# 6601 & 6625 COLORADO BLVD ZONE CHANGE APPLICATION - SITE DEVELOPMENT PLAN

#### **LIST OF EXHIBITS:**

**Exhibit A:** Zone Change Narrative

Exhibit B: PUD

**Exhibit C:** Material Board

**Exhibit D:** Preliminary Drainage Report

**Exhibit E:** Traffic Impact Study

#### **EXHIBIT A**

**Zone Change Narrative** 



November 4, 2022 11/4/2022

City of Commerce City Planning Department 7887 E 60<sup>th</sup> Ave Commerce City, CO 80022

RE: 6601 Colorado Boulevard Zone Change

This project narrative has been prepared to address the PUD Development Permit requirements set forth by the City for a zone change to the subject property located at 6601 Colorado Boulevard. Through the Zone change and the PUD DP processes, the team aims to convert the 11.55 Acre site from agricultural use (AG) to Light Industrial (I-1).

The property is currently being used primarily for vehicular storage. In additional, there are three single family residential buildings and small storage buildings on the property. A majority of the site is either open field area or gravel covered storage areas. Trees, shrubs, and other landscaped areas can be found throughout the site.

Adjacent properties to the north and south are zoned as various density industrial areas (I-1 through I-3) and the agricultural zoning limits the usability and value of the site. Per City GIS, the future land use for the site is noted as general industrial. As such, the property owner intends to complete a zone change to enable the future construction of a trucking terminal.

The Development Permit provides a generalized industrial building adhering to setback, sizing, and height requirements as laid out by City development code. West of the building and the paved parking areas, a gravel storage yard that can facilitate a variety of industrial uses is proposed. Two access points are shown along the Colorado Boulevard frontage. Of the entry points, the larger, 30 ft wide access path along the south property edge serves as the main means for truck and trailer circulation on the site to the gravel lot. No specific truck maneuvering pathways or parking are proposed for the gravel lot since specific uses of the site aren't known at this time.

Given no current arrangements for a future tenant, no anticipated vehicular/delivery activity has been estimated. Furthermore, no anticipated employee count or hours of operation are proposed under the Rezone or Development Permit. The aim of this permit is to enhance the value of the site by having an approved Development Permit in hand to enhance the speed and ease in which an industrial tenant can begin construction and occupy the site.



#### **EXHIBIT B**

PUD

# LOT 1, CLAIRE AND ALYSSA INDUSTRIAL SUBDIVISION

A PARCEL OF LAND SITUATED IN THE SOUTHEAST 1/4 OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M. COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO

# PLANNED UNIT DEVELOPMENT PERMIT

## LIST OF CONTACTS

WATER & SANITARY SEWER APPLICANT/DEVELOPER 6601 COLORADO HOLDING, LLC 6860 S. YOSEMITE COURT, SUITE 200 SOUTH ADAMS COUNTY WATER & SANITATION DISTRICT DC FACILITY 10200 E 102ND AVE HENDERSON, CO 80022 CENTENNIAL, CO 80112 TEL: (970) 402–6918 CONTACT: KARL UMLAND TEL: (720) 506-0595 EMAIL: karl@coneglic.com GALLOWAY & COMPANY, INC. 5500 GREENWOOD PLAZA BLVD, SUITE 200 TEL: (303) 288-0835 GREENWOOD VILLAGE, COLORADO 80111 TEL: (303) 770-8884 FAX: (303) 770-3636 STORM SEWER CONTACT: JENNY ROMANO, P.E. CITY OF COMMERCE - PUBLIC WORKS EMAIL: jennyromano@gallowayus.com 8602 ROSEMARY STREET COMMERCE CITY, CO 80022 GALLOWAY & COMPANY, INC. 5500 GREENWOOD PLAZA BLVD, SUITE 200 ELECTRICAL GREENWOOD VILLAGE, COLORADO 80111 UNITED POWER TEL: (303) 770-8884 FAX: (303) 770-3636 500 COOPERATIVE WAY BRIGHTON, CO 80603 CONTACT: LISA METZGER, AIA TEL: (303) 269-8165 LANDSCAPE ARCHITECT GALLOWAY & COMPANY, INC. 500 COOPERATIVE WAY 5500 GREENWOOD PLAZA BLVD, SUITE 200 BRIGHTON, CO 80603 TEL: (303) 571-3306 GREENWOOD VILLAGE, COLORADO 80111 TEL: (303) 770-8884 FAX: (303) 770-3636 CONTACT: DAVE FOSTER EMAIL: davefoster@gallowayus.com

## DEVELOPMENT PLAN NOTES

LIGHTING NOTE: IN THE INTEREST OF COMPATIBILITY OF SURROUNDING LAND USES, ILLUMINATION OF ANY KIND ON PRIVATE PROPERTY SHALL BE DIRECTED AND CONTROLLED IN SUCH A MANNER SO THAT THERE SHALL BE NO DIRECT RAYS OF LIGHT WHICH EXTEND BEYOND THE BOUNDARIES OF THE PROPERTY FROM WHICH IT ORIGINATES.

TRASH ENCLOSURE NOTE: TRASH ENCLOSURES SHALL BE CONSTRUCTED TO A MINIMUM HEIGHT OF SIX (6) FEET AND OF THE SAME OR COMPLIMENTARY MATERIAL AND COLOR AS THE MAIN BUILDING.

SCREENING NOTE: ROOF MOUNTED ELECTRICAL AND MECHANICAL EQUIPMENT SHALL BE PLACED OR SCREENED SUCH THAT THE EQUIPMENT IS NOT VISIBLE FROM ANY POINT. SUCH EQUIPMENT SHALL BE SCREENED WITH THE SAME MATERIALS AND COLORS AS THE MAIN BUILDING.

SIGNAGE NOTE: APPROVAL OF A SIGN PERMIT IS REQUIRED IN ADDITION TO DEVELOPMENT PLAN APPROVAL. SIGN LOCATIONS SHOWN ON THE DEVELOPMENT PLAN WILL BE REVIEWED FOR POSSIBLE CONFLICTS WITH SIGHT TRIANGLES AND EASEMENTS. THESE SIGNS WILL NOT BE APPROVED BY THE DEVELOPMENT PLAN REVIEW PROCESS OR APPROVAL OF THIS DEVELOPMENT PLAN. ALL SIGNS MUST CONFORM TO THE CITY'S STANDARDS.

FENCING NOTE: APPROVAL OF A FENCE PERMIT IS REQUIRED IN ADDITION TO DEVELOPMENT PLAN APPROVAL. ALL FENCES MUST CONFORM TO THE CITY OF COMMERCE CITY'S FENCING REQUIREMENTS

**DOWNSPOUT NOTE:** NO ROOF DOWNSPOUT OUTFALLS WILL BE ALLOWED TO DRAIN OVER SIDEWALKS, BIKE PATHS, OR ANY OTHER PEDESTRIAN ROUTES.

AMERICANS WITH DISABILITIES NOTE: THE APPLICANT HAS THE OBLIGATION TO COMPLY WITH ALL APPLICABLE REQUIREMENTS OF THE AMERICAN DISABILITIES ACT. APPROVAL OF THIS DEVELOPMENT PLAN DOES NOT CONSTITUTE COMPLIANCE WITH THIS ACT.

CONSTRUCTION NOTE: THE APPROVAL OF THIS DEVELOPMENT PLAN DOES NOT CONSTITUTE FINAL APPROVAL OF GRADING, DRAINAGE, UTILITY, PUBLIC IMPROVEMENTS, AND BUILDING PLANS. THESE PLANS MUST BE REVIEWED AND APPROVED BY THE APPROPRIATE AGENCY PRIOR TO THE ISSUANCE OF BUILDING PERMITS.

UNDERGROUND UTILITY NOTE: ALL OVERHEAD UTILITIES SERVING THIS SITE MUST BE PLACED UNDERGROUND PER LAND DEVELOPMENT CODE.

## LIST OF ABBREVIATIONS

 $\Delta$  - DEFLECTION ANGLE L – LENGTH R - RADIUS CB — CHORD BEARING C — CHORD LENGTH N - NORTH/NORTHING W - WEST E - EAST/EASTING S - SOUTH DET — DETAIL EX — EXISTING W/ – WITH PC - POINT OF CURVATURE/PORTLAND CEMENT WWF – WELDED WIRE FABRIĆ VERT - VERTICAL OC - ON CENTER FDC - FIRE DEPARTMENT CONNECTION CT - COURT DR - DRIVE TYP - TYPICAL REC - RECEPTION NUMBER ø, DIA – DIAMETER PT - POINT OF TANGENCY MIN - MINIMUM

MAX — MAXIMUM

HDPE - HIGH DENSITY POLYETHYLENE



SCALE: 1" = 1500'

SITE DATA TABLE				
EXISTING & PROPOSED ZONING:	EXISTING: AG	PROPOSED: I-1		
PARCEL IDENTIFICATION NUMBER (PIN):	182501400006 & 182501400005			
ITEM	SQUARE FOOTAGE	ACRES		
SITE AREA	502,987	11.55		
BUILDING FOOTPRINT	30,000	0.69		
ASPHALT	49,897	1.14		
CONCRETE	26,102	0.60		
LANDSCAPED AREA	133,729	3.07		
GRAVEL	263,259 6.04			
F.A.R.	0.0	060		
BUILDING OCCUPANCY GROUP	B/S-1			
BUILDING CONSTRUCTION TYPE	V	'A		
PARKING	REQUIRED	PROVIDED		
STANDARD SPACES	60 (2/1000 SF)	69		
TOTAL ACCESSIBLE SPACES	3	3		
ACCESSIBLE SPACES	2	2		
VAN ACCESSIBLE SPACES	1	1		
BICYCLE SPACES	4	4		
LANDSCAPING	(SEE LANDSCAPE PLAN FOR DETAILS)	(SEE LANDSCAPE PLAN FOR DETAILS)		

## SHEET INDEX

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LANNED UNIT DEVELOPMENT PERMIT OT 1, TWO DUMMIES INDUSTRIAL SUBDIVISION

# Date Issue / Description Init.

 Project No:
 6CH000001

 Drawn By:
 RDG

 Checked By:
 MSJ

 Date:
 10/14/2022

COVER SHEET

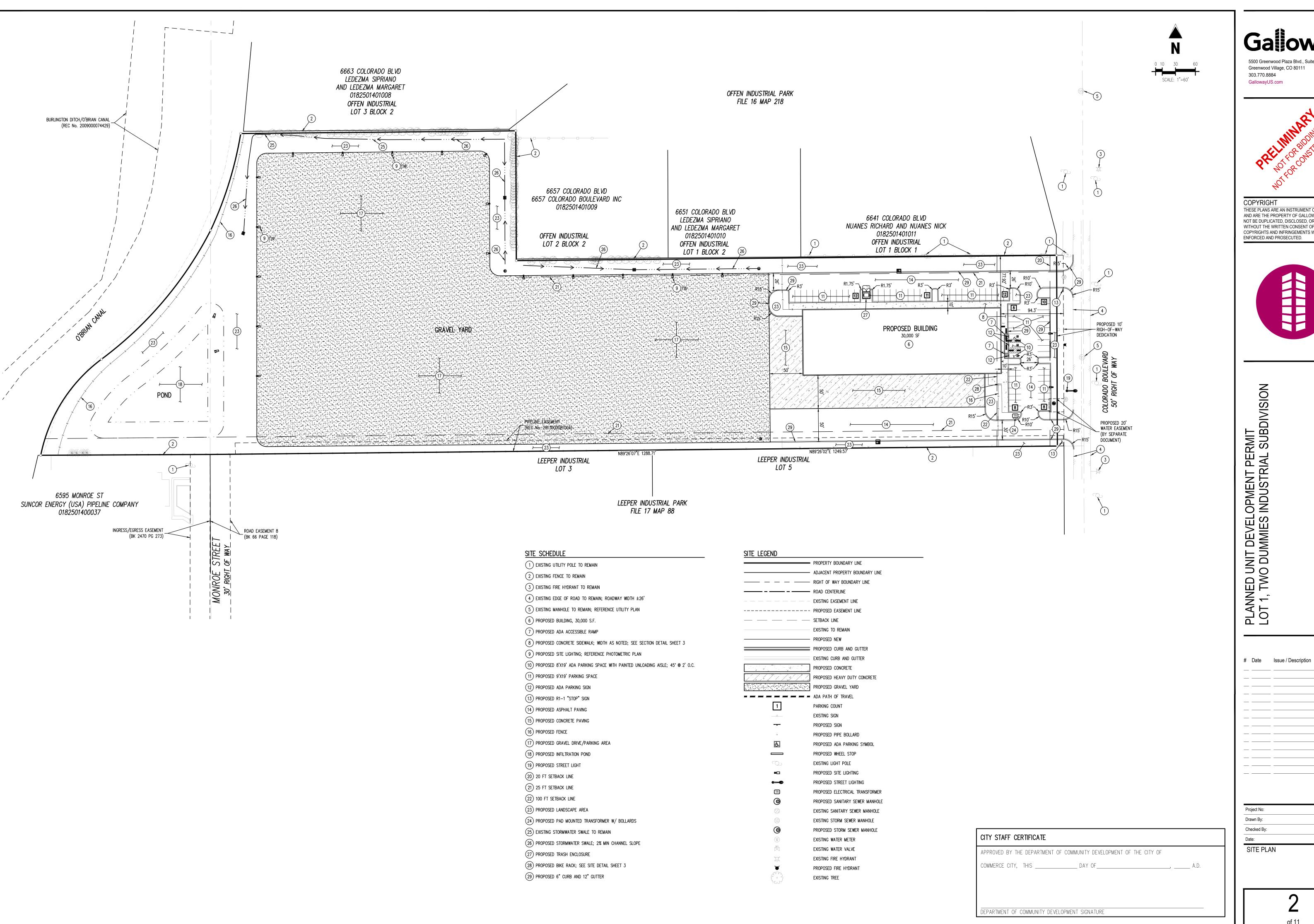
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LEGAL DESCRIPTION

LOT 1, TWO DUMMIES INDUSTRIAL SUBDIVISION, SOUTHEAST 1/4 OF SECTION 1, TOWNSHIP 3 SOUTH, RANGE 68 WEST OF THE 6TH P.M., COMMERCE CITY, COUNTY OF ADAMS, STATE OF COLORADO.

CITY STAFF CERTIFICATE	
APPROVED BY THE DEPARTMENT OF COMMUNITY DEVELOPMENT OF THE CITY OF	
COMMERCE CITY, THIS DAY OF, _	A.D.
DEPARTMENT OF COMMUNITY DEVELOPMENT SIGNATURE	



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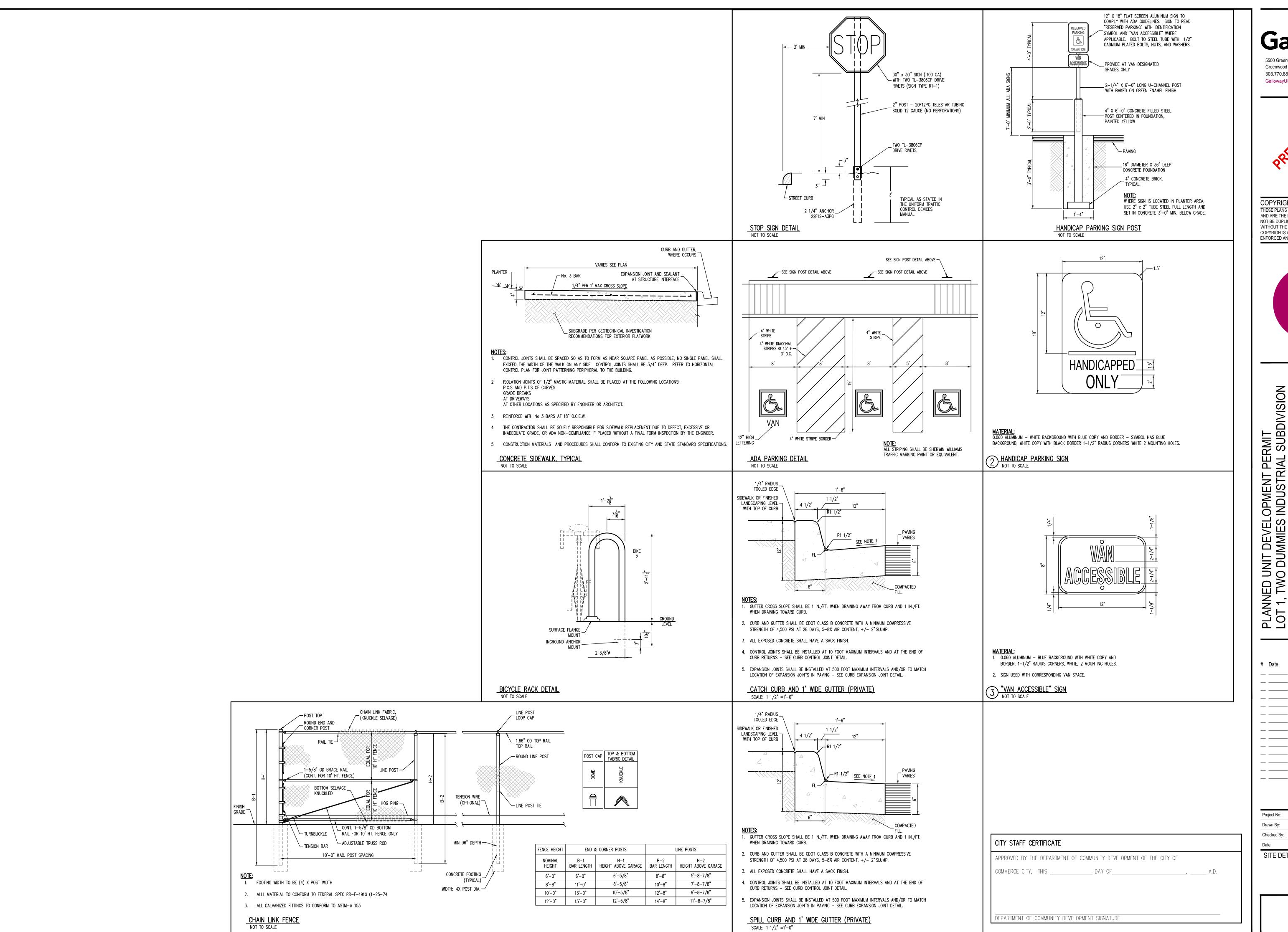


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6601 COLORADO BOULEVARD COMMERCE CITY, COLORADO

Project No:	6CH000001
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SITE PLAN	



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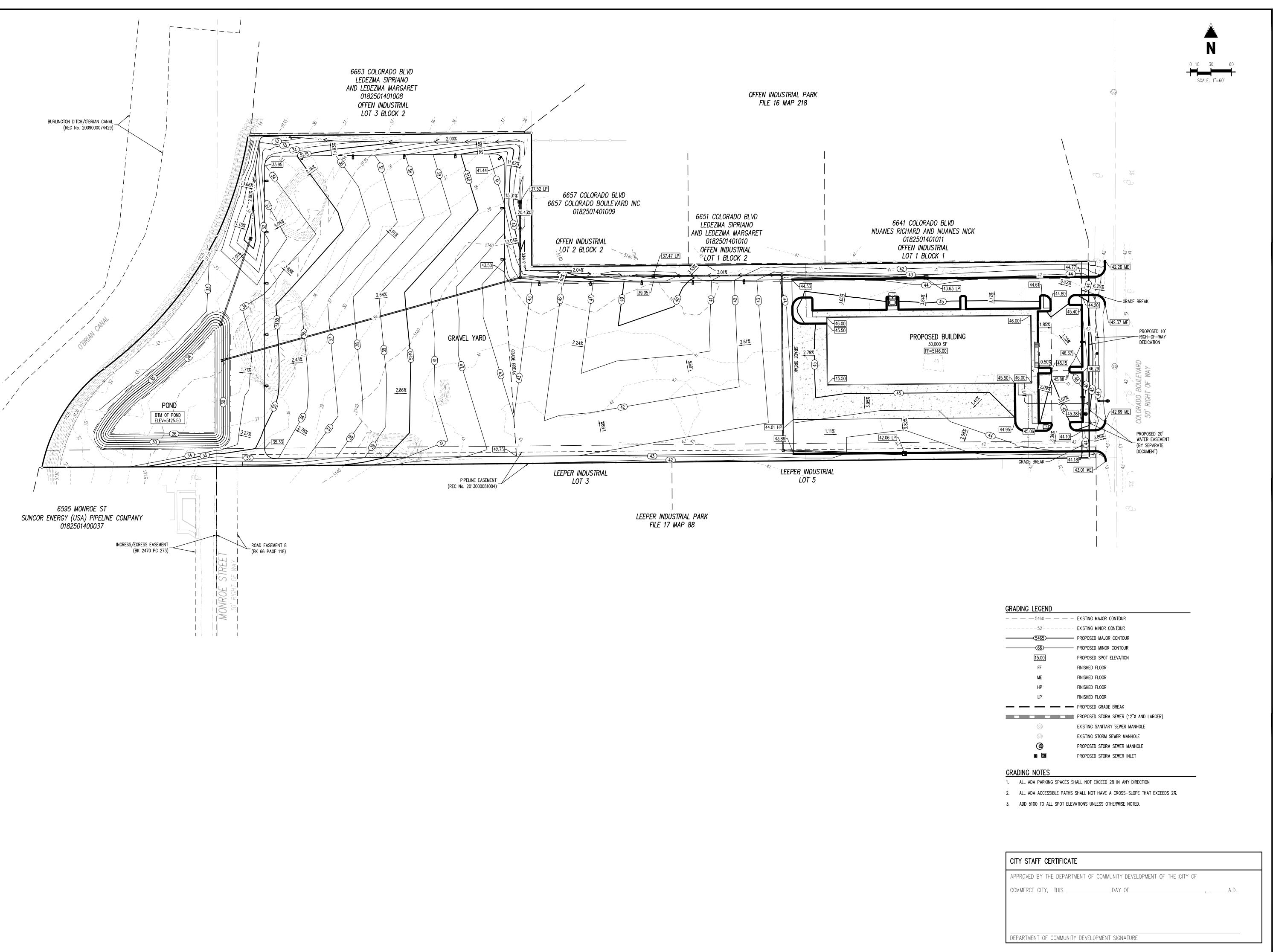
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SITE DETAILS



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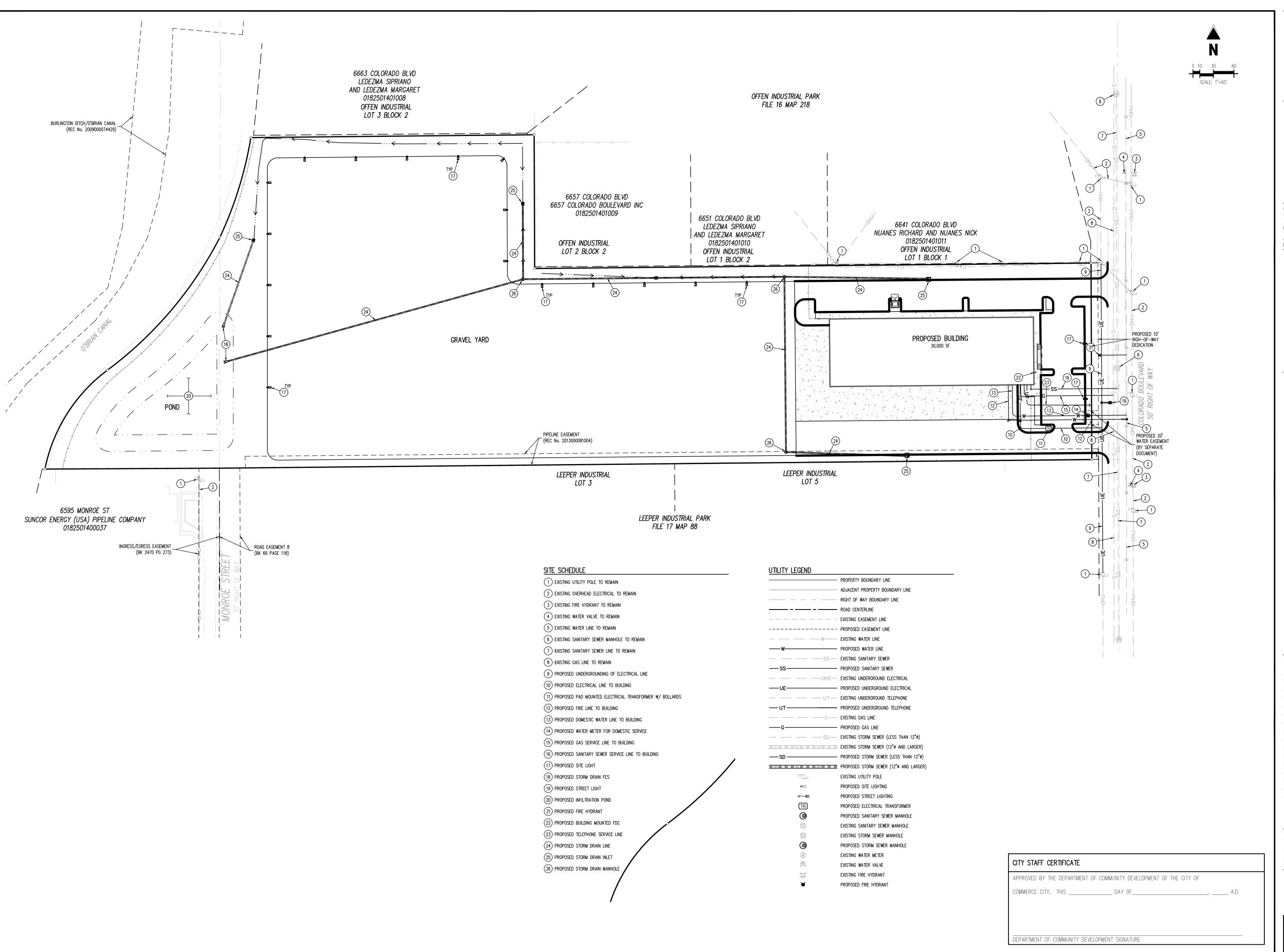
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GRADING PLAN

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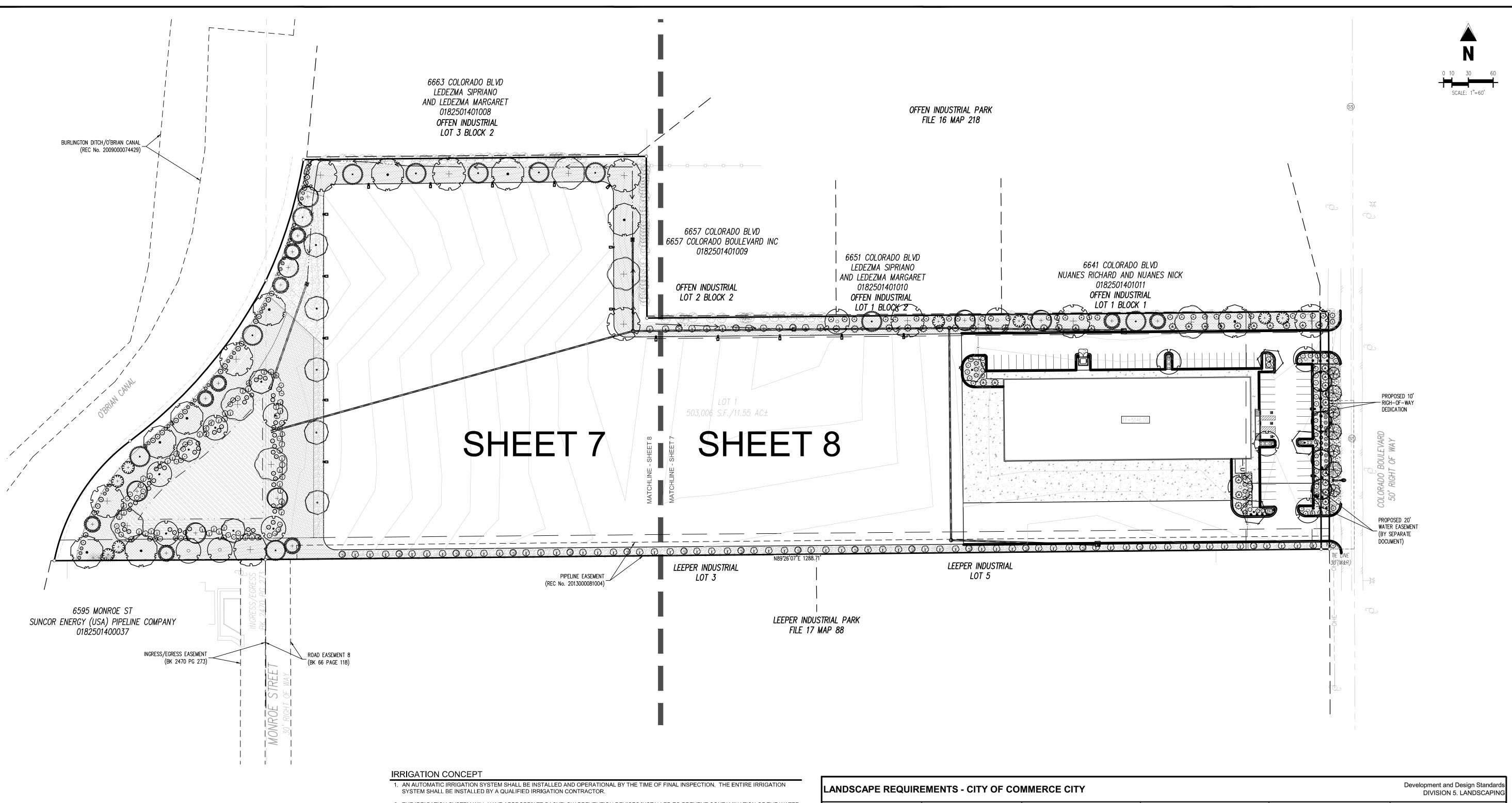
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6601 COLORADO BOULEVARD COMMERCE CITY, COLORADO

Project No:	6CH000001
Drawn By:	RDG
Checked By:	MJ
Date:	10/14/2022
UTILITY PLAN	

UTILITY PLAN

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- 2. THE IRRIGATION SYSTEM WILL HAVE APPROPRIATE BACKFLOW PREVENTION DEVICES INSTALLED TO PREVENT CONTAMINATION OF THE WATER
- 3. ALL NON-TURF/SEED PLANTED AREAS WILL BE DRIP IRRIGATED. TURF SOD/SEED SHALL RECEIVE POP-UP SPRAY IRRIGATION FOR HEAD TO
- 4. ALL PLANTS SHARING SIMILAR HYDROZONE CHARACTERISTICS SHALL BE PLACED ON A VALVE DEDICATED TO PROVIDE THE NECESSARY WATER REQUIREMENTS SPECIFIC TO THAT HYDROZONE.
- 5. THE IRRIGATION SYSTEM SHALL BE DESIGNED AND INSTALLED, TO THE MAXIMUM EXTENT POSSIBLE, TO CONSERVE WATER BY USING THE FOLLOWING DEVICES AND SYSTEMS: MATCHED PRECIPITATION RATE TECHNOLOGY ON ROTOR AND SPRAY HEADS (WHEREVER POSSIBLE), RAIN SENSORS, AND SMART MULTI-PROGRAM COMPUTERIZED IRRIGATION CONTROLLERS FEATURING SENSORY INPUT CAPABILITIES.

