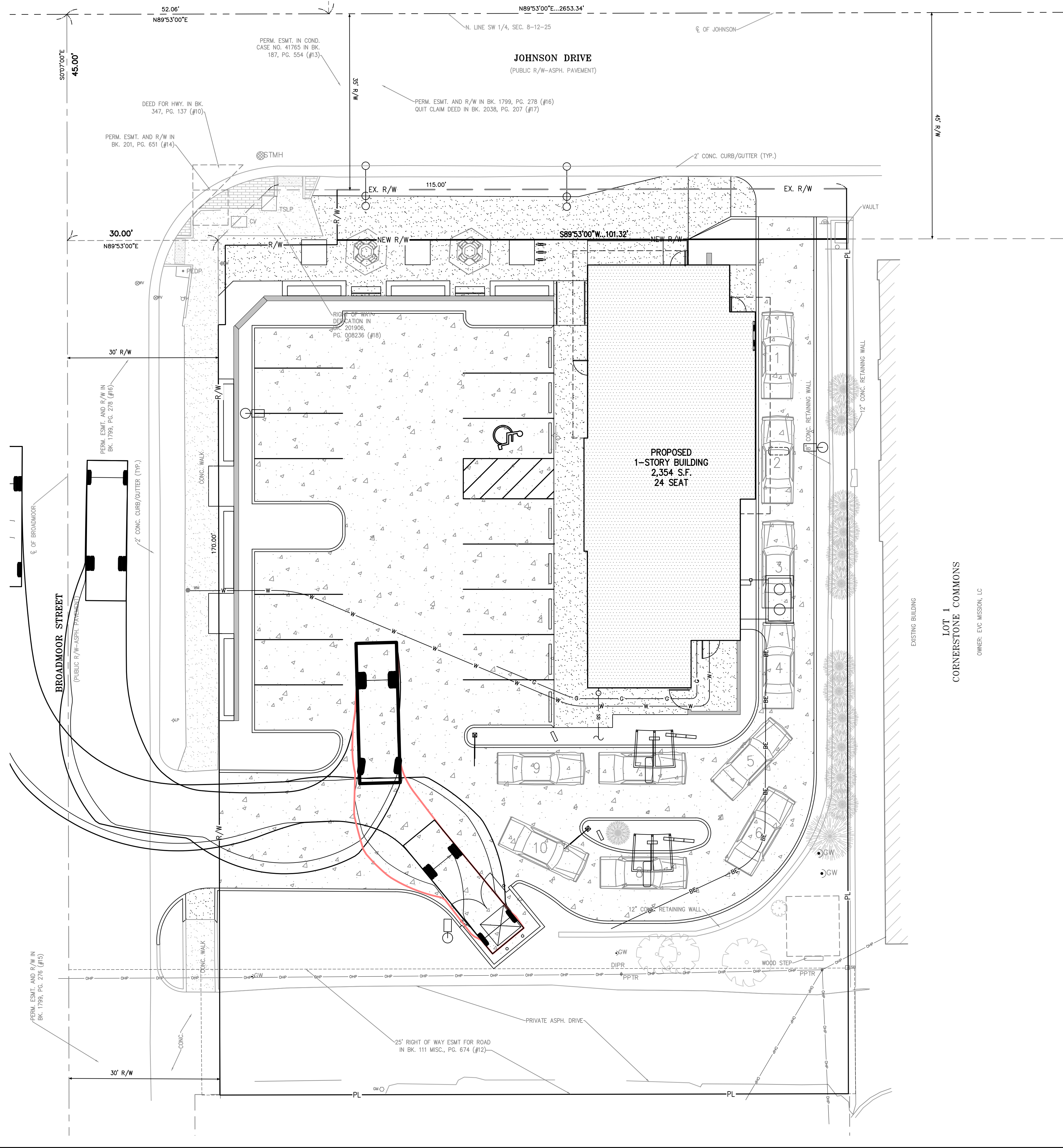
Revisions:

No.	Date	Revised Per	Comments
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2	11-14-2023	DAF	REVISED PER STAFF COMMENTS

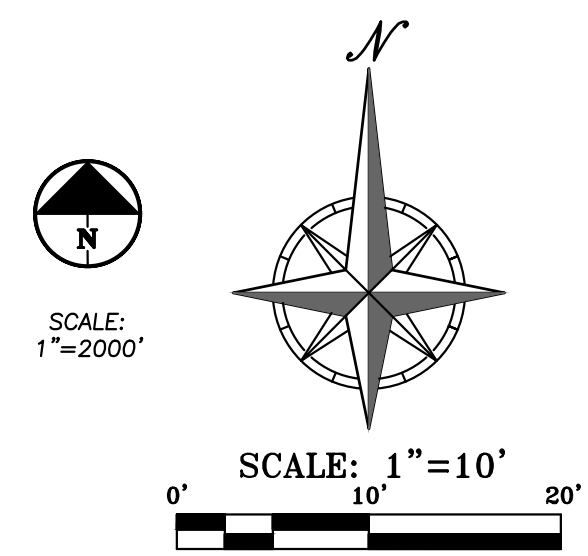
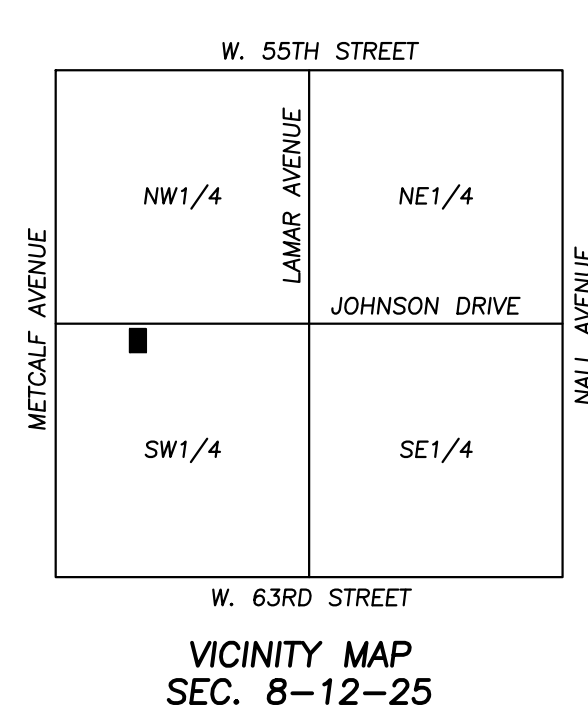
DATE: 09-21-2023
 DRAWN: AEB
 CHECKED: DAF
 APPROVED: JCC
 CADD: JCC
 PROJECT: POPEYE'S LOUISIANA KITCHEN
 LAND SURVEYING - LS-82
 ENGINEERING - E-361
 CERTIFICATE OF AUTHORIZATION
 LAND SURVEYING: 200701028
 ENGINEERING: 200300308

SHEET
C2.1

\\PHELPS-SERVER\Projects\230228\Drawings\Truck Turn Plan.dwg Layout:1 Nov 14, 2023 - 10:01am Donal Finn



Hino 338 M + Wayne Royal GT14 Refuse Truck
 Overall Length 27.883ft
 Overall Width 8.042ft
 Overall Body Height 10.488ft
 Min Body Ground Clearance 1.318ft
 Track Width 8.042ft
 Lock-to-lock time 6.00s
 Curb to Curb Turning Radius 27.400ft



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PLANNING
 ENGINEERING
 IMPLEMENTATION

TRUCK TURN PLAN
 POPEYE'S LOUISIANA KITCHEN
 6821 JOHNSON DRIVE
 MISSION, KANSAS 66202

Project No.	Date	By	App.
230228	10-30-2023	AEB	DAF
230228	11-14-2023	AEB	DAF

Revisions:

No.	Date	Revised Per	Staff	Comments
1.	10-30-2023	REVISOR	DAF	REVISED PER STAFF COMMENTS
2.	11-14-2023	REVISOR	DAF	REVISED PER STAFF COMMENTS

DATE: 09-21-2023
 DRAWN: AEB
 CHECKED: DAF
 APPROVED: JCC
 CADD: JCC
 PROJECT: POPEYE'S LOUISIANA KITCHEN
 LANS: JCC
 SURVEYING: LS-82
 ENGINEERING: E-361
 CERTIFICATE OF AUTHORIZATION
 LICENSE NO. 200700128
 EXPIRES: 20250330



UTILITY NOTES:
 VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
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 THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL
 FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

Know what's below.
 Call before you dig.

SITE GRADING NOTES:

- CONTOURS AND ELEVATIONS: Existing and proposed contours are shown on plans at one foot (1') contour intervals, unless otherwise noted. Proposed contours and elevations shown represent approximate finish grade. Contractor shall hold down subgrades to allow for pavement and sub-base thicknesses.
- If the contractor does not accept existing topography as shown on the plans, without exception, he shall have made at his expense, a topographic survey by a registered land surveyor and submit it to the owner for review.
- CLEARING AND GRUBBING: Prior to beginning preparation of subgrade, all areas under pavements or building shall be stripped of all topsoil, vegetation, large rock fragments (greater than 6 inches in any dimension) and any other deleterious material. The actual stripping depth should be based on visual examination during construction and the results of proof-rolling operations. The root systems of all trees (not designated to remain) shall be removed in their entirety. Stripping materials shall not be incorporated into structural fills.
- TOPSOIL STRIPPING: Prior to the start of site grading, the contractor shall strip all topsoil from areas to be graded, and stockpiled at a location on or adjacent to the site as directed by the owner. At completion of grading operations and related construction, the contractor will be responsible for redistribution of topsoil over all areas disturbed by the construction activities. Topsoil shall be placed to a minimum depth of six inches (6") and in accordance with specifications for landscaping. At that time, and prior to the installation of landscaping or irrigation, all topsoil graded areas shall be visually inspected and accepted by the owner and ILL.
- Contractor shall adjust and/or cut existing pavement as necessary to assure a smooth fit and continuous grade. Contractor shall assure positive drainage away from buildings for all natural and paved areas.
- SUBGRADE PREPARATION: Prior to placement of new fill material, the existing subgrade shall be proofrolled and approved under the direction of the Geotechnical Engineer or his representative.
- PROOFROLLING: Subsequent to completion of stripping and over-excavation, all building and pavement areas to receive engineered fill shall be systematically proof-rolled using a tandem axle dump truck loaded to approximately 20,000 pounds per axle. Also, any finished subgrade areas to receive paving shall be proof-rolled within 48 hours of paving. Unsuitable soils that are detected and that can not be recompacted should be over-excavated and replaced with controlled structural fill.
- EARTHWORK:
 - GEOTECHNICAL: All earthwork shall conform to the recommendations of the Geotechnical report. Said report and its recommendations are herein incorporated into the project requirements by reference. Prior to beginning construction, the contractor shall obtain a copy of and become familiar with the geotechnical report. Unless specifically noted on the plans, the recommendations in the geotechnical report are hereby incorporated into the project requirements and specifications.
 - SURFACE WATER: Surface water shall be intercepted and diverted during the placement of fill.
 - FILLS: All fills shall be considered controlled or structural fill and shall be free of vegetation, organic matter, topsoil and debris. In areas where the thickness of the engineered fill is greater than five feet building and pavement construction should not commence until so authorized by the on-site geotechnical engineer to allow for consolidation.
 - BUILDING SUBGRADE: As specified in the Geotechnical Engineering Report, the upper section of building subgrade shall consist of Low Volume Change (LVC) material defined as approved, compacted granular fill or low to moderate plasticity cohesive soil materials stabilized with Class C Flyash. Granular fill shall consist of compacted granular materials with a maximum particle size of two (2) inches or less, such as limestone screenings. Refer to geotechnical report for complete requirements.
 - EXISTING SLOPES: Where fill material is to be placed on existing slopes greater than 5:1 (horizontal to vertical), existing slope shall be benched providing a minimum vertical face of twelve inches (12"). The benches should be cut wide enough to accommodate the compaction equipment. Fill material shall be placed and compacted in horizontal lifts not exceeding nine inches (9") (loose lift measurement), unless otherwise approved by the Geotechnical Engineer.
 - COMPACTION REQUIREMENTS: The upper 9 inches of pavement subgrade areas shall be compacted to a minimum density of ninety five percent (95%) of the material's maximum dry density as determined by ASTM D698 (standard proctor compaction). The moisture content at the time of placement and compaction shall within a range of 0% below to 4% above optimum moisture content as defined by the standard proctor compaction procedure. The moisture contents shall be maintained within this range until completion of the work. Where compaction of earth fill by a large roller is impractical or undesirable, the earth fill shall be hand compacted with small vibrating rollers or mechanical tampers.
- All cut or fill slopes shall be 3:1 or flatter. All asphalt parking areas shall be a minimum of 1% slope but not more than 5% slope unless otherwise noted. All pavements within ADA parking areas shall not exceed 2% total slope. All grades around building shall be held down 6" from finish floor and slope away another 6" in 10 feet. Contractor shall notify engineer prior to final subgrade construction of any areas not within this slope requirement.
- TESTING AND INSPECTION: Owner's Independent Testing Laboratory (ITL) shall make tests of earthwork during construction and observe the placement of fills and other work performed on this project to verify that work has been completed in accordance with Geotechnical Engineering Report, Project Specifications and within industry standards. The ITL will be selected by the owner and the cost of testing will be the owner's responsibility.
- CLASSIFICATION: All excavation shall be considered unclassified. No separate or additional payments shall be made for rock excavation.
- PERMANENT RESTORATION: All areas disturbed by earthwork operations shall be sodded, unless shown otherwise by the landscaping plan or erosion control plan.
- UTILITIES: The contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies, and where possible, measurements taken in the field. The information is not to be relied on as being exact or complete. The contractor must call the appropriate utility companies at least 48 hours before any excavation to request exact field location of utilities. It shall be the responsibility of the contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plans.
- LAND DISTURBANCE: The contractor shall adhere to all terms & conditions as outlined in the EPA or applicable state N.P.D.E.S. permit for storm water discharge associated with construction activities. Refer to project S.W.P.P.P. requirements.

BENCHMARK:

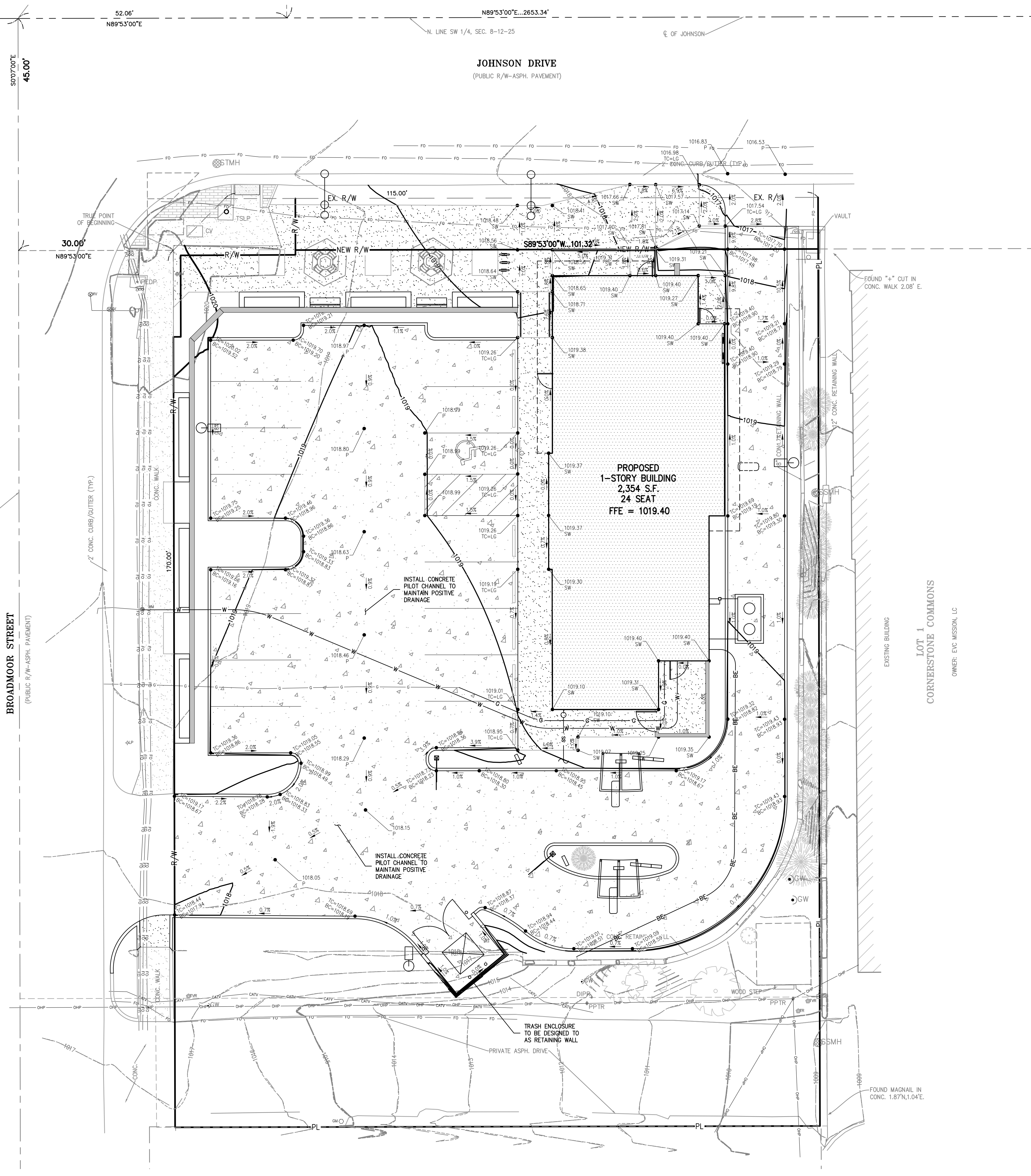
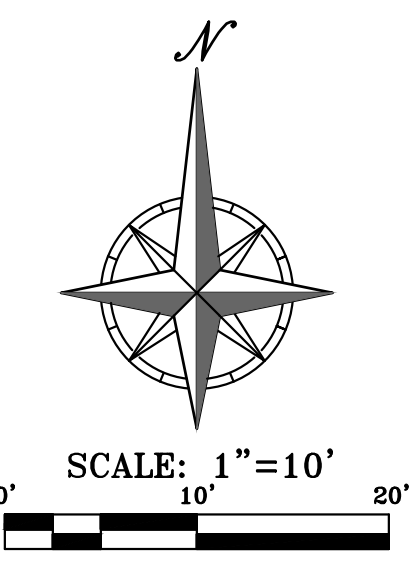
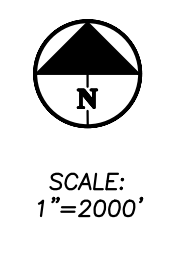
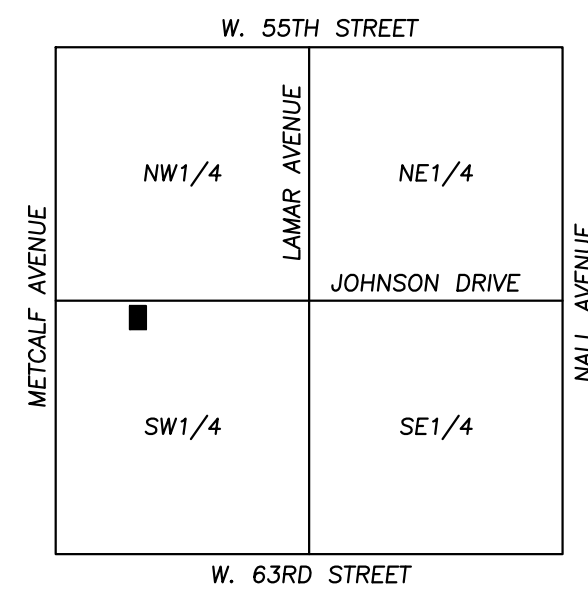
VERTICAL DATUM = NAVD88 BASED ON GPS OBSERVATION USING SMARTNET GPS NETWORK
 1. SET "1" CUT IN BACK OF CURB NW CORNER OF PARKING LOT
 ELEVATION = 1020.60

FLOOD NOTE:

THIS PROPERTY LIES WITHIN ZONE X, DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE CITY OF MISSION, COMMUNITY NO. 200170, JOHNSON COUNTY, KANSAS, MAP NO. 20091C0023G, AND DATED AUGUST 3, 2009.

LEGEND

- PL PROPERTY LINE
- LL LOT LINE
- R/W RIGHT-OF-WAY
- 2' CURB & GUTTER
- EXISTING CONTOURS
- PROPOSED CONTOURS
- PROPOSED SPOT ELEVATION
- LG LIP OF GUTTER
- TC TOP OF CURB
- SW SIDEWALK
- ME MATCH EXISTING
- HP HIGH POINT
- LP LOW POINT
- P TOP OF PAVEMENT
- TS TOP OF STRUCTURE
- GR GROUND ELEVATION
- BS BOTTOM OF STEPS
- TS TOP OF STEPS
- BW BOTTOM OF WALL
- TW TOP OF WALL
- EXISTING STORM SEWER
- PROPOSED STORM PIPE
- PROPOSED WET CURB & GUTTER
- PROPOSED DRY CURB & GUTTER
- PROPOSED RETAINING WALL



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PLANNING
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GRADING PLAN
 POPEYE'S LOUISIANA KITCHEN
 6821 JOHNSON DRIVE
 MISSION, KANSAS 66202

PROJECT NO.	Date	By	App.
230238	10-30-2023	AEF	DAF
DATE 09-21-2023 DRAWN/AEB	11-14-2023	REVISIONS	COMMENTS
CHECKER/DAF APPROVED/JCC		1	REVISED PER STAFF COMMENTS
CORPORATE AUTHORIZATION		2	REVISED PER STAFF COMMENTS
LAND SURVEYING - LS-82			
ENGINEERING - E-5F			
CREATED DATE OF AUTHORIZATION			
LAND SURVEYING-200701028			
ENGINEERING-200303038			

SHEET
C3



Know what's below.
Call before you dig.

UTILITY NOTES:
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UTILITY NOTES:

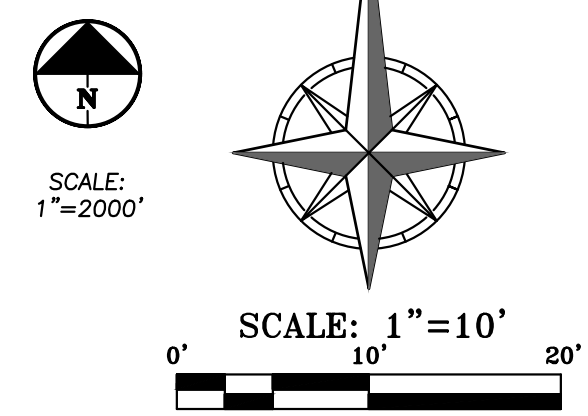
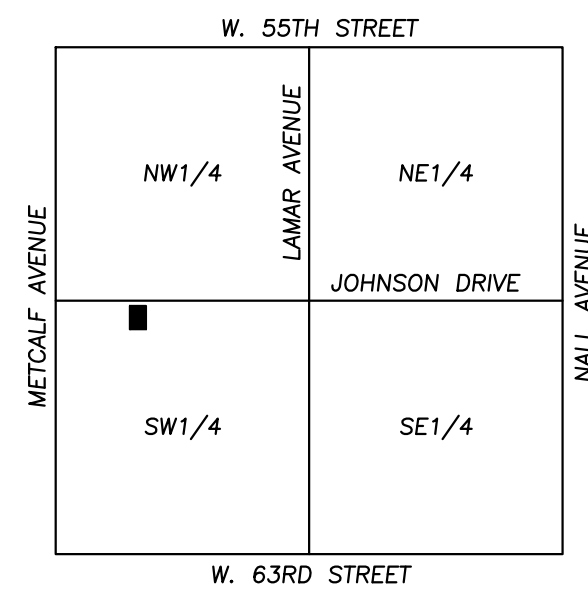
- The contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies, and where possible, measurements taken in the field. The information is not to be relied on as being exact or complete. The contractor must call the appropriate utility companies at least 48 hours before any excavation to request exact field location of utilities. It shall be the responsibility of the contractor to coordinate with and relocate &/or remove all existing utilities which conflict with the proposed improvements shown on the plans.
- The construction of storm sewers on this project shall conform to the requirements of the City's Technical Specifications and Design Criteria.
- The contractor shall field verify the exact location and elevation of the existing storm sewer lines and the existing elevation at locations where the proposed storm sewer collects or releases to existing ground. If discrepancies are encountered from the information shown on the plans, the contractor shall contact the design engineer. No pipes shall be laid until direction is received from the design engineer.
- It will be the contractor's responsibility to field adjust the top of all manholes and boxes as necessary to match the grade of the adjacent area. Tops of existing manholes shall be raised as necessary to be flush with proposed pavement elevations, and to be 6-inches above finished ground elevations in non-paved areas. No separate or additional compensation will be made to the contractor for making final adjustments to the manholes and boxes.
- Inlet locations, horizontal pipe information and vertical pipe information is shown to the center of the structure. Deflection angles shown for storm sewer pipes are measured from the center of curb inlets and manholes. The contractor shall adjust the horizontal location of the pipes to go to the face of the boxes. All roof drains shall be connected to storm sewer structures. Provide cleanouts on roof drain lines at 100' max. Spacing and at all bend points. Do not connect roof drains directly to storm sewer pipe.
- The contractor shall be responsible for furnishing and installing all fire and domestic water lines, meters, backflow devices, pits, valves and all other incidentals required for a complete operable fire protection and domestic water system. All costs associated with the complete water system for the buildings shall be the responsibility of the contractor. All work shall conform to the requirements of City.
- The contractor shall be responsible for furnishing and installing all sanitary sewer service lines from the buildings to the public line. All work shall conform to the requirements of the City and Johnson County Unified Wastewater District.
- The contractor will be responsible for securing all permits, bonds and insurance required by the contract documents, City, and all other governing agencies (including local, county, state and federal authorities) having jurisdiction over the work proposed by these construction documents. The cost for all permits bonds and insurance shall be the contractor's responsibility and shall be included in the bid for the work.
- By the use of these construction documents the contractor hereby agrees that he/she shall be solely responsible for the safety of the construction workers and the public. The contractor agrees to hold the engineer and owner harmless for any and all injuries, claims, losses or damages related to the project.
- The Contractor shall be responsible for furnishing all materials, tools and equipment and installation of electrical power, telephone and gas service from a point of connection from the public utility lines to the building structures. This will include all conduits, service lines, meters, concrete pads and all other incidentals required for a complete and operational system as required by the owner and the public utilities. Refer to building plans for exact tie-in locations of all utilities. Contractor shall verify connection points prior to installation of utility line.
- All fill material is to be in place, compacted, and consolidated before installation of proposed utilities. On-site geotechnical engineer shall provide written confirmation that this requirement has been met and that utilities may proceed in the fill areas. All utilities are to be placed in trench conditions.
- Contractor shall notify the utility authorities inspectors 48 hours before connecting to any existing line.
- Water lines shall be as follows (unless otherwise shown on plans):
 - Pipe sizes less than 3-inches that are installed below grade and outside building shall comply with the following:
 - Seamless Copper Tubing: Type "K" soft copper, ASTM B88.
 - Fittings: Wrought copper (95.5 Tin Antimony solder joint), ASME B 16.22.
 - Pipe sizes 3-inches through 48-inches that are installed below grade and outside building shall comply with one of the following:
 - Grey Cast Iron Water Pipe: ANSI A21.6, thickness class 52.
 - Fittings: Either mechanical joint or push-on joint, AWWA C110 or AWWA C111.
 - Elastomeric gaskets and lubricant: ASTM F477.
 - Cement Mortar Lining, AWWA C104
 - Ductile Iron Water Pipe: AWWA C151, thickness class 50.
 - Fittings: Either mechanical joint or push-on joint, AWWA C110 or AWWA C111.
 - Elastomeric gaskets and lubricant: ASTM F477.
 - Cement Mortar Lining, AWWA C104
 - Polyvinyl Chloride (PVC) Water Pipe: Pipe, AWWA C900, rated DR 18 (Class 150), continually marked as required.
 - Elastomeric gaskets and lubricant: ASTM F477 for smaller pipes.
 - Pipe joints: integrally molded bell ends, ASTM D3139.
 - Trace wire: Magnetic detectable conductor, (#12 Copper) brightly colored plastic covering imprinted with "Water Service" in large letters
- Minimum trench width shall be 2 feet.
- Contractor shall maintain a minimum of 42" cover on all waterlines. All water line joints are to be mechanical joints with thrust blocking as called out in specifications and construction plans. Water mains and service lines shall be constructed in accordance to waterline's specifications for commercial services.
- All waterlines shall be kept min. ten (10') apart (parallel) from sanitary sewer lines or manholes. Or when crossing, on 24" vertical clearance (outside edge of pipe to outside edge of pipe) of the water line above the sewer line is required.
- Sanitary conflicts will be resolved prior to permit issuance.
- In the event of a vertical conflict between waterlines, sanitary lines, storm lines and gas lines (existing and proposed), the sanitary line shall be ductile iron pipe with mechanical joints at least 10 feet on both sides of crossing (or encased in concrete this some distance), the waterline shall have mechanical joints with appropriate thrust blocking as required to provide a minimum of 24" clearance. Meeting requirements of ANSI A21.10 or ANSI 21.11 (AWWA C-151) (CLASS 50).
- All underground storm, sanitary, water and other utility lines shall be installed, inspected and approved before backfilling. Failure to have inspection approval prior to backfill will constitute rejection of work.
- All necessary inspections and/or certifications required by codes and/or utility service companies shall be performed prior to announced building possession and the final connection of service. Contractor shall coordinate with all utility companies for installation requirements and specifications.
- Refer to building plans for site lighting electrical plan, irrigation, parking lot security system and associated conduit requirements. Coordinate with Owner that all required conduits are in place & tested prior to paving.
- When a building utility connection from site utilities leading up to the building cannot be made immediately, temporarily mark all such site utility terminations.
- Refer to the building plans for site lighting electrical requirements, including conduits, pole bases, pull boxes, etc.

