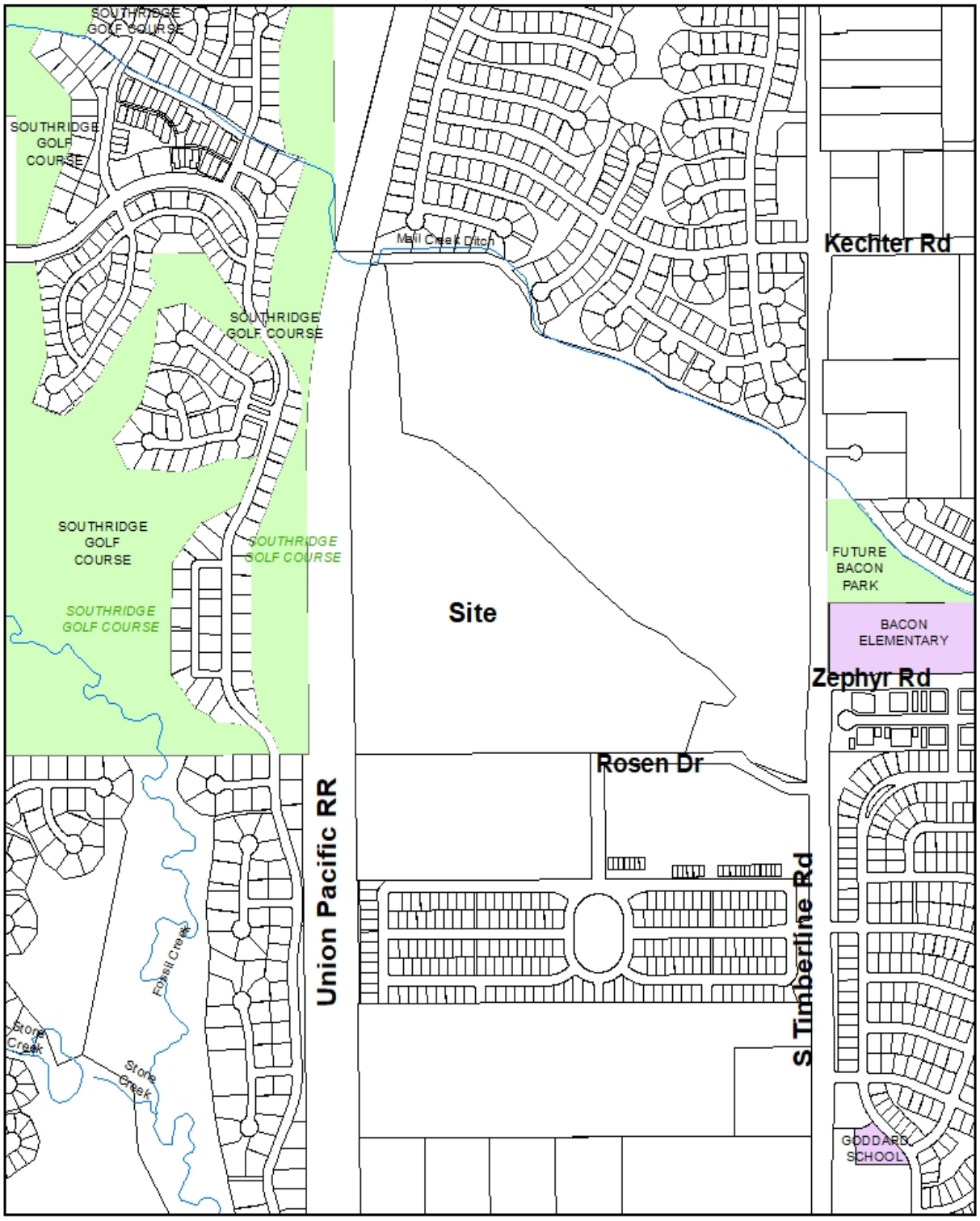


Rennat Subdivision PDP - Vicinity Map

N

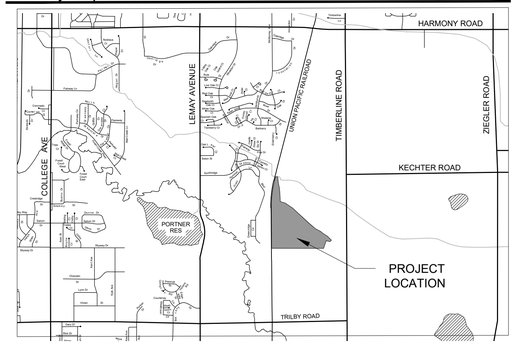
1 inch = 666.666667 feet

RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH PRINCIPAL MERIDIAN, COUNTY OF LARIMER, STATE OF COLORADO

Vicinity Map:

NOT TO SCALE NORTH



Land-Use Statistics - LMN Zone

EXISTING ZONING:	LMN	
GROSS LAND AREA:	2,465,496 S.F.	56.6 AC.
NET LAND AREA:	1,692,306 S.F.	38.8 AC.
NUMBER OF SINGLE-FAMILY DETACHED:	84	
NUMBER OF SINGLE-FAMILY DETACHED WITH REAR-LOADED GARAGES	67	
NUMBER OF SINGLE-FAMILY ATTACHED:	37	
TOTAL NUMBER OF UNITS:	188	
LAND USE:	RESIDENTIAL	
TOTAL STORIES:	2	
GROSS DENSITY	3.32 D.U. / ACRE	
NET DENSITY	4.84 D.U./ACRE	

GROSS AREA COVERAGE	SQUARE FEET	ACRES	% OF
BUILDING FOOTPRINTS	335,414	7.70	13.6%
LANDSCAPE AREA	1,663,087	38.18	67.4%
FUTURE PARK	102,366	2.35	4.2%
PUBLIC STREETS	234,210	5.38	9.5%
ALLEYS	51,877	1.19	2.1%
SIDEWALKS / TRAILS	78,972	1.81	3.2%
TOTAL AREA:	2,519,074	56.61	100%

LAND USE HOUSING MIX

*PER LUC SECTION 4.5(D)(2): 4 HOUSING TYPES HAVE BEEN PROVIDED WHICH INCLUDE THE FOLLOWING:

1. SINGLE-FAMILY DETACHED DWELLINGS
2. SINGLE-FAMILY DETACHED DWELLINGS WITH REAR-LOADED GARAGES
3. SINGLE-FAMILY ATTACHED DWELLINGS
4. SINGLE-FAMILY ATTACHED DWELLINGS WITH FRONT LOADED GARAGES

*NOTE: A MODIFICATION OF STANDARD IS REQUESTED TO SECTION 4.5(D)(2)(C)TO BE ALLOWED TO COUNT SINGLE-FAMILY ATTACHED WITH FRONT LOADED GARAGES AS A BUILDING TYPE.

PARKING

PER LUC SECTION 3.2.2(K)(1)(1)(a)(1.):
45 TOTAL UNITS (SINGLE-FAMILY ATTACHED)

45 - 2 BR UNITS X 1.75 = 78 SPACES REQUIRED

78 SPACES PROVIDED IN GARAGES

SPACES PROVIDED FOR SINGLE-FAMILY DETACHED:

306 GARAGE SPACES

306 DRIVEWAY SPACES

612 SPACES TOTAL PROVIDED

Land-Use Statistics - NC Zone

EXISTING ZONING:	NC	
OVERALL NC ZONE LAND AREA:	394,909 S.F.	9.07 AC.
RESIDENTIAL NC ZONE AREA:	53,143 S.F.	1.22 AC. (13.4%)
NUMBER OF SINGLE-FAMILY ATTACHED:	17	
LAND USE:	RESIDENTIAL	
TOTAL STORIES:	2	
GROSS DENSITY	1.87 D.U. / ACRE	

GROSS AREA COVERAGE	SQUARE FEET	ACRES	% OF
BUILDING FOOTPRINTS	16,200	0.372	30.5%
LANDSCAPE AREA	6,266	0.144	11.8%
PUBLIC STREETS	20,616	0.473	38.7%
ALLEYS	6,920	0.159	13.0%
SIDEWALKS / TRAILS	3,146	0.072	6.0%
TOTAL AREA:	53,148	1.220	100%

NC AREA CALCULATIOINS

OVERALL NC-ZONED AREA = 9.07 AC.

RESIDENTIAL AREA IN NC ZONE = 1.22 AC. (13.4%)

PARKING

PER LUC SECTION 3.2.2(K)(1)(1)(a)(1.):

17 TOTAL UNITS (SINGLE-FAMILY ATTACHED)

17 - 2 BR UNITS X 1.75 = 29 SPACES REQUIRED

29 SPACES PROVIDED IN GARAGES

Owner's Certification of Approval:

THE UNDERSIGNED DOES/DO HEREBY CERTIFY THAT I/WE ARE THE LAWFUL OWNERS OF REAL PROPERTY DESCRIBED ON THIS SITE PLAN AND DO HEREBY CERTIFY THAT I/WE ACCEPT THE CONDITIONS AND RESTRICTIONS SET FORTH ON SAID SITE PLAN.

IN WITNESS WHEREOF, WE HAVE HEREUNTO SET OUR HANDS AND SEALS THIS THE _____ DAY OF _____, 20_____.

_____

NOTARIAL CERTIFICATE

STATE OF COLORADO)

COUNTY OF _____)

THE FOREGOING INSTRUMENT WAS ACKNOWLEDGED BEFORE ME BY (PRINTED NAME) THIS _____ DAY OF _____, 20_____.

MY COMMISSION EXPIRES:_____ _____
NOTARY PUBLIC

(SEAL)

Planning Approval:

BY THE DIRECTOR OF COMMUNITY DEVELOPMENT AND NEIGHBORHOOD SERVICES OF THE CITY OF FORT COLLINS, COLORADO THIS_____DAY OF _____ A.D., 20_____.

_____
DIRECTOR OF COMMUNITY DEVELOPMENT AND NEIGHBORHOOD SERVICES

NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

Site Plan Notes:

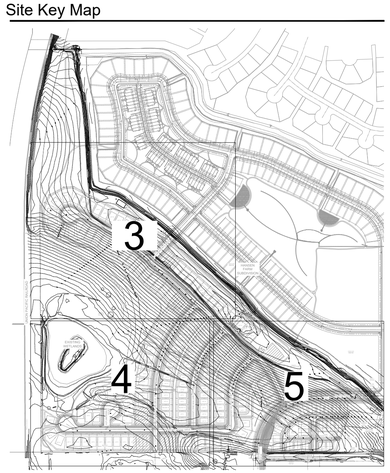
1. THE PROJECT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FINAL PLANS. AMENDMENTS TO THE PLANS MUST BE REVIEWED AND APPROVED BY THE CITY PRIOR TO THE IMPLEMENTATION OF ANY CHANGES TO THE PLANS.
2. REFER TO FINAL UTILITY PLANS FOR EXACT LOCATIONS AND CONSTRUCTION INFORMATION FOR STORM DRAINAGE STRUCTURES, UTILITY MAINS AND SERVICES.
3. REFER TO THE FINAL CIVIL ENGINEERING PLANS FOR DETAILED INFORMATION REGARDING PROPOSED TOPOGRAPHY, UTILITY MAINS AND SERVICES, PROPOSED TOPOGRAPHY AND STREET IMPROVEMENTS.
4. REFER TO THE SUBDIVISION PLAT AND UTILITY PLANS FOR EXACT LOCATIONS, AREAS AND DIMENSIONS OF ALL EASEMENTS, LOTS, TRACTS, STREETS, WALKS AND OTHER SURVEY INFORMATION.
5. ALL CONSTRUCTION WITH THIS DEVELOPMENT PLAN MUST BE COMPLETED IN ONE PHASE UNLESS A PHASING PLAN IS SHOWN WITH THESE PLANS.
6. ALL ROOFTOP AND GROUND MOUNTED MECHANICAL EQUIPMENT MUST BE SCREENED FROM VIEW FROM ADJACENT PROPERTY AND PUBLIC STREETS. IN CASES WHERE BUILDING PARAPETS DO NOT ACCOMPLISH SUFFICIENT SCREENING, THEN FREESTANDING SCREEN WALLS MATCHING THE PREDOMINANT COLOR OF THE BUILDING SHALL BE CONSTRUCTED. OTHER MINOR EQUIPMENT SUCH AS CONDUIT, METERS AND PLUMBING VENTS SHALL BE SCREENED OR PAINTED TO MATCH SURROUNDING BUILDING SURFACES.
7. ALL CONSTRUCTION WITHIN THIS DEVELOPMENT PLAN MUST BE COMPLETED IN ONE PHASE UNLESS A PHASING PLAN IS SHOWN WITH THESE PLANS.
8. ALL SINGLE FAMILY DETACHED HOMES SHALL MEET OR EXCEED THE GARAGE DOOR STANDARDS AS OUTLINED IN 3.5.2(E) OF THE LAND USE CODE.
9. A MINIMUM OF THREE (3) HOUSING MODELS FOR THE SINGLE FAMILY HOMES SHALL BE REQUIRED. THESE HOUSING MODELS SHALL MEET OR EXCEED THE STANDARD AS OUTLINED IN 3.5.2(C) OF THE LAND USE CODE.
10. ALL EXTERIOR LIGHTING PROVIDED WITH THE DEVELOPMENT SHALL COMPLY WITH THE FOOT-CANDLE REQUIREMENTS IN SECTION 3.2.4 OF THE LAND USE CODE AND SHALL USE A CONCEALED, FULLY SHIELDED LIGHT SOURCE WITH SHARP CUT-OFF CAPABILITY SO AS TO MINIMIZE UP-LIGHT, GLARE AND UNNECESSARY DIFFUSION.
11. SIGNAGE AND ADDRESSING ARE NOT PERMITTED WITH THIS PLANNING DOCUMENT AND MUST BE APPROVED BY SEPARATE CITY PERMIT PRIOR TO CONSTRUCTION. SIGNS MUST COMPLY WITH CITY SIGN CODE UNLESS A SPECIFIC VARIANCE IS GRANTED BY THE CITY.
12. FIRE HYDRANTS MUST MEET OR EXCEED POUDRE FIRE AUTHORITY STANDARDS. ALL BUILDINGS MUST PROVIDE AN APPROVED FIRE EXTINGUISHING SYSTEM.
13. ALL BIKE RACKS PROVIDED MUST BE PERMANENTLY ANCHORED.
14. ALL SIDEWALKS AND RAMPS MUST CONFORM TO CITY STANDARDS. ACCESSIBLE RAMPS MUST BE PROVIDED AT ALL STREET AND DRIVE INTERSECTIONS AND AT ALL DESIGNATED ACCESSIBLE PARKING SPACES. ACCESSIBLE PARKING SPACES MUST SLOPE NO MORE THAN 1:48 IN ANY DIRECTION. ALL ACCESSIBLE ROUTES MUST SLOPE NO MORE THAN 1:20 IN DIRECTION OF TRAVEL AND WITH NO MORE THAN 1:48 CROSS SLOPE.
15. COMMON OPEN SPACE AREAS AND LANDSCAPING WITHIN RIGHT OF WAYS, STREET MEDIANS, AND TRAFFIC CIRCLES ADJACENT TO COMMON OPEN SPACE AREAS ARE REQUIRED TO BE MAINTAINED BY A PROPERTY OWNERS' ASSOCIATION. THE PROPERTY OWNERS' ASSOCIATION IS RESPONSIBLE FOR SNOW REMOVAL ON ALL ADJACENT STREET SIDEWALKS AND SIDEWALKS IN COMMON OPEN SPACE AREAS.
16. THE PROPERTY OWNER FOR EACH RESIDENTIAL LOT IS RESPONSIBLE FOR SNOW REMOVAL ON ALL STREET SIDEWALKS ADJACENT TO EACH RESIDENTIAL LOT.
17. PRIVATE CONDITIONS, COVENANTS, AND RESTRICTIONS (CC&R'S), OR ANY OTHER PRIVATE RESTRICTIVE COVENANT IMPOSED ON LANDOWNERS WITHIN THE DEVELOPMENT, MAY NOT BE CREATED OR ENFORCED HAVING THE EFFECT OF PROHIBITING OR LIMITING THE INSTALLATION OF XERISCAPE LANDSCAPING, SOLAR/PHOTO-VOLTAIC COLLECTORS (IF MOUNTED FLUSH UPON ANY ESTABLISHED ROOF LINE), CLOTHES LINES (IF LOCATED IN BACK YARDS), ODOR-CONTROLLED COMPOST BINS, OR WHICH HAVE THE EFFECT OF REQUIRING THAT A PORTION OF ANY INDIVIDUAL LOT BE PLANTED IN TURF GRASS.
18. ANY DAMAGED CURB, GUTTER AND SIDEWALK EXISTING PRIOR TO CONSTRUCTION, AS WELL AS STREETS, SIDEWALKS, CURBS AND GUTTERS, DESTROYED, DAMAGED OR REMOVED DUE TO CONSTRUCTION OF THIS PROJECT, SHALL BE REPLACED OR RESTORED TO CITY OF FORT COLLINS STANDARDS AT THE DEVELOPER'S EXPENSE PRIOR TO THE ACCEPTANCE OF COMPLETED IMPROVEMENTS AND/OR PRIOR TO THE ISSUANCE OF THE FIRST CERTIFICATE OF OCCUPANCY.
19. FIRE LANE MARKING: A FIRE LANE MARKING PLAN MUST BE REVIEWED AND APPROVED BY THE FIRE OFFICIAL PRIOR TO ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY. WHERE REQUIRED BY THE FIRE CODE OFFICIAL, APPROVED SIGNS OR OTHER APPROVED NOTICES THAT INCLUDE THE WORDS NO PARKING FIRE LAND SHALL BE PROVIDED FOR FIRE APPARATUS ACCESS ROADS TO IDENTIFY SUCH ROADS OR PROHIBIT THE OBSTRUCTION THEREOF. THE MEANS BY WHICH FIRE LANES ARE DESIGNATED SHALL BE MAINTAINED IN A CLEAN AND LEGIBLE CONDITION AT ALL TIMES AND BE REPLACED OR REPAIRED WHEN NECESSARY TO PROVIDE ADEQUATE VISIBILITY.
20. PREMISE IDENTIFICATION: AN ADDRESSING PLAN IS REQUIRED TO BE REVIEWED AND APPROVED BY THE CITY AND POUDRE FIRE AUTHORITY PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY. UNLESS THE PRIVATE DRIVE IS NAMED, MONUMENT SIGNAGE MAY BE REQUIRED TO ALLOW WAY-FINDING. ALL BUILDING IDENTIFICATION PLACED IN A POSITION THAT IS PLAINLY LEGIBLE, WITH A MINIMUM OF SIX-INCH NUMERALS ON A CONTRASTING BACKGROUND. WHERE ACCESS IS BY MEANS OF A PRIVATE ROAD AND THE BUILDING CANNOT BE VIEWED FROM THE PUBLIC WAY, A MONUMENT ,A POLE OR OTHER SIGN OR MEANS SHALL BE USED TO IDENTIFY THE STRUCTURE.

Legal Description:

Beginning at a point 736.44 feet North 89°58'05" West of the East Quarter Corner of Section 7, Township 6 North, Range 68 West of the 6th Principal Meridian, thence North 18°54'22" East 280.05 feet, thence South 80°51'54" East 140.66 feet, thence North 43°25'25" East 68.46 feet, thence North 45°20'01" West 193.08 feet, thence North 57°51'56" West 191.24 feet, thence North 48°05'35" West 109.43 feet, thence North 63°33'59" West 198.72 feet, thence North 49°44'35" West 330.86 feet, thence North 47°11'22" West 783.31 feet, thence North 55°06'07" West 318.92 feet, thence North 74°09'06" West 184.15 feet, thence North 03°01'25" West 367.61 feet, thence North 05°58'23" West 117.72 feet, thence North 11°31'17" West 221.70 feet, thence North 02°50'53" West 122.76 feet, thence North 09°30'36" West 65.31 feet, thence South 89°34'37" West 74.45 feet, thence South 14°42'15" West 117.21 feet, thence on a 15° curve 973.82 feet to the left with a radius of curvature of 1°32'25" from a bearing of South 14°42'15" West to South 00°17'45" East, thence South 00°17'45" East 1480.42 feet, thence South 89°58'05" East 1860.30 feet to the point of beginning, County of Larimer, State of Colorado

Including an access easement granted to Harry O. and Ingrid M. Rennat described as follows:
A 60-foot access easement whose centerline begins at a point in the east line of Section 7, Township 6 North, Range 68 West, said line being the centerline of County Road 11, 191.91 feet north of the East Quarter Corner of said section, thence North 80°51'54" West a distance of 488.05 feet to a point in the property line of Harry O. and Ingrid M. Rennat.

Site Key Map



Sheet Index:

SHEET 1	COVER SHEET
SHEET 2	OVERALL SITE PLAN
SHEET 3	SITE PLAN
SHEET 4	SITE PLAN
SHEET 5	SITE PLAN
SHEET 6	NEIGHBORHOOD CONTEXT PLAN
SHEET 7	HOUSING MODEL VARIETY EXHIBIT
SHEET 8	OVERALL LANDSCAPE PLAN
SHEET 9	EXISTING TREE INVENTORY & MITIGATION PLAN
SHEET 10	OVERALL NATURAL HABITAT BUFFER ZONE PLAN
SHEET 11	LANDSCAPE PLAN
SHEET 12	LANDSCAPE PLAN
SHEET 13	LANDSCAPE PLAN
SHEET 14	LANDSCAPE PLAN
SHEET 15	LANDSCAPE PLAN
SHEET 16	LANDSCAPE PLAN
SHEET 17	LANDSCAPE PLAN
SHEET 18	LANDSCAPE PLAN
SHEET 19	LANDSCAPE NOTES, DETAILS & SCHEDULES
SHEET 20	LANDSCAPE DETAILS

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PROJECT TITLE

RENNAT SUBDIVISION

Preliminary Development Plan

6015 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

POST MODERN DEVELOPMENT
144 N. MASON ST.
SUITE 4
FORT COLLINS, CO 80524

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REVISIONS DATE
STAFF COMMENTS 10.18.19
STAFF COMMENTS 12.04.19
STAFF COMMENTS 12.23.19

DATE

AUGUST 9, 2019

SHEET TITLE

Cover Sheet

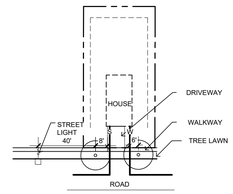
SHEET INFORMATION

SHEET 1

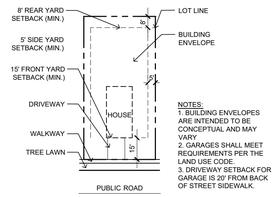
LOT MATRIX

	PRODUCT	SIZE	SQUARE FEET	QUANTITY	PERCENT
	SINGLE-FAMILY DETACHED	50' X 105' MIN	5,250 SF MIN	42	20.5%
	SINGLE -FAMILY DETACHED WITH REAR LOADED GARAGES	40' X 82' MIN	3,280 SF MIN	67	32.7%
	SINGLE-FAMILY DETACHED	50' X 100' MIN	5,000 SF MIN	42	20.5%
	SINGLE-FAMILY ATTACHED	25' X 74' MIN	1,850 SF MIN	42	20.5%
	SINGLE -FAMILY ATTACHED WITH FRONT LOADED GARAGES	50' X 100' MIN	5,000 SF MIN	12	5.8%
	TOTAL	-	-	205	100%
TOTAL DENSITY				5.51 D.U./AC. NET	

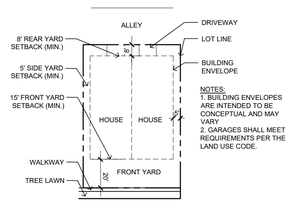
TYPICAL UTILITY LAYOUT



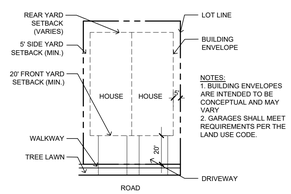
TYPICAL LOT: SINGLE-FAMILY DETACHED



TYPICAL LOT: SINGLE-FAMILY ATTACHED (ALLEY LOAD ONLY)



TYPICAL LOT: SINGLE-FAMILY ATTACHED (WITH FRONT LOADED GARAGE)



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SHEET TITLE

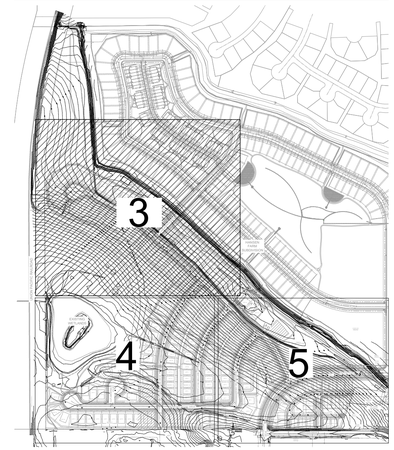
Housing Model Variety Exhibit

SHEET INFORMATION

SHEET 2



Site Key Map



NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

Legend

- PROPERTY LINE
- EASEMENT
- RIGHT-OF-WAY LINE
- LOT LINE
- BUILDING ENVELOPE
- NATURAL HABITAT BUFFER ZONE BOUNDARY
- NATURAL HABITAT BUFFER OFFSET
- NATURAL HABITAT BUFFER ZONE (NHBZ) AREA

0 50' 75' 100'
SCALE 1" = 50'-0"

NORTH

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SHEET TITLE

Site Plan

SHEET INFORMATION

SHEET 3

MATCH LINE SHEET 3

MATCH LINE SHEET 4

TRACT A
DRAINAGE
EASEMENT

NATURAL HABITAT BUFFER ZONE AREA (NHBZ)

EDGE OF WETLANDS

100' WETLANDS BUFFER FROM EDGE OF WETLANDS

NATURAL HABITAT BUFFER ZONE BOUNDARY

EXISTING WETLANDS

MISTY MEADOW DRIVE

AUTUMN BREEZE COURT

CROAKING TOAD DRIVE

FLYING MALLARD DRIVE

WINDY WILLOW DRIVE

DANCING CATTAIL DRIVE

TRACT B

TRACT C

TRACT D
DUA&EAE

TRACT F

TRACT G

TRACT H

TRACT I

TRACT S
DUA&EAE

OPEN SPACE/DE

5' SIDEWALK

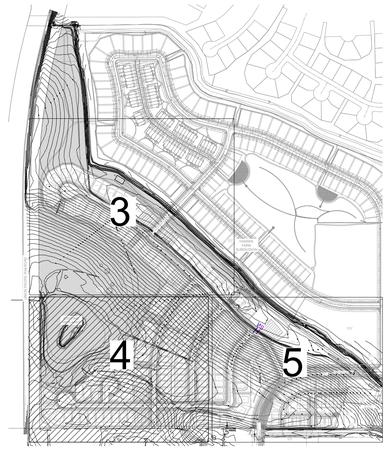
9' UTILITY EASEMENT
5' DETACHED SIDEWALK TYP.
5.5ft TREE LAWN

9' UTILITY EASEMENT TYP.

PROPERTY LINE TYP.

BLOCK 6
BLOCK 7
BLOCK 8
BLOCK 9
BLOCK 10
BLOCK 12
BLOCK 13
BLOCK 14
BLOCK 15
BLOCK 16

Site Key Map



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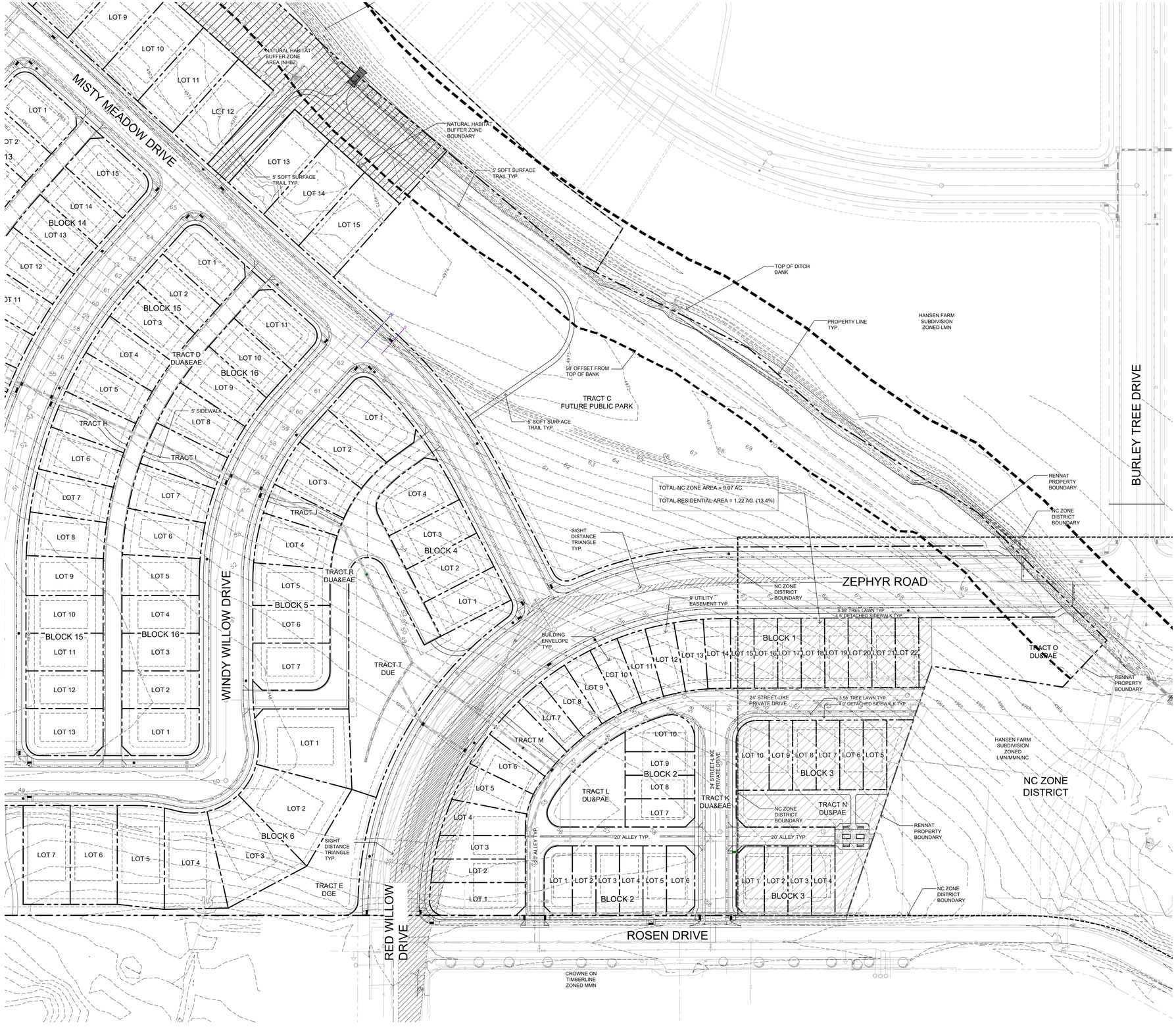
AUGUST 9, 2019

SHEET TITLE

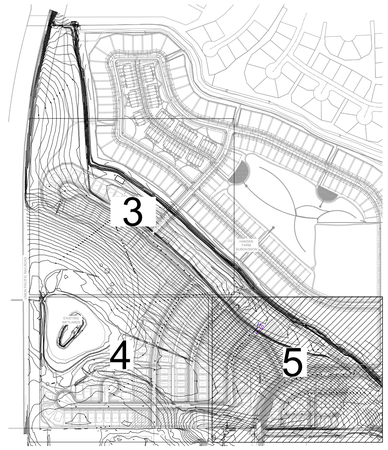
Site Plan

SHEET INFORMATION

SHEET 4



Site Key Map



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POST MODERN DEVELOPMENT
144 N. MASON ST.
SUITE 4
FORT COLLINS, CO 80524

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REVISIONS DATE
STAFF COMMENTS 10.18.19
STAFF COMMENTS 12.04.19
STAFF COMMENTS 12.23.19

DATE

AUGUST 9, 2019

SHEET TITLE

Site Plan

SHEET INFORMATION

SHEET 5



NORTH
NOT TO SCALE

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Berthoud,CO 80513

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SEAL

PROJECT TITLE

RENNAT
SUBDIVISION

Preliminary
Development
Plan

6015 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

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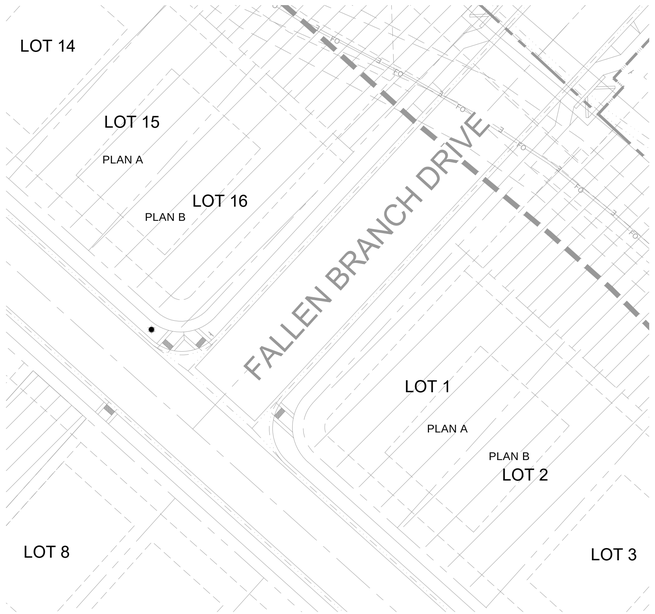
SHEET TITLE

Neighborhood Context Plan

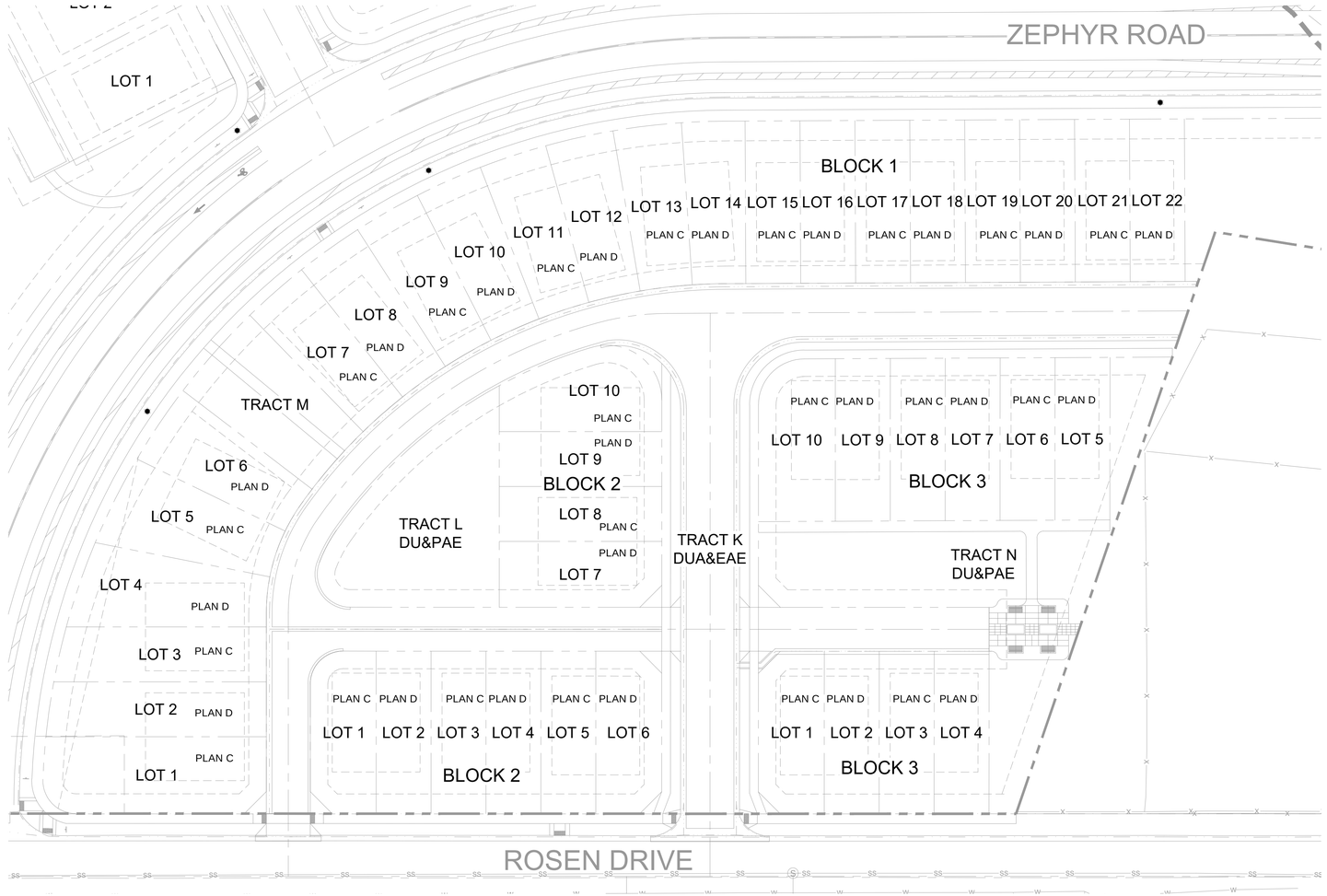
SHEET INFORMATION

SHEET 6

SINGLE FAMILY ATTACHED WITH FRONT LOADED GARAGES



SINGLE FAMILY ATTACHED



SINGLE FAMILY ATTACHED WITH FRONT LOADED GARAGES

SINGLE FAMILY ATTACHED WITH REAR LOADED GARAGES

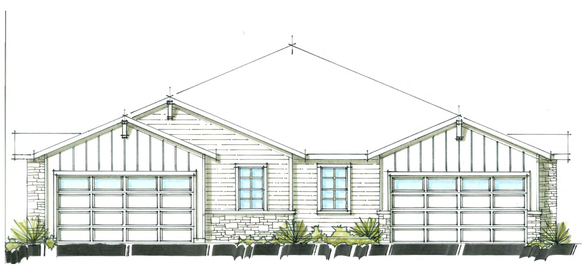


PLAN C

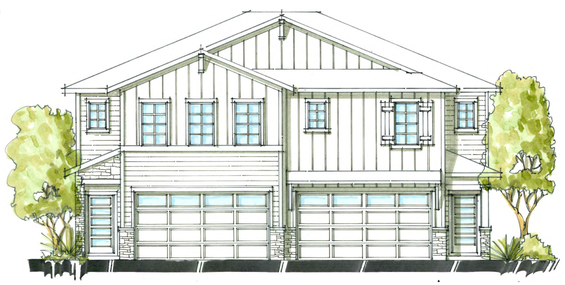


PLAN D

SINGLE FAMILY ATTACHED WITH FRONT LOADED GARAGES



PLAN A



PLAN B

NORTH

0 30' 45' 60'