## LANDSCAPE GUARANTEE AND MAINTENANCE

- 1. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL TREES, SHRUBS, PERENNIALS, SOD, SEEDED AREAS, AND IRRIGATION SYSTEMS FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE OWNER'S ACCEPTANCE. THE CONTRACTOR SHALL REPLACE, AT HIS OWN EXPENSE, ANY PLANTS WHICH DIE IN THAT TIME, OR REPAIR ANY PORTIONS OF THE IRRIGATION SYSTEM WHICH OPERATE IMPROPERLY.
- 2. THE LANDSCAPE CONTRACTOR SHALL MAINTAIN THE LANDSCAPE IN A NEAT, CLEAN, AND HEALTHY CONDITION FOR A PERIOD OF 90 DAYS. THIS SHALL INCLUDE PROPER PRUNING, MOWING AND AERATION OF LAWNS, WEEDING, REPLACEMENT OF MULCH, REMOVAL OF LITTER, AND THE APPROPRIATE WATERING OF ALL PLANTINGS. IRRIGATION SHALL BE MAINTAINED IN PROPER WORKING ORDER, WITH SCHEDULING ADJUSTMENTS BY SEASON AND TO MAXIMIZE WATER CONSERVATION. IF SITE OPENS DURING WINTER, TO AVOID FREEZE DAMAGE ON PLANTINGS, THE <u>90 DAYS</u> SHOULD BEGIN AFTER ACCEPTANCE OF THE WORK.
- 3. DURING THE LANDSCAPE MAINTENANCE PERIOD, THE LANDSCAPE CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM STRUCTURES IN ALL LANDSCAPE AREAS AT THE MINIMUM SLOPE SPECIFIED IN THE GEOTECHNICAL REPORT. LANDSCAPE AREAS WHICH SETTLE AND CREATE THE POTENTIAL FOR PONDING SHALL BE REPAIRED TO ELIMINATE PONDING POTENTIAL AND BLEND IN WITH THE SURROUNDING GRADES. SHOULD ANY CONFLICTS AND/OR DISCREPANCIES ARISE BETWEEN THE GEOTECHNICAL REPORT, THE GRADING PLANS, THESE NOTES, AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY BRING SUCH ITEMS TO THE ATTENTION OF THE

## **UTILITY NOTES**

LANDSCAPE ARCHITECT AND OWNER.

- 1. THE LANDSCAPE CONTRACTOR IS REQUIRED TO CONTACT THE COUNTY PUBLIC WORKS DEPARTMENT, AND ANY OTHER PUBLIC OR PRIVATE AGENCY NECESSARY FOR UTILITY LOCATION PRIOR TO ANY CONSTRUCTION.
- 2. THIS DRAWING IS A PART OF A COMPLETE SET OF BID DOCUMENTS, SPECIFICATIONS, ADDITIONAL DRAWINGS, AND EXHIBITS. UNDER NO CIRCUMSTANCES SHOULD THESE PLANS BE USED FOR CONSTRUCTION PURPOSES WITHOUT EXAMINING ACTUAL LOCATIONS OF UTILITIES ON SITE, AND REVIEWING ALL RELATED DOCUMENTS.
- 3. THE LOCATION OF THE ALL UNDERGROUND UTILITIES ARE LOCATED ON THE ENGINEERING DRAWINGS FOR THIS PROJECT. THE MOST CURRENT REVISION IS HERE IN MADE PART OF THIS DOCUMENT. UNDERGROUND UTILITIES EXIST THROUGHOUT THIS SITE AND MUST BE LOCATED PRIOR TO ANY CONSTRUCTION ACTIVITY. WHERE UNDERGROUND UTILITIES EXIST, FIELD ADJUSTMENT MAY BE NECESSARY AND MUST BE APPROVED BY A REPRESENTATIVE OF THE OWNER. NEITHER THE OWNER NOR THE LANDSCAPE ARCHITECT ASSUMES ANY RESPONSIBILITY WHATSOEVER, IN RESPECT TO THE CONTRACTORS ACCURACY IN LOCATING THE INDICATED PLANT MATERIAL, AND UNDER NO CIRCUMSTANCES SHOULD THESE PLANS BE USED WITHOUT REFERENCING THE ABOVE MENTIONED DOCUMENTS.

				1	DIVISION 5. LANDSCA
CODE SECTION	CATEGORY	FORMULA	CALCULATION	REQUIRED	PROVIDED
		PROJECT	SITE REQUIREMENTS		
	NET LANDSCAPE AREA	TOTAL L.S. AREA, EXCLUDING DETENTION POND, R.O.W., PUBLIC EASEMENT AND UNDISTURBED AREA	77,558 S.F		
Sec. 21-7510	TREE REQUIREMENT	1 TREE / 1,200SF	77,558 SF / 1,200	65 TREES	65 TREES
Sec. 21-7510	SHRUB REQUIREMENT	1 SHRUB / 300SF	77,558 SF / 300	259 SHRUBS	265 SHRUBS
Sec. 21-7530	DETENTION POND LANDSCAPE	1 TREE & 10 SHRUBS / 50LF OF PERMETER 681 LF / 50LF 14 TREES & 136 SHRUBS		14 TREES & 136 SHRUBS	
Sec. 21-7510	TURF - SOD	Not to exceed 50% of Landscape area	≤ 50% LANDSCAPE AREA	-	2,345 s.f. (R.O.W. ONLY)
Sec. 21-7510	MULCH REQUIREMENT	2 TYPES REQUIRED FOR NON- RESIDENTIAL DEVELOPMENT	2 TYPES REQUIRED	2	2
		PARKING	LOT REQUIREMENTS		
Sec. 21-7540	PARKING LOT PERIMITER LANDSCAPING	1 TREE & 5 SHRUBS / 30 LF ALONG P- LOT PERIMETER	107 LF / 30	4 TREES & 18 SHRUBS	4 TREES & 18 SHRUBS
Sec. 21-7541	PARKING LOT LANDSCAPING	1 TREE & 6 SHRUBS / ISLAND	8 ISLANDS	8 TREESS & 48 SHRUBS	8 TREESS & 48 SHRUBS
		RIGHT-OF	-WAY REQUIREMENTS		
Sec. 21-7550	ROW TREE REQUIREMENT	1 CANOPY TREE / 40 LF OR 1 ORNAMENTAL TREE / 30 LF OF STREET FRONTAGE	230 LF / 40 OR 230 LF / 30	6 CANOPY TREES or 7 ORNAMENTAL TREES	7 ORNAMENTAL TREES

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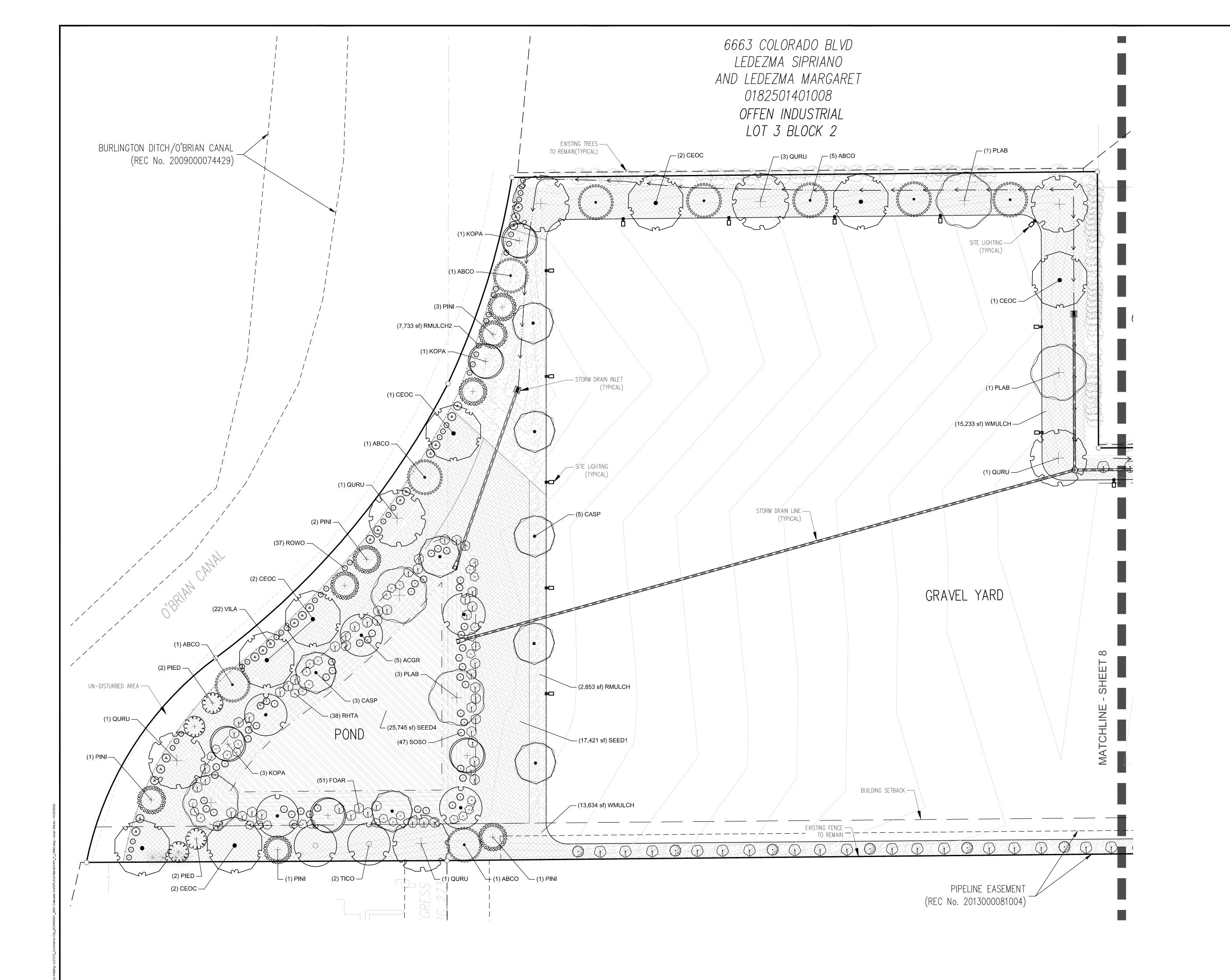
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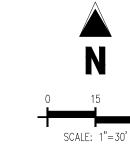
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LANDSCAPE PLAN OVERALL

Know what's  $b \in OW$ . Call before you dig. ~~~~~~~ UTILITIES EXIST WITHIN CONSTRUCTION LIMITS. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THEIR LOCATION PRIOR TO CONSTRUCTION.

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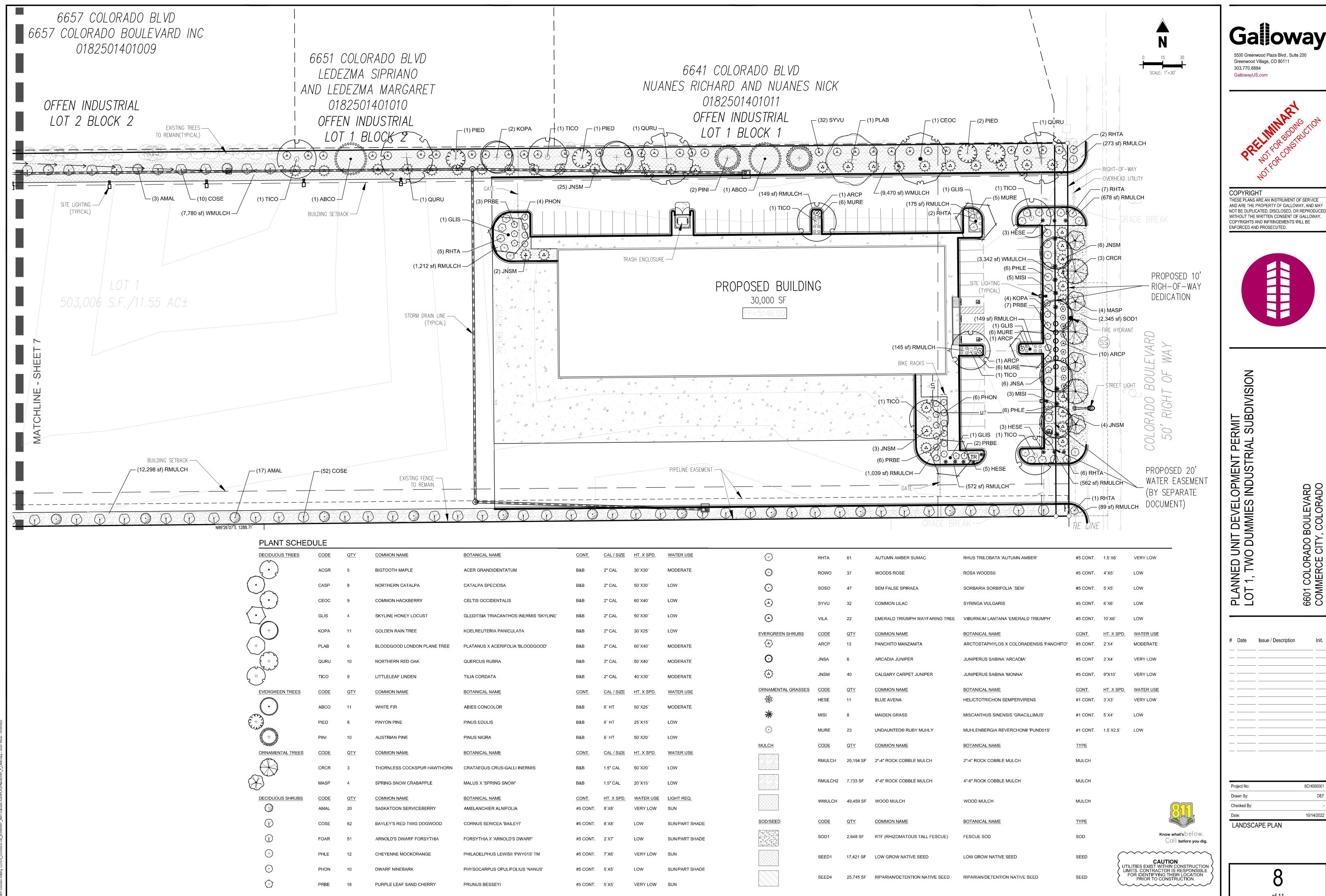
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| Checked By:    | -          |
| Date:          | 10/14/2022 |
| LANDSCAPE PLAN |            |

CAUTION

UTILITIES EXIST WITHIN CONSTRUCTION LIMITS. CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THEIR LOCATION PRIOR TO CONSTRUCTION.

Know what's below. Call before you dig.

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6CH000001 10/14/2022

- 1. USE CITYOF COMMERCE CITY TREE PROTECTION NOTES (IF AVAILABLE). TREE PROTECTION NOTES BELOW SHALL BE USED FOR FURTHER INTEGRATION.
- 2. "PROTECTED ZONE" FOR EXISTING TREES: BEFORE BEGINNING ANY DEMOTION OR CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL INSTALL TEMPORARY FENCING AROUND ALL EXISTING TREES WITHIN THE CONSTRUCTION ZONE THAT ARE TO BE SAVED. THE FENCE SHALL BE INSTALLED NO CLOSER TO THE TREE THAN THE EDGE OF THE TREE'S PROTECTED ZONE, GENERALLY DEFINED AS THE AREA BEGINNING FIVE FEET OUTSIDE OF THE TREE'S DRIPLINE AND EXTENDING TOWARDS THE TREE (OR AS FAR AWAY FROM THE TRUNK AS PRACTICABLE). THE FENCING SHALL BE OF A MATERIAL AND HEIGHT ACCEPTABLE TO THE LANDSCAPE ARCHITECT. ALL CONTRACTORS AND THEIR CREWS SHALL NOT BE ALLOWED INSIDE THIS "PROTECTED ZONE" NOR SHALL THEY BE ALLOWED TO STORE OR DUMP FOREIGN MATERIALS WITHIN THIS AREA. NO WORK OF ANY KIND, INCLUDING TRENCHING, SHALL BE ALLOWED WITHIN THE PROTECTED ZONE EXCEPT AS DESCRIBED BELOW. THE FENCING SHALL REMAIN AROUND EACH TREE TO BE SAVED UNTIL THE COMPLETION OF CONSTRUCTION OPERATIONS.
- 3. TEMPORARY MULCH: TO ALLEVIATE SOIL COMPACTION IN ANTICIPATED AREAS OF HIGH CONSTRUCTION TRAFFIC, AND ONLY WHERE FENCING CANNOT BE SET FIVE FEET OUTSIDE OF THE DRIPLINE, THE CONTRACTOR SHALL INSTALL A LAYER OF MULCH, 9"-12" THICK, OVER ALL EXPOSED EARTH FROM THE TREE TRUNK TO 5' OUTSIDE OF THE DRIPLINE. THIS LAYER SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION. WHEN PLANTING OPERATIONS ARE COMPLETED, THE MULCH SHALL BE REDISTRIBUTED THROUGHOUT ALL PLANTING AREAS IN A 3" THICK "PERMANENT" MULCH LAYER.
- 4. NECESSARY WORK: WHEN IT BECOMES NECESSARY TO ENTER THE "PROTECTED ZONE", SUCH AS FOR FINE GRADING, IRRIGATION INSTALLATION, AND PLANTING OPERATIONS, THE CONTRACTOR SHALL STRICTLY ADHERE TO THE FOLLOWING RULES:
- A. EVERY EFFORT SHALL BE MADE TO PRESERVE THE EXISTING GRADE AROUND PROTECTED TREES IN AS WIDE AN AREA AS POSSIBLE.
- B. TRENCHING WITHIN THE PROTECTED ZONE OF EXISTING TREES SHALL BE PERFORMED BY HAND, AND WITH EXTREME CARE NOT TO SEVER ROOTS 1-1/2" IN DIAMETER AND LARGER. WHERE ROOTS 1-1/2" IN DIAMETER AND LARGER ARE ENCOUNTERED, THE CONTRACTOR SHALL TUNNEL UNDER SAID ROOTS. EXPOSED ROOTS THAT HAVE BEEN TUNNELED UNDER SHALL BE WRAPPED IN WET BURLAP AND KEPT MOIST WHILE THE TRENCH IS OPEN.
- C. WHERE ROOTS 1-1/2" IN DIAMETER OR LARGER MUST BE CUT DUE TO EXTENSIVE GRADE CHANGES, THOSE ROOTS MUST BE EXPOSED BY HAND DIGGING AND CUT CLEANLY. RAGGED CUTS GENERALLY DO NOT HEAL PROPERLY, AND MAY LEAVE THE TREE OPEN TO PESTS AND
- D. WHERE TRENCHING NEAR TREES HAS ALREADY OCCURRED FROM PREVIOUS CONSTRUCTION OPERATIONS, THE CONTRACTOR SHALL MAKE EVERY EFFORT TO CONFINE HIS TRENCHING OPERATIONS TO THE PREVIOUSLY-CREATED TRENCHES, WHILE ADHERING TO THE
- 4. POTENTIAL CONFLICTS: THE CONTRACTOR SHALL NOTIFY THE OWNER AND ARBORIST SHOULD ANY POTENTIAL CONFLICTS ARISE BETWEEN THESE SPECIFICATIONS AND/OR LARGE ROOTS ENCOUNTERED IN THE FIELD, AND CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL NOT TAKE ANY ACTION IN SUCH CONFLICTS WITHOUT THE ARBORIST'S WRITTEN APPROVAL. THE ARBORIST SHALL HAVE FINAL AUTHORITY OVER ALL METHODS NECESSARY TO HELP ENSURE THE PROTECTION AND SURVIVAL OF EXISTING TREES.
- 5. PRUNING: PRUNE ONLY THE TREES THAT ARE INDICATED ON THE PLANS AS REQUIRING PRUNING. PRUNE TREES ACCORDING TO INTERNATIONAL SOCIETY OF ARBORICULTURE / ANSI A300 STANDARDS:
- A. REMOVE ALL DEAD WOOD.
- B. PRUNE LIVE WOOD FOR HEALTH OR STRUCTURAL REASONS ONLY, INCLUDING THE NEED TO ELIMINATE DISEASED OR DAMAGED GROWTH, ELIMINATE STRUCTURALLY UNSOUND GROWTH, REDUCE THE POTENTIAL FOR WIND TOPPLING OR WIND DAMAGE, OR TO MAINTAIN GROWTH WITHIN LIMITED SPACE. DO NOT REMOVE MORE THAN 25% OF ANY TREE'S LIVE FOLIAGE IN ANY ONE GROWING SEASON. PRUNE ONLY TO INTERNATIONAL SOCIETY OF ARBORICULTURE/ANSI A300 STANDARDS, AND ONLY UNDER THE DIRECT SUPERVISION OF A CERTIFIED ARBORIST.
- C. FINAL CUTS SHALL BE MADE JUST OUTSIDE THE SHOULDER RING AREA. EXTREMELY FLUSHED CUTS WHICH PRODUCE LARGE WOUNDS SHALL NOT BE MADE.
- D. ALL TRIMMING CUTS SHALL BE PERFORMED IN SUCH A MANNER AS TO PROMOTE THE NATURAL GROWTH AND SHAPE OF EACH TREE
- E. IMPROPER PRUNING METHODS INCLUDING, BUT NOT LIMITED TO, "TOPPING", "TIPPING", "HEADING BACK", "DEHORNING", AND "LIONTAILING" WILL NOT BE ALLOWED. THE CONTRACTOR SHALL PAY FOR ALL WORK NECESSARY TO CORRECT SUCH PRUNING WHEN PERFORMED BY HIS CREWS OR SUBCONTRACTORS.
- F. SHOULD THE CONTRACTOR REQUIRE MORE INFORMATION, THE CONTRACTOR SHALL CONTACT THE ISA AT (217) 355-9411 FOR A COPY OF THE ANSI A300 PRUNING STANDARDS. CONTRACTOR SHALL ADHERE TO THE METHODS AND PRACTICES SET FORTH IN THIS DOCUMENT.
- 6. LANDSCAPE AND IRRIGATION (NATIVE TREES ONLY): ANY FUTURE LANDSCAPE AND IRRIGATION SHOULD ADHERE TO THE FOLLOWING
- A. NO IRRIGATION OR PLANTING SHOULD OCCUR CLOSER THAN 8'-10' FROM THE TRUNK.
- B. WHERE IRRIGATION DOES OCCUR WITHIN THE PROTECTED ZONE, DRIP IRRIGATION SHOULD BE USED WHEREVER POSSIBLE. ADDITIONALLY, ONLY PLANTS WITH LOW WATER NEEDS SHOULD BE PLANTED WITHIN THE PROTECTED ZONE, SPACED FAR APART WHERE CLOSE TO THE TREE. PLANTS MAY BE SPACED CLOSER TOGETHER NEAR THE EDGE OF THE PROTECTED ZONE.

NOTE: ALL PLANTS SHALL BE PLANTED AT EQUAL

TRIANGULAR SPACING (EXCEPT WHERE SHOWN

PLANT LEGEND FOR SPACING DISTANCE

BETWEEN PLANTS

PLANT CENTER (TYP.)