UTILITY KEY NOTES:

- (E1) ELECTRIC ENTRY INTO BUILDING. FOLLOW ELECTRIC COMPANY (EVERGY) REQUIREMENTS FOR SECONDARY SERVICE. (RE: MEP PLANS).
- (E2) CONTRACTOR TO LOCATE AND INTERCEPT EXISTING ELECTRICAL SECONDARY SERVICE AND REROUTE TO NEW BUILDING ENTRY LOCATION. COORDINATE WITH EVERGY (RE: MEP PLANS).
- (G1) GAS ENTRY INTO BUILDING. FOLLOW GAS COMPANY (KANSAS GAS) REQUIREMENTS FOR SERVICE (RE: MEP PLANS).
- (G2) CONTRACTOR TO LOCATE AND INTERCEPT EXISTING GAS SERVICE AND REROUTE TO NEW BUILDING ENTRY LOCATION. COORDINATE WITH KANSAS GAS (RE: MEP PLANS).
- (W1) 2" DOMESTIC WATERLINE ENTRY TO BUILDING. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ANY APPURTENANCES ON THE DOMESTIC LINE SUCH AS BACKFLOW PREVENTION DEVICES (RE: BUILDING PLANS), GATE VALVES, REDUCERS, BENDS, TEES, ETC., WHICH MAY BE REQUIRED. CONTRACTOR TO COORDINATE WITH WATER UTILITY.
- (W2) CONNECT TO AND REUSE EXISTING DOMESTIC WATER METER PIT. COORDINATE ALL WORK WITH WATERLINE. ALL LABOR AND MATERIALS SHALL BE PROVIDED AND INSTALLED BY APPROVED CONTRACTOR IN ACCORDANCE WITH WATERLINE STANDARDS. METER PIT SHALL HAVE 2 FEET OF CLEARANCE ON ALL SIDES. CONTRACTOR TO INSTALL 2" DOMESTIC WATER LINE FROM METER TO BUILDING.
- (S1) CONNECT TO BUILDING INTERIOR PLUMBING. TRANSITION FROM 4" INTERIOR TO 6" EXTERIOR AT FOUNDATION WALL. (RE: MEP PLANS).
- (S2) INSTALL 6" PVC (SDR-26) SANITARY SEWER SERVICE LINE (SDR-26) @ 1.0% MIN. SLOPE.
- (S3) INSTALL CLEANOUT IN NON-PAVED AREA.
- (S4) CONTRACTOR TO LOCATE AND CONNECT TO EXISTING SANITARY SEWER SERVICE LINE.
- (S5) CONNECT TO BUILDING INTERIOR PLUMBING (GREASE LINE). (RE: MEP PLANS).
- (S6) INSTALL 1,000 GALLON GREASE INTERCEPTOR.
- (S7) INSTALL SAMPLING PORT.
- (S8) CONNECT TO BUILDING INTERIOR PLUMBING (GREASE LINE) (RE: MEP PLANS).
- (S9) INSTALL 2" PVC (SDR-26) VENT LINE FROM SAMPLING PORT TO BUILDING (RE: MEP PLANS). CONNECT TO BUILDING INTERIOR PLUMBING (RE: MEP PLANS).

LEGEND

- PL PROPERTY LINE
- LL LOT LINE
- R/W RIGHT-OF-WAY
- CATV EXISTING CABLE TELEVISION LINE
- FO EXISTING FIBER OPTIC LINE
- G EXISTING GAS LINE
- BE EXISTING BURIED ELECTRIC LINE
- OHP EXISTING OVERHEAD POWER LINE
- OHT EXISTING OVERHEAD TELEPHONE LINE
- SS EXISTING SANITARY SEWER LINE
- ST EXISTING STORM SEWER LINE (& SIZE)
- BT EXISTING BURIED TELEPHONE LINE
- W-6" EXISTING WATER LINE (& SIZE)
- F-6" EXISTING FIRE LINE (& SIZE)
- ST-6" EXISTING ROOF DRAIN (& SIZE)
- PL PROPOSED CABLE TELEVISION LINE
- FO PROPOSED FIBER OPTIC LINE
- G PROPOSED GAS LINE
- BE PROPOSED BURIED ELECTRIC LINE
- OHP PROPOSED OVERHEAD POWER LINE
- OHT PROPOSED OVERHEAD TELEPHONE LINE
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- ST-6" PROPOSED ROOF DRAIN (& SIZE)

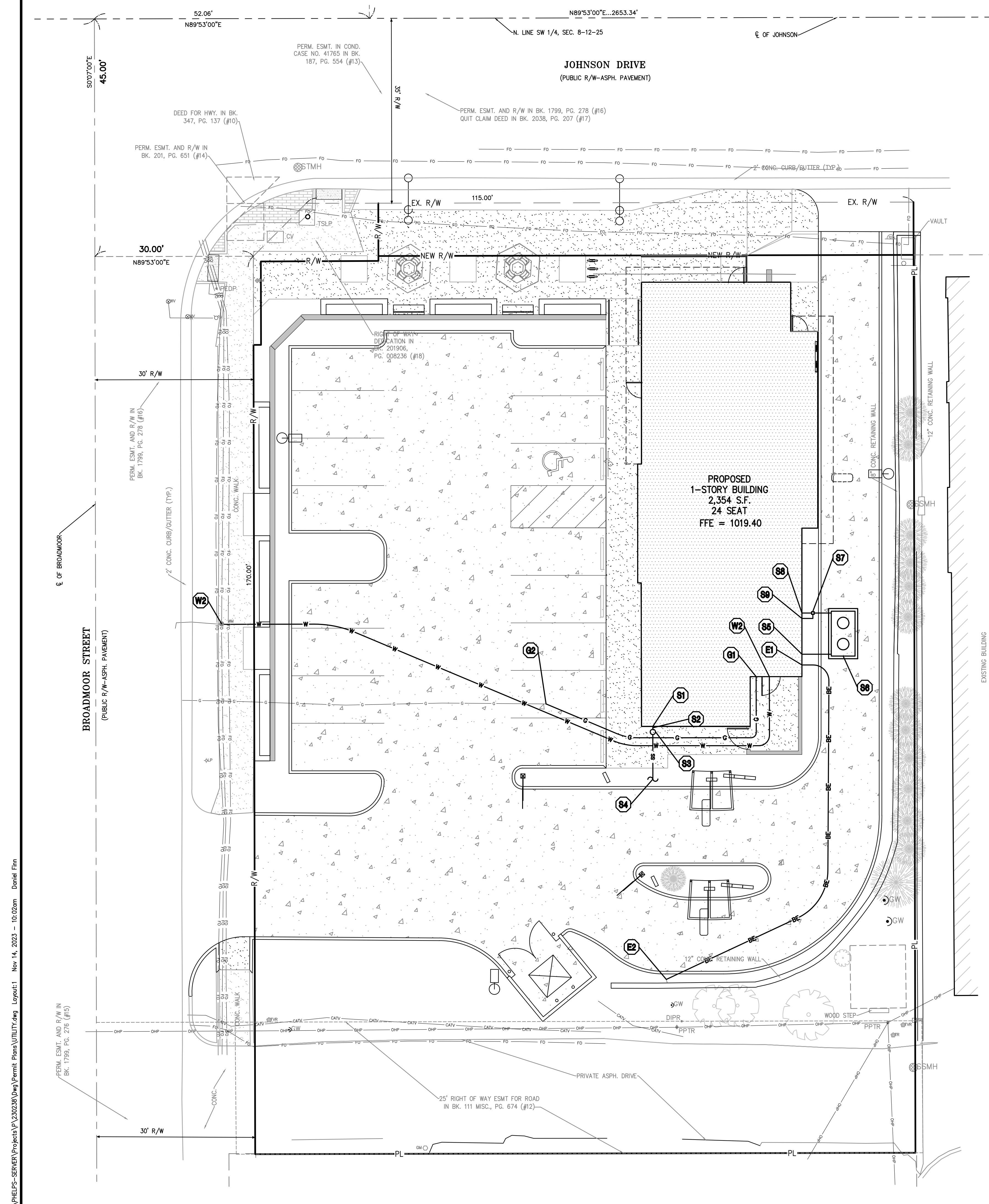


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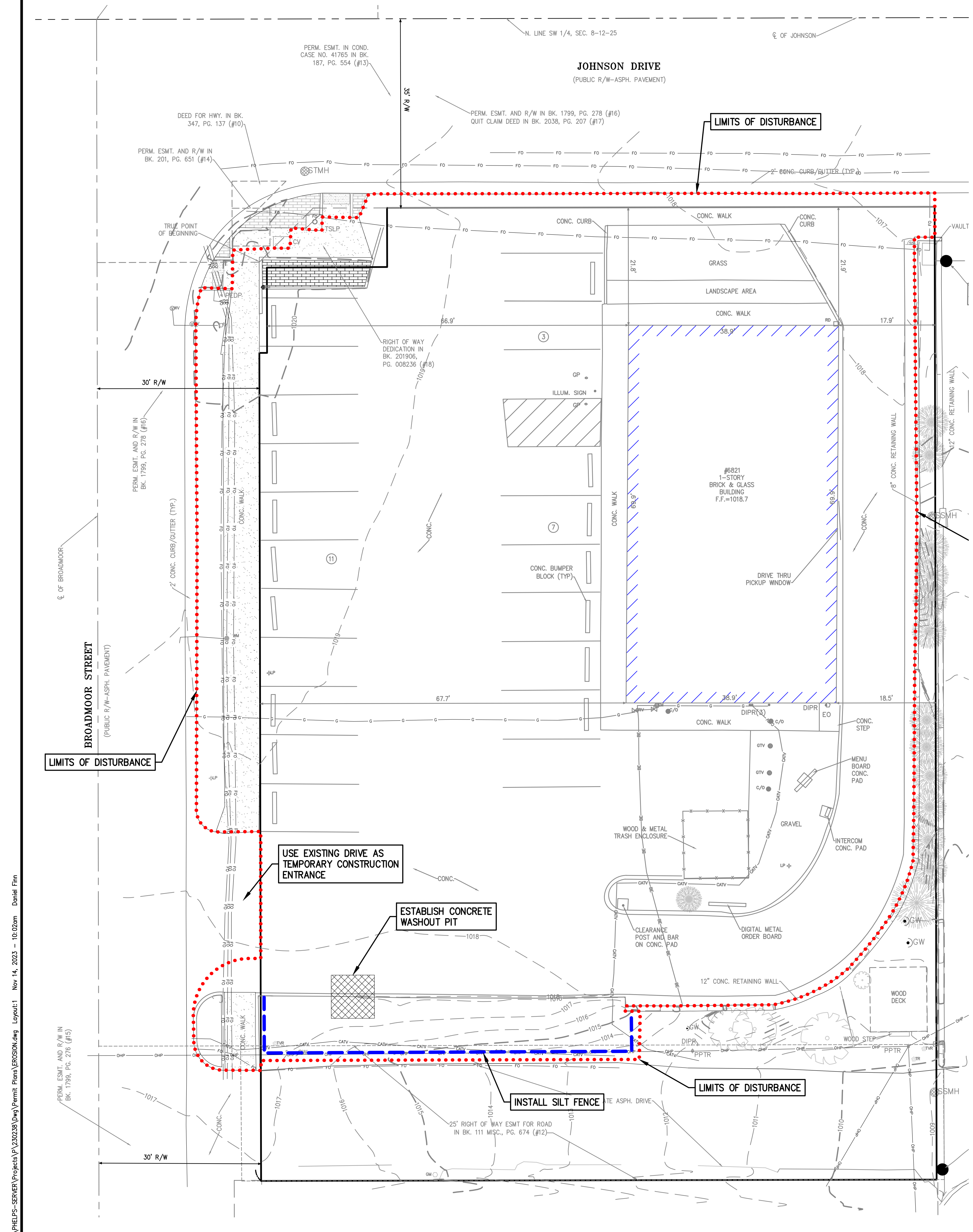
UTILITY PLAN
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	DATE	BY	APP.	REVISIONS
230238	10-30-2023	DAF	DAF	1. REVISED PER STAFF COMMENTS
230238	11-14-2023	DAF	DAF	2. REVISED PER STAFF COMMENTS

SHEET
C4



\\PHILIPS-SERVER\Projects\230238\Utility\Utility.dwg Layout:1 Nov 14, 2023 10:02am Daniel Finn



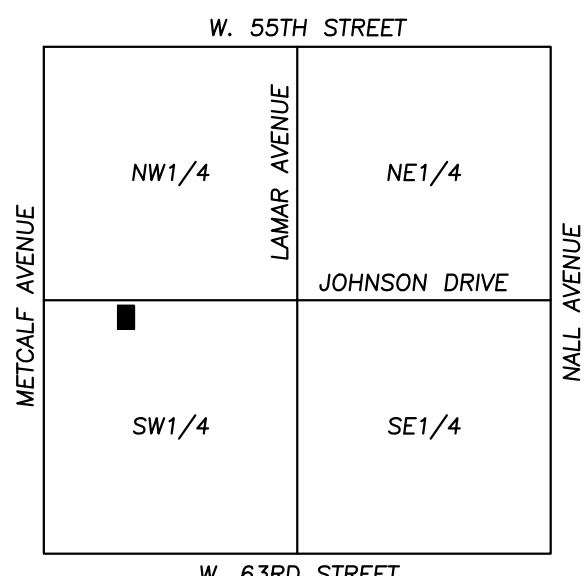
- Erosion and Sedimentation Control**
- All earth disturbance activities shall proceed in accordance with the following sequence. Each stage shall be completed and immediately stabilized before any subsequent stage is initiated. Clearing, grubbing, and topsoil stripping shall be limited only to those areas described in each stage. No fill shall be placed in future rights-of-way under a Land Disturbance permit unless approved by the City Engineer.
 - The Contractor or Owner shall obtain a Land Disturbance Permit from the City of Olathe. The permit holder shall schedule an initial erosion and sediment control inspection prior to any earthmoving on the proposed site as per the approved plan. Scheduling of initial inspections must be made at least twenty four (24) hours in advance.
 - All excavation for utility line installation shall be limited to the amount that can be excavated, installed, backfilled and stabilized within one working day. All excavated material shall be deposited on the upslope side of the trench. Sediment laden water that accumulates in the trenches shall be pumped through a filtration device or equivalent sediment removal facility, or over non-disturbed vegetated areas. Discharge points should be established to provide for maximum distance to active waterways.
 - Before implementing any revisions to the approved erosion and sediment control Plan or revisions to other plans, which may affect the effectiveness of the approved Erosion and Sediment control plan, the Contractor must receive approval of the revisions from the City of Olathe.
 - All building materials and wastes must be removed from the site and recycled or disposed of in accordance with the Kansas Department of Health and Environment's regulations. No building materials or wastes or unused building materials shall be burned, buried, dumped, or discharged at the site.
 - Before disposing of soil or receiving borrow for the site, the Contractor must assure that each spoil or borrow area has an Erosion and Sediment Control Plan approved by the City of Olathe and which is being implemented and maintained according to City of Olathe regulations.
 - Any disturbed area on which activity has ceased must be stabilized immediately. During non-germinating periods, mulch must be applied at the recommended rates. Disturbed areas which are not at finished grade and which will be re-disturbed before winter shall be stabilized in accordance with temporary seeding specifications. Disturbed areas that are either at finished grade or will not be re-disturbed before winter must be stabilized with permanent seeding specifications.
 - Planting and seeding dates shall be in accordance with the City of Olathe Technical Specifications for Public Improvement Projects. Interim stabilization will be achieved by mulching.
 - Only limited disturbance will be permitted to construct sediment traps, diversion terraces, etc.
 - At the end of each working day, any sediment tracked or conveyed onto a public roadway will be removed and re-deposited onto the construction site. Removal can be completed through use of mechanical or hand tools, but must never be washed off the road using water.
 - Sediment removal from erosion and sediment controls and facilities shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains, or drainage swales and immediately stabilized or placed in topsoil stockpiles.
 - Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the Contractor shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution.
 - A copy of the approved erosion and sediment control plan and Stormwater Pollution Prevention Plan (SWPPP) must be available at the project site at all times.
 - All pumping of sediment laden water shall be through a sediment removal facility or over undisturbed vegetated areas.
 - Stabilization is defined as a minimum uniform 70% perennial vegetated cover or other permanent non-vegetated cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.
 - An erosion control blanket will be installed on all disturbed slopes steeper than 3:1 and all areas of concentrated flows.
 - Until the site is stabilized, all erosion and sediment control BMPs must be maintained properly. Maintenance must include inspections of all erosion and sediment control BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, mulching, and renetting must be performed immediately. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required.
 - Any sediment removed from BMPs during construction shall be returned to upland areas on site and incorporated into site grading.
 - Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner and or Contractor shall contact the City for a final inspection.

SOIL EROSION/SEDIMENTATION CONTROL OPERATION TIME SCHEDULE

NOTE: GENERAL CONTRACTOR TO COMPLETE TABLE WITH THEIR SPECIFIC PROJECT SCHEDULE

CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
ROUGH GRADE / SEDIMENT CONTROL																			
TEMPORARY CONTROL MEASURES																			
STRIP & STOCKPILE TOPSOIL																			
STORM FACILITIES																			
TEMPORARY CONSTRUCTION ROADS																			
FOUNDATION / BUILDING CONSTRUCTION																			
SITE CONSTRUCTION																			
PERMANENT CONTROL STRUCTURES																			
FINISH GRADING																			
LANDSCAPING/SEED/FINAL STABILIZATION																			

DISTURBED AREA = 0.46± ACRES



VICINITY MAP
SEC. 8-12-25

LEGEND

- CONCRETE WASHOUT PIT
- LIMITS OF DISTURBED AREAS
- SILT FENCE



UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

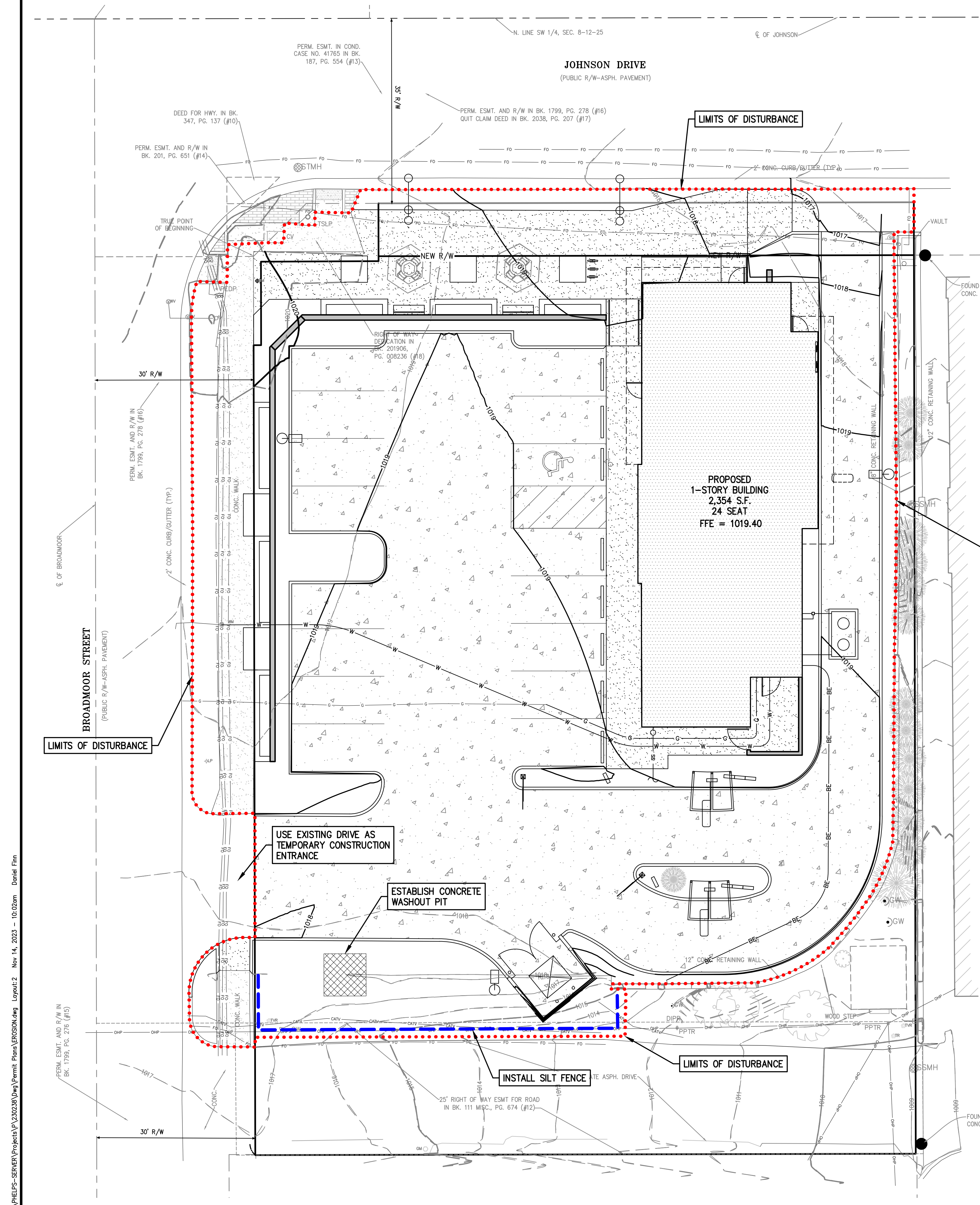
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**PLANNING
ENGINEERING
IMPLEMENTATION**

EROSION CONTROL PLAN—PHASE I
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	230238	Date	10-30-2023	By	App.
DATE	09-21-2023	DATE	11-14-2023	REVISIONS	REVISIONS
CHECKED	DAF	APPROVED	JCC	REVISIONS	REVISIONS
CORPORATE OF AUTHORIZATION		CORPORATE OF AUTHORIZATION		REVISIONS	REVISIONS
LAND SURVEYING - LS-82		LAND SURVEYING - LS-82		REVISIONS	REVISIONS
ENGINEERING - E-36		ENGINEERING - E-36		REVISIONS	REVISIONS
CREATING DATE OF AUTHORIZATION		CREATING DATE OF AUTHORIZATION		REVISIONS	REVISIONS
LAND SURVEYING-20070128		LAND SURVEYING-20070128		REVISIONS	REVISIONS
ENGINEERING-20050308		ENGINEERING-20050308		REVISIONS	REVISIONS

SHEET
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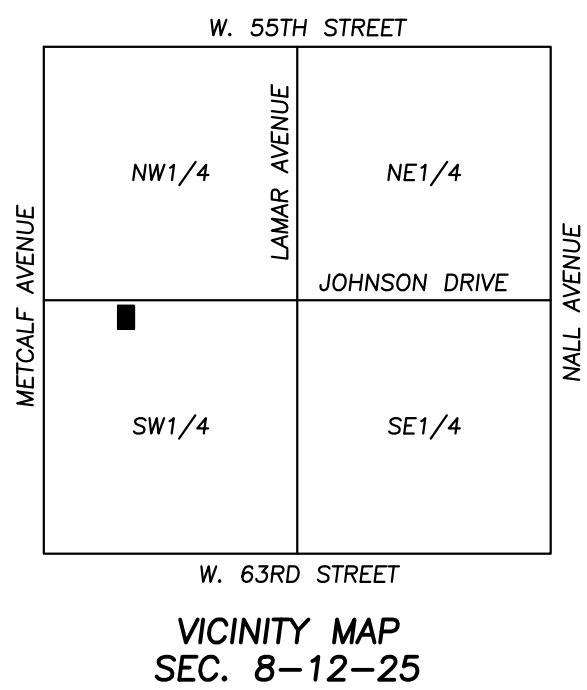
- Erosion and Sedimentation Control**
- All earth disturbance activities shall proceed in accordance with the following sequence. Each stage shall be completed and immediately stabilized before any subsequent stage is initiated. Clearing, grubbing, and topsoil stripping shall be limited only to those areas described in each stage. No fill shall be placed in future rights-of-way under a Land Disturbance permit unless approved by the City Engineer.
 - The Contractor or Owner shall obtain a Land Disturbance Permit from the City of Olathe. The permit holder shall schedule an initial erosion and sediment control inspection prior to any earthmoving on the proposed site as per the approved plan. Scheduling of initial inspections must be made at least twenty four (24) hours in advance.
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 - Before implementing any revisions to the approved erosion and sediment control Plan or revisions to other plans, which may affect the effectiveness of the approved Erosion and Sediment control plan, the Contractor must receive approval of the revisions from the City of Olathe.
 - All building materials and wastes must be removed from the site and recycled or disposed of in accordance with the Kansas Department of Health and Environment's regulations. No building materials or wastes or unused building materials shall be burned, buried, dumped, or discharged at the site.
 - Before disposing of soil or receiving borrow for the site, the Contractor must assure that each spoil or borrow area has an Erosion and Sediment Control Plan approved by the City of Olathe and which is being implemented and maintained according to City of Olathe regulations.
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 - Planting and seeding dates shall be in accordance with the City of Olathe Technical Specifications for Public Improvement Projects. Interim stabilization will be achieved by mulching.
 - Only limited disturbance will be permitted to construct sediment traps, diversion terraces, etc.
 - At the end of each working day, any sediment tracked or conveyed onto a public roadway will be removed and re-deposited onto the construction site. Removal can be completed through use of mechanical or hand tools, but must never be washed off the road using water.
 - Sediment removal from erosion and sediment controls and facilities shall be disposed of in landscaped areas outside of steep slopes, wetlands, floodplains, or drainage swales and immediately stabilized or placed in topsoil stockpiles.
 - Immediately upon discovering unforeseen circumstances posing the potential for accelerated erosion and/or sediment pollution, the Contractor shall implement appropriate best management practices to eliminate the potential for accelerated erosion and/or sediment pollution.
 - A copy of the approved erosion and sediment control plan and Stormwater Pollution Prevention Plan (SWPPP) must be available at the project site at all times.
 - All pumping of sediment laden water shall be through a sediment removal facility or over undisturbed vegetated areas.
 - Stabilization is defined as a minimum uniform 70% perennial vegetated cover or other permanent non-vegetated cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements.
 - An erosion control blanket will be installed on all disturbed slopes steeper than 3:1 and all areas of concentrated flows.
 - Until the site is stabilized, all erosion and sediment control BMPs must be maintained properly. Maintenance must include inspections of all erosion and sediment control BMPs after each runoff event and on a weekly basis. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, mulching, and renetting must be performed immediately. If erosion and sediment control BMPs fail to perform as expected, replacement BMPs, or modifications of those installed will be required.
 - Any sediment removed from BMPs during construction shall be returned to upland areas on site and incorporated into site grading.
 - Upon completion of all earth disturbance activities and permanent stabilization of all disturbed areas, the Owner and or Contractor shall contact the City for a final inspection.