SCALE 1" = 30'-0"

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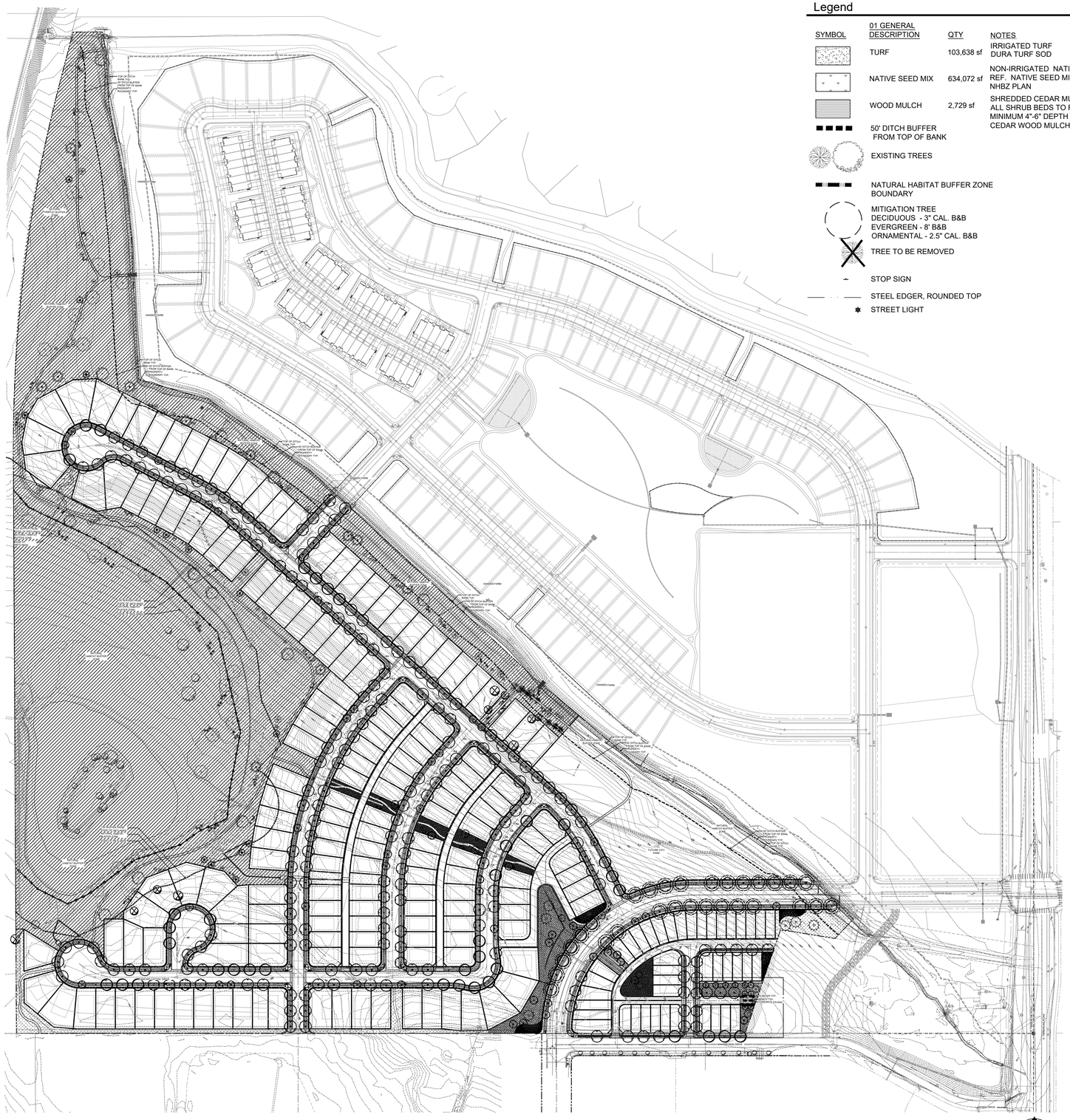
AUGUST 9, 2019

SHEET TITLE

Housing Model Variety Exhibit

SHEET INFORMATION

SHEET 7



NORTH
NOT TO SCALE

Legend

SYMBOL	01 GENERAL DESCRIPTION	QTY	NOTES
	TURF	103,638 sf	IRRIGATED TURF DURA TURF SOD
	NATIVE SEED MIX	634,072 sf	NON-IRRIGATED NATIVE GRASS MIX REF. NATIVE SEED MIX ON OVERALL NHBZ PLAN
	WOOD MULCH	2,729 sf	SHREDDED CEDAR MULCH ALL SHRUB BEDS TO RECEIVE A MINIMUM 4"-6" DEPTH SHREDDED CEDAR WOOD MULCH
	50' DITCH BUFFER FROM TOP OF BANK		
	EXISTING TREES		
	NATURAL HABITAT BUFFER ZONE BOUNDARY		
	MITIGATION TREE DECIDUOUS - 3" CAL. B&B EVERGREEN - 8' B&B ORNAMENTAL - 2.5" CAL. B&B		
	TREE TO BE REMOVED		
	STOP SIGN		
	STEEL EDGER, ROUNDED TOP		
	STREET LIGHT		

Plant List

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	6	Picea abies `Cupressina` Fastigiate Norway Spruce	6`, BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	3	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine	6`, BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	6	Pinus ponderosa Ponderosa Pine	6`, BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	6	Pinus strobiformis Southwestern White Pine	6`, BB	FULL SPECIMEN, EVENLY AND WELL BRANCHED

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	7	Amelanchier x grandiflora `Autumn Brilliance` `Autumn Brilliance` Serviceberry	1.5" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	15	Crataegus crus-galli inermis Thornless Cockspur Hawthorn	1.5" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	9	Malus x `Spring Snow` Spring Snow Crab Apple	1.5" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	10	Pyrus fauriei Korean Sun Korean Wild Pear	1.5" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	14	Syringa reticulata Japanese Tree Lilac	1.5" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER

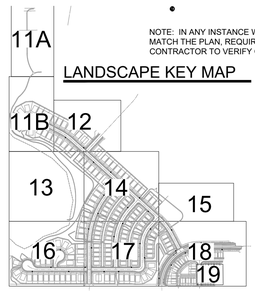
SHADE TREES	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	39	Catalpa speciosa Catalpa 7 of 31 = Mitigation Tree	2" cal. BB 3" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	41	Celtis occidentalis Western Hackberry 4 of 41 = Mitigation Tree	2" cal. BB 3" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	44	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree 8 of 40 = Mitigation Tree	2" cal. BB 3" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	44	Quercus buckleyi Texas Red Oak	2" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	46	Quercus shummardi Shumard Oak 7 of 44 = Mitigation Tree	2" cal. BB 3" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	43	Ulmus x `Accolade` Accolade Elm 3 of 44 = Mitigation Tree	2" cal. BB 3" cal. BB	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	26	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry	5 gal.	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	37	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea	5 gal.	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	25	Philadelphus x `Snowbell` Snowbell Mock Orange	5 gal.	24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED

GRASSES	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	103	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass	1 gal.	WELL ROOTED AND ESTABLISHED
	59	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass	1 gal.	WELL ROOTED AND ESTABLISHED
	107	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass	1 gal.	WELL ROOTED AND ESTABLISHED

PERENNIALS	QTY	BOTANICAL / COMMON NAME	SIZE	REMARKS
	55	Agastache rupestris `Sunset` Sunset Hyssop	1 gal.	WELL ROOTED AND ESTABLISHED
	87	Echinacea purpurea Purple Coneflower	1 gal.	WELL ROOTED AND ESTABLISHED
	42	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan	1 gal.	WELL ROOTED AND ESTABLISHED

NOTE: IN ANY INSTANCE WHERE THE PLANT LIST OR LANDSCAPE QUANTITIES DO NOT MATCH THE PLAN, REQUIRED PLANTS/QUANTITIES SHALL BE PER THE PLAN. CONTRACTOR TO VERIFY QUANTITIES.



LANDSCAPE KEY MAP

Sheet Index:

OVERALL LANDSCAPE PLAN	8
EXISTING TREE INVENTORY & MITIGATION PLAN	9
OVERALL NATURAL HABITAT BUFFER ZONE PLAN	10
LANDSCAPE PLAN	11
LANDSCAPE PLAN	12
LANDSCAPE PLAN	13
LANDSCAPE PLAN	14
LANDSCAPE PLAN	15
LANDSCAPE PLAN	16
LANDSCAPE PLAN	17
LANDSCAPE PLAN	18
LANDSCAPE DETAILS	19
LANDSCAPE NOTES, DETAILS & SCHEDULES	20

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AUGUST 9, 2019

SHEET TITLE

Overall Landscape Plan

SHEET INFORMATION

SHEET 8



Existing Tree Schedule

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
1. BLUE SPRUCE	3"	FAIR MINUS	NO	YES - 1 FOR 1 REPLACE.	---
2. GREEN ASH	35"	FAIR	NO	YES - 3	---
3. PLAINS COTTONWOOD	80"	FAIR	NO	YES - 6	---
4. PLAINS COTTONWOOD	80"	FAIR	NO	YES - 6	---
5. LANCELEAF COTTONWOOD	24"/3"/4"/6"	FAIR MINUS	NO	YES - 2.5	---
6. LANCELEAF COTTONWOOD	26"/8"/8"	FAIR	NO	YES - 3	---
7. LANCELEAF COTTONWOOD	22"	FAIR	NO	YES - 2.5	---
8. WEEPING WILLOW	60"	FAIR MINUS	NO	YES - 6	---
9. WILLOW	35"	FAIR MINUS	NO	YES - 2	---
10. WILLOW	18"	FAIR MINUS	NO	YES - 1	---
11. LANCELEAF COTTONWOOD	26.5"	FAIR	YES	YES - 2.5	LOTTING CONFLICT
12. LANCELEAF COTTONWOOD	26"	FAIR MINUS	YES	YES - 2	LOTTING CONFLICT
13. LANCELEAF COTTONWOOD	20"	POOR	YES	YES - 1.5	LOTTING CONFLICT

Existing Tree Schedule (cont'd)

COMMON NAME	SIZE	CONDITION	TO BE REMOVED	MITIGATION REQUIRED	REASON FOR REMOVAL
14. LANCELEAF COTTONWOOD	23"	FAIR	NO	YES - 2.5	---
15. RUSSIAN OLIVE	26"	FAIR MINUS	YES	YES - 2	GRADING
16. BLUE SPRUCE	9"	FAIR PLUS	YES	YES - 1.5	TRAIL CONFLICT
17. BLUE SPRUCE	9"	FAIR PLUS	YES	YES - 1.5	TRAIL CONFLICT
18. BLUE SPRUCE	10"	FAIR PLUS	YES	YES - 1.5	TRAIL CONFLICT
19. CRABAPPLE	12"	FAIR	YES	YES - 1.5	LOTTING CONFLICT
20. CRABAPPLE	14"	FAIR	YES	YES - 2	LOTTING CONFLICT
21. BLUE SPRUCE	14"	GOOD	YES	YES - 2	TRAIL CONFLICT
22. BLUE SPRUCE	12"	FAIR	YES	YES - 1.5	TRAIL CONFLICT
23. BLUE SPRUCE	10"	FAIR MINUS	YES	YES - 1	TRAIL CONFLICT
24. BLUE SPRUCE	15"	FAIR	YES	YES - 2	TRAIL CONFLICT
25. BLUE SPRUCE	10"	FAIR PLUS	NO	YES - 1.5	---
26. GREEN ASH	16"	FAIR	YES	YES - 2	LOTTING CONFLICT
27. RUSSIAN OLIVE	18"	FAIR MINUS	YES	YES - 1.5	LOTTING CONFLICT
28. GREEN ASH	24"	FAIR	YES	YES - 3	LOTTING CONFLICT
29. RUSSIAN OLIVE	18"	FAIR PLUS	YES	YES - 2	LOTTING CONFLICT
			TOTAL MITIGATION REQUIRED	29 MITIGATION TREES	

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SHEET TITLE

Existing Tree
Inventory &
Mitigation Plan

SHEET INFORMATION

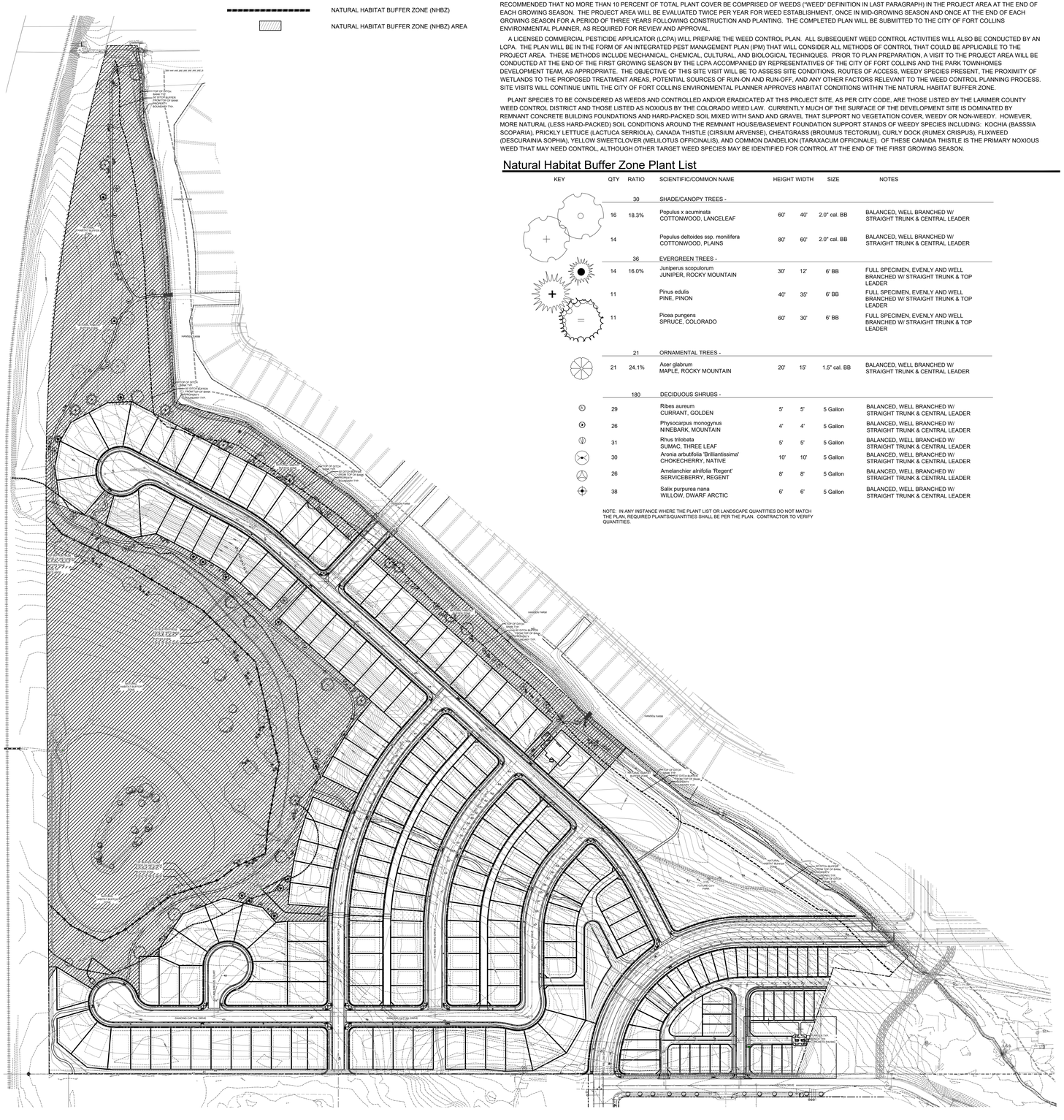
SHEET 9

Legend

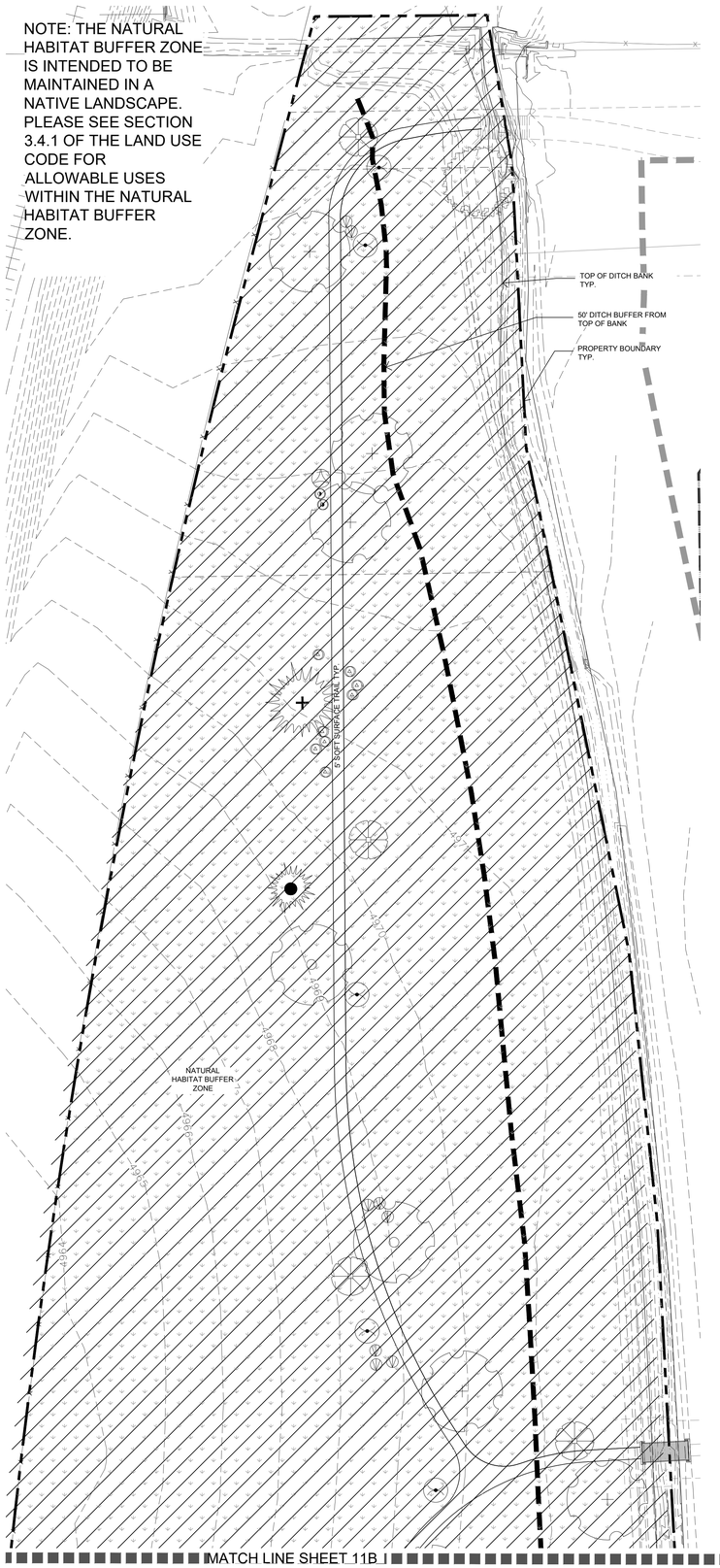
PROPERTY LINE

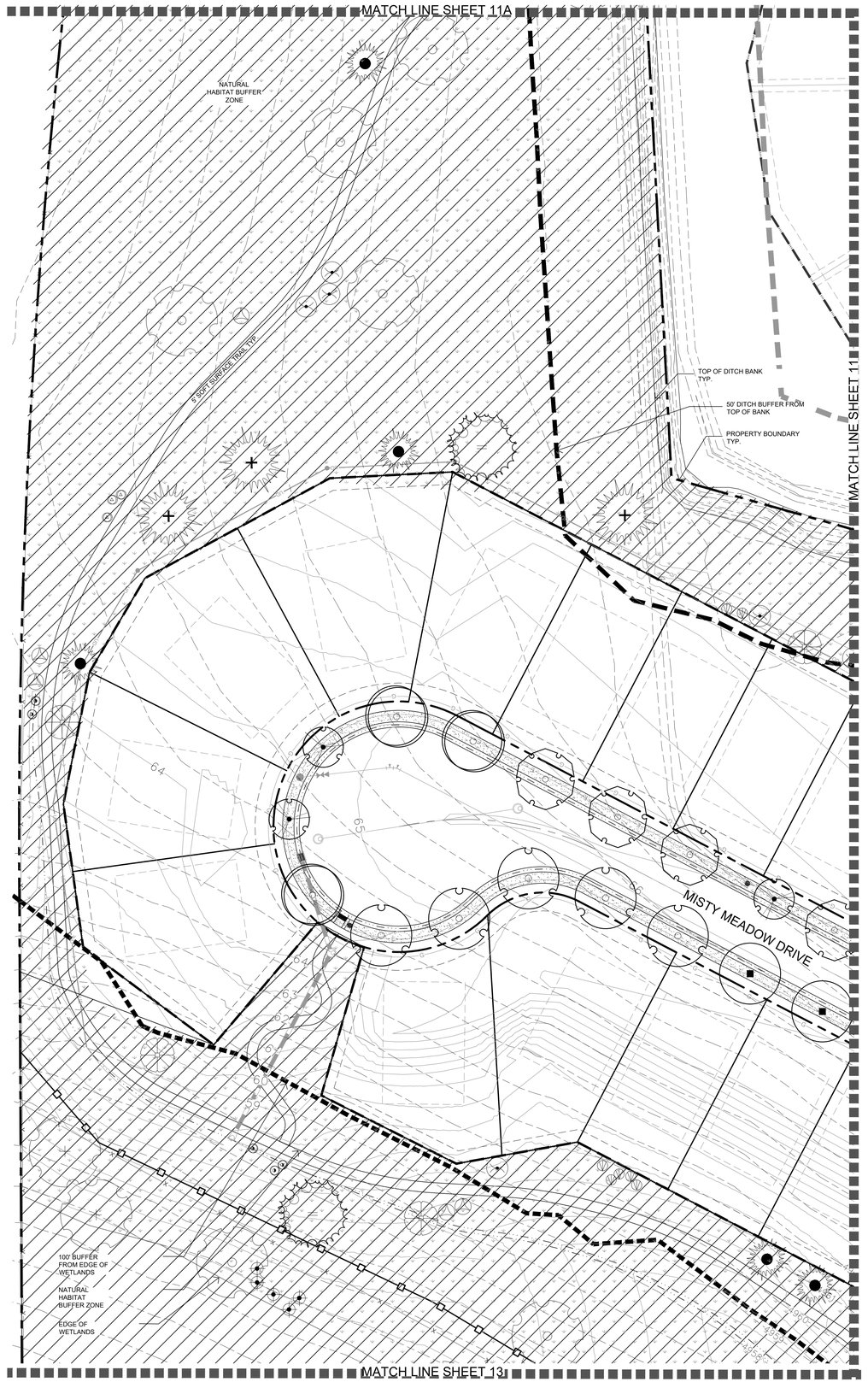
NATURAL HABITAT BUFFER ZONE (NHBZ)

NATURAL HABITAT BUFFER ZONE (NHBZ) AREA


TOP OF SOIL
BASE TOP OF BANK
TOP OF BANK
TOP OF SOIL
BASE TOP OF BANK
TOP OF SOIL
BASE TOP OF BANK
TOP OF SOIL
BASE

NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.





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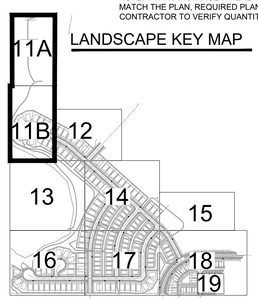
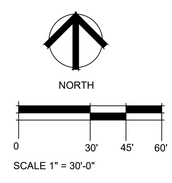
LANDSCAPE KEY MAP





SCALE 1" = 30'-0"

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SHEET 11

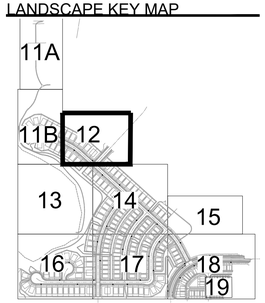


0 30' 45' 60'

SCALE 1" = 30'-0"

NORTH

LANDSCAPE KEY MAP



A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS, AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE C ITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLAC ING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.

NOTE: THE NATURAL HABITAT BUFFER ZONE IS INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONE.

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STAFF COMMENTS	10.18.19
STAFF COMMENTS	12.04.19
STAFF COMMENTS	12.23.19

DATE

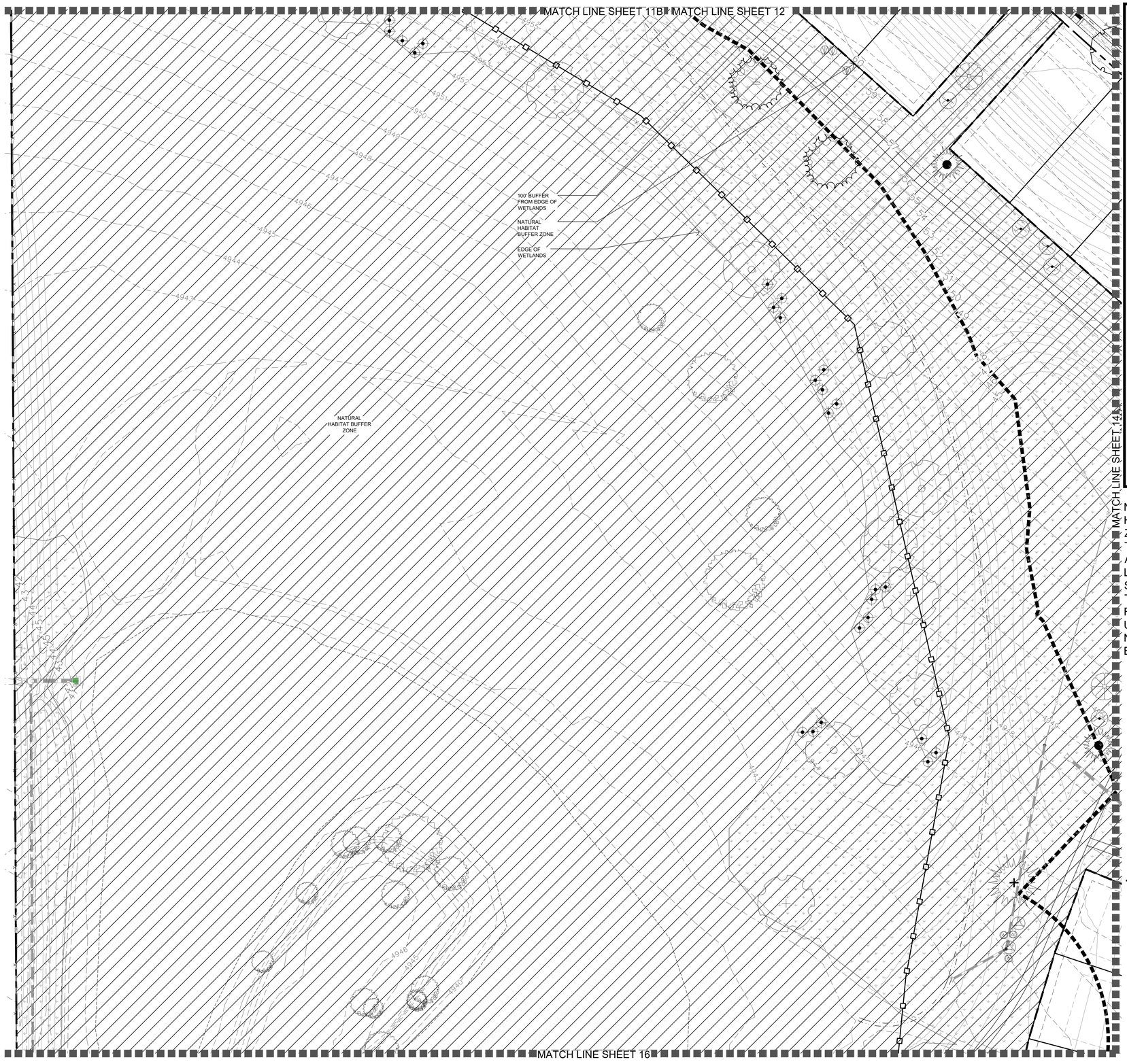
AUGUST 9, 2019

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 12



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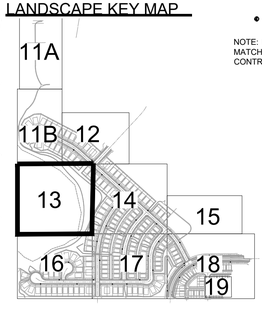
NORTH

0 30' 45' 60'

SCALE 1" = 30'-0"

LANDSCAPE KEY MAP



PLANT LIST

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	15	Crataegus crus-galli inermis Thornless Cockspur Hawthorn
	9	Malus x `Spring Snow` Spring Snow Crab Apple
	10	Pyrus fauriei Korean Sun Korean Wild Pear
	14	Syringa reticulata Japanese Tree Lilac

SHADE TREES	QTY	BOTANICAL / COMMON NAME
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	25	Philadelphus x `Snowbell` Snowbell Mock Orange

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	59	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass
	107	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass

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	55	Agastache rupestris `Sunset` Sunset Hyssop
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WEB TBGroup.us

SEAL

PROJECT TITLE

RENNAT SUBDIVISION

Preliminary Development Plan

6015 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

POST MODERN DEVELOPMENT
144 N. MASON ST.
SUITE 4
FORT COLLINS, CO 80524

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DATE

AUGUST 9, 2019

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 13



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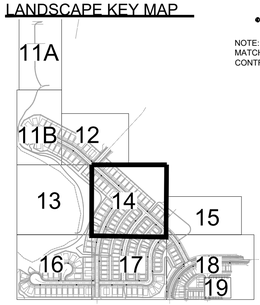
0 30' 45' 60'

SCALE 1" = 30'-0"

LANDSCAPE KEY MAP



PLANT LIST

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	9	Malus x `Spring Snow` Spring Snow Crab Apple
	10	Pyrus fauriei Korean Sun Korean Wild Pear
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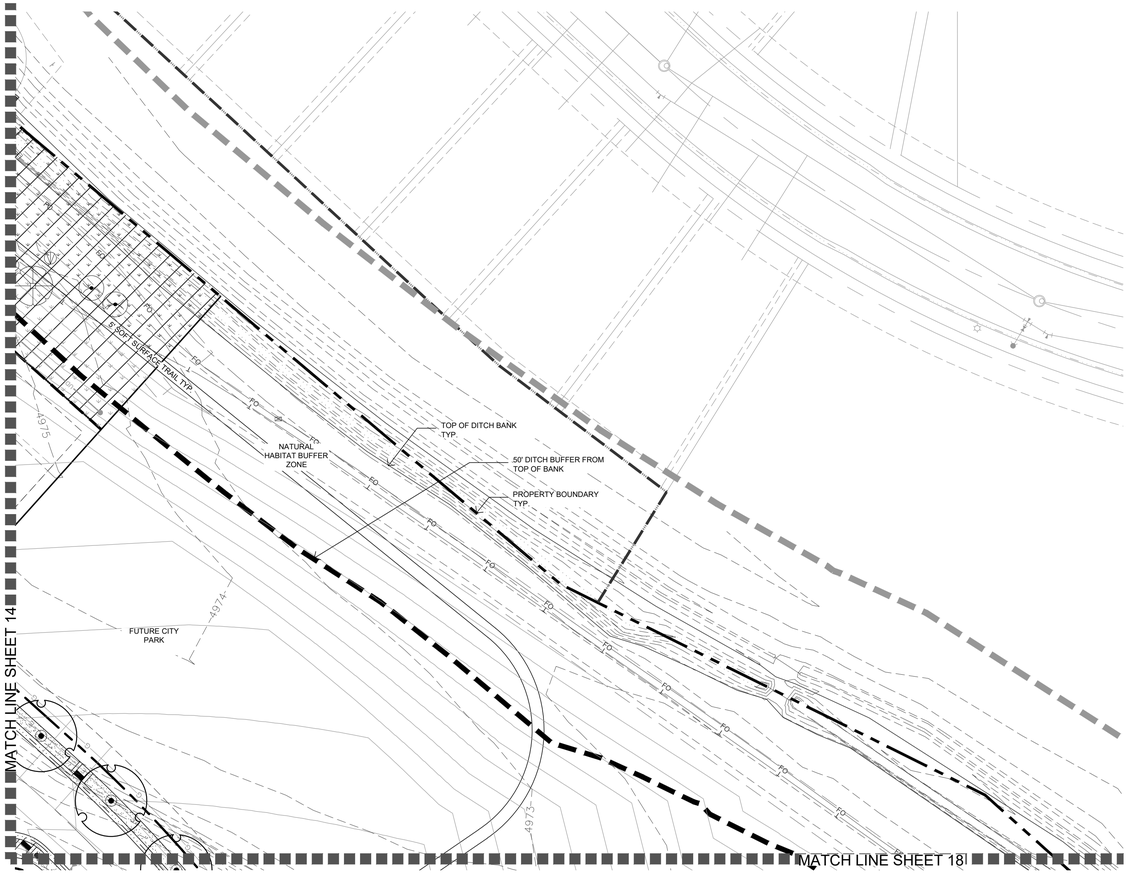
SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 14



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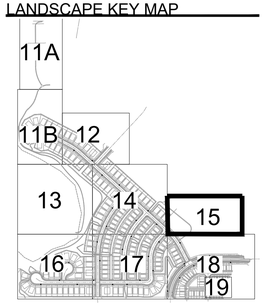
LANDSCAPE KEY MAP



PLANT LIST

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SEAL

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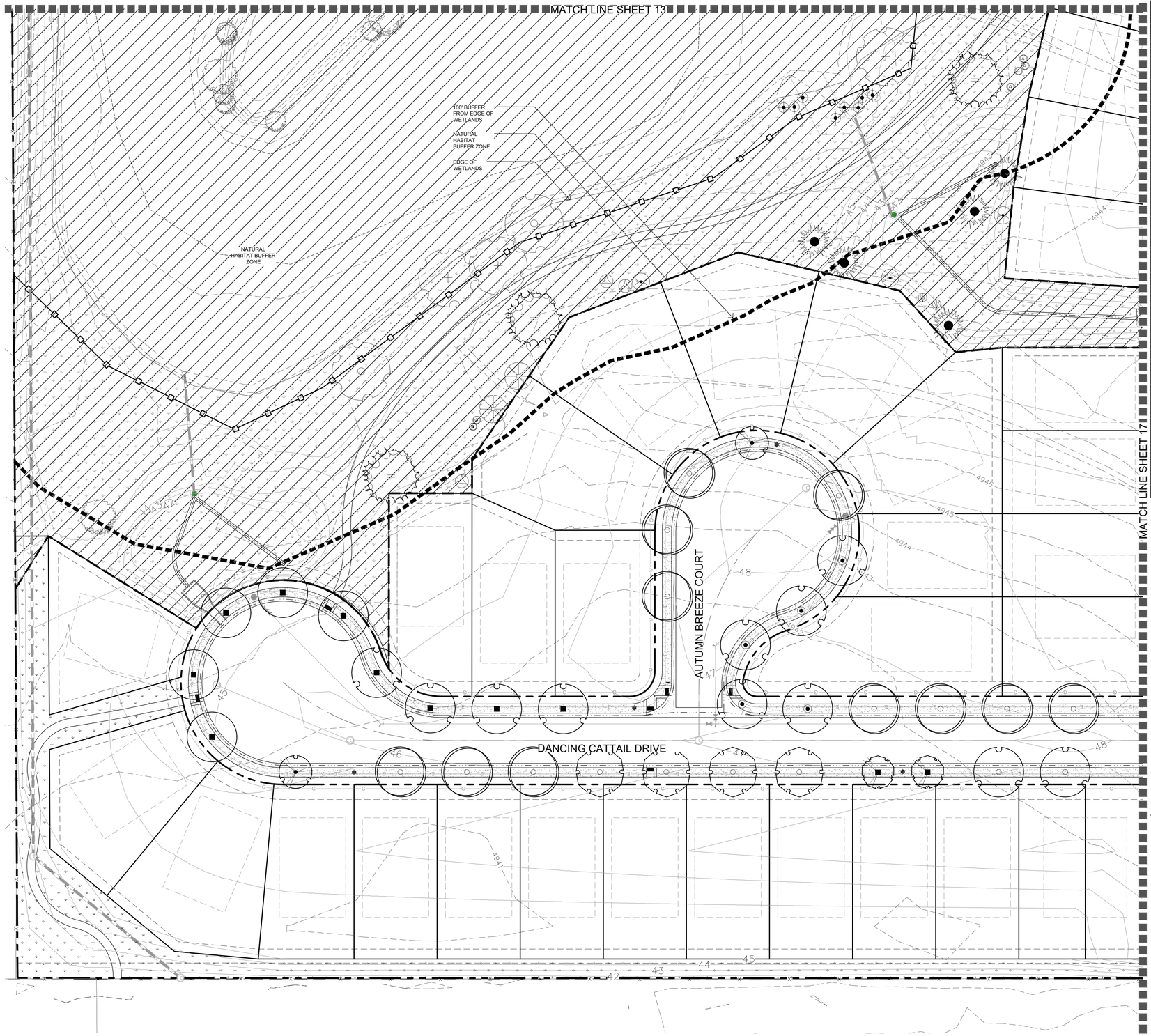
AUGUST 9, 2019