- EDGE OF PLANTING AREA

PLANT SPACING

SCALE: NOT TO SCALE

ON PLANS AS INFORMAL GROUPINGS). REFER TO

#### PLANTING NOTES

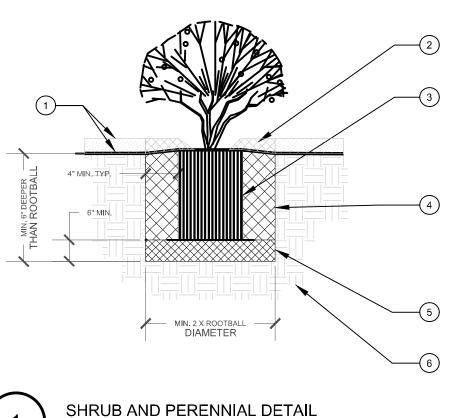
- 1. ALL WORK SHALL CONFORM TO ALL APPLICABLE STATE AND LOCAL CODES, STANDARDS, AND SPECIFICATIONS.
- 2. LANDSCAPE DESIGN IS DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS OWN TAKEOFFS AND QUANTITY CALCULATIONS. IN THE EVENT OF A DISCREPANCY BETWEEN THE PLAN AND THE LANDSCAPE LEGEND, THE PLANT QUANTITY AS SHOWN ON THE PLAN SHALL TAKE PRECEDENCE AND NOTIFY THE LANDSCAPE ARCHITECT OF THESE DISCREPANCIES. MINOR ADJUSTMENTS TO THE LANDSCAPE MATERIAL AND LOCATIONS MAY BE PROPOSED FOR CITY CONSIDERATION AT THE CONSTRUCTION DOCUMENT STAGE TO RESPOND TO MARKET AND FIELD CONDITIONS. HOWEVER, THERE SHALL BE NO REDUCTION IN THE NUMBER AND SIZE OF MATERIALS.
- 3. CONTRACTOR SHALL MAKE HIMSELF AWARE OF THE LOCATIONS OF EXISTING AND PROPOSED UTILITIES. AND SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE UTILITIES AND/OR ANY INJURY TO ANY PERSON. THIS DRAWING IS PART OF A COMPLETE SET OF CONTRACT DOCUMENTS. UNDER NO CIRCUMSTANCES SHOULD THIS PLAN BE USED FOR CONSTRUCTION PURPOSES WITHOUT EXAMINING ACTUAL LOCATIONS OF UTILITIES ON SITE AND REVIEW ALL RELATED PLANS AND
- 4. ALL UTILITY EASEMENTS SHALL REMAIN UNOBSTRUCTED AND FULLY ACCESSIBLE ALONG THEIR ENTIRE LENGTH FOR
- 5. THE CONTRACTOR SHALL TAKE EXTREME CARE NOT TO DAMAGE ANY EXISTING PLANTS INDICATED AS "TO REMAIN". ANY SUCH PLANTS DAMAGED BY THE CONTRACTOR SHALL BE REPLACED WITH THE SAME SPECIES, SIZE, AND QUANTITY AT THE CONTRACTOR'S OWN EXPENSE, AND AS ACCEPTABLE TO THE OWNER. REFER TO THE TREE PROTECTION NOTES ON THE PLANS (AS APPLICABLE).
- 6. LANDSCAPE CONTRACTOR SHALL EXAMINE THE SITE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND NOTIFY THE GENERAL CONTRACTOR IN WRITING OF UNSATISFACTORY CONDITIONS. IF SITE CONDITIONS OR PLANT AVAILABILITY REQUIRE CHANGES TO THE PLAN, THEN AN APPROVAL WILL BE OBTAINED FROM THE CITY. DO NOT PROCEED UNTIL CONDITIONS HAVE BEEN CORRECTED.
- 7. ALL CONSTRUCTION DEBRIS AND MATERIAL SHALL BE REMOVED AND CLEANED OUT PRIOR TO INSTALLATION OF TOPSOIL,
- 8. FOR ALL INFORMATION ON SURFACE MATERIAL OF WALKS, DRIVES, AND PARKING LOTS, SEE THE SITE PLAN. SEE PHOTOMETRIC PLAN FOR FREE STANDING LIGHTING INFORMATION.
- 9. THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT ONE WEEK PRIOR TO BEGINNING CONSTRUCTION.
- 10. WINTER WATERING SHALL BE AT THE EXPENSE OF THE CONTRACTOR UNTIL SUCH TIME AS FINAL ACCEPTANCE IS RECEIVED.
- 11. ALL LANDSCAPE CONSTRUCTION PRACTICES, WORKMANSHIP, AND ETHICS SHALL, BE IN ACCORDANCE WITH INDUSTRY STANDARDS SET FORTH IN THE CONTRACTORS HANDBOOK PUBLISHED BY THE COLORADO LANDSCAPE CONTRACTORS
- 12. LANDSCAPE AND IRRIGATION WORK SHALL BE COMPLETED PRIOR TO THE ISSUANCE OF THE FINAL CERTIFICATE OF
- FINISH GRADING AND SOIL PREPARATION 13. CONTRACTOR SHALL CONSTRUCT AND MAINTAIN FINISH GRADES AS RECOMMENDED BY THE GEOTECHNICAL REPORT. ALL LANDSCAPE AREAS SHALL HAVE POSITIVE DRAINAGE AWAY FROM STRUCTURES AT THE MINIMUM SLOPE SPECIFIED IN THE REPORT, AND AREAS OF POTENTIAL PONDING SHALL BE REGRADED TO BLEND IN WITH THE SURROUNDING GRADES AND ELIMINATE PONDING POTENTIAL. SHOULD ANY CONFLICTS AND/OR DISCREPANCIES ARISE BETWEEN THE GEOTECHNICAL REPORT. THE GRADING PLANS, THESE NOTES, AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY BRING SUCH ITEMS TO THE ATTENTION OF THE LANDSCAPE ARCHITECT AND OWNER.
- 14. AFTER FINISH GRADES HAVE BEEN ESTABLISHED, IT IS RECOMMENDED THAT THE CONTRACTOR SHALL HAVE SOIL SAMPLES TESTED BY AN ESTABLISHED SOIL TESTING LABORATORY FOR THE FOLLOWING: GENERAL SOIL FERTILITY, PH, ORGANIC MATTER CONTENT, SALT (CEC), LIME, SODIUM ADSORPTION RATIO (SAR) AND BORON CONTENT. EACH SAMPLE SUBMITTED SHALL CONTAIN NO LESS THAN ONE QUART OF SOIL. CONTRACTOR SHALL ALSO SUBMIT THE PROJECT'S PLANT LIST TO THE LABORATORY ALONG WITH THE SOIL SAMPLES. THE SOIL REPORT PRODUCED BY THE LABORATORY SHALL CONTAIN RECOMMENDATIONS FOR THE FOLLOWING (AS APPROPRIATE): GENERAL SOIL PREPARATION AND BACKFILL MIXES, PRE-PLANT FERTILIZER APPLICATIONS, AND ANY OTHER SOIL RELATED ISSUES. THE REPORT SHALL ALSO PROVIDE A FERTILIZER PROGRAM FOR THE ESTABLISHMENT PERIOD AND FOR LONG-TERM MAINTENANCE.
- 15. THE CONTRACTOR SHALL RECOMMEND INSTALLATION OF SOIL AMENDMENTS AND FERTILIZERS PER THE SOILS REPORT FOR THE THE OWNER/OWNER'S REPRESENTATIVE CONSIDERATION.
- 16. AT A MINIMUM, ALL TOPSOIL SHALL BE AMENDED WITH NITROGEN STABILIZED ORGANIC AMENDMENT COMPOST AT A RATE OF 5.0 CUBIC YARDS AND AMMONIUM PHOSPHATE 16-20-0 AT A RATE OF 15 POUNDS PER THOUSAND SQUARE FEET OF LANDSCAPE AREA. COMPOST SHALL BE MECHANICALLY INTEGRATED INTO THE TOP 6" OF SOIL BY MEANS OF ROTOTILLING AFTER CROSS-RIPPING. GROUND COVER & PERENNIAL BED AREAS SHALL BE AMENDED AT A RATE OF 8 CUBIC FEET PER THOUSAND SQUARE FEET OF NITROGEN STABILIZED ORGANIC AMENDMENT AND 10 LBS. OF 12-12-12 FERTILIZER PER CU. YD., ROTOTILLED TO A DEPTH OF 8". NO MANURE OR ANIMAL-BASED PRODUCTS SHALL BE USED FOR ORGANIC AMENDMENTS.

- 17. ALL DECIDUOUS TREES SHALL HAVE FULL, WELL-SHAPED HEADS/ALL EVERGREENS SHALL BE UNSHEARED AND FULL TO THE GROUND; UNLESS OTHERWISE SPECIFIED. TREES WITH CENTRAL LEADERS WILL NOT BE ACCEPTED IF LEADER IS DAMAGED OR REMOVED. PRUNE ALL DAMAGED TWIGS AFTER PLANTING.
- 18. ALL PLANTS WITHIN A SPECIES SHALL HAVE SIMILAR SIZE, AND SHALL BE OF A FORM TYPICAL FOR THE SPECIES. ANY PLANT DEEMED UNACCEPTABLE BY THE LANDSCAPE ARCHITECT SHALL BE IMMEDIATELY REMOVED FROM THE SITE AND SHALL BE REPLACED WITH AN ACCEPTABLE PLANT OF LIKE TYPE AND SIZE AT THE CONTRACTOR'S OWN EXPENSE. ANY PLANTS

- APPEARING TO BE UNHEALTHY, EVEN IF DETERMINED TO STILL BE ALIVE, SHALL NOT BE ACCEPTED. THE LANDSCAPE ARCHITECT SHALL BE THE SOLE JUDGE AS TO THE ACCEPTABILITY OF PLANT MATERIAL.
- 19. ALL TREES SHALL BE GUYED AND WOOD STAKED AS PER DETAILS. NO 'T-STAKES' SHALL BE USED FOR TREES.
- ALL PLANT MATERIALS SHALL BE TRUE TO TYPE, SIZE, SPECIES, QUALITY, AND FREE OF INJURY, BROKEN ROOT BALLS, PESTS, AND DISEASES, AS WELL AS CONFORM TO THE MINIMUM REQUIREMENTS DESCRIBED IN THE "AMERICAN STANDARD FOR NURSERY STOCK". FOLLOW GREENCO TREE PLANTING RECOMMENDATIONS FOR MINIMUM QUALITY REQUIREMENTS FOR
- 21. ALL TREE AND SHRUB BED LOCATIONS ARE TO BE STAKED OUT ON SITE FOR APPROVAL BY THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- 22. ALL TREES PLANTED ADJACENT TO PUBLIC AND/OR PEDESTRIAN WALKWAYS SHALL BE PRUNED CLEAR OF ALL BRANCHES BETWEEN GROUND AND A HEIGHT OF EIGHT (8) FEET FOR THAT PORTION OF THE PLAN LOCATED OVER THE SIDEWALK AND/OR
- 23. ALL PLANT MATERIAL SHALL NOT BE PLANTED PRIOR TO INSTALLATION OF TOPSOIL
- 24. ALL PLANT BEDS SHALL BE CONTAINED WITH STEEL EDGER. STEEL EDGER IS NOT REQUIRED ALONG CURBS. WALKS OR BUILDING FOUNDATIONS. ALL EDGING SHALL OVERLAP AT JOINTS A MINIMUM OF 6-INCHES. AND SHALL BE FASTENED WITH A MINIMUM OF 4 PINS PER EACH 10 FOOT SECTION. THE TOP OF ALL EDGING MATERIAL SHALL BE A ROLLED TOP AND 1/2 INCH ABOVE THE FINISHED GRADE OF ADJACENT LAWN OR MULCH AREAS. COLOR: GREEN.
- 25. THE DEVELOPER, HIS SUCCESSOR, OR ASSIGNEE SHALL BE RESPONSIBLE FOR ESTABLISHING AND CONTINUING A REGULAR PROGRAM OF MAINTENANCE FOR ALL LANDSCAPED AREAS. SEE LANDSCAPE GUARANTEE AND MAINTENANCE NOTE.
- 26. A 3-FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF ALL FIRE HYDRANTS.
- 27. LANDSCAPE CONTRACTOR TO SUBMIT SAMPLES OF MISCELLANEOUS LANDSCAPING MATERIALS TO THE LANDSCAPE ARCHITECTS AND OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO INSTALLATION, IE.; MULCH, EDGER, LANDSCAPE

#### MULCHING

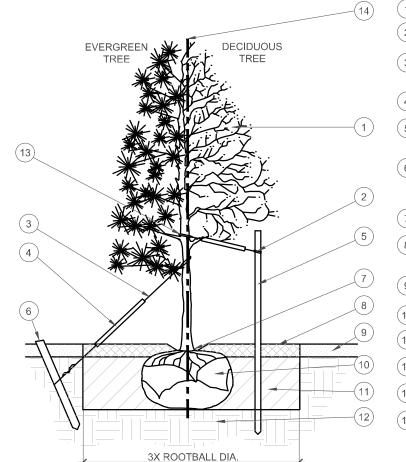
- AFTER ALL PLANTING IS COMPLETE, THE CONTRACTOR SHALL INSTALL A MINIMUM 4" THICK LAYER OF MULCH AS SPECIFIED IN THE PLANTING LEGEND. INSTALL A 4" THICK RING OF DOUBLE SHREDDED CEDAR BARK MULCH AROUND ALL PLANT MATERIAL IN ROCK MULCH BEDS WHERE LANDSCAPING IS SHOWN ON THE PLANS. WOOD MULCH RING SIZE SHALL BE THE CONTAINER SIZE OF THE SHRUBS, PERENNIALS, AND ORNAMENTAL GRASSES. TREE RING SIZE SHALL BE GREEN INDUSTRIES OF COLORADO INDUSTRY STANDARD WIDTH.
- 29. ALL MULCH SHALL BE HARVESTED IN A SUSTAINABLE MANNER FROM A LOCAL SOURCE.
- 30. INSTALL DEWITT PRO-5 WEED BARRIER FABRIC UNDER ALL ROCK MULCH SHRUB BEDS SPECIFIED ON THE PLANS ONLY. NO LANDSCAPE FABRIC SHALL BE USED IN WOOD MULCH AREAS. NO PLASTIC WEED BARRIERS SHALL BE SPECIFIED.
- 31. ABSOLUTELY NO EXPOSED GROUND SHALL BE LEFT SHOWING ANYWHERE ON THE PROJECT AFTER MULCH HAS BEEN INSTALLED.
- 32. ALL PLANTING AREAS WITH LESS THAN A 4:1 GRADIENT SHALL RECEIVE A LAYER OF MULCH, TYPE AND DEPTH PER PLANS. SUBMIT 1 CUBIC FOOT SAMPLE OF MULCH (ONE SAMPLE PER TYPE) TO LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION. THE MULCH SHALL BE SPREAD EVENLY THROUGHOUT ALL PLANTING AREAS EXCEPT SLOPES 4:1 OR STEEPER, OR AS OTHERWISE DENOTED ON THE PLAN. ABSOLUTELY NO EXPOSED GROUND SHALL REMAIN IN AREAS TO RECEIVE MULCH
- 33. ALL PLANTING AREAS ON SLOPES OVER 4:1 SHALL RECEIVE COCONUT FIBER EROSION CONTROL NETTING FROM ROLLS. NETTING SHALL BE #CT-125, AS MANUFACTURED BY NORTH AMERICAN GREEN (OR EQUAL). INSTALL AND STAKE PER MANUFACTURER'S SPECIFICATIONS. SEE ALSO THE CIVIL ENGINEER'S EROSION CONTROL PLAN.



PLAN FOR GROUND COVER TREATMENT SHREDDED BARK MULCH, 3" MIN. DEPTH, ROUGHLY THE EXTENTS OF ROOTBALL 3) PLANT ROOT BALL. SET TOP ROOTBALL 2" ABOVE ADJECENT GRADE. IN BERMED AREAS SET ROOTBALL 2" ABOVE LOWER ADJECENT GRADE - INSTALL WATER RING (2 - 3" HT.) BACKFILL MIX (PER PLANTING SPECIFICATIONS), AMEND AND FERTILIZE ONLY AS RECOMMENDED IN SOIL FERTILITY ANALYSIS, JET BACKFILL WITH WATER TO ELIMINATE VOIDS. (5) COMPACTED BACKFILL MIX (75%).

FINISH GRADE. SEE PLANTING

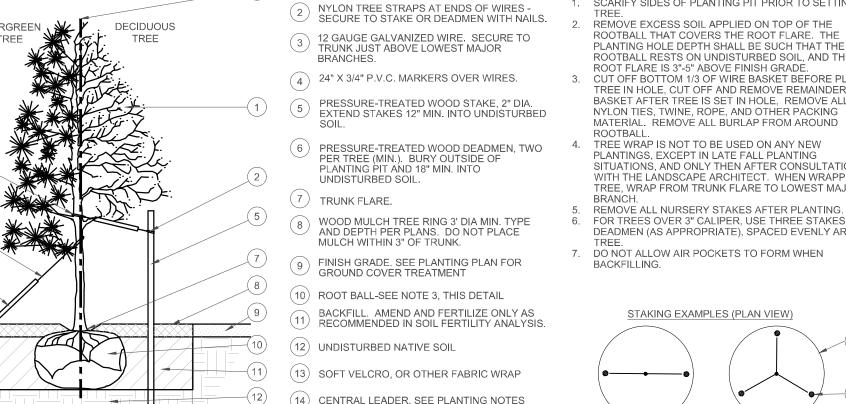
(6) UNDISTURBED NATIVE SOIL.



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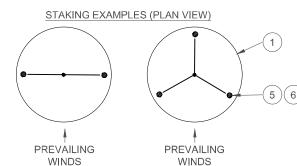
1) TREE CANOPY. NYLON TREE STRAPS AT ENDS OF WIRES -

- (14) CENTRAL LEADER, SEE PLANTING NOTES
- 3X ROOTBALL DIA. TREE PLANTING DETAIL



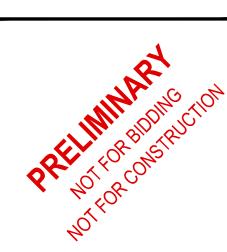
SCARIFY SIDES OF PLANTING PIT PRIOR TO SETTING

- REMOVE EXCESS SOIL APPLIED ON TOP OF THE ROOTBALL THAT COVERS THE ROOT FLARE. THI PLANTING HOLE DEPTH SHALL BE SUCH THAT THI ROOTBALL RESTS ON UNDISTURBED SOIL, AND THE ROOT FLARE IS 3"-5" ABOVE FINISH GRADE. CUT OFF BOTTOM 1/3 OF WIRE BASKET BEFORE PLACING REE IN HOLE, CUT OFF AND REMOVE REMAINDER OF BASKET AFTER TREE IS SET IN HOLE. REMOVE ALL
- TREE WRAP IS NOT TO BE USED ON ANY NEW PLANTINGS, EXCEPT IN LATE FALL PLANTING SITUATIONS, AND ONLY THEN AFTER CONSULTATION WITH THE LANDSCAPE ARCHITECT. WHEN WRAPPING TREE, WRAP FROM TRUNK FLARE TO LOWEST MAJOR
- 6. FOR TREES OVER 3" CALIPER, USE THREE STAKES OR DEADMEN (AS APPROPRIATE), SPACED EVENLY AROUND 7. DO NOT ALLOW AIR POCKETS TO FORM WHEN





Greenwood Village, CO 80111 303.770.8884 GallowayUS.com



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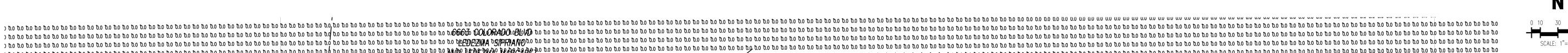
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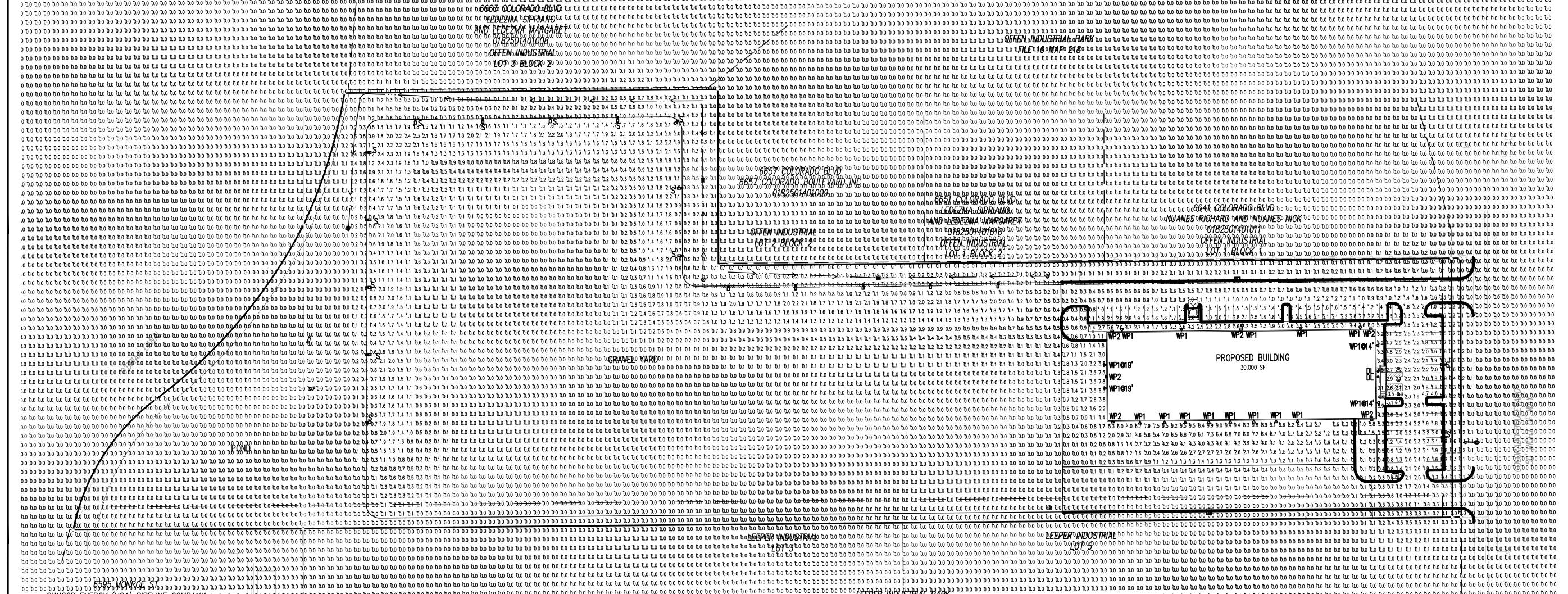
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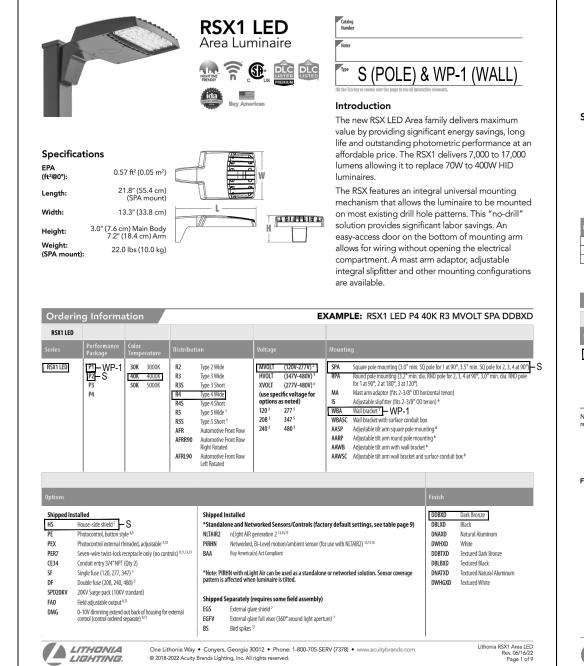
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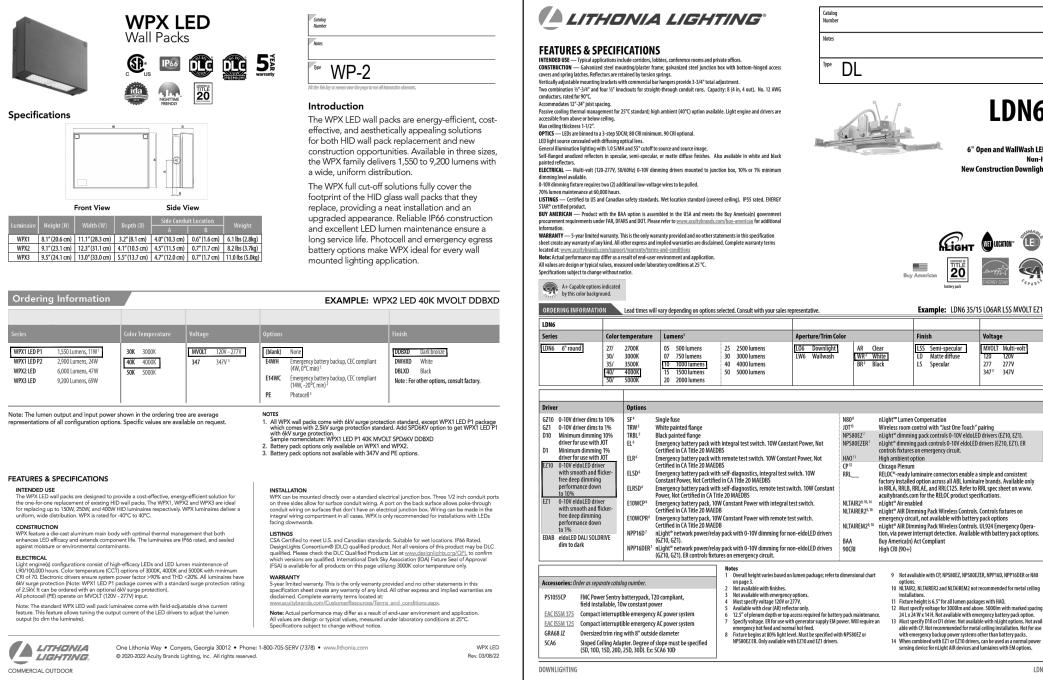




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COMMERCIAL OUTDOOR



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| YMBOL | QTY  | LABEL | MOUNT    | MODEL NUMBER                          | DESCRIPTION                                                                                                                                                                                 | LLF | WATTS | LUMENS |
| 0     | 2    | DL    | RECESSED | LDN6-40/10-L06AR-LS-EZ10              | LITHONIA LIGHTING, LDN6 RECESSED DOWNLIGHT, 4000K COLOR TEMPERATURE, 1000 LUMENS, CLEAR, SEMI-SPECULAR FINISH, MOUNTED @ 10'-0" OR APPROVED EQUAL                                           | 1.0 | 10.44 | 987    |
| ۵     | 17   | WP1   | WALL     | RSX1-LED-P1-40K-R4MVOLT-WBA-DDBXD     | LITHONIA LIGHTING, RSX1 LED AREA LUMINAIRE, 4000K COLOR TEMPERATURE, TYPE 4 DISTRIBUTION, P1 PACKAGE WALL BRACKET, DARK BRONZE COLOR MOUNTED @ 15' UNLESS NOTED OTHERWISE OR APPROVED EQUAL | 1.0 | 51.34 | 7,189  |
|       | 6    | WP2   | WALL     | WPX1-LED-P1-40K-MVOLT-DDBXD           | LITHONIA LIGHTING, WPX LED WALL LUMINAIRE, 4000K COLOR TEMPERATURE, BRONZE MOUNTED © 8' OR APPROVED EQUAL                                                                                   | 1.0 | 11.47 | 1,537  |
|       | 21   | S     | POLE     | RSX1-LED-P2-40K-R4-MVOLT-SPA-HS-DDBXD | LITHONIA LIGHTING, RSX1 LED AREA LUMINAIRE, 4000K COLOR TEMPERATURE, TYPE 4 DISTRIBUTION, P1 PACKAGE DARK BRONZE, WITH REAR SHIELD, MOUNTED AT 30' OR APPROVED EQUAL                        | 1.0 | 72.95 | 9,972  |

| CALCULATION SUMMARY |       |      |     |     |         |
|---------------------|-------|------|-----|-----|---------|
| LABEL               | UNITS | AVG  | MAX | MIN | MAX/MIN |
| PARKING AREAS       | FC    | 1.83 | 5.1 | 0.5 | 10.20:1 |
| LOADING AREA        | FC    | 3.57 | 9.9 | 0.7 | 14.14:1 |
| BUILDING SURROUNDS  | FC    | 3.61 | 8.5 | 0.9 | 9.44:1  |
| GRAVEL YARD DRIVE   | FC    | 1.26 | 2.5 | 0.5 | 5.00:1  |

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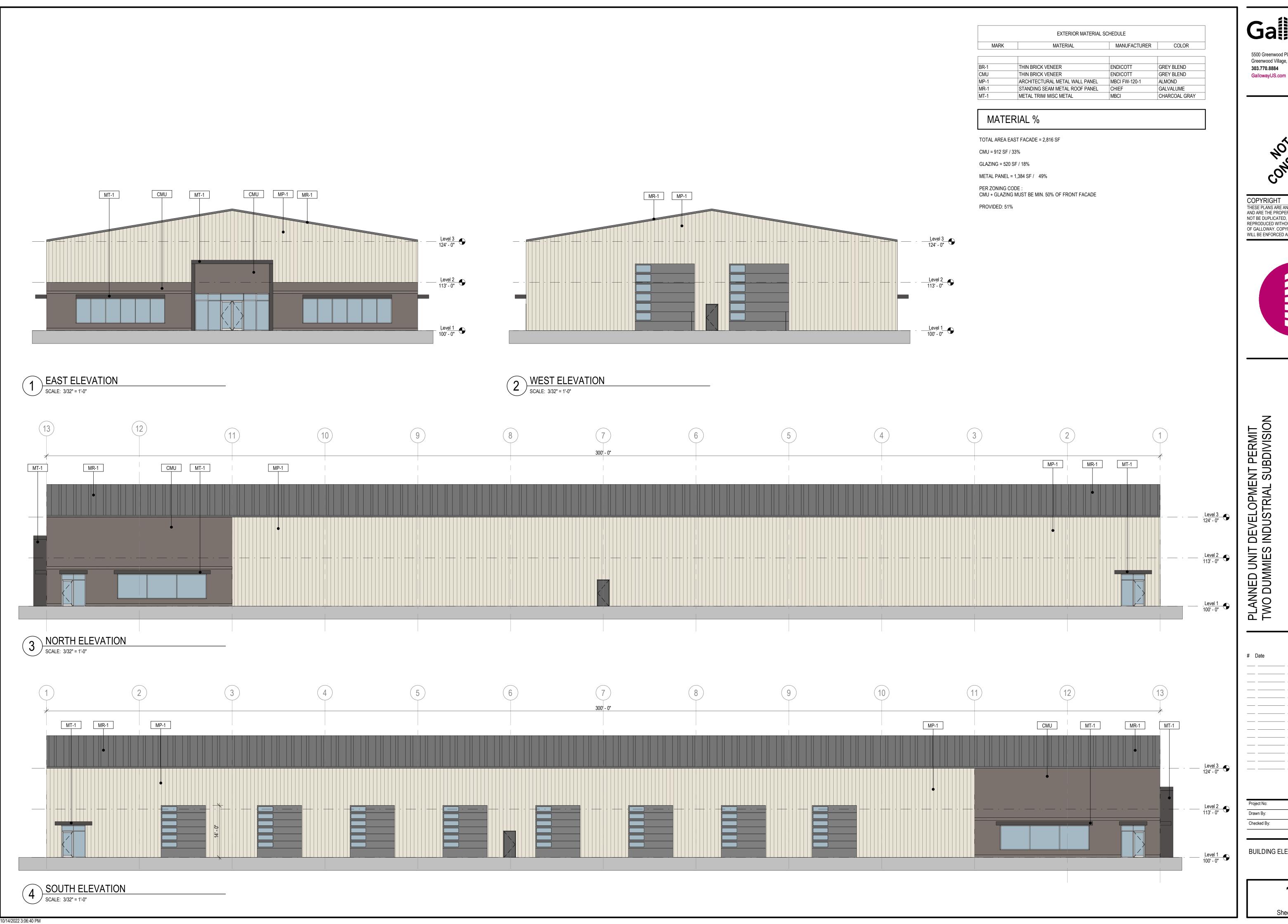
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| Drawn By:     | RDG        |
| Checked By:   | MJ         |
| Date:         | 10/14/2022 |
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PHOTOMETRIC PLAN AND DETAILS