SOIL EROSION/SEDIMENTATION CONTROL OPERATION TIME SCHEDULE

NOTE: GENERAL CONTRACTOR TO COMPLETE TABLE WITH THEIR SPECIFIC PROJECT SCHEDULE

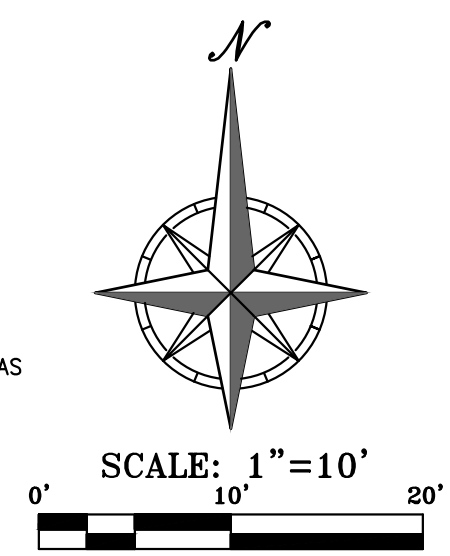
CONSTRUCTION SEQUENCE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	
ROUGH GRADE / SEDIMENT CONTROL																			
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SITE CONSTRUCTION																			
PERMANENT CONTROL STRUCTURES																			
FINISH GRADING																			
LANDSCAPING/SEED/FINAL STABILIZATION																			

DISTURBED AREA = 0.46± ACRES



LEGEND

- CONCRETE WASHOUT PIT
- LIMITS OF DISTURBED AREAS
- SILT FENCE



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**PLANNING
ENGINEERING
IMPLEMENTATION**

EROSION CONTROL PLAN - PHASE II
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PROJECT NO.	DATE	BY	APP.	REVISIONS
230238	10-30-2023	DAE	DAE	1. 10-30-2023 [DRAWN/AEB] REVISED PER STAFF COMMENTS
	11-14-2023	DAE	DAE	2. 11-14-2023 [CHECKED/DAE APPROVED/JCC] REVISED PER STAFF COMMENTS
				3. [DATE OF AUTHORIZATION] LAND SURVEYING - LS-82
				4. [DATE OF AUTHORIZATION] LAND SURVEYING - E-36
				5. [DATE OF AUTHORIZATION] LAND SURVEYING-200701028
				6. [DATE OF AUTHORIZATION] LAND SURVEYING-200500308

PROJECT NO.	DATE	BY	APP.
230513	10-12-2023	DAVID DDB	
		CHECKED: DAF	APPROVED: JCC
		CERTIFICATE OF AUTHORIZATION	
		LAND SURVEYING - LS-82	
		ENGINEERING - E-361	
		CERTIFICATE OF AUTHORIZATION	
		LAND SURVEYING-200701028	
		ENGINEERING-200300308	

Notes for Construction Entrance:

- Avoid locating on steep slopes, at curves on public roads, or downhill of disturbed areas.
- Remove all vegetation and other unsuitable material from the foundation area, grade, and crown for positive drainage.
- If slope towards the public road exceeds 3%, construct a 6- to 8-inch high ridge with 3:1 V side slopes across the foundation approximately 15 feet from the edge of the public road to divert runoff from it.
- Install pipe under the entrance if needed to maintain drainage ditches along public roads.
- Place stone to dimensions and grade as shown on plans. Leave surface sloped for drainage.
- Divert all surface runoff and drainage from the entrance to a sediment control device.
- If conditions warrant, place geotextile fabric on the graded foundation to improve stability.

Maintenance for Construction Entrance:

- Reshape entrance as needed to maintain function and integrity of installation. Top dress with clean aggregate as needed.

Notes for Concrete Washout:

- Concrete washout areas shall be installed prior to any concrete placement on site.
- Concrete washout areas shall include a first subsurface pit sized relative to the amount of concrete to be placed on site. The slope leading out of the subsurface pit shall be 2:1. The vehicle tracking pit shall be sloped towards the concrete washout area.
- Vehicle tracking control is required at the access point to all concrete washout areas.
- Signs shall be placed at the construction site entrance, washout area and elsewhere as necessary to clearly indicate the location(s) of the concrete washout area(s) to operators of concrete truck and dump rigs.
- A one-piece impervious liner may be required along the bottom and sides of the subsurface pit in sandy or gravelly soils.

Maintenance for Concrete Washout:

- Concrete washout materials shall be removed once the materials have filled the washout to approximately 75% full.
- Concrete washout areas shall be enlarged as necessary to maintain capacity for washed concrete.
- Concrete washout water, washed pieces of concrete and all other debris in the subsurface pit shall be transported from the job site in a well-sealed container and disposed of properly.
- Concrete washout areas shall remain in place until all concrete for the project is placed.
- When concrete washout areas are removed, excavations shall be filled with suitable compacted backfill and topped, any disturbed areas associated with the installation, maintenance, and/or removal of the concrete washout areas shall be stabilized.

CONSTRUCTION ENTRANCE

AMERICAN PUBLIC WORKS ASSOCIATION
 KANSAS CITY METRO CHAPTER
 STANDARD DRAWING NUMBER ESC-01 ADOPTED: 10/24/2016

Notes:

- Immediately following inlet construction and prior to construction of curb and inlet throat, protect inlet opening by installing 2" x 10" (min.) board wrapped in silt fence. Structures shall have excavated storage area on all four sides to allow settling of sediment (Early Stage Curb Inlet). Show wetlines are not approved for curb inlet use.
- When inlet is completed and curb poured, filter socks or approved equal should be used (Late Stage Curb Inlet). Show wetlines are not approved for curb inlet use.
- Contractor to field verify ponding water shall not create a traffic hazard.

Maintenance:

- Remove deposited sediment from excavated storage areas when available storage has been reduced by 20%.
- Remove deposited sediment from filter socks or similar when any accumulation of sediment is visible.
- Repair or replace as necessary to maintain function and integrity of installation.

EARLY STAGE CURB INLET
 (Open Box and Prior to Pouring Curb and Inlet Throat)

AMERICAN PUBLIC WORKS ASSOCIATION
 KANSAS CITY METRO CHAPTER
 STANDARD DRAWING NUMBER ESC-06 ADOPTED: 10/24/2016

Notes:

- In order to contain water, the ends of the silt fence must be turned uphill (Figure A).
- Long perimeter runs of silt fence must be limited to 100'. Runs should be broken up into several smaller segments to minimize water concentrations (Figure A).
- Long slopes should be broken up with intermediate rows of silt fence to slow runoff velocities.
- Attach fabric to upstream side of post.
- Install posts a minimum of 2' into the ground.
- Trenching will only be allowed for small or difficult installation, where stinging machine cannot be reasonably used.

Maintenance:

- Remove and dispose of sediment deposits when the deposit approaches 1/2 the height of silt fence.
- Repair as necessary to maintain function and structure.

CONCRETE WASHOUT

AMERICAN PUBLIC WORKS ASSOCIATION
 KANSAS CITY METRO CHAPTER
 STANDARD DRAWING NUMBER ESC-03 ADOPTED: 10/24/2016

Notes:

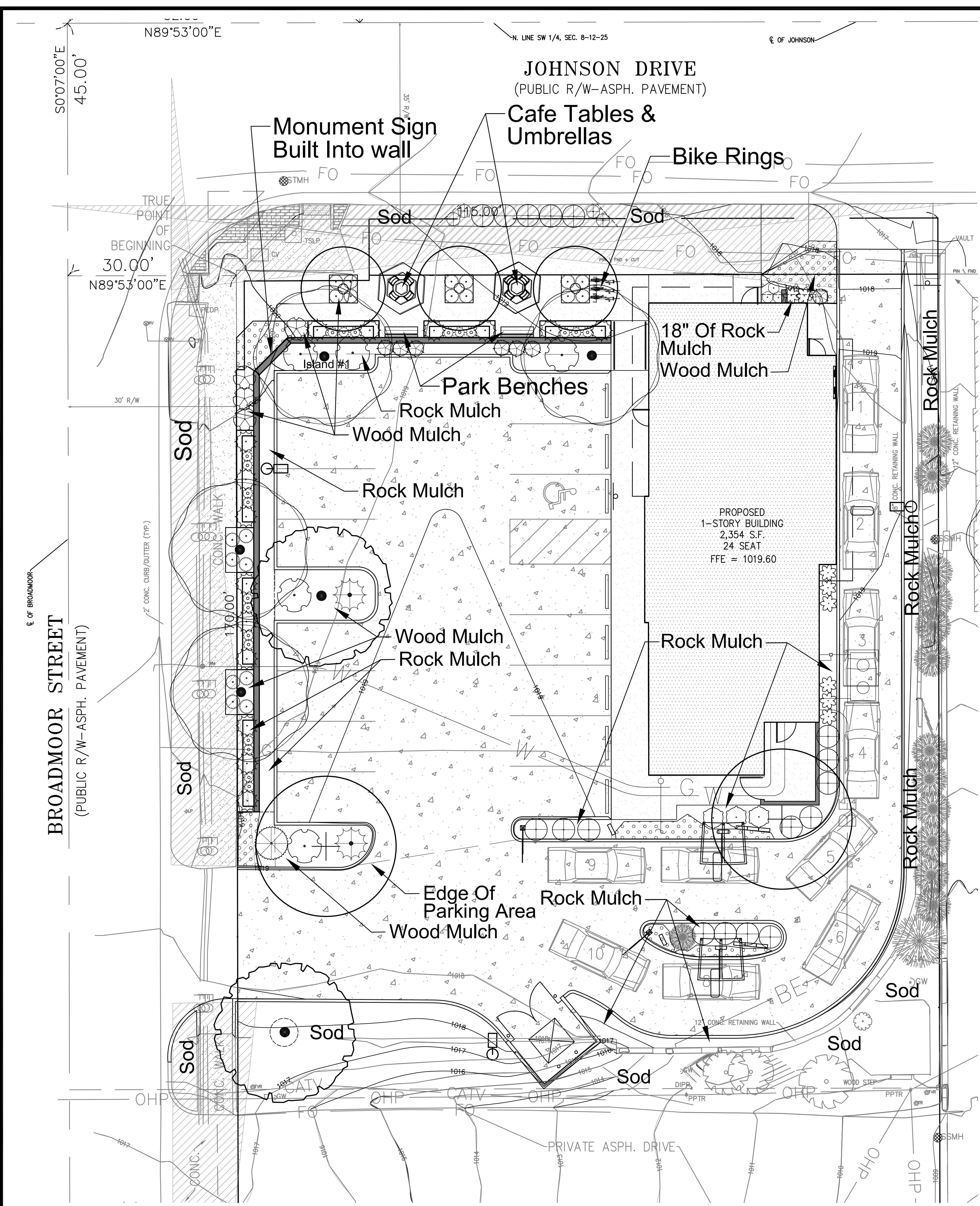
- Early Stage Area Inlet Sediment Barrier to be installed immediately after inlet or junction box is constructed.
- Silt fence shall remain in place until excavated area is removed and Late Stage Area Inlet is being installed.
- Backfill excavated area ONLY after final grading of the site. Stabilization of the site is to immediately follow.
- Wire reinforced silt fence may be used in place of silt fence attached to wood frame.

Maintenance:

- Remove deposited sediment from excavated storage areas when available storage has been reduced by 20%.
- Remove deposited sediment from filter socks or similar when any accumulation of sediment is visible.
- Repair or replace as necessary to maintain function and integrity of installation.

EARLY STAGE AREA INLET
 (All open boxes and inlets not at final grade)

AMERICAN PUBLIC WORKS ASSOCIATION
 KANSAS CITY METRO CHAPTER
 STANDARD DRAWING NUMBER ESC-07 ADOPTED: 10/24/2016



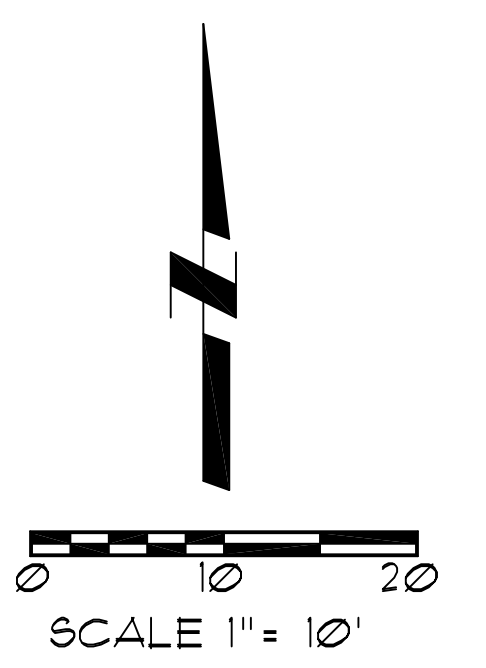
PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONT	CAL
	2	Acer rubrum 'October Glory' TM / October Glory Maple	B & B	2"Cal
	3	Cercis canadensis / Oklahoma Redbud	B & B	1.5"Cal
	2	Gleditsia triacanthos 'Skyline' / 'Skyline' Honey Locust	B & B	2"Cal
	4	Gymnocladus dioica 'Epresso' / Kentucky Coffee Tree Seedless/Male Only	B & B	2"Cal
SHRUBS	QTY	BOTANICAL / COMMON NAME	CONT	
	21	Buxus / 'Green Mound' 12" hgt & sp.	2 gal	
	3	Hypericum frondosum 'Sunburst' / Sunburst Hypericum 18"-24" hgt. & sp.	2 gal	
	1	Juniperus chinensis 'Sea Green' / Sea Green Juniper 24"-30" hgt. & sp.	5 gal	
	15	Juniperus horizontalis 'Wiltonii' / Blue Rug Juniper 15"-18" sp.	2 gal	
	2	Juniperus virginiana 'Grey Owl' / Grey Owl Juniper 24" sp.	3 gal	
	7	Juniperus virginiana 'Taylor' / Taylor Eastern Redcedar B&B	6ft.	
	4	Nepeta x faassenii 'Walkers Low' / Walkers Low Catmint	1 gal	
	5	Rhus aromatica 'Gro-Low' / Gro-Low Fragrant Sumac 18"-24" sp.	3 gal	
	4	Spiraea x bumalda 'Anthony Waterer' / Anthony Waterer Spiraea 18"-24" hgt.	3 gal	
	17	Spiraea x bumalda 'Gold Flame' / Gold Flame Spiraea 18"-24" hgt.	3 gal	
GRASSES	QTY	BOTANICAL / COMMON NAME	CONT	
	3	Calamagrostis acutiflora 'Karl Foerster' / Feather Reed Grass 24" hgt.	3 gal	
	8	Miscanthus sinensis 'Morning Light' / Eulalia Grass	3 gal	
	21	Pennisetum alopecuroides 'Hameln' / Hameln Dwarf Fountain Grass 15"-18" hgt. & sp.	1 gal	
GROUND COVERS	QTY	BOTANICAL / COMMON NAME	CONT	
	137	Liriope muscari 'Big Blue' / Big Blue Lilyturf 18" o.c. in triangular pattern	1 gt.	

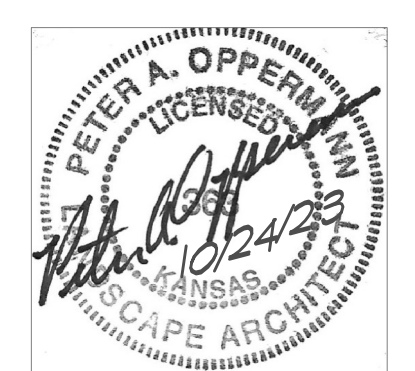
Parking Lot Island Calcs:
Overall Lot Equals 5326 s.f.
Island #1 50.31 s.f.
Island #2 50.00 s.f.
Island #3 158.15 s.f.
Island #4 59.14 s.f.
Island #5 123.43 s.f.
Ttl. Island 441 s.f.
441 Divided By 5326 = 8.33%

See LS-2 for island parking area hatched area.

NOTES:
All landscape plant material shall be native and/or hardy in the State of Kansas.
Details and specifications to be provided in construction documents.

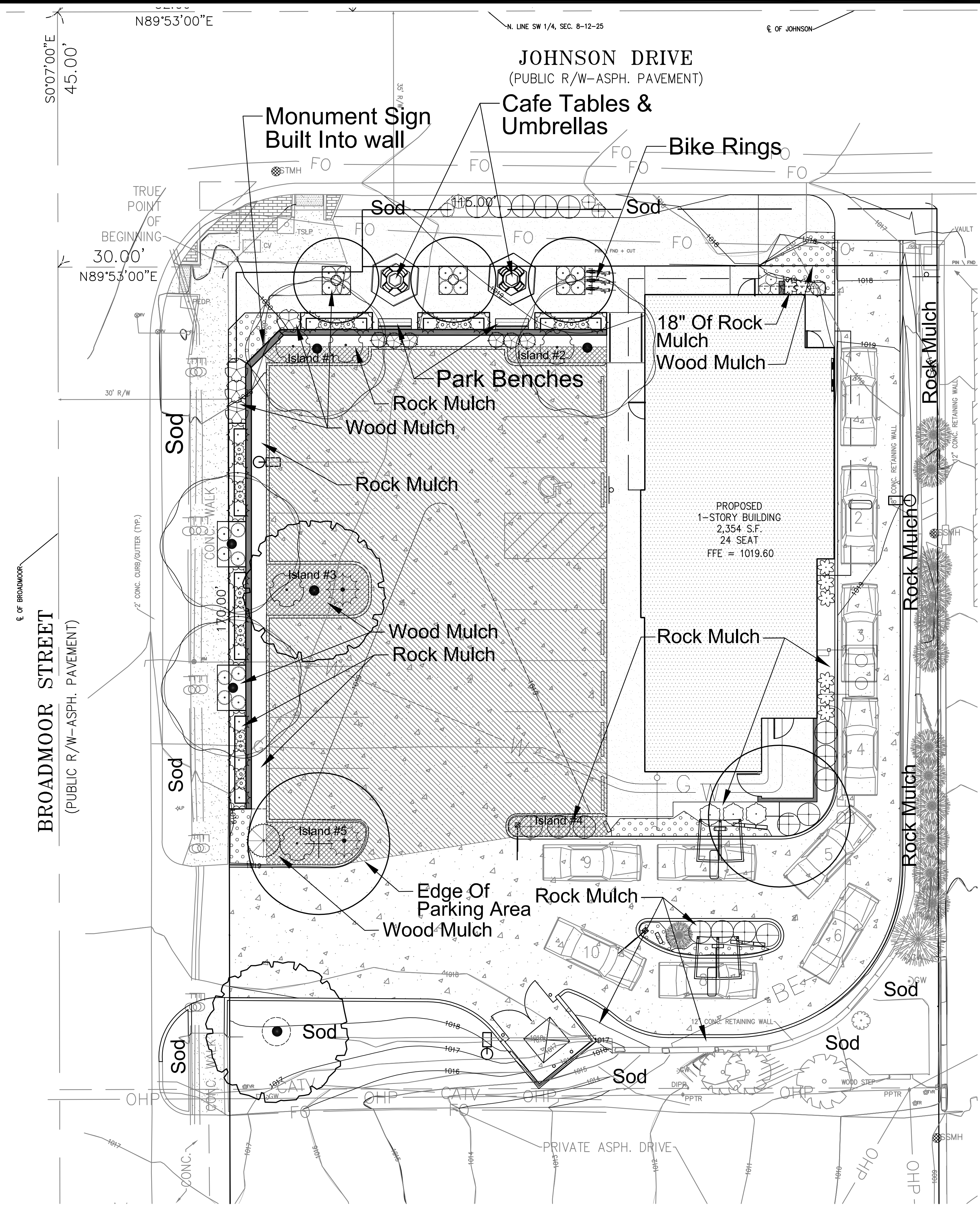


Landscape Plan
Popeye's Louisiana Kitchen
Johnson Drive and Broadmoor St.
Mission, Kansas



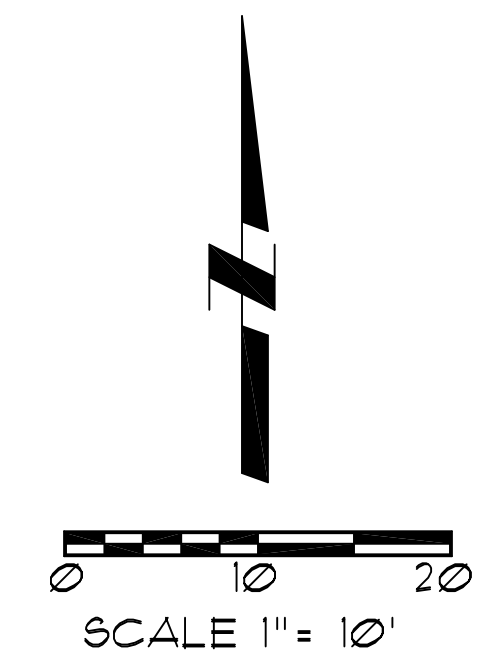
Oppermann LandDesign, LLC
Land Planning + Landscape Architecture
22 Debra Lane
New Windsor, New York 12553
pete@oppermans56@gmail.com
913.529.5598

10/24/2023

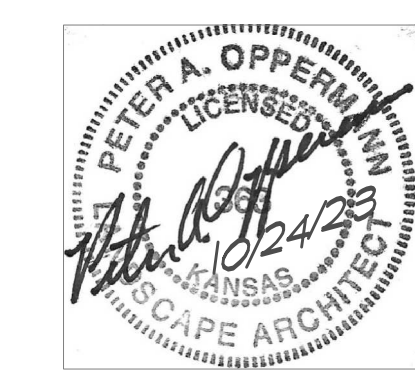


PROPOSED
1-STORY BUILDING
2,354 S.F.
24 SEAT
FFE = 1019.60

Parking Lot Island Calcs:
Overall Lot Equals 5326 s.f.
Island #1 50.31 s.f.
Island #2 50.00 s.f.
Island #3 158.15 s.f.
Island #4 59.14 s.f.
Island #5 123.43 s.f.
Titl. Island 441 s.f.
441 Divided By 5326 = 8.33%



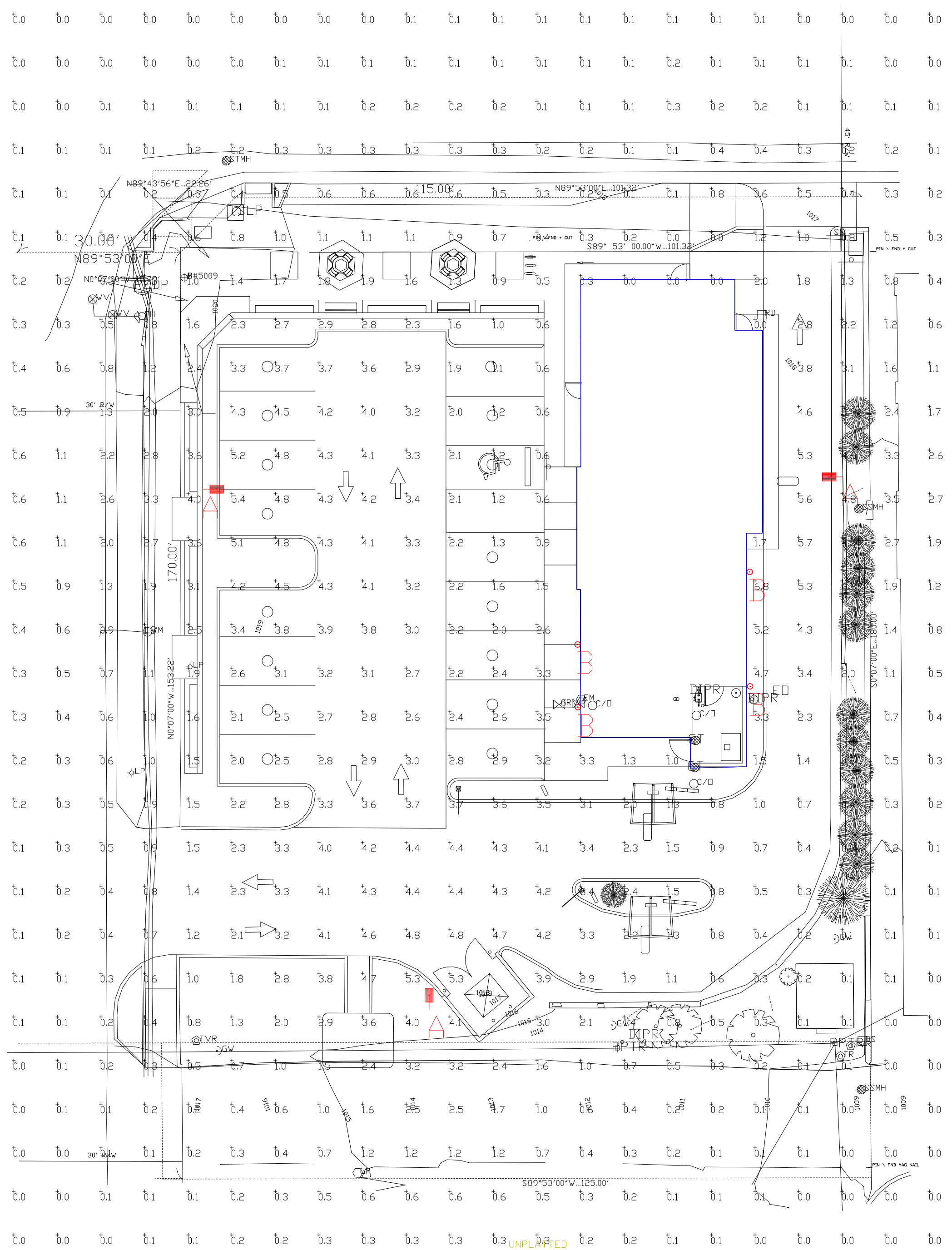
Island Square Footage Plan
Popeye's Louisiana Kitchen
Johnson Drive and Broadmoor St.
Mission, Kansas



Oppermann LandDesign, LLC
Land Planning + Landscape Architecture
22 Debra Lane peteoppermann56@gmail.com
New Windsor, New York 12553 913.529.5598

Utility Note:
Utilities shown on plan are diagrammatic and some may be missing. Before starting any construction call appropriate locating service. In Kansas call 1-800-DIG-SAFE (344-7233) to have utilities located.