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 15



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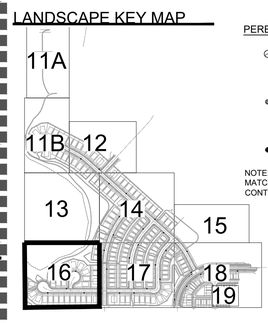
LANDSCAPE KEY MAP



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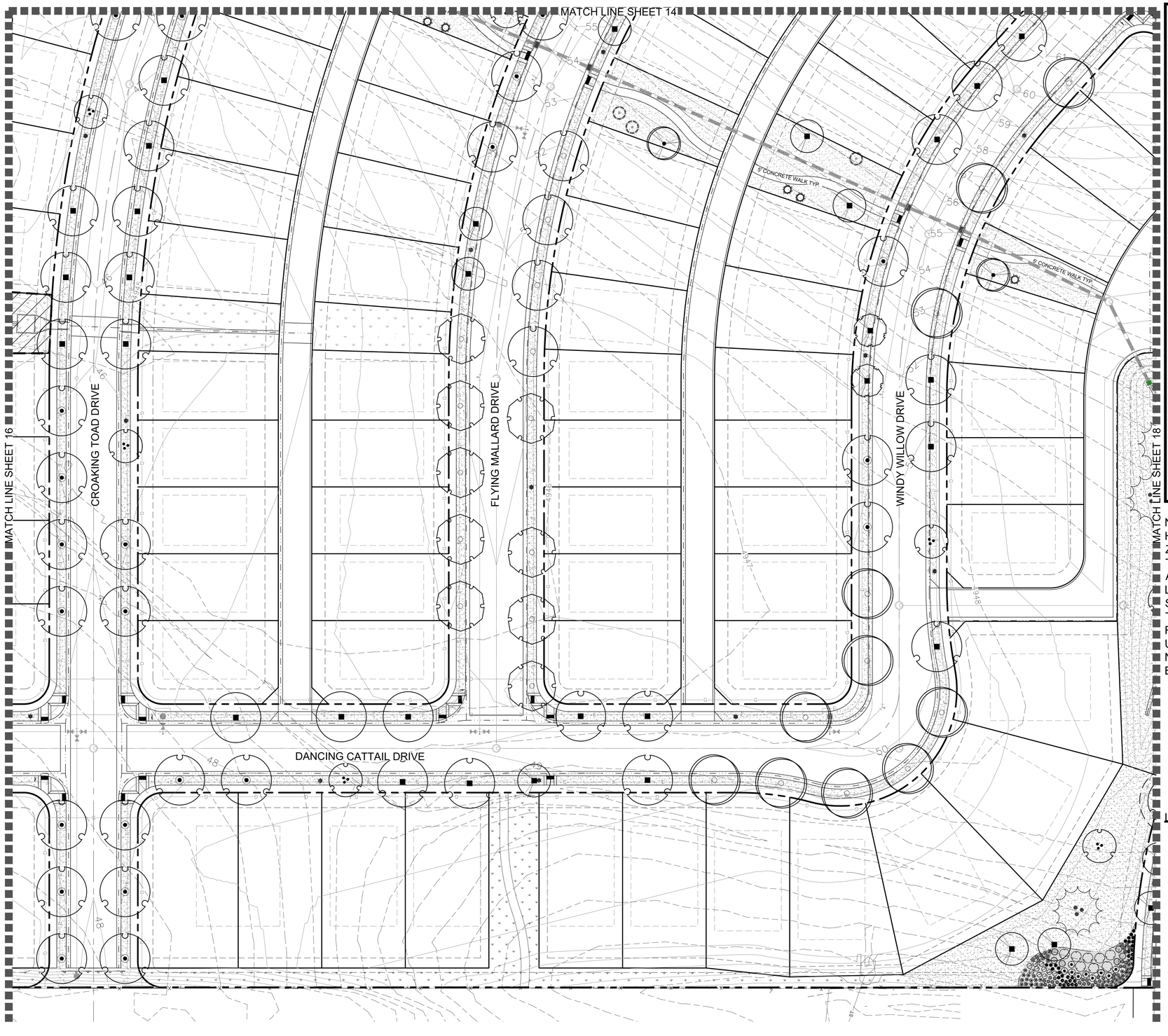
SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 16



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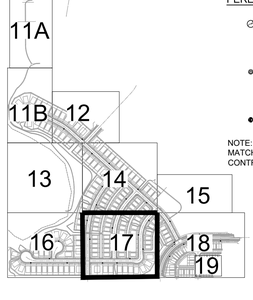
LANDSCAPE KEY MAP



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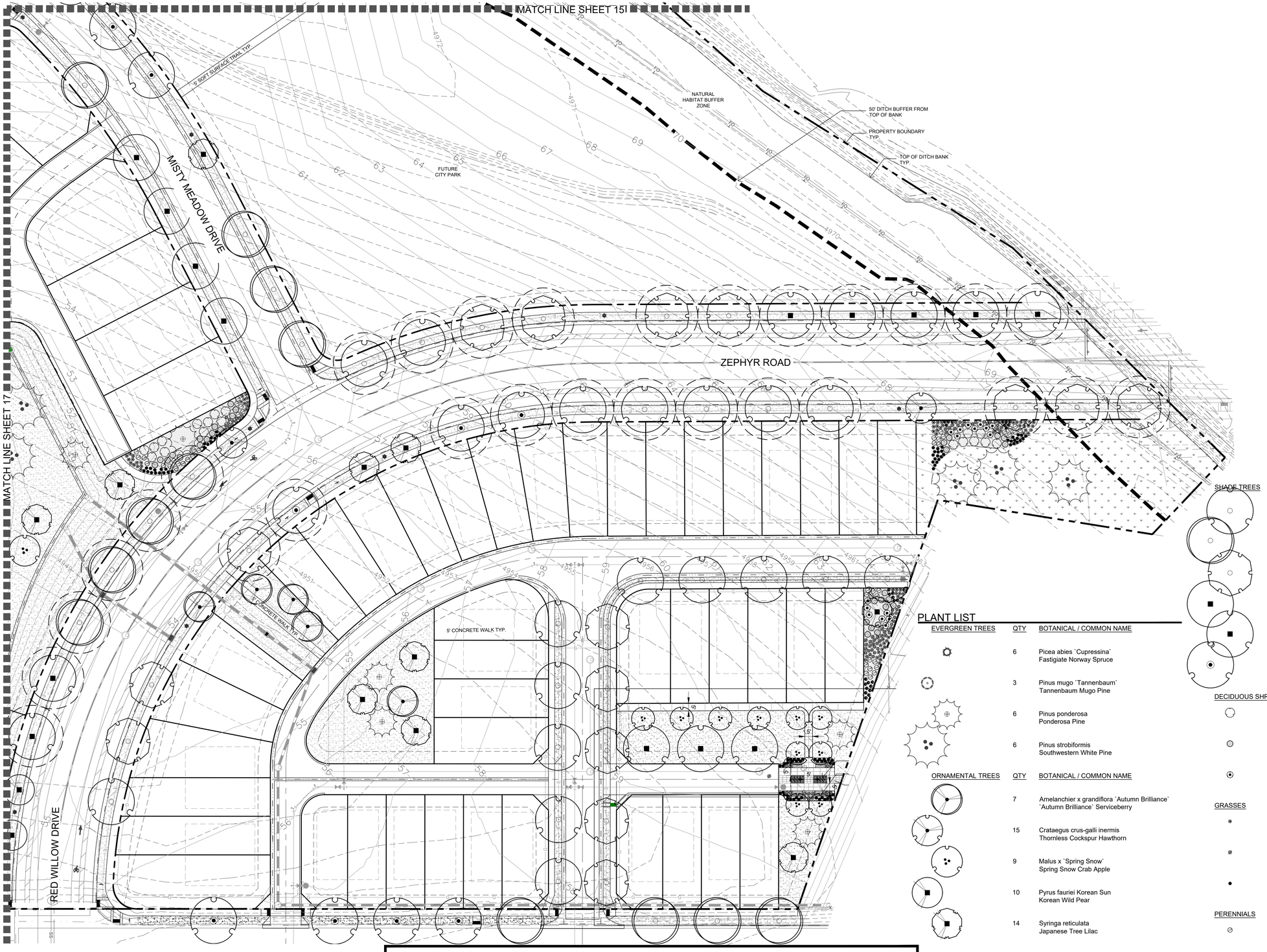
AUGUST 9, 2019

SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 17



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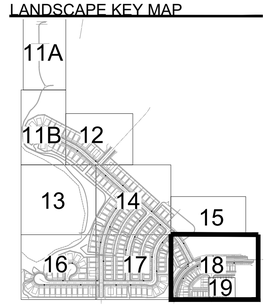
LANDSCAPE KEY MAP



PLANT LIST

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME
	6	Picea abies `Cupressina` Fastigiate Norway Spruce
	3	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine
	6	Pinus ponderosa Ponderosa Pine
	6	Pinus strobiformis Southwestern White Pine

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME
	7	Amelanchier x grandiflora `Autumn Brilliance` `Autumn Brilliance` Serviceberry
	15	Crataegus crus-galli inermis Thornless Cockspur Hawthorn
	9	Malus x `Spring Snow` Spring Snow Crab Apple
	10	Pyrus fauriei Korean Sun Korean Wild Pear
	14	Syringa reticulata Japanese Tree Lilac

SHADE TREES	QTY	BOTANICAL / COMMON NAME
	39	Catalpa speciosa Catalpa 7 of 31 = Mitigation Tree
	41	Celtis occidentalis Western Hackberry 4 of 41 = Mitigation Tree
	44	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree 8 of 40 = Mitigation Tree
	44	Quercus buckleyi Texas Red Oak
	46	Quercus shummardi Shumard Oak 7 of 44 = Mitigation Tree
	43	Ulmus x `Accolade` Accolade Elm 3 of 44 = Mitigation Tree

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME
	26	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry
	37	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea
	25	Philadelphus x `Snowbell` Snowbell Mock Orange

GRASSES	QTY	BOTANICAL / COMMON NAME
	103	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass
	59	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass
	107	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass

PERENNIALS	QTY	BOTANICAL / COMMON NAME
	55	Agastache rupestris `Sunset` Sunset Hyssop
	87	Echinacea purpurea Purple Coneflower
	42	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan

NOTE: IN ANY INSTANCE WHERE THE PLANT LIST OR LANDSCAPE QUANTITIES DO NOT MATCH THE PLAN, REQUIRED PLANTS/QUANTITIES SHALL BE PER THE PLAN. CONTRACTOR TO VERIFY QUANTITIES.

TB GROUP
landscape architecture | planning | illustration

444 Mountain Ave.
Berthoud,CO 80513

TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

RENNAT SUBDIVISION

Preliminary Development Plan

6015 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

POST MODERN DEVELOPMENT
144 N. MASON ST.
SUITE 4
FORT COLLINS, CO 80524

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
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REVISIONS	DATE
STAFF COMMENTS	10.18.19
STAFF COMMENTS	12.04.19
STAFF COMMENTS	12.23.19

DATE

AUGUST 9, 2019

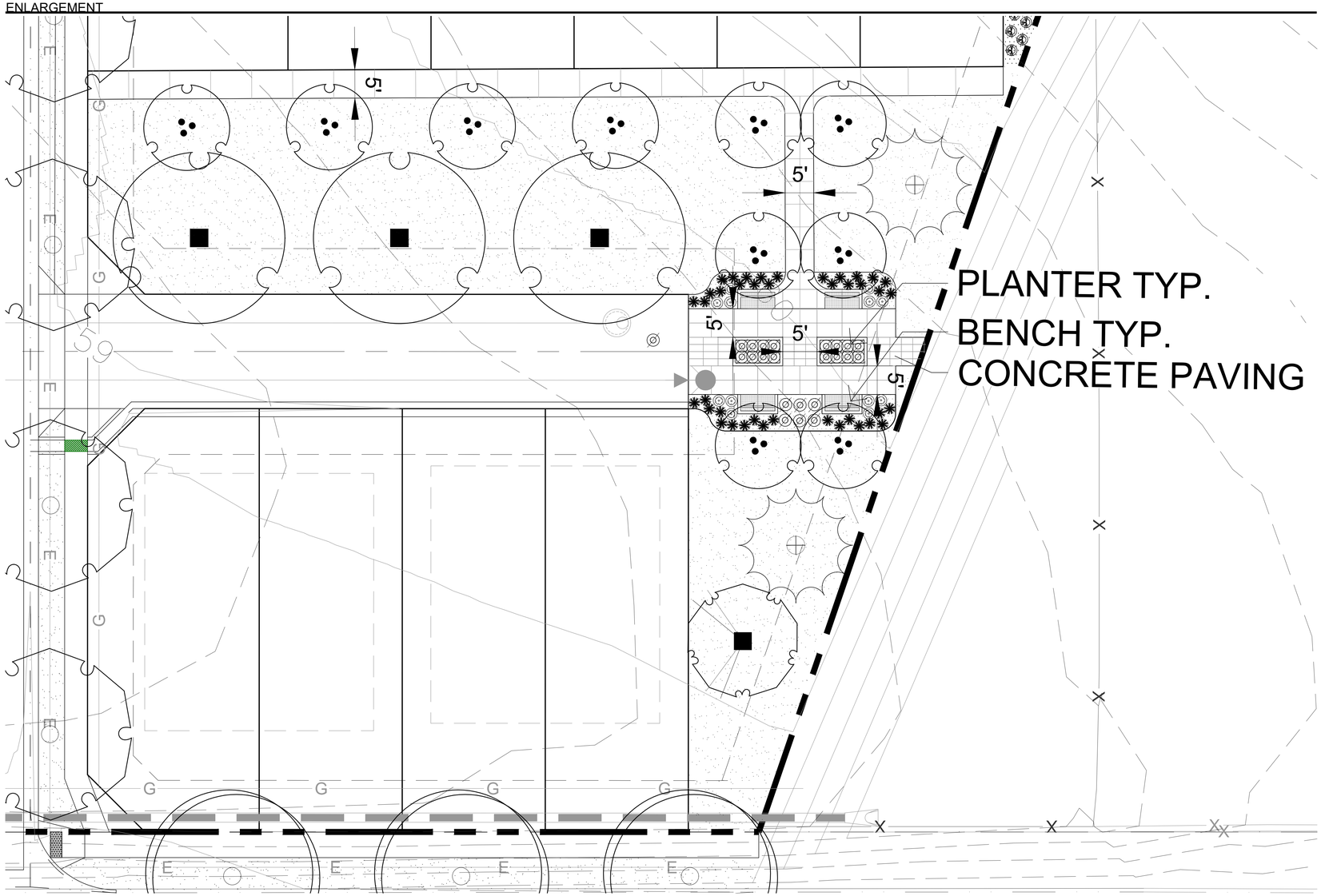
SHEET TITLE

LANDSCAPE PLAN

SHEET INFORMATION

SHEET 18

ENLARGEMENT



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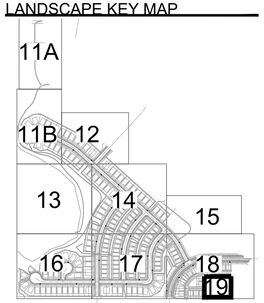
LANDSCAPE KEY MAP



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DATE

AUGUST 9, 2019

SHEET TITLE

LANDSCAPE
DETAILS &
ENLARGEMENT

SHEET INFORMATION

SHEET 19

General Landscape Notes

1. PLANT QUALITY: ALL PLANT MATERIAL SHALL BE A-GRADE OR NO. 1 GRADE - FREE OF ANY DEFECTS, OF NORMAL HEALTH, HEIGHT, LEAF DENSITY AND SPREAD APPROPRIATE TO THE SPECIES AS DEFINED BY THE AMERICAN ASSOCIATION OF NURSERYMEN (AAN) STANDARDS. ALL TREES SHALL BE BALL AND BURLAP OR EQUIVALENT.

2. IRRIGATION: ALL LANDSCAPE AREAS WITHIN THE SITE INCLUDING TURF, SHRUB BEDS AND TREE AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC IRRIGATION SYSTEM. THE IRRIGATION PLAN MUST BE REVIEWED AND APPROVED BY THE CITY OF FORT COLLINS WATER UTILITIES DEPARTMENT PRIOR TO THE ISSUANCE OF A BUILDING PERMIT. ALL TURF AREAS SHALL BE IRRIGATED WITH AN AUTOMATIC POP-UP IRRIGATION SYSTEM. ALL SHRUB BEDS AND TREES, INCLUDING IN NATIVE SEED AREAS, SHALL BE IRRIGATED WITH AN AUTOMATIC DRIP (TRICKLE) IRRIGATION SYSTEM, OR WITH AN ACCEPTABLE ALTERNATIVE APPROVED BY THE CITY WITH THE IRRIGATION PLANS. THE IRRIGATION SYSTEM SHALL BE ADJUSTED TO MEET THE WATER REQUIREMENTS OF THE INDIVIDUAL PLANT MATERIAL.

3. TOPSOIL: TO THE MAXIMUM EXTENT FEASIBLE, TOPSOIL THAT IS REMOVED DURING CONSTRUCTION ACTIVITY SHALL BE CONSERVED FOR LATER USE ON AREAS REQUIRING REVEGETATION AND LANDSCAPING.

4. SOIL AMENDMENTS: SOIL AMENDMENTS SHALL BE PROVIDED AND DOCUMENTED IN ACCORDANCE WITH CITY CODE SECTION 12-132. THE SOIL IN ALL LANDSCAPE AREAS, INCLUDING PARKWAYS AND MEDIANS, SHALL BE THOROUGHLY LOOSENED TO A DEPTH OF NOT LESS THAN EIGHT(8) INCHES AND SOIL AMENDMENT SHALL BE THOROUGHLY INCORPORATED INTO THE SOIL OF ALL LANDSCAPE AREAS TO A DEPTH OF AT LEAST SIX(6) INCHES BY TILLING, DISCING OR OTHER SUITABLE METHOD, AT A RATE OF AT LEAST THREE (3) CUBIC YARDS OF SOIL AMENDMENT PER ONE THOUSAND (1,000) SQUARE FEET OF LANDSCAPE AREA. PRIOR TO THE ISSUANCE OF ANY CERTIFICATE OF OCCUPANCY, A WRITTEN CERTIFICATION MUST BE SUBMITTED TO THE CITY THAT ALL PLANTED AREAS, OR AREAS TO BE PLANTED, HAVE BEEN THOROUGHLY LOOSENED AND THE SOIL AMENDED, CONSISTENT WITH THE REQUIREMENTS SET FORTH IN SECTION 12-132.

5. INSTALLATION AND GUARANTEE: ALL LANDSCAPING SHALL BE INSTALLED ACCORDING TO SOUND HORTICULTURAL PRACTICES IN A MANNER DESIGNED TO ENCOURAGE QUICK ESTABLISHMENT AND HEALTHY GROWTH. ALL LANDSCAPING FOR EACH PHASE MUST BE EITHER INSTALLED OR THE INSTALLATION MUST BE SECURED WITH AN IRREVOCABLE LETTER OF CREDIT, PERFORMANCE BOND, OR ESCROW ACCOUNT FOR 125% OF THE VALUATION OF THE MATERIALS AND LABOR PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY FOR ANY BUILDING IN SUCH PHASE.

6. MAINTENANCE: TREES AND VEGETATION, IRRIGATION SYSTEMS, FENCES, WALLS AND OTHER LANDSCAPE ELEMENTS WITH THESE FINAL PLANS SHALL BE CONSIDERED AS ELEMENTS OF THE PROJECT IN THE SAME MANNER AS PARKING, BUILDING MATERIALS AND OTHER SITE DETAILS. THE APPLICANT, LANDOWNER OR SUCCESSORS IN INTEREST SHALL BE JOINTLY AND SEVERALLY RESPONSIBLE FOR THE REGULAR MAINTENANCE OF ALL LANDSCAPING ELEMENTS IN GOOD CONDITION. ALL LANDSCAPING SHALL BE MAINTAINED FREE FROM DISEASE, PESTS, WEEDS AND LITTER, AND ALL LANDSCAPE STRUCTURES SUCH AS FENCES AND WALLS SHALL BE REPAIRED AND REPLACED PERIODICALLY TO MAINTAIN A STRUCTURALLY SOUND CONDITION.

7. REPLACEMENT: ANY LANDSCAPE ELEMENT THAT DIES, OR IS OTHERWISE REMOVED, SHALL BE PROMPTLY REPLACED IN ACCORDANCE WITH THE REQUIREMENTS OF THESE PLANS.

8. THE FOLLOWING SEPARATIONS SHALL BE PROVIDED BETWEEN TREES/SHRUBS AND UTILITIES:

   40 FEET BETWEEN CANOPY TREES AND STREET LIGHTS
   15 FEET BETWEEN ORNAMENTAL TREES AND STREETLIGHTS
   10 FEET BETWEEN TREES AND PUBLIC WATER, SANITARY AND STORM SEWER MAIN LINES
   6 FEET BETWEEN TREES AND PUBLIC WATER, SANITARY AND STORM SEWER SERVICE LINES.
   4 FEET BETWEEN SHRUBS AND PUBLIC WATER AND SANITARY AND STORM SEWER LINES
   4 FEET BETWEEN TREES AND GAS LINES

9. ALL STREET TREES SHALL BE PLACED A MINIMUM EIGHT (8) FEET AWAY FROM THE EDGES OF DRIVEWAYS AND ALLEYS PER LUC 3.2.1(D)(2)(a).

10. PLACEMENT OF ALL LANDSCAPING SHALL BE IN ACCORDANCE WITH THE SIGHT DISTANCE CRITERIA AS SPECIFIED BY THE CITY OF FORT COLLINS. NO STRUCTURES OR LANDSCAPE ELEMENTS GREATER THAN 24" SHALL BE ALLOWED WITHIN THE SIGHT DISTANCE TRIANGLE OR EASEMENTS WITH THE EXCEPTION OF DECIDUOUS TREES PROVIDED THAT THE LOWEST BRANCH IS AT LEAST 6' FROM GRADE. ANY FENCES WITHIN THE SIGHT DISTANCE TRIANGLE OR EASEMENT MUST BE NOT MORE THAN 42" IN HEIGHT AND OF AN OPEN DESIGN.

11. THE FINAL LANDSCAPE PLAN SHALL BE COORDINATED WITH ALL OTHER FINAL PLAN ELEMENTS SO THAT THE PROPOSED GRADING, STORM DRAINAGE, AND OTHER DEVELOPMENT IMPROVEMENTS DO NOT CONFLICT WITH NOR PRECLUDE INSTALLATION AND MAINTENANCE OF LANDSCAPE ELEMENTS ON THIS PLAN.

12. MINOR CHANGES IN SPECIES AND PLANT LOCATIONS MAY BE MADE DURING CONSTRUCTION – AS REQUIRED BY SITE CONDITIONS OR PLANT AVAILABILITY. OVERALL QUANTITY, QUALITY, AND DESIGN CONCEPT MUST BE CONSISTENT WITH THE APPROVED PLANS. IN THE EVENT OF CONFLICT WITH THE QUANTITIES INCLUDED IN THE PLANT LIST, SPECIES AND QUANTITIES ILLUSTRATED SHALL BE PROVIDED. ALL CHANGES OF PLANT SPECIES AND LOCATION MUST HAVE WRITTEN APPROVAL BY THE CITY PRIOR TO INSTALLATION.

13. ALL PLANTING BEDS SHALL BE MULCHED TO A MINIMUM DEPTH OF THREE INCHES.

Tree Protection Notes

1. ALL EXISTING TREES WITHIN THE LIMITS OF THE DEVELOPMENT AND WITHIN ANY NATURAL AREA BUFFER ZONES SHALL REMAIN AND BE PROTECTED UNLESS NOTED ON THESE PLANS FOR REMOVAL.
2. WITHIN THE DRIP LINE OF ANY PROTECTED EXISTING TREE, THERE SHALL BE NO CUT OR FILL OVER A FOUR-INCH DEPTH UNLESS A QUALIFIED ARBORIST OR FORESTER HAS EVALUATED AND APPROVED THE DISTURBANCE.
3. ALL PROTECTED EXISTING TREES SHALL BE PRUNED TO THE CITY OF FORT COLLINS FORESTRY STANDARDS. TREE PRUNING AND REMOVAL SHALL BE PERFORMED BY A BUSINESS THAT HOLDS A CURRENT CITY OF FORT COLLINS ARBORIST LICENSE WHERE REQUIRED BY CODE.
4. PRIOR TO AND DURING CONSTRUCTION, BARRIERS SHALL BE ERECTED AROUND ALL PROTECTED EXISTING TREES WITH SUCH BARRIERS TO BE OF ORANGE FENCING A MINIMUM OF FOUR (4) FEET IN HEIGHT, SECURED WITH METAL T-POSTS, NO CLOSER THAN SIX (6) FEET FROM THE TRUNK OR ONE-HALF (½) OF THE DRIP LINE, WHICHEVER IS GREATER. THERE SHALL BE NO STORAGE OR MOVEMENT OF EQUIPMENT, MATERIAL, DEBRIS OR FILL WITHIN THE FENCED TREE PROTECTION ZONE.
5. DURING THE CONSTRUCTION STAGE OF DEVELOPMENT, THE APPLICANT SHALL PREVENT THE CLEANING OF EQUIPMENT OR MATERIAL OR THE STORAGE AND DISPOSAL OF WASTE MATERIAL SUCH AS PAINTS, OILS, SOLVENTS, ASPHALT, CONCRETE, MOTOR OIL OR ANY OTHER MATERIAL HARMFUL TO THE LIFE OF A TREE WITHIN THE DRIP LINE OF ANY PROTECTED TREE OR GROUP OF TREES.
6. NO DAMAGING ATTACHMENT, WIRES, SIGNS OR PERMITS MAY BE FASTENED TO ANY PROTECTED TREE.
7. LARGE PROPERTY AREAS CONTAINING PROTECTED TREES AND SEPARATED FROM CONSTRUCTION OR LAND CLEARING AREAS, ROAD RIGHTS-OF-WAY AND UTILITY EASEMENTS MAY BE "RIBBONED OFF," RATHER THAN ERECTING PROTECTIVE FENCING AROUND EACH TREE AS REQUIRED IN SUBSECTION (G)(3) ABOVE. THIS MAY BE ACCOMPLISHED BY PLACING METAL T-POST STAKES A MAXIMUM OF FIFTY (50) FEET APART AND TYING RIBBON OR ROPE FROM STAKE-TO-STAKE ALONG THE OUTSIDE PERIMETERS OF SUCH AREAS BEING CLEARED.
8. THE INSTALLATION OF UTILITIES, IRRIGATION LINES OR ANY UNDERGROUND FIXTURE REQUIRING EXCAVATION DEEPER THAN SIX (6) INCHES SHALL BE ACCOMPLISHED BY BORING UNDER THE ROOT SYSTEM OF PROTECTED EXISTING TREES AT A MINIMUM DEPTH OF TWENTY-FOUR (24) INCHES. THE AUGER DISTANCE IS ESTABLISHED FROM THE FACE OF THE TREE (OUTER BARK) AND IS SCALED FROM TREE DIAMETER AT BREAST HEIGHT AS DESCRIBED IN THE CHART BELOW:

TREE DIAMETER AT BREAST HEIGHT (INCHES)	AUGER DISTANCE FROM FACE OF TREE (FEET)
0-2	1
3-4	2
5-9	5
10-14	10
15-19	12
OVER 19	15

9. NO TREES SHALL BE REMOVED DURING THE SONGBIRD NESTING SEASON (FEBRUARY 1 TO JULY 31) WITHOUT FIRST HAVING A PROFESSIONAL ECOLOGIST OR WILDLIFE BIOLOGIST COMPLETE A NESTING SURVEY TO IDENTIFY ANY ACTIVE NESTS EXISTING ON THE PROJECT SITE. THE SURVEY SHALL BE SENT TO THE CITY ENVIRONMENTAL PLANNER. IF ACTIVE NESTS ARE FOUND, THE CITY WILL COORDINATE WITH RELEVANT STATE AND FEDERAL REPRESENTATIVES TO DETERMINE WHETHER ADDITIONAL RESTRICTIONS ON TREE REMOVAL AND CONSTRUCTION APPLY."

Native Grass Seed Mix

NATIVE GRASS - UPLAND CITY OF FORT COLLINS MIX:

1. SEED SHALL BE AS MANUFACTURED BY ARKANSAS VALLEY SEED SOLUTIONS, 4625 COLORADO BOULEVARD, DENVER, CO 80216, (877) 957-3337.
2. SEED SHALL BE A MIXTURE THAT MATCHES THE FOLLOWING:

NON-IRRIGATED UPLAND MIX COMMON NAME	SCIENTIFIC NAME	SEEDING RATE (PLS LBS/ACRE-DRILL RATE)
BEEPLANT	CLEOME SEEULATA	1.08
HAIRY GOLDENASTER	HETEROTHECA VILLOSA	0.36
PURPLE PRAIRIE CLOVER	DALEA PURPUREA	0.41
WALLFLOWER	ERYSIMUM ASPERUM	0.11
ANNUAL SUNFLOWER	HELIANTHUS ANNUUS	2.07
DOTTED GAYFEATHER	LIATRIS PUNCTATA	0.73
BLUE FLAX	LINUM LEWSII	0.41
PRAIRIE ASTER	MACHAERANTHERA TANACETIFLIA	0.25
MEXICAN HAT	RATIBIDA COLUMNIFERA	0.10
AMERICAN VETCH	VICIA AMERICANA	6.10
SIDEOATS GRAMA	BOUTELOUA CURTIPENDULA	0.96
BUFFALOGRASS	BOUTELOUA DACTYLOIDES	3.27
BLUE GRAMA	BOUTELOUA GRACILIS	0.22
PRAIRIE SANDREED	CALAMOVILFA LONGIFOLIA	0.67
PRAIRIE JUNEGRASS	KOELERIA MACRANTHA	0.08
NEEDLE AND THREAD	HESPEROSTIPA COMATA	1.59
SWITCH GRASS	PANICUM VIRGATUM	0.47
WESTERN WHEATGRASS	PASCOPYRUM SMITHII	1.66
SAND DROPSEED	SPOROBOLUS CRYPTANDRUS	0.04
SIX WEEKS FESCUE	VULPIA OCTOFLORA	0.19
	TOTAL LBS/ACRE	**20.77**

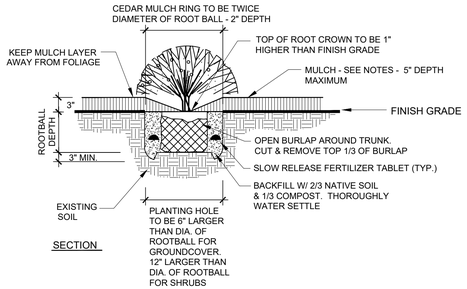
3. NATIVE SEED AREAS: ADEQUATE TEMPORARY IRRIGATION WILL BE PROVIDED FOR THE ESTABLISHMENT AND MAINTENANCE FOR THESE SEEDED AREAS, AND THAT NATIVE GRASSES SHALL BE MAINTAINED IN A CONDITION OF ACCEPTABLE HEIGHT, FREE OF WEEDS, TRASH AND DEBRIS, AND SHALL NOT REPRESENT A FIRE HAZARD NOR BECOME A NUISANCE SITE FOR WATER OR WIND EROSION.
4. PREPARE SOIL AS NECESSARY AND APPROPRIATE FOR NATIVE SEED MIX SPECIES THROUGH AERATION AND ADDITION OF AMENDMENDMENTS IF NECESSARY THEN SEED IN TWO DIRECTIONS TO DISTRIBUTE SEED EVENTLY OVER ENTIRE AREA.
5. IF CHANGES ARE TO BE MADE TO SEED MIX BASED ON SITE CONDITIONS THEN APPROVAL MUST BE PROVIDED BY CITY ENVIRONMENTAL PLANNER.
6. APPROPRIATE NATIVE SEEDING EQUIPMENT WILL BE USED (STANDARD TURF SEEDING EQUIPMENT OR AGRICULTURE EQUIPMENT SHALL NOT BE USED).
7. DRILL SEED APPLICATION RECOMMENDED PER SPECIFIED APPLICATION RATE TO NO MORE THAN ½ INCH DEPTH. FOR BROADCAST SEEDING INSTEAD OF DRILL SEEDING METHOD - DOUBLE SPECIFICIED APPLICATION REFER TO NATIVE SEED MIX TABLE FOR SPECIES, PERCENTAGES AND APPLICATION RATES.
8. TREAT NATIVE SEED MIX AREA PRIOR TO INSTALLATION OF SEED WITH APPROPRIATE HERBICIDE TO PROACTIVELY MITIGATE HERBACEOUS WEED SPECIES GROWTH DURING ESTABLISHMENT PERIOD THEN AFTER APPROPRIATE TIME PERIOD APPLY NATIVE SEED AS CALLED FOR ON APPROVED PLANS.
9. AFTER SEEDING THE AREA SHALL BE COVERED WITH CRIMPED STRAW OR OTHER APPROPRIATE METHODS AND PROVIDED TEMPORARY IRRIGATION UNTIL SEED IS ESTABLISHED.
10. CONTRACTOR SHALL MONITOR SEEDED AREA FOR PROPER IRRIGATION, EROSION CONTROL, GERMINATION AND RESEEDING AS NEEDED TO ESTABLISH COVER.
11. THE APPROVED SEED MIX AREA IS INTENDED TO BE MAINTAINED IN A NATURAL-LIKE LANDSCAPE AESTHETIC. IF AND WHEN MOWING OCCURS IN NATIVE GRASS SEED MIX AREAS DO NOT MOW LOWER THAN 6-8 INCHES IN HEIGHT TO AVOID INHIBITING NATIVE PLANT GROWTH.
12. NATIVE SEED AREA WILL BE CONSIDERED ESTABLISHED WHEN SEVENTY-PERCENT TOTAL COVER IS REACHED WITH NO LARGER THAN ONE FOOT SQUARE BARE SPOTS AND/OR UNTIL DEEMED ESTABLISHED BY CITY PLANNING SERVICES.

MULCH IN ALL NATIVE SEED AREAS:

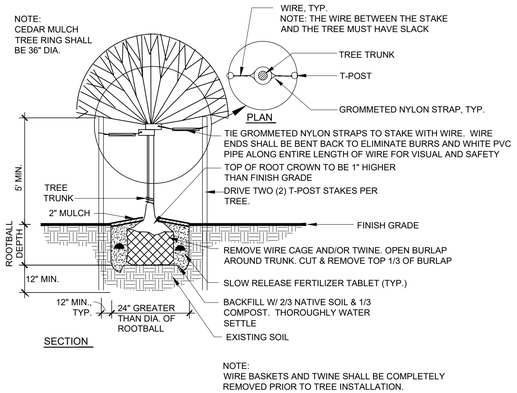
1. IMMEDIATELY FOLLOWING THE RAKING OPERATION, ADD STRAW MULCH TO THE SEEDED AREAS.
2. APPLY STRAW MULCH AT A MINIMUM OF 1.5 TONS PER ACRE OF AIR DRY MATERIAL. SPREAD STRAW MULCH UNIFORMLY OVER THE AREA WITH MECHANICAL MULCH SPREADER / CRIMPER. DO NOT MULCH WHEN WIND VELOCITY EXCEEDS 10 MPH.
3. WHEREVER THE USE OF CRIMPING EQUIPMENT IS PRACTICAL, PLACE MULCH IN THE MANNER NOTED ABOVE AND ANCHOR IT INTO THE SOIL. USE A DISC SUCH AS A MULCH TILLER, WITH A FLAT SERRATED DISC AT LEAS ¼ INCH IN THICKNESS, HAVING DULL EDGES, AND SPACE NO MORE THAN 9 INCHES APART, WITH DISCS OF SUFFICIENT DIAMETER TO PREVENT THE FRAME OF THE EQUIPMENT FROM DRAGGING THE MULCH. ANCHOR MULCH A MINIMUM DEPTH OF 2 INCHES AND ACROSS THE SLOPE WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT.
4. IMMEDIATELY UPON COMPLETION OF THE MULCHING AND BINDING OPERATION, THE SEEDED AREAS SHALL BE IRRIGATED, KEEPING THE TOP 2 INCHES OF SOIL EVENLY MOIST UNTIL SEED HAS UNIFORMLY GERMINATED AND GROWN TO A HEIGHT OF 2-INCHES.
5. WATERING APPLICATION SHALL BE DONE IN A MANNER WHICH WILL PROVIDE UNIFORM COVERAGE BUT WHICH WILL NOT CAUSE EROSION, MOVEMENT, OR DAMAGE TO THE FINISHED SURFACE.