Galloway

5500 Greenwood Plaza Blvd., Suite 200 Greenwood Village, CO 80111 303.770.8884

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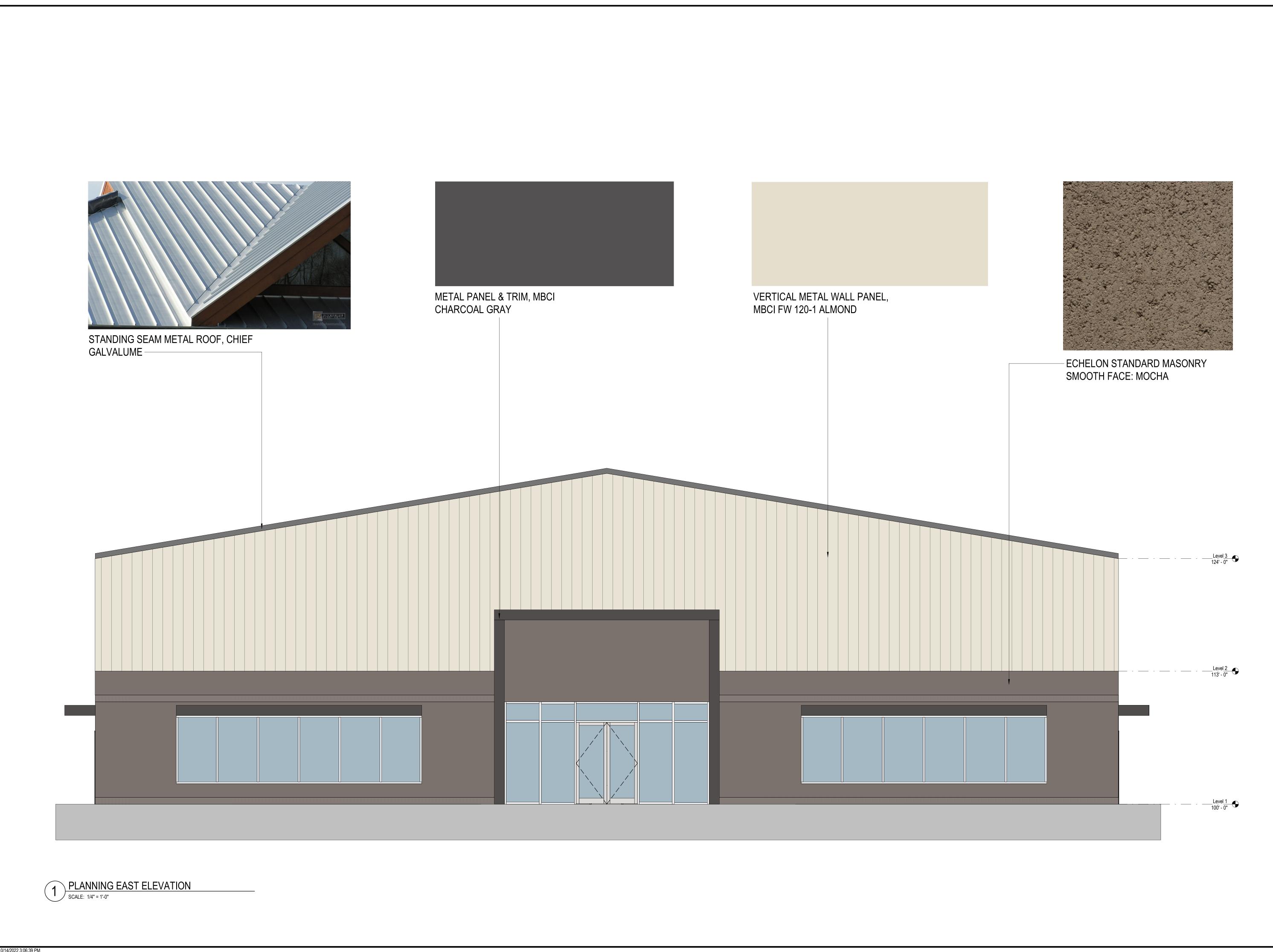
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**BUILDING ELEVATIONS** 

#### **EXHIBIT C**

#### **Material Board**



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MATERIAL BOARD

#### **EXHIBIT D**

**Preliminary Drainage Report** 



## PRELIMINARY DRAINAGE REPORT

### 6601 COLORADO BOULEVARD INDUSTRIAL AT CLAIRE AND ALYSSA INDUSTRIAL SUBDIVISION

Commerce City, Colorado

PREPARED FOR: 6601 COLORADO HOLDING, LLC 2551 N York St Denver, CO 80205 Attn: Karl Umland

PREPARED BY:

Galloway & Company, Inc. 5500 Greenwood Plaza Blvd, Suite 200 Greenwood Village, CO 80111 Attn: Jenny Romano

Attn: Jenny Romano

PREPARED: October 24, 2022

**REVISED:** 

\_

#### **ENGINEER'S STATEMENT**

| I affirm that this report and plan for the Final drainage designerepared by me (or under my direct supervision) in accordance Storm Drainage Design and Technical Criteria Manual for the of Commerce City does not and will not assume liability for                                                                                                                                                 | ance with the provisions of the Commerce City the owners thereof. I understand that the City                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Jennifer Romano, PE #44401                                                                                                                                                                                                                                                                                                                                                                            | <br>Date                                                                                                                                                                                  |
| For and on behalf of Galloway & Company, Inc.                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                           |
| DEVELOPER'S CERTIFICATION                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                           |
| "6601 Colorado Holding, LLC hereby certifies that the drain Industrial facility shall be constructed according to the design the City of Commerce City does not and will not assume lia certified by my engineer and that the City of Commerce City Municipal Code; but cannot, on behalf of 6601 Colorado Holding review will absolve 6601 Colorado Holding, LLC and liability for improper design." | ign presented in this report. I understand that ability for the drainage facilities designed and/ority reviews drainage plans pursuant to the lolding, LLC, guarantee that final drainage |
| Authorized Signature 6601 Colorado Holding, LLC – Karl Umland                                                                                                                                                                                                                                                                                                                                         | Date                                                                                                                                                                                      |

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#### Appendices:

- A. Reference Materials
- B. Hydrology CalculationsC. Hydraulic Calculations
- D. Drainage Map

#### I. General Location and Description

#### Location

The 6601 Colorado Holding site, is located on a parcel of land situated in the SW ¼ of Section 1, Township 3 south, Range 68 West of the 6<sup>th</sup> Principal Meridian, Commerce City, County of Adams, State of Colorado. The site is currently developed as a light vehicle storage yard, unused fields, a small collection of storage buildings, and two single family residences. The site is bound by Colorado Boulevard to the east, industrial private lots to the north and south, and the O'Brian canal to the west. See Appendix A for a Vicinity Map of the site.

#### **Description of Property**

The site is currently developed as a storage yard with a few acres of unused field area and is zoned AG agricultural. The project seeks to rezone the site as medium industrial (I-2). The area of disturbance is estimated to be approximately 11.00 acres. The west half of the site generally slopes to the northwest at 1-3% slopes while the east portion of the site slopes at less than 1% generally to the east.

According to the USDA NRCS Web Soil Survey for Adams County the site contains Terrace escarpments and Vona sandy loam, 0 to 1 percent, which are both classified as Hydrologic Soil Group A. Refer to Appendix A for soil survey information.

There are no known existing irrigation canals or irrigation ditches on the project site. O'Brian canal is located directly west of the site and will not be impacted by this development. There are no wetlands present on-site.

This report will present the proposed drainage design for this development, which includes regrading of the open yard of the site and a proposed warehouse building with associated paving on the east side of the site. On-site stormwater will be managed with a series of inlets connected to an infiltration pond. No existing connection to a public storm sewer exists or is proposed.

#### **Proposed Project Description**

The project proposes to demolish all existing buildings on site as well as two existing water wells. The existing yard composing the majority of the site will be regraded to discourage ponding on site and route surface runoff to a proposed infiltration pond at the southwest corner of the site. A 30,000 SF light industrial building is proposed on the east side of the site. Paved parking and access drives surround the proposed building. Additional site improvements include installation of an approximately 263,260 SF gravel storage yard, utility services to the building, additional fencing and new access gates, site lights, and landscaping improvements. The development will be served by two access points along Colorado Boulevard.

#### Drainage Studies Relevant to the Site

There are no known drainage studies relevant to the site or adjacent areas.

#### II. Drainage Basins and Sub-Basins

#### **Existing Basin Description**

The majority of the existing site, primarily the western section of the property, sheet flows west and outfalls to the existing O'Brian Canal. The remainder of the site is sloped at less than 1% generally sloping to the north. There are no existing detention or water quality facilities located on the project site and there is no existing storm infrastructure in close proximity to the site. The proposed development will

include stormwater infrastructure to collect and infiltrate water on site at a pond located in the southeast corner of the site. No offsite basins are accounted for in the proposed drainage design.

#### Proposed Sub-Basin Descriptions

The proposed drainage plan for the site consists of nine drainage basins over the 11.55 acre site

As will be discussed later, the below proposed basin coverages are not reflected in the infiltration pond sizing. The pond has been sized to accommodate potential future use. Below is a breakdown of the site coverages as proposed:

Basin A-1 (0.69 acres) represents the proposed building roof area. Downspouts on the south side of the building route runoff to the concrete and asphalt paved area south of the building before runoff is collected and piped to the existing infiltration pond.

Basin A-2 and A-3 (0.87 and 1.07 acres respectfully) are located on the eastern side of the site and consist of mostly paved areas surrounding the proposed building. They consist of asphalt and concrete pavement, sidewalks, and landscaping. Drainage from the basins is collected at a pair of inlets north and south of the proposed building. These inlets are routed to the proposed infiltration pond.

Basin A-4 through A-7 (2.90, 0.17, 2.16, and 3.03 acres respectfully) are located on the west portion of the site. The majority of this area is proposed as gravel storage/parking areas. Landscaping surrounds the gravel yard. The individual basins are broken apart by drainage point. Runoff within basins A-4, A-5, and A-6 are routed by grass-lined swales and collected by inlets placed at low spots on the site. These inlets discharge to the proposed infiltration pond. Meanwhile, Basin A-7 sheet flows to the proposed infiltration pond.

Basin B-1 (0.13 acres) is located on the eastern most edge of the site. Due to proposed grading, this area is unable to be collected on site and is discharged to Colorado Boulevard.

Basing C-1 (0.55 acres) represents the untouched portions of landscaping along the west edge of the site. Due to pond placement and existing grading, this area is infeasible to be collected in the proposed pond on site. Runoff from this area routes as it currently does in the existing condition, towards the O'Brian Canal.

#### III. Design Criteria

#### Regulations

The proposed drainage design complies with the Mile High Flood District *Urban Storm Drainage Criteria Manual* and the Commerce City *Storm Drainage Design and Technical Criteria Manual*.

#### **Hydrology**

The drainage calculations will be based on the *Storm Drainage Design and Technical Criteria Manual*. The design point rainfall values listed below will be utilized in the design calculations at a later stage in the project. These values were obtained from Chapter 4 of the *Storm Drainage Design and Technical Criteria Manual* (refer to Appendix A).

|          | Average Recurrence Interval (years) |      |      |      |      |
|----------|-------------------------------------|------|------|------|------|
| Duration | 2                                   | 5    | 10   | 50   | 100  |
| 60-min   | 0.97                                | 1.37 | 1.55 | 2.24 | 2.58 |

The time of concentration for each basin is assumed to be 5 minutes, which is based on the minimum allowable standards per the *Urban Storm Drainage Criteria Manual, Chapter 6*.

The rational method will used to calculate peak flows as the tributary areas are less than 100 acres. The rational method has proven to be accurate for basins of this size and is based on the following formula:

Q = CIA

Where:

Q = Peak Discharge (cfs)

C = Runoff Coefficient

I = Runoff Intensity (inches/hour)

A = Drainage Area (acres)

#### **Hydraulics**

Sheet flow, swales, and inlets shall convey runoff through the site to the designated infiltration pond. The WQCV water surface elevation, EURV water surface elevation, and 100-year water surface elevation were calculated using the Mile High Flood District Detention Basin Design Workbook (refer to Appendix C).

#### Water Quality Enhancement

The proposed infiltration pond will provide water quality for approximately 94.11% of the site, which meets the state MS4 permit requirement of 80% minimum. The remaining 0.68 acres (Basins B-1 and C-1) of the site will flow offsite untreated since it is infeasible to capture and treat runoff from these areas, as allowed by the MS4 permit. The proposed infiltration pond will be seeded and grown to established vegetation that will assist in the removal of soluble pollutants such as phosphorous and nitrogen through biological uptake. Sediment will be removed during the percolation process.

#### IV. Stormwater Management Facility Design

#### Stormwater Conveyance Facilities

Stormwater runoff will be conveyed through the site via sheet flow or vegetated swales, inlets, and pipes to the proposed infiltration pond.

#### Stormwater Storage Facilities

A single infiltration pond will be provided at the southwest corner of the site. Infiltration was chosen because there is no existing storm infrastructure available on or adjacent to the site to outfall detained runoff nor can it be released into the O'Brian Canal. Percolation testing will be performed to determine the infiltration capacity of the site. Nearby sites have utilized a similar approach for drainage conformance in Commerce City. As proposed, a majority of the site is proposed as a gravel yard suitable for storage or parking. MHFD provides an impervious value of 40% for gravel areas. To account for potential future use cases, the pond has been sized for the entirety of the site with gravel areas assumed to be 80% impervious. In the Appendix B composite % impervious calculations show that this approach leads to an

overall basin imperviousness of 64.1%. As proposed with the basin breakdown discussed in Section II of this report, the proposed composite imperviousness is 47.1%. Therefore, the pond is sufficiently sized for the proposed development with additional capacity for further impervious development on the site.

A MHFD-Detention spreadsheet was utilized to calculate the 100-year water surface elevation for the pond. The 1-hour point rainfall data built into this spreadsheet was utilized. The Rain Garden — Bioretention BMP was used since this provides the most accurate approximation for an infiltration pond. The infiltration pond was sized for two times the required 100-year detention volume per Commerce City requirements. Because additional detention volume was provided a factor of safety was not applied to the release rates of the pond. The required design volume (2\*100-year detention volume) is 2.65 acrefeet. Based on the MHFD-Detention spreadsheet the provided storage volume in the 100-year storm event is 2.92 acre-feet.

#### V. Conclusions

#### Compliance with Standards

The proposed storm drainage design has been performed in accordance with applicable sections of the MHFD *Urban Storm Drainage Criteria Manual*, the Commerce City *Storm Drainage Design and Technical Criteria Manual*, and sound engineering principles. The proposed improvements will modify existing drainage patterns to limit runoff currently running to neighboring properties or the existing canal by diverting flows to the proposed infiltration pond. The design shows that the runoff from the proposed and existing site improvements will be safely conveyed and treated with no adverse effects to downstream systems. Detailed calculations provided in this report show the design will be adequate for the proposed development.

#### VI. References

- 1. <u>Urban Storm Drainage Criteria Manual</u>, Mile High Flood District, August 2018 (with current revisions).
- Storm Drainage Design and Technical Criteria Manual, City of Commerce City, 1989.
- 3. Soil Map Adams County, Colorado as available through the Natural Resources Conservation Service National Cooperative Soil Survey web site via Web Soil Survey 2.0.

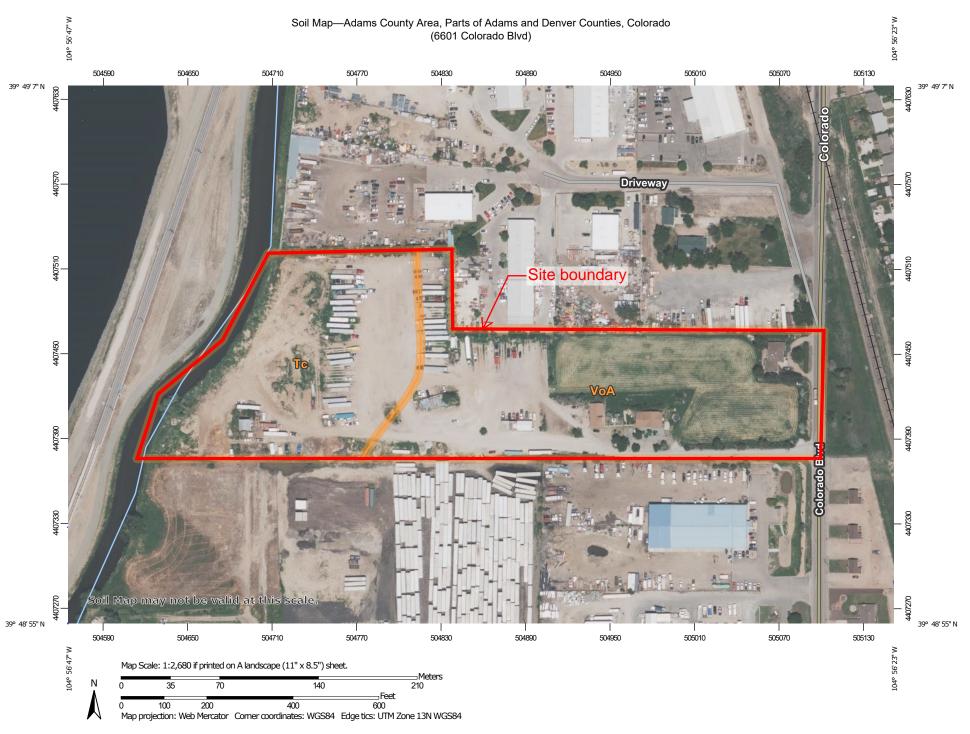
#### **APPENDIX A – Reference Material**

Vicinity Map NRCS Soils Map





# VICINITY MAP



#### MAP LEGEND

#### Area of Interest (AOI)

Area of Interest (AOI)

#### Soils

Soil Map Unit Polygons



Soil Map Unit Lines



Soil Map Unit Points

#### **Special Point Features**

Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



**Gravelly Spot** 



Landfill



Lava Flow

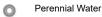
Marsh or swamp



Mine or Quarry



Miscellaneous Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot

#### 8

Spoil Area



Stony Spot



Very Stony Spot



Wet Spot Other



Special Line Features

#### Water Features

~

Streams and Canals

#### **Transportation**



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

#### Background



Aerial Photography

#### MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20.000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Adams County Area, Parts of Adams and Denver Counties, Colorado

Survey Area Data: Version 18, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 9, 2021—Jun 12, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## **Map Unit Legend**

| Map Unit Symbol                            | Map Unit Name       | Acres in AOI | Percent of AOI |  |
|--------------------------------------------|---------------------|--------------|----------------|--|
| Тс                                         | Terrace escarpments | 5.3          | 42.9%          |  |
| VoA Vona sandy loam, 0 to 1 percent slopes |                     | 7.1          | 57.1%          |  |
| Totals for Area of Interest                | - 1                 | 12.4         | 100.0%         |  |

#### **COMPOSITE % IMPERVIOUS CALCULATIONS**

**Subdivision:** Lot 1 Two Dummies Subdivision

Location: CO, Commerce City

 Project Name:
 6601 Colorado Blvd

 Project No.:
 6CH01

 Calculated By:
 MSJ

 Checked By:
 JRR

 Date:
 10/3/22

|          |                 |        | Paved Road | ds                 |        | Lawns     |                 |        | Roofs     |                 |        | Gravel    |                 | Basins Total       |                      |
|----------|-----------------|--------|------------|--------------------|--------|-----------|-----------------|--------|-----------|-----------------|--------|-----------|-----------------|--------------------|----------------------|
| Basin ID | Total Area (ac) | % lmp. | Area (ac)  | Weighted<br>% Imp. | % lmp. | Area (ac) | Weighted % Imp. | % lmp. | Area (ac) | Weighted % Imp. | % lmp. | Area (ac) | Weighted % Imp. | Weighted %<br>Imp. |                      |
| Site     | 11.55           | 100    | 1.74       | 15.1               | 0      | 0.24      | 0.0             | 90     | 0.69      | 5.40            | 80     | 6.29      | 43.60           | 64.1               | As Pond Sized        |
|          |                 |        |            |                    |        |           |                 |        |           |                 |        |           |                 |                    |                      |
| A-1      | 0.69            | 100    | 0.00       | 0.00               | 0      | 0.00      | 0.00            | 90     | 0.69      | 90.20           | 40     | 0.00      | 0.00            | 90.20              |                      |
| A-2      | 0.87            | 100    | 0.63       | 72.69              | 0      | 0.24      | 0.00            | 90     | 0.00      | 0.00            | 40     | 0.00      | 0.00            | 72.69              |                      |
| A-3      | 1.07            | 100    | 1.03       | 95.87              | 0      | 0.05      | 0.00            | 90     | 0.00      | 0.00            | 40     | 0.00      | 0.00            | 95.87              |                      |
| A-4      | 2.90            | 100    | 0.00       | 0.00               | 0      | 0.24      | 0.00            | 90     | 0.69      | 21.40           | 40     | 2.66      | 36.70           | 58.10              |                      |
| A-5      | 0.17            | 100    | 0.00       | 0.00               | 0      | 0.17      | 0.00            | 90     | 0.00      | 0.00            | 40     | 0.00      | 0.00            | 0.00               |                      |
| A-6      | 2.16            | 100    | 0.00       | 0.00               | 0      | 0.52      | 0.00            | 90     | 0.00      | 0.00            | 40     | 1.64      | 30.40           | 30.40              |                      |
| A-7      | 3.03            | 100    | 0.00       | 0.00               | 0      | 1.04      | 0.00            | 90     | 0.00      | 0.00            | 40     | 1.99      | 26.30           | 26.30              |                      |
| B-1      | 0.13            | 100    | 0.03       | 22.73              | 0      | 0.10      | 0.00            | 90     | 0.00      | 0.00            | 40     | 0.00      | 0.00            | 22.73              |                      |
| C-1      | 0.55            | 100    | 0.00       | 0.00               | 0      | 0.55      | 0.00            | 90     | 0.00      | 0.00            | 40     | 0.00      | 0.00            | 0.00               |                      |
| Total    | 11.57           | 100    | 1.69       | 14.61              | 0      | 2.91      | 0.00            | 90     | 1.38      | 10.70           | 40     | 6.29      | 21.80           | 47.11              | Total Site As Design |

Galloway & Company, Inc. Page 4 of 15

# STANDARD FORM SF-2 TIME OF CONCENTRATION

Subdivision: Lot 1 Two Dummies Subdivision
Location: CO, Commerce City

**Project Name:** 6601 Colorado Blvd

Project No.: 6CH01

Calculated By: MSJ
Checked By: JRR

Date: 10/3/22

|       |       | SUB-B       | ASIN       |                  |                | INITI | AL/OVER           | LAND           |      | TR  | AVEL TIM          | ſΕ    |                |                      | Tc CHECK    |                          |                |
|-------|-------|-------------|------------|------------------|----------------|-------|-------------------|----------------|------|-----|-------------------|-------|----------------|----------------------|-------------|--------------------------|----------------|
|       |       | DAT         | Α          |                  |                |       | (T <sub>i</sub> ) |                |      |     | (T <sub>t</sub> ) |       |                | (U                   | RBANIZED BA | SINS)                    | FINAL          |
| BASIN | D.A.  | Hydrologic  | Impervious | C <sub>100</sub> | C <sub>5</sub> | L     | S                 | T <sub>i</sub> | L    | S   | Cv                | VEL.  | T <sub>t</sub> | COMP. T <sub>c</sub> | TOTAL       | Urbanized T <sub>c</sub> | T <sub>c</sub> |
| ID    | (AC)  | Soils Group | (%)        |                  |                | (FT)  | (%)               | (MIN)          | (FT) | (%) |                   | (FPS) | (MIN)          | (MIN)                | LENGTH (FT) | (MIN)                    | (MIN)          |
| Site  | 11.55 | Α           | 64.1       | 0.52             | 0.40           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
|       |       |             |            |                  |                |       |                   |                |      |     |                   |       |                |                      |             |                          |                |
| A-1   | 0.69  | Α           | 90.2       | 0.79             | 0.71           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-2   | 0.87  | Α           | 72.7       | 0.59             | 0.48           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-3   | 1.07  | Α           | 95.9       | 0.88             | 0.81           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-4   | 2.90  | Α           | 58.1       | 0.49             | 0.35           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-5   | 0.17  | Α           | 0.0        | 0.20             | 0.00           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-6   | 2.16  | Α           | 30.4       | 0.37             | 0.19           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| A-7   | 3.03  | Α           | 26.3       | 0.36             | 0.17           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| B-1   | 0.13  | Α           | 22.7       | 0.34             | 0.15           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| C-1   | 0.55  | Α           | 0.0        | 0.20             | 0.00           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
| Total | 11.57 | Α           | 47.1       | 0.43             | 0.28           |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
|       |       |             |            |                  |                |       |                   |                |      |     |                   |       |                |                      |             |                          | 5.0            |
|       |       |             |            |                  |                |       |                   |                |      |     |                   |       |                |                      |             |                          |                |
|       |       |             |            |                  |                |       |                   |                |      |     |                   |       |                |                      |             |                          |                |

#### NOTES:

 $T_i = (0.395*(1.1 - C_5)*(L)^0.5)/((S)^0.33), S in ft/ft$ 

T<sub>t</sub>=L/60V (Velocity From Fig. 501)

Velocity V=Cv\*S^0.5, S in ft/ft

Tc Check = 10+L/180

For Urbanized basins a minimum  $T_{\rm c}$  of 5.0 minutes is required.

For non-urbanized basins a minimum  $T_{\text{c}}$  of 10.0 minutes is required

Galloway & Company, Inc.