10/24/2023



Photometric data for fixture type "B" are based upon another manufacturer's test data and as a result can not be verified by LSI Industries for this calculation.

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
CALCULATION POINTS @ GRADE	Illuminance	Fc	1.36	6.8	0.0	N.A.	N.A.
PAVED AREA	Illuminance	Fc	2.92	5.7	0.3	9.73	19.00

Luminaire Schedule									
Symbol	Qty	Label	Arrangement	Description	Mounting Height	LLD	LLF	Arr. Lum. Lumens	Arr. Watts
	3	A	Single	MRS-LED-24L-SIL-FT-30-70CRI-SINGLE	25'	1.000	1.000	22164	196
	4	B	Single	H-161-12 (SUPPLIED BY HERMITAGE)	15'	1.000	1.000	1284	0

PHOTOMETRIC EVALUATION
NOT FOR CONSTRUCTION

Based on the information provided, all dimensions and luminaire locations shown represent recommended positions. The engineer and/or architect must determine the applicability of the layout to existing or future field conditions.

This lighting plan represents illumination levels calculated from laboratory data taken under controlled conditions in accordance with The Illuminating Engineering Society (IES) approved methods. Actual performance of any manufacturer's luminaires may vary due to changes in electrical voltage, tolerance in lamps/LED's and other variable field conditions. Calculations do not include obstructions such as buildings, curbs, landscaping, or any other architectural elements unless noted. Fixture nomenclature noted does not include mounting hardware or poles. This drawing is for photometric evaluation purposes only and should not be used as a construction document or as a final document for ordering product.

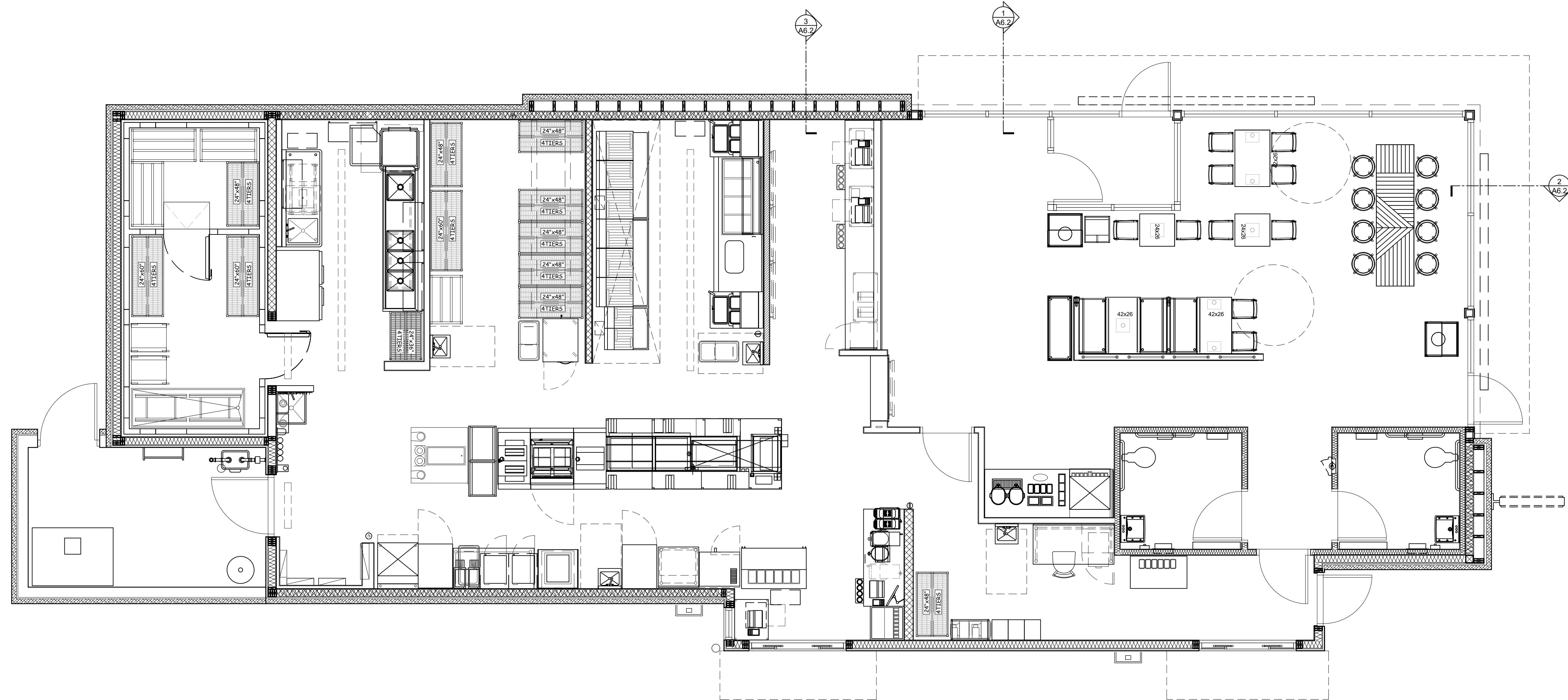
Total Project Watts
Total Watts = 588

LIGHTING PROPOSAL LD-158766-1

POPEYES
6821 JOHNSON DR
MISSION, KS

BY: SAM DATE: 9/17/23 REV: 10/27/23 SHEET 1 OF 1

SCALE: 1"=16' 0 16



1
A1

EQUIPMENT PLAN

SCALE: 1/4"=1'-0"



ISSUE TABLE		
No.	Date (mm/dd/yy)	Description
01	02-07-2023	2124 VE UPDATED DRAWINGS

REVISIONS		
No.	Date	Description

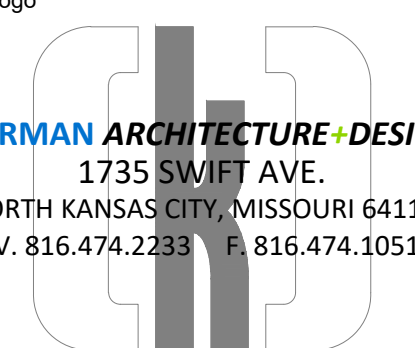
DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS

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Seal

Company Logo



WARMAN ARCHITECTURE + DESIGN
1735 SWIFT AVE.
NORTH KANSAS CITY, MISSOURI 64116
V. 816.474.2233 F. 816.474.1051

Project



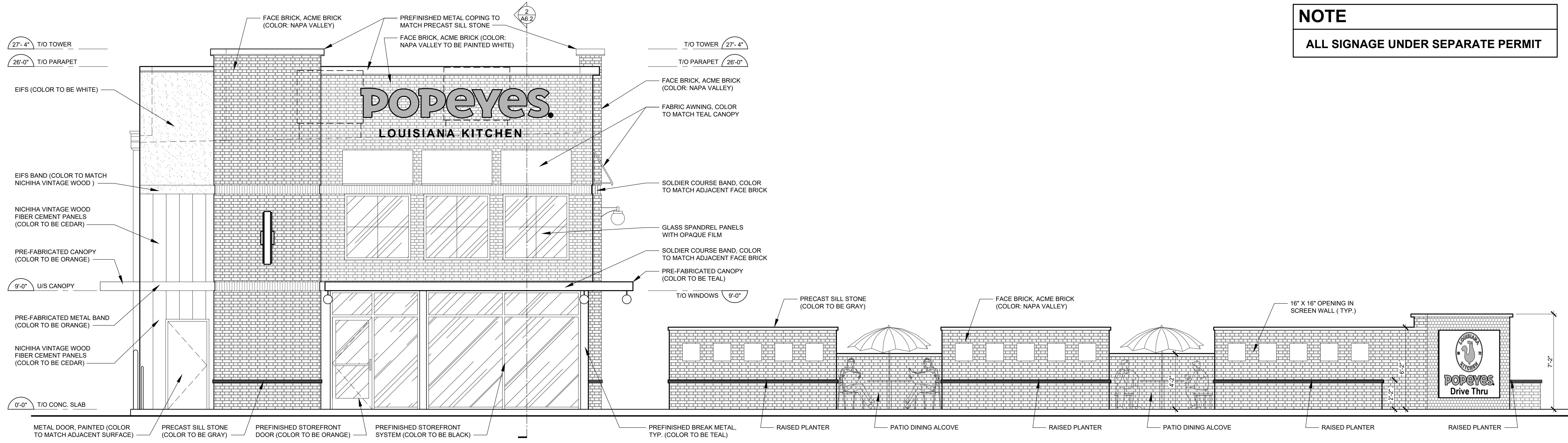
LOUISIANA KITCHEN
POPEYES

Store Type
ATYPICAL
(BASED ON US 2124 PROTOTYPE)

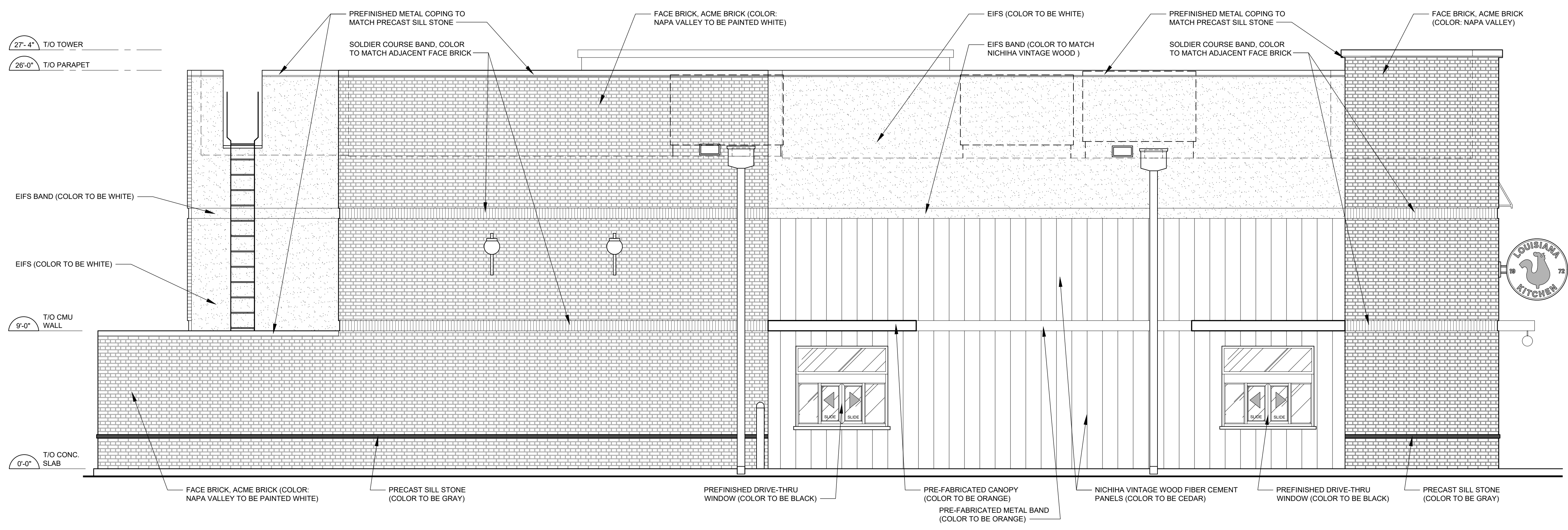
Location
**6821 Johnson Dr
Mission, KS**

Drawing Title
EQUIPMENT PLAN

Drawn	cdt	Checked	KAW
Scale	1/4"=1'-0"	Date	AUGUST 01, 2023
Project No.	5961-23	Drawing No.	A1



1 NORTH ELEVATION
SCALE: 1/4"=1'-0"



2 EAST ELEVATION
SCALE: 1/4"=1'-0"

NOTE
ALL SIGNAGE UNDER SEPARATE PERMIT

ISSUE TABLE		
No.	Date (mm/dd/yyyy)	Description
01	02-07-2023	2124 VE UPDATED DRAWINGS

REVISIONS		
No.	Date	Description

DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS

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Seal

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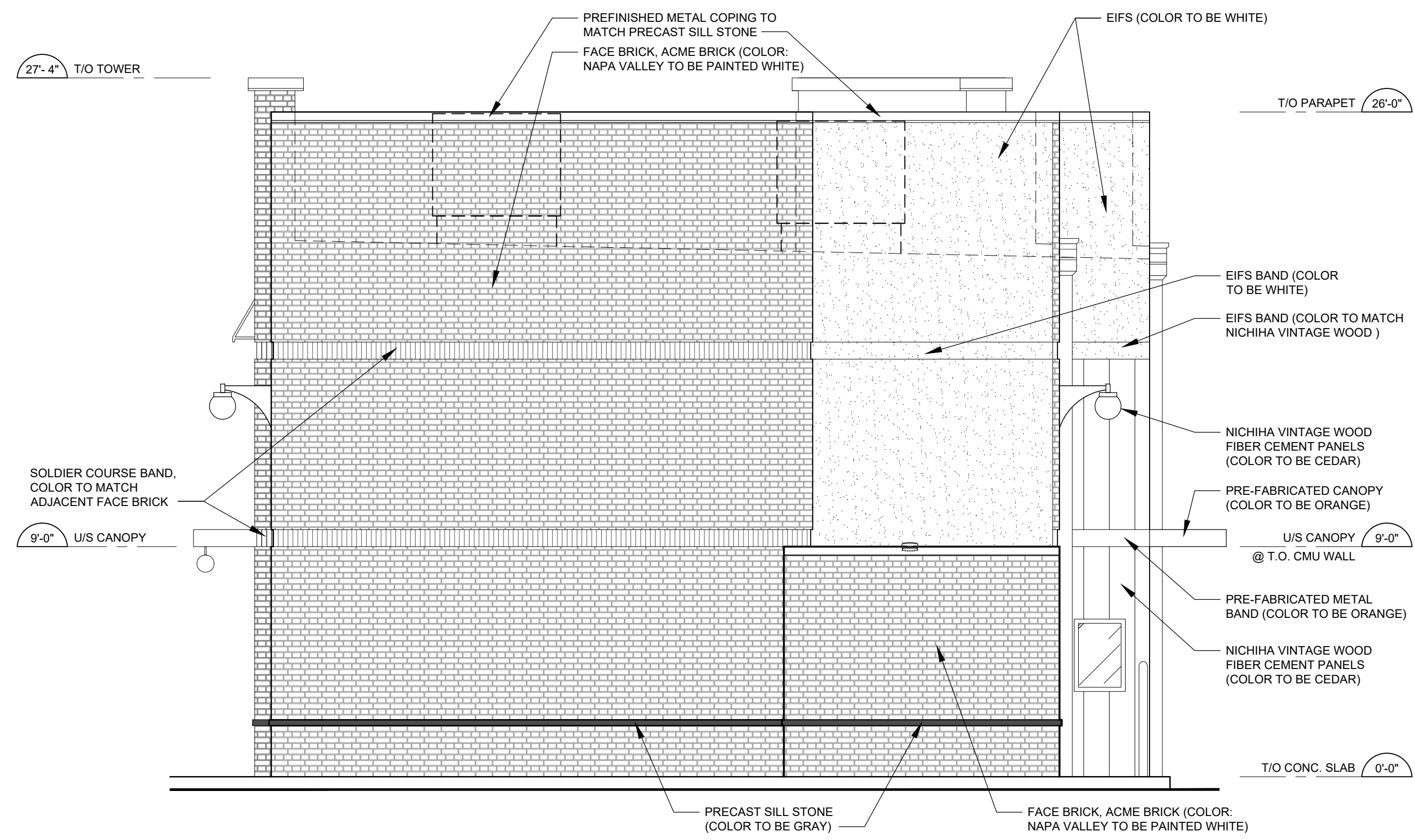


Store Type
ATYPICAL
(BASED ON US 2124 PROTOTYPE)

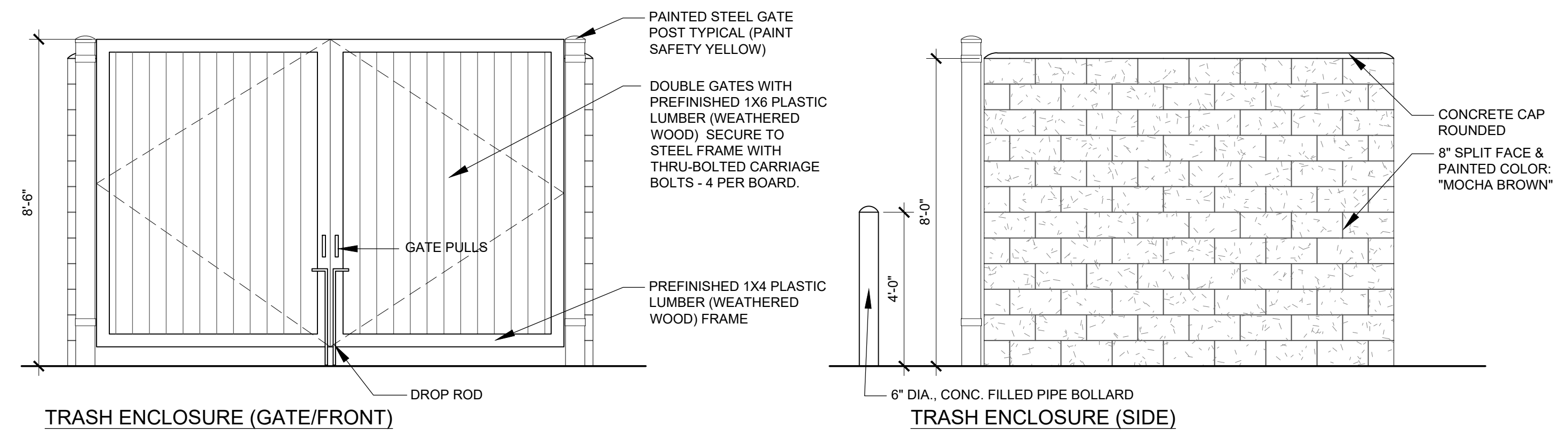
Location
**6821 Johnson Dr
Mission, KS**

Drawing Title
EXTERIOR ELEVATIONS

Drawn	cdt	Checked	KAW
Scale	1/4"=1'-0"	Date	AUGUST 01, 2023
Project No.	5961-23	Drawing No.	A5.0

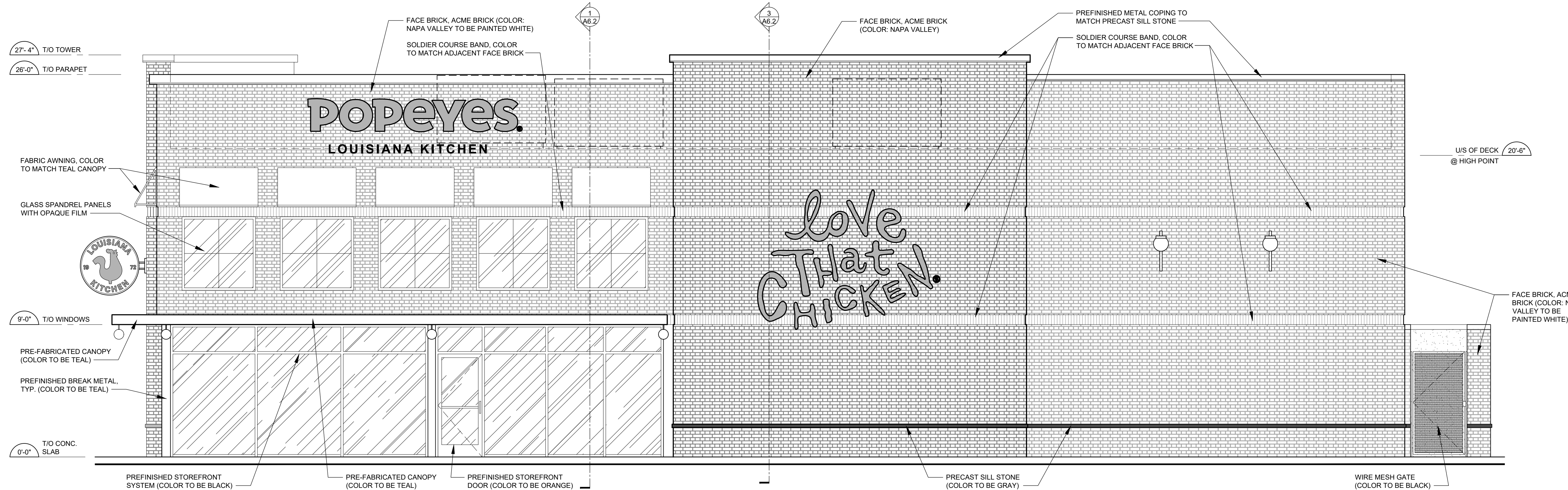


1 SOUTH ELEVATION
A5.1 SCALE: 1/4"=1'-0"



3 DUMPSTER ENCLOSURE ELEVATIONS
A5.1 SCALE: 3/8"=1'-0"

NOTE
ALL SIGNAGE UNDER SEPARATE PERMIT



2 WEST ELEVATION
A5.1 SCALE: 1/4"=1'-0"

ISSUE TABLE		
No.	Date (mm/dd/yyyy)	Description
01	02-07-2023	2124 VE UPDATED DRAWINGS

REVISIONS		
No.	Date	Description

DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS

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Seal

Company Logo

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V. 816.474.2233 F. 816.474.1051