Street Tree Notes

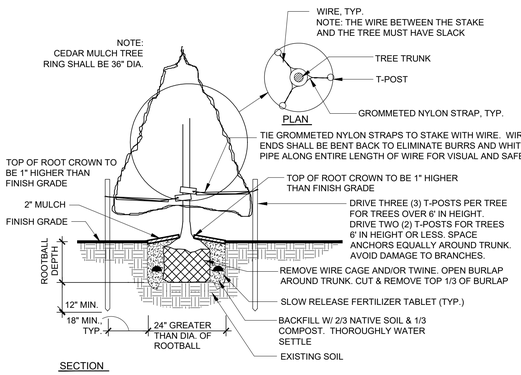
1. A PERMIT MUST BE OBTAINED FROM THE CITY FORESTER BEFORE ANY TREES OR SHRUBS AS NOTED ON THIS PLAN ARE PLANTED, PRUNED OR REMOVED IN THE PUBLIC RIGHT-OF-WAY. THIS INCLUDES ZONES BETWEEN THE SIDEWALK AND CURB, MEDIANS AND OTHER CITY PROPERTY. THIS PERMIT SHALL APPROVE THE LOCATION AND SPECIES TO BE PLANTED. FAILURE TO OBTAIN THIS PERMIT IS A VIOLATION OF THE CITY OF FORT COLLINS CODE SUBJECT TO CITATION (SECTION 27-31) AND MAY ALSO RESULT IN REPLACING OR RELOCATING TREES AND A HOLD ON CERTIFICATE OF OCCUPANCY.
2. CONTACT THE CITY FORESTER TO INSPECT ALL STREET TREE PLANTINGS AT THE COMPLETION OF EACH PHASE OF THE DEVELOPMENT. ALL MUST BE INSTALLED AS SHOWN ON THE LANDSCAPE PLAN. APPROVAL OF STREET TREE PLANTING IS REQUIRED BEFORE FINAL APPROVAL OF EACH PHASE.
3. STREET LANDSCAPING, INCLUDING STREET TREES, SHALL BE SELECTED IN ACCORDANCE WITH ALL CITY CODES AND POLICIES. ALL TREE PRUNING AND REMOVAL WORKS SHALL BE PERFORMED BY A CITY OF FORT COLLINS LICENSED ARBORS WHERE REQUIRED BY CODE.STREET TREES SHALL BE SUPPLIED AND PLANTED BY THE DEVELOPER USING A QUALIFIED LANDSCAPE CONTRACTOR.
4. THE DEVELOPER SHALL REPLACE DEAD OR DYING STREET TREES AFTER PLANTING UNTIL FINAL MAINTENANCE INSPECTION AND ACCEPTANCE BY THE CITY OF FORT COLLINS FORESTRY DIVISION. ALL STREET TREES IN THE PROJECT MUST BE ESTABLISHED, WITH AN APPROVED SPECIES AND OF ACCEPTABLE CONDITION PRIOR TO ACCEPTANCE.
5. SUBJECT TO APPROVAL BY THE CITY FORESTER – STREET TREE LOCATIONS MAY BE ADJUSTED TO ACCOMMODATE DRIVEWAY LOCATIONS, UTILITY SEPARATIONS BETWEEN TREES, STREET SIGNS AND STREET LIGHTS. STREET TREES TO BE CENTERED IN THE MIDDLE OF THE LOT TO THE EXTENT FEASIBLE. QUANTITIES SHOWN ON PLAN MUST BE INSTALLED UNLESS A REDUCTION IS APPROVED BY THE CITY TO MEET SEPARATION STANDARDS.



GROUND COVER & SHRUB PLANTING DETAIL



DECIDUOUS TREE PLANTING DETAIL



CONIFER TREE PLANTING DETAIL

Hydrozone Table

ZONE	AREA		WATER USE	GALLONS
HIGH	0	SF	18 GAL/SF	0 GAL
MODERATE	106,437	SF	10 GAL/SF	1,064,370 GAL
LOW	0	SF	3 GAL/SF	0 GAL
VERY LOW	648,093	SF	0 GAL/SF	0 GAL
TOTAL / AVERAGE	754,530	SF	1,064,370 GAL	1.4 GAL/SF

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Plant List

EVERGREEN TREES	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	6	Picea abies `Cupressina` Fastigiate Norway Spruce	6`, BB		FULL SPECIMEN, EVENLY AND WELL BRANCHED
	3	Pinus mugo `Tannenbaum` Tannenbaum Mugo Pine	6`, BB	15`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	6	Pinus ponderosa Ponderosa Pine	6`, BB	20`	FULL SPECIMEN, EVENLY AND WELL BRANCHED
	6	Pinus strobiformis Southwestern White Pine	6`, BB		FULL SPECIMEN, EVENLY AND WELL BRANCHED

ORNAMENTAL TREES	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	7	Amelanchier x grandiflora `Autumn Brilliance` `Autumn Brilliance` Serviceberry	1.5" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	15	Crataegus crus-galli inermis Thornless Cockspur Hawthorn	1.5" cal. BB	15`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	9	Malus x `Spring Snow` Spring Snow Crab Apple	1.5" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	10	Pyrus fauriei Korean Sun Korean Wild Pear	1.5" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER
	14	Syringa reticulata Japanese Tree Lilac	1.5" cal. BB	15`	WELL BRANCHED W/ STRAIGHT TRUNK & CENTRAL LEADER

SHADE TREES	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	39	Catalpa speciosa Catalpa 7 of 31 = Mitigation Tree	2" cal. BB 3" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	41	Celtis occidentalis Western Hackberry 4 of 41 = Mitigation Tree	2" cal. BB 3" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	44	Gymnocladus dioica `Espresso` Seedless Kentucky Coffeetree 8 of 40 = Mitigation Tree	2" cal. BB 3" cal. BB	50`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	44	Quercus buckleyi Texas Red Oak	2" cal. BB	30`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	46	Quercus shummardi Shumard Oak 7 of 44 = Mitigation Tree	2" cal. BB 3" cal. BB		WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER
	43	Ulmus x `Accolade` Accolade Elm 3 of 44 = Mitigation Tree	2" cal. BB 3" cal. BB	50`	WELL BRANCHED W/ STRAIGHT TRUNK AND CENTRAL LEADER

DECIDUOUS SHRUBS	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	26	Aronia arbutifolia `Brilliantissima` Brilliant Red Chokeberry/Red Chokeberry	5 gal.		24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	37	Caryopteris x clandonensis `Dark Knight` Blue Mist Spirea	5 gal.		24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED
	25	Philadelphus x `Snowbell` Snowbell Mock Orange	5 gal.		24" (h) FULL SPECIMEN, EVENLY AND WELL BRANCHED

GRASSES	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	103	Bouteloua gracilis `Blonde Ambition` Blonde Ambition Grama Grass	1 gal.		WELL ROOTED AND ESTABLISHED
	59	Calamagrostis x acutiflora `Karl Foerster` Feather Reed Grass	1 gal.		WELL ROOTED AND ESTABLISHED
	107	Panicum virgatum `Heavy Metal` Heavy Metal Blue Switch Grass	1 gal.		WELL ROOTED AND ESTABLISHED

PERENNIALS	QTY	BOTANICAL / COMMON NAME	SIZE	WIDTH	REMARKS
	55	Agastache rupestris `Sunset` Sunset Hyssop	1 gal.		WELL ROOTED AND ESTABLISHED
	87	Echinacea purpurea Purple Coneflower	1 gal.		WELL ROOTED AND ESTABLISHED
	42	Rudbeckia fulgida sullivantii `Goldsturm` Black-eyed Susan	1 gal.		WELL ROOTED AND ESTABLISHED

NOTE: IN ANY INSTANCE WHERE THE PLANT LIST OR LANDSCAPE QUANTITIES DO NOT MATCH THE PLAN, REQUIRED PLANTS/QUANTITIES SHALL BE PER THE PLAN. CONTRACTOR TO VERIFY QUANTITIES.

Overall Biodiversity Table

		SHADE/CANOPY TREES -
287		
41	-	Celtis occidentalis HACKBERRY, WESTERN
39	-	Catalpa speciosa CATALPA
44	-	Gymnocladus dioicus 'Espresso' KENTUCKY COFFEETREE, ESPRESSO
14	-	Populus deltoides ssp. monilifera COTTONWOOD, PLAINS
16	-	Populus x acuminata COTTONWOOD, LANCELEAF
44	-	Quercus buckleyi OAK, TEXAS RED
46	10.9%	Quercus shummardi OAK, SHUMARD
43	-	Ulmus Accolade ELM, ACCOLADE

		EVERGREEN TREES -
57		
6	-	Pinus ponderosa PINE, PONDEROSA
11	-	Picea pungens SPRUCE, COLORADO
11	-	Pinus edulis PINE, PINON
6	-	Pinus strobiforus PINE, SOUTHWESTERN WHITE
6	-	Picea abies 'Cupressina' SPRUCE, FASTIGIATE NORWAY
3	-	Pinus mugo 'Tannenbaum' PINE, TANNENBAUM MUGO
14	3.3%	Juniperus scopulorum JUNIPER, ROCKY MOUNTAIN

		ORNAMENTAL TREES -
77		
7	-	Amelanchier x grandiflora 'Autumn Brilliance' SERVICEBERRY, AUTUMN BRILLIANCE
15	-	Crataegus macracantha occidentalis HAWTHORN, WESTERN
9	-	Malus 'Spring Snow' CRABAPPLE, SPRING SNOW
10	-	Pyrus fauriei Korean Sun PEAR, KOREAN WILD
13	-	Syringa reticulata LILAC, JAPANESE TREE
21	4.9%	Acer glabrum MAPLE, ROCKY MOUNTAIN

TB GROUP
landscape architecture | planning | illustration
444 Mountain Ave.
Berthoud,CO 80513
TEL 970.532.5891
WEB TBGroup.us

SEAL

PROJECT TITLE

RENNAT SUBDIVISION

Preliminary Development Plan

6015 S. Timberline Road
Ft Collins, Colorado

PREPARED FOR

POST MODERN DEVELOPMENT
144 N. MASON ST.
SUITE 4
FORT COLLINS, CO 80524

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
Know what's below.
Call before you dig.
CALL 3 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES

REVISIONS DATE
STAFF COMMENTS 10.18.19
STAFF COMMENTS 12.04.19
STAFF COMMENTS 12.23.19

DATE

AUGUST 9, 2019

SHEET TITLE

Landscape Notes, Details & Schedules

SHEET INFORMATION

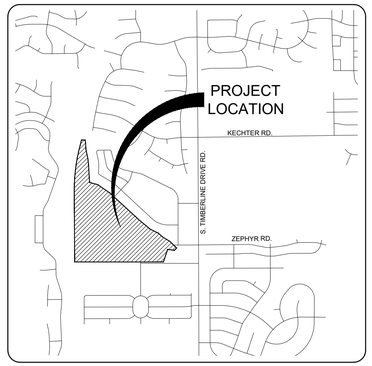
SHEET 20

PRELIMINARY UTILITY PLANS

RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

DECEMBER 2019



NORTH

VICINITY MAP

1"=1500'

PROJECT BENCHMARKS:

PROJECT DATUM: NAVD88

BENCHMARK 2-02 EAST SIDE OF TIMBERLAND ROAD, 1/2 MILE NORTH OF TRILBY ROAD, ON THE MIDDLE CONCRETE PAD TO AN ELECTRIC BOX.
ELEVATION: 4964.37

BENCHMARK 16-01 SOUTH SIDE OF WILLOW SPRINGS WAY APPROX. 50 FT. WEST OF THE INTERSECTION OF WILLOW SPRINGS WAY AND TIMBERLINE ROAD ON THE SOUTHWEST CORNER OF A STORM INLET.
ELEVATION: 4956.98

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BASIS OF BEARINGS
THE BASIS OF BEARINGS IS THE EAST LINE OF THE NORTHEAST QUARTER OF SECTION 7, AS BEARING SOUTH 00°00'53" EAST (ASSUMED BEARING) AS MONUMENTED ON PLAT.

ORIGINAL FIELD SURVEY BY:

Northern Engineering Services, Inc.
Project No. 1204-003
Date: February 19, 2019

DISCLAIMER STATEMENT:

These plans have been reviewed by the City of Fort Collins for concept only. The review does not imply responsibility by the reviewing department, the City of Fort Collins Engineer, or the City of Fort Collins for accuracy and correctness of the calculations. Furthermore, the review does not imply that quantities of items on the plans are the final quantities required. The review shall not be construed for any reason as acceptance of financial responsibility by the City of Fort Collins for additional quantities of items shown that may be required during the construction phase.

CERTIFICATION STATEMENT:

I hereby affirm that these final construction plans were prepared under my direct supervision, in accordance with all applicable City of Fort Collins and State of Colorado standards and statutes, respectively; and that I am fully responsible for the accuracy of all design, revisions, and record conditions that I have noted on these plans.

CONTACT INFORMATION

PROJECT TEAM:

OWNER/APPLICANT
JD Padillla
Post Modern Development
144 North Mason St., Suite 4
Fort Collins, Colorado 80524
(970) 407-7808

PLANNER/ LANDSCAPE ARCHITECT
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TB Group
444 Mountain Avenue
Berthoud, Colorado 80513
(970) 532-5891

SITE ENGINEER
Danny Weber, PE
Northern Engineering Services, Inc.
301 North Howes Street, Sutie 100
Fort Collins, Colorado 80521
(970) 221-4158

SURVEYOR
Bob Tessely, PLS
Northern Engineering Services, Inc.
301 North Howes Street, Sutie 100
Fort Collins, Colorado 80521
(970) 221-4158

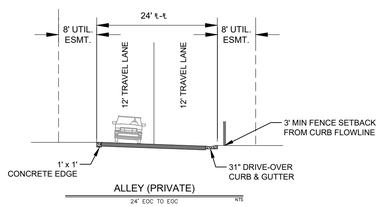
UTILITY CONTACT LIST: *

UTILITY COMPANY			PHONE NUMBER
GAS----------	Xcel Energy----------	Stephanie Rich	(970) 225-7857
ELECTRIC---------	City of Fort Collins Light & Power-------	Austin Kreager	(970) 224-6152
CABLE----------	Comcast----------	Don Kapperman	(970) 567-0245
TELECOM---------	CenturyLink Local Network----------	William Johnson	(970) 377-6401
WATER----------	Fort Collins-Loveland Water District----	Jay East	(970) 226-3104
WASTEWATER-	South Fort Collins Sanitation District---	Jay East	(970) 226-3104
STORMWATER-	City of Fort Collins Utilities----------	Wes Lamarque	(970) 416-2418

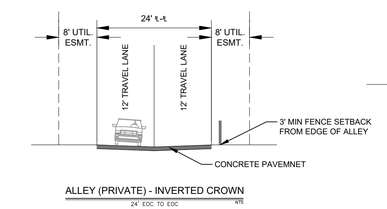
* This list is provided as a courtesy reference only. Northern Engineering Services assumes no responsibility for the accuracy or completeness of this list. In no way shall this list relinquish the Contractor's responsibility for locating all utilities prior to commencing any construction activity. Please contact the Utility Notification Center of Colorado (UNCC) at 811 for additional information.

SHEET INDEX

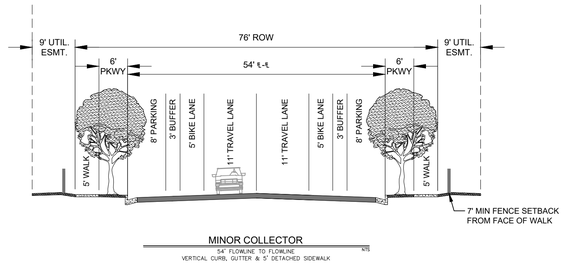
1	CS1	COVER SHEET
2	CS2	GENERAL AND CONSTRUCTION NOTES
3	EX1	EXISTING CONDITIONS AND DEMOLITION PLAN
4	PH1	PHASING PLAN
5	OU1	OVERALL UTILITY PLAN
6-8	U1-U3	UTILITY PLAN
9	OG1	OVERALL GRADING PLAN
10-15	G1-G6	GRADING PLAN
16-18	R1-R3	MISTY MEADOW DR PLAN & PROFILE
19-20	R4-R5	DANCING CATTAIL DR & WINDY WILLOW DR PLAN & PROFILE
21-22	R6-R7	CROAKING TOAD DR PLAN & PROFILE
23	R8	FLYING MALLARD DR PLAN & PROFILE
24	R9	FALLEN BRANCH DR PLAN & PROFILE
25-26	R10-R11	ZEPHYR RD PLAN & PROFILE
27	INT1	INTERSECTION DETAILS
28	DR1	DRAINAGE EXHIBIT



ALLEY (PRIVATE)
24' EOC TO EOC NTS

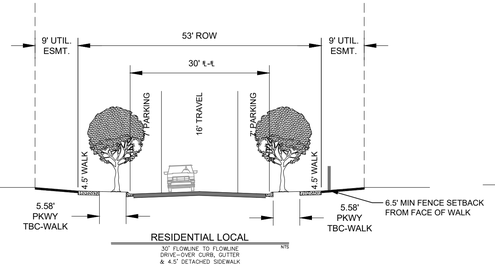


ALLEY (PRIVATE) - INVERTED CROWN
24' EOC TO EOC NTS



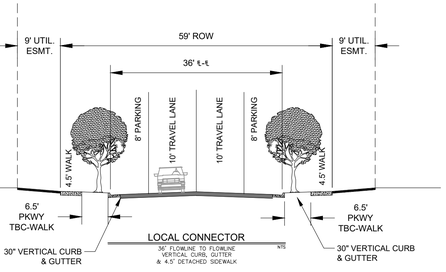
MINOR COLLECTOR
54' FLOWLINE TO FLOWLINE
VERTICAL CURB, GUTTER & 5' DETACHED SIDEWALK NTS

- ZEPHYR RD



RESIDENTIAL LOCAL
30' FLOWLINE TO FLOWLINE
DRIVE-OVER CURB, GUTTER & 4.5' DETACHED SIDEWALK NTS

- MISTY MEADOW DR
- DANCING CATTAIL DR
- CROAKING TOAD DR
- FALLEN BRANCH DR
- AUTUMN BREEZE CT



LOCAL CONNECTOR
36' FLOWLINE TO FLOWLINE
VERTICAL CURB, GUTTER & 4.5' DETACHED SIDEWALK NTS

- FLYING MALLARD DR
- WINDY WILLOW DR

CALL UTILITY NOTIFICATION CENTER OF COLORADO
811
Know what's below.
Call before you dig.
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

NEW MERCER IRRIGATION CANAL COMPANY APPROVAL

SECRETARY _____ DATE _____

FORT COLLINS - LOVELAND WATER DISTRICT
SOUTH FORT COLLINS SANITATION DISTRICT

District Engineer _____ Date _____

All changes, addendums, additions, deletions and modifications to these drawings must be approved, in writing, by the Fort Collins-Loveland Water District and the South Fort Collins Sanitation District.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: City Engineer _____ Date _____
CHECKED BY: Water & Wastewater Utility _____ Date _____
CHECKED BY: Stormwater Utility _____ Date _____
CHECKED BY: Parks & Recreation _____ Date _____
CHECKED BY: Traffic Engineer _____ Date _____
CHECKED BY: Environmental Planner _____ Date _____

No. Revisions: Date:
1 REVIEW SET NOT FOR CONSTRUCTION 12/24/19

These drawings are instruments of service provided by Northern Engineering Services, Inc. and are not to be used for any type of construction unless signed and sealed by a Professional Engineer in the employ of Northern Engineering Services, Inc.

NORTHERN ENGINEERING
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003 | DESIGNED BY: D. Weber | DRAWN BY: D. Weber | DATE: 12/24/19 | SCALE: NTS | REVIEWED BY: D. Weber

RENNAT SUBDIVISION

COVER SHEET

Sheet CS1

1 of 28

DRAWING FILENAME: P:\1204-003\Engr\1204-003_COVER.dwg LAYOUT NAME: CS1 DATE: Dec 23, 2019 - 2:11pm CAD OPERATOR: mason
LIST OF XREFS: [NOT-Attached]

GENERAL NOTES

1. All materials, workmanship, and construction of ppublic improvements shall meet or exceed the standards and specifications set forth in the Larimer County Urban Area Street Standards and applicable state and federal regulations. Where there is conflict between these plans and the specifications, or any applicable standards, the most restrictive standard shall apply. All work shall be inspected and approved by the City of Fort Collins.

2. All references to any published standards shall refer to the latest revision of said standard, unless specifically stated otherwise.

3. These public improvement construction plans shall be valid for a period of three years from the date of approval by the City of Fort Collins Engineer. Use of these plans after the expiration date will require a new review and approval process by the City of Fort Collins prior to commencement of any work shown in these plans.

4. The engineer who has prepared these plans, by execution and/or seal hereof, does hereby affirm responsibility to the City of Fort Collins, as beneficiary of said engineer's work, for any errors and omissions contained in these plans, and approval of these plans by the City of Fort Collins Engineer shall not relieve the engineer who has prepared these plans of all such responsibility. Further, to the extent permitted by law, the engineer hereby agrees to hold harmless and indemnify the City of Fort Collins, and its officers and employees, from and against all liabilities, claims, and demands which may arise from any errors and omissions contained in these plans.

5. All storm sewer construction, as well as power and other "dry" utility installations, shall conform to the City of Fort Collins standards and specifications current at the date of approval of the plans by the City of Fort Collins Engineer.

6. The type, size, location and number of all known underground utilities are approximate when shown on the drawings. It shall be the responsibility of the Developer to verify the existence and location of all underground utilities along the route of the work before commencing new construction. The Developer shall be responsible for unknown underground utilities.

7. The Developer shall contact the Utility Notification Center of Colorado (UNCC) at 1-800-922-1987, at least 2 working days prior to beginning excavation or grading, to have all registered utility locations marked. Other unregistered utility entities (i.e. ditch / irrigation company) are to be located by contacting the respective representative. Utility service laterals are also to be located prior to beginning excavation or grading. It shall be the responsibility of the Developer to relocate all existing utilities that conflict with the proposed improvements shown on these plans.

8. The Developer shall be responsible for protecting all utilities during construction and for coordinating with the appropriate utility company for any utility crossings required.

9. If a conflict exists between existing and proposed utilities and/or a design modification is required, the Developer shall coordinate with the engineer to modify the design. Design modification(s) must be approved by the City of Fort Collins prior to beginning construction.

10. The Developer shall coordinate and cooperate with the City of Fort Collins, and all utility companies involved, to assure that the work is accomplished in a timely fashion and with a minimum disruption of service. The Developer shall be responsible for contacting, in advance, all parties affected by any disruption of any utility service as well as the utility companies.

11. No work may commence within any public storm water, sanitary sewer or potable water system until the Developer notifies the utility provider. Notification shall be a minimum of 2 working days prior to commencement of any work. At the discretion of the water utility provider, a pre-construction meeting may be required prior to commencement of any work.

12. The Developer shall sequence installation of utilities in such a manner as to minimize potential utility conflicts. In general, storm sewer and sanitary sewer should be constructed prior to installation of the water lines and dry utilities.

13. The minimum cover over water lines is 4.5 feet and the maximum cover is 5.5 feet unless otherwise noted in the plans and approved by the Water Utility.

14. A State Construction Dewatering Wastewater Discharge Permit is required if dewatering is required in order to install utilities or if water is discharged into a storm sewer, channel, irrigation ditch or any waters of the United States.

15. The Developer shall comply with all terms and conditions of the Colorado Permit for Storm Water Discharge (Contact Colorado Department of Health, Water Quality Control Division, (303) 692-3590), the Storm Water Management Plan, and the Erosion Control Plan.

16. The City of Fort Collins shall not be responsible for the maintenance of storm drainage facilities located on private property. Maintenance of onsite drainage facilities shall be the responsibility of the property owner(s).

17. Prior to final inspection and acceptance by the City of Fort Collins, certification of the drainage facilities, by a registered engineer, must be submitted to and approved by the Stormwater Utility Department. Certification shall be submitted to the Stormwater Utility Department at least two weeks prior to the release of a certificate of occupancy for single family units. For commercial properties, certification shall be submitted to the Stormwater Utility Department at least two weeks prior to the release of any building permits in excess of those allowed prior to certification per the Development Agreement.

18. The City of Fort Collins shall not be responsible for any damages or injuries sustained in this Development as a result of groundwater seepage, whether resulting from groundwater flooding, structural damage or other damage unless such damage or injuries are sustained as a result of the City of Fort Collins failure to properly maintain its water, wastewater, and/or storm drainage facilities in the development.

19. All recommendations of the Preliminary Drainage and Erosion Control Report for Rennat Subdivision dated December 24, 2019 by Northern Engineering Services, Inc., shall be followed and implemented.

20. Temporary erosion control during construction shall be provided as shown on the Erosion Control Plan. All erosion control measures shall be maintained in good repair by the Developer, until such time as the entire disturbed areas is stabilized with hard surface or landscaping.

21. The Developer shall be responsible for insuring that no mud or debris shall be tracked onto the existing public street system. Mud and debris must be removed within 24 hours by an appropriate mechanical method (i.e. machine broom sweep, light duty front-end loader, etc.) or as approved by the the City of Fort Collins street inspector.

22. No work may commence within any improved or unimproved public Right-of-Way until a Right-of-Way Permit or Development Construction Permit is obtained, if applicable.

23. The Developer shall be responsible for obtaining all necessary permits for all applicable agencies prior to commencement of construction. The Developer shall notify the the City of Fort Collins Inspector (Fort Collins - 221-6605) and the City of Fort Collins Erosion Control Inspector (Fort Collins - 221-6700) at least 2 working days prior to the start of any earth disturbing activity, or construction on any and all public improvements. If the City of Fort Collins Engineer is not available after proper notice of construction activity has been provided, the Developer may commence work in the Engineer's absence. However, the City of Fort Collins reserves the right not to accept the improvement if subsequent testing reveals an improper installation.

24. The Developer shall be responsible for obtaining soils tests within the Public Right-of-Way after right of way grading and all utility trench work is complete and prior to the placement of curb, gutter, sidewalk and pavement. If the final soils/pavement design report does not correspond with the results of the original geotechnical report, the Developer shall be responsible for a re-design of the subject pavement section or, the Developer may use the City of Fort Collins' default pavement thickness section(s). Regardless of the option used, all final soils/pavement design reports shall be prepared by a licensed Professional Engineer. The final report shall be submitted to the Inspector a minimum of 10 working days prior to placement of base and asphalt. Placement of curb, gutter, sidewalk, base and asphalt shall not occur until the City of Fort Collins Engineer approves the final report.

25. The contractor shall hire a licensed engineer or land surveyor to survey the constructed elevations of the street subgrade and the gutter flowline at all intersections, inlets, and other locations requested by the the City of Fort Collins inspector. The engineer or surveyor must certify in a letter to the City of Fort Collins that these elevations conform to the approved plans and specifications. Any deviations shall be noted in the letter and then resolved with the City of Fort Collins before installation of base course or asphalt will be allowed on the streets.

26. All utility installations within or across the roadbed of new residential roads must be completed prior to the final stages of road construction. For the purposes of these standards, any work except c/g above the subgrade is considered final stage work. All service lines must be stubbed to the property lines and marked so as to reduce the excavation necessary for building connections.

27. Portions of Larimer County are within overlay districts. The Larimer County Flood Plain Resolution should be referred to for additional criteria for roads within these districts.

28. All road construction in areas designated as Wild Fire Hazard Areas shall be done in accordance with the construction criteria as established in the Wild Fire Hazard Area Mitigation Regulations in force at the time of final plat approval.

29. Prior to the commencement of any construction, the contractor shall contact the Local Entity Forester to schedule a site inspection for any tree removal requiring a permit.

30. The Developer shall be responsible for all aspects of safety including, but not limited to, excavation, trenching, shoring, traffic control, and security. Refer to OSHA Publication 2226, Excavating and Trenching.

31. The Developer shall submit a Construction Traffic Control Plan, in accordance with MUTCD, to the appropriate Right-of-Way authority. (The the City of Fort Collins, Larimer County, Colorado), for approval, prior to any construction activities within, or affecting, the Right-of-Way. The Developer shall be responsible for providing any and all traffic control devices as may be required by the construction activities.

32. Prior to the commencement of any construction that will affect traffic signs of any type, the contractor shall contact the City of Fort Collins Traffic Operations Department, who will temporarily remove or relocate the sign at no cost to the contractor, however, if the contractor moves the traffic sign then the contractor will be charged for the labor, materials and equipment to reinstall the sign as needed.

33. The Developer is responsible for all costs for the initial installation of traffic signing and striping for the Development related to the Development's local street operations. In addition, the Developer is responsible for all costs for traffic signing and striping related to directing traffic access to and from the Development.

34. There shall be no site construction activities on Saturdays, unless specifically approved by the City of Fort Collins Engineer, and no site construction activities on Sundays or holidays, unless there is prior written approval by Larimer County.

35. The Developer is responsible for providing all labor and materials necessary for the completion of the intended improvements, shown on these drawings, or designated to be provided, installed, or constructed, unless specifically noted otherwise.

36. Dimensions for layout and construction are not to be scaled from any drawing. If pertinent dimensions are not shown, contact the Designer for clarification, and annotate the dimension on the as-built record drawings.

37. The Developer shall have, onsite at all times, one (1) signed copy of the approved plans, one (1) copy of the appropriate standards and specifications, and a copy of any permits and extension agreements needed for the job.

38. If, during the construction process, conditions are encountered which could indicate a situation that is not identified in the plans or specifications, the Developer shall contact the Designer and the City of Fort Collins Engineer immediately.

39. The Developer shall be responsible for recording as-built information on a set of record drawings kept on the construction site, and available to the Larimer County's Inspector at all times. Upon completion of the work, the contractor(s) shall submit record drawings to the City of Fort Collins Engineer.

40. The Designer shall provide, in this location on the plan, the location and description of the nearest survey benchmarks (2) for the project as well as the basis of bearings. The information shall be as follows:

PROJECT DATUM: NAVD88

BENCHMARK 2-02 EAST SIDE OF TIMBERLAND ROAD, 1/2 MILE NORTH OF TRILBY ROAD, ON THE MIDDLE CONCRETE PAD TO AN ELECTRIC BOX.
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THE BASIS OF BEARINGS IS THE EAST LINE OF THE NORTHEAST QUARTER OF SECTION 7, AS BEARING SOUTH 00'00'53" EAST (ASSUMED BEARING) AS MONUMENTED ON PLAT.

41. All stationing is based on centerline of roadways unless otherwise noted.

42. Damaged curb, gutter and sidewalk existing prior to construction, as well as existing fences, trees, streets, sidewalks, curbs and gutters, landscaping, structures, and improvements destroyed, damaged or removed due to construction of this project, shall be replaced or restored in like kind at the Developer's expense, unless otherwise indicated on these plans, prior to the acceptance of completed improvements and/or prior to the issuance of the first Certificate of Occupancy.

43. When an existing asphalt street must be cut, the street must be restored to a condition equal to or better than its original condition. The existing street condition shall be documented by the City of Fort Collins Construction Inspector before any cuts are made. Patching shall be done in accordance with the City of Fort Collins Street Repair Standards. The finished patch shall blend in smoothly into the existing surface. All large patches shall be paved with an asphalt lay-down machine. In streets where more than one cut is made, an overlay of the entire street width, including the patched area, may be required. The determination of need for a complete overlay shall be made by the Larimer County Engineer and/or the City of Fort Collins Inspector at the time the cuts are made.

44. Upon completion of construction, the site shall be cleaned and restored to a condition equal to, or better than, that which existed before construction, or to the grades and condition as required by these plans.

45. Standard Handicap ramps are to be constructed at all curb returns and at all "T" intersections.

46. After acceptance by the City of Fort Collins, public improvements depicted in these plans shall be guaranteed to be free from material and workmanship defects for a minimum period of two years from the date of acceptance.

47. The City of Fort Collins shall not be responsible for the maintenance of roadway and appurtenant improvements, including storm drainage structures and pipes, for the following private streets: N.A.

48. Approved Variances are listed as follows: N/A

CONSTRUCTION NOTES

A. Grading and Erosion Control Notes

1. The erosion control inspector must be notified at least twenty-four (24) hours prior to any construction on this site.

2. There shall be no earth-disturbing activity outside the limits designated on the accepted plans.

3. All required perimeter silt and construction fencing shall be installed prior to any land disturbing activity (stockpiling, stripping, grading, etc). All other required erosion control measures shall be installed at the appropriate time in the construction sequence as indicated in the approved project schedule, construction plans, and erosion control report.

4. At all times during construction, the Developer shall be responsible for preventing and controlling on-site erosion including keeping the property sufficiently watered so as to minimize wind blown sediment. The Developer shall also be responsible for installing and maintaining all erosion control facilities shown herein.

5. Pre-disturbance vegetation shall be protected and retained wherever possible. Removal or disturbance of existing vegetation shall be limited to the area(s) required for immediate construction operations, and for the shortest practical period of time.

6. All soils exposed during land disturbing activity (stripping, grading, utility installations, stockpiling, filling, etc.) shall be kept in a roughened condition by ripping or disking along land contours until mulch, vegetation, or other permanent erosion control BMPs are installed. No soils in areas outside project street rights-of-way shall remain exposed by land disturbing activity for more than thirty (30) days before required temporary or permanent erosion control (e.g. seed/mulch, landscaping, etc.) is installed, unless otherwise approved by the City/County.

7. In order to minimize erosion potential, all temporary (structural) erosion control measures shall:

a. Be inspected at a minimum of once every two (2) weeks and after each significant storm event and repaired or reconstructed as necessary in order to ensure the continued performance of their intended function.
b. Remain in place until such time as all the surrounding disturbed areas are sufficiently stabilized as determined by the erosion control inspector.
c. Be removed after the site has been sufficiently stabilized as determined by the erosion control inspector.

8. When temporary erosion control measures are removed, the Developer shall be responsible for the clean up and removal of all sediment and debris from all drainage infrastructure and other public facilities.

9. The contractor shall immediately clean up any construction materials inadvertently deposited on existing streets, sidewalks, or other public rights of way, and make sure streets and walkways are cleaned at the end of each working day.

10. All retained sediments, particularly those on paved roadway surfaces, shall be removed and disposed of in a manner and location so as not to cause their release into any waters of the United States.

11. No soil stockpile shall exceed ten (10) feet in height. All soil stockpiles shall be protected from sediment transport by surface roughening, watering, and perimeter silt fencing. Any soil stockpile remaining after thirty (30) days shall be seeded and mulched.

12. The stormwater volume capacity of detention ponds will be restored and storm sewer lines will be cleaned upon completion of the project and before turning the maintenance over to the City/County or Homeowners Association (HOA).

13. City Ordinance and Colorado Discharge Permit System (CDPS) requirements make it unlawful to discharge or allow the discharge of any pollutant or contaminated water from construction sites. Pollutants include, but are not limited to discarded building materials, concrete truck washout, chemicals, oil and gas products, litter, and sanitary waste. The developer shall at all times take whatever measures are necessary to assure the proper containment and disposal of pollutants on the site in accordance with any and all applicable local, state, and federal regulations.

14. A designated area shall be provided on site for concrete truck chute washout. The area shall be constructed so as to contain washout material and located at least fifty (50) feet away from any waterway during construction. Upon completion of construction activities the concrete washout material will be removed and properly disposed of prior to the area being restored.

15. Conditions in the field may warrant erosion control measures in addition to what is shown on these plans. The Developer shall implement whatever measures are determined necessary, as directed by the City.

B. Street Improvement Notes

1. All street construction is subject to the General Notes on the cover sheet of these plans as well as the Street Improvements Notes listed here.

2. A paving section design, signed and stamped by a Colorado licensed Engineer, must be submitted to the City of Fort Collins Engineer for approval, prior to any street construction activity, (full depth asphalt sections are not permitted at a depth greater than 8 inches of asphalt). The job mix shall be submitted for approval prior to placement of any asphalt.

3. Where proposed paving adjoins existing asphalt, the existing asphalt shall be saw cut, a minimum distance of 12 inches from the existing edge, to create a clean construction joint. The Developer shall be required to remove existing pavement to a distance where a clean construction joint can be made. Wheel cuts shall not be allowed unless approved by the City of Fort Collins Engineer in Fort Collins.

4. Street subgrades shall be scarified the top 12 inches and re-compacted prior to subbase installation. No base material shall be laid until the subgrade has been inspected and approved by the City of Fort Collins Engineer.

5. Ft. Collins only. Valve boxes and manholes are to be brought up to grade at the time of pavement placement or overlay. Valve box adjusting rings are not allowed.

6. When an existing asphalt street must be cut, the street must be restored to a condition equal to or better than its original condition. The existing street condition shall be documented by the Inspector before any cuts are made. Cutting and patching shall be done in conformance with Chapter 25, Reconstruction and Repair. The finished patch shall blend smoothly into the existing surface. The determination of need for a complete overlay shall be made by the City of Fort Collins Engineer. All overlay work shall be coordinated with adjacent landowners such that future projects do not cut the new asphalt overlay work.

7. All traffic control devices shall be in conformance with these plans or as otherwise specified in M.U.T.C.D. (including Colorado supplement) and as per the Right-of-Way Work Permit traffic control plan.

8. The Developer is required to perform a gutter water flow test in the presence of the City of Fort Collins Inspector and prior to installation of asphalt. Gutters that hold more than 1/4 inch deep or 5 feet longitudinally, of water, shall be completely removed and reconstructed to drain properly.

9. Prior to placement of H.B.P. or concrete within the street and after moisture/density tests have been taken on the subgrade material (when a full depth section is proposed) or on the subgrade and base material (when a composite section is proposed), a mechanical "proof roll" will be required. The entire subgrade and/or base material shall be rolled with a heavily loaded vehicle having a total GVW of not less than 50,000 lbs. and a single axle weight of at least 18,000 lbs. with pneumatic tires inflated to not less that 90 p.s.i.g. "Proof roll" vehicles shall not travel at speeds greater than 3 m.p.h. Any portion of the subgrade or base material which exhibits excessive pumping or deformation, as determined by the City of Fort Collins Engineer, shall be reworked, replaced or otherwise modified to form a smooth, non-yielding surface. The City of Fort Collins Engineer shall be notified at least 24 hours prior to the "proof roll." All "proof rolls" shall be preformed in the presence of an Inspector.

C. Traffic Signing and Pavement Marking Construction Notes

1. All signage and marking is subject to the General Notes on the cover sheet of these plans, as well as the Traffic Signing and Marking Construction Notes listed here.

2. All symbols, including arrows, ONLYS, crosswalks, stop bars, etc. shall be pre-formed thermo-plastic.

3. All signage shall be per the City of Fort Collins Standards and these plans or as otherwise specified in MUTCD.

4. All lane lines for asphalt pavement shall receive two coats of latex paint with glass beads.

5. All lane lines for concrete pavement should be epoxy paint.

6. Prior to permanent installation of traffic striping and symbols, the Developer shall place temporary tabs or tape depicting alignment and placement of the same. Their placement shall be approved by the City of Fort Collins Traffic Engineer prior to permanent installation of striping and symbols.

7. Pre-formed thermo-plastic applications shall be as specified in these Plans and/or these Standards.

8. Epoxy applications shall be applied as specified in CDOT Standard Specifications for Road and Bridge Construction.

9. All surfaces shall be thoroughly cleaned prior to installation of striping or markings.

10. All sign posts shall utilize break-away assemblies and fasteners per the Standards.

11. A field inspection of location and installation of all signs shall be performed by the City of Fort Collins Traffic Engineer. All discrepancies identified during the field inspection must be corrected before the 2-year warranty period will begin.