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#### STANDARD FORM SF-3

#### STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

|                                            | Project Name: 6601 Colorado Blvd |
|--------------------------------------------|----------------------------------|
| Subdivision: Lot 1 Two Dummies Subdivision | Project No.: 6CH01               |
| Location: CO, Commerce City                | Calculated By: MSJ               |
| Design Storm: 5-Year                       | Checked By: JRR                  |
| <del></del>                                | Date: 10/3/22                    |

|        |              |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           | 10/3/2             |             |                |          |                                                          |
|--------|--------------|----------|-----------|---------------|----------|----------|-----------|---------|----------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|----------|----------------------------------------------------------|
|        |              |          |           | DIR           | ECT R    | UNOFF    |           |         |          | OTAL     | RUNOF     | F       | STR       | EET               |                   | PIPE      |                    | TR/         | VEL T          | IME      |                                                          |
| STREET | Design Point | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | l (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | l (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | REMARKS                                                  |
|        | 1            | A-1      | 0.69      | 0.71          | 5.0      | 0.49     | 4.79      | 2.3     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Building Roof area                                       |
|        | 1            | A-2      | 0.87      | 0.48          | 5.0      | 0.42     | 4.79      | 2.0     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Parking lot area north of building                       |
|        | 1            | A-3      | 1.07      | 0.81          | 5.0      | 0.87     | 4.79      | 4.2     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Parking lot area south of building                       |
|        | 1            | A-4      | 2.90      | 0.35          | 5.0      | 1.01     | 4.79      | 4.8     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, swale and inlet at north prop edge           |
|        | 1            | A-5      | 0.17      | 0.00          | 5.0      | 0.00     | 4.79      | 0.0     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Landscape area, swale and inlet at north prop edge       |
|        | 1            | A-6      | 2.16      | 0.19          | 5.0      | 0.41     | 4.79      | 2.0     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, swale and inlet along north and west edge    |
|        | 1            | A-7      | 3.03      | 0.17          | 5.0      | 0.52     | 4.79      | 2.5     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, sheet flow to infiltration pond              |
|        | -            |          | <u> </u>  |               |          |          |           |         | 5.0      | 3.72     | 4.79      | 17.8    |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to infiltration pond           |
|        | 2            | B-1      | 0.13      | 0.15          | 5.0      | 0.02     | 4.79      | 0.1     |          |          |           |         |           |                   |                   |           |                    |             |                |          | East frontage of site sheet flowing east to Colo. Blvd   |
|        |              |          |           |               |          |          |           |         | 5.0      | 0.02     | 4.79      | 0.1     |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to Colorado Blvd               |
|        | 3            | C-1      | 0.55      | 0.00          | 5.0      | 0.00     | 4.79      | 0.0     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Existing area to remain. All Lscape. Sheet flow to canal |
|        | -            |          |           |               |          |          |           |         | 5.0      | 0.00     | 4.79      | 0.0     |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to O'Brian Canal               |
|        | +            |          | <u> </u>  |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        | +            |          | <u> </u>  |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        | lacksquare   |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        | +            |          | <u> </u>  |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        | 1            |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |

Galloway & Company, Inc.

# STANDARD FORM SF-3 STORM DRAINAGE SYSTEM DESIGN

(RATIONAL METHOD PROCEDURE)

|                                            | Project Name: 6601 Colorado Blvd |
|--------------------------------------------|----------------------------------|
| Subdivision: Lot 1 Two Dummies Subdivision | Project No.: 6CH01               |
| Location: CO, Commerce City                | Calculated By: MSJ               |
| Design Storm: 100-Year                     | Checked By: JRR                  |
|                                            | Date: 10/3/22                    |

|        |              |          |           | DIRE          | CT RUN   | OFF      |           |         |          | TOTAL    | RUNOFF    | =       | STR       | EET               |                   | PIPE      |                    | TRA         | VEL T          | IME      |                                                          |
|--------|--------------|----------|-----------|---------------|----------|----------|-----------|---------|----------|----------|-----------|---------|-----------|-------------------|-------------------|-----------|--------------------|-------------|----------------|----------|----------------------------------------------------------|
| STREET | Design Point | Basin ID | Area (Ac) | Runoff Coeff. | Tc (min) | C*A (Ac) | l (in/hr) | Q (cfs) | Tc (min) | C*A (Ac) | l (in/hr) | Q (cfs) | Slope (%) | Street Flow (cfs) | Design Flow (cfs) | Slope (%) | Pipe Size (inches) | Length (ft) | Velocity (fps) | Tt (min) | REMARKS                                                  |
|        | 1            | A-1      | 0.69      | 0.79          | 5.0      | 0.54     | 9.02      | 4.9     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Building Roof area                                       |
|        | 1            | A-2      | 0.87      | 0.59          | 5.0      | 0.51     | 9.02      | 4.6     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Parking lot area north of building                       |
|        | 1            | A-3      | 1.07      | 0.88          | 5.0      | 0.95     | 9.02      | 8.6     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Parking lot area south of building                       |
|        | 1            | A-4      | 2.90      | 0.49          | 5.0      | 1.42     | 9.02      | 12.8    |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, swale and inlet at north prop edge           |
|        | 1            | A-5      | 0.17      | 0.20          | 5.0      | 0.03     | 9.02      | 0.3     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Landscape area, swale and inlet at north prop edge       |
|        | 1            | A-6      | 2.16      | 0.37          | 5.0      | 0.80     | 9.02      | 7.2     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, swale and inlet along north and west edge    |
|        | 1            | A-7      | 3.03      | 0.36          | 5.0      | 1.09     | 9.02      | 9.8     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Gravel lot, sheet flow to infiltration pond              |
|        |              |          |           |               |          |          |           |         | 5.0      | 5.34     | 4.79      | 25.6    |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to infiltration pond           |
|        | 2            | B-1      | 0.13      | 0.34          | 5.0      | 0.04     | 9.02      | 0.4     |          |          |           |         |           |                   |                   |           |                    |             |                |          | East frontage of site sheet flowing east to Colo. Blvd   |
|        |              |          |           |               |          |          |           |         | 5.0      | 0.04     | 4.79      | 0.2     |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to Colorado Blvd               |
|        | 3            | C-1      | 0.55      | 0.20          | 5.0      | 0.11     | 9.02      | 1.0     |          |          |           |         |           |                   |                   |           |                    |             |                |          | Existing area to remain. All Lscape. Sheet flow to canal |
|        |              |          |           |               |          |          |           |         | 5.0      | 0.11     | 4.79      | 0.5     |           |                   |                   |           |                    |             |                |          | Total runoff from on-site to O'Brian Canal               |
|        |              |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        |              |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        |              |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        |              |          |           |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |
|        |              |          | 1         |               |          |          |           |         |          |          |           |         |           |                   |                   |           |                    |             |                |          |                                                          |

Galloway & Company, Inc.

## **APPENDIX B – Hydrology Calculations**

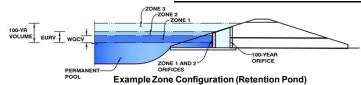
Composite Imperviousness Calculations

#### DETENTION BASIN STAGE-STORAGE TABLE BUILDER

MHFD-Detention, Version 4.04 (February 2021)

#### Project: 6601 Colorado Boulevard

#### Basin ID: Site



#### Watershed Information

| Selected BMP Type =                       | RG     |         |
|-------------------------------------------|--------|---------|
| Watershed Area =                          | 11.46  | acres   |
| Watershed Length =                        | 1,585  | ft      |
| Watershed Length to Centroid =            | 600    | ft      |
| Watershed Slope =                         | 0.020  | ft/ft   |
| Watershed Imperviousness =                | 64.90% | percent |
| Percentage Hydrologic Soil Group A =      | 100.0% | percent |
| Percentage Hydrologic Soil Group B =      | 0.0%   | percent |
| Percentage Hydrologic Soil Groups $C/D =$ | 0.0%   | percent |
| Target WQCV Drain Time =                  | 12.0   | hours   |

Location for 1-hr Rainfall Depths = Commerce City - Civic Center

After providing required inputs above including 1-hour rainfall depths, click 'Run CUHP' to generate runoff hydrographs using the embedded Colorado Urban Hydrograph Procedure.

| the embedded Colorado Urban Hydro      | graph Procedu | re.       |
|----------------------------------------|---------------|-----------|
| Water Quality Capture Volume (WQCV) =  | 0.194         | acre-feet |
| Excess Urban Runoff Volume (EURV) =    | 0.922         | acre-feet |
| 2-yr Runoff Volume (P1 = 0.84 in.) =   | 0.461         | acre-feet |
| 5-yr Runoff Volume (P1 = 1.12 in.) =   | 0.631         | acre-feet |
| 10-yr Runoff Volume (P1 = 1.37 in.) =  | 0.794         | acre-feet |
| 25-yr Runoff Volume (P1 = 1.75 in.) =  | 1.068         | acre-feet |
| 50-yr Runoff Volume (P1 = 2.08 in.) =  | 1.345         | acre-feet |
| 100-yr Runoff Volume (P1 = 2.43 in.) = | 1.674         | acre-feet |
| 500-yr Runoff Volume (P1 = 3.35 in.) = | 2.535         | acre-feet |
| Approximate 2-yr Detention Volume =    | 0.424         | acre-feet |
| Approximate 5-yr Detention Volume =    | 0.586         | acre-feet |
| Approximate 10-yr Detention Volume =   | 0.740         | acre-feet |
| Approximate 25-yr Detention Volume =   | 0.996         | acre-feet |
| Approximate 50-yr Detention Volume =   | 1.159         | acre-feet |
| Approximate 100-yr Detention Volume =  | 1.326         | acre-feet |

#### Optional User Overrides

| acre-feet |
|-----------|
| acre-feet |
| inches    |
|           |

#### <u>Define Zones and Basin Geometry</u>

| Zone 1 Volume (WQCV)                                  | = | 0.194 | acre-feet       |
|-------------------------------------------------------|---|-------|-----------------|
| Zone 2 Volume (EURV - Zone 1)                         | = | 0.729 | acre-feet       |
| Zone 3 Volume (User Defined - Zones 1 & 2)            | = | 1.730 | acre-feet       |
| Total Detention Basin Volume                          | = | 2.652 | acre-feet       |
| Initial Surcharge Volume (ISV)                        | = | N/A   | ft <sup>3</sup> |
| Initial Surcharge Depth (ISD)                         | = | N/A   | ft              |
| Total Available Detention Depth (H <sub>total</sub> ) | = | user  | ft              |
| Depth of Trickle Channel ( $H_{TC}$ )                 | = | N/A   | ft              |
| Slope of Trickle Channel (S <sub>TC</sub> )           | = | N/A   | ft/ft           |
| Slopes of Main Basin Sides (S <sub>main</sub> )       | - | user  | H:V             |
| Basin Length-to-Width Ratio (R <sub>L/W</sub> )       | = | user  |                 |

| Initial Surcharge Area $(A_{ISV})$ =          | user | ft²             |
|-----------------------------------------------|------|-----------------|
| Surcharge Volume Length $(L_{ISV}) =$         | user | ft              |
| Surcharge Volume Width $(W_{ISV}) =$          | user | ft              |
| Depth of Basin Floor $(H_{FLOOR})$ =          | user | ft              |
| Length of Basin Floor $(L_{FLOOR})$ =         | user | ft              |
| Width of Basin Floor $(W_{FLOOR}) =$          | user | ft              |
| Area of Basin Floor $(A_{FLOOR}) =$           | user | ft²             |
| Volume of Basin Floor $(V_{FLOOR}) =$         | user | ft <sup>3</sup> |
| Depth of Main Basin $(H_{MAIN}) =$            | user | ft              |
| Length of Main Basin $(L_{MAIN}) =$           | user | ft              |
| Width of Main Basin ( $W_{MAIN}$ ) =          | user | ft              |
| Area of Main Basin $(A_{MAIN}) =$             | user | ft²             |
| Volume of Main Basin ( $V_{MAIN}$ ) =         | user | ft <sup>3</sup> |
| Calculated Total Basin Volume $(V_{total}) =$ | user | acre-feet       |
|                                               |      |                 |

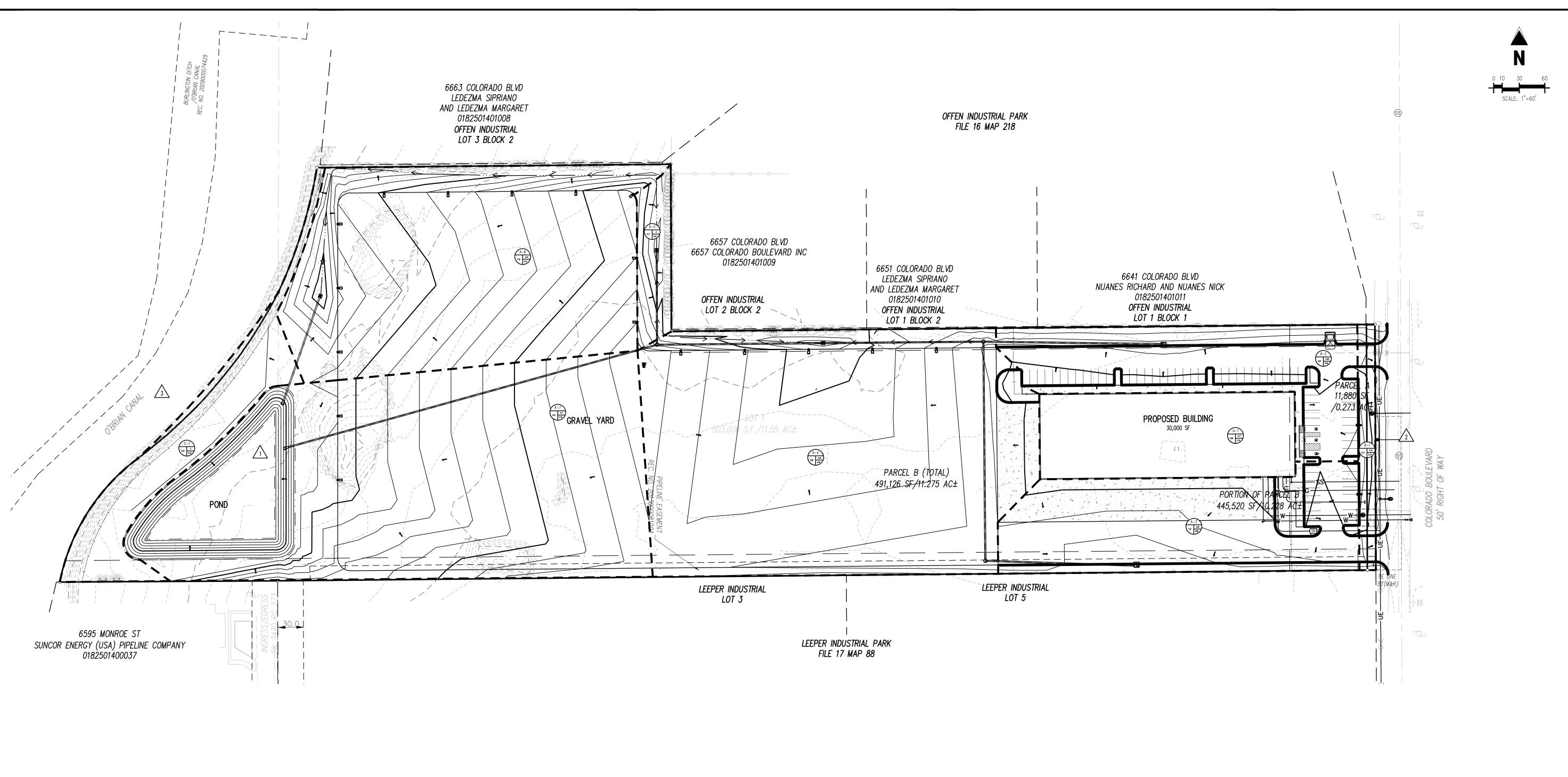
| Depth Increment = |       | ft         |        |       |                    |                         |
|-------------------|-------|------------|--------|-------|--------------------|-------------------------|
|                   |       | Optional   |        |       |                    | Optional                |
| Stage - Storage   | Stage | Override   | Length | Width | Area               | Override                |
| Description       | (ft)  | Stage (ft) | (ft)   | (ft)  | (ft <sup>2</sup> ) | Area (ft <sup>2</sup> ) |
| Media Surface     |       | 0.00       |        |       |                    | 11,245                  |
|                   |       | 0.50       |        |       |                    | 12,232                  |
|                   |       | 1.00       |        |       |                    | 13,219                  |
|                   |       | 1.50       |        |       |                    | 14,207                  |
|                   |       | 2.00       |        |       |                    | 15,194                  |
|                   |       | 2.50       |        |       |                    | 16,181                  |
|                   |       | 3.00       |        |       |                    | 17,168                  |
|                   |       | 3.50       |        |       |                    | 18,155                  |
|                   |       | 4.00       |        |       |                    |                         |
|                   |       |            |        |       |                    | 19,143                  |
|                   |       | 4.50       |        |       |                    | 20,130                  |
|                   |       | 5.00       |        |       |                    | 21,117                  |
|                   |       | 5.50       |        |       |                    | 22,104                  |
|                   |       | 6.00       |        |       |                    | 23,092                  |
|                   |       | 6.50       |        |       |                    | 24,079                  |
|                   |       | 7.00       |        |       |                    | 25,066                  |
|                   |       |            |        |       |                    |                         |
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MHFD-Detention\_v4 04.xlsm, Basin 10/19/2022, 1:04 PM

# **APPENDIX C – Hydraulic Calculations**

Infiltration Pond Sizing Calculations
UD-Detention Spreadsheets

# APPENDIX D - Drainage Map



|                 | PROPERTY BOUNDARY LINE                  |
|-----------------|-----------------------------------------|
|                 | - ADJACENT PROPERTY BOUNDARY LINE       |
|                 | - RIGHT OF WAY BOUNDARY LINE            |
|                 | - EXISTING EASEMENT LINE                |
|                 | - PROPOSED EASEMENT LINE                |
| SD              | - PROPOSED STORM SEWER (LESS THAN 12"ø) |
|                 | PROPOSED STORM SEWER (12"0 AND LARGER)  |
| — — — 5460 —  — | - EXISTING MAJOR CONTOUR                |
|                 | EXISTING MINOR CONTOUR                  |
| (5465)          | - PROPOSED MAJOR CONTOUR                |
| 66              | - PROPOSED MINOR CONTOUR                |
|                 | ■ MAJOR BASIN BOUNDARY LINE             |
| <u></u>         | DESIGN POINT                            |
| <b>=</b>        | FLOW ARROW                              |
| 100             | — Basin designation                     |
| 0.00            | — 5-YEAR RUNOFF COEFFICIENT             |
| 0.00            | — 100-YEAR RUNOFF COEFFICIENT           |
|                 | — BASIN AREA IN ACRES                   |

| APPROVED BY THE DEPA  | RTMENT OF COMMUNITY DEVELO | OPMENT OF THE CITY | OF     |
|-----------------------|----------------------------|--------------------|--------|
| COMMERCE CITY, THIS _ | DAY OF                     |                    | , A.D. |
|                       |                            |                    |        |
|                       |                            |                    |        |
|                       |                            |                    |        |

# Galloway

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DRAINAGE MAP LOT 1, TWO DUMMIES INDUSTRIAL SUBDIVISION

|   | Date | Issue / Description | In |
|---|------|---------------------|----|
| _ |      |                     |    |
| _ |      |                     |    |
| _ |      |                     | _  |

| Project No: | 6CH00000   |
|-------------|------------|
| Drawn By:   | RDO        |
| Checked By: | MS         |
| Date:       | 10/14/2022 |
|             | ***        |

FINAL DRAINAGE PLAN

DR1

# **EXHIBIT E**

**Traffic Impact Study** 

# Galloway TRAFFIC IMPACT STUDY

# 6601 COLORADO HOLDING

Commerce City, CO

PREPARED FOR: **6601 Colorado Holding, LLC** 

PREPARED BY: Brian Horan, PE Daniela Gonzalez

Galloway & Company, Inc. 5500 Greenwood Plaza Blvd, Suite 200 Greenwood Village, CO 80111

DATE:

October 14, 2022





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- A. Full Sized Conceptual Site Plan
- B. LOS Descriptions
- C. Traffic Counts
- D. Existing Synchro Outputs
- E. Background (without site development) Synchro Outputs
- F. Future (with site development) Synchro Outputs

# **Executive Summary**

#### Site Location and Study Area

The property that comprises the application area for the proposed development is approximately 11.6 acres in size and is identified as Adams County Parcel Numbers 0182501400005 and 0182501400006. It is located at 6601 Colorado Boulevard in Commerce City, Colorado. It is zoned Agricultural District (AG) and is currently occupied by a light industrial and residential use.

The study area is generally bounded by Colorado Boulevard to the east, Burlington Ditch to the west, and property lines to the north and south. The study area for the project includes those intersections identified that could be affected by the proposed development:

- 68th Avenue/Colorado Boulevard
- 64<sup>th</sup> Avenue/Colorado Boulevard
- Proposed Site Accesses

#### <u>Description of Proposed Development</u>

The Applicant, 6601 Colorado Holding, LLC seeks to develop the property with a general light industrial use. Site access is being proposed via two full movement accesses on Colorado Boulevard.

#### **Conclusions and Recommendations**

#### Conclusions

Based on the results of this traffic impact study, the following may be concluded:

- Under existing traffic conditions, the intersections within the study area currently operate at overall acceptable levels of service (LOS) "C" or better during the weekday AM and PM peak hours.
- Under background future 2024 and 2044 traffic conditions, without the development of the subject site, delays would increase slightly at study intersections due to regional traffic growth.
- The proposed site development would generate, upon completion and full occupancy, 24 new weekday AM and 17 new weekday PM peak hour vehicle trips as well as 163 new weekday daily trips.
- Under total future traffic conditions with development of the site, study intersections would continue to operate at acceptable LOS "C" consistent with background conditions.
- Under total future traffic conditions with development of the site, all forecasted queues would be contained within their effective storage.

# Recommendations

The Applicant should provide access consistent with the site plan contained herein.

#### I. Introduction

#### <u>Overview</u>

This report presents the results of a Traffic Impact Study (TIS) conducted in support of a site plan to develop an industrial use in Commerce City, Colorado. Currently, the site is zoned Agricultural District (AG) and is occupied by a light industrial and residential use.

The Applicant, 6601 Colorado Holding, LLC seeks to rezone the property from Agricultural District (AG) to either Medium-Intensity Industrial District (I-2) or Heavy-Intensity Industrial District (I-3). Per the requirements of the City of Commerce City Engineering Construction Standards and Specifications, Section 5.02, a TIS is required for "A rezoning application or for the application for annexation into the City".

#### Site Location and Study Area

The property that comprises the application area for the proposed development is approximately 11.6 acres in size and is identified as Adams County Parcel Numbers 0182501400005 and 0182501400006. It is located at 6601 Colorado Boulevard in Commerce City, Colorado as shown on Figure 1-1. Site access is being proposed via two full movement accesses on Colorado Boulevard.

The Applicant, 6601 Colorado Holding, LLC seeks to develop the property with a general light industrial use. A reduction of the Applicant's proposed conceptual site plan is provided on Figure 1-2. A full-size copy of the plan is provided in Appendix A.

The study area is generally bounded by Colorado Boulevard to the east, Burlington Ditch to the west, and property lines to the north and south.

Tasks undertaken in the course of this study included the following:

- 1. Reviewed the Applicant's proposed development plans and other background data.
- 2. Conducted a virtual field reconnaissance of existing roadway and intersection geometries, traffic controls, and speed limits.
- 3. Conducted peak hour turning movement counts at the key intersections.
- 4. Analyzed existing levels of service at each of the key study intersections based on the methodologies set forth in the <u>Highway Capacity Guidelines (HCM)</u> 6<sup>th</sup> Edition as reported by Synchro version 11.
- 5. Forecasted background future traffic volumes based on baseline traffic counts and regional traffic growth for build-out (2024), and long-range (2044) conditions.
- 6. Calculated background levels of service at each of the key study intersections for the projected buildout years based on background future traffic forecasts, and the existing lane use and traffic controls.
- 7. Estimated the number of AM and PM peak hour trips that would be generated by the proposed use based on the Institute of Transportation Engineers (ITE) <u>Trip Generation Manual</u> 11<sup>th</sup> Edition rates/equations and methodologies.

- 8. Prepared AM and PM peak hour total future traffic forecasts based on background traffic forecasts plus site traffic assignments for the 2024 (buildout year) as well as 2044 (long range) conditions.
- 9. Calculated total future levels of service for each of the key study intersections based on projected total future traffic forecasts, existing/future traffic controls and intersection geometries.
- 10. Identified roadway improvements required to accommodate future traffic volumes as necessary.

Sources of data for this analysis included the ITE, HCM 6th, 6601 Colorado Holding, LLC, Commerce City, Colorado, and the files/library of Galloway.

#### Site Description and Access

#### **Site Conditions**

The terrain proximate to and surrounding the site is generally classified as "level".

#### **Hazardous Conditions**

Based on the field reconnaissance in the vicinity of the subject site, no hazardous features or constraints were identified.

#### **Proposed Site Access**

Access to the site is being proposed via two existing full movement accesses on Colorado Boulevard.

#### **Existing Zoning**

The subject site is currently zoned Agricultural District (AG) and is currently occupied by a light industrial and residential use. Figure 1-3 depicts the existing zoning associated with the subject property, as well as neighboring properties as shown on the Commerce City zoning map.

#### **Nearby Uses**

The properties surrounding the subject site are generally industrial uses to the north and south, and residential uses to the east.

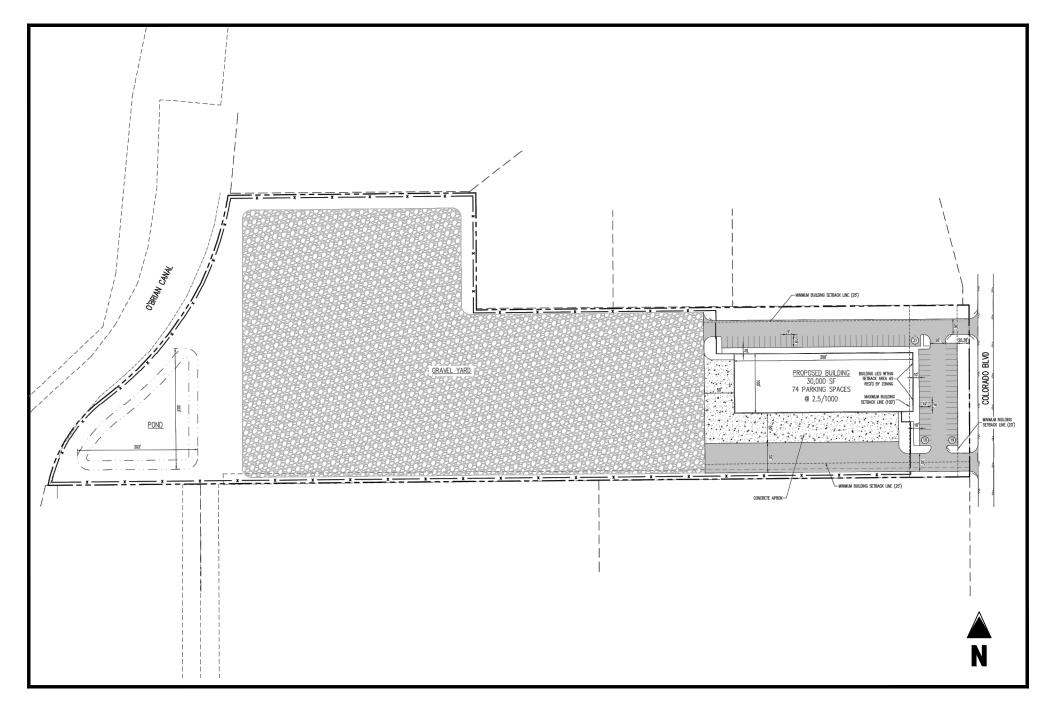
#### **Comprehensive Plan Land Use Recommendations for the Property**

According to the Commerce City Comprehensive Plan the future lane use planned for the subject site is General Industrial. Primary uses include medium intensive and heavy-industrial uses. Secondary uses include flex space, warehousing, outdoor storage, open space, and other public uses and facilities. The proposed use is in conformance with the Comprehensive Plan.