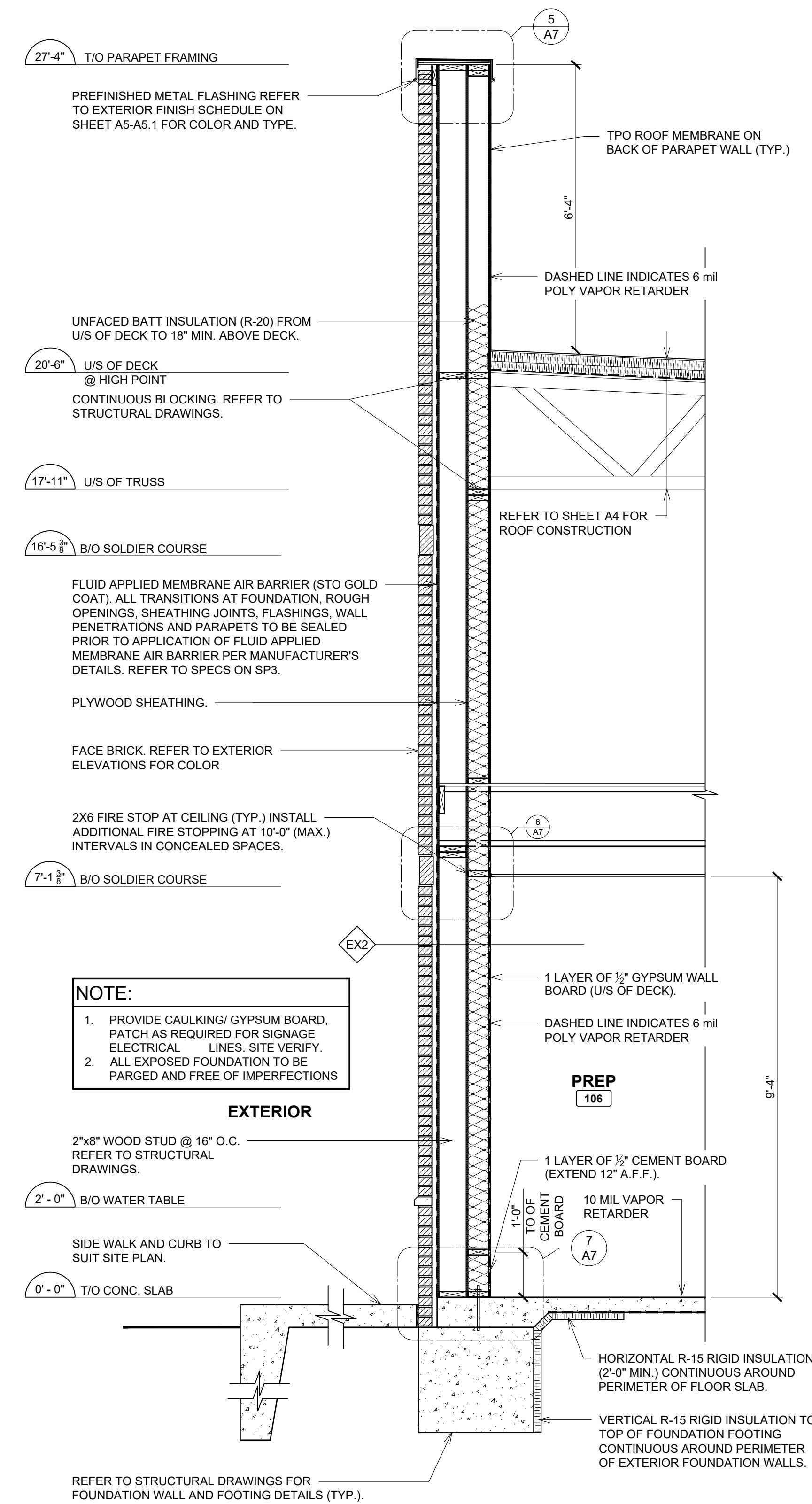
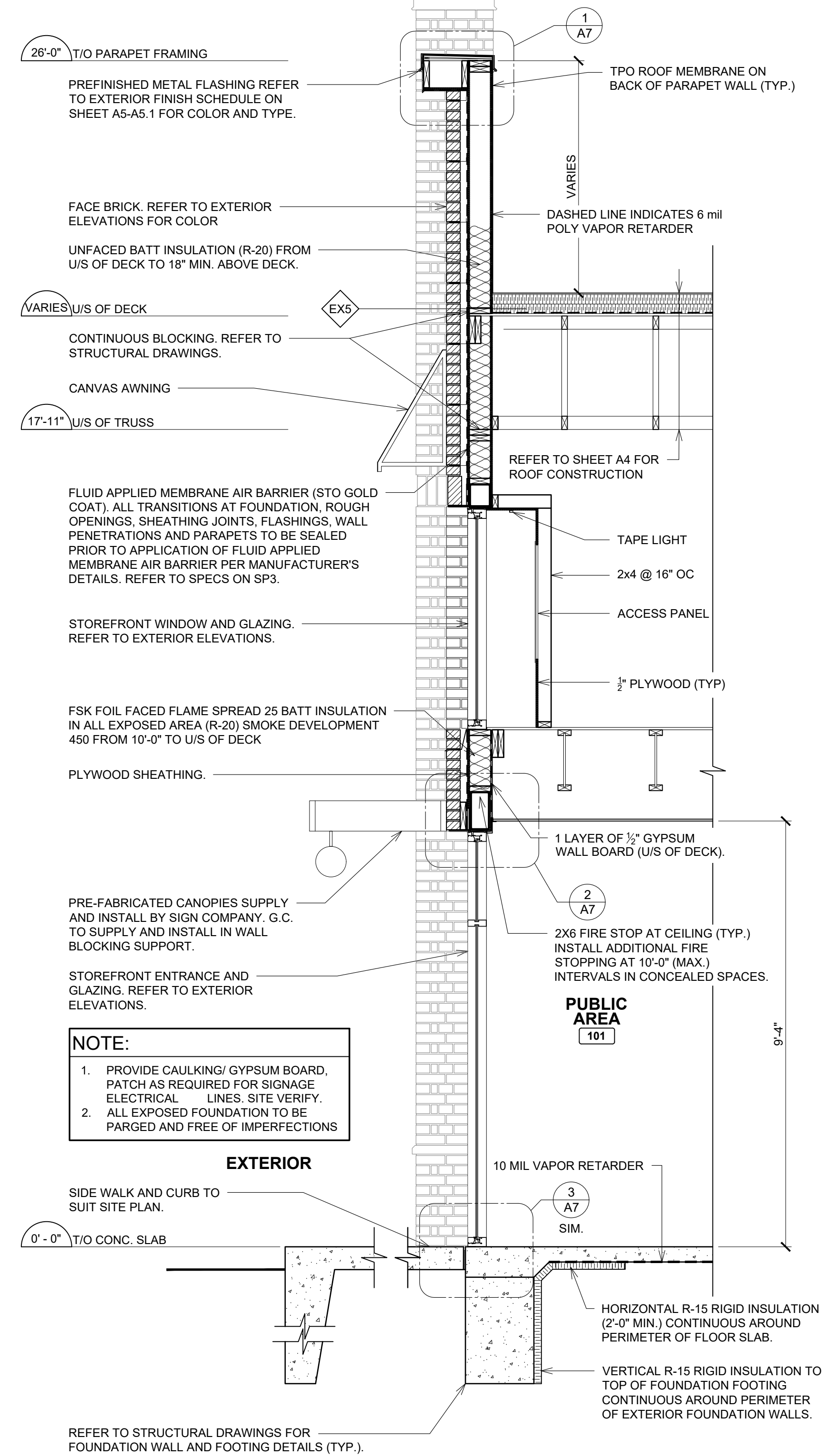
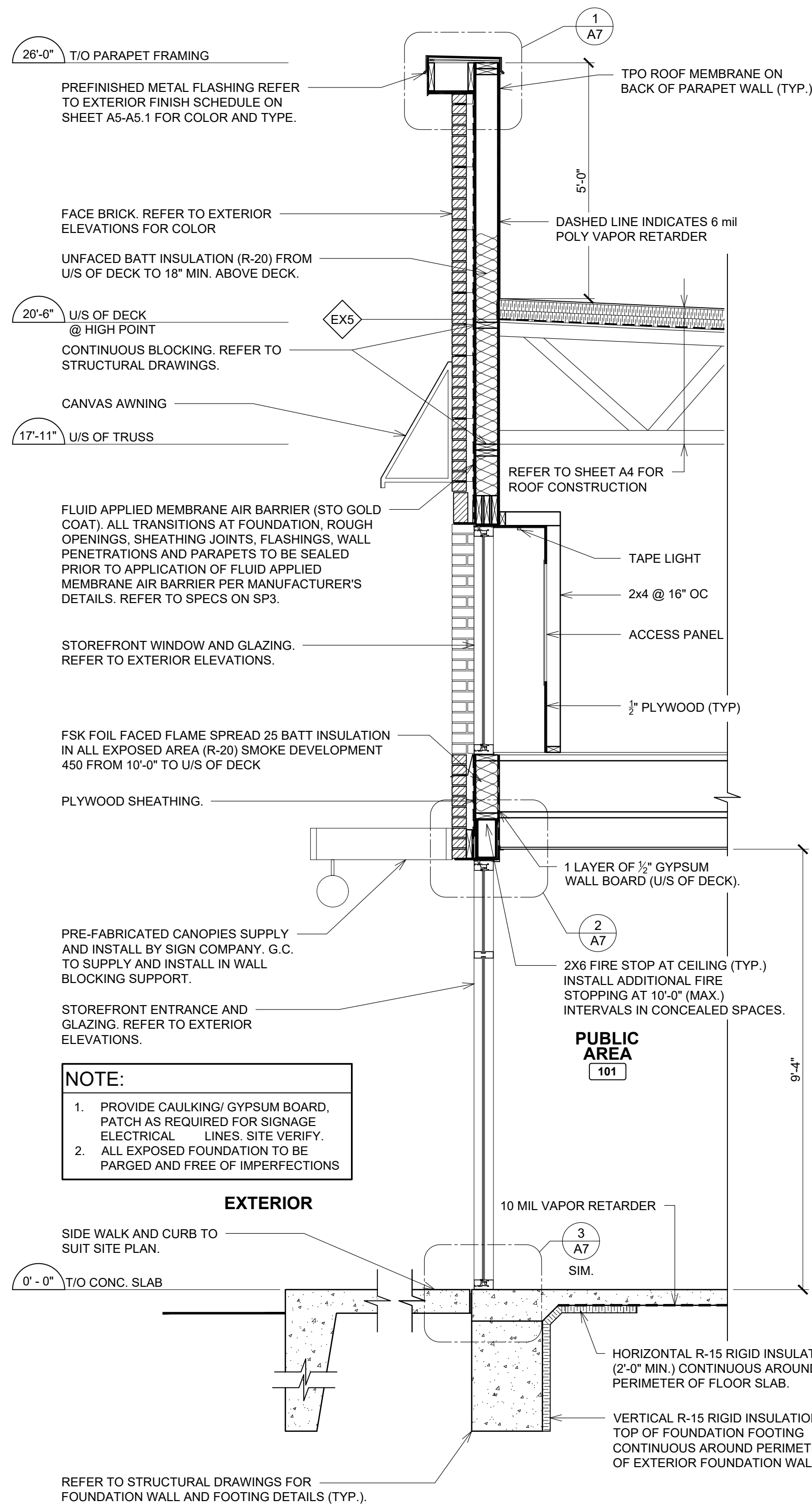


Store Type
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(BASED ON US 2124 PROTOTYPE)

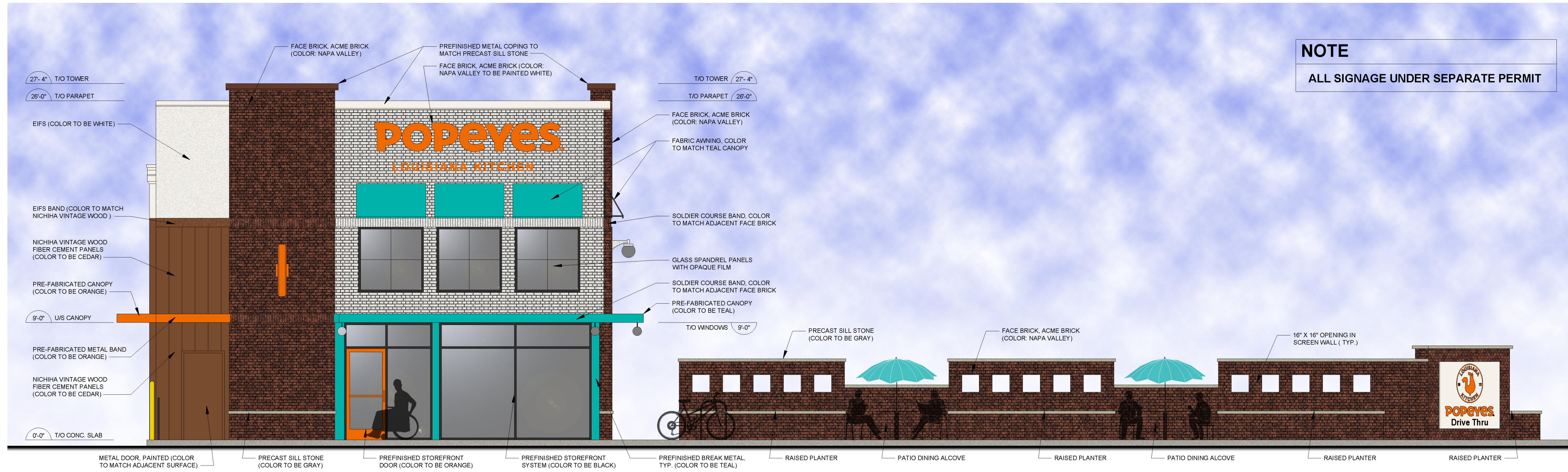
Location
**6821 Johnson Dr
Mission, KS**

Drawing Title
EXTERIOR ELEVATIONS

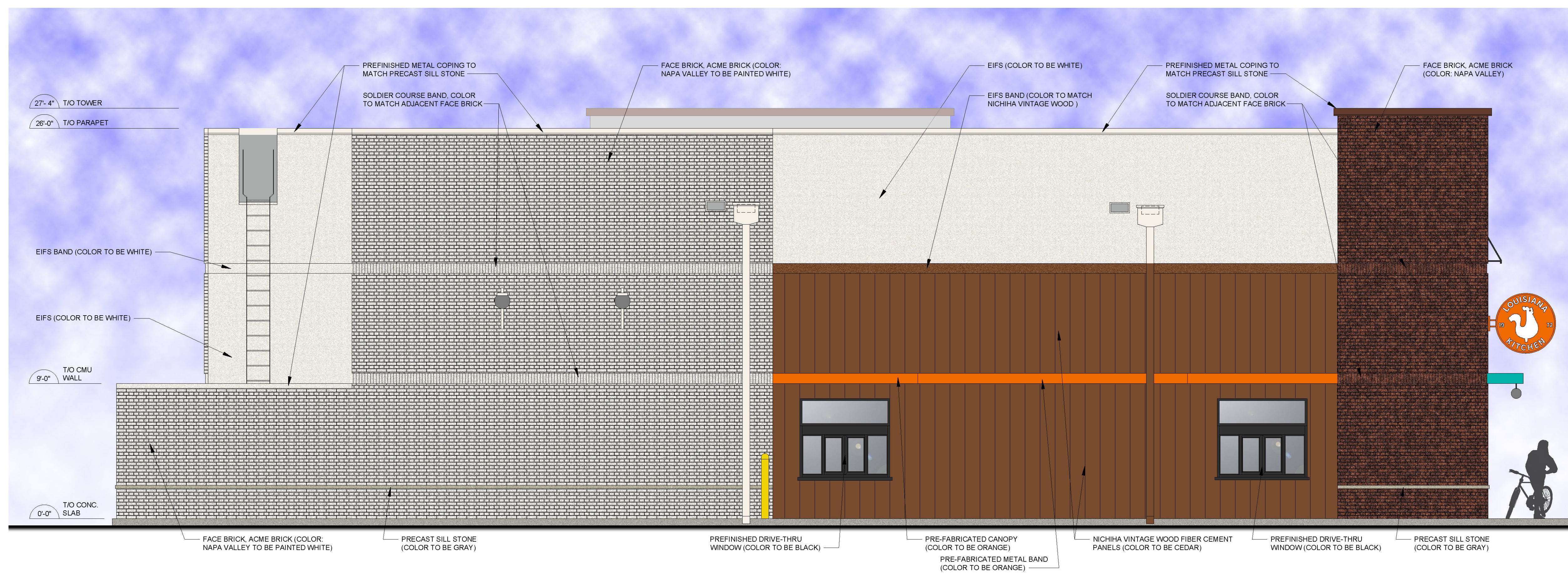
Drawn cdt	Checked KAW
Scale 1/4"=1'-0"	Date AUGUST 01, 2023
Project No. 5961-23	Drawing No. A5.1



ISSUE TABLE		
No.	Date (mm/dd/yyyy)	Description
01	02-07-2023	2124 VE UPDATED DRAWINGS
REVISIONS		
No.	Date	Description
DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS
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Seal		
Company Logo		
 WARMAN ARCHITECTURE + DESIGN 1735 SWIFT AVE. NORTH KANSAS CITY, MISSOURI 64116 V. 816.474.2233 F. 816.474.1051		
Project		
 POPEYES		
Store Type		
ATYPICAL (BASED ON US 2124 PROTOTYPE)		
Location		
6821 Johnson Dr Mission, KS		
Drawing Title		
WALL SECTIONS		
Drawn	XX	Checked
Scale	AS NOTED	Date
Project No.	5961-23	August 01, 2023
		Drawing No.
		A6.2



1 NORTH ELEVATION
SCALE: 1/4"=1'-0"



2 EAST ELEVATION
SCALE: 1/4"=1'-0"

ISSUE TABLE		
No.	Date (mm/dd/yyyy)	Description
01	02-07-2023	2124 VE UPDATED DRAWINGS

NOTE
ALL SIGNAGE UNDER SEPARATE PERMIT

REVISIONS		
No.	Date	Description

DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS

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V. 816.474.2233 P. 816.474.1051

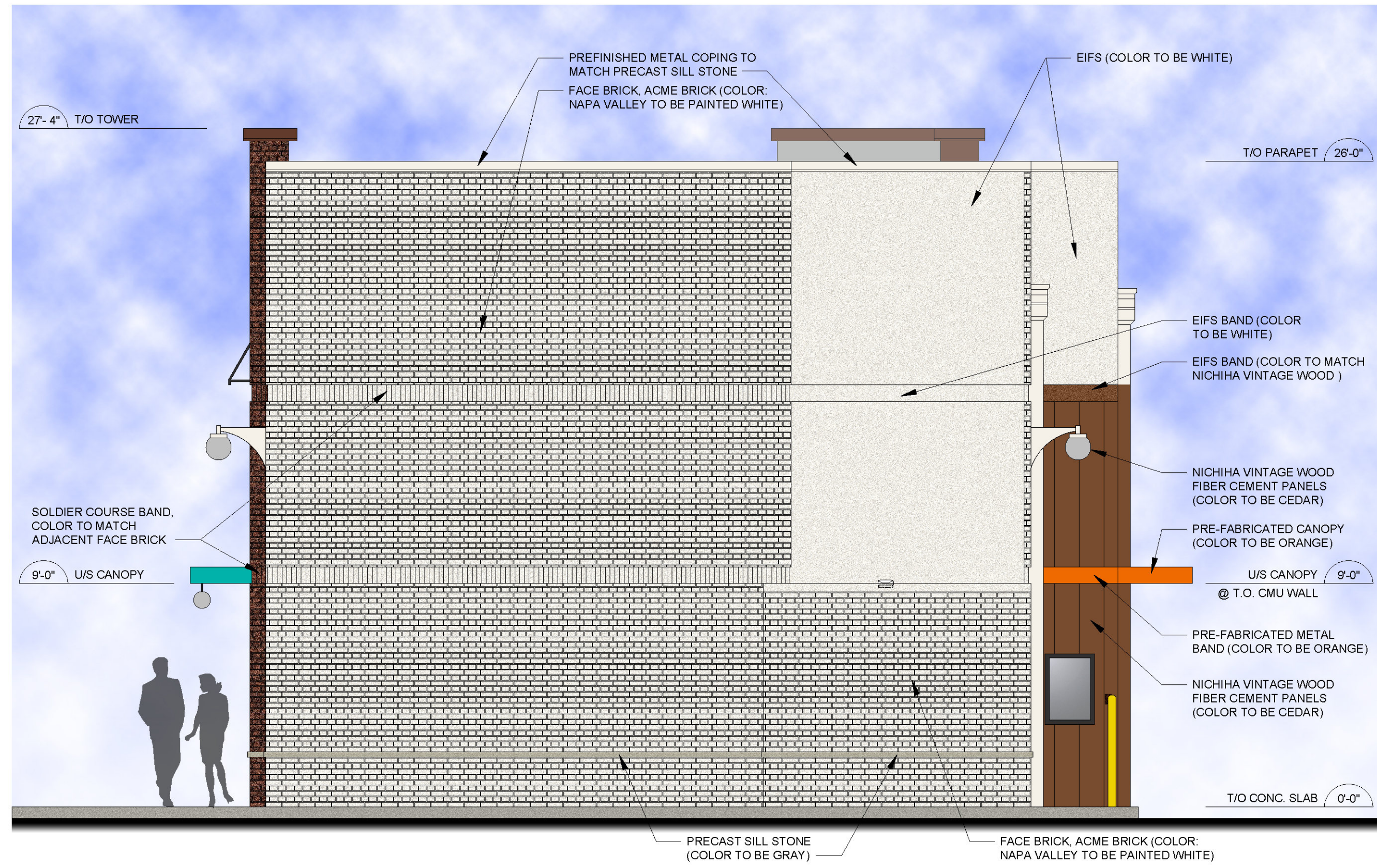


Store Type
ATYPICAL
(BASED ON US 2124 PROTOTYPE)

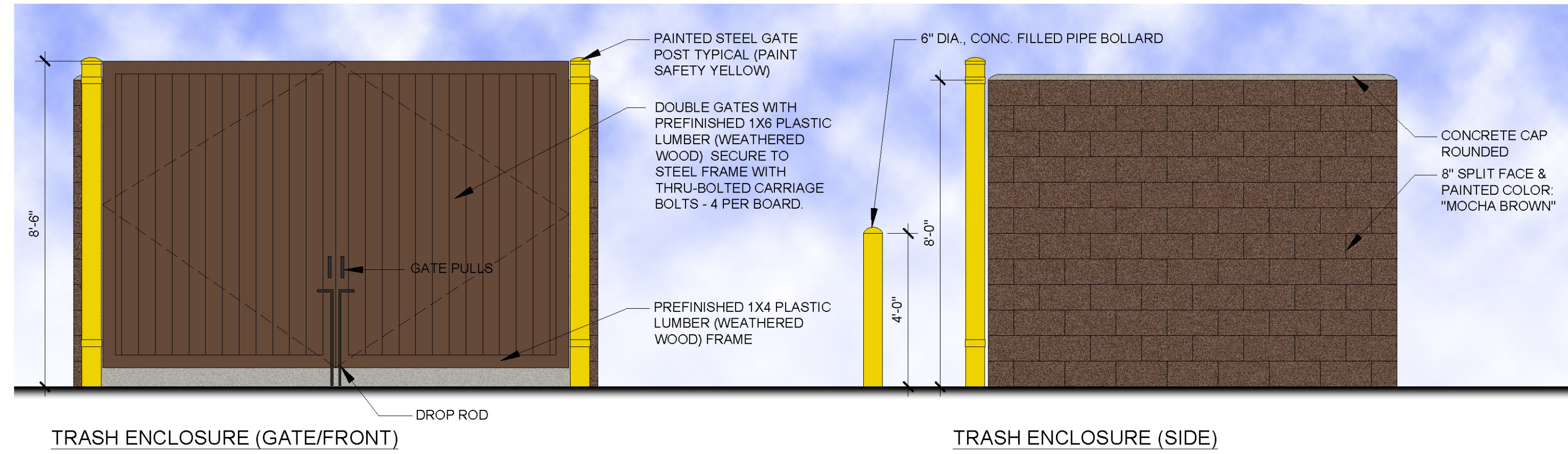
Location
**6821 Johnson Dr
Mission, KS**

Drawing Title
EXTERIOR ELEVATIONS

Drawn cdt	Checked KAW
Scale 1/4"=1'-0"	Date AUGUST 01, 2023
Project No. 5961-23	Drawing No. A5.0