12. The Developer installing signs shall be responsible for locating and protecting all underground utilities.

13. Special care shall be taken in sign location to ensure an unobstructed view of each sign.

14. Signage and striping has been determined by information available at the time of review. Prior to initiation of the warranty period,the City of Fort Collins Traffic Engineer reserves the right to require additional signage and/or striping if the City of Fort Collins Traffic Engineer determines that an unforeseen condition warrants such signage according to the MUTCD or the CDOT M and S Standards. All signage and striping shall fall under the requirements of the 2-year warranty period for new construction (except fair wear on traffic markings).

15. Sleeves for sign posts shall be required for use in islands/medians. Refer to Chapter 14, Traffic Control Devices, for additional detail.

D. Storm Drainage Notes

1. The City of Fort Collins shall not be responsible for the maintenance of storm drainage facilities located on private property. Maintenance of onsite drainage facilities shall be the responsibility of the property owner(s).

2. All recommendations of the Preliminary Drainage and Erosion Control Report for Rennat Subdivision dated December 24, 2019 by Northern Engineering Services, Inc., shall be followed and implemented.

3. Prior to final inspection and acceptance by the City of Fort Collins, certification of the drainage facilities, by a registered engineer, must by submitted to and approved by the Stormwater Utility Department. Certification shall be submitted to the Stormwater Utility Department at least two weeks prior to the release of a certificate of occupancy for single family units. For commercial properties, certification shall by submitted to the Stormwater Utility Department at least two weeks prior to the release of any building permits in excess of those allowed prior to certification per the Development Agreement.

E. Utility Notes

1. All waterline construction shall conform to the Fort Collins-Loveland Water District Standard Construction Specifications current at the date of construction.

2. All sanitary sewer construction shall conform to the South Fort Collins Sanitation District Standard Construction Specifications current at the date of construction.

3. The contractor shall maintain a minimum of 10 feet of horizontal separation and 18 inches of vertical separation between all sewer and water lines.

4. Minimum depth of cover over water mains shall be 5.0 feet and maximum cover shall be 6.0 feet.

5. Manhole rim elevations are to be adjusted to 1/4" below finished grade. If necessary, cone sections shall be rotated to prevent lids being located within bicycle or vehicle wheel paths.

6. The size, type and location of all known underground utilities are approximate when shown on these drawings. It shall be the responsibility of the contractor to verify the existence of all underground utilities in the area of the work. Before commencing new construction, the contractor shall be responsible for locating all underground utilities and shall be responsible for all unknown underground utilities.

7. All water fittings and valves are only graphically represented and are not to scale.

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Know what's below.
Call before you dig.
CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	City Engineer	Date
CHECKED BY:	Water & Wastewater Utility	Date
CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
CHECKED BY:	Traffic Engineer	Date
CHECKED BY:	Environmental Planner	Date

Revisions: No. By: Date:

REVIEW SET
NOT FOR CONSTRUCTION
12/24/19

These drawings are instruments of service provided by Northern Engineering Services, Inc. and are not to be used for any type of construction unless signed and sealed by a Professional Engineer in the employ of Northern Engineering Services, Inc.

NORTHERN ENGINEERING
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003
DATE: 12/24/19
DESIGNED BY: D. Weber
SCALE: NTS
DRAWN BY: D. Weber
REVIEWED BY: D. Weber

RENNAT SUBDIVISION
GENERAL AND CONSTRUCTION NOTES

Sheet
CS2

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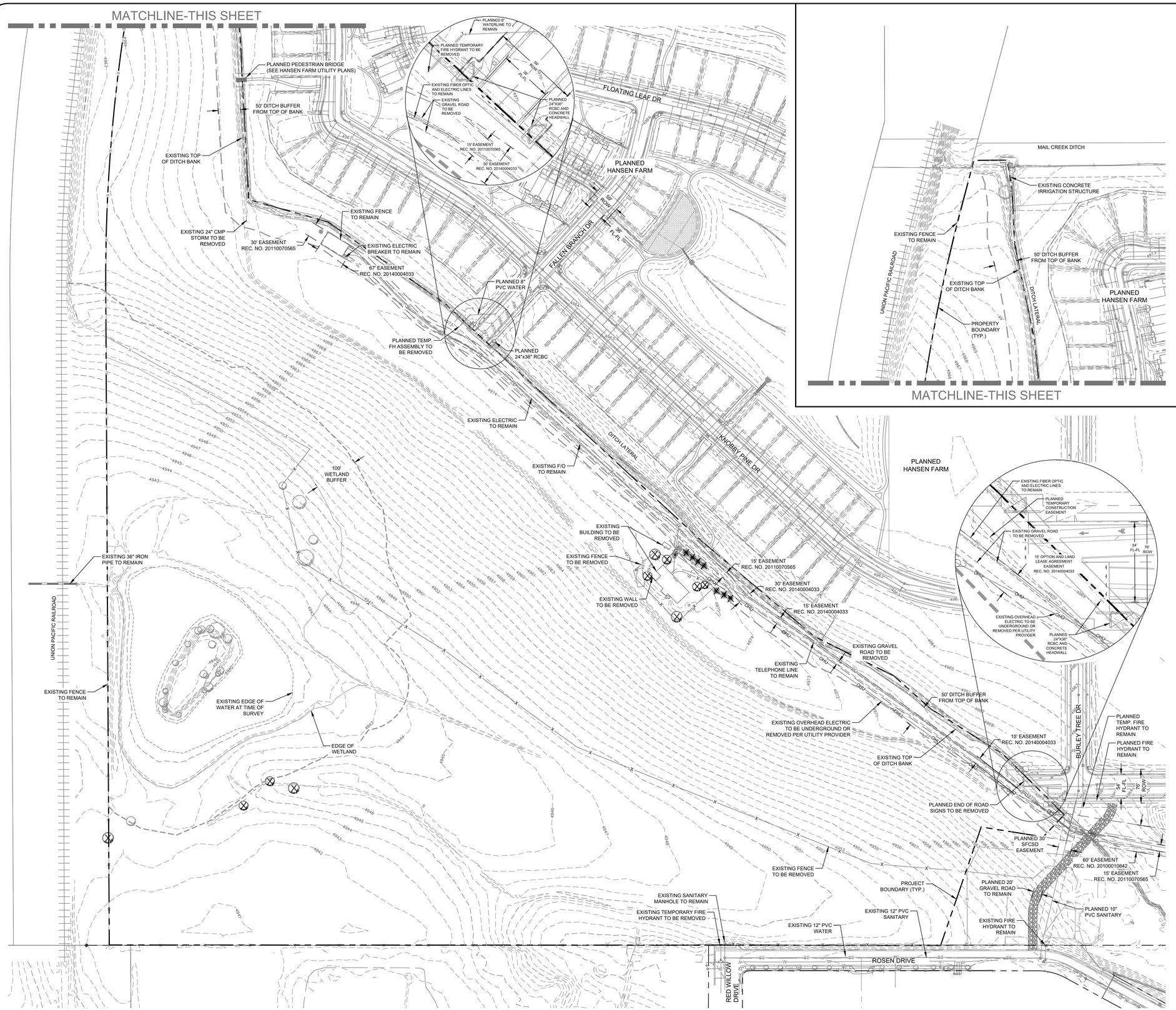

NORTH

100 0 100 200 300 Feet

(IN FEET)
1 inch = 100 ft.



KEYMAP

LEGEND:

- PROJECT BOUNDARY
- EXISTING RIGHT-OF-WAY
- EXISTING MAJOR CONTOUR — 5015
- EXISTING MINOR CONTOUR — 5013
- EXISTING STORM SEWER — ST
- EXISTING TELEPHONE — T
- EXISTING GAS — G
- EXISTING SANITARY SEWER — SS
- EXISTING WATER — W
- EXISTING ELECTRIC — E
- EXISTING FENCE — X
- EXISTING ELECTRIC VAULT
- EXISTING FIRE HYDRANT
- EXISTING IRRIGATION BOX
- EXISTING WATER METER
- EXISTING GAS METER
- EXISTING TELEPHONE PEDESTAL
- EXISTING TREES (TO REMAIN)
- EXISTING TREES (TO BE REMOVED)
- APPROXIMATE LIMITS OF CONCRETE/ ASPHALT REMOVAL OR MILL & OVERLAY

NATURAL HABITAT BUFFER ZONES

1. THE NATURAL HABITAT BUFFER ZONES ARE INTENDED TO BE MAINTAINED IN A NATIVE LANDSCAPE. PLEASE SEE SECTION 3.4.1 OF THE LAND USE CODE FOR ALLOWABLE USES WITHIN THE NATURAL HABITAT BUFFER ZONES.

NOTES:

1. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING DEMOLITION, REMOVAL, REPLACEMENT, AND DISPOSAL OF ALL FACILITIES AND MATERIAL.
3. CONTRACTOR IS ENCOURAGED TO PERFORM DEMOLITION IN A MANNER THAT MAXIMIZES SALVAGE, RE-USE, AND RECYCLING OF MATERIALS. THIS INCLUDES APPROPRIATE SORTING AND STORING. IN PARTICULAR, DEMOLISHED CONCRETE, ASPHALT, AND BASE COURSE SHOULD BE RECYCLED IF POSSIBLE. THE CITY OF FORT COLLINS STREET DEPARTMENT OPERATES A CRUSHING OPERATION THAT WILL ACCEPT CONCRETE MATERIAL AT NO COST FOR CRUSHING AND RE-USE AS RECYCLED AGGREGATE. THIS OPERATION IS LOCATED AT 1380 HOFFMAN MILL ROAD AND CAN BE REACHED AT (970) 482-1249.
4. ALL SYMBOLS ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
5. CONTACT THE PROJECT SURVEYOR FOR ANY INQUIRIES RELATED TO THE EXISTING SITE SURVEY.
6. LIMITS OF STREET CUT ARE APPROXIMATE. FINAL LIMITS ARE TO BE DETERMINED IN THE FIELD BY THE CITY ENGINEERING INSPECTOR. ALL REPAIRS TO BE IN ACCORDANCE WITH CITY STREET REPAIR STANDARDS.
7. ALL IMPROVEMENTS LABELED AS "PLANNED" ARE A PART OF THE HANSEN PROJECT. DESIGN DETAILS FOR THESE IMPROVEMENTS CAN BE FOUND IN THE HANSEN FARM UTILITY PLANS.

CALL UTILITY NOTIFICATION CENTER OF COLORADO

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CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: _____ City Engineer _____ Date
CHECKED BY: _____ Water Utility _____ Date
CHECKED BY: _____ Stormwater Utility _____ Date
CHECKED BY: _____ Parks & Recreation _____ Date
CHECKED BY: _____ Traffic Engineer _____ Date
CHECKED BY: _____ Environmental Planner _____ Date

No. Revisions: Date:
1 REVIEW SET NOT FOR CONSTRUCTION 12/24/19

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NORTHERN ENGINEERING
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1"=100'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

EXISTING CONDITIONS AND DEMOLITION PLAN

Sheet EX1
3 of 28

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MATCHLINE-THIS SHEET

PLANNED PED BRIDGE (SEE HANSEN FARM UTILITY PLANS)

FALLEN BRANCH DR

MISTY MEADOW DR

PHASE 1

OUTLET STRUCTURE AND STORM PIPE (PHASE 1)

RAIN GARDEN 1 (PHASE 1)

EXISTING WETLANDS

PROPOSED PEDESTRIAN BRIDGE (PHASE 1)

UNION PACIFIC RAILROAD

FUTURE STORM DRAIN (BY OTHERS)

CROAKING TOAD DR

SANITARY SEWER MANHOLE (PHASE 1)

WATER (PHASE 2)

PROPOSED STORM DRAIN (PHASE 1)

WATER QUALITY POND 1 (PHASE 2)

WATER QUALITY POND 2 (PHASE 2)

AUTUMN BREEZE CT

PHASE 2

FLYING MALLARD DR

WINDY WILLOW DR

ZEPHYR RD

PROPOSED DETENTION POND (PHASE 1)

DANCING CATTAIL DR

SANITARY SEWER MANHOLE (PHASE 2)

SANITARY SEWER MANHOLE (PHASE 1)

FUTURE BRIDGE (BY OTHERS)

PHASE 1

MATCHLINE-THIS SHEET

NORTH

100 0 100 200 300Feet

(IN FEET)
1 inch = 100 ft.

LEGEND:

- PROJECT BOUNDARY
- PHASE LINE
- PROPOSED SEWER MAIN
- PROPOSED WATER MAIN
- PROPOSED STORM SEWER

NOTES:

1. OVERLOT GRADING FOR SITE SHALL BE PROVIDED IN PHASE 1.
2. PHASE LINES SHOWN DELINEATE THE LOTS AND/OR AREAS THAT ARE INCLUDED WITHIN A PHASE. DEPENDING ON CONSTRUCTION SEQUENCING, INSTALLATION OF INFRASTRUCTURE OUTSIDE THE LIMITS OF THE PHASE MAY BE REQUIRED.
3. DEPENDING ON CONSTRUCTION SEQUENCING, PREVIOUSLY CONSTRUCTED ROADWAYS MAY REQUIRE SAWCUTS, MILLING AND/OR PATCHING OF ASPHALT. FINAL LIMITS WILL BE DETERMINED IN THE FIELD BY THE CITY ENGINEERING INSPECTOR. ALL PATCHING AND STREET REPAIRS SHALL BE IN ACCORDANCE WITH CITY STANDARDS.
4. THE PHASING DESIGNATIONS SHOWN ARE FOR REFERENCE ONLY AND MAY NOT HAVE ANY RELATIONSHIP TO THE ACTUAL ORDER OF CONSTRUCTION.
5. INSTALL TYPE III BARRICADES AT END OF PHASE ROADWAY TERMINATIONS.
6. PROVIDE ALL WEATHER SURFACE – MINIMUM 15-FT WIDE FOR ANY UTILITIES THAT EXTEND PAST THE PHASE LINE AND BEYOND THE NEXT MANHOLE FOR SANITARY SEWER AND BEYOND THE NEXT FITTING FOR WATERLINE.

No. Revisions: Date:

REVIEW SET
NOT FOR CONSTRUCTION
12/24/19

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PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=100'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

PHASING PLAN

Sheet
PH1
4 of 28

DRAWING FILENAME: P:\1204-003\Engr\Civ\1204-003_PHASE.dwg LAYOUT NAME: PH1 DATE: Dec 23, 2019 - 2:12pm CAD OPERATOR: mason
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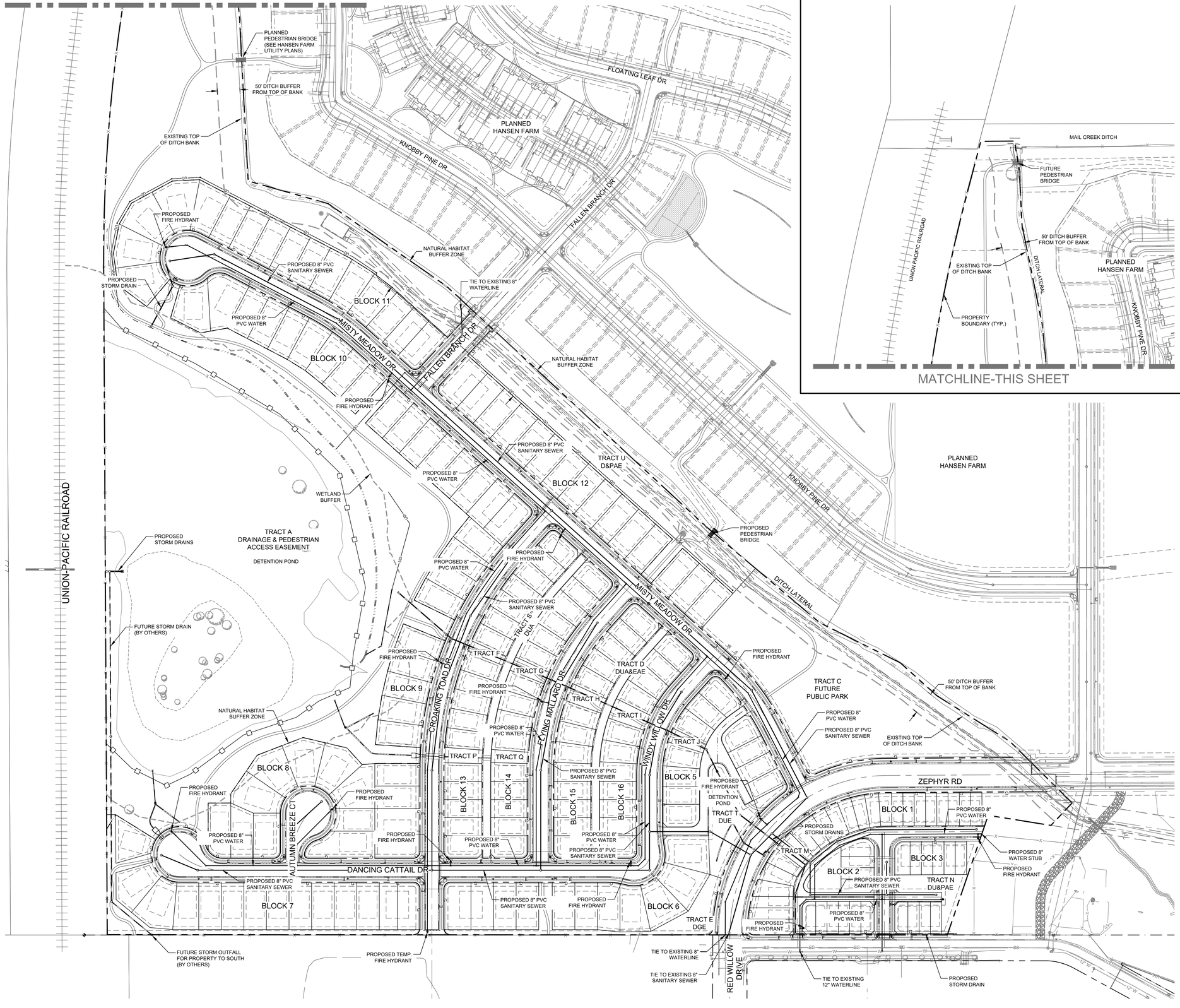

NORTH

100 0 100 200 300 Feet

(IN FEET)
1 inch = 100 ft.



KEYMAP

LEGEND:

PROPOSED WATER MAIN	W
EXISTING WATER MAIN	W
PROPOSED SANITARY SEWER	S
EXISTING SANITARY SEWER	SS
PROPOSED SEWER SERVICE	S
PROPOSED RESIDENTIAL WATER SERVICE	W
PROPOSED UNDERDRAIN	UD
PROPOSED SUBDRAIN	SD
PROPOSED FIRE HYDRANT	
EXISTING FIRE HYDRANT	
PROPOSED STORMLINE	
PROPOSED STORMLINE	
EXISTING STORM SEWER	ST
PROPOSED ELECTRIC	E
EXISTING TELEPHONE	T
EXISTING GAS	G
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOTLINE	
EASEMENT LINE	
RIGHT OF WAY	
LIMITS OF DEVELOPMENT	LOD

NATURAL HABITAT BUFFER ZONES

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NOTES:

1. ALL WATERLINE CONSTRUCTION SHALL CONFORM TO THE FORT COLLINS-LOVELAND WATER DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
2. ALL SANITARY SEWER CONSTRUCTION SHALL CONFORM TO THE SOUTH FORT COLLINS SANITATION DISTRICT STANDARD CONSTRUCTION SPECIFICATIONS CURRENT AT THE DATE OF CONSTRUCTION.
3. THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF 10 FEET OF HORIZONTAL SEPARATION AND 18 INCHES OF VERTICAL SEPARATION BETWEEN ALL SEWER AND WATER LINES.
4. MINIMUM DEPTH OF COVER OVER WATER MAINS SHALL BE 5.0 FEET AND MAXIMUM COVER SHALL BE 6.0 FEET.
5. MANHOLE RIM ELEVATIONS ARE TO BE ADJUSTED TO 1/4" BELOW FINISHED GRADE. IF NECESSARY, CONE SECTIONS SHALL BE ROTATED TO PREVENT LIDS BEING LOCATED WITHIN BICYCLE OR VEHICLE WHEEL PATHS.
6. THE SIZE, TYPE AND LOCATION OF ALL KNOWN UNDERGROUND UTILITIES ARE APPROXIMATE WHEN SHOWN ON THESE DRAWINGS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE EXISTENCE OF ALL UNDERGROUND UTILITIES IN THE AREA OF THE WORK. BEFORE COMMENCING NEW CONSTRUCTION, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR ALL UNKNOWN UNDERGROUND UTILITIES.
7. ALL WATER FITTINGS AND VALVES ARE ONLY GRAPHICALLY REPRESENTED AND ARE NOT TO SCALE.
8. ALL WATER FITTINGS TO BE MECHANICALLY RESTRAINED PER FCLWD STANDARDS.
9. DRIVEWAY ACCESS FOR BLOCK 7, LOT 1 AND BLOCK 6, LOT 11 SHALL BE RESTRICTED TO DANCING CATTAIL DRIVE.

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City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED:	City Engineer	Date
CHECKED BY:	Water Utility	Date
CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
CHECKED BY:	Traffic Engineer	Date
CHECKED BY:	Environmental Planner	Date

Revisions:

No.	Date:
	REVIEW SET NOT FOR CONSTRUCTION 12/24/19

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PROJECT: 1204-003 | DATE: 12/24/19 | SCALE: 1"=100' | REVIEWED BY: D. Weber | DESIGNED BY: D. Weber | DRAWN BY: M. Rudebel

RENNAT SUBDIVISION

OVERALL UTILITY PLAN

Sheet OU1

5 of 28

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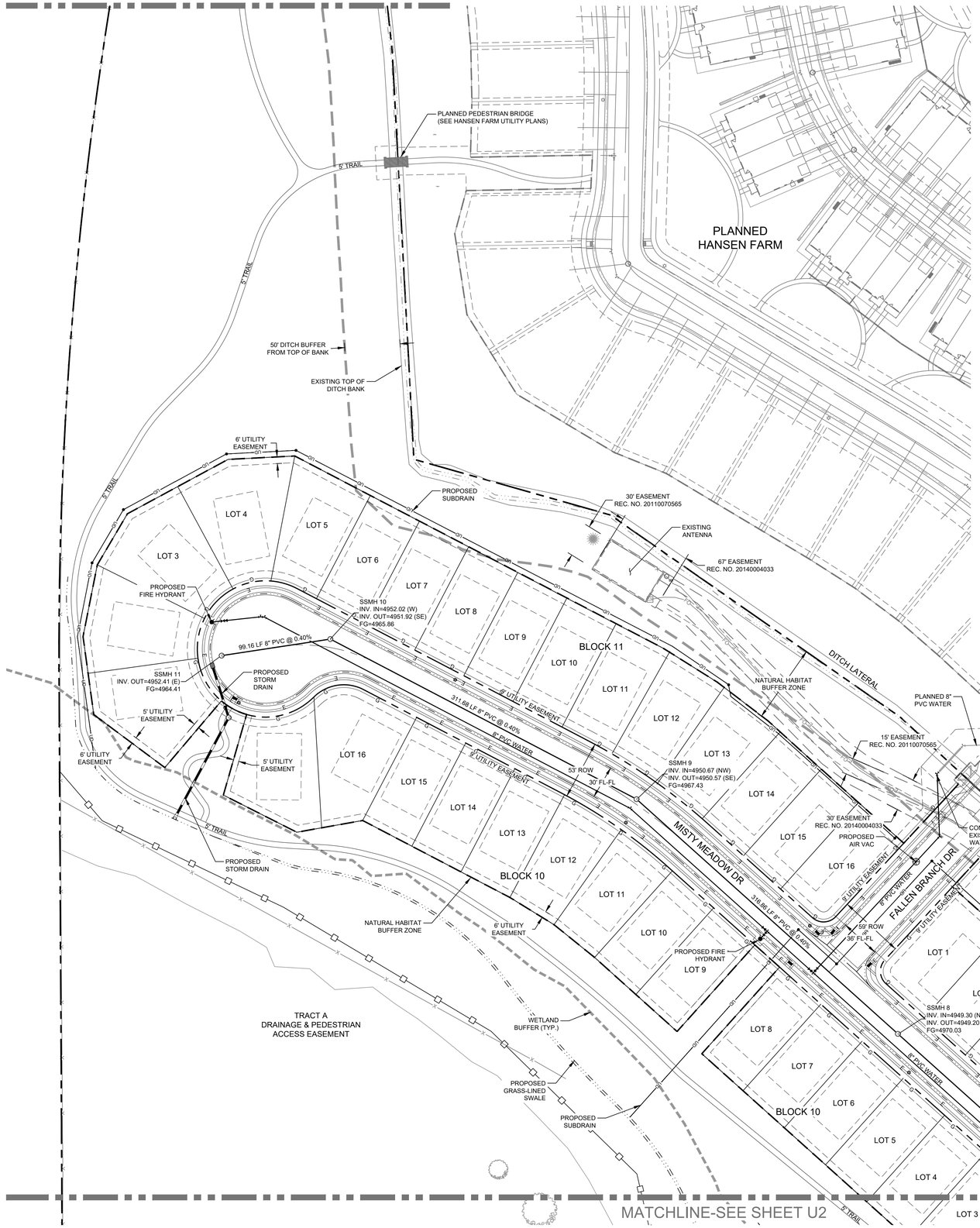
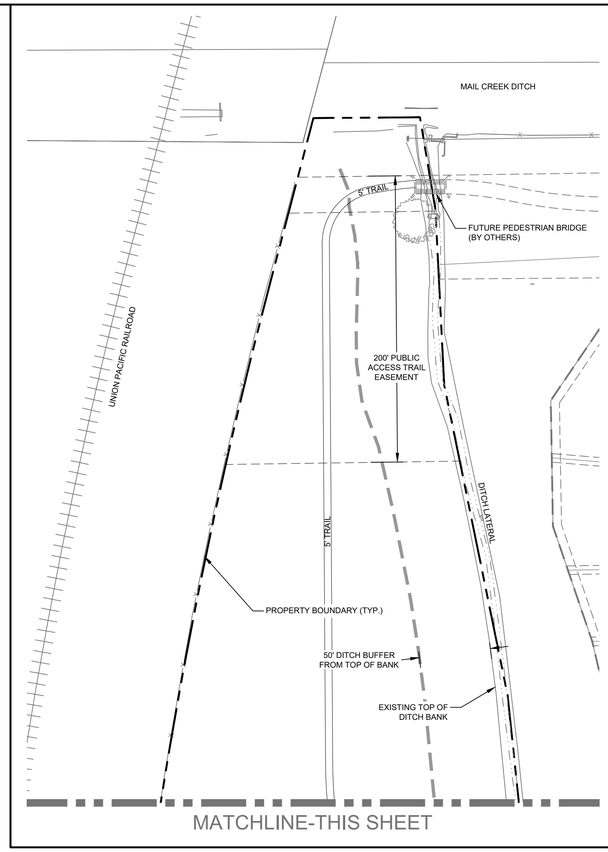
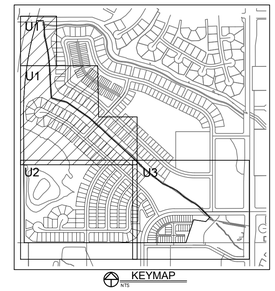




NORTH

50 0 50 100 150 Feet

(IN FEET)
1 inch = 50 ft.



KEYMAP

LEGEND:

PROPOSED WATER MAIN	W
EXISTING WATER MAIN	W
PROPOSED SANITARY SEWER	S
EXISTING SANITARY SEWER	SS
PROPOSED SEWER SERVICE	S
PROPOSED RESIDENTIAL WATER SERVICE	W
PROPOSED UNDERDRAIN	UD
PROPOSED SUBDRAIN	SD
PROPOSED FIRE HYDRANT	
EXISTING FIRE HYDRANT	
PROPOSED STORMLINE	
PROPOSED STORMLINE	
EXISTING STORM SEWER	ST
PROPOSED ELECTRIC	E
EXISTING TELEPHONE	T
EXISTING GAS	G
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOTLINE	
EASEMENT LINE	
RIGHT OF WAY	
LIMITS OF DEVELOPMENT	LOD

NATURAL HABITAT BUFFER ZONES

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811

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CHECKED BY: _____ Traffic Engineer _____ Date

CHECKED BY: _____ Environmental Planner _____ Date

No. Revisions: Date:
REVIEW SET
NOT FOR CONSTRUCTION
12/24/19

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NORTHERN ENGINEERING
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 2204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rutledel
DATE: 12/24/19
SCALE: 1" = 50'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

UTILITY PLAN

Sheet
U1
6 of 28

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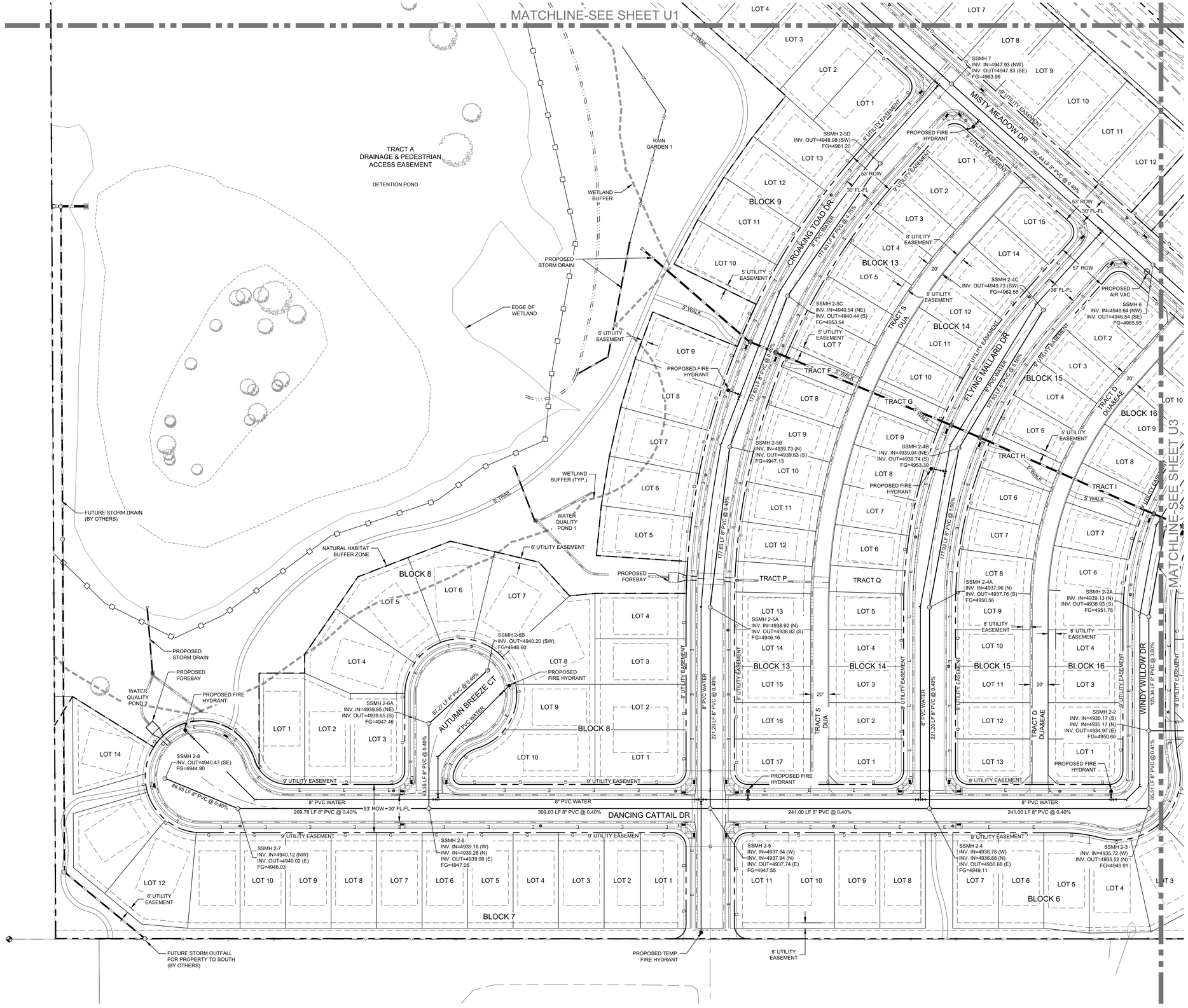
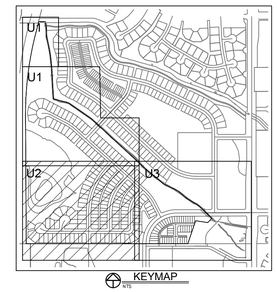


NORTH

50 0 50 100 150 Feet

(IN FEET)
1 inch = 50 ft.



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- EXISTING SANITARY SEWER
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- PROPOSED STORMLINE
- PROPOSED STORMLINE
- EXISTING STORM SEWER
- PROPOSED ELECTRIC
- EXISTING TELEPHONE
- EXISTING GAS
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- EASEMENT LINE
- RIGHT OF WAY
- LIMITS OF DEVELOPMENT

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GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1"=50'
REVIEWED BY: D. Weber
PROJECT: 12.04-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudesill

RENNAT SUBDIVISION

UTILITY PLAN

Sheet
U2
7 of 28

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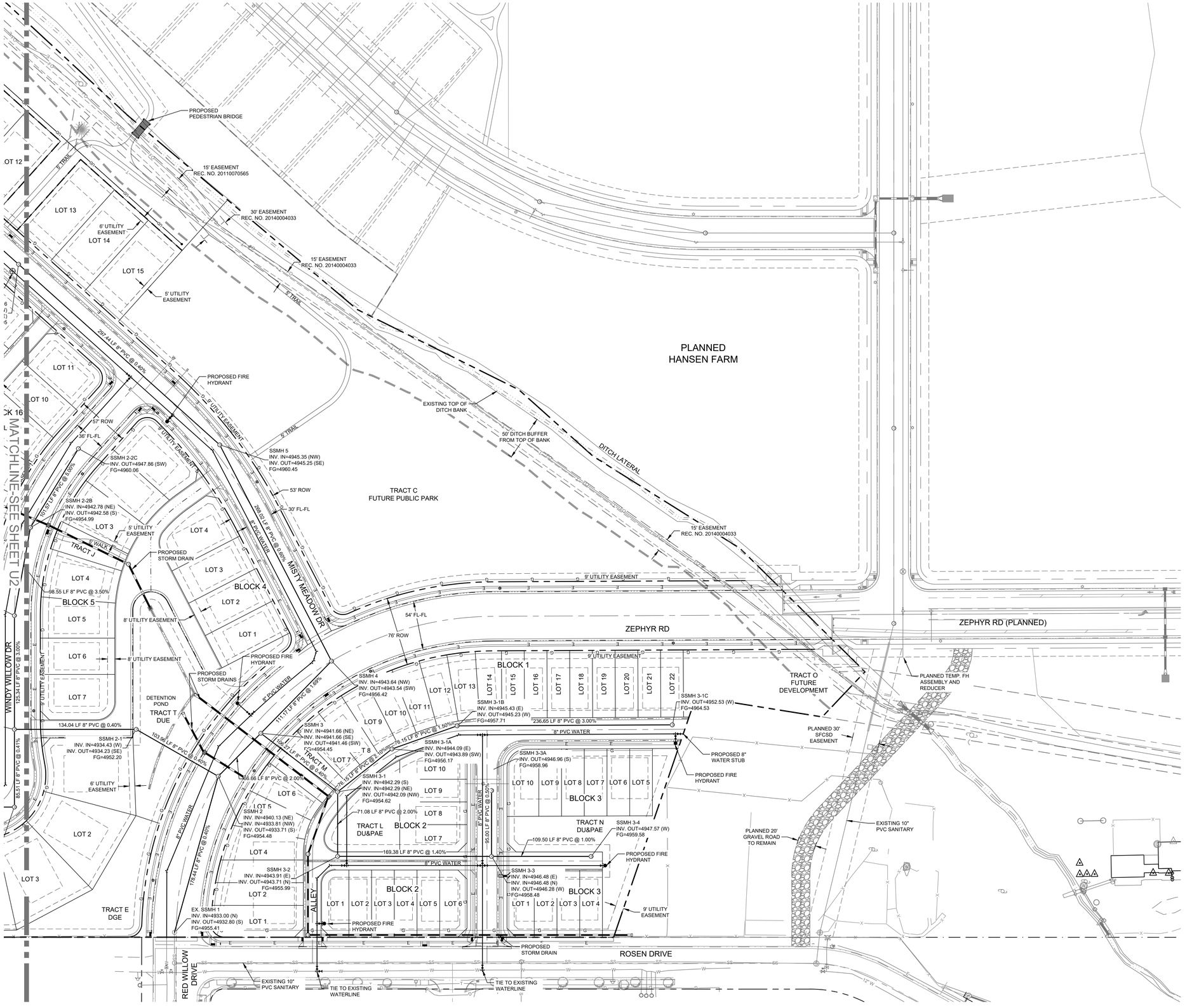
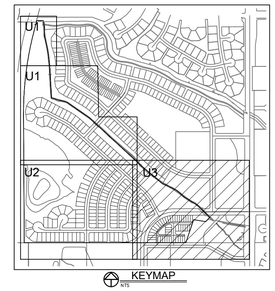


NORTH

50 0 50 100 150 Feet

(IN FEET)
1 inch = 50 ft.