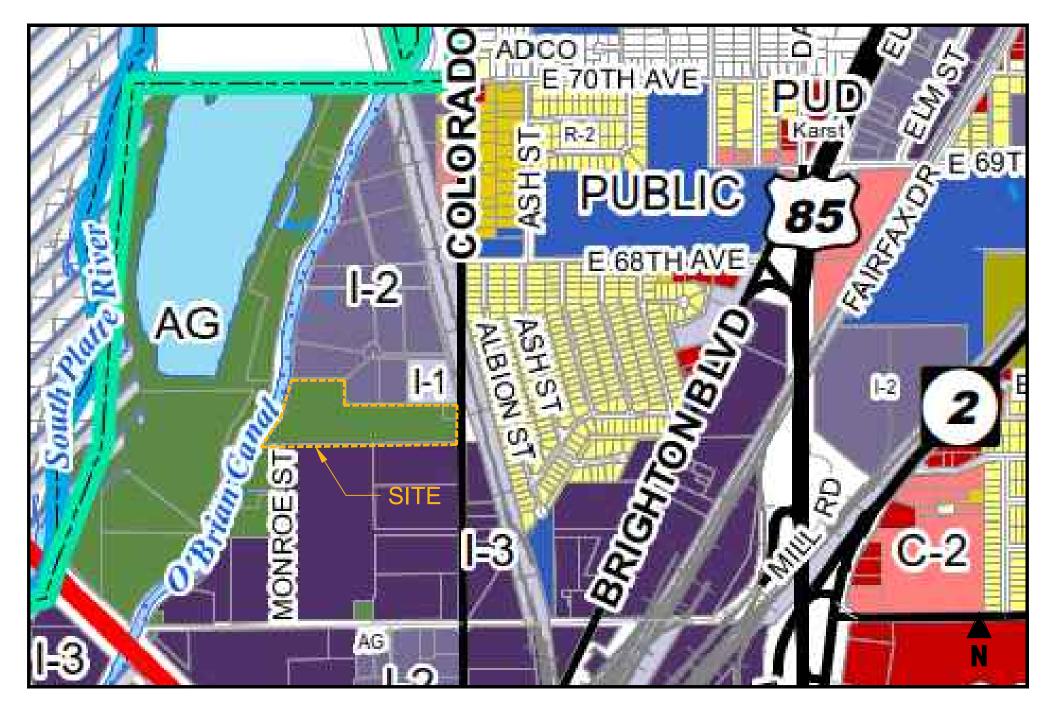


FIGURE 1-3
EXISTING ZONING



#### **II. Background Information**

#### Study Area

The study area was determined by a review of intersections that would experience a significant portion of turning movement volumes generated by the site. As such, the traffic study focuses primarily on the following intersections:

#### **Study Intersections**

- 68th Avenue/Colorado Boulevard
- 64<sup>th</sup> Avenue/Colorado Boulevard
- Proposed Site Accesses

#### Study Assumptions

For purposes of this analysis only, the proposed use is assumed to be built and occupied in one distinct phase. It was assumed that the use would be built and operational in study year 2024. As required by Commerce City, a long-term analysis of 2044 is also provided.

#### Study Methodology

Synchro software version 11 was used to evaluate levels of service at each of the study intersections during the weekday AM and PM peak hours. Synchro is a macroscopic model used for optimizing traffic signal timing and performing capacity analyses. The software can model existing traffic signal timings or optimize splits, offsets, and cycle lengths for individual intersections, an arterial, or a complete network. Synchro allows the user to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings as well as optimize traffic signal timings.

The levels of service reported for the study intersections analyzed herein were taken from the <u>Highway Capacity Manual</u> (HCM) 6<sup>th</sup> reports generated by Synchro 11. Level of service descriptions are included in Appendix B.

# **Existing Roadway Network**

Regional and local access to the subject site is provided via Colorado Boulevard. Figure 2-1 depicts existing lane use and traffic controls in the vicinity of the subject site. The following provides a description of the roadway within the study network.

#### **Colorado Boulevard**

Colorado Boulevard is constructed as a two-lane undivided section with a posted speed limit of 35 mph in the vicinity of the subject site. The city of Commerce City classifies the roadway as a Major Collector. The intersections with 68<sup>th</sup> Avenue and 64<sup>th</sup> Avenue operate under stop control.

# <u>Assumed Improvements</u>

No funded/programmed roadway improvements were identified at the study intersections.

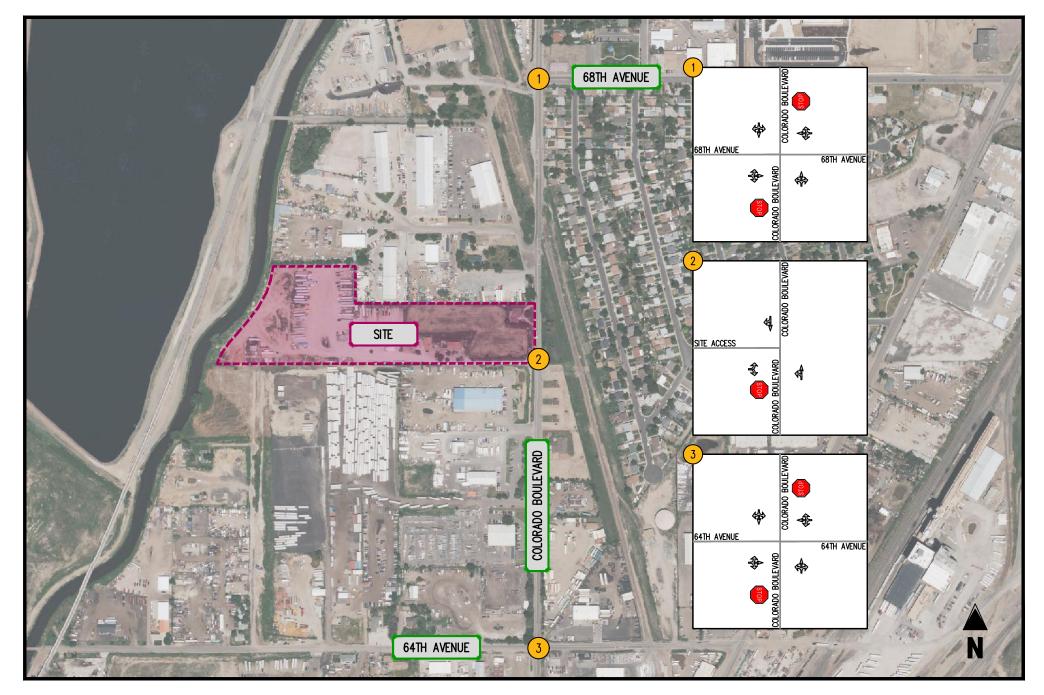


FIGURE 2-1 EXISTING LANE USE AND TRAFFIC CONTROL





# **III. Analysis of Existing Conditions**

# **Traffic Volumes**

Weekday AM and PM peak hour traffic volumes counts were conducted on Thursday September 1, 2022, from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM at the study intersections by IDAX Data Solutions.

Based on a review of the intersection volumes, for purposes of this study, the peak hour of each intersection was selected in order to provide a conservative analysis.

The existing volumes are summarized on Figure 3-1. Copies of traffic counts are included in Appendix C. Existing peak hour factors (PHF) were also computed by approach from the traffic counts and applied to the analysis with a minimum of 0.85 and a maximum of 0.92.

#### **Operational Analysis**

Capacity/level of service analyses were conducted at the study intersections based on the existing lane use and traffic controls shown on Figure 2-1 and existing baseline vehicular traffic volumes shown on Figure 3-1. The capacity analysis results are presented in Appendix D and summarized in Table 3-1 and on Figure 3-2.

As shown in Table 3-1, the study intersections, currently operate at overall acceptable LOS "C" or better during the weekday peak hours.

#### **Existing Intersection Queues**

An analysis of intersection 95<sup>th</sup>-percentile queues was performed at key locations. The results of the queuing analysis, as reported by Synchro, are summarized in Table 3-2.

As shown in the table, the existing queues are contained within the effective storage within the study area.

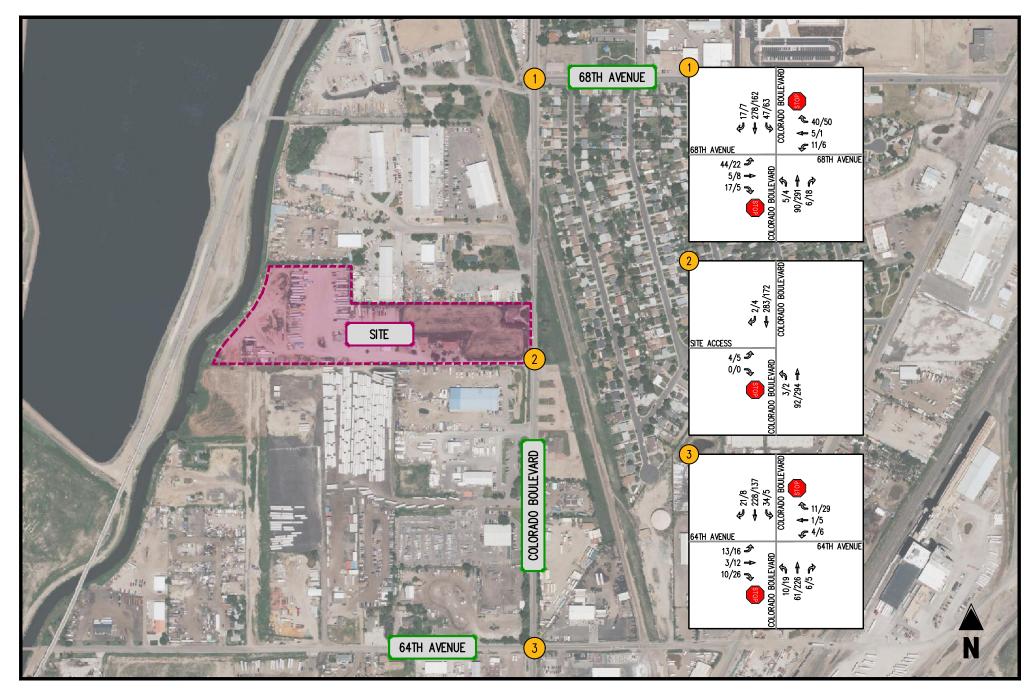


FIGURE 3-1 EXISTING VOLUMES 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)





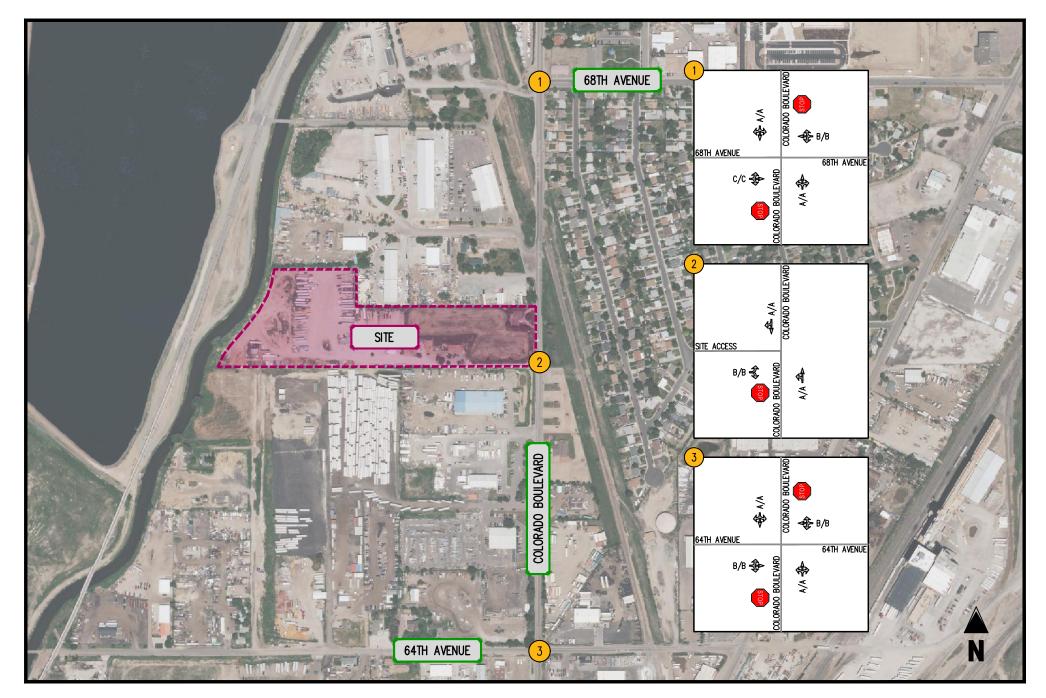


FIGURE 3-2 EXISTING LOS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







Table 3-1 6601 COLORADO HOLDING, LLC Existing Intersection Level of Service Summary (1) (2)

| Intersection                     | •    | Operating Street Condition Name                                        |                                  | Existir<br>AM<br>Peak Hour                 | ng 2022<br>PM<br>Peak Hour                 |  |
|----------------------------------|------|------------------------------------------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|--|
| 1 68TH AVENUE/COLORADO BOULEVARD | STOP | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | C [17.9]<br>B [11.0]<br>A [8.5]<br>A [7.5] | C [18.1]<br>B [11.6]<br>A [8.7]<br>A [8.2] |  |
| 2 SITE ACCESS/COLORADO BOULEVARD | STOP | SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD                | EBLR<br>NBLT<br>SBTR             | B [12.4]<br>A [8.8]<br>A [0.0]             | B [12.4]<br>A [8.2]<br>A [0.0]             |  |
| 3 64TH AVENUE/COLORADO BOULEVARD | STOP | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | B [13.1]<br>B [10.4]<br>A [8.2]<br>A [7.7] | B [12.1]<br>B [11.3]<br>A [7.8]<br>A [8.8] |  |

Notes (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

Table 3-2
6601 COLORADO HOLDING, LLC
Existing Intersection Queueing Summary (1)

| Intersection                     | Operating<br>Condition |                                                                        | Approach/<br>Movement            |                  | Existin<br>AM<br>Peak Hour | g 2022<br>PM<br>Peak Hour |
|----------------------------------|------------------------|------------------------------------------------------------------------|----------------------------------|------------------|----------------------------|---------------------------|
| 1 68TH AVENUE/COLORADO BOULEVARD | STOP                   | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | -<br>-<br>-      | 20<br>7.5<br>0<br>2.5      | 10<br>7.5<br>0<br>5       |
| 2 SITE ACCESS/COLORADO BOULEVARD | STOP                   | SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD                | EBLR<br>NBLT<br>SBTR             | -<br>-<br>-      | 0<br>0<br>0                | 0<br>0<br>0               |
| 3 64TH AVENUE/COLORADO BOULEVARD | STOP                   | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | -<br>-<br>-<br>- | 5<br>2.5<br>0<br>2.5       | 10<br>5<br>2.5<br>0       |

Note (1) Queue length is based on the 95th percentile queue as reported by Synchro, Version 11.

# IV. Analysis of Future Conditions without Site Development

#### <u>Methodology</u>

The future traffic forecasts, without the proposed new use, were developed for 2024 and 2044 conditions based on a composite of existing baseline traffic volumes and regional traffic. A 1.0% growth factor per year was applied to the existing traffic volumes.

#### Regional Growth

Increases in traffic associated with regional growth were estimated at 1.0 percent per year compounded for movements along the study intersections up to 2024 as well as to 2044. This growth accounts for increases in traffic resulting from influences outside of the immediate study area. The resulting increases in traffic within the study area are reflected on Figure 4-1 for 2024 build-out year conditions and Figure 4-2 for 2044 long range conditions.

#### **Background Traffic Forecasts**

The existing traffic forecasts depicted on Figure 3-1 and the regional growth shown on Figure 4-1 (2024) and Figure 4-2 (2044) were added together to yield the background future traffic forecasts shown on Figure 4-3 for 2024 conditions, and Figure 4-4 for 2044 conditions.

#### Background Future Levels of Service

Capacity analyses of 2024 and 2044 future traffic conditions without the proposed development are provided in Appendix E and summarized in Table 4-1. The forecasted levels of service are also depicted graphically on Figure 4-5 for 2024 conditions and Figure 4-6 for 2044 conditions.

As shown on Table 4-1, the signalized intersections within the study area would operate at overall acceptable LOS "C" or better during the AM and PM peak hours, consistent with existing conditions.

# **Background Future Queueing**

An analysis of intersection queues was performed at key locations under background future traffic conditions. The results of the queuing analysis are summarized in Table 4-2.

As shown in the table, queues within the study network will increase due to regional traffic growth and pipeline development. Forecasted queues would be contained within their effective storage.

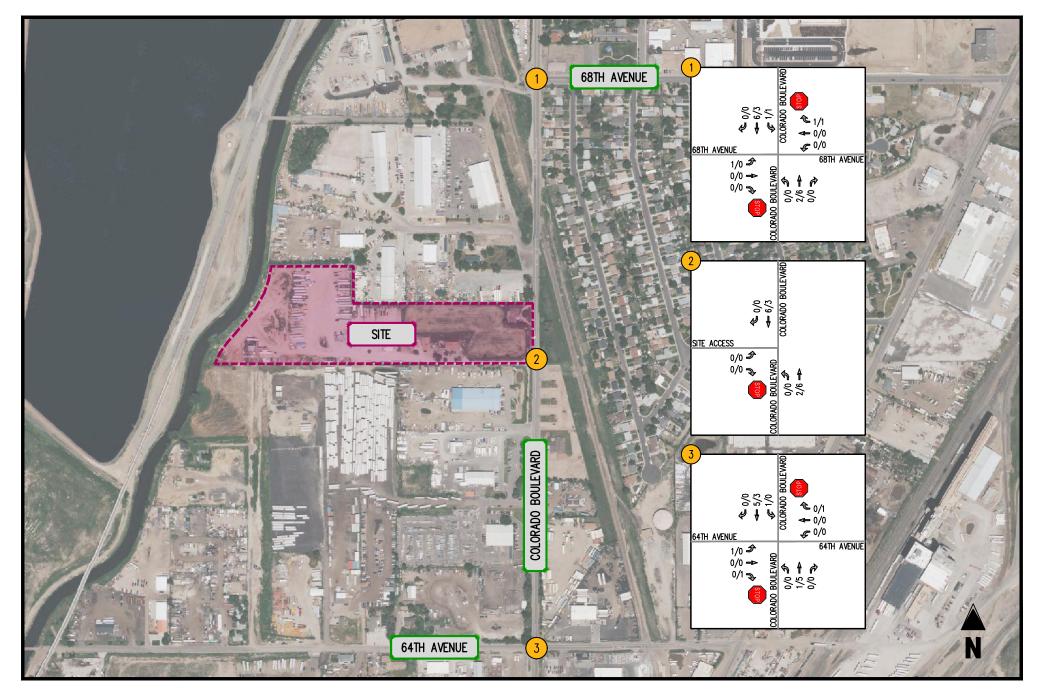


FIGURE 4-1 BACKGROUND 2024 GROWTH 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







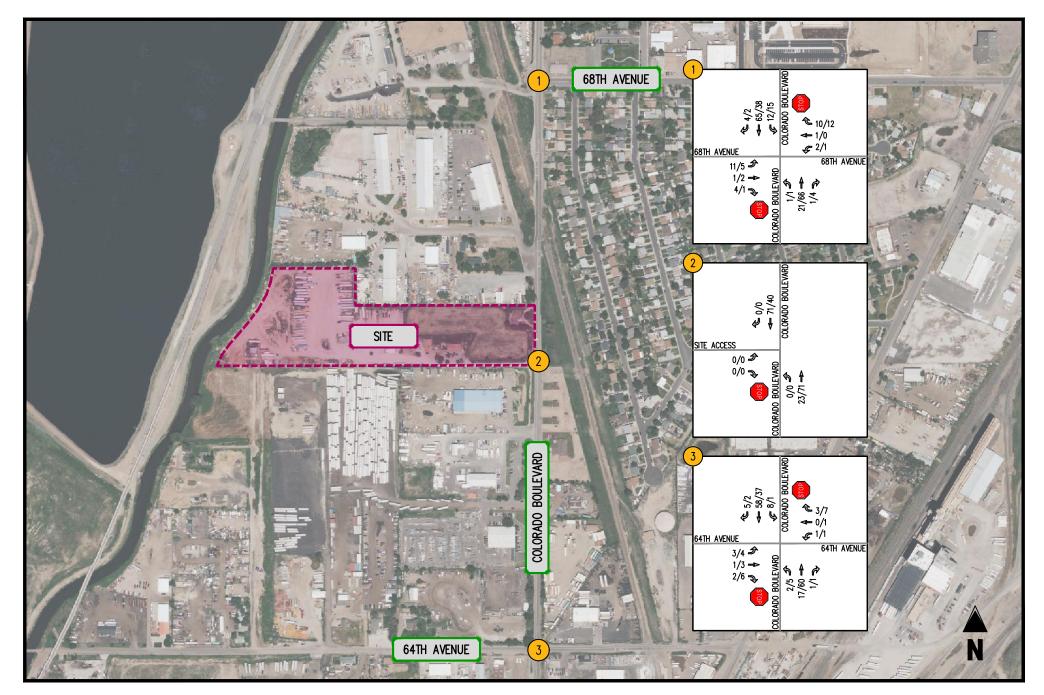


FIGURE 4-2 BACKGROUND 2044 GROWTH

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







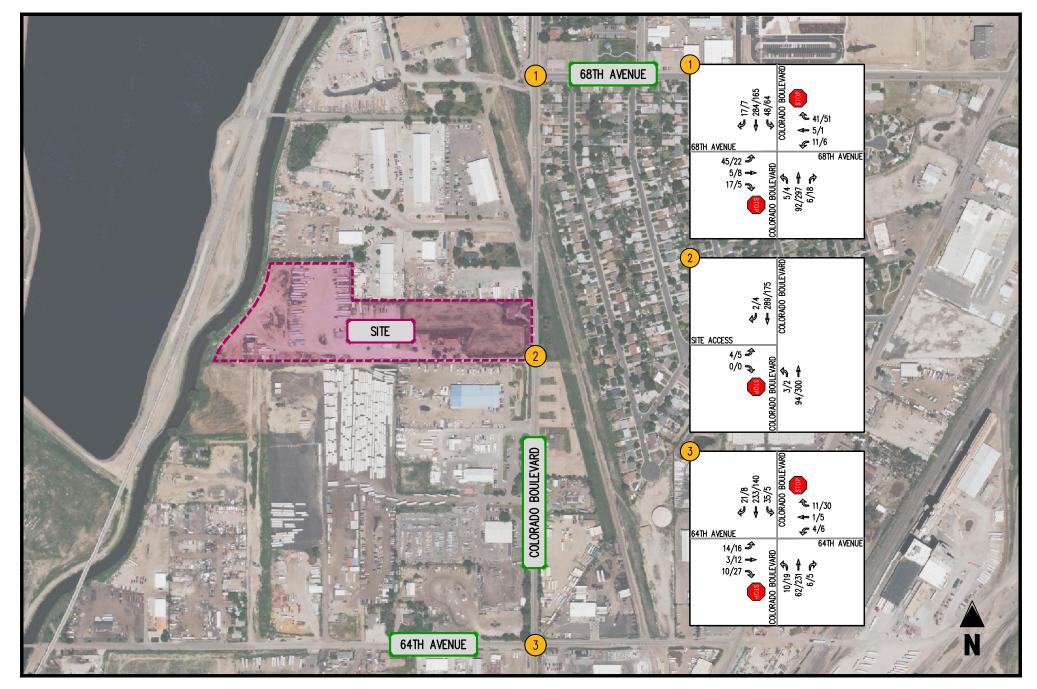


FIGURE 4-3 BACKGROUND 2024 FORECASTS

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)





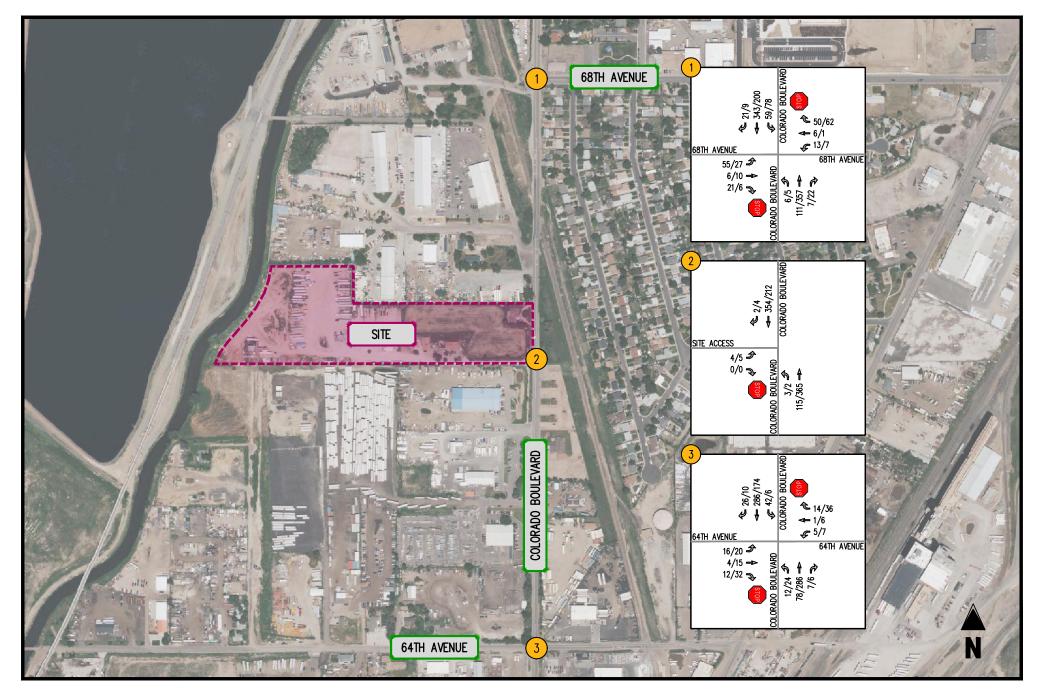


FIGURE 4-4 BACKGROUND 2044 FORECASTS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)





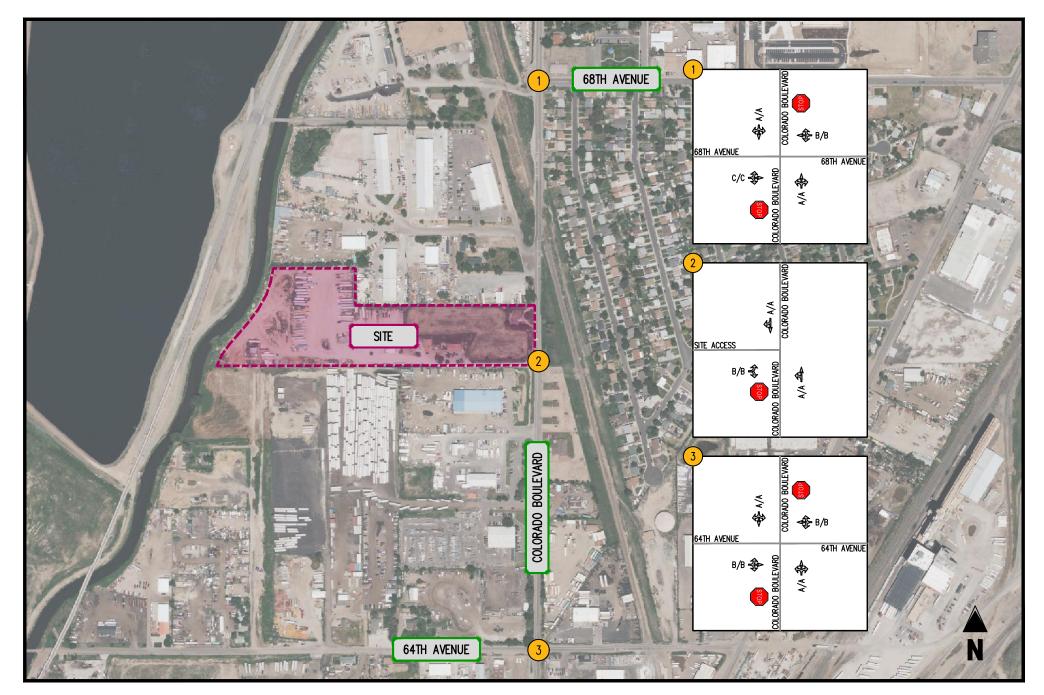


FIGURE 4-5 BACKGROUND 2024 LOS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