1 SOUTH ELEVATION
SCALE: 1/4"=1'-0"

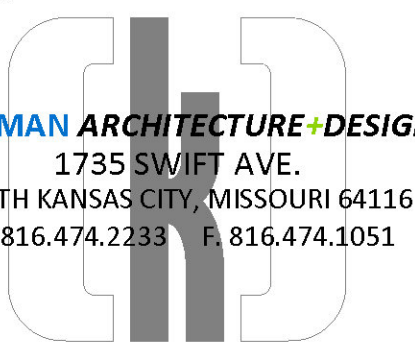



3 DUMPSTER ENCLOSURE ELEVATIONS
SCALE: 3/8"=1'-0"

NOTE
ALL SIGNAGE UNDER SEPARATE PERMIT



2 WEST ELEVATION
SCALE: 1/4"=1'-0"

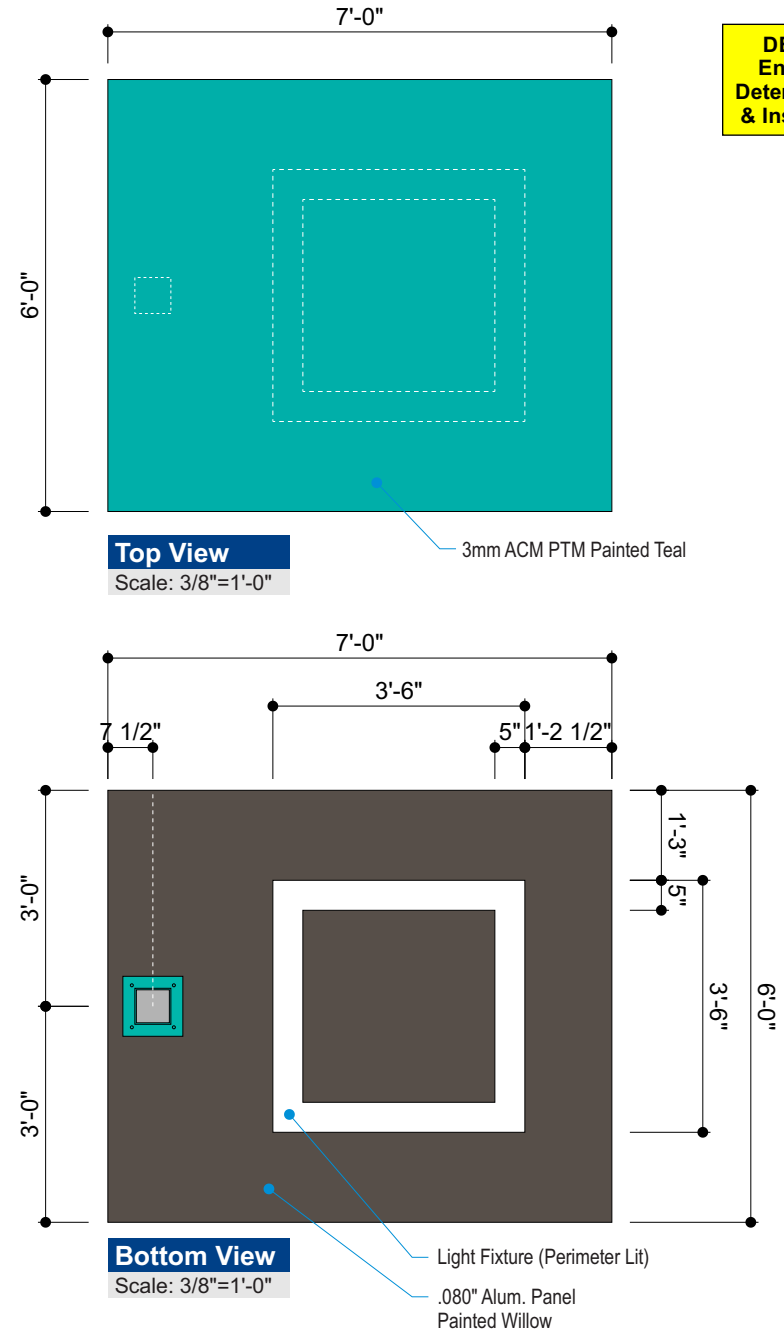
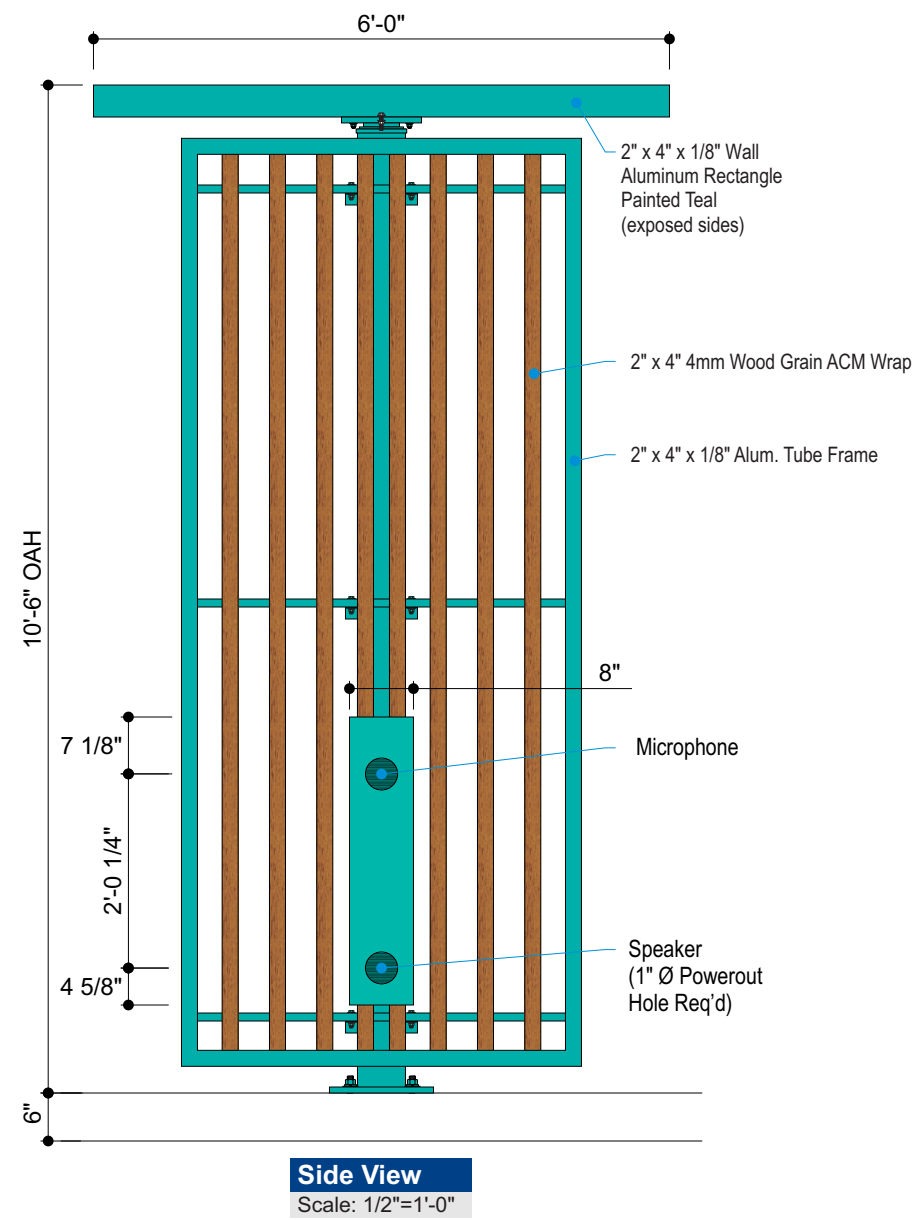
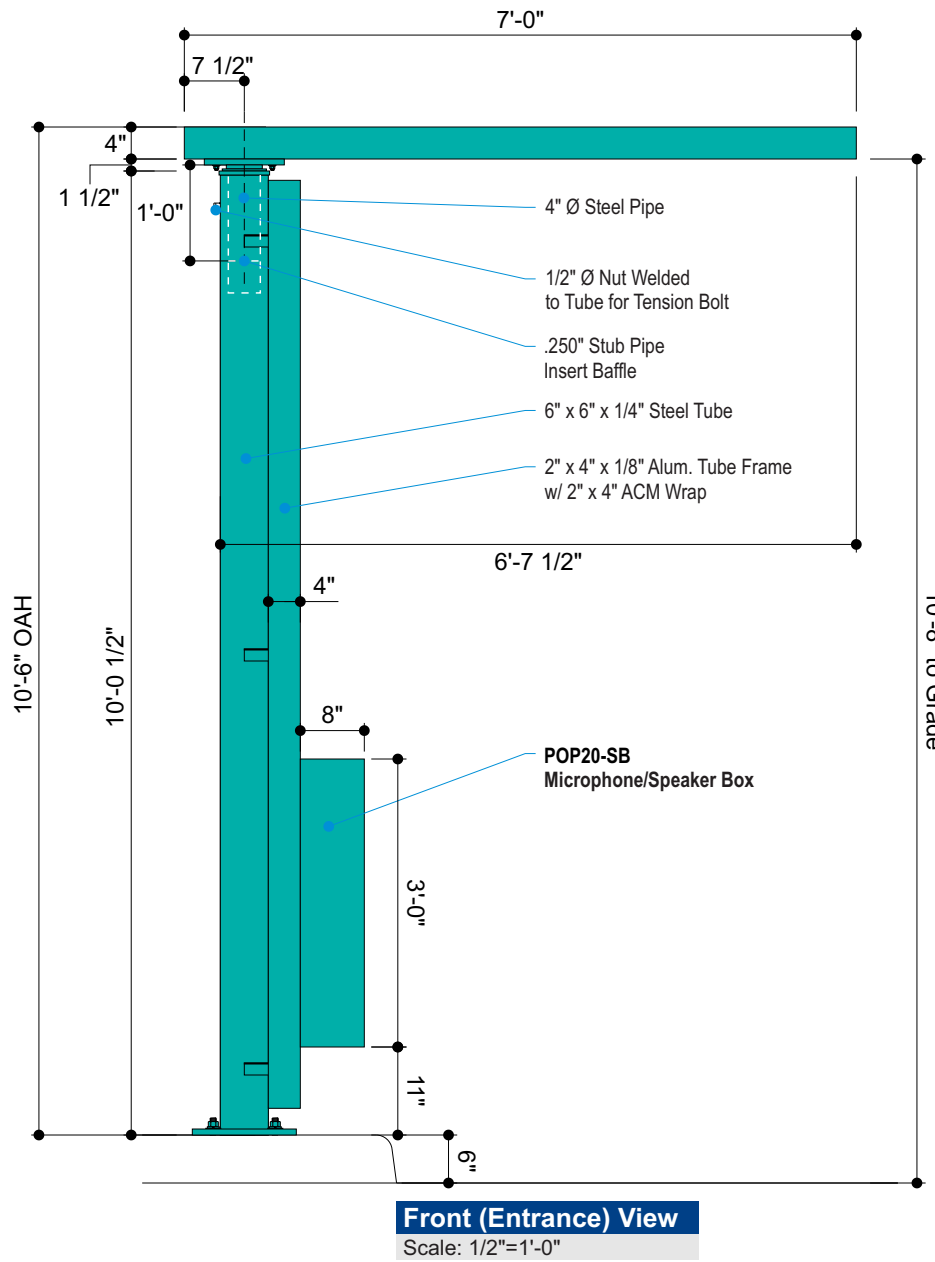
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No.	Date	Description
DRAWINGS REVISED AS PER DESIGN BULLETIN		
No.	Date	Description
01	10-27-21	2124 PROTOTYPE DOCUMENTS
Company Logo		
 <p>WARMAN ARCHITECTURE + DESIGN 1735 SWIFT AVE. NORTH KANSAS CITY, MISSOURI 64116 V. 816.474.2233 F. 816.474.1051</p>		
Project		
 <p>LOUISIANA KITCHEN</p>		
Store Type		
<p>ATYPICAL (BASED ON US 2124 PROTOTYPE)</p>		
Location		
<p>6821 Johnson Dr Mission, KS</p>		
Drawing Title		
<p>EXTERIOR ELEVATIONS</p>		
Drawn	cdt	Checked
Scale	1/4"=1'-0"	KAW
Project No.	5961-23	Date
		AUGUST 01, 2023
		Drawing No.
		A5.1

Warranty Information:
 1.) 10 Year Warranty on GE 7100K LED Lighting
 2.) 5 Year Warranty on GE Power Supplies

Drive Thru Order Canopy

Proposed
 Insert Item Code

DESIGN INTENT ONLY
 Engineering Required to
 Determine Actual Production
 & Installation Requirements



Color Specifications

Reynobond Duragloss 5000 French Walnut

Paint Specifications

- Paint to Match Pantone 326C - Teal
- BM CC-542 Willow

All paint finishes to be Satin unless otherwise specified

General Specifications:

Canopy: Fabricated Aluminum & ACM Structure w/ Steel Tube Support.

Electrical: Actual Number of Circuits to be Determined by Licensed Electrical Contractor (1) 20 AMP Circuit, 120 Volts - All Wiring Shall be 12 GA

Quantity: (1) ONE

Allen Industries FILE NUMBER: E212503

Listed MET E212503 Electric Sign Complies with UL48

THIS SIGN IS INTENDED TO BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ARTICLE 600 OF THE NATIONAL ELECTRICAL CODE AND/OR OTHER APPLICABLE LOCAL CODES. THIS INCLUDES PROPER GROUNDING AND BONDING OF THE SIGN.

GROUNDING ELECTRICAL CONNECTIONS

Allen Industries
 YOUR BRAND AT ITS BEST™
 1-800-967-2553
 www.allenindustries.com

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Client: POPEYES #
Address: "

Issue Date: 05/23/22
Page #: 14 of 21
File Name: Popeyes_2100 Series Signage Reference Book
Sales: House **Design:** ECW **PM:** -

#	Date	Description	Initial
1	-	-	-
2	-	-	-
3	-	-	-
4	-	-	-
5	-	-	-
6	-	-	-

Client Review Status
 Allen Industries, Inc. requires that an approved drawing be obtained from the client prior to any production release or production release revision.

Client Signature: _____ Approval Date: _____

103675



Napa Valley
Blend
TUP033
Acme Brick - Tulsa Plant
Size
Modular
Texture
Heritage



White Bluff
Blend
PWP856
Acme Brick - Perla West Gate Plant
Size
King
Texture
Heritage



Moonlight White
OC-125





NATURAL
GROCERS

NATURAL
GROCERS



POPEYES
LOUISIANA KITCHEN

POPEYES
LOUISIANA KITCHEN

love
That
CHICKEN



October 30, 2023

Re: **Popeye's Louisiana Kitchen
Stormwater Memo**
PEI #230238

The existing and proposed impervious areas were analyzed to determine if post development BMPs and detention are required for the proposed Popeye's Louisiana Kitchen.

Existing Site

The existing 21,198 SF (0.49 Ac.) site consists of a paved parking lot and building. The site has 3 drainage areas.

- The western and southern parking lot drain southwesterly directly to Broadmoor Street. See Discharge Point #1 on Exhibit B1.
- The northeast portion of the site surface drains northerly directly to Johnson Drive. See Discharge Point #2 on Exhibit B1.
- The southern portion of the site (existing private drive) drains early directly off the site. See Discharge Point #3 on Exhibit B1.

The existing site consists of 17,891 SF (0.41 acres) of impervious area. See exhibits A1 and B1 for reference.

Proposed Site

The proposed project will remove the existing building and a portion of the existing parking lot. A new Popeye's Louisiana Kitchen will be constructed. The proposed site will maintain the existing drainage patterns with negligible shifts in watershed (see Exhibit B2).

The proposed site consists of 16,780 SF (0.39 acres) of impervious area. See exhibits A2 and B2 reference.

Conclusion

The proposed site results in a decrease in impervious area of 1,111 SF.

Section 500.210 of the Mission Kansas municipal code has adopted APWA for regulating stormwater management. Stormwater detention is not required per Section 5601.3 of the Kansas City Metropolitan Chapter APWA Standard Specifications & Design Criteria, which states that any remodeling, repair, replacement, or other improvements to any existing structure or facility and appurtenances that does not result an increase area of impervious surface on the site is exempt of detention requirements.

Section 500.215 of the Mission Kansas municipal code has adopted the MARC BMP manual for purposes of stormwater quality management. Stormwater treatment BMP's are not required for this site per Section 4.2.1 of the MARC BMP manual, which states that a previously developed site that maintains or reduces the percent impervious area, would not meet the definition of a development as stated in APWA 5601.3 and would not require additional stormwater BMP's.

Please feel free to contact me at (913) 393-1155 if you require additional information.

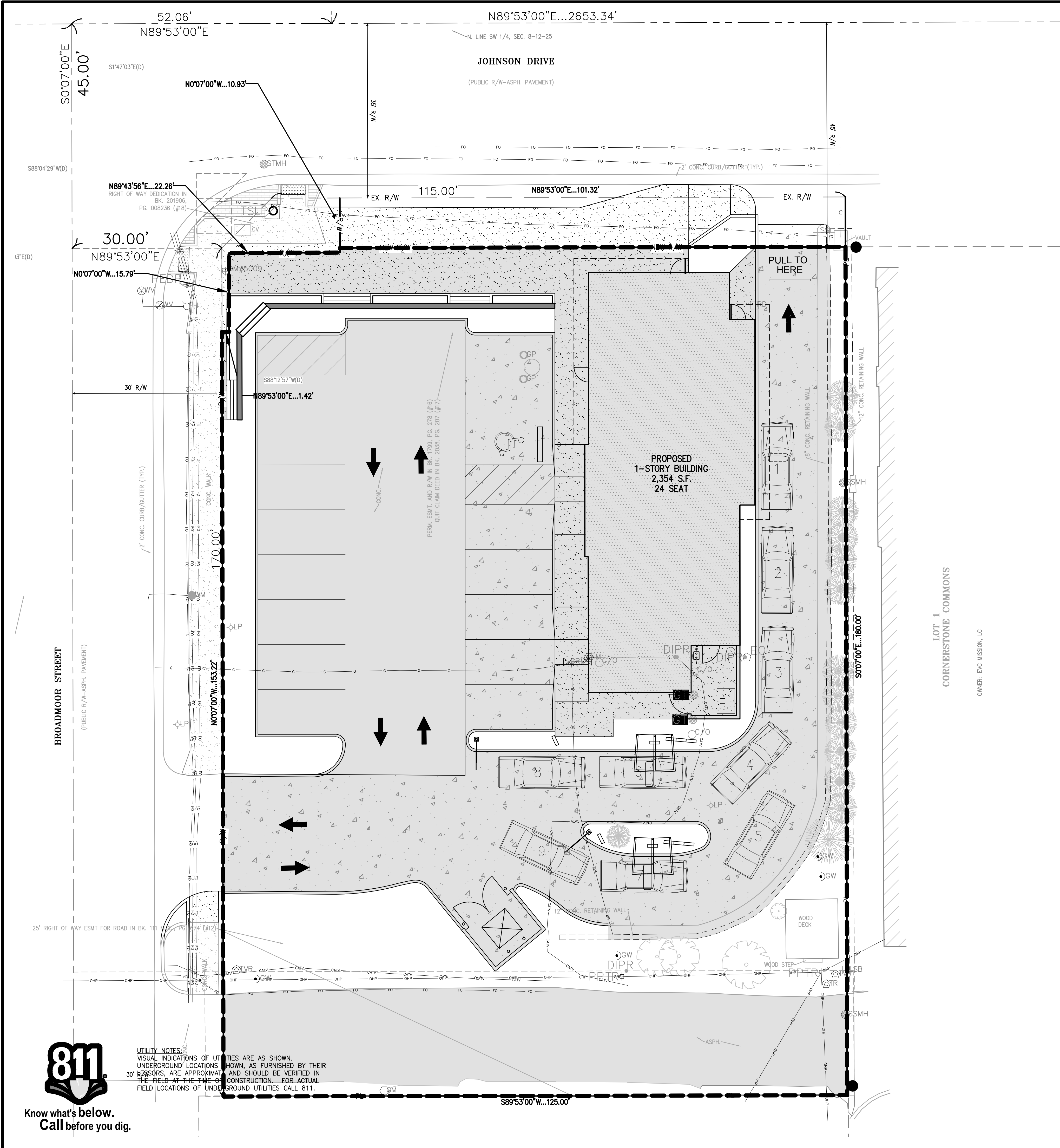
Sincerely,

Phelps Engineering, Inc.

Daniel Finn, P.E.



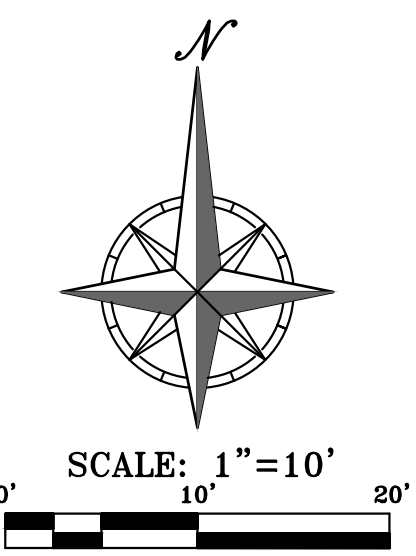
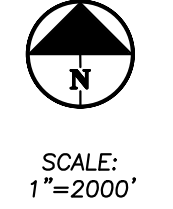
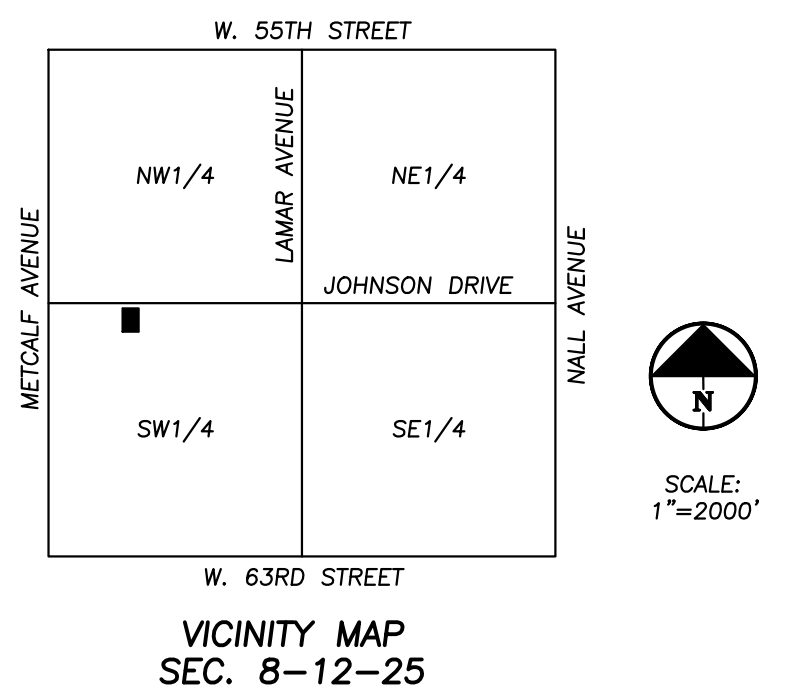
\\PHELPS-SERVER\Projects\230228\Stormwater\Exhibits\Proposed Conditions A2.dwg Layout A2 Jun 21, 2023 - 11:46am Dakota Byrum



LEGEND

- PL PROPERTY LINE
- LOT LINE
- R/W- RIGHT-OF-WAY
- IMPERVIOUS
- OPEN SPACE
- DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION

TOTAL LOT = 21,198 S.F. (0.49 ACRES)
 IMPERVIOUS = 16,780 S.F. (0.39 ACRES)
 OPEN SPACE = 4,418 S.F. (0.10 ACRES)



UTILITY NOTES:
 VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
 UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.



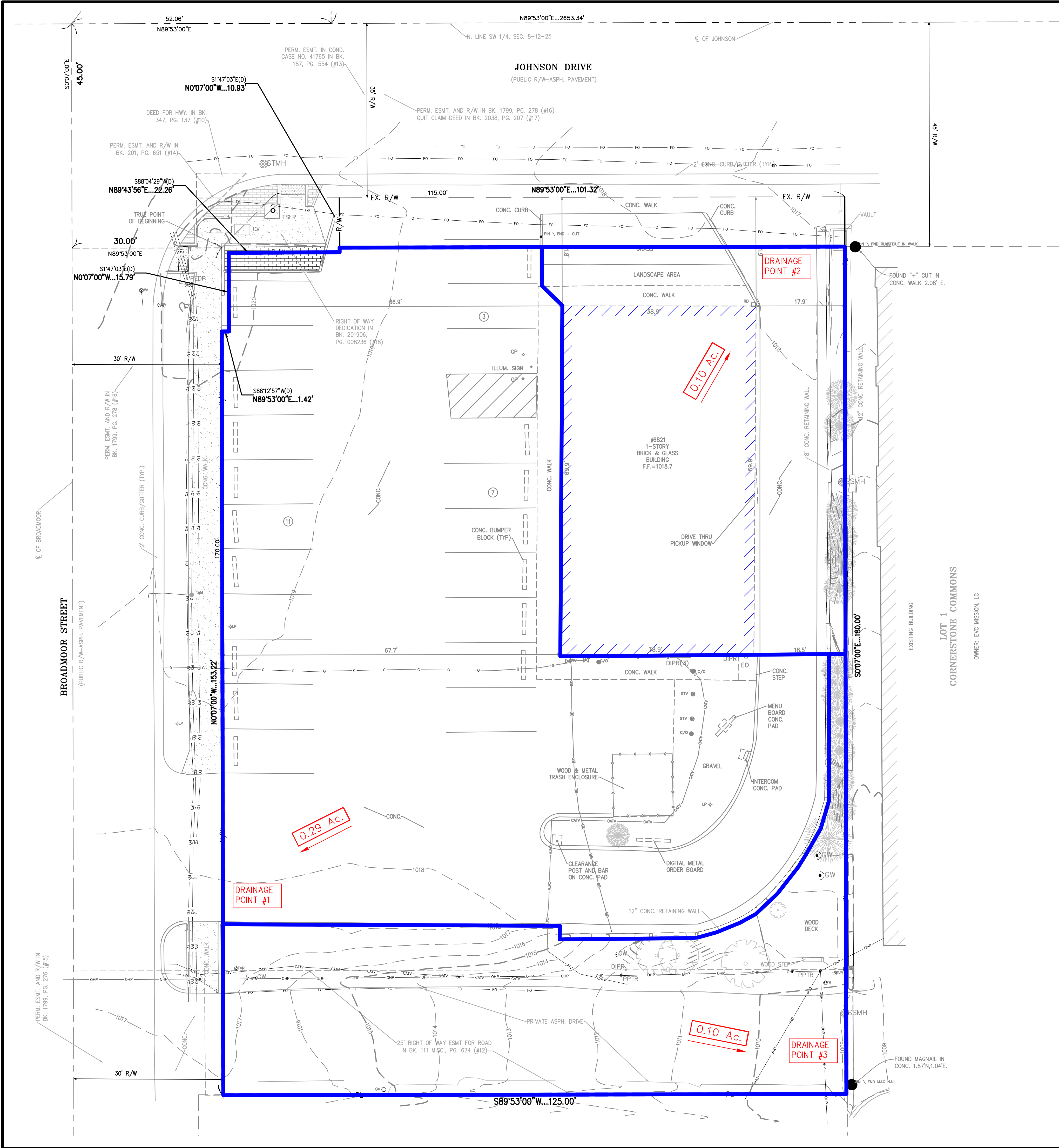
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PHELPS ENGINEERING, INC.
 1570 N. Winchester
 Olathe, Kansas 66061
 (913) 993-1155
 Fax (913) 993-1165
 www.phelpsenr.com

PLANNING
 ENGINEERING
 IMPLEMENTATION

PROPOSED CONDITIONS MAP
 POPEYE'S LOUISIANA KITCHEN
 6821 JOHNSON DRIVE
 MISSION, KANSAS 66202

Revisions:	No.	Date	By	App.

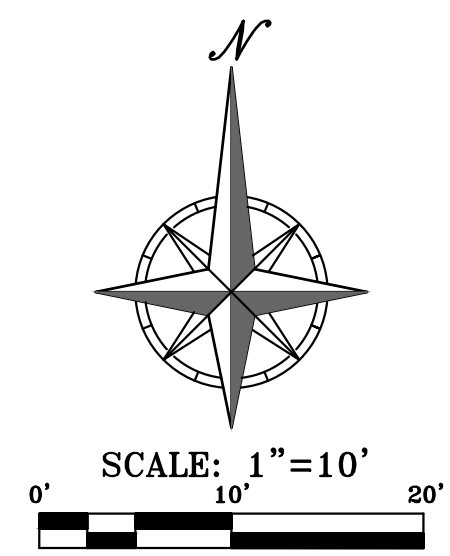


LEGEND

- PL — PROPERTY LINE
- LOT LINE
- - - R/W - - RIGHT-OF-WAY
- DRAINAGE BOUNDARY

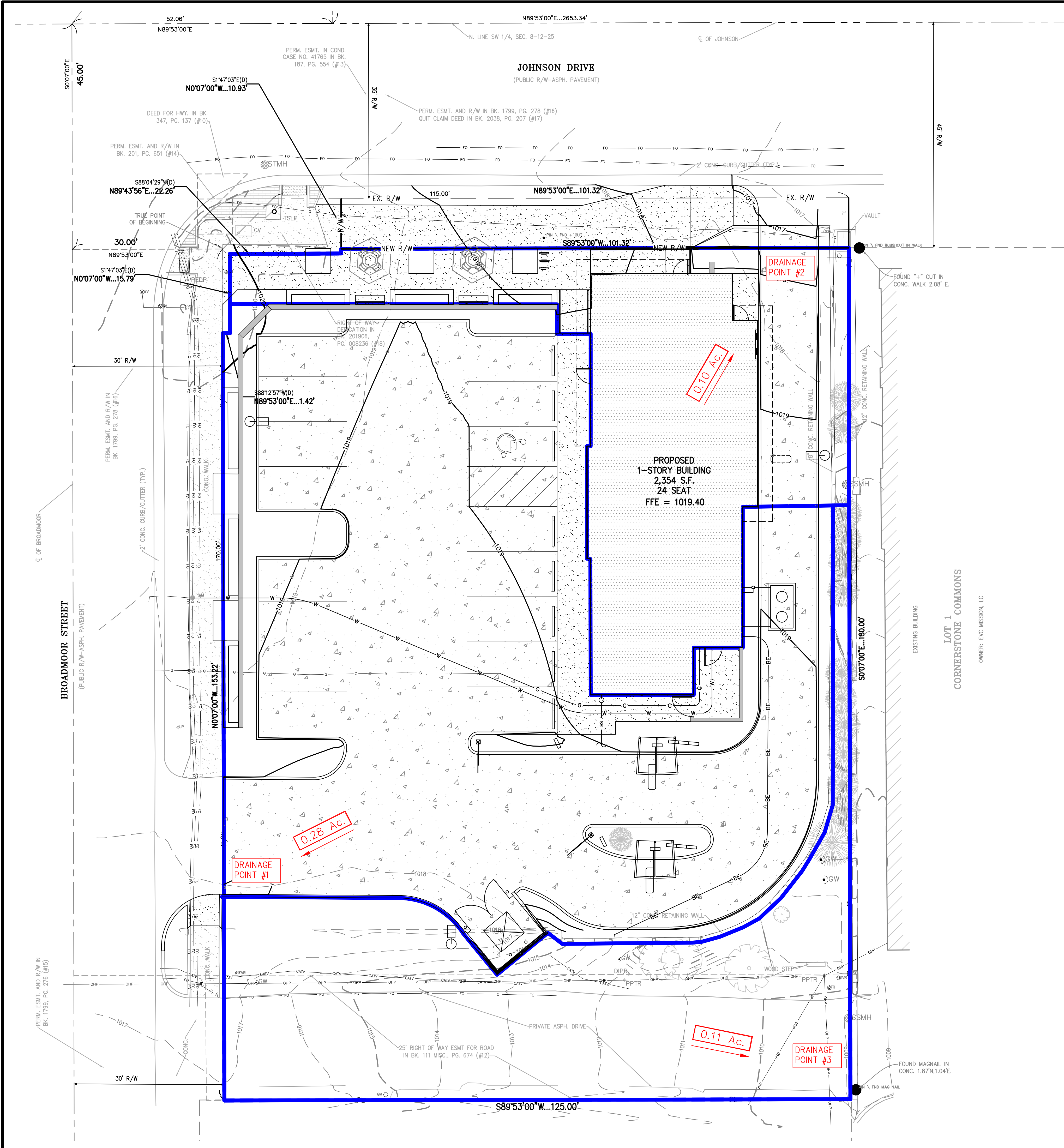


UTILITY NOTES:
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<p>PHELPS ENGINEERING, INC. 1370 N. Winchester Olathe, Kansas 66061 (913) 993-1155 Fax: (913) 993-1165 www.phelpsengineering.com</p>	<p>PLANNING ENGINEERING IMPLEMENTATION</p>	<p>EXISTING DRAINAGE MAP POPEYE'S LOUISIANA KITCHEN 6821 JOHNSON DRIVE MISSION, KANSAS 66202</p>								
<p>PROJECT NO. 230228 DATE: 05-11-2023 DRAWN: AEB CHECKED: DAF APPROVED: JOC CARRIER OF AUTHORIZATION LAND SURVEYING - LS-82 ENGINEERING - E-91 CARRIER OF AUTHORIZATION LAND SURVEYING - 260701028 ENGINEERING - 260705028</p>	<p>Revisions:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>No.</th> <th>Date</th> <th>By</th> <th>App.</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	No.	Date	By	App.					<p>SHEET B1</p>
No.	Date	By	App.							