KEYMAP

LEGEND:

PROPOSED WATER MAIN	W
EXISTING WATER MAIN	W
PROPOSED SANITARY SEWER	S
EXISTING SANITARY SEWER	SS
PROPOSED SEWER SERVICE	S
PROPOSED RESIDENTIAL WATER SERVICE	W
PROPOSED UNDERDRAIN	UD
PROPOSED SUBDRAIN	SD
PROPOSED FIRE HYDRANT	
EXISTING FIRE HYDRANT	
PROPOSED STORMLINE	
PROPOSED STORMLINE	
EXISTING STORM SEWER	ST
PROPOSED ELECTRIC	E
EXISTING TELEPHONE	T
EXISTING GAS	G
PROPOSED CURB & GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOTLINE	
EASEMENT LINE	
RIGHT OF WAY	
LIMITS OF DEVELOPMENT	LOD

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FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1" = 50'
REVIEWED BY: D. Weber
PROJECT: 2204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudebeil

RENNAT SUBDIVISION

UTILITY PLAN

Sheet
U3
8 of 28

DRAWING FILENAME: P:\2204-003\Drawings\Utility\2204-003_UTP.dwg LAYOUT NAME: U3 DATE: Dec 24, 2019 - 3:34pm CAD OPERATOR: rmoss
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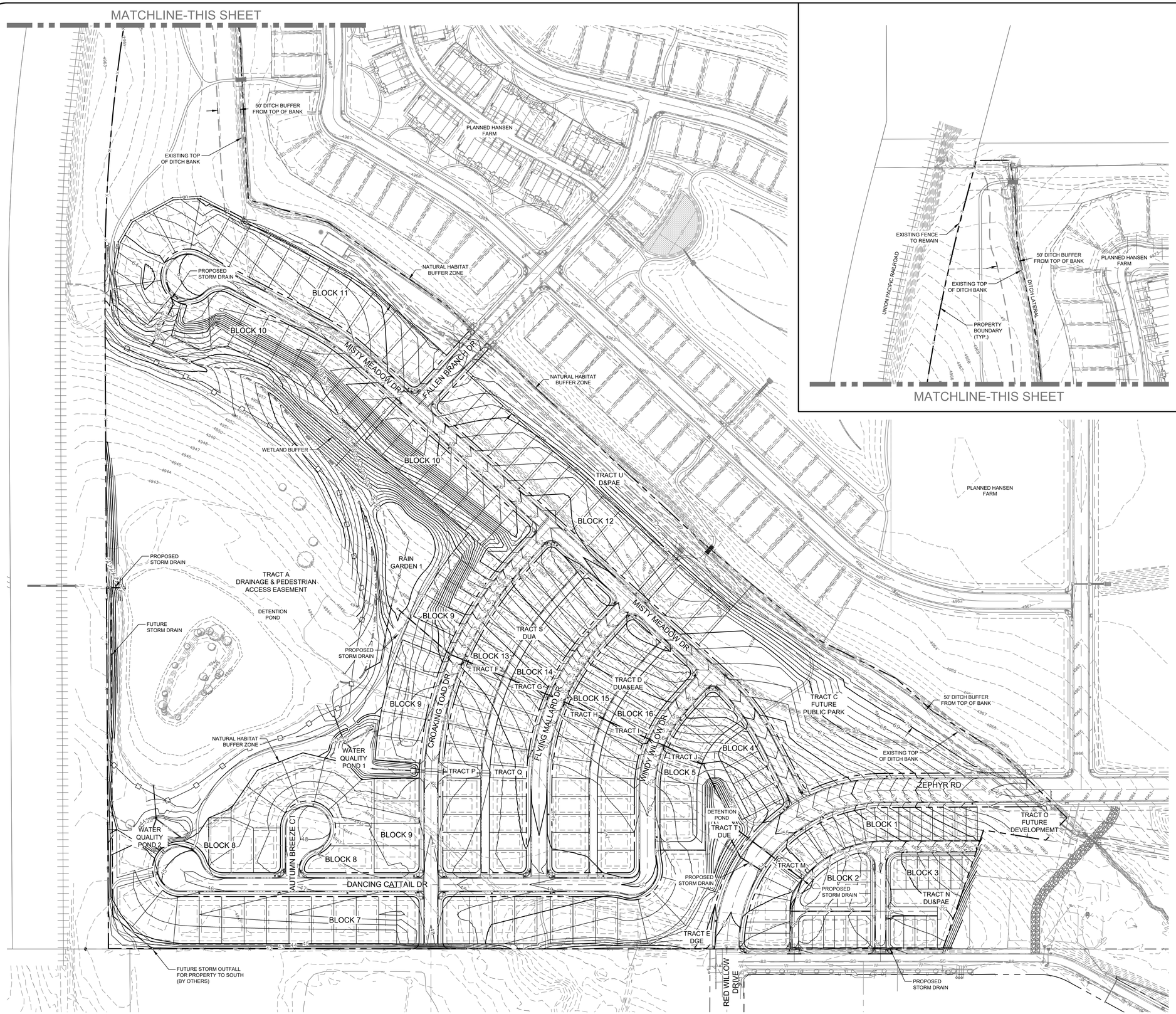

NORTH

100 0 100 200 300 Feet

(IN FEET)
1 inch = 100 ft.



LEGEND:

- EXISTING STORM SEWER — ST
- PROPOSED STORM SEWER
- PROPOSED STORM INLET
- PROPOSED CONTOUR — 93
- EXISTING CONTOUR — 5013
- PROPOSED SWALE
- PROPOSED CURB AND GUTTER
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- PROPOSED EASEMENT
- NATURAL HABITAT BUFFER ZONE (NHBZ)
- LIMITS OF DEVELOPMENT — LOD
- PROPOSED SPOT ELEVATION — 36.25
- EXISTING SPOT ELEVATION — (36.25)
- PROPOSED SLOPES — 2.0%

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FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY, 800 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=100'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

OVERALL GRADING PLAN

Sheet
OG1
9 of 28

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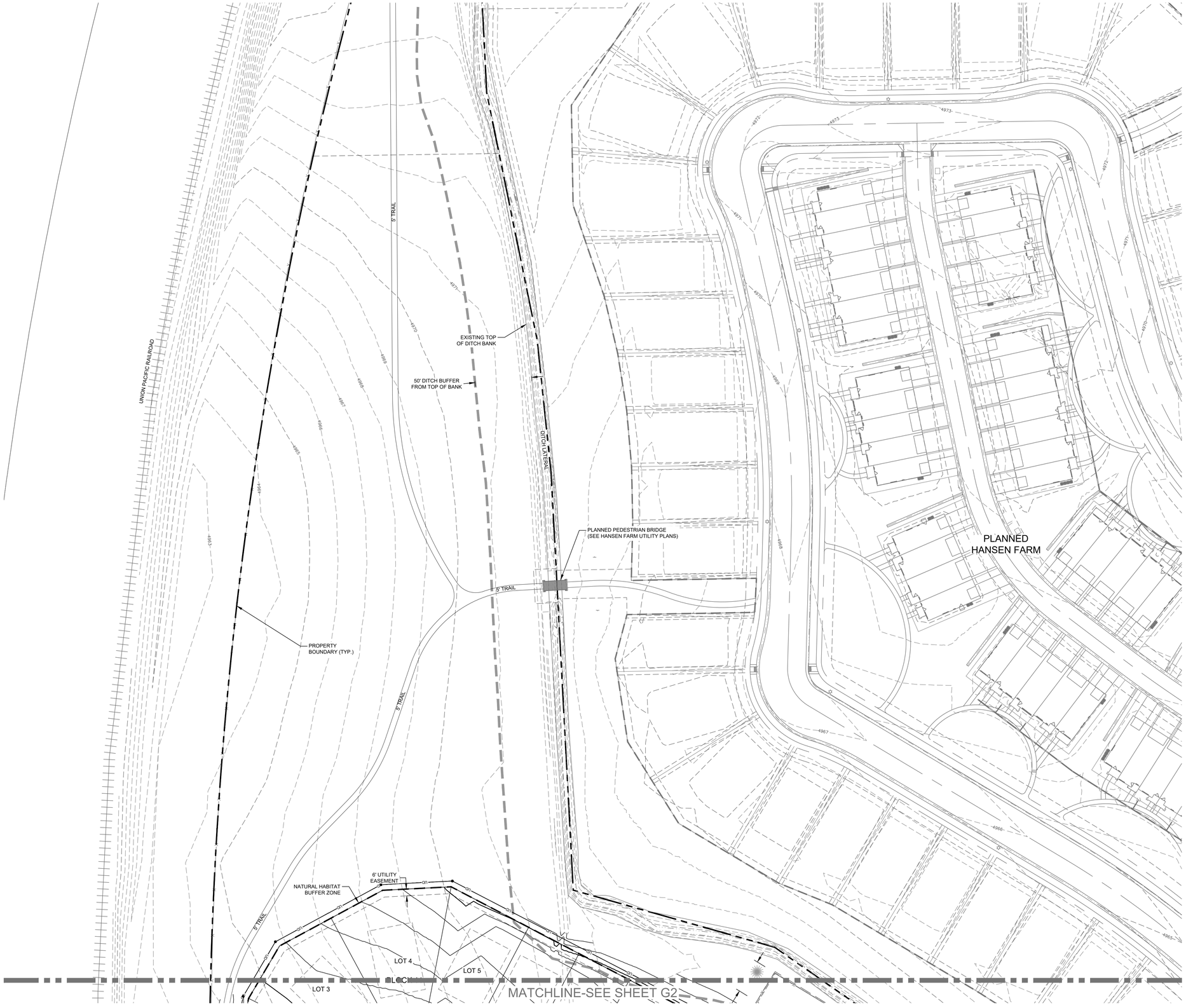

NORTH

40 0 40 80 120 Feet

(IN FEET)
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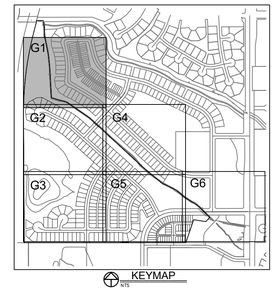

KEYMAP

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PROPOSED LOT LINE	
EXISTING RIGHT OF WAY	
PROPOSED RIGHT OF WAY	
PROPOSED EASEMENT	
NATURAL HABITAT BUFFER ZONE (NHBZ)	
LIMITS OF DEVELOPMENT	LOD
PROPOSED SPOT ELEVATION	38.25
EXISTING SPOT ELEVATION	(36.25)
PROPOSED SLOPES	2.0%

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DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

GRADING PLAN

Sheet
G1
10 of 28

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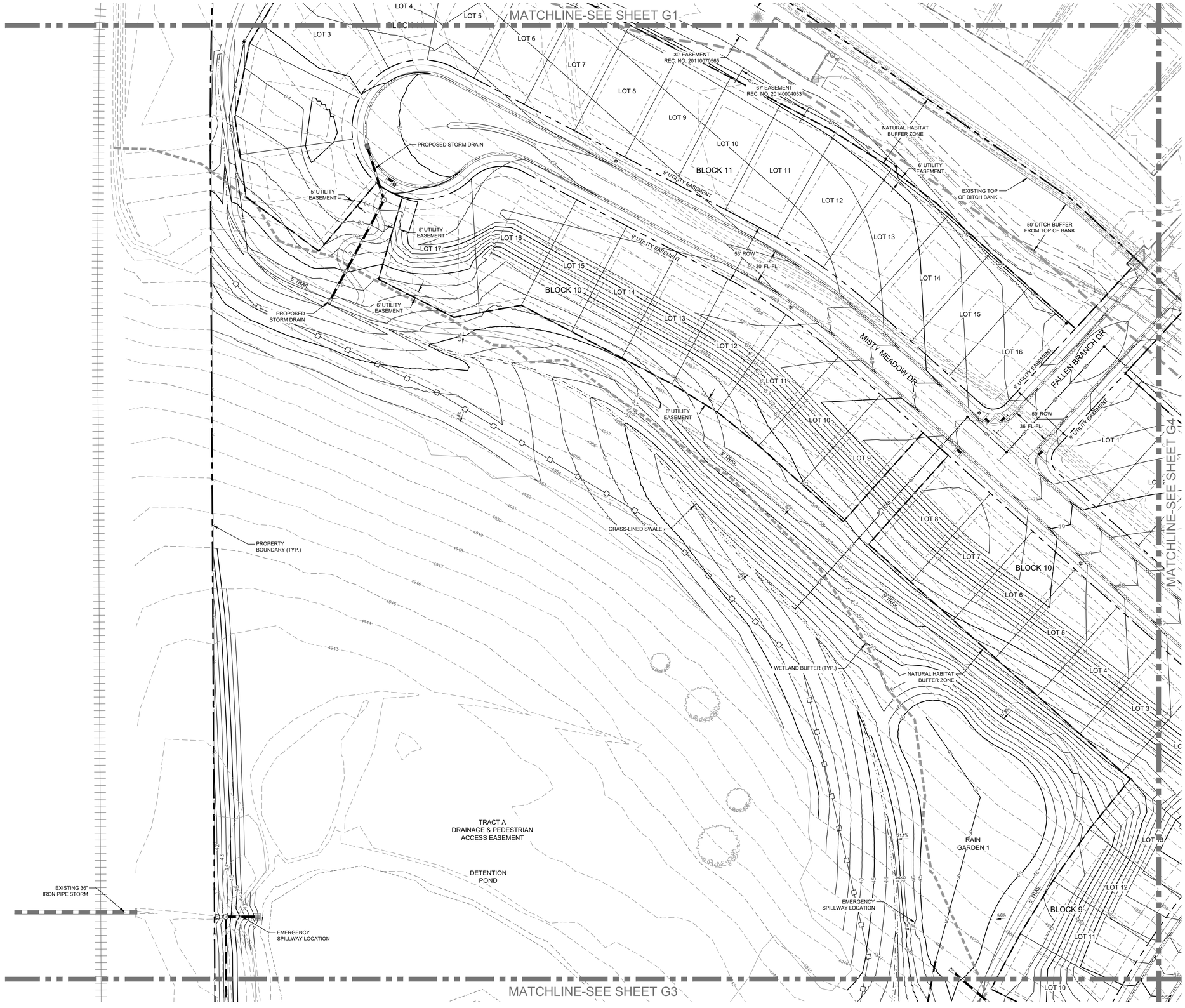

NORTH

40 0 40 80 120 Feet

(IN FEET)
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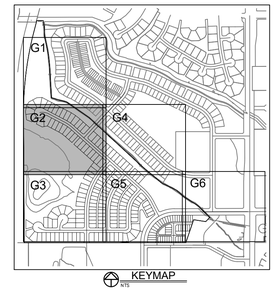

KEYMAP

LEGEND:

EXISTING STORM SEWER	ST
PROPOSED STORM SEWER	
PROPOSED STORM INLET	
PROPOSED CONTOUR	93
EXISTING CONTOUR	5013
PROPOSED SWALE	
PROPOSED CURB AND GUTTER	
PROPERTY BOUNDARY	
PROPOSED LOT LINE	
EXISTING RIGHT OF WAY	
PROPOSED RIGHT OF WAY	
PROPOSED EASEMENT	
NATURAL HABITAT BUFFER ZONE (NHBZ)	
LIMITS OF DEVELOPMENT	LOD
PROPOSED SPOT ELEVATION	36.25
EXISTING SPOT ELEVATION	(36.25)
PROPOSED SLOPES	2.0%

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CHECKED BY:	Water Utility	Date
CHECKED BY:	Stormwater Utility	Date
CHECKED BY:	Parks & Recreation	Date
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CHECKED BY:	Environmental Planner	Date

No. Revisions: Date:
REVIEW SET NOT FOR CONSTRUCTION 12/24/19

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FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

GRADING PLAN

Sheet G2
11 of 28

DRAWING FILENAME: P:\1204-003\Engr\Civil\1204-003_GRAD.dwg | LAYOUT NAME: G2 | DATE: Thu, 23. Jan - 3:34pm | USR: JEFFMARTIN - mmm
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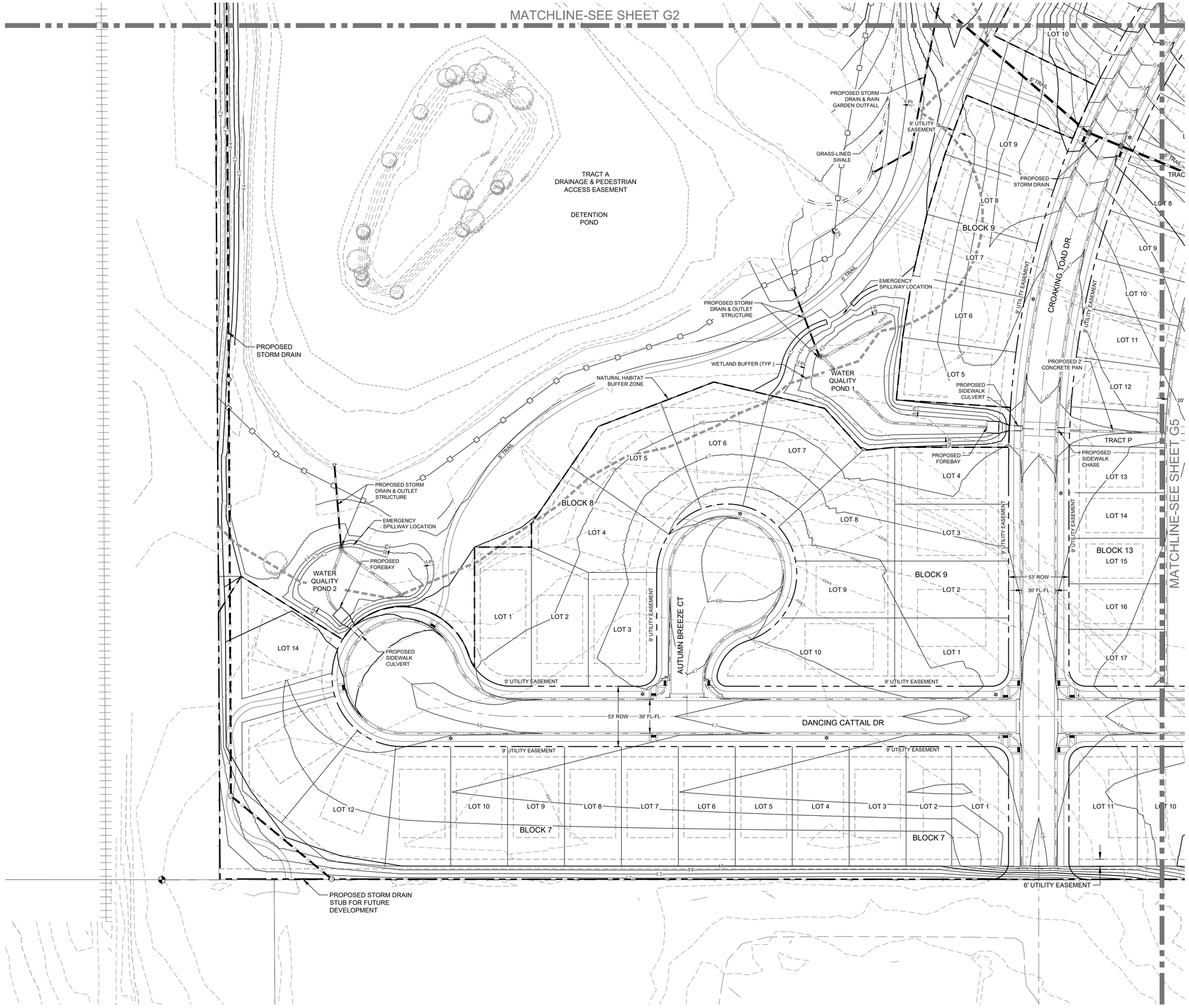
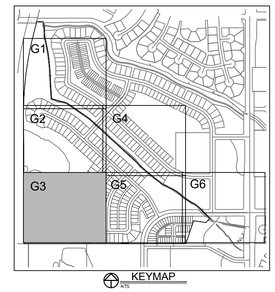


NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



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SCALE: 1"=40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

GRADING PLAN

Sheet
G3
12 of 28

DRAWING FILENAME: P:\1204-003\Engineering\1204-003_GRAD.dwg LAYOUT NAME: G3 DATE: Dec 23, 2019 - 2:34pm CAD OPERATOR: rmoon
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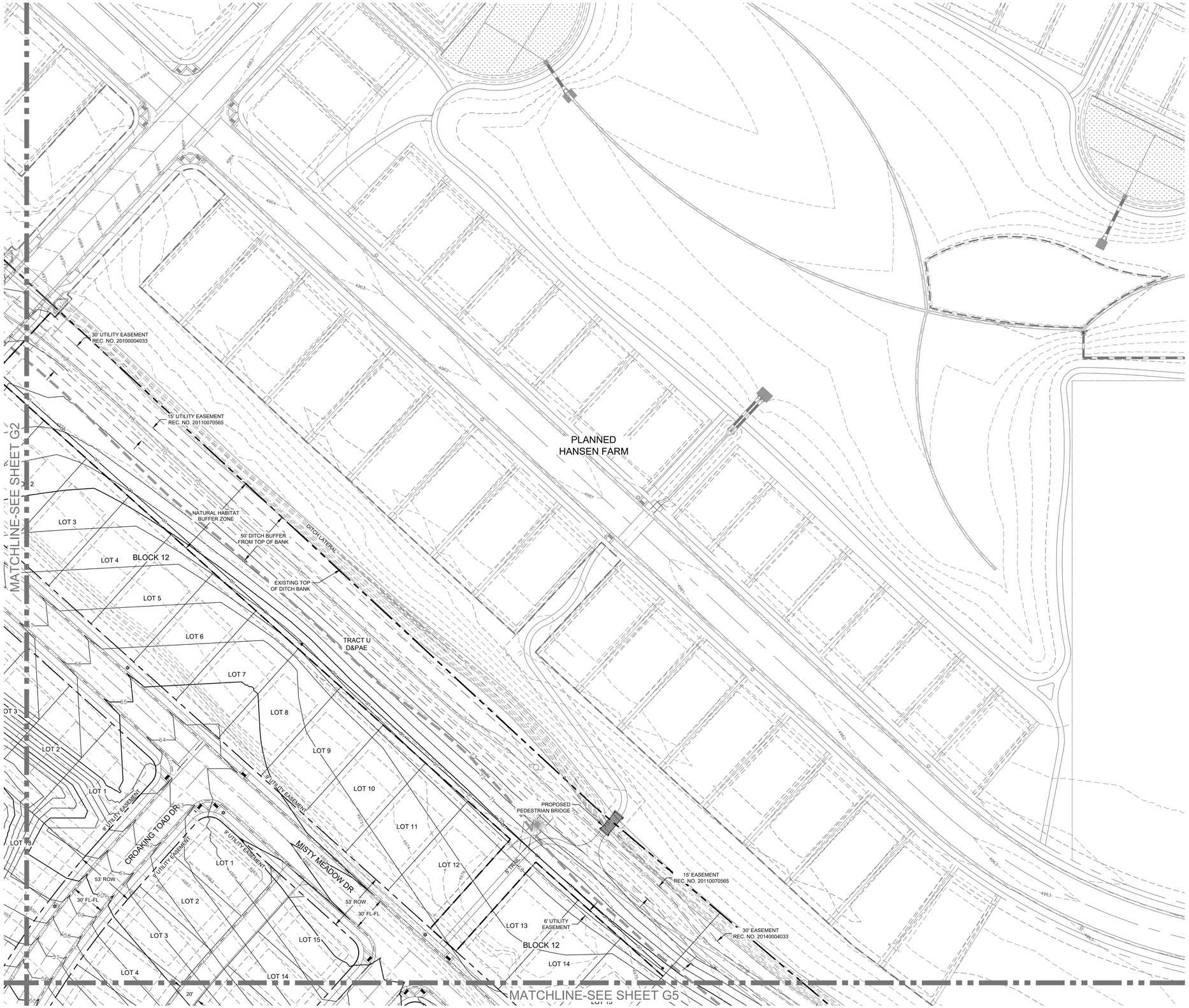

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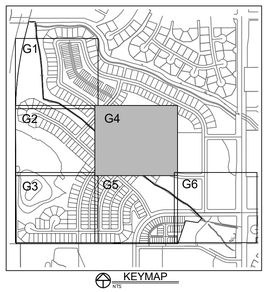

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REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

GRADING PLAN

Sheet
G4
13 of 28

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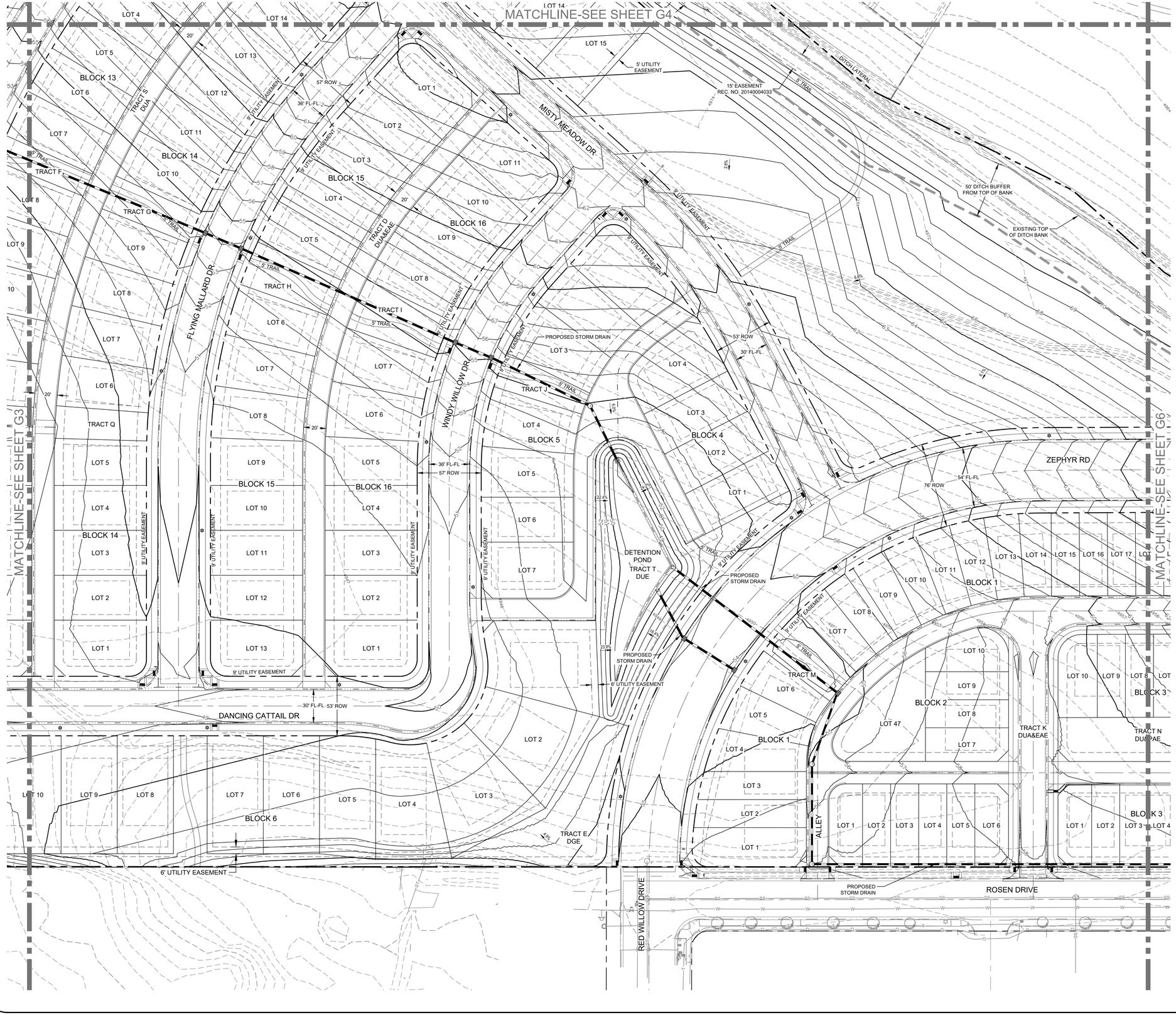

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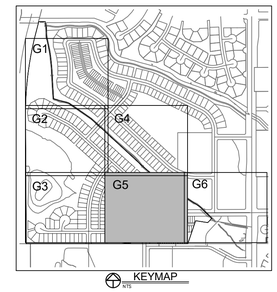

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PROJECT: 1204-003
DATE: 12/24/19
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

GRADING PLAN

Sheet G5
14 of 28

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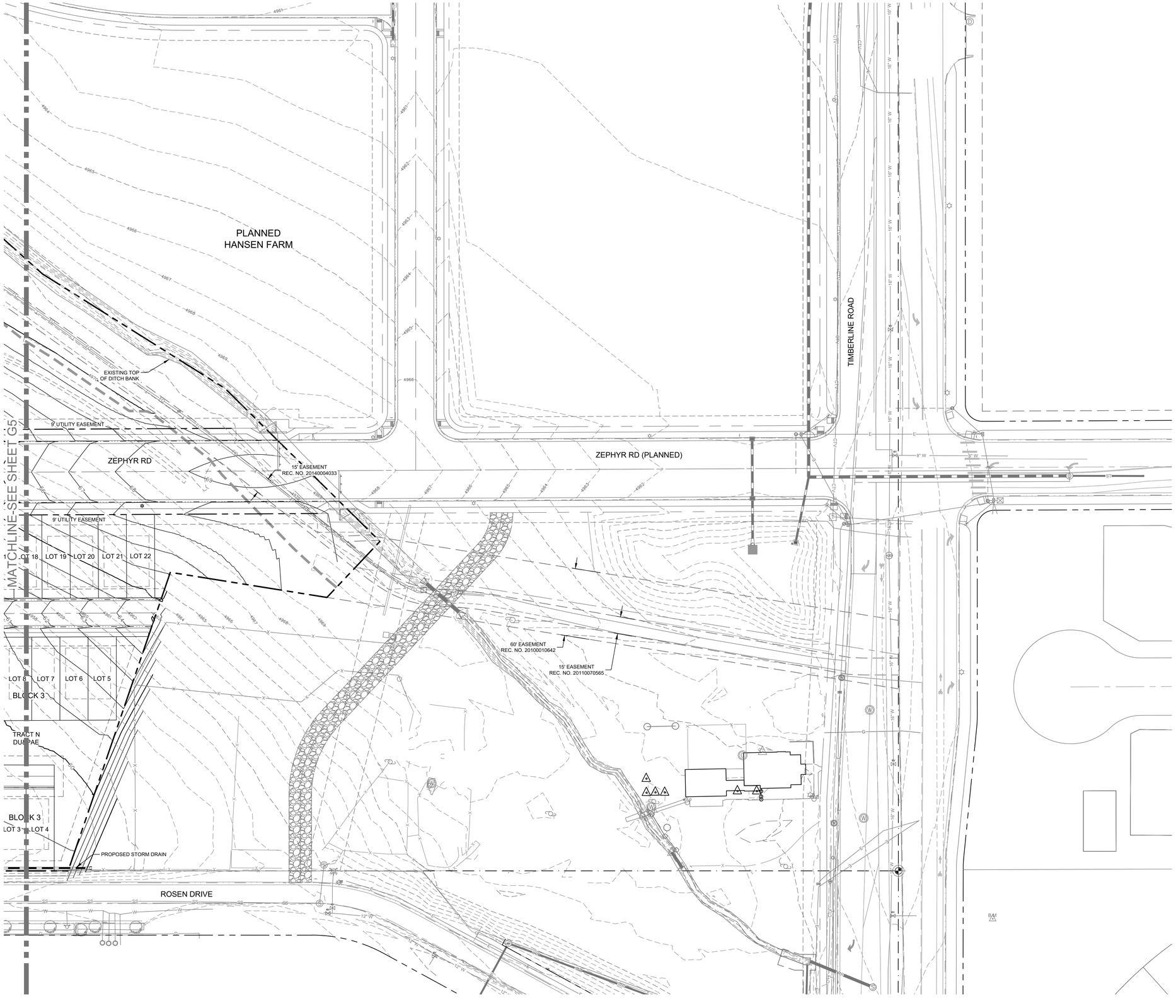

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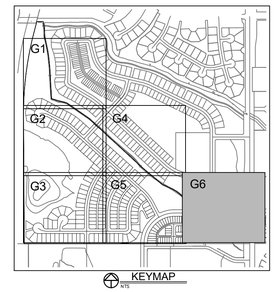

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Sheet
G6
15 of 28

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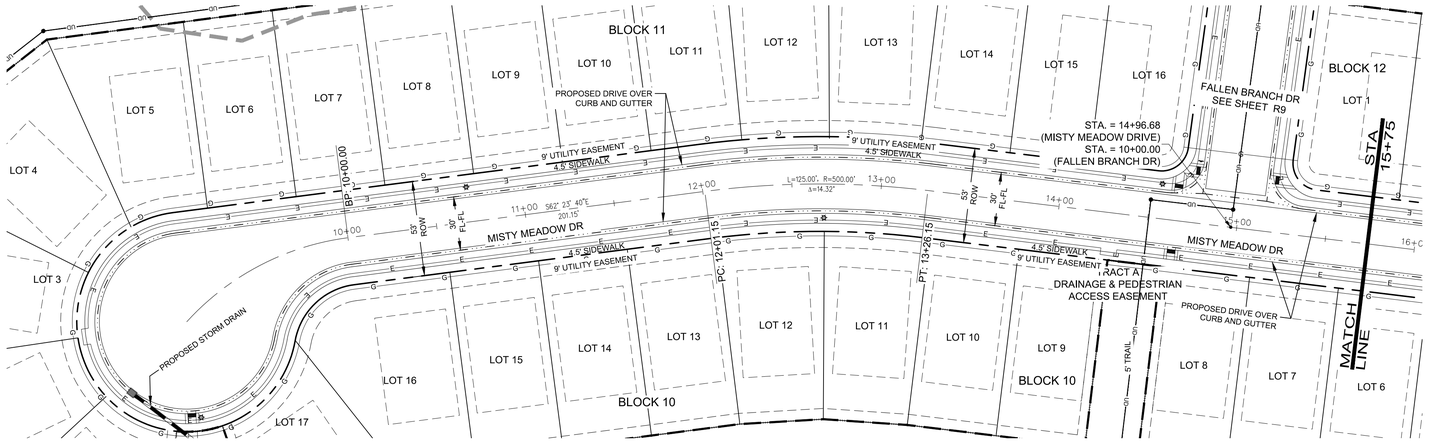

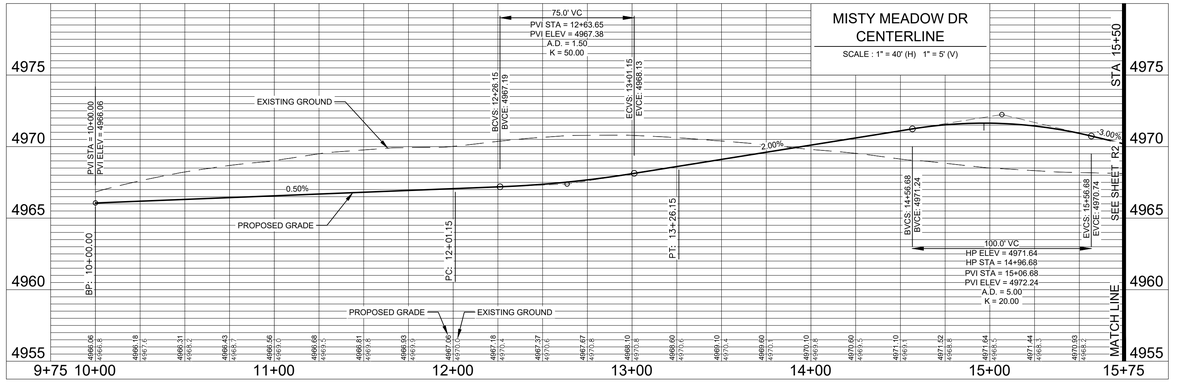

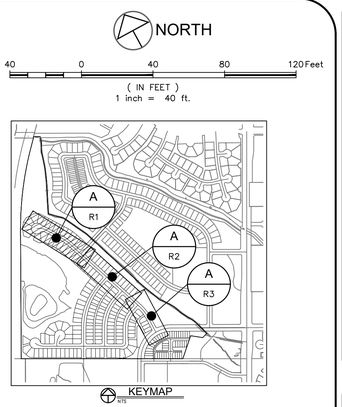

LEGEND:

- PROPOSED CURB & GUTTER
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- EXISTING RIGHT-OF-WAY
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- EASEMENT LINE
- SAWCUT LINE
- PROPOSED STORM SEWER
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APPROVED: _____ City Engineer _____ Date

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CHECKED BY: _____ Stormwater Utility _____ Date

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CHECKED BY: _____ Environmental Planner _____ Date

No. Revisions: Date:
REVIEW SET
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12/24/19

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NORTHERN ENGINEERING
FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY: 800 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 12045-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

MISTY MEADOW DR PLAN & PROFILE

Sheet
R1
16 of 28

DRAWING FILENAME: P:\12045-003\Eng\Civil\12045-003_STP * dwg LAYOUT NAME: R1 DATE: Dec 23, 2019 - 2:14pm CAD OPERATOR: rmoon
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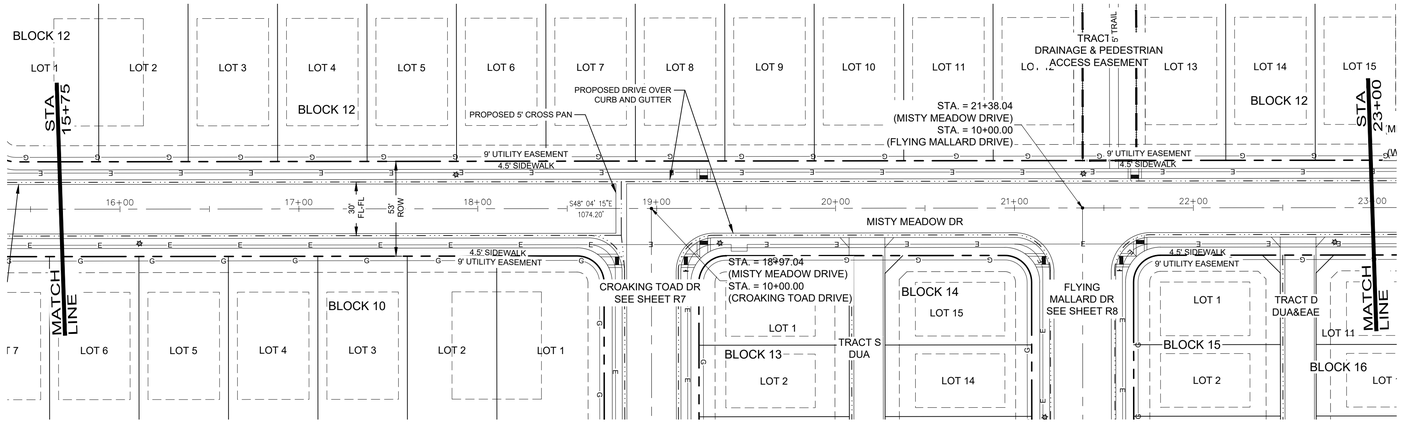