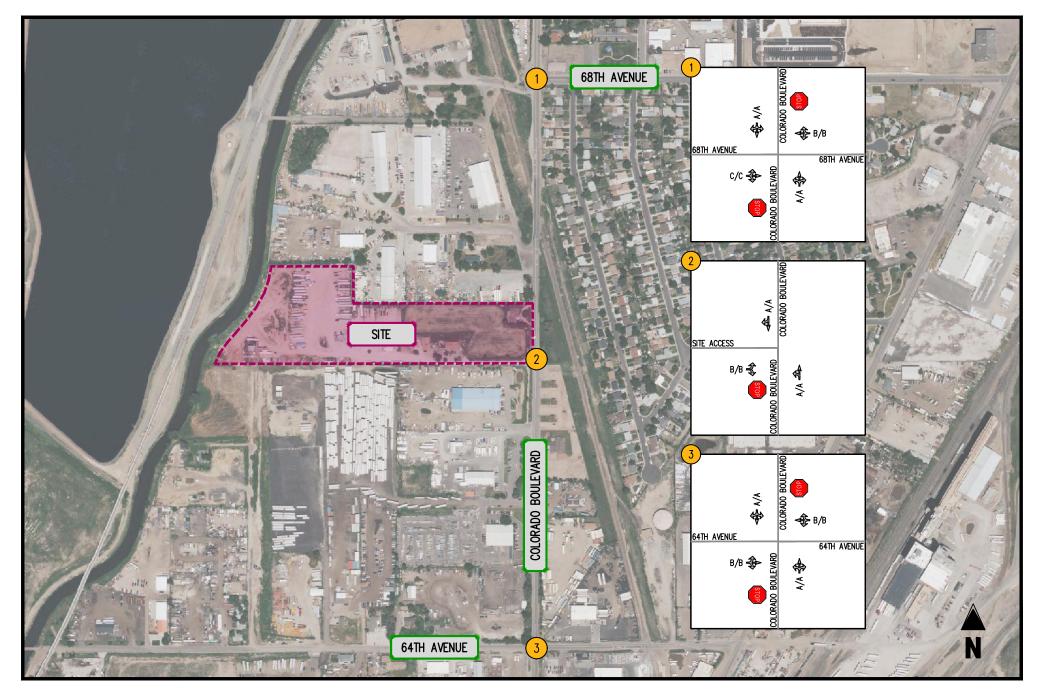


FIGURE 4-6 BACKGROUND 2044 LOS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







Table 4-1
6601 COLORADO HOLDING, LLC
Background Future Intersection Level of Service Summary (1) (2)

| Intersection                     | Operating<br>Condition |                                                                        | Approach/<br>Movement            | Existir<br>AM<br>Peak Hour                 | ng 2022<br>PM<br>Peak Hour                 | Backgro<br>AM<br>Peak Hour                 | und 2024<br>PM<br>Peak Hour                | Backgro<br>AM<br>Peak Hour                 | und 2044<br>PM<br>Peak Hour                |
|----------------------------------|------------------------|------------------------------------------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
| 1 68TH AVENUE/COLORADO BOULEVARD | STOP                   | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | C [17.9]<br>B [11.0]<br>A [8.5]<br>A [7.5] | C [18.1]<br>B [11.6]<br>A [8.7]<br>A [8.2] | C [17.0]<br>B [10.8]<br>A [8.5]<br>A [7.5] | C [17.3]<br>B [11.5]<br>A [8.7]<br>A [8.2] | C [21.8]<br>B [11.6]<br>A [8.7]<br>A [7.6] | C [22.1]<br>B [12.6]<br>A [8.8]<br>A [8.4] |
| 2 SITE ACCESS/COLORADO BOULEVARD | STOP                   | SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD                | EBLR<br>NBLT<br>SBTR             | B [12.4]<br>A [8.8]<br>A [0.0]             | B [12.4]<br>A [8.2]<br>A [0.0]             | B [12.2]<br>A [8.8]<br>A [0.0]             | B [12.1]<br>A [8.2]<br>A [0.0]             | B [13.2]<br>A [9.1]<br>A [0.0]             | B [13.2]<br>A [8.3]<br>A [0.0]             |
| 3 64TH AVENUE/COLORADO BOULEVARD |                        | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | B [13.1]<br>B [10.4]<br>A [8.2]<br>A [7.7] | B [12.1]<br>B [11.3]<br>A [7.8]<br>A [8.8] | B [13.1]<br>B [10.3]<br>A [8.2]<br>A [7.7] | B [11.7]<br>B [11.1]<br>A [7.8]<br>A [8.8] | B [14.6]<br>B [10.9]<br>A [8.4]<br>A [7.8] | B [13.2]<br>B [12.1]<br>A [7.9]<br>A [9.0] |

Notes (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

Table 4-2 6601 COLORADO HOLDING, LLC Background Future Intersection Queueing Summary (1)

| Intersection                     | Operating<br>Condition |                                                                        | Approach/<br>Movement            |             |                       | ng 2022<br>PM<br>Peak Hour | Backgro<br>AM<br>Peak Hour | und 2024<br>PM<br>Peak Hour | Backgro<br>AM<br>Peak Hour | und 2044<br>PM<br>Peak Hour |
|----------------------------------|------------------------|------------------------------------------------------------------------|----------------------------------|-------------|-----------------------|----------------------------|----------------------------|-----------------------------|----------------------------|-----------------------------|
| 1 68TH AVENUE/COLORADO BOULEVARD | STOP                   | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR |             | 20<br>7.5<br>0<br>2.5 | 10<br>7.5<br>0<br>5        | 17.5<br>7.5<br>0<br>2.5    | 10<br>7.5<br>0<br>5         | 30<br>10<br>0<br>2.5       | 17.5<br>12.5<br>0<br>5      |
| 2 SITE ACCESS/COLORADO BOULEVARD | STOP                   | SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD                | EBLR<br>NBLT<br>SBTR             | -<br>-<br>- | 0<br>0<br>0           | 0<br>0<br>0                | 0<br>0<br>0                | 0<br>0<br>0                 | 0<br>0<br>0                | 0<br>0<br>0                 |
| 3 64TH AVENUE/COLORADO BOULEVARD | STOP                   | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | -<br>-<br>- | 5<br>2.5<br>0<br>2.5  | 10<br>5<br>2.5<br>0        | 5<br>2.5<br>0<br>2.5       | 7.5<br>5<br>0               | 7.5<br>2.5<br>0<br>2.5     | 12.5<br>7.5<br>2.5<br>0     |

Note (1) Queue length is based on the 95th percentile queue as reported by Synchro, Version 11.

#### V. Site Analysis

#### <u>Overview</u>

The Applicant is proposing to develop the approximately 11.6 acre site with a general light industrial use. For purposes of this study, the site will be developed in one phase. For analysis purposes it was assumed that the development would be complete and operational in study year 2024. The following use and development programs were analyzed:

Build Out - 2024

30,000 SF General Light Industrial

#### **Proposed Site Access**

As shown on the Applicant's conceptual plan (Figure 1-2), access to the development is being proposed via two existing full movement accesses on Colorado Boulevard

#### **Trip Generation**

#### Overview

Trip generation estimates for the weekday AM and PM peak hours, as well as the weekday average daily traffic (ADT), were derived from the standard Institute of Transportation Engineers (ITE) <u>Trip Generation Manual</u> rates/equations, as published in the 11<sup>th</sup> edition. The trip generation analysis is presented in Table 5-1.

#### **Site Trips**

The vehicle trips that would be generated by the proposed development plan are summarized in Table 5-1. As shown in Table 5-1, the site would generate upon completion and full occupancy, 24 new weekday AM and 17 new weekday PM peak hour vehicle trips as well as 163 new weekday daily trips.

#### **Site Trip Distributions**

The distribution of the anticipated trips generated by the completion of the proposed development was based on an examination of existing traffic counts and local knowledge. Existing travel patterns indicate the following distribution is appropriate in the forecasting of future site traffic:

- To/from the north on Colorado Boulevard: 50%
- To/from the south on Colorado Boulevard: 50%

#### **Site Trip Assignments**

The assignment of the new vehicle trips generated upon the future build-out of the development project was based on the above distribution. The trips assignments are depicted on Figure 5-1.

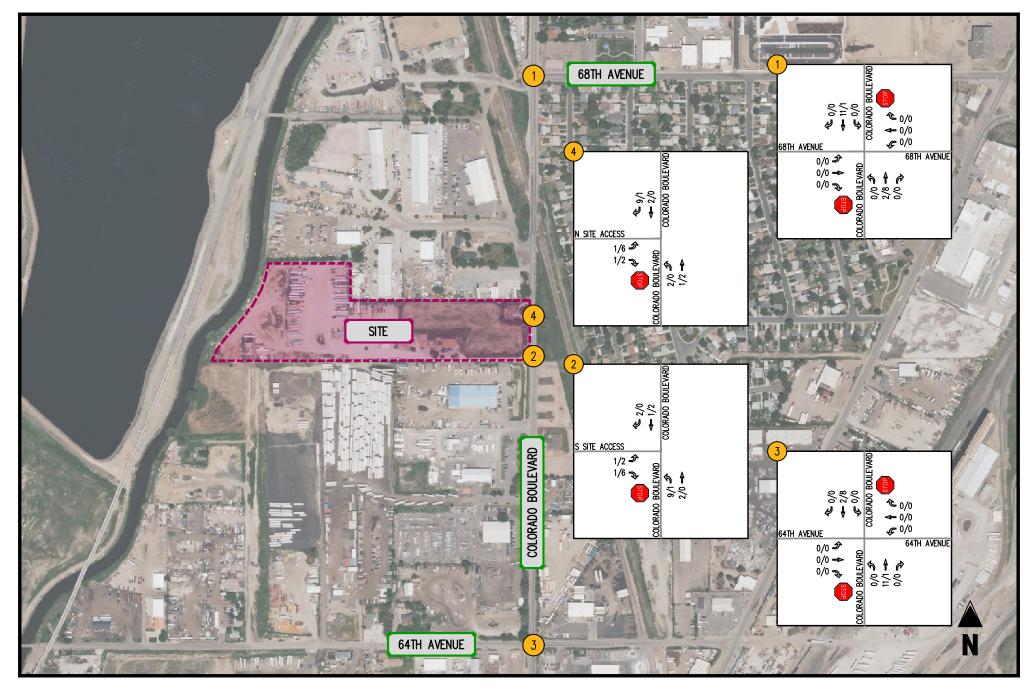


FIGURE 5-1 SITE TRIPS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







Table 5-1 6601 Colorado Holding Site Trip Generation

| Land Use                                         | Land<br>Use |        |       | AM Peak Hour |     |       | PM Peak Hour |     |       | Average<br>Daily |
|--------------------------------------------------|-------------|--------|-------|--------------|-----|-------|--------------|-----|-------|------------------|
|                                                  | Code        | Amount | Units | ln           | Out | Total | ln           | Out | Total | Trips            |
| Proposed <sup>(1)</sup> General Light Industrial | 110         | 30,000 | SF    | 21           | 3   | 24    | 2            | 15  | 17    | 163              |

Note(s):
(1) Trip generation based on the Institute of Transportation Engineers' <u>Trip Generation Manual</u>, 11th Edition

# VI. Analysis of Future Conditions with Site Development

# **Total Future Traffic Forecasts**

The 2024 and 2044 total future traffic forecasts associated with the proposed development were developed by combining background future forecasts shown on Figure 4-4 (2024) and Figure 4-5 (2044), and the site trip assignments shown on Figure 5-1. The resulting total future traffic forecasts are provided on Figure 6-1 for 2024 and Figure 6-2 for 2044 conditions.

# Total Future Levels of Service with Proposed Development

Future levels of service with the proposed development plan were estimated at key study intersections based on the future traffic volumes shown on Figures 6-1 and Figure 6-2, the existing lane use on Figure 2-1, and the HCM 6<sup>th</sup> methodologies for unsignalized intersections. The results of these analyses are provided in Appendix F and presented in Table 6-1. Total future levels of service are also presented graphically on Figure 6-3 (2024) and Figure 6-4 (2044).

As shown in Table 6-1, levels of service under future site development conditions would remain consistent with future background conditions (i.e., without site development). Overall delays would experience minor increase due to site trips. The intersections within the study area would continue to operate at acceptable overall LOS "C" or better in the AM and PM peak hours in all future scenarios.

#### **Total Future Queuing**

Total future queues were forecasted using Synchro software. The results of the queuing analysis are summarized in Table 6-2. As shown on Table 6-2, forecasted queues would be contained within their effective storage consistent with background conditions.

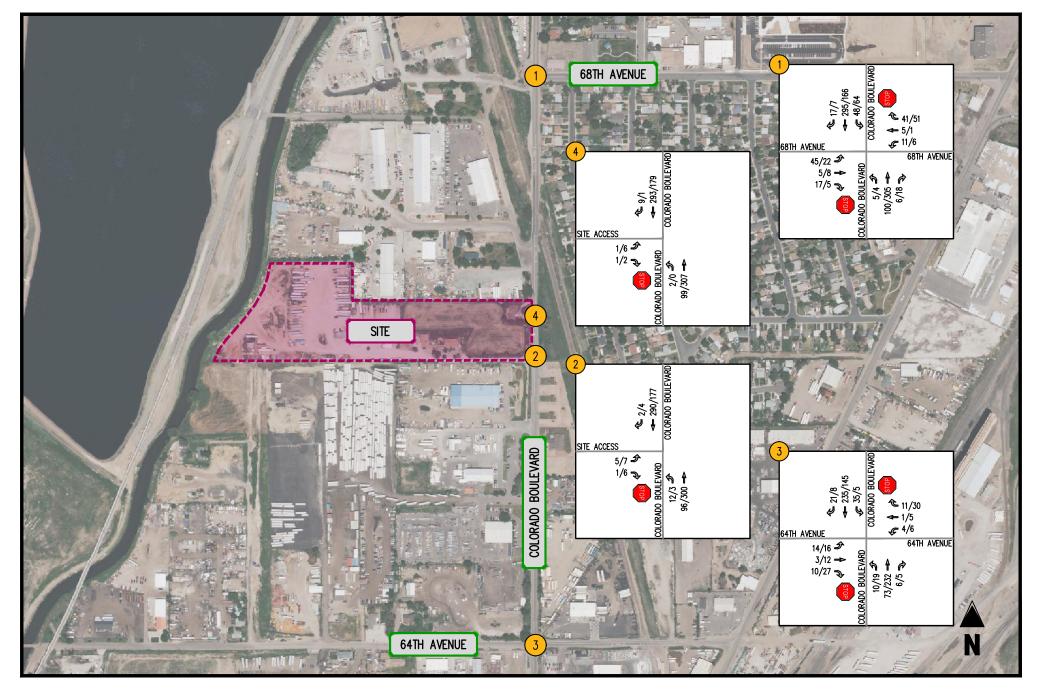


FIGURE 6-1 TOTAL FUTURE 2024 FORECASTS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)







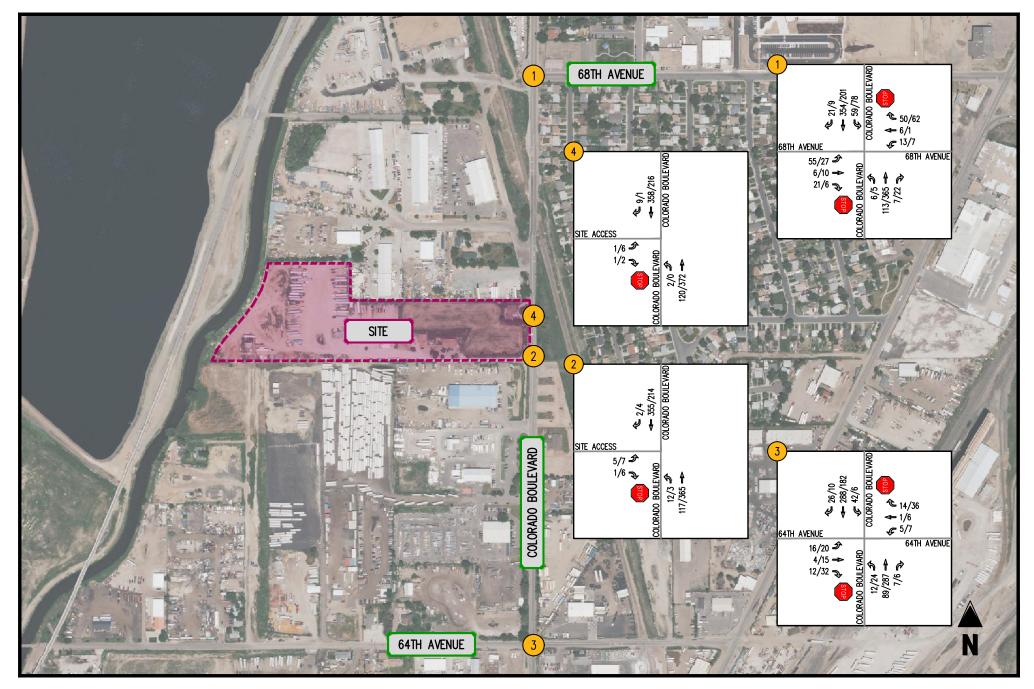


FIGURE 6-2 TOTAL FUTURE 2044 FORECASTS

0000/0000 (AM PEAK HOUR/PM PEAK HOUR)





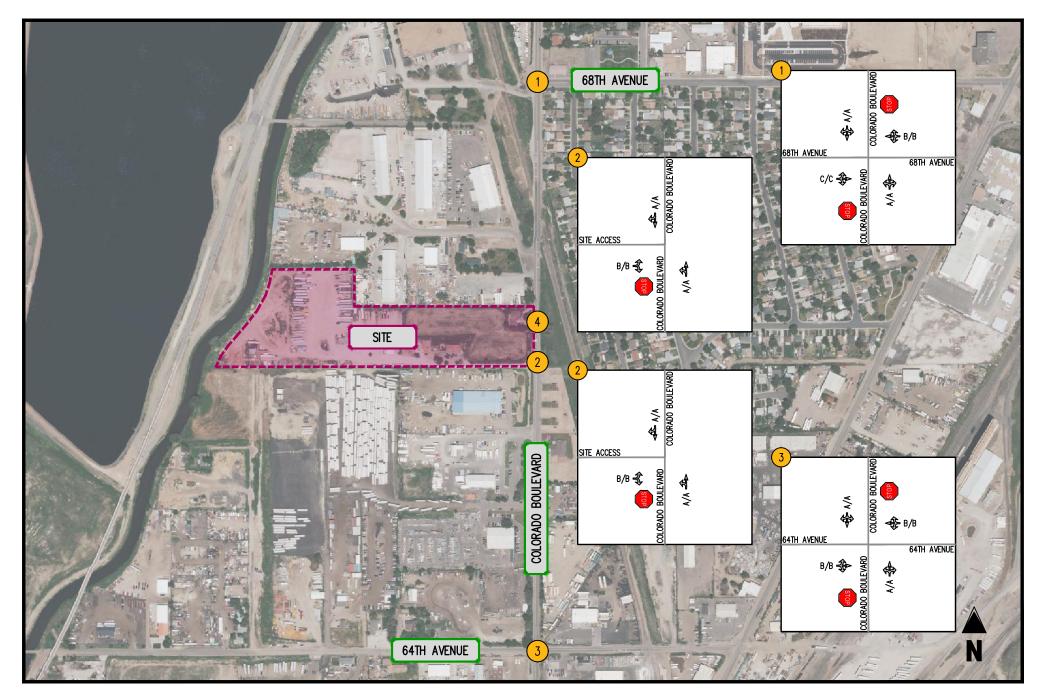


FIGURE 6-3 TOTAL FUTURE 2024 LOS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)





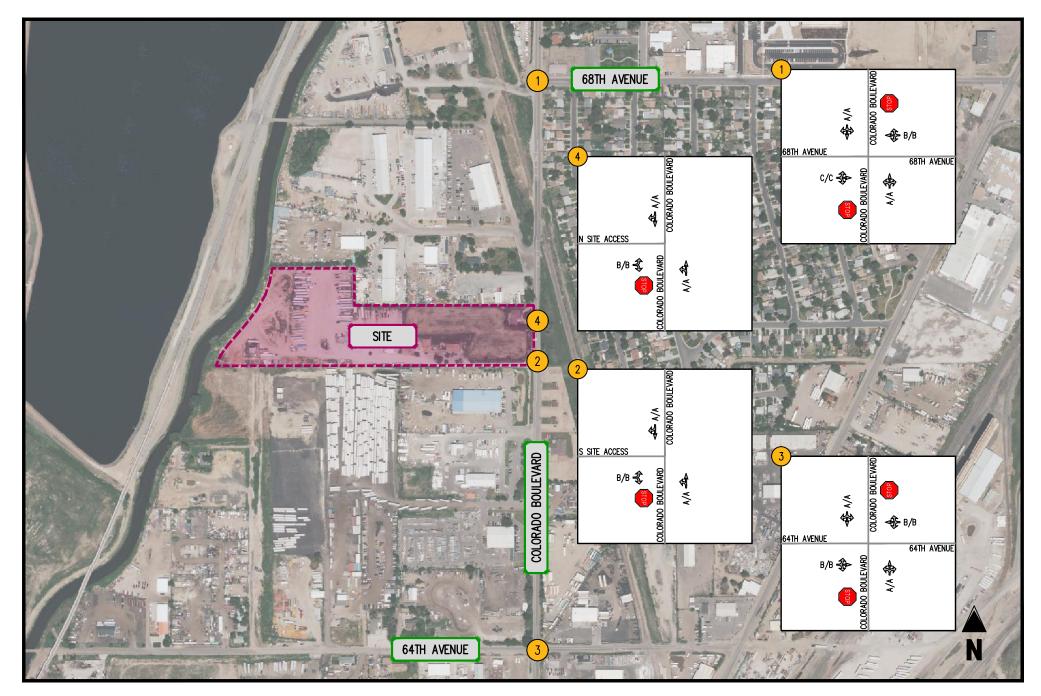


FIGURE 6-4 TOTAL FUTURE 2044 LOS 0000/0000 (AM PEAK HOUR/PM PEAK HOUR)

◆ MOVEMENT







Table 6-1 6601 COLORADO HOLDING, LLC
Total Future Intersection Level of Service Summary (1) (2)

| Intersection                       | Operating<br>Condition |                                                                        | Approach/<br>Movement            | Backgro<br>AM<br>Peak Hour                 | und 2024<br>PM<br>Peak Hour                | Backgro<br>AM<br>Peak Hour                 | und 2044<br>PM<br>Peak Hour                | Total Fu<br>AM<br>Peak Hour                | ture 2024<br>PM<br>Peak Hour               | Total Fut<br>AM<br>Peak Hour               | ture 2044<br>PM<br>Peak Hour               |
|------------------------------------|------------------------|------------------------------------------------------------------------|----------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|
| 1 68TH AVENUE/COLORADO BOULEVARD   | STOP                   | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | C [17.0]<br>B [10.8]<br>A [8.5]<br>A [7.5] | C [17.3]<br>B [11.5]<br>A [8.7]<br>A [8.2] | C [21.8]<br>B [11.6]<br>A [8.7]<br>A [7.6] | C [22.1]<br>B [12.6]<br>A [8.8]<br>A [8.4] | C [17.3]<br>B [10.8]<br>A [8.5]<br>A [7.5] | C [17.5]<br>B [11.5]<br>A [8.7]<br>A [8.2] | C [22.3]<br>B [11.7]<br>A [8.7]<br>A [7.6] | C [22.3]<br>B [12.7]<br>A [8.8]<br>A [8.5] |
| 2 S SITE ACCESS/COLORADO BOULEVARD | STOP                   | S SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD              | EBLR<br>NBLT<br>SBTR             | B [12.2]<br>A [8.8]<br>A [0.0]             | B [12.1]<br>A [8.2]<br>A [0.0]             | B [13.2]<br>A [9.1]<br>A [0.0]             | B [13.2]<br>A [8.3]<br>A [0.0]             | B [12.3]<br>A [8.8]<br>A [0.0]             | B [10.9]<br>A [8.2]<br>A [0.0]             | B [13.3]<br>A [9.1]<br>A [0.0]             | B [11.7]<br>A [8.3]<br>A [0.0]             |
| 3 64TH AVENUE/COLORADO BOULEVARD   | STOP                   | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR | B [13.1]<br>B [10.3]<br>A [8.2]<br>A [7.7] | B [11.7]<br>B [11.1]<br>A [7.8]<br>A [8.8] | B [14.6]<br>B [10.9]<br>A [8.4]<br>A [7.8] | B [13.2]<br>B [12.1]<br>A [7.9]<br>A [9.0] | B [13.2]<br>B [10.4]<br>A [8.2]<br>A [7.8] | B [11.8]<br>B [11.1]<br>A [7.8]<br>A [8.8] | B [14.8]<br>B [11.0]<br>A [8.4]<br>A [7.8] | B [13.3]<br>B [12.1]<br>A [7.9]<br>A [9.0] |
| 4 N SITE ACCESS/COLORADO BOULEVARD | STOP                   | N SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD              | EBLR<br>NBLT<br>SBTR             | N/A<br>N/A<br>N/A                          | N/A<br>N/A<br>N/A                          | N/A<br>N/A<br>N/A                          | N/A<br>N/A<br>N/A                          | B [10.6]<br>A [7.9]<br>A [0.0]             | B [11.5]<br>A [0.0]<br>A [0.0]             | B [13.3]<br>A [9.1]<br>A [0.0]             | B [11.7]<br>A [8.3]<br>A [0.0]             |

Notes (1) Numbers in brackets [] represent delay at unsignalized intersections in seconds per vehicle.

(2) Numbers in parenthesis () represent delay at signalized intersections in seconds per vehicle.

Table 6-2 6601 COLORADO HOLDING, LLC Total Future Intersection Queueing Summary (1)

| Intersection                      | Operating<br>Condition |                                                                        | Approach/<br>Movement            |   | AM                      | und 2024<br>PM<br>Peak Hour | Backgro<br>AM<br>Peak Hour | und 2044<br>PM<br>Peak Hour | Total Fut<br>AM<br>Peak Hour | ture 2024<br>PM<br>Peak Hour | Total Fut<br>AM<br>Peak Hour | ture 2044<br>PM<br>Peak Hour |
|-----------------------------------|------------------------|------------------------------------------------------------------------|----------------------------------|---|-------------------------|-----------------------------|----------------------------|-----------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1 68TH AVENUE/COLORADO BOULEVARI  | O STOP                 | 68TH AVENUE<br>68TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR |   | 17.5<br>7.5<br>0<br>2.5 | 10<br>7.5<br>0<br>5         | 30<br>10<br>0<br>2.5       | 17.5<br>12.5<br>0<br>5      | 17.5<br>7.5<br>0<br>2.5      | 10<br>7.5<br>0<br>5          | 30<br>10<br>0<br>2.5         | 17.5<br>12.5<br>0<br>5       |
| 2 S SITE ACCESS/COLORADO BOULEVAR | R STOP                 | S SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD              | EBLR<br>NBLT<br>SBTR             | - | 0<br>0<br>0             | 0<br>0<br>0                 | 0<br>0<br>0                | 0<br>0<br>0                 | 0<br>0<br>0                  | 2.5<br>0<br>0                | 0<br>0<br>0                  | 2.5<br>0<br>0                |
| 3 64TH AVENUE/COLORADO BOULEVARI  | O STOP                 | 64TH AVENUE<br>64TH AVENUE<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD | EBLTR<br>WBLTR<br>NBLTR<br>SBLTR |   | 5<br>2.5<br>0<br>2.5    | 7.5<br>5<br>0               | 7.5<br>2.5<br>0<br>2.5     | 12.5<br>7.5<br>2.5<br>0     | 5<br>2.5<br>0<br>2.5         | 7.5<br>5<br>0                | 7.5<br>2.5<br>0<br>2.5       | 12.5<br>7.5<br>2.5<br>0      |
| 4 N SITE ACCESS/COLORADO BOULEVAR | R STOP                 | N SITE ACCESS<br>COLORADO BOULEVARD<br>COLORADO BOULEVARD              | EBLR<br>NBLT<br>SBTR             |   | N/A<br>N/A<br>N/A       | N/A<br>N/A<br>N/A           | N/A<br>N/A<br>N/A          | N/A<br>N/A<br>N/A           | 0<br>0<br>0                  | 0<br>0<br>0                  | 0<br>0<br>0                  | 0<br>0<br>0                  |

Note (1) Queue length is based on the 95th percentile queue as reported by Synchro, Version 11.