\\PHELPS-SERVER\Projects\1\230228\Stormwater\Exhibits\Proposed Drainage E2.dwg Layout: A2 Oct 30, 2023 - 4:14pm Daniel Finn



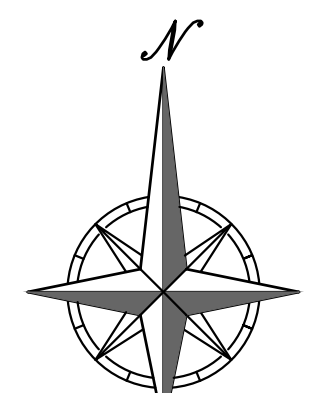
LEGEND

- PL — PROPERTY LINE
- - - LOT LINE
- - - R/W - - RIGHT-OF-WAY
- DRAINAGE BOUNDARY



Know what's below.
Call before you dig.

UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN.
UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.



SCALE: 1" = 10'

PROJECT NO.	No.	Date	Revisions:	By	App.
230228					
DATE: 05-11-2023					
CHECKER: DAF					
DATE OF AUTHORIZATION					
CERTIFICATE OF AUTHORIZATION					
LAND SURVEYING - LS-82					
ENGINEERING - E-91					
CERTIFICATE OF AUTHORIZATION					
LAND SURVEYING-200701028					
ENGINEERING-200700208					

SHEET
B2

PROPOSED DRAINAGE MAP
POPEYE'S LOUISIANA KITCHEN
6821 JOHNSON DRIVE
MISSION, KANSAS 66202

PHELPS ENGINEERING, INC.
1370 N. Winchester
Olathe, Kansas 66060
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PLANNING
ENGINEERING
IMPLEMENTATION

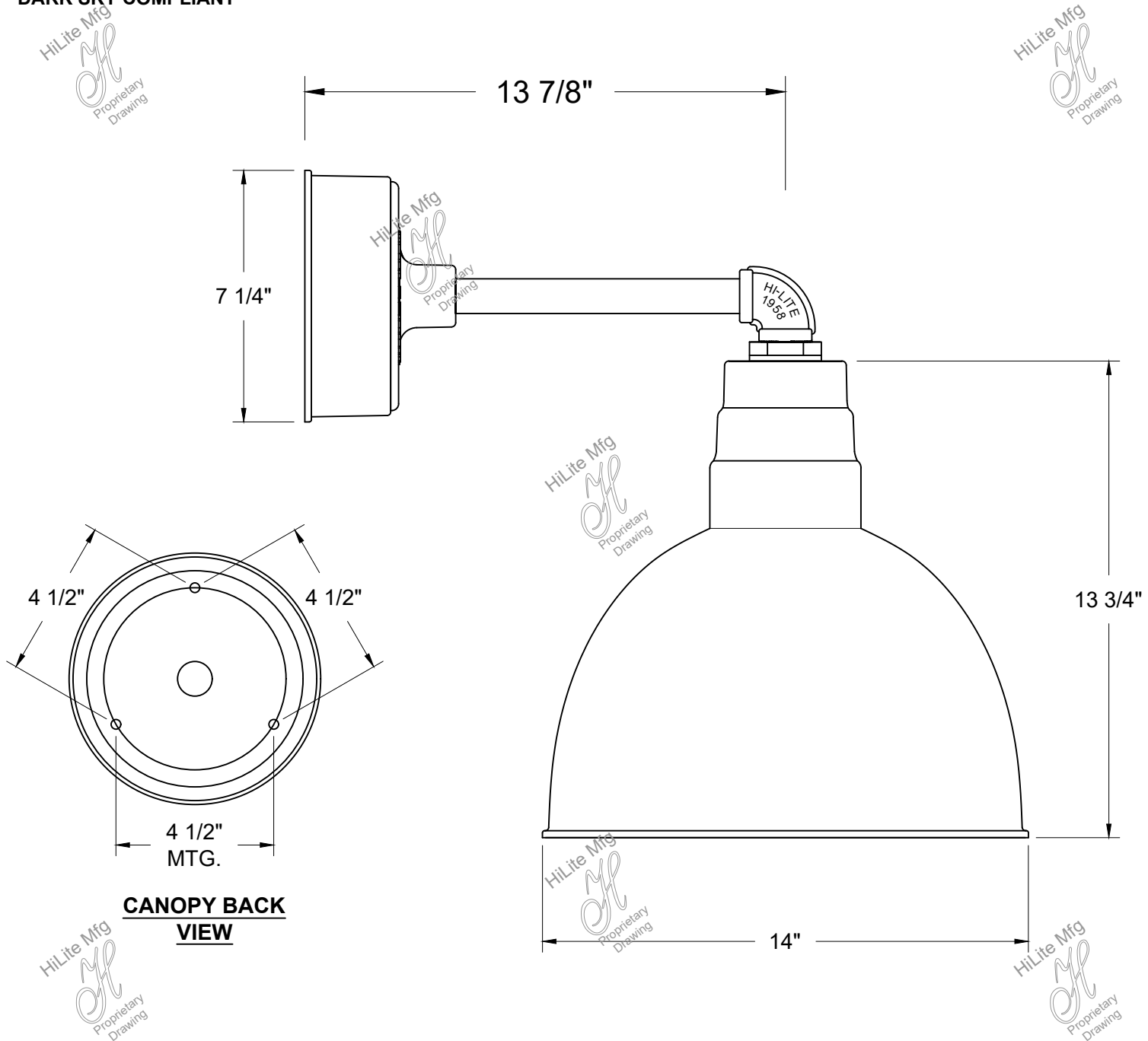


HI-LITE MFG. CO., INC.

13450 Monte Vista Avenue
 Chino, California 91710
 Telephone: (909) 465-1999
 Toll Free: (800) 465-0211
 Fax: (909) 465-0907
 www.hilitemfg.com

JOB NAME:		
SCALE: N.T.S.	DATE: 10/24/2023	TYPE:
DRAWN BY: B.A.-D	QTY:	REV:
SHEET:		

DARK SKY COMPLIANT



ETL Listed
 Suitable for WET Location

Item Number	Wattage	Voltage
H-HLPP644BL-LED4-WH	34W	120/277V

Finish
 93-White (Interior/Exterior of Shade & Arm)

Mounting
 Wall Mount

DEDICATED LED INFO
 34W LED4 4000 Lumens, 4000K
 Dimming ELV, Triac & 0/1-10v Dim
 Standard. Triac Dim will only work at
 120V



Catalog #: _____

Project: _____

Prepared By: _____

Date: _____

Mirada Small Area (MRS)

Outdoor LED Area Light



IP66 IK08



OVERVIEW

Lumen Package	6,000 - 24,000
Wattage Range	41 - 196
Efficacy Range (LPW)	112 - 156
Fixture Weight lbs (kg)	20 (9.1)

QUICK LINKS

[Ordering Guide](#)
[Performance](#)
[Photometrics](#)
[Dimensions](#)

FEATURES & SPECIFICATIONS

Construction

- Rugged die-cast aluminum housing contains factory prewired driver and optical unit. Cast aluminum wiring access door located underneath.
- Fixtures are finished with LSI's DuraGrip® polyester powder coat finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling. Other standard LSI finishes available. Consult factory.
- Shipping weight: 27 lbs in carton.

Optical System

- State-of-the-Art one piece silicone optic sheet delivers industry leading optical control with an integrated gasket to provide IP66 rated seal.
- Proprietary silicone refractor optics provide exceptional coverage and uniformity in distribution types 2, 3, 5W, and FT.
- Silicone optical material does not yellow or crack with age and provides a typical light transmittance of 93%.
- Zero uplight.
- Available in 5000K, 4000K, and 3000K color temperatures per ANSI C78.377
- Minimum CRI of 70.
- Integral louver (IL) and integral half louver (IH) options available for enhanced backlight control.

Electrical

- High-performance driver features over-voltage, under-voltage, short-circuit and over temperature protection.
- 0-10V dimming (10% - 100%) standard.
- Standard Universal Voltage (120-277 VAC) Input 50/60 Hz or optional High Voltage (347-480 VAC).
- L70 Calculated Life: >60k Hours
- Total harmonic distortion: <20%
- Operating temperature: -40°C to +50°C (-40°F to +122°F).
- Power factor: >.90
- Input power stays constant over life.
- Field replaceable 10kV surge protection device meets a minimum Category C Low operation (per ANSI/IEEE C62.41.2).
- High-efficacy LEDs mounted to metal-core circuit board to maximize heat dissipation
- Driver is fully encased in potting material for moisture resistance and complies with FCC standards. Driver and key electronic components can easily be accessed.

Controls

- Optional integral passive infrared Bluetooth™ motion and photocell sensor. Fixtures operate independently and can be commissioned via iOS or Android configuration app.
- LSI's AirLink™ wireless control system options reduce energy and maintenance costs while optimizing light quality 24/7.

Installation

- Designed to mount to square or round poles.
- A single fastener secures the hinged door, underneath the housing and provides quick & easy access to the electrical compartment.
- Included terminal block accepts up to 12 ga. wire.
- Utilizes LSI's traditional B3 drill pattern.

Warranty

- LSI luminaires carry a 5-year limited warranty. Refer to <https://www.lsicorp.com/resources/terms-conditions-warranty/> for more information.

Listings

- Listed to UL 1598 and UL 8750.
- Meets Buy American Act requirements.
- IDA compliant; with 3000K color temperature selection.
- Title 24 Compliant; see local ordinance for qualification information.
- Suitable for wet locations.
- IP66 rated Luminaire per IEC 60598-1.
- 3G rated for ANSI C136.31 high vibration applications are qualified.
- IK08 rated luminaire per IEC 66262 mechanical impact code
- DesignLights Consortium® Listings in progress.



ORDERING GUIDE

[Back to Quick Links](#)

TYPICAL ORDER EXAMPLE: MRS LED 18L SIL FT UNV DIM 40 70CRI ALBCS1 BLK IH

Prefix	Light Source	Lumen Package	Lens	Distribution	Orientation ²	Voltage	Driver
MRS - Mirada Small Area Light	LED	6L - 6,000 lms 9L - 9,000 lms 12L - 12,000 lms 15L - 15,000 lms 18L - 18,000 lms 21L - 21,000 lms 24L - 24,000 lms Custom Lumen Packages ¹	SIL - Silicone	2 - Type 2 3 - Type 3 5W - Type 5 Wide FT - Forward Throw	(blank) - standard L - Optics rotated left 90° R - Optics rotated right 90°	UNV - Universal Voltage (120-277V) HV - High Voltage (347-480V)	DIM - 0-10V Dimming (0-10%)

Color Temp	Color Rendering	Controls (Choose One)	Finish	Options
50 - 5,000 CCT 40 - 4,000 CCT 30 - 3,000 CCT	70CRI - 70 CRI	(Blank) - None Wireless Controls System ALSC - AirLink Synapse Control System ALSCS2 - AirLink Synapse Control System with 12-20' MH Motion Sensor ALSCS4 - AirLink Synapse Control System with 20-40' MH Motion Sensor ALBCS1 - AirLink Blue Wireless Motion & Photo Sensor Controller (8-24' MH) ALBCS2 - AirLink Blue Wireless Motion & Photo Sensor Controller (25-40' MH) Stand-Alone Controls EXT - 0-10V Dimming leads extended to housing exterior CR7P - 7 Pin Control Receptacle ANSI C136.41 ³ IMSBT1 - Integral Bluetooth™ Motion and Photocell Sensor (8-24' MH) ⁴ IMSBT2 - Integral Bluetooth™ Motion and Photocell Sensor (25-40' MH) ⁴	BLK - Black BRZ - Dark Bronze GMG - Gun Metal Gray GPT - Graphite MSV - Metallic Silver PLP - Platinum Plus SVG - Satin Verde Green WHT - White	(Blank) - None IH - Integral Half Louver (Moderate Spill Light Cutoff) ² IL - Integral Louver (Sharp Spill Light Cutoff) ²



Need more information?
Click here for our glossary

Have additional questions?
Call us at (800) 436-7800



Accessory Ordering Information⁵

CONTROLS ACCESSORIES		MOUNTING ACCESSORIES	
Description	Order Number	Description	Order Number ⁶
Twist Lock Photocell (120V) for use with CR7P	122514	Universal Mounting Bracket	684616CLR
Twist Lock Photocell (208-277) for use with CR7P	122515	Adjustable Slip Fitter (2" - 2 3/8" Tenon)	688138CLR
Twist Lock Photocell (347V) for use with CR7P	122516	Horizontal Slip Fitter (2" - 2 3/8" Tenon)	652761CLR
Twist Lock Photocell (480V) for use with CR7P	1225180	Quick Mount Pole Bracket (Square Pole)	687073CLR
AirLink 5 Pin Twist Lock Controller	661409	Quick Mount Pole Bracket (4-5" Round Pole)	689903CLR
AirLink 7 Pin Twist Lock Controller	661410	15 Tilt Quick Mount Pole Bracket (Square Pole)	688003CLR
Pole-Mounted Occupancy Sensor (24V)	663284CLR ⁶	15 Tilt Quick Mount Pole Bracket (4-5" Round Pole)	689905CLR
Shorting Cap for use with CR7P	149328	Wall Mount Bracket	382132CLR

FUSING OPTIONS ⁷	
Description	Order Number
Single Fusing (120V)	See Fusing Accessory Guide
Single Fusing (277V)	
Double Fusing (208V, 240V)	
Double Fusing (480V)	
Double Fusing (347V)	

SHIELDING OPTIONS	
Mirada Small	See Shielding Guide
Mirada Medium	
Mirada Large	
Zone Medium	
Zone Large	
Slice Medium	

SHIELDING & MISCELLANEOUS ACCESSORIES	
Description	Order Number
Field Install Integral Louver (Sharp Spill Light Cutoff)	690981
Field Install Integral Half Louver (Moderate Spill Light Cutoff)	743415
10' Linear Bird Spike Kit (2" Recommended per Luminaire)	751632

FOOTNOTES:

1. Custom lumen and wattage packages available, consult factory. Values are within industry standard tolerances but not DLC listed.
2. Not available on "Type 5W" distribution.
3. Control device or shorting cap must be ordered separately. See Accessory Ordering Information.
4. IMSBT is field configurable via the LSI app that can be downloaded from your smartphone's native app store.
5. Accessories are shipped separately and field installed.
6. "CLR" denotes finish. See Finish options.
7. Fusing must be located in hand hole of pole. See [Fusing Accessory Guide](#) for compatibility.



ACCESSORIES

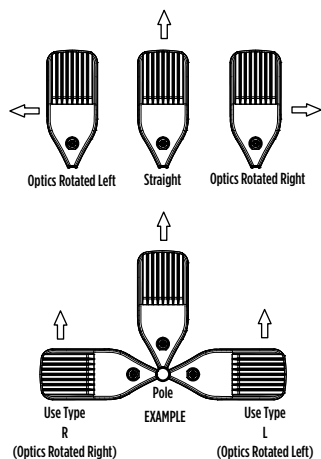
[Back to Quick Links](#)

MOUNTING ACCESSORIES		SHIELDING, POLES & MISC. ACCESSORIES		
Side Arm	Universal Mounting Bracket Mounts to ≥ 3" square or round (tapered/straight) poles with (2) mounting hole spaces between 3.5" to 5" Part Number: BKA UMB CLR		Shielding Integral Louver Field Install Integral Louver provides maximum backlight control by shielding each individual row of LEDs Part Number: 686485 Integral Half Louver Field Install Integral Half Louver provides great backlight control without impacting front side distribution. Part Number: 743416 External Shield External shield blocks view of light source from any side of luminaire, additional shielding configurations available Part Number: 785970BLK (3") / 785962BLK (6")	
	Quick Mount Plate True one person installation to existing/new construction poles with hole spaces between 2.4 to 4.6" Part Number: BKS PQM B3B5 XX CLR			
	15° Tilt Quick Mount Plate True one person installation to existing/new construction poles with hole spaces between 2.4 to 4.6" Part Number: BKS PQ15 B3B5 XX CLR			
Tenon / Slipfitter	Adjustable Slipfitter Mounts onto a 2" (51mm) IP, 2.375" (60mm) O.D. tenon and provides 180° of tilt (max 45° above horizontal) Part Number: BKA ASF CLR		Poles Square Poles 14 - 39' steel and aluminum poles in 4", 5" and 6" sizes for retrofit and new construction Part Number: 45Q/55Q/65Q Round Poles 10 - 30' steel and aluminum poles in 4" and 5" sizes for retrofit and new construction Part Number: 4RP/5RP Tapered Poles 20' - 39' steel and aluminum poles for retrofit and new construction Part Number: RTP	
	Square Tenon Top Mounts onto a 2" (51mm) IP, 2.375" (60mm) O.D. tenon and allows for mounting up to 4 luminaires Part Number: BKA XNM *			
	Square Internal Slipfitter Mounts inside 4" or 5" square pole and allows for mounting up to 4 luminaires Part Number: BKA X_ISF * CLR			
Wall Mount / Wood Pole	Wall Mount Bracket Mounts onto vertical wall surface (hardware/anchors not included) Part Number: BKS XBO WM CLR		Misc. Bird Spikes 10' Linear Bird Spike Kit, 4" recommended per luminaire, includes silicone adhesive and application tool Part Number: 751632	
	Wood Pole Bracket Mounts onto wooden poles (6" minimum OD, hardware/anchors not included) Part Number: BKS XBO WP CLR			

Replace CLR with paint finish description
 Replace XX with SQ for square pole or RD for round pole (≥3" OD)
 Replace * with S (Single), D180 (Double @180°), D90 (Double @90°), T90 (Triple), Q90 (Quad)
 Replace _ with 4 (4" square pole) or 5 (5" square pole)

OPTICS ROTATION

Top View



ACCESSORIES/OPTIONS

Integral Louver (IL) and House-Side Shield (IH)

Accessory louver and shield available for improved backlight control without sacrificing street side performance. LSI's Integral Louver (L) and Integral House-Side Shield (IH) options deliver backlight control that significantly reduces spill light behind the poles for applications with pole locations close to adjacent properties. The design maximizes forward reflected light while reducing glare, maintaining the optical distribution selected, and most importantly eliminating light trespass. Both options rotate with the optical distribution.

Luminaire Shown with Integral Louver (IL)



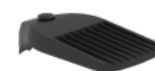
Luminaire Shown with IMSBT Option



7 Pin Photoelectric Control

7-pin ANSI C136.41-2013 control receptacle option available for twist lock photocontrols or wireless control modules. Control accessories sold separately. Dimming leads from the receptacle will be connected to the driver dimming leads (Consult factory for alternate wiring).

Luminaire Shown with CR7P



PERFORMANCE

[Back to Quick Links](#)

DELIVERED LUMENS*												
Lumen Package	Distribution	CRI	3000K CCT			4000K CCT			5000K CCT			Wattage
			Delivered Lumens	Efficacy	BUG Rating	Delivered Lumens	Efficacy	BUG Rating	Delivered Lumens	Efficacy	BUG Rating	
6L	2	70	6045	148	B2-U0-G1	6268	154	B2-U0-G1	6253	153	B2-U0-G1	41
	3		6145	151	B1-U0-G2	6372	156	B1-U0-G2	6357	156	B1-U0-G2	
	5W		5812	142	B3-U0-G1	6,026	148	B3-U0-G1	6012	147	B3-U0-G1	
	FT		5947	146	B1-U0-G1	6166	151	B1-U0-G1	6152	151	B1-U0-G1	
9L	2	70	9091	145	B2-U0-G2	9484	152	B2-U0-G2	9462	151	B2-U0-G2	63
	3		9241	148	B2-U0-G2	9641	154	B2-U0-G2	9619	154	B2-U0-G2	
	5W		8740	140	B3-U0-G2	9,118	146	B3-U0-G2	9097	144	B3-U0-G2	
	FT		8943	143	B2-U0-G2	9330	149	B2-U0-G2	9308	149	B2-U0-G2	
12L	2	70	12132	141	B3-U0-G2	12685	148	B3-U0-G2	12514	146	B3-U0-G2	86
	3		12333	143	B2-U0-G2	12894	150	B2-U0-G2	12721	148	B2-U0-G2	
	5W		11664	136	B4-U0-G2	12195	142	B4-U0-G2	12031	140	B4-U0-G2	
	FT		11935	139	B2-U0-G2	12479	145	B2-U0-G2	12311	143	B2-U0-G2	
15L	2	70	14220	128	B3-U0-G2	15167	137	B3-U0-G2	14488	131	B3-U0-G2	111
	3		14938	135	B2-U0-G2	15933	144	B2-U0-G2	15219	137	B2-U0-G2	
	5W		14304	129	B4-U0-G2	15257	137	B4-U0-G2	14574	131	B4-U0-G2	
	FT		14342	129	B2-U0-G2	15297	138	B2-U0-G2	14612	132	B2-U0-G2	
18L	2	70	16438	122	B3-U0-G3	17532	130	B3-U0-G3	16747	124	B3-U0-G3	135
	3		17267	128	B3-U0-G3	18417	137	B3-U0-G3	17592	131	B3-U0-G3	
	5W		16535	123	B4-U0-G2	17636	133	B5-U0-G3	16846	125	B4-U0-G2	
	FT		16578	123	B3-U0-G3	17682	131	B3-U0-G3	16890	125	B3-U0-G3	
21L	2	70	19488	118	B3-U0-G3	20786	126	B3-U0-G3	19885	120	B3-U0-G3	165
	3		20472	124	B3-U0-G3	21835	132	B3-U0-G3	20857	126	B3-U0-G3	
	5W		19604	119	B5-U0-G3	20,909	126	B5-U0-G3	19973	121	B5-U0-G3	
	FT		19655	119	B3-U0-G3	20964	127	B3-U0-G3	20025	121	B3-U0-G3	
24L	2	70	21976	112	B3-U0-G3	23439	120	B3-U0-G3	22390	114	B3-U0-G3	196
	3		23085	118	B3-U0-G3	24622	126	B3-U0-G3	23519	120	B3-U0-G3	
	5W		22105	113	B5-U0-G3	23578	120	B5-U0-G3	22522	115	B5-U0-G3	
	FT		22164	113	B3-U0-G3	23640	121	B3-U0-G3	22581	115	B3-U0-G3	

*LEDs are frequently updated therefore values are nominal.

ELECTRICAL DATA (AMPS)*						
Lumens	120V	208V	240V	277V	347V	480V
6L	0.34	0.20	0.17	0.15	0.12	0.09
9L	0.52	0.30	0.26	0.23	0.18	0.13
12L	0.72	0.41	0.36	0.31	0.25	0.18
15L	0.93	0.53	0.46	0.40	0.32	0.23
18L	1.12	0.65	0.56	0.49	0.39	0.28
21L	1.38	0.80	0.69	0.60	0.48	0.34
24L	1.63	0.94	0.82	0.71	0.56	0.41

*Electrical data at 25°C (77°F). Actual wattage may differ by +/-10%

RECOMMENDED LUMEN MAINTENANCE ¹					
Ambient Temp	Lumen Multiplier				
	0 hrs. ²	25K hrs. ²	50K hrs. ²	75K hrs. ³	100K hrs. ³
0 C - 25 C	100%	95%	89%	84%	79%
40 C	100%	94%	87%	80%	74%

FOOTNOTES:

- Lumen maintenance values at 25°C are calculated per TM-21 based on LM-80 data and in-situ luminaire testing.
- In accordance with IESNA TM-21-11, Projected Values represent interpolated value based on time durations that are within six times (6X) the IESNA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip).
- In accordance with IESNA TM-21-11, Calculated Values represent time durations that exceed six times NA LM-80-08 total test duration (in hours) for the device under testing ((DUT) i.e. the packaged LED chip).



PHOTOMETRICS

[Back to Quick Links](#)

Luminaire photometry has been conducted by an accredited laboratory in accordance with IESNA LM-79. As specified by IESNA LM-79 the entire luminaire is tested as the source resulting in a luminaire efficiency of 100%.