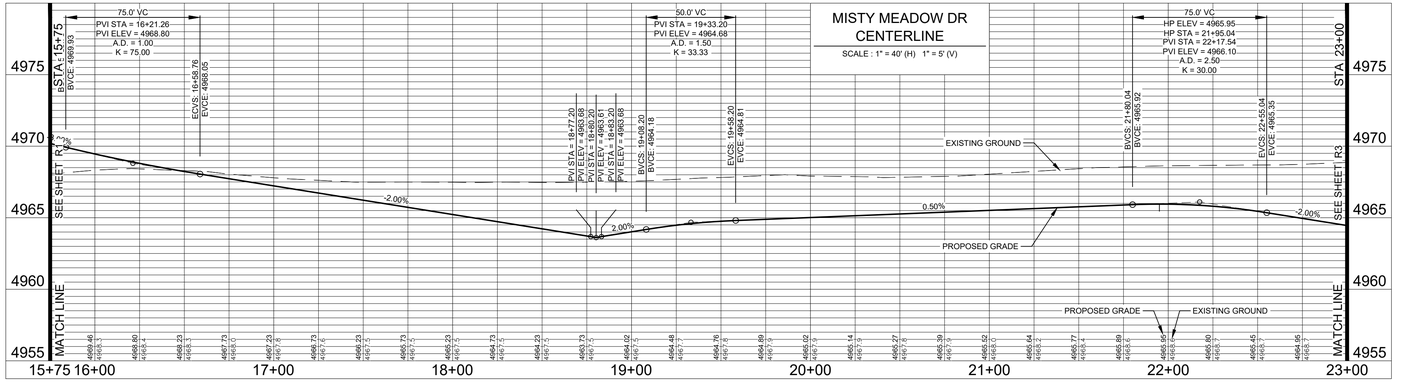

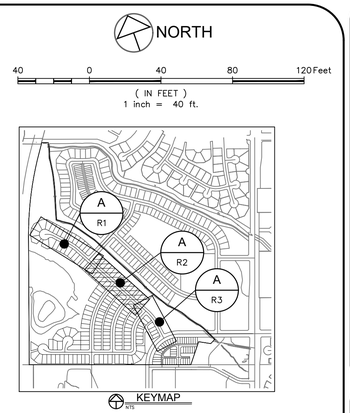

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northernengineering.com

PROJECT: 12045.003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

MISTY MEADOW DR
PLAN & PROFILE

Sheet
R2
17 of 28

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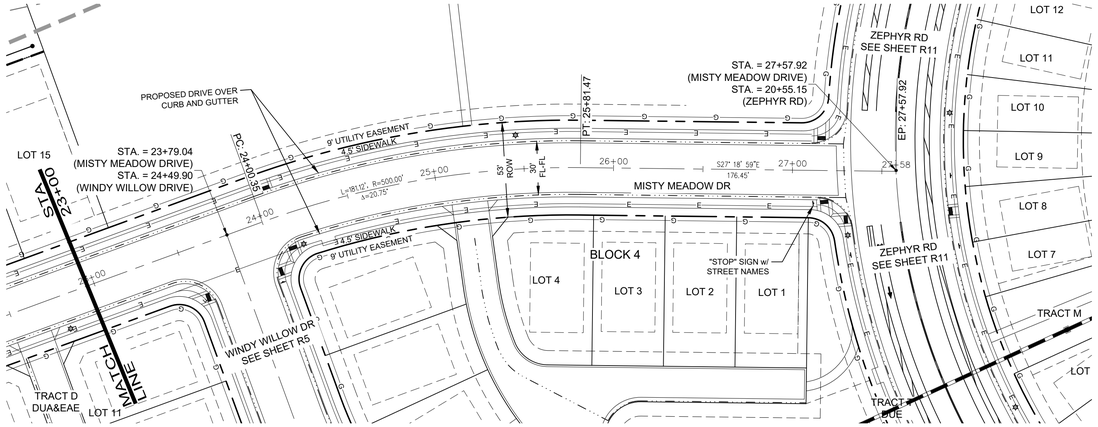

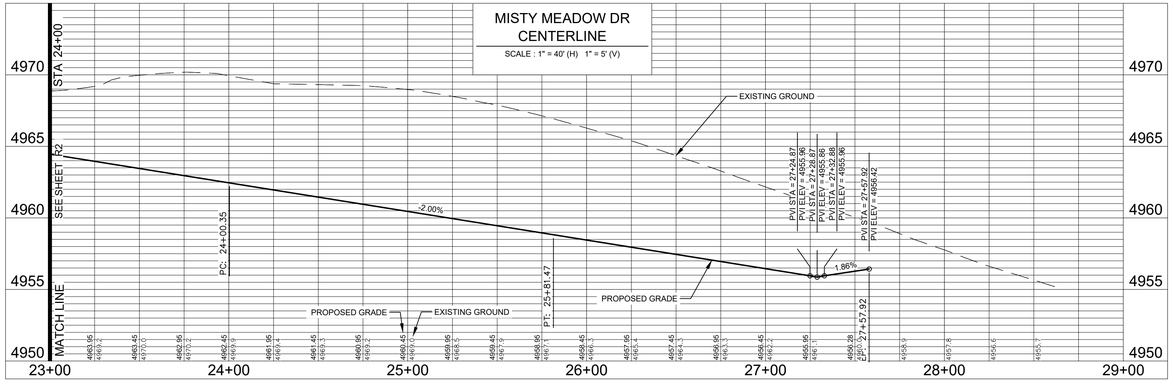

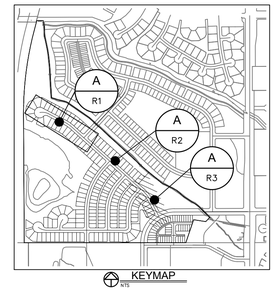

NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.

LEGEND:

- PROPOSED CURB & GUTTER
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
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PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

MISTY MEADOW DR
PLAN & PROFILE

Sheet
R3
18 of 28

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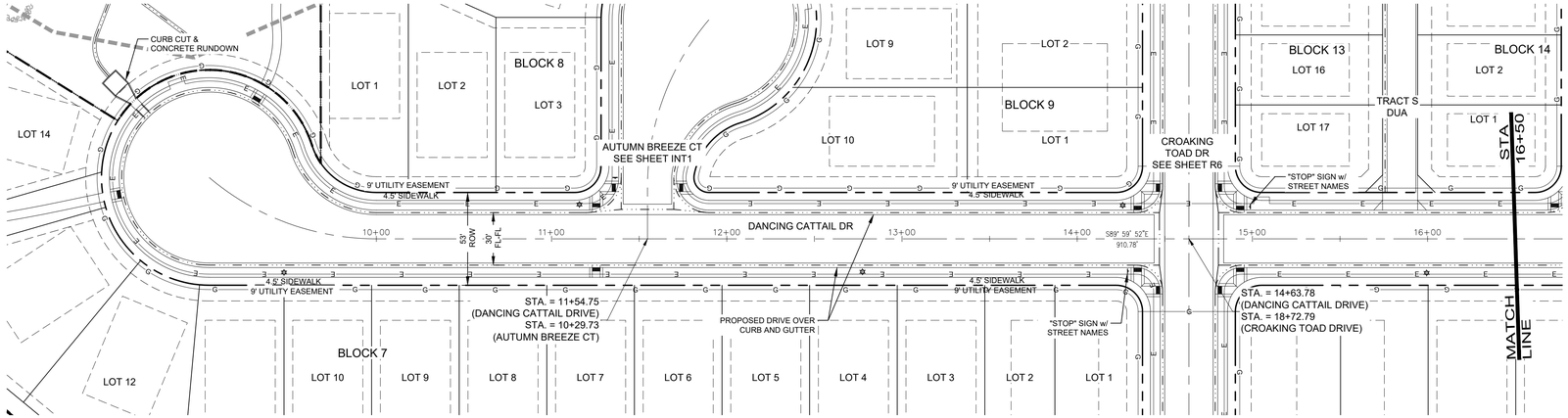

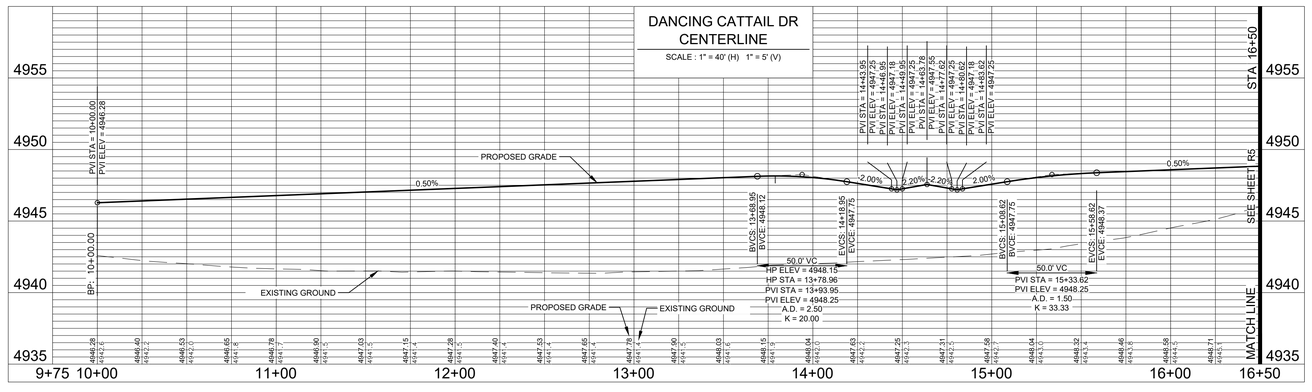

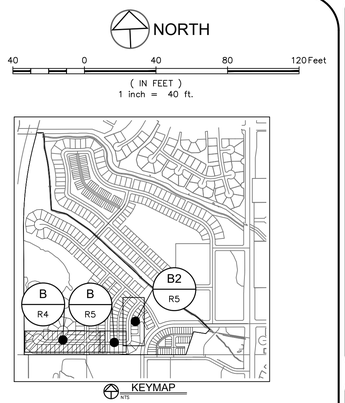

LEGEND:

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PROJECT: 12045-003
DATE: 12/24/19
DESIGNED BY: D. Weber
SCALE: 1"=40'
DRAWN BY: M. Ruebel
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

DANCING CATTAIL DR PLAN & PROFILE

Sheet
R4
19 of 28

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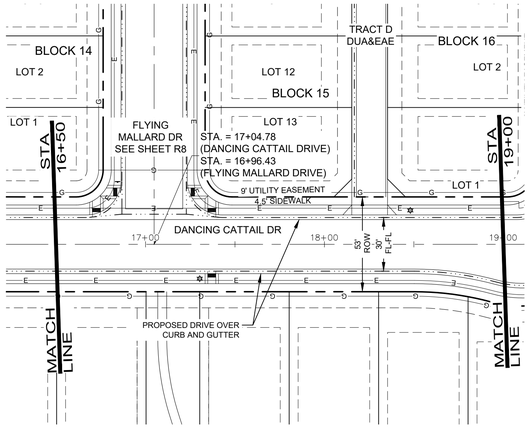

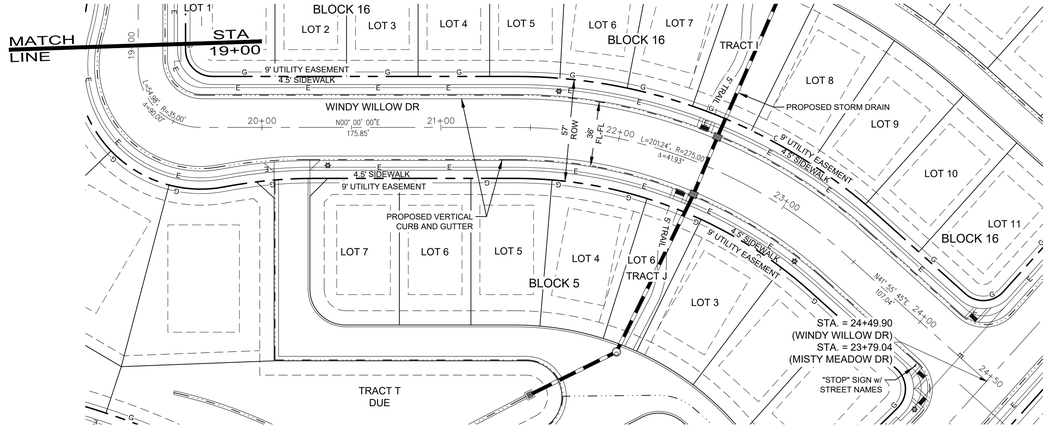

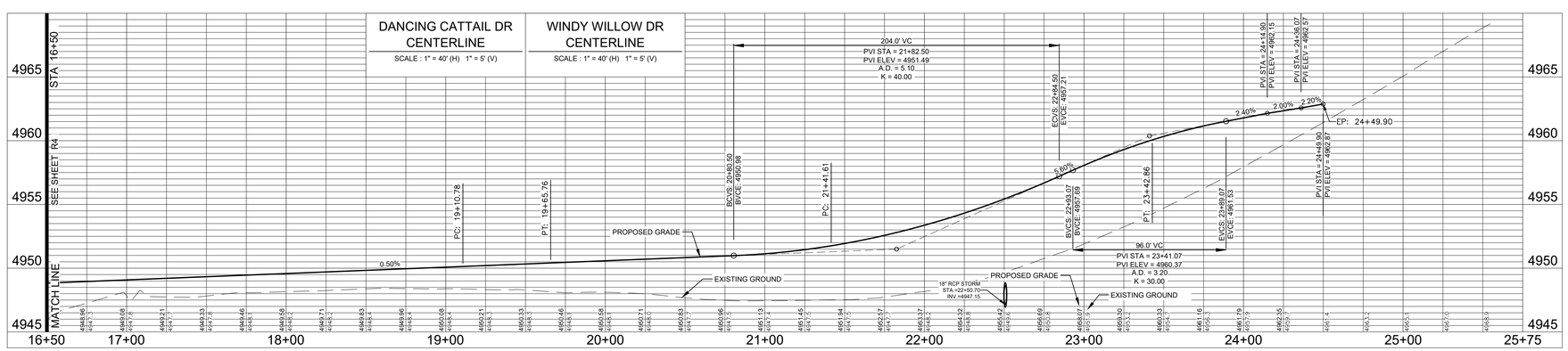

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40 0 40 80 120 Feet

(IN FEET)
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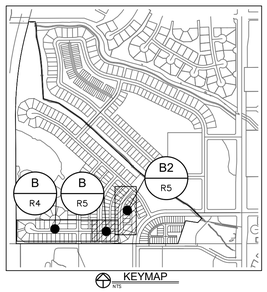

KEYMAP

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Revisions:
No.

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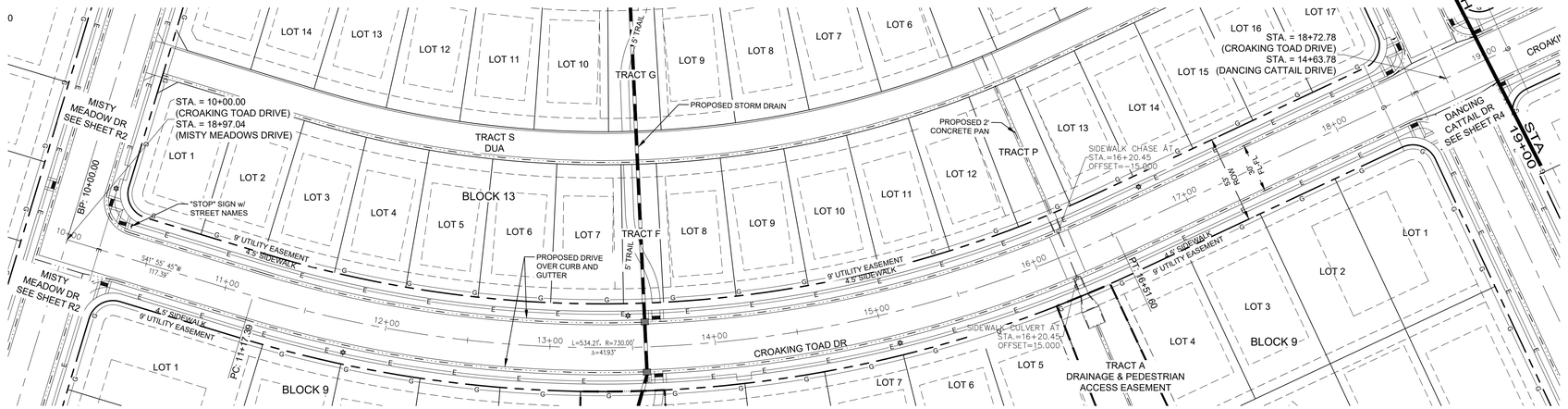
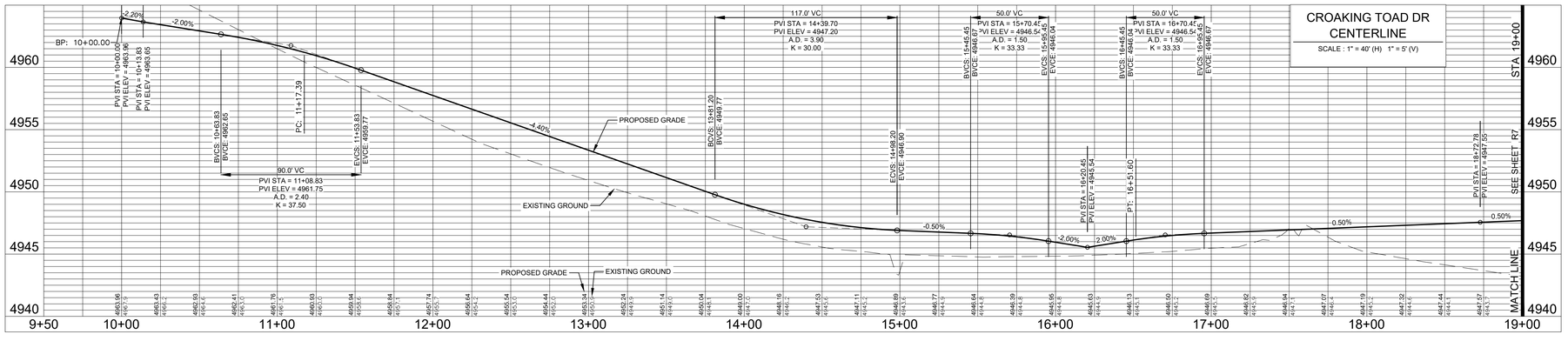
DATE: 12/24/19
SCALE: 1" = 40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudebel

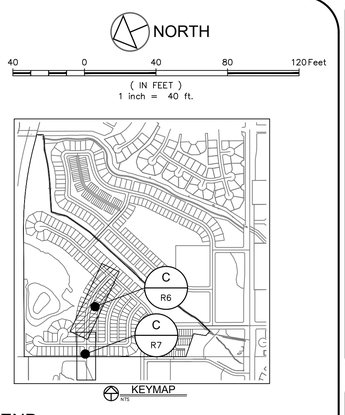
RENNAT SUBDIVISION

DANCING CATTAIL DR & WINDY WILLOW DR PLAN & PROFILE

Sheet
R5
20 of 28







LEGEND:

- PROPOSED CURB & GUTTER
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
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- PROPERTY BOUNDARY
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No. Revisions: Date:
1 REVIEW SET 12/24/19
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FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY: 800 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

CROAKING TOAD DR PLAN & PROFILE

Sheet R6

DRAWING FILENAME: P:\1204-003\Proj\Civ\1204-003_SHT_C.dwg LAYOUT NAME: R6 DATE: Dec 23, 2019 - 2:13pm CAD OPERATOR: rmason
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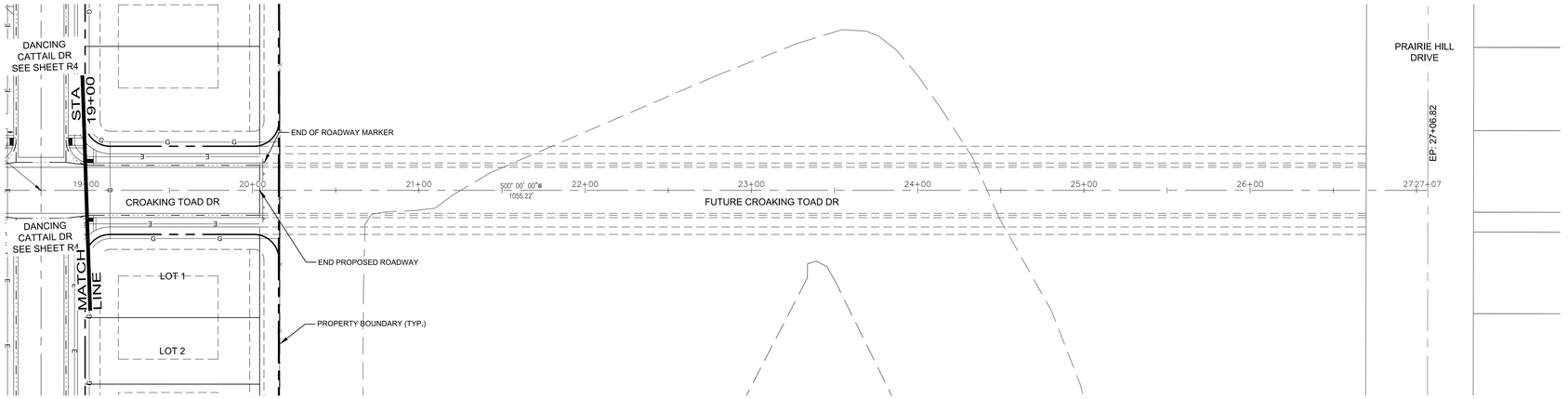

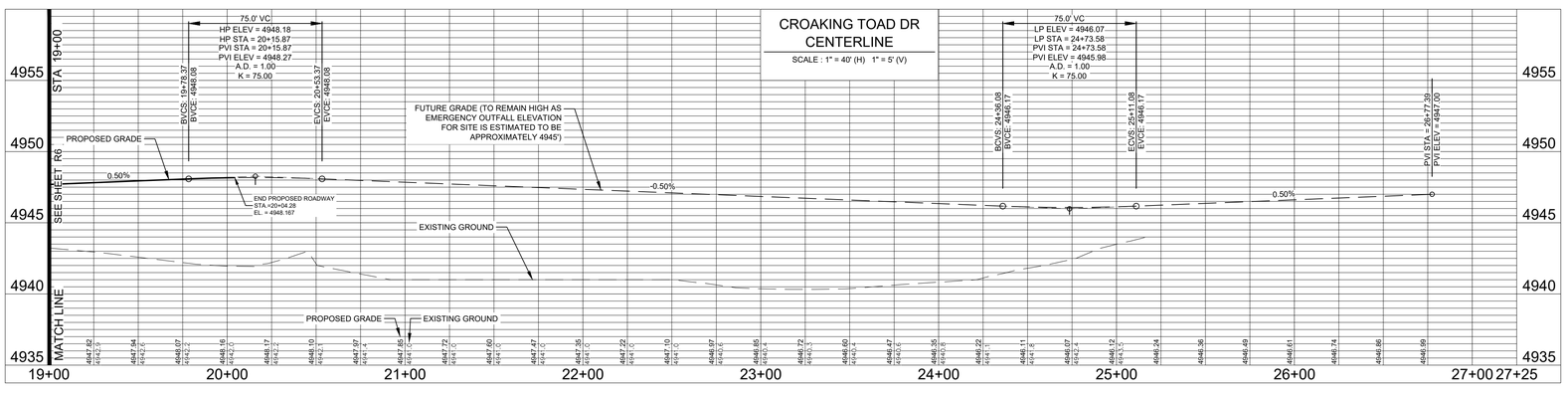

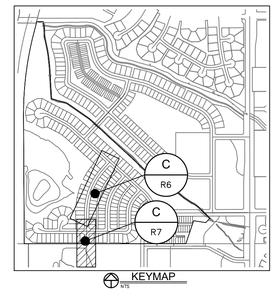

NORTH

40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.

LEGEND:

- PROPOSED CURB & GUTTER
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- PROPOSED RIGHT-OF-WAY
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northernengineering.com

DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel

RENNAT SUBDIVISION

CROAKING TOAD DR PLAN & PROFILE

Sheet
R7
22 of 28

DRAWING FILENAME: P:\1204-003\Engineering\1204-003_ENT_Cover Layout Insert R7 DATE: Dec 23, 2019 - 2:13pm CAD APPROVED: mmoon
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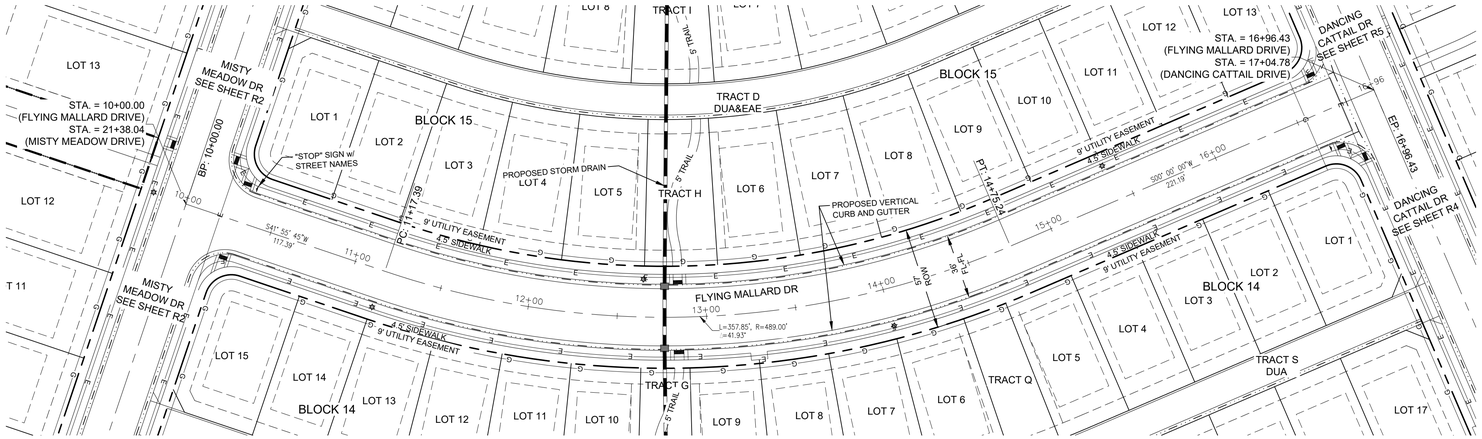

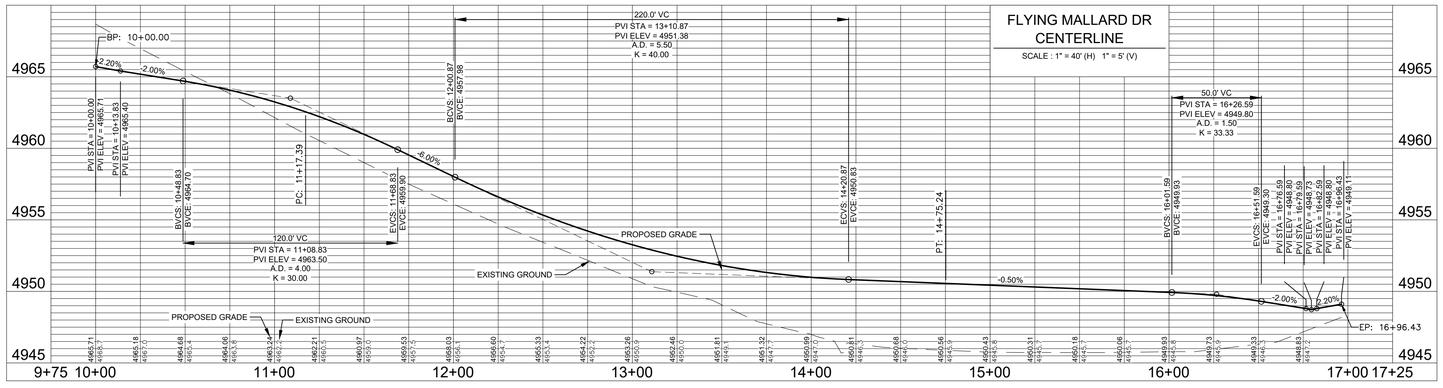

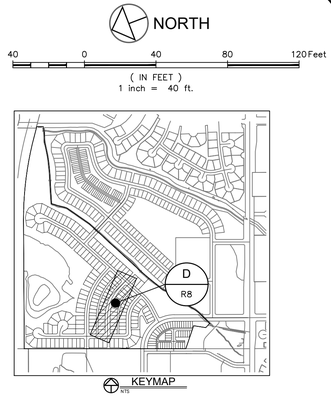

LEGEND:

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PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

FLYING MALLARD DR PLAN & PROFILE

Sheet
R8
23 of 28

DRAWING FILENAME: P:\1204-003\Eng\Civil\1204-003_STP 2.dwg LAYOUT NAME: R8 DATE: Dec 23, 2019 - 2:15pm CAD OPERATOR: rmoon
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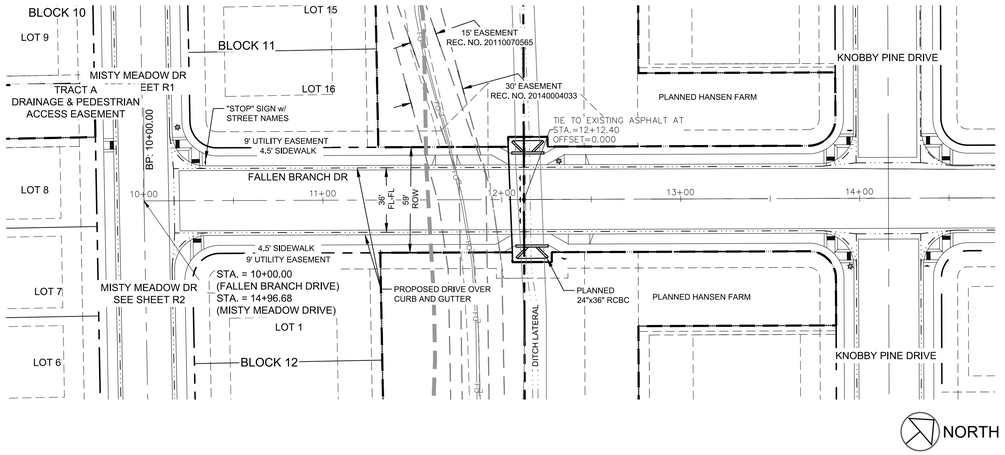
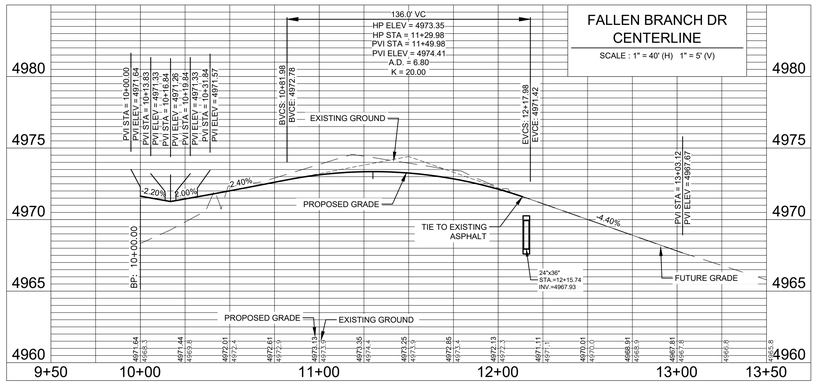
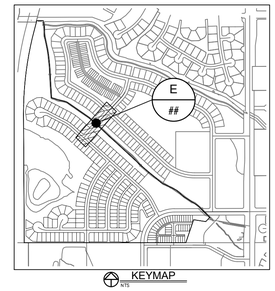




40 0 40 80 120 Feet

(IN FEET)
1 inch = 40 ft.



LEGEND:

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PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

FALLEN BRANCH DR PLAN & PROFILE

Sheet
R9

DRAWING FILENAME: R:\1204-003\Eng\Civil\1204-003_STP [Eng] LAYOUT NAME: R9 DATE: Tue, Dec 24, 2019 - 2:19pm CAD XREFS/PEN: none
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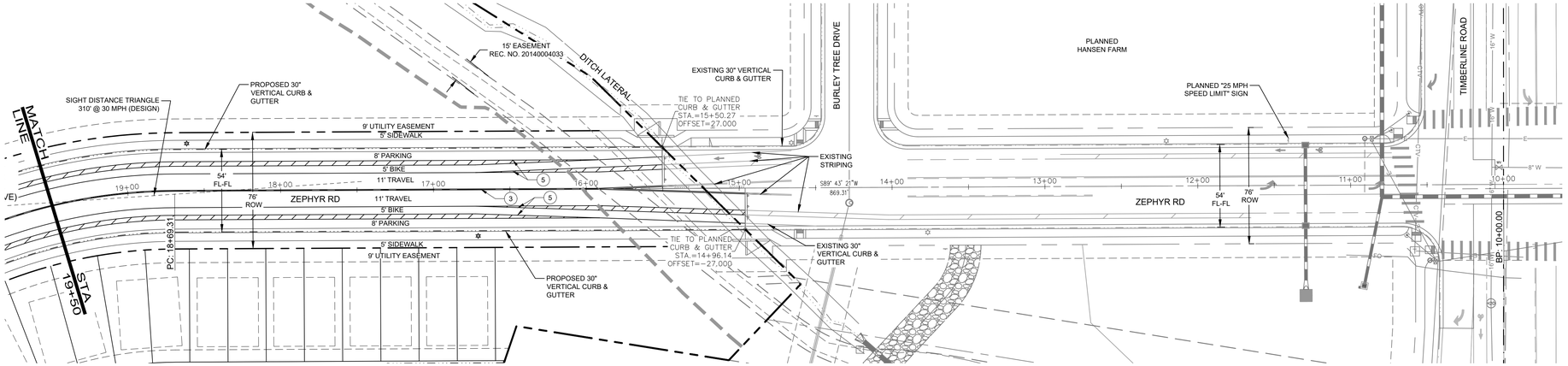

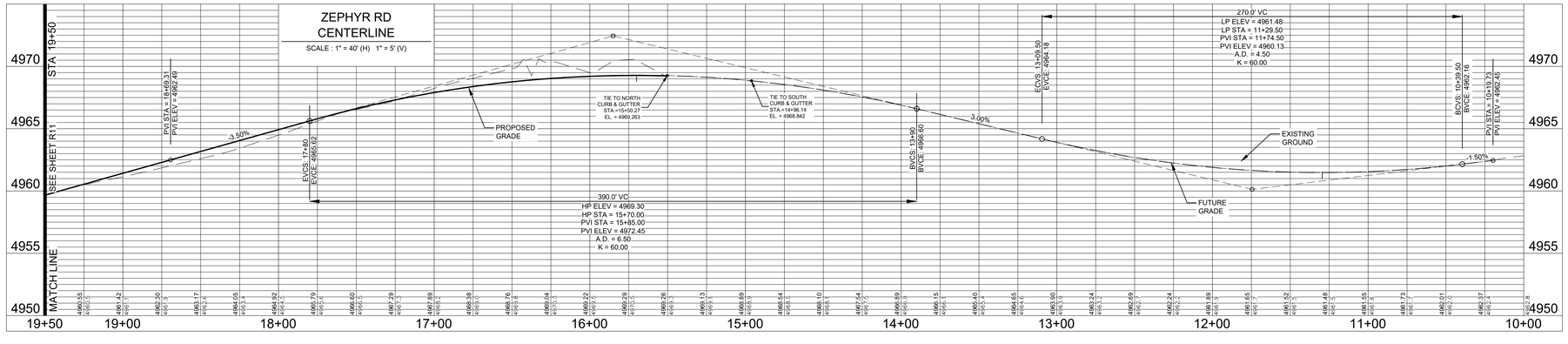

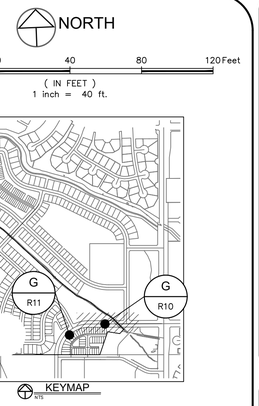

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STRIPING LEGEND:

PAVEMENT STRIPING AND MARKINGS:

1. 8" SOLID WHITE LINE
2. 8" DASHED WHITE LINE 3' STRIPE, 9' GAP
3. DOUBLE YELLOW LINE (2) 4" SOLID LINES; 4" APART
4. DOUBLE YELLOW LINE 4" SOLID LINE, 4" DASHED LINE; 4" APART
5. 6" SOLID WHITE LINE
6. 6" DOTTED WHITE LINE 3' STRIPE, 9' GAP
7. 4" SOLID YELLOW LINE
8. 4" WHITE LINE 10' STRIPE, 30' GAP
- A. PREFORMED PLASTIC PAVEMENT MARKING BICYCLIST AND ARROW
- B. PREFORMED PLASTIC PAVEMENT MARKING LEFT TURN ARROW (15.5 S.F. EA.)
- C. PREFORMED PLASTIC PAVEMENT MARKING RIGHT TURN ARROW (15.5 S.F. EA.)
- D. PREFORMED PLASTIC PAVEMENT MARKING "ONLY" (22.5 S.F. EA.)
- E. PREFORMED PLASTIC PAVEMENT MARKING 24" WIDE STOP BAR
- F. 18" x 12' CROSS-WALK ON LANE LINES

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PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: K. Rudloff
DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

ZEPHYR RD
PLAN & PROFILE

Sheet
R10
25 of 28

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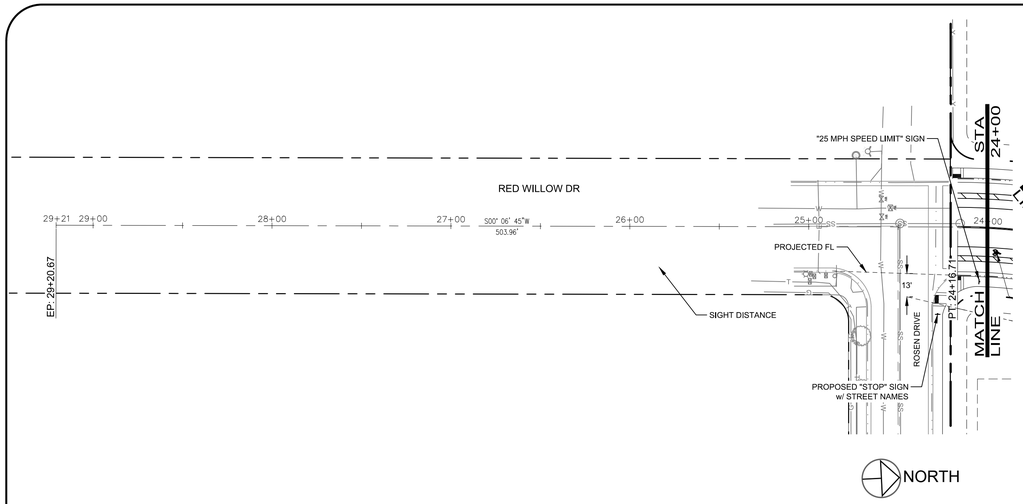

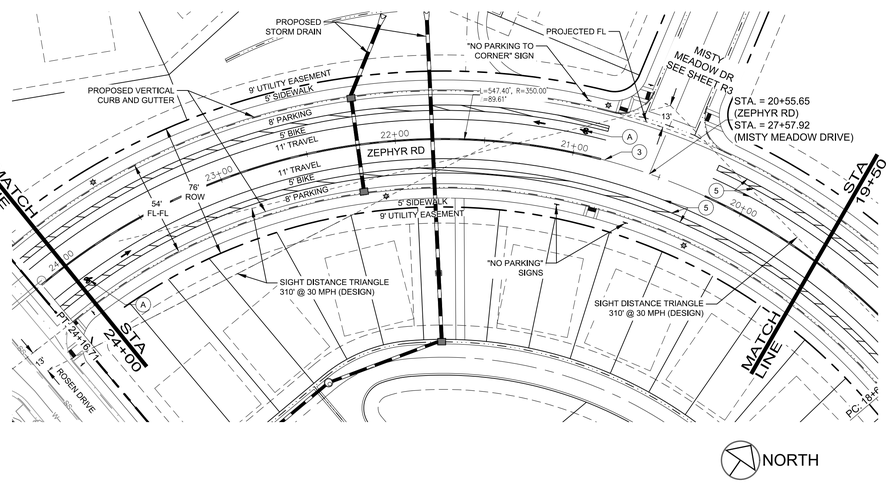

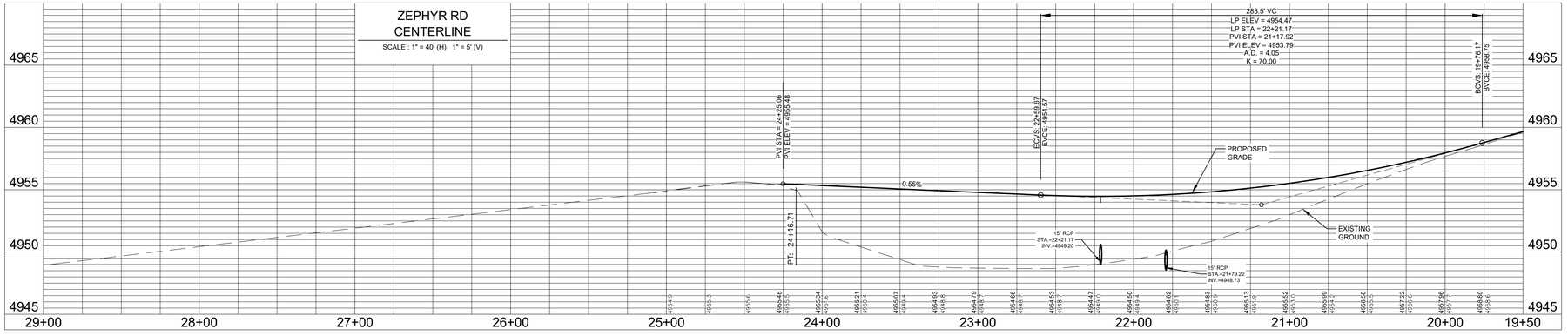

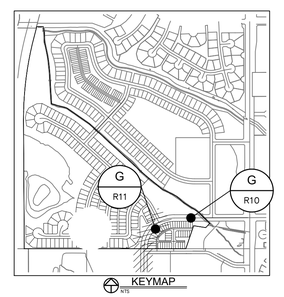

LEGEND:

- PROPOSED CURB & GUTTER
- PROPOSED CENTERLINE
- PROPOSED RIGHT-OF-WAY
- EXISTING RIGHT-OF-WAY
- PROPERTY BOUNDARY
- PROPOSED LOT LINE
- EXISTING LOT LINE
- EASEMENT LINE
- SAWCUT LINE
- PROPOSED STORM SEWER
- PROPOSED STORM INLET
- EXISTING STORM SEWER
- LIMITS OF DEVELOPMENT — LOD —
- PROPOSED CONCRETE CROSSPAN (TYP.)