### VII. Conclusions and Recommendations

## **Conclusions**

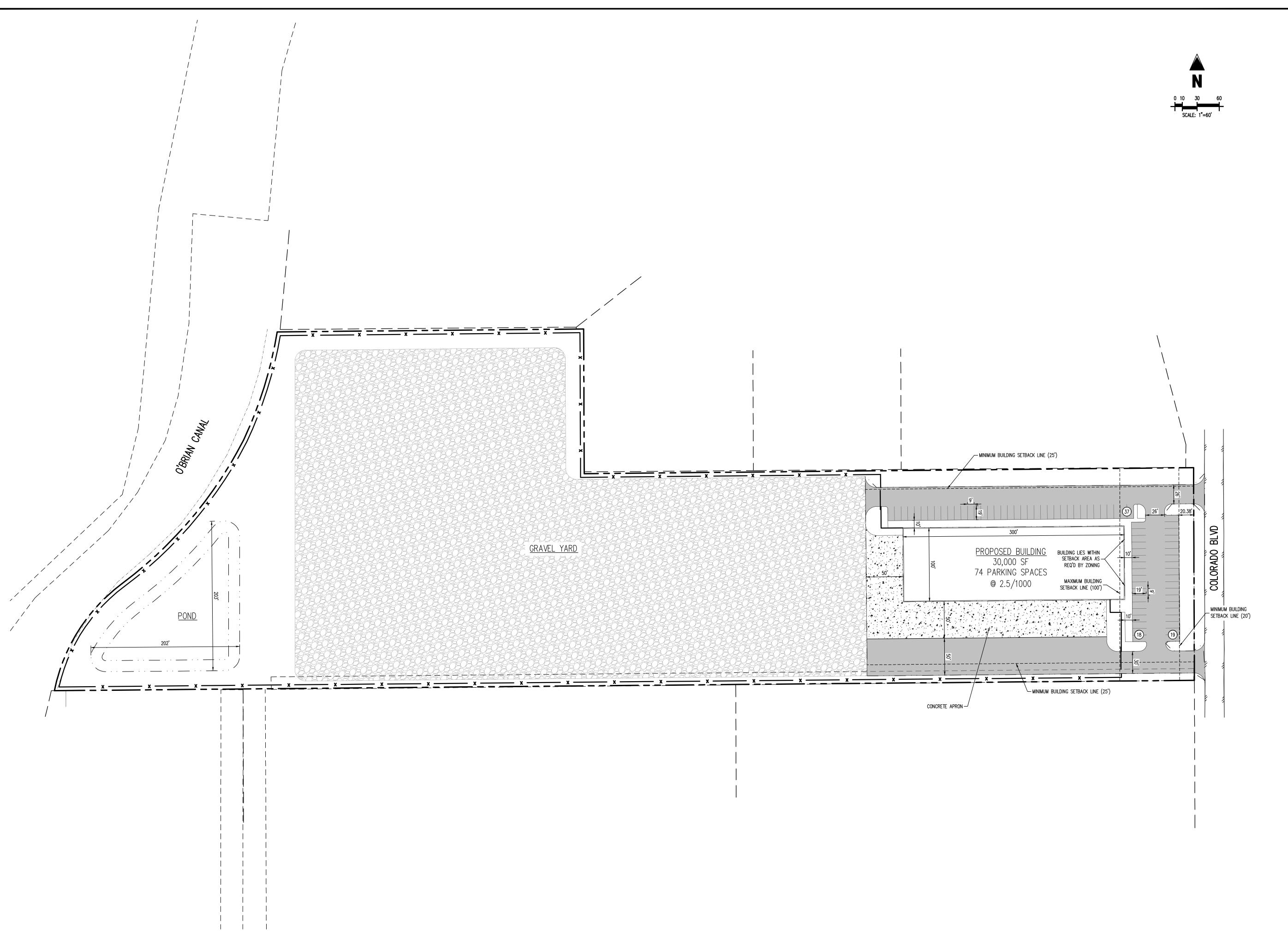
Based on the results of this traffic impact study, the following may be concluded:

- Under existing traffic conditions, the intersections within the study area currently operate at overall
  acceptable levels of service (LOS) "C" or better during the weekday AM and PM peak hours.
  Unsignalized side street movements within the study area are at or approaching capacity.
- Under background future 2024 and 2044 traffic conditions, without the development of the subject site, delays would increase slightly at study intersections due to regional traffic growth.
- The proposed site development would generate, upon completion and full occupancy, 24 new weekday AM and 17 new weekday PM peak hour vehicle trips as well as 163 new weekday daily trips.
- Under total future traffic conditions with development of the site, study intersections would continue to operate at acceptable LOS "C" consistent with background conditions.
- Under total future traffic conditions with development of the site, all forecasted queues would be contained within their effective storage.

## Recommendations

The Applicant should provide access consistent with the site plan contained herein.

## **APPENDIX A – Full Sized Conceptual Plan**



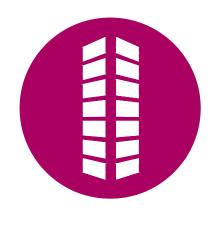


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|-------------|------------|
| Drawn By:   | MSJ        |
| Checked By: | JRR        |
| Date:       | 2022-09-27 |

CONCEPTUAL SITE PLAN

1

## **APPENDIX B – LOS Descriptions**

#### Level of Service for Signalized Intersections

Level of service for signalized intersections is defined in terms of delay, which is a measure of driver discomfort and frustration, fuel consumption, and lost travel time. Specifically, level-of-service (LOS) criteria are stated in terms of the average stopped delay per vehicle for a 15-min analysis period. The criteria are given in Exhibit 16-2. Delay may be measured in the field or estimated using procedures presented later in this chapter. Delay is a complex measure and is dependent on a number of variables, including the quality of progression, the cycle length, the green ratio, and the *v/c* ratio for the lane group in question.

**LOS A** describes operations with very low delay, up to 10 sec per vehicle. This level of service occurs when progression is extremely favorable and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.

**LOS B** describes operations with delay greater than 10 and up to 20 sec per vehicle. This level generally occurs with good progression, short cycle lengths, or both. More vehicles stop than with LOS A, causing higher levels of average delay.

Exhibit 16-2. Level-of-Service Criteria for Signalized Intersections

| LEVEL OF SERVICE | STOPPED DELAY PER VEHICLE (SEC) |
|------------------|---------------------------------|
| А                | <u>≤</u> 10.0                   |
| В                | > 10.0 and <u>&lt;</u> 20.0     |
| С                | > 20.0 and <u>&lt;</u> 35.0     |
| D                | > 35.0 and <u>&lt;</u> 55.0     |
| E                | > 55.0 and <u>&lt;</u> 80.0     |
| F                | >80.0                           |

**LOS C** describes operations with delay greater than 20 and up to 35 sec per vehicle. These higher delays may result from fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, though many still pass through the intersection without stopping.

**LOS D** describes operations with delay greater than 35 and up to 55 sec per vehicle. At level D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high *v/c* ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.

**LOS E** describes operations with delay greater than 55 and up to 80 sec per vehicle. This level is considered by many agencies to be the limit of acceptable delay. These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.

**LOS F** describes operations with delay in excess of 80 sec per vehicle. This level, considered to be unacceptable to most drivers, often occurs with oversaturation, that is, when arrival flow rates exceed the capacity of the intersection. It may also occur at high *v/c* ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: Highway Capacity Manual, 2000. Transportation Research Board, National Research Council

#### Level of Service Criteria for Stop Sign Controlled Intersections

The level of service criteria are given in Table 17-2. As used here, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue until the vehicle departs from the stop line; this time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position, including deceleration of vehicles from free-flow speed to the speed of vehicles in queue.

The average total delay for any particular minor movement is a function of the service rate or capacity of the approach and the degree of saturation. . . .

Table 17-2. Level of Service Criteria for TWSC Intersections

| LEVEL OF SERVICE | AVERAGE CONTROL DELAY (sec/veh) |
|------------------|---------------------------------|
| А                | ≤ 10                            |
| В                | > 10 and <u>&lt;</u> 15         |
| С                | > 15 and <u>&lt;</u> 25         |
| D                | > 25 and <u>&lt;</u> 35         |
| E                | > 35 and ≤ 50                   |
| F                | > 50                            |

Average total delay less than 10 sec/veh is defined as Level of Service (LOS) A. Follow-up times of less than 5 sec have been measured when there is no conflicting traffic for a minor street movement, so control delays of less than 10 sec/veh are appropriate for low flow conditions. To remain consistent with the AWSC intersection analysis procedure described later in this chapter, a total delay of 50 sec/veh is assumed as the break point between LOS E and F.

The proposed level of service criteria for TWSC intersections are somewhat different from the criteria used in Chapter 16 for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, several driver behavior considerations combine to make delays at signalized intersections less onerous than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, where drivers on the minor approaches to unsignalized intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized than signalized intersections. For these reasons, it is considered that the total delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. . . .

LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queueing on the minor approaches. The method, however, is based on a constant critical gap size - that is, the critical gap remains constant, no matter how long the side street motorist waits. LOS F may also appear in the form of side street vehicles' selecting smaller-than-usual gaps. In such cases, safety may be a problem and some disruption to the major traffic stream may result. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal gap acceptance behavior. The latter is more difficult to observe on the field than queueing, which is more obvious.

Source: Highway Capacity Manual, 2000. Transportation Research Board, National Research Council

## **APPENDIX C - Traffic Counts**

| Interval    |    |       | eway |    |    |      | /A    |    |    |       | do Blvo | t  |    |       | do Blvo | <u> </u> | 15-min | Rolling  |
|-------------|----|-------|------|----|----|------|-------|----|----|-------|---------|----|----|-------|---------|----------|--------|----------|
| Start       |    | Eastb | ound |    |    | West | bound |    |    | North | bound   |    |    | South | bound   |          | Total  | One Hour |
|             | UT | LT    | TH   | RT | UT | LT   | TH    | RT | UT | LT    | TH      | RT | UT | LT    | TH      | RT       |        |          |
| 7:00 AM     | 0  | 1     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 2     | 7       | 0  | 0  | 0     | 16      | 0        | 26     | 0        |
| 7:15 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 18      | 0  | 0  | 0     | 7       | 0        | 25     | 0        |
| 7:30 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 8       | 0  | 0  | 0     | 10      | 0        | 18     | 0        |
| 7:45 AM     | 0  | 1     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 11      | 0  | 0  | 0     | 8       | 0        | 20     | 89       |
| 8:00 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 6       | 0  | 0  | 0     | 8       | 0        | 14     | 77       |
| 8:15 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 9       | 0  | 0  | 0     | 10      | 0        | 19     | 71       |
| 8:30 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 9       | 0  | 0  | 0     | 13      | 0        | 22     | 75       |
| 8:45 AM     | 0  | 0     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 0     | 7       | 0  | 0  | 0     | 9       | 0        | 16     | 71       |
| Count Total | 0  | 2     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 2     | 75      | 0  | 0  | 0     | 81      | 0        | 160    | 0        |
| Peak Hour   | 0  | 2     | 0    | 0  | 0  | 0    | 0     | 0  | 0  | 2     | 44      | 0  | 0  | 0     | 41      | 0        | 89     | 0        |

#### Two-Hour Count Summaries - Bikes

| Interval    |    | Driveway | /  |    | N/A      |    | Co | lorado B  | lvd | Co | lorado B | lvd | 15-min | Rolling     |
|-------------|----|----------|----|----|----------|----|----|-----------|-----|----|----------|-----|--------|-------------|
| Start       | E  | Eastboun | d  | ٧  | Vestbour | ıd | N  | lorthbour | nd  | S  | outhbour | nd  | Total  | One Hour    |
| J.a         | LT | TH       | RT | LT | TH       | RT | LT | TH        | RT  | LT | TH       | RT  |        | 0.101.104.1 |
| 7:00 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 7:15 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 7:30 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 7:45 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 8:00 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 8:15 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 8:30 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| 8:45 AM     | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| Count Total | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |
| Peak Hour   | 0  | 0        | 0  | 0  | 0        | 0  | 0  | 0         | 0   | 0  | 0        | 0   | 0      | 0           |

Note: U-Turn volumes for bikes are included in Left-Turn, if any.

Project Manager: (720) 646-1008

# **APPENDIX D – Existing Synchro Outputs**

| Intersection           |        |       |        |        |        |                |        |      |          |         |      |      |
|------------------------|--------|-------|--------|--------|--------|----------------|--------|------|----------|---------|------|------|
| Int Delay, s/veh       | 2.6    |       |        |        |        |                |        |      |          |         |      |      |
| Movement               | EBL    | EBT   | EBR    | WBL    | WBT    | WBR            | NBL    | NBT  | NBR      | SBL     | SBT  | SBR  |
| Lane Configurations    | LDL    | 4     | LDIX   | VVDL   | 4      | WDIX           | INDL   | 4    | HUIL     | ODL     | 4    | ODIN |
| Traffic Vol, veh/h     | 16     | 12    | 26     | 6      | 5      | 29             | 19     | 226  | 5        | 5       | 137  | 8    |
| Future Vol, veh/h      | 16     | 12    | 26     | 6      | 5      | 29             | 19     | 226  | 5        | 5       | 137  | 8    |
| Conflicting Peds, #/hr | 0      | 0     | 0      | 0      | 0      | 0              | 0      | 0    | 0        | 0       | 0    | 0    |
| Sign Control           | Stop   | Stop  | Stop   | Stop   | Stop   | Stop           | Free   | Free | Free     | Free    | Free | Free |
| RT Channelized         | -      | -     | None   | -      | -      | None           | -      | -    | None     | -       | -    | None |
| Storage Length         | _      | _     | 110110 | _      | _      | -              | _      | _    | -        | _       | _    | -    |
| Veh in Median Storage  | e.# -  | 0     | _      | -      | 0      | _              | _      | 0    | _        | _       | 0    | _    |
| Grade, %               | σ, π - | 0     | _      | _      | 0      | _              | _      | 0    | _        | _       | 0    | _    |
| Peak Hour Factor       | 85     | 85    | 85     | 85     | 85     | 85             | 86     | 86   | 86       | 85      | 85   | 85   |
| Heavy Vehicles, %      | 13     | 17    | 2      | 50     | 2      | 7              | 21     | 16   | 60       | 80      | 24   | 50   |
| Mvmt Flow              | 19     | 14    | 31     | 7      | 6      | 34             | 22     | 263  | 6        | 6       | 161  | 9    |
| IVIVIIIL I IOW         | 19     | 14    | 31     | ı      | U      | J <del>4</del> | 22     | 200  | U        | U       | 101  | 9    |
|                        |        |       |        |        |        |                |        |      |          |         |      |      |
| Major/Minor            | Minor2 |       | ا      | Minor1 |        |                | Major1 |      | <u> </u> | /lajor2 |      |      |
| Conflicting Flow All   | 508    | 491   | 166    | 510    | 492    | 266            | 170    | 0    | 0        | 269     | 0    | 0    |
| Stage 1                | 178    | 178   | -      | 310    | 310    | -              | -      | -    | -        | -       | -    | -    |
| Stage 2                | 330    | 313   | -      | 200    | 182    | -              | -      | -    | -        | -       | -    | -    |
| Critical Hdwy          | 7.23   | 6.67  | 6.22   | 7.6    | 6.52   | 6.27           | 4.31   | -    | -        | 4.9     | -    | -    |
| Critical Hdwy Stg 1    | 6.23   | 5.67  | -      | 6.6    | 5.52   | -              | -      | -    | -        | -       | -    | -    |
| Critical Hdwy Stg 2    | 6.23   | 5.67  | -      | 6.6    | 5.52   | -              | -      | -    | -        | -       | -    | -    |
| Follow-up Hdwy         | 3.617  | 4.153 | 3.318  | 3.95   | 4.018  | 3.363          | 2.389  | -    | -        | 2.92    | -    | -    |
| Pot Cap-1 Maneuver     | 458    | 457   | 878    | 405    | 478    | 761            | 1300   | -    | -        | 952     | -    | -    |
| Stage 1                | 799    | 724   | -      | 609    | 659    | -              | -      | -    | -        | -       | -    | -    |
| Stage 2                | 661    | 631   | -      | 703    | 749    | -              | -      | -    | -        | -       | -    | -    |
| Platoon blocked, %     |        |       |        |        |        |                |        | -    | -        |         | -    | -    |
| Mov Cap-1 Maneuver     | 425    | 445   | 878    | 374    | 465    | 761            | 1300   | -    | -        | 952     | -    | -    |
| Mov Cap-2 Maneuver     | 425    | 445   | -      | 374    | 465    | -              | -      | -    | -        | -       | -    | -    |
| Stage 1                | 783    | 719   | -      | 597    | 646    | -              | -      | -    | -        | -       | -    | -    |
| Stage 2                | 613    | 618   | -      | 661    | 744    | -              | -      | -    | -        | -       | -    | -    |
| J.                     |        |       |        |        |        |                |        |      |          |         |      |      |
| A mara a ala           | ED     |       |        | MD     |        |                | MD     |      |          | CD      |      |      |
| Approach               | EB     |       |        | WB     |        |                | NB     |      |          | SB      |      |      |
| HCM Control Delay, s   | 12.1   |       |        | 11.3   |        |                | 0.6    |      |          | 0.3     |      |      |
| HCM LOS                | В      |       |        | В      |        |                |        |      |          |         |      |      |
|                        |        |       |        |        |        |                |        |      |          |         |      |      |
| Minor Lane/Major Mvn   | nt     | NBL   | NBT    | NBR    | EBLn1\ | WBLn1          | SBL    | SBT  | SBR      |         |      |      |
| Capacity (veh/h)       |        | 1300  | _      | -      | 573    | 616            | 952    | _    |          |         |      |      |
| HCM Lane V/C Ratio     |        | 0.017 | _      | _      |        | 0.076          |        | _    | -        |         |      |      |
| HCM Control Delay (s)  |        | 7.8   | 0      | _      | 12.1   | 11.3           | 8.8    | 0    | _        |         |      |      |
| HCM Lane LOS           |        | Α.    | A      | _      | В      | В              | Α      | A    | -        |         |      |      |
| HCM 95th %tile Q(veh   | )      | 0.1   | -      |        | 0.4    | 0.2            | 0      | -    | _        |         |      |      |
| HOW JOHN JOHNE W(VEH   | 1      | 0.1   | _      | _      | 0.4    | 0.2            | U      | _    | -        |         |      |      |

\_EX PM 3:08 pm 09/08/2022 Synchro 11 Report Page 3

# APPENDIX E – Background (without site development) Synchro Outputs

| Intersection           |        |        |       |        |        |        |        |      |          |        |      |      |
|------------------------|--------|--------|-------|--------|--------|--------|--------|------|----------|--------|------|------|
| Int Delay, s/veh       | 2.6    |        |       |        |        |        |        |      |          |        |      |      |
| Movement               | EBL    | EBT    | EBR   | WBL    | WBT    | WBR    | NBL    | NBT  | NBR      | SBL    | SBT  | SBR  |
| Lane Configurations    | LDL    | 4      | LDI   | WDL    | ₩      | WDIX   | NDL    | 4    | אטא      | ODL    | 4    | JUIN |
| Traffic Vol, veh/h     | 16     | 12     | 27    | 6      | 5      | 30     | 19     | 231  | 5        | 5      | 140  | 8    |
| Future Vol, veh/h      | 16     | 12     | 27    | 6      | 5      | 30     | 19     | 231  | 5        | 5      | 140  | 8    |
| Conflicting Peds, #/hr | 0      | 0      | 0     | 0      | 0      | 0      | 0      | 0    | 0        | 0      | 0    | 0    |
| Sign Control           | Stop   | Stop   | Stop  | Stop   | Stop   | Stop   | Free   | Free | Free     | Free   | Free | Free |
| RT Channelized         | -<br>- | -<br>- | None  | -      | -      | None   | -      | -    | None     | -      | -    | None |
| Storage Length         | -      | -      | -     | -      | -      | -      | -      | -    | -        | -      | -    | -    |
| Veh in Median Storage  | e.# -  | 0      | -     | -      | 0      | -      | _      | 0    | _        | -      | 0    | -    |
| Grade, %               | -      | 0      | -     | -      | 0      | -      | -      | 0    | -        | -      | 0    | -    |
| Peak Hour Factor       | 92     | 92     | 92    | 92     | 92     | 92     | 92     | 92   | 92       | 92     | 92   | 92   |
| Heavy Vehicles, %      | 13     | 17     | 2     | 50     | 2      | 7      | 21     | 16   | 60       | 80     | 24   | 50   |
| Mvmt Flow              | 17     | 13     | 29    | 7      | 5      | 33     | 21     | 251  | 5        | 5      | 152  | 9    |
|                        |        |        |       |        |        |        |        |      |          |        |      |      |
| Major/Minor            | Minor2 |        |       | Minor1 |        |        | Major1 |      |          | Major2 |      |      |
| Conflicting Flow All   | 482    | 465    | 157   | 484    | 467    | 254    | 161    | 0    | 0        | 256    | 0    | 0    |
| Stage 1                | 167    | 167    | 101   | 296    | 296    | 254    | -      | -    | -        | 200    | -    | -    |
| Stage 2                | 315    | 298    | _     | 188    | 171    | _      | _      | _    | _        | _      | _    | _    |
| Critical Hdwy          | 7.23   | 6.67   | 6.22  | 7.6    | 6.52   | 6.27   | 4.31   | _    | _        | 4.9    | _    | _    |
| Critical Hdwy Stg 1    | 6.23   | 5.67   | -     | 6.6    | 5.52   | -      | -      | _    | _        | -      | _    | _    |
| Critical Hdwy Stg 2    | 6.23   | 5.67   | -     | 6.6    | 5.52   | -      | -      | -    | -        | -      | -    | -    |
| Follow-up Hdwy         | 3.617  | 4.153  | 3.318 | 3.95   | 4.018  | 3.363  | 2.389  | -    | -        | 2.92   | -    | -    |
| Pot Cap-1 Maneuver     | 477    | 473    | 889   | 423    | 493    | 773    | 1310   | -    | -        | 964    | -    | -    |
| Stage 1                | 810    | 733    | -     | 620    | 668    | -      | -      | -    | -        | -      | -    | -    |
| Stage 2                | 673    | 641    | -     | 715    | 757    | -      | -      | -    | -        | -      | -    | -    |
| Platoon blocked, %     |        |        |       |        |        |        |        | -    | -        |        | -    | -    |
| Mov Cap-1 Maneuver     | 445    | 461    | 889   | 393    | 481    | 773    | 1310   | -    | -        | 964    | -    | -    |
| Mov Cap-2 Maneuver     | 445    | 461    | -     | 393    | 481    | -      | -      | -    | -        | -      | -    | -    |
| Stage 1                | 795    | 729    | -     | 608    | 655    | -      | -      | -    | -        | -      | -    | -    |
| Stage 2                | 627    | 629    | -     | 675    | 752    | -      | -      | -    | -        | -      | -    | -    |
|                        |        |        |       |        |        |        |        |      |          |        |      |      |
| Approach               | EB     |        |       | WB     |        |        | NB     |      |          | SB     |      |      |
| HCM Control Delay, s   | 11.7   |        |       | 11.1   |        |        | 0.6    |      |          | 0.3    |      |      |
| HCM LOS                | В      |        |       | В      |        |        |        |      |          |        |      |      |
|                        |        |        |       |        |        |        |        |      |          |        |      |      |
| Minor Lane/Major Mvm   | nt     | NBL    | NBT   | NRR    | EBLn1V | WRI n1 | SBL    | SBT  | SBR      |        |      |      |
| Capacity (veh/h)       | TC .   | 1310   | -     | - NDIX | 596    | 636    | 964    | -    | ODIX     |        |      |      |
| HCM Lane V/C Ratio     |        | 0.016  | -     | -      | 0.1    |        | 0.006  | -    | -        |        |      |      |
| HCM Control Delay (s)  |        | 7.8    | 0     | _      | 11.7   | 11.1   | 8.8    | 0    | -        |        |      |      |
| HCM Lane LOS           |        | Α.     | A     | _      | В      | В      | Α      | A    | <u>-</u> |        |      |      |
| HCM 95th %tile Q(veh)  | )      | 0      | -     | _      | 0.3    | 0.2    | 0      | -    | -        |        |      |      |
|                        |        |        |       |        | 0.0    | V.L    |        |      |          |        |      |      |

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# **APPENDIX F – Future (with site development) Synchro Outputs**

| Intersection                                                                                                     |               |                      |               |                      |          |      |
|------------------------------------------------------------------------------------------------------------------|---------------|----------------------|---------------|----------------------|----------|------|
| Int Delay, s/veh                                                                                                 | 0.3           |                      |               |                      |          |      |
| Movement                                                                                                         | ום:           | EDD                  | NDL           | NDT                  | CDT      | CDD  |
|                                                                                                                  | BL            | EBR                  | NBL           | NBT                  | SBT      | SBR  |
|                                                                                                                  | Y             | •                    | _             | 4                    | - ♣      |      |
| Traffic Vol, veh/h                                                                                               | 7             | 6                    | 3             | 300                  | 177      | 4    |
| Future Vol, veh/h                                                                                                | 7             | 6                    | 3             | 300                  | 177      | 4    |
| Conflicting Peds, #/hr                                                                                           | 0             | 0                    | 0             | 0                    | 0        | 0    |
|                                                                                                                  | top           | Stop                 | Free          | Free                 | Free     | Free |
| RT Channelized                                                                                                   | -             | None                 | -             | None                 | -        | None |
| Storage Length                                                                                                   | 0             | -                    | -             | -                    | -        | -    |
| Veh in Median Storage, #                                                                                         | 0             | -                    | -             | 0                    | 0        | -    |
| Grade, %                                                                                                         | 0             | -                    | -             | 0                    | 0        | -    |
|                                                                                                                  | 92            | 92                   | 92            | 92                   | 92       | 92   |
| Heavy Vehicles, %                                                                                                | 2             | 2                    | 50            | 14                   | 35       | 50   |
| Mymt Flow                                                                                                        | 8             | 7                    | 3             | 326                  | 192      | 4    |
| IVIVIII( I IOW                                                                                                   | U             |                      | J             | 320                  | 132      | 7    |
|                                                                                                                  |               |                      |               |                      |          |      |
| Major/Minor Mino                                                                                                 | or2           | N                    | /lajor1       | N                    | //ajor2  |      |
| Conflicting Flow All 5                                                                                           | 526           | 194                  | 196           | 0                    | -        | 0    |
|                                                                                                                  | 194           | -                    | -             | -                    | -        | -    |
| •                                                                                                                | 332           | -                    | _             | _                    | _        | -    |
|                                                                                                                  | 5.42          | 6.22                 | 4.6           | -                    | -        | _    |
| •                                                                                                                | .42           | -                    | - 1.0         | _                    | _        | _    |
|                                                                                                                  | .42           | _                    | _             |                      | _        |      |
| , ,                                                                                                              |               | 3.318                | 2.65          | _                    | _        | _    |
|                                                                                                                  | 512           | 847                  |               | -                    | -        | -    |
|                                                                                                                  |               | 047                  | 1136          | -                    | -        | -    |
| •                                                                                                                | 839           | -                    | -             | -                    | -        | -    |
| 9                                                                                                                | 727           | -                    | -             | -                    | -        | -    |
| Platoon blocked, %                                                                                               |               |                      |               | -                    | -        | -    |
|                                                                                                                  | 510           | 847                  | 1136          | -                    | -        | -    |
| Mov Cap-2 Maneuver 5                                                                                             | 510           | -                    | -             | -                    | -        | -    |
| Stage 1 8                                                                                                        | 836           | -                    | -             | -                    | -        | -    |
|                                                                                                                  | 727           | -                    | -             | -                    | -        | -    |
| J                                                                                                                |               |                      |               |                      |          |      |
|                                                                                                                  |               |                      | ND            |                      | 0.0      |      |
|                                                                                                                  |               |                      |               |                      | SB       |      |
|                                                                                                                  | EB            |                      | NB            |                      |          |      |
|                                                                                                                  | <b>EB</b> 0.9 |                      | 0.1           |                      | 0        |      |
|                                                                                                                  |               |                      |               |                      | 0        |      |
| HCM Control Delay, s 10                                                                                          | 0.9           |                      |               |                      | 0        |      |
| HCM Control Delay, s 10<br>HCM LOS                                                                               | 0.9           | NRI                  | 0.1           | ERI n1               |          | CDD  |
| HCM Control Delay, s 10 HCM LOS  Minor Lane/Major Mvmt                                                           | 0.9           | NBL<br>4420          | 0.1           | EBLn1                | SBT      | SBR  |
| HCM Control Delay, s 10 HCM LOS  Minor Lane/Major Mvmt Capacity (veh/h)                                          | 0.9<br>B      | 1136                 | 0.1<br>NBT    | 625                  | SBT -    | -    |
| HCM Control Delay, s 10 HCM LOS  Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio                       | 0.9<br>B      | 1136<br>0.003        | 0.1<br>NBT -  | 625<br>0.023         | SBT      |      |
| HCM Control Delay, s 10 HCM LOS  Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio HCM Control Delay (s) | 0.9<br>B      | 1136<br>0.003<br>8.2 | 0.1<br>NBT  0 | 625<br>0.023<br>10.9 | SBT -    | -    |
| HCM Control Delay, s 10 HCM LOS  Minor Lane/Major Mvmt Capacity (veh/h) HCM Lane V/C Ratio                       | 0.9<br>B      | 1136<br>0.003        | 0.1<br>NBT -  | 625<br>0.023         | SBT<br>- | -    |

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