MRS-LED-18L-SIL-2-40-70CRI

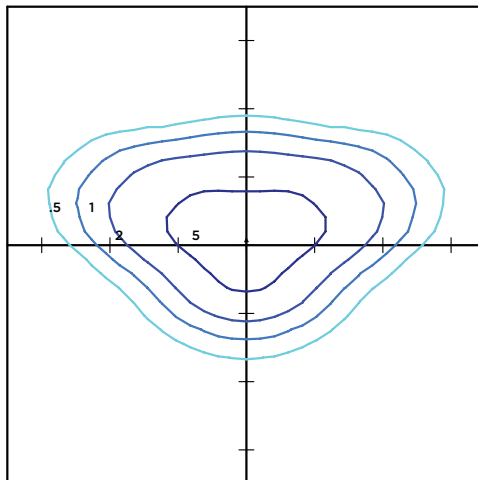
LUMINAIRE DATA

Type 2 Distribution	
Description	4000 Kelvin, 70 CRI
Delivered Lumens	17,532
Watts	135
Efficacy	130
IES Type	Type II - Short
BUG Rating	B3-U0-G3

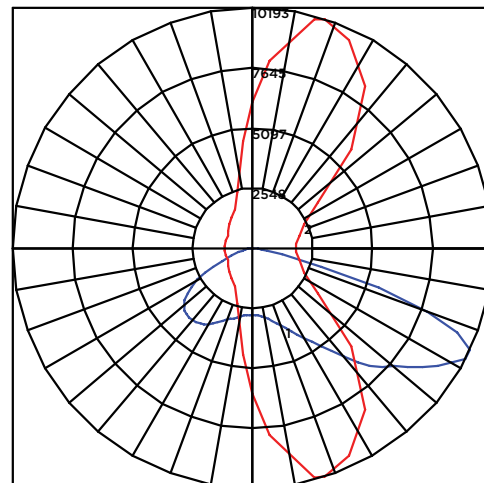
Zonal Lumen Summary

Zone	Lumens	%Luminaire
Low (0-30)°	2831	16%
Medium (30-60)°	10310	59%
High (60-80)°	4208	24%
Very High (80-90)°	184	1%
Uplight (90-180)°	0	0%
Total Flux	17532	100%

ISO FOOTCANDLE



POLAR CURVE



20' Mounting Height/20' Grid Spacing

■ 5 FC ■ 2 FC ■ 1 FC ■ 0.5 FC

MRS-LED-18L-SIL-3-40-70CRI

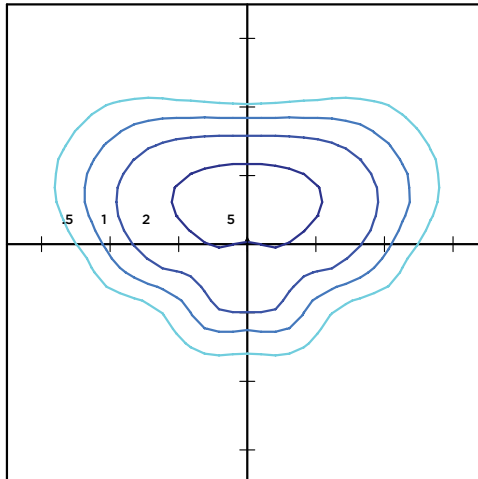
LUMINAIRE DATA

Type 3 Distribution	
Description	4000 Kelvin, 70 CRI
Delivered Lumens	18,417
Watts	135
Efficacy	137
IES Type	Type III - Short
BUG Rating	B3-U0-G3

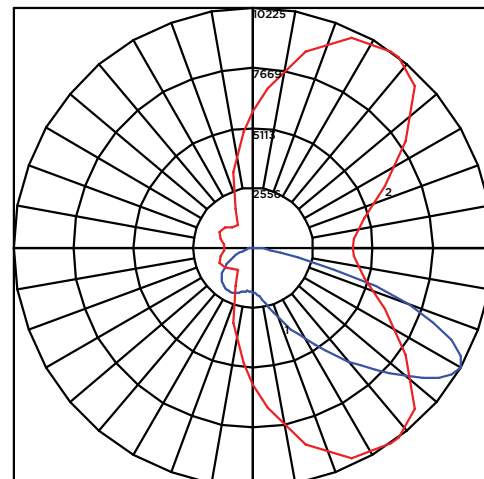
Zonal Lumen Summary

Zone	Lumens	%Luminaire
Low (0-30)°	2329	13%
Medium (30-60)°	10634	61%
High (60-80)°	5246	30%
Very High (80-90)°	208	1%
Uplight (90-180)°	0	0%
Total Flux	18417	100%

ISO FOOTCANDLE



POLAR CURVE



20' Mounting Height/20' Grid Spacing

■ 5 FC ■ 2 FC ■ 1 FC ■ 0.5 FC

Mirada Small Area Light (MRS)

Type: _____

 Have questions? Call us at (800) 436-7800

PHOTOMETRICS (CONT)

[Back to Quick Links](#)

MRS-LED-18L-SIL-FT-40-70CRI

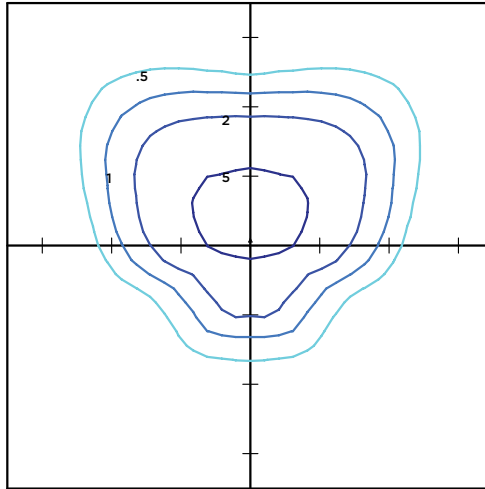
LUMINAIRE DATA

Type FT Distribution	
Description	4000 Kelvin, 70 CRI
Delivered Lumens	17,682
Watts	135
Efficacy	131
IES Type	Type III - Short
BUG Rating	B3-U0-G2

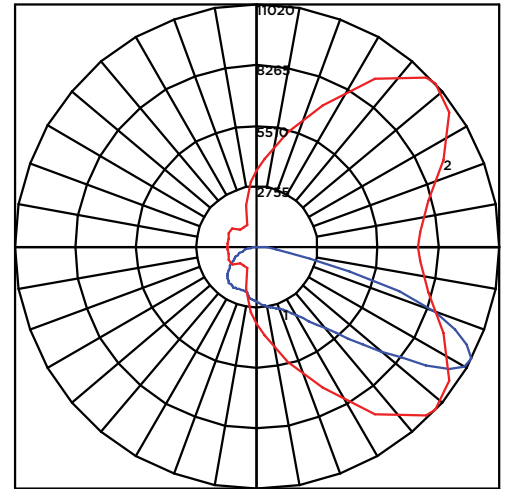
Zonal Lumen Summary

Zone	Lumens	%Luminaire
Low (0-30)°	2255	13%
Medium (30-60)°	9463	54%
High (60-80)°	5696	32%
Very High (80-90)°	268	2%
Uplight (90-180)°	0	0%
Total Flux	17682	100%

ISO FOOTCANDLE



POLAR CURVE



20' Mounting Height/20' Grid Spacing

■ 5 FC ■ 2 FC ■ 1 FC ■ 0.5 FC

MRM-LED-30L-SIL-5W-40-70CRI

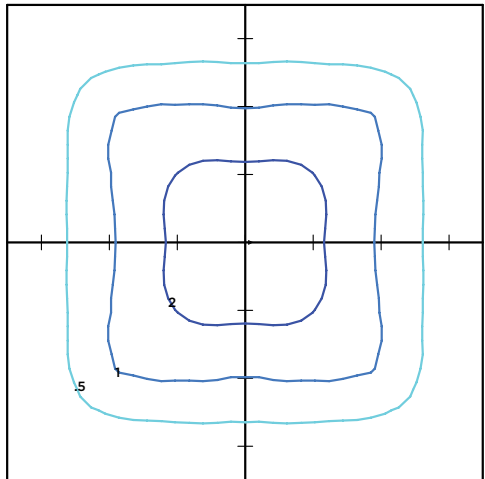
LUMINAIRE DATA

Type 5W Distribution	
Description	4000 Kelvin, 70 CRI
Delivered Lumens	17,636
Watts	135
Efficacy	131
IES Type	Type VS - Short
BUG Rating	B4-U0-G2

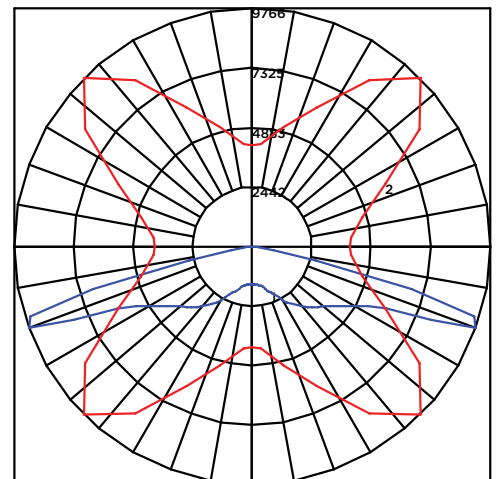
Zonal Lumen Summary

Zone	Lumens	%Luminaire
Low (0-30)°	1646	9%
Medium (30-60)°	7453	43%
High (60-80)°	8405	48%
Very High (80-90)°	132	1%
Uplight (90-180)°	0	0%
Total Flux	17636	100%

ISO FOOTCANDLE



POLAR CURVE



20' Mounting Height/20' Grid Spacing

■ 5 FC ■ 2 FC ■ 1 FC ■ 0.5 FC



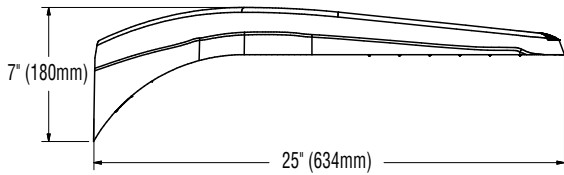
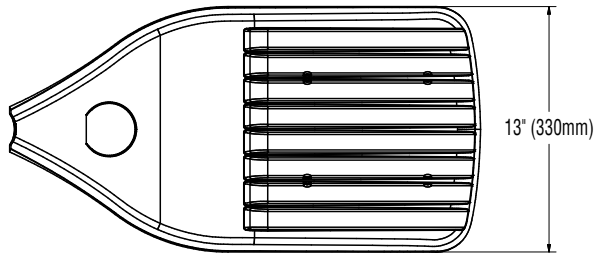
Mirada Small Area Light (MRS)







Type: _____

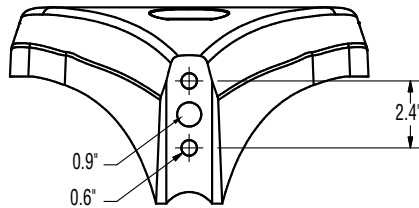
 Have questions? Call us at (800) 436-7800

PRODUCT DIMENSIONS

[Back to Quick Links](#)



LUMINAIRE EPA CHART - MRS					LUMINAIRE EPA CHART - MRS				
Tilt Degree		0°	30°	45°	Tilt Degree		0°	30°	45°
	Single	0.5	1.3	1.8		T90°	1.4	2.3	2.6
	D180°	0.9	1.3	1.8		TN120°	1.4	1.9	2.3
	D90°	0.9	1.8	2.2		Q90°	1.4	2.3	2.6



B3 Drill Pattern

CONTROLS

AirLink Wireless Lighting Controller

The AirLink integrated controller is a California Title 24 compliant lighting controller that provides real-time light monitoring and control with utility-grade power monitoring. It includes a 24V sensor input and power supply to connect a sensor into the outdoor AirLink wireless lighting system. The wireless integrated controller is compatible with this fixture.

[Click here to learn more about AirLink.](#)

Integral Bluetooth™ Motion and Photocell Sensor (IMSBT)

Slim low profile sensor provides multi-level control based on motion and/or daylight. Sensor controls 0-10 VDC LED drivers and is rated for cold and wet locations (-30° C to 70° C). Two unique PIR lenses are available and used based on fixture mounting height. All control parameters are adjustable via an iOS or Android App capable of storing and transmitting sensor profiles.

[Click here to learn more about IMSBT.](#)

AirLink Blue

Wireless Bluetooth Mesh Outdoor Lighting Control System that provides energy savings, code compliance and enhanced safety/security for parking lots and parking garages. Three key components; Bluetooth wireless radio/sensor controller, Time Keeper and an iOS App. Capable of grouping multiple fixtures and sensors as well as scheduling time-based events by zone. Radio/Sensor Controller is factory integrated into Area/Site, Wall Mounted, Parking Garage and Canopy luminaires.

[Click here to learn more about AirLink Blue.](#)





AT A GLANCE

Applicant:
CSM Groups, DBA Popeye's Louisiana
Kitchen

Location:
6821 Johnson Drive

Property ID:
KF251208-2052

Current Zoning:
C-2B

Proposed Zoning:
N/A

Current Land Use:
Drive-Through Restaurant/Vacant

Proposed Land Use:
N/A

N/A Public Hearing Required

Legal Notice:
N/A

Case Number:
23-24

Project Name:
Popeye's Final Plat

Project Summary:
The applicant proposes a dedication of additional right-of-way for public improvements on Johnson Drive.

Staff Contact:
Karie Kneller, Planner



PROPERTY BACKGROUND AND INFORMATION

The applicant, CSM Groups, dba Popeye's Louisiana Kitchen, has submitted an application for a final plat for the property located at 6821 Johnson Drive, on the southeast corner of Johnson Drive and Broadmoor Street. The preliminary plat was approved by the Planning Commission at its August 28, 2023 meeting and public hearing.

PROJECT PROPOSAL

The applicant proposes a replat of the former Popeye's drive-through restaurant site, with certain site improvements in the public right-of-way to meet the intent of the municipal code and Form Based Code overlay. Improvements include a widened pedestrian path, or pedestrian "plaza," and eliminating existing curb-cut on Johnson Drive. Park benches, pedestrian-scaled streetlights, and bike racks improve the pedestrian realm, and additional landscaping in the pedestrian right-of-way improves the walkability along Johnson Drive and Broadmoor Street.

PLAN REVIEW AND ANALYSIS

Mission Comprehensive Plan

The property lies within the FBC overlay district. The FBC takes precedence for development and performance standards over the municipal code for setback, height, architectural features, and priority of the pedestrian realm. The front and side street setbacks require a 0-to-10-foot setback, and the rear and side yard setbacks require a minimum of zero feet.

Analysis: The setbacks conform with the regulations set forth in the FBC. The right-of-way provided by the setback includes space for features that improve the pedestrian experience and attempt to meet the intent of the Comprehensive Plan.

Johnson Drive Design Guidelines

According to the requirements of the Johnson Drive Design Guidelines, sidewalks on Johnson Drive shall be a minimum of eight feet wide. Sidewalks on secondary streets such as Broadmoor shall be a minimum of five feet wide. Elements that enhance the pedestrian realm, including park benches, pedestrian-scaled streetlights, bike racks, and landscaping are required.

Analysis: The proposal provides an extended pedestrian "plaza" along Johnson Drive that will include outdoor seating, landscaping, street lighting, and bicycle amenities as part of the final development plan.

Municipal Code

Section 440.240 stipulates that following approval of the preliminary plat by the Planning Commission,

a final plat shall be considered by the Planning Commission and, upon approval, by the Governing Body for final approval. Section 440.260 stipulates that final plats shall be approved by the Planning Commission if it determines that:

1. The final plat substantially conforms to the approved preliminary plat
2. The plat conforms to all applicable requirements of the municipal code.
3. All submission requirements have been satisfied.
4. Approval of the final plat is affirmed by the majority of the Planning Commission.

RECOMMENDATION

Staff recommends that the Planning Commission vote to recommend approval of Case #23-24 Popeye's Final Plat.

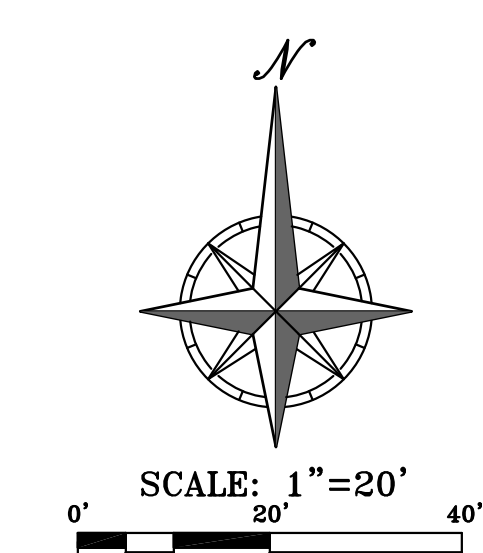
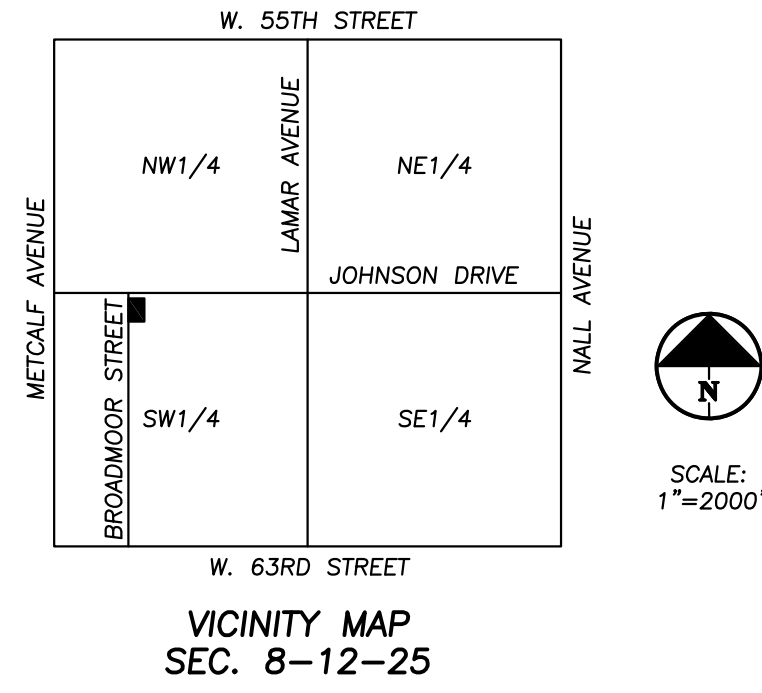
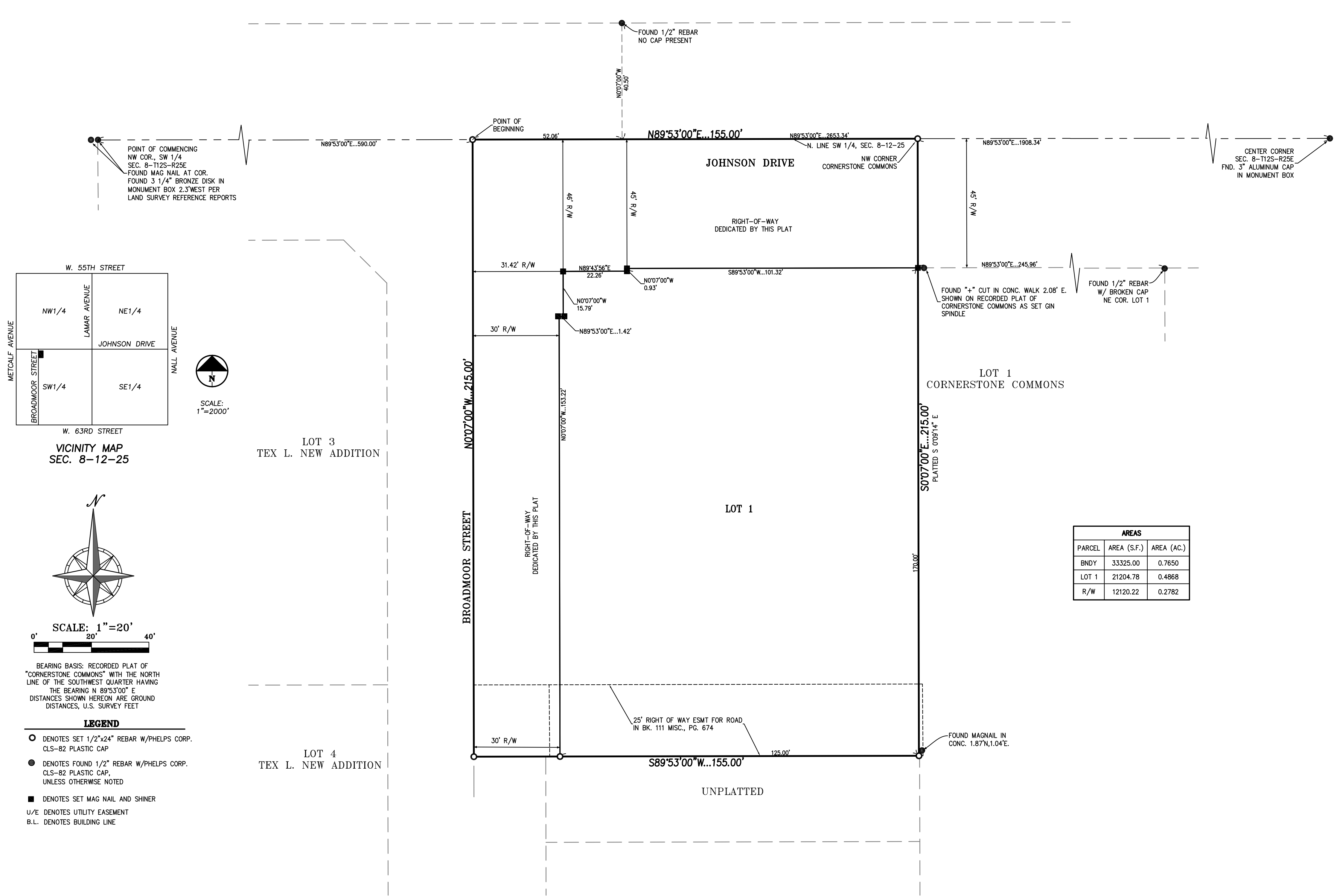
PLANNING COMMISSION ACTION

The Planning Commission will consider Case #23-24 Popeye's Final Plat at its November 27, 2023 meeting.

CITY COUNCIL ACTION

City Council will consider Case #23-24 at its December 20, 2023 meeting.

FINAL PLAT OF
POPEYE'S ON JOHNSON DRIVE
 A SUBDIVISION OF LAND IN THE SOUTHWEST QUARTER
 SECTION 8, TOWNSHIP 12 SOUTH, RANGE 25 EAST, IN THE
 CITY OF MISSION, JOHNSON COUNTY, KANSAS



BEARING BASIS: RECORDED PLAT OF "CORNERSTONE COMMONS" WITH THE NORTH LINE OF THE SOUTHWEST QUARTER HAVING THE BEARING N 89°53'00" E. DISTANCES SHOWN HEREON ARE GROUND DISTANCES, U.S. SURVEY FEET.

LEGEND

- DENOTES SET 1/2"x24" REBAR W/PHELPS CORP. CLS-82 PLASTIC CAP
- DENOTES FOUND 1/2" REBAR W/PHELPS CORP. CLS-82 PLASTIC CAP, UNLESS OTHERWISE NOTED
- DENOTES SET MAG NAIL AND SHINER
- U/E DENOTES UTILITY EASEMENT
- B.L. DENOTES BUILDING LINE

AREAS		
PARCEL	AREA (S.F.)	AREA (AC.)
BNDY	33325.00	0.7650
LOT 1	21204.78	0.4868
R/W	12120.22	0.2782

DESCRIPTION

All that part of the Southwest Quarter of Section 8, Township 12 South, Range 25 East, in the City of Mission, Johnson County, Kansas, being more particularly described by Scott G Chrisman, LS-1306, on June 19, 2023, for project 230238, as follows:

Commencing at the Northwest corner of the Southwest Quarter of said Section 8; thence N 89°53'00" E, along the North line of said Southwest Quarter of said Section 8, a distance of 590.00 feet, to the point of intersection of the North line of the Southwest Quarter of said Section 8, and the centerline of Broadmoor Street, as now established, said point also being the Point of Beginning; thence, continuing along said North line, N 89°53'00" E, a distance of 155.00 feet, to the Northwest corner of CORNERSTONE COMMONS, a platted subdivision of land in the City of Mission, Johnson County, Kansas; thence S 0°07'00" E, a distance of 215.00 feet; thence S 89°53'00" W, a distance of 155.00 feet, to a point on the centerline of Broadmoor Street, as now established; thence N 0°07'00" W, along said centerline of said Broadmoor Street, a distance of 215.00 feet, to the Point of Beginning, containing 0.7650 acres, more or less, of unplatted land.

DEDICATION

The undersigned proprietors of the above described tract of land have caused the same to be subdivided in the manner shown on the accompanying plat, which subdivision and plat shall hereafter be known as "POPEYE'S ON JOHNSON DRIVE".

The undersigned proprietor of said property shown on this plat does hereby dedicate over, under, and through all parcels and parts of land indicated on said plat as streets, terraces, places, roads, drives, lanes, parkways and avenues not heretofore dedicated, a perpetual easement for the purpose of constructing, using, replacing, and maintaining public roadways, public ways and thoroughfares, including storm sewer, street lighting, sidewalks, trails, and appurtenant work in any part of the easement, including the right to clean, repair, maintain and replace the roadway, and for any future expansion of such facilities within the area of the easement together with the right of access to the easement and over the easement for these purposes. Where prior easement rights have been granted to any person, utility or corporation on said parts of the land so dedicated, and any pipes, lines, poles and wires, conduits, ducts or cables heretofore installed thereupon and therein are required to be relocated, in accordance with proposed improvements as now set forth, the undersigned proprietor hereby absolves and agrees to indemnify the City of Mission, Kansas, from any expense incident to the relocation of any such existing utility installations within said prior easement.

CONSENT TO LEVY

The undersigned proprietors of the above described land hereby agree and consents that the Board of County Commissioners of Johnson County, Kansas, and the City of Overland Park, Johnson County, Kansas, shall have the power to release such land proposed to be dedicated for public ways and thoroughfares, or parts thereof, for public use, from the lien and effect of any special assessment, and that the amount of unpaid special assessments on such land so dedicated, shall become and remain a lien on the remainder of this land fronting or abutting on such dedicated public ways or thoroughfares.

EXECUTION

IN TESTIMONY WHEREOF, undersigned proprietors has caused this instrument to be executed on this _____ day of _____, 20____.

CSM GROUP

By: _____
 Felix Zamilkovsky, Member

ACKNOWLEDGEMENT

STATE OF KANSAS)
) SS
 COUNTY OF JOHNSON)

BE IT REMEMBERED that on this _____ day of _____, 20____, before me, the undersigned, a Notary Public in and for said County and State, came Felix Zamilkovsky, Member of, CSM Group, who is personally known to me to be such person who executed, as such officer, the within instrument on behalf of said company, and such person duly acknowledged the execution of the same to be the act and deed of the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year last above written.

Notary Public: _____ My Appointment Expires: _____

Print Name: _____

APPROVALS

Approved by the Planning Commission of the City of Mission, Johnson County, Kansas, this _____ day of _____, 20____.

Chairman: Mike Lee Planning Commission Secretary: Kimberly Steffens

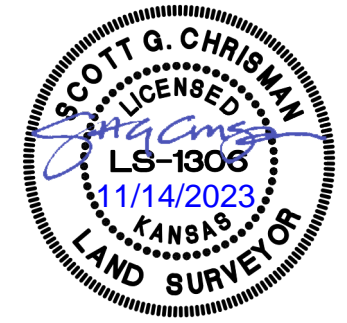
Approved by the Governing Body of the City of Overland Park, Kansas, this _____ day of _____, 20____.

Mayor: Solana Flora Attest: _____ City Clerk: Robyn Fulks

FLOOD NOTE:
 THIS PROPERTY LIES WITHIN ZONE X, DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE CITY OF MISSION, COMMUNITY NO. 200170, JOHNSON COUNTY, KANSAS, MAP NO. 20091C00236, AND DATED AUGUST 3, 2009.

TITLE NOTE:
 TITLE INFORMATION SHOWN HEREON WAS TAKEN FROM CHICAGO TITLE INSURANCE COMPANY COMMITMENT FOR TITLE INSURANCE NO. KC230901 DATED APRIL 11, 2023 AT 08:00 A.M.

I, SCOTT G. CHRISMAN, HEREBY CERTIFY THAT IN APRIL 2023, I OR SOMEONE UNDER MY DIRECT SUPERVISION HAVE MADE A SURVEY OF THE ABOVE DESCRIBED TRACT OF LAND AND THE RESULTS OF SAID SURVEY ARE CORRECTLY REPRESENTED ON THIS PLAT.



CERTIFICATE OF AUTHORIZATION
 KANSAS
 LAND SURVEYING - LS-82
 ENGINEERING - E-301
 MISSOURI
 CERTIFICATE OF AUTHORIZATION
 LAND SURVEYING-200700128
 ENGINEERING-200700208

PEI PLANNING ENGINEERING IMPLEMENTATION

1270 N. Winchester
 Olathe, Kansas 66061
 (913) 393-1155
 Fax (913) 393-1166

PHELPS ENGINEERING, INC.