NOTES:

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2. SEE SOILS REPORT FOR PAVEMENT AND SUBGRADE PREPARATION, DESIGN AND RECOMMENDATIONS.
3. MANHOLE RIM ELEVATIONS ARE TO BE ADJUSTED TO 1/4" BELOW FINISHED GRADE. IF NECESSARY, CONE SECTIONS SHALL BE ROTATED TO PREVENT LIDS BEING LOCATED WITHIN VEHICLE OR BICYCLE WHEEL PATHS.
4. EXPANSION JOINTS SHALL BE PROVIDED IN ALL TRAILS AT MAXIMUM SPACING OF 50 FEET.
5. LIMITS OF STREET CUT ARE APPROXIMATE. FINAL LIMITS ARE TO BE DETERMINED IN THE FIELD BY THE TOWN ENGINEERING INSPECTOR. ALL REPAIRS TO BE IN ACCORDANCE WITH TOWN STREET REPAIR STANDARDS.
6. CONSTRUCTION ON DITCH LATERAL WILL BE LIMITED FROM OCTOBER 1 TO MAY 1 WHEN NOT IN USE.
8. PARKWAY WIDTH SHOWN ON THIS SHEET IS MEASURED FROM BACK OF CURB TO FACE OF WALK

STRIPING LEGEND:

PAVEMENT STRIPING AND MARKINGS:

1. 8" SOLID WHITE LINE
2. 8" DASHED WHITE LINE 3' STRIPE, 9' GAP
3. DOUBLE YELLOW LINE (2) 4" SOLID LINES; 4" APART
4. DOUBLE YELLOW LINE 4" SOLID LINE, 4" DASHED LINE; 4" APART
5. 6" SOLID WHITE LINE
6. 6" DOTTED WHITE LINE 3' STRIPE, 9' GAP
7. 4" SOLID YELLOW LINE
8. 4" WHITE LINE 10' STRIPE, 30' GAP
- A. PREFORMED PLASTIC PAVEMENT MARKING BICYCLIST AND ARROW
- B. PREFORMED PLASTIC PAVEMENT MARKING LEFT TURN ARROW (15.5 S.F. EA.)
- C. PREFORMED PLASTIC PAVEMENT MARKING RIGHT TURN ARROW (15.5 S.F. EA.)
- D. PREFORMED PLASTIC PAVEMENT MARKING "ONLY" (22.5 S.F. EA.)
- E. PREFORMED PLASTIC PAVEMENT MARKING 24" WIDE STOP BAR
- F. 18" x 12' CROSS-WALK ON LANE LINES

CALL UTILITY NOTIFICATION CENTER OF COLORADO

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CALL 2 BUSINESS DAYS IN ADVANCE BEFORE YOU DIG, GRADE, OR EXCAVATE FOR THE MARKING OF UNDERGROUND MEMBER UTILITIES.

City of Fort Collins, Colorado
UTILITY PLAN APPROVAL

APPROVED: _____ City Engineer _____ Date

CHECKED BY: _____ Water Utility _____ Date

CHECKED BY: _____ Stormwater Utility _____ Date

CHECKED BY: _____ Parks & Recreation _____ Date

CHECKED BY: _____ Traffic Engineer _____ Date

CHECKED BY: _____ Environmental Planner _____ Date

No. Revisions: Date:
- REVIEW SET NOT FOR CONSTRUCTION 12/24/19

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NORTHERN ENGINEERING
FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1"=40'
REVIEWED BY: D. Weber
PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudisill

RENNAT SUBDIVISION

ZEPHYR RD
PLAN & PROFILE

Sheet
R11
26 of 28

DRAWING FILENAME: R:\1204-003\Civil\1204-003_ZEPHYR.dwg | LAYOUT NAME: R11 | DATE: Dec 23, 2019 - 2:19pm | CAD OPERATOR: mswan
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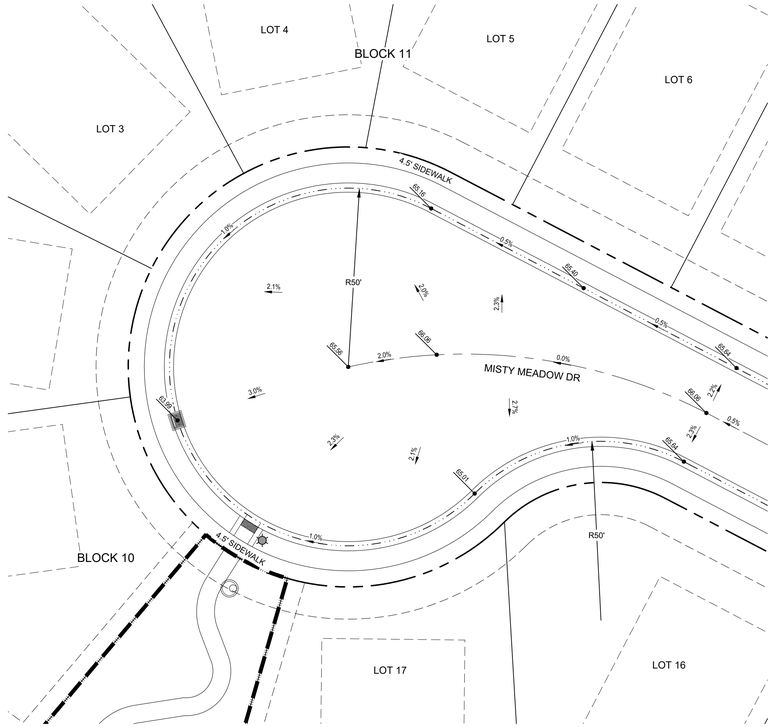

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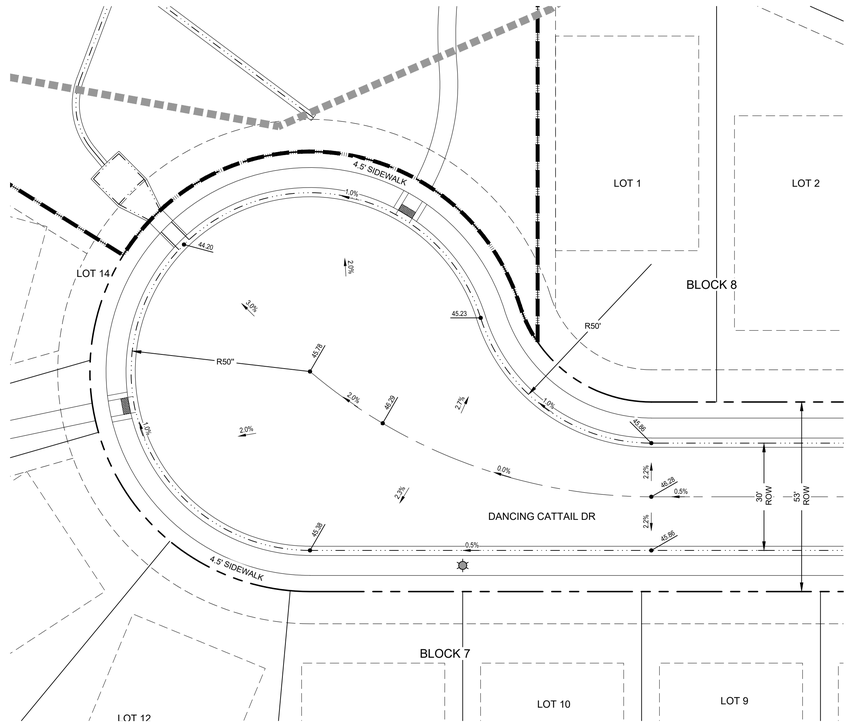

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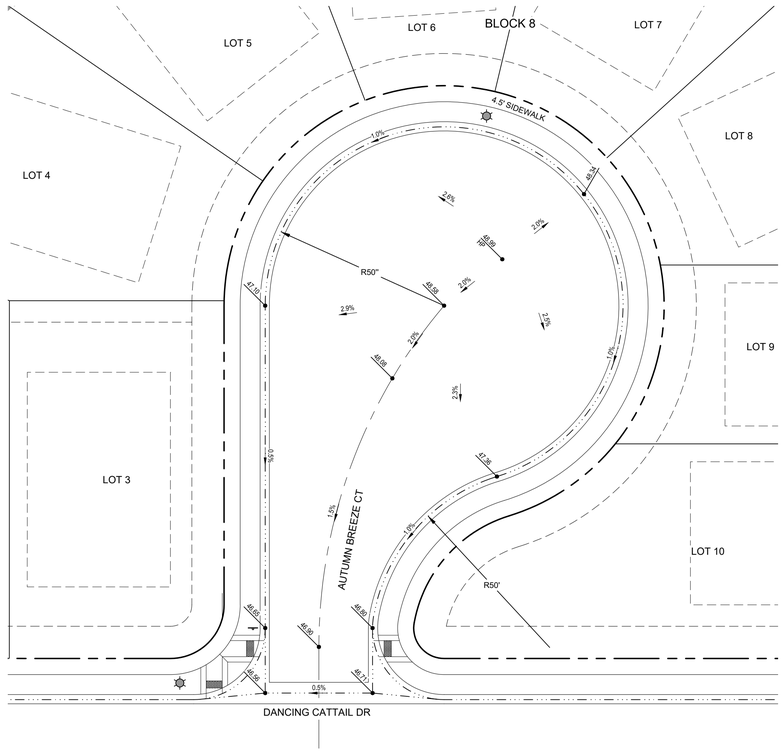

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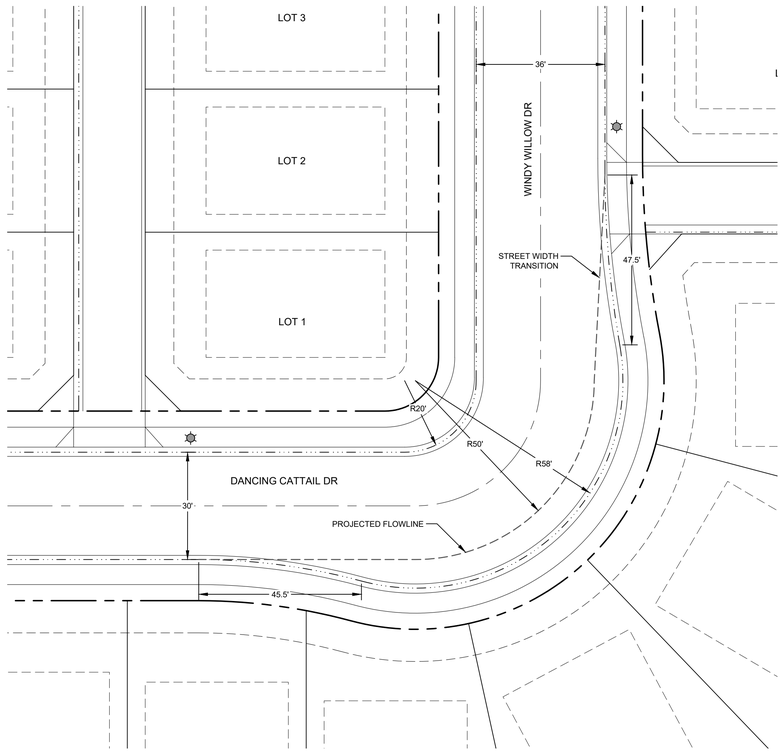

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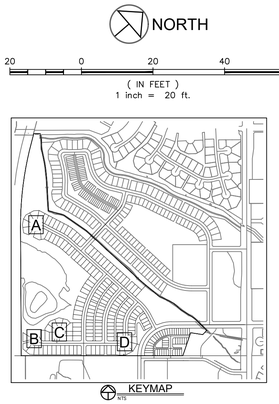

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NORTHERN ENGINEERING
FORT COLLINS, 301 North Howes Street, Suite 100, 80521
GREELEY, 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003
DESIGNED BY: D. Weber
DRAWN BY: M. Ruebel
DATE: 12/24/19
SCALE: 1"=20'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

INTERSECTION DETAILS

Sheet
INT1
27 of 28

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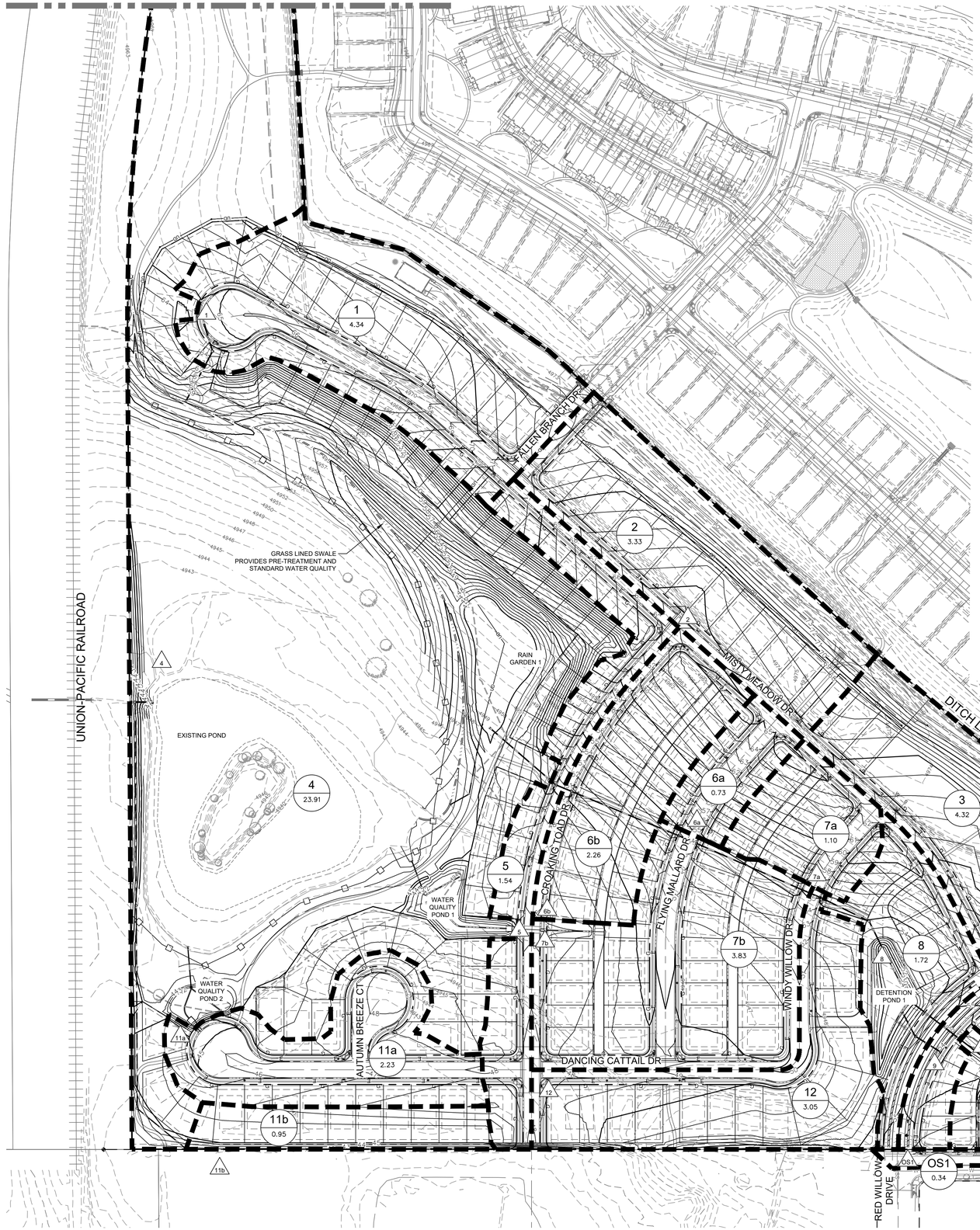
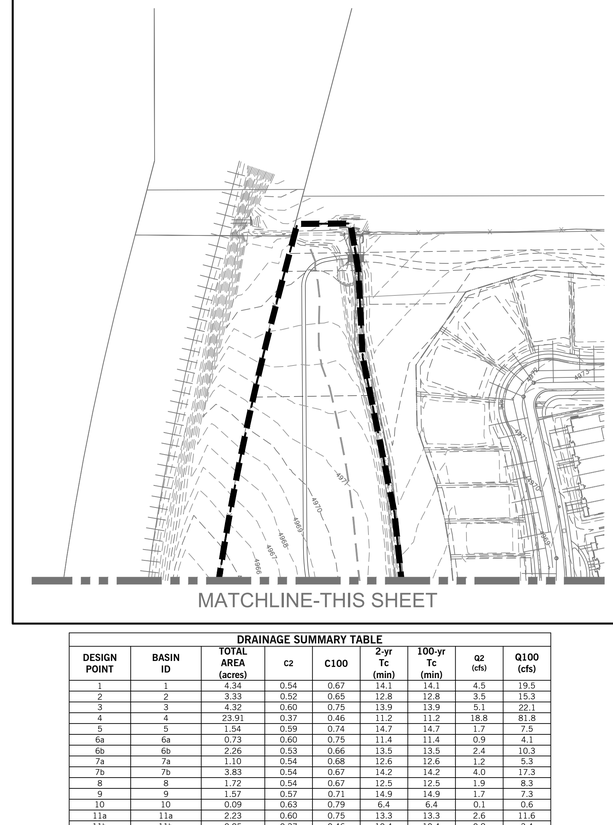
MATCHLINE-THIS SHEET





DRAINAGE SUMMARY TABLE

DESIGN POINT	BASIN ID	TOTAL AREA (acres)	C2	C100	2-yr Tc (min)	100-yr Tc (min)	Q2 (cfs)	Q100 (cfs)
1	1	4.34	0.54	0.67	14.1	14.1	4.5	19.5
2	2	3.33	0.52	0.65	12.8	12.8	3.5	15.3
3	3	4.32	0.60	0.75	13.9	13.9	5.1	22.1
4	4	23.91	0.37	0.46	11.2	11.2	18.8	81.8
5	5	1.54	0.59	0.74	14.7	14.7	1.7	7.5
6a	6a	0.73	0.60	0.75	11.4	11.4	0.9	4.1
6b	6b	2.26	0.53	0.66	13.5	13.5	2.4	10.3
7a	7a	1.10	0.54	0.68	12.6	12.6	1.2	5.3
7b	7b	3.83	0.54	0.67	14.2	14.2	4.0	17.3
8	8	1.72	0.54	0.67	12.5	12.5	1.9	8.3
9	9	1.57	0.57	0.71	14.9	14.9	1.7	7.3
10	10	0.09	0.63	0.79	6.4	6.4	0.1	0.6
11a	11a	2.23	0.60	0.75	13.3	13.3	2.6	11.6
11b	11b	0.95	0.37	0.46	10.4	10.4	0.8	3.4
12	12	3.05	0.52	0.65	15.5	15.5	2.9	12.8
13	13	2.51	0.59	0.74	13.0	13.0	2.9	12.9
OS1	OS1	0.34	0.71	0.88	13.0	13.0	0.5	2.1

NORTH

100 0 100 200 300Feet

(IN FEET)
1 inch = 100 ft.

LEGEND:

- PROPOSED STORM SEWER
- PROPOSED INLET
- PROPOSED CONTOUR — 93
- EXISTING CONTOUR — 4953
- PROPOSED SWALE
- PROPOSED CURB & GUTTER
- PROPERTY BOUNDARY
- DESIGN POINT — A
- FLOW ARROW
- DRAINAGE BASIN LABEL — BASIN DESIGNATION: B2; BASIN AREA (AC): 1.45 ac
- DRAINAGE BASIN BOUNDARY
- PROPOSED SWALE SECTION — 1 : 1

FOR DRAINAGE REVIEW ONLY
NOT FOR CONSTRUCTION

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No. Revisions: Date:

REVIEW SET
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12/24/19

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NORTHERN ENGINEERING
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 12X-003
DESIGNED BY: D. Weber
DRAWN BY: M. Rudebil
DATE: 12/24/19
SCALE: 1"=100'
REVIEWED BY: D. Weber

RENNAT SUBDIVISION

DRAINAGE EXHIBIT

Sheet
DR1
28 of 28

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RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

STATEMENT OF OWNERSHIP AND SUBDIVISION:

Know all persons by these presents, that the undersigned owner(s) of the following described land:

A tract of land located in the East Half of Section 7, Township 6 North, Range 68 West of the 6th Principal Meridian, County of Larimer, State of Colorado, and being more particularly described as follows:

Considering the South line of the Northeast Quarter of said Section 7 as bearing North 89° 58' 58" West (Record North 89° 58' 05" West) and with all bearings herein relative thereto:

Beginning at a point 736.44 feet North 89° 58' 58" West (Record North 89° 58' 05" West) of the East Quarter Corner of Section 7, Township 6 North, Range 68 West of the 6th Principal Meridian, said point being the Southwest corner of Tract C, Hansen Farm Subdivision; thence along the Southwesterly line of Hansen Farm Subdivision the following 16 courses and distances: North 18° 53' 29" East (Record North 18° 54' 22" East), 280.05 feet; thence, South 80° 52' 47" East (Record South 80° 51' 54" East), 140.66 feet; thence, North 43° 24' 32" East (Record North 43° 25' 25" East), 68.46 feet; thence, North 45° 20' 54" West (Record North 45° 20' 01" West), 193.08 feet; thence, North 57° 52' 49" West (Record North 57° 51' 56" West), 191.24 feet; thence, North 48° 06' 29" West (Record North 48° 05' 35" West), 109.43 feet; thence, North 63° 34' 52" West (Record North 63° 33' 59" West), 198.72 feet; thence, North 49° 45' 28" West (Record North 49° 44' 35" West), 330.86 feet; thence, North 47° 12' 15" West (Record North 47° 11' 22" West), 783.31 feet; thence, North 55° 07' 00" West (Record North 55° 06' 07" West), 318.91 feet (Record 318.92 feet); thence, North 74° 09' 59" West (Record North 74° 09' 06" West), 184.15 feet; thence, North 03° 02' 18" West (Record North 03° 01' 25" West), 367.61 feet; thence, North 05° 59' 16" West (Record North 05° 58' 23" West), 117.72 feet; thence, North 11° 32' 10" West (Record North 11° 31' 17" West), 221.70 feet; thence, North 02° 51' 46" West (Record North 02° 50' 53" West), 122.76 feet; thence, North 09° 31' 45" West (Record North 09° 30' 36" West), 65.32 feet (Record 65.31 feet) to the South line of Willow Springs PUD Second Filing; thence along said South line, South 89° 33' 44" West (Record South 89° 34' 37" West), 74.45 feet to the Easterly right-of-way line of Union Pacific Railroad; thence along said Easterly line the following 3 courses and distances: South 14° 41' 22" West (Record South 14° 42' 15" West), 117.21 feet; thence, along a curve concave to the East having a central angle of 15° 03' 24" with a radius of 3706.11 feet, an arc length of 973.92 feet and the chord of which bears South 07° 16' 04" West, 971.12 feet (Record - on a 15° curve 973.82 feet to the left with a radius of curvature of 1° 32' 25" from a bearing of South 14° 42' 15" West to South 00° 17' 45" East); thence non-tangent from said curve, South 00° 18' 38" East (Record South 00° 17' 45" East), 1480.42 feet to the South line of the Northeast Quarter of Section 7; thence along said South line, South 89° 58' 58" East (Record South 89° 58' 05" East), 1860.30 feet to the Point of Beginning, County of Larimer, State of Colorado.

Including an access easement granted to Harry O. and Ingrid M. Rennat described as follows:
A 60-foot access easement whose centerline begins at a point in the east line of Section 7, Township 6 North, Range 68 West, said line being the centerline of County Road 11, 191.91 feet north of the East Quarter Corner of said section, thence, North 80°51'54" West a distance of 488.05 feet to a point in the property line of Harry O. and Ingrid M. Rennat.

Said described tract contains 2,518,903 square feet or 57.826 acres, more or less.

For themselves and their successors in interest (collectively "Owner") have caused the above described land to be surveyed and subdivided into lots, tracts and streets as shown on this Plat to be known as RENNAT SUBDIVISION (the "Development"), subject to all easements and rights-of-way now of record or existing or indicated on this Plat. The rights and obligations of this Plat shall run with the land.

CERTIFICATE OF DEDICATION:

The Owner does hereby dedicate and convey to the City of Fort Collins, Colorado (hereafter "City"), for public use, forever, a permanent right-of-way for street purposes and the "Easements" as laid out and designated on this Plat; provided, however, that (1) acceptance by the City of this dedication of Easements does not impose upon the City a duty to maintain the Easements so dedicated, and (2) acceptance by the City of this dedication of streets does not impose upon the City a duty to maintain streets so dedicated until such time as the provisions of the Maintenance Guarantee have been fully satisfied. The streets dedicated on this Plat are the fee property of the City as provided in Section 31-23-107 C.R.S. The City's rights under the Easements include the right to install, operate, access, maintain, repair, reconstruct, remove and replace within the Easements public improvements consistent with the intended purpose of the Easements; the right to install, maintain and use gates in any fences that cross the Easements; the right to mark the location of the Easements with suitable markers; and the right to permit other public utilities to exercise these same rights. Owner reserves the right to use the Easements for purposes that do not interfere with the full enjoyment of the rights hereby granted. The City is responsible for maintenance of its own improvements and for repairing any damage caused by its activities in the Easements, but by acceptance of this dedication, the City does not accept the duty of maintenance of the Easements, or of improvements in the Easements that are not owned by the City. Owner will maintain the surface of the Easements in a sanitary condition in compliance with any applicable weed, nuisance or other legal requirements.

Except as expressly permitted in an approved plan of development or other written agreement with the City, Owner will not install on the Easements, or permit the installation on the Easements, of any building, structure, improvement, fence, retaining wall, sidewalk, tree or other landscaping (other than usual and customary grasses and other ground cover). In the event such obstacles are installed in the Easements, the City has the right to require the Owner to remove such obstacles from the Easements. If Owner does not remove such obstacles, the City may remove such obstacles without any liability or obligation for repair and replacement thereof, and charge the Owner the City's costs for such removal. If the City chooses not to remove the obstacles, the City will not be liable for any damage to the obstacles or any other property to which they are attached.

The rights granted to the City by this Plat inure to the benefit of the City's agents, licensees, permittees and assigns.

OWNER:

BY: _____

STATE OF COLORADO)
)ss.
COUNTY OF LARIMER)

The foregoing instrument was acknowledged before me this _____ day of _____, 20____, by

_____ as _____ of _____.

Witness my hand and official seal

My commission expires: _____

_____
Notary Public

APPROVED AS TO FORM, CITY ENGINEER

By the City Engineer of the City of Fort Collins, Colorado this _____day of _____ A.D., 20_____.

_____
City Engineer

DIRECTOR OF COMMUNITY DEVELOPMENT AND NEIGHBORHOOD SERVICES APPROVAL

By the Director of Community Development and Neighborhood Services the City of Fort Collins, Colorado this _____ day of _____ A.D., 20_____.

_____
Director of Community Development and Neighborhood Services

AMERICAN TOWERS LLC APPROVAL

_____ _____
DATE

MAINTENANCE GUARANTEE:

The Owner hereby warrants and guarantees to the City, for a period of two (2) years from the date of completion and first acceptance by the City of the improvements warranted hereunder, the full and complete maintenance and repair of the improvements to be constructed in connection with the Development which is the subject of this Plat. This warranty and guarantee is made in accordance with the City Land Use Code and/or the Transitional Land Use Regulations, as applicable. This guarantee applies to the streets and all other appurtenant structures and amenities lying within the rights-of-way, Easements and other public properties, including, without limitation, all curbing, sidewalks, bike paths, drainage pipes, culverts, catch basins, drainage ditches and landscaping. Any maintenance and/or repair required on utilities shall be coordinated with the owning utility company or department.

The Owner shall maintain said improvements in a manner that will assure compliance on a consistent basis with all construction standards, safety requirements and environmental protection requirements of the City. The Owner shall also correct and repair, or cause to be corrected and repaired, all damages to said improvements resulting from development-related or building-related activities. In the event the Owner fails to correct any damages within thirty (30) days after written notice thereof, then said damages may be corrected by the City and all costs and charges billed to and paid by the Owner. The City shall also have any other remedies available to it as authorized by law. Any damages which occurred prior to the end of said two (2) year period and which are unrepaired at the termination of said period shall remain the responsibility of the Owner.

REPAIR GUARANTEE:

In consideration of the approval of this final Plat and other valuable consideration, the Owner does hereby agree to hold the City harmless for a five (5) year period, commencing upon the date of completion and first acceptance by the City of the improvements to be constructed in connection with the development which is the subject of this Plat, from any and all claims, damages, or demands arising on account of the design and construction of public improvements of the property shown herein; and the Owner furthermore commits to make necessary repairs to said public improvements, to include, without limitation, the roads, streets, fills, embankments, ditches, cross pans, sub-drains, culverts, walls and bridges within the right-of-way, Easements and other public properties, resulting from failures caused by design and/or construction defects. This agreement to hold the City harmless includes defects in materials and workmanship, as well as defects caused by or consisting of settling trenches, fills or excavations.

Further, the Owner warrants that he/she owns fee simple title to the property shown hereon and agrees that the City shall not be liable to the Owner or his/her successors in interest during the warranty period, for any claim of damages resulting from negligence in exercising engineering techniques and due caution in the construction of cross drains, drives, structures or buildings, the changing of courses of streams and rivers, flooding from natural creeks and rivers, and any other matter whatsoever on private property. Any and all monetary liability occurring under this paragraph shall be the liability of the Owner. I further warrant that I have the right to convey said land according to this Plat.

NOTICE OF OTHER DOCUMENTS:

All persons take notice that the Owner has executed certain documents pertaining to this Development which create certain rights and obligations of the Development, the Owner and/or subsequent Owners of all or portions of the Development site, many of which obligations constitute promises and covenants that, along with the obligations under this Plat, run with the land. The said documents may also be amended from time to time and may include, without limitation, the Development Agreement, Site And Landscape Covenants, Final Site Plan, Final Landscape Plan, and Architectural Elevations, which documents are on file in the office of the clerk of the City and should be closely examined by all persons interested in purchasing any portion of the Development site.

ATTORNEY'S CERTIFICATION

I hereby certify that this Subdivision Plat has been duly executed as required pursuant to Section 2.2.3(C)(3)(a) through (e) inclusive of the Land Use Code of the City of Fort Collins and that all persons signing this Subdivision Plat on behalf of a corporation or other entity are duly authorized signatories under the laws of the State of Colorado. This Certification is based upon the records of the Clerk and Recorder of Larimer County, Colorado as of the date of execution of the Plat and other information discovered by me through reasonable inquiry and is limited as authorized by Section 2.2.3(C)(3)(f) of the Land Use Code.

Attorney:_____

Address: _____

_____

Registration No.:_____

NOTES:

1) The Basis of Bearings is the South line of the Northeast Quarter of Section 7, as bearing North 89° 58' 58" West (Record North 89° 58' 05" West) (assumed bearing) as monumented on drawing.

2) For all information regarding easements, right-of-way or title of record, Northern Engineering relied upon Commitment No. 459-H0551684-081-TMY, dated December 10, 2018, prepared by Heritage Title Company.

3) The lineal unit of measurement for this plat is U.S. Survey Feet.

4) There shall be no private conditions, covenants or restrictions that prohibit or limit the installation of resource conserving equipment or landscaping that are allowed by Sections 12-120 - 12-122 of the City code.

5) FLOOD ZONE DESIGNATION: According to FIRM Panel 08069C1000F (not printed) for Larimer County, this tract of land is located within an unshaded Zone X, and does not lie within a FEMA designated 100-year floodplain.

6) Northern Engineering or the Professional Land Surveyor listed hereon, does not have the expertise to address mineral rights, and recommends the owner retain an expert to address these matters. Northern Engineering or the Professional Land Surveyor listed heron assumes no responsibility for the mineral rights upon the subject property.

7) For easements created by separate document and shown hereon refer to record document for specific terms.

8) A copy of the title commitment and the documents contained therein were provided to the owner, client and attorney listed hereon for their use and review.

9) Not all documents listed in the title commitment are plottable or definable by their terms. All easements that are definable by their descriptions are shown hereon with sufficient data to establish their position. Owner, Client and others should refer to the title commitment and those documents listed therein for a true understanding of all rights of way, easements, encumbrances, interests and title of record concerning the subject property.

10) Based on correspondence with Williamson Ditch lateral users, it is understood that there is and will remain a prescriptive easement for the Williamson Ditch Lateral as it exists on and or near the Hansen Farm property, as shown hereon.

11) Adjacent property owner information per the Larimer County Land information Locator.

12) Zoning information per the City of Fort Collins GIS Zoning Districts information locator.

13) Easements and other record documents shown or noted hereon were examined as to location and purpose and were not examined as to restrictions, exclusions, conditions, obligations, terms, or as to the right to grant the same.

14) Subject property is currently zoned LMN - Low Density Mixed Use, MMN - Medium Density Mixed Use, and NC - Neighborhood Conservation Low Density

15) Driveway access for Block 7, Lot 1 and Block 6, Lot 11 shall be restricted to Dancing Cattail Drive.

16) The recorded description, as referenced in Statement of Ownership and Subdivision, does not mathematically close.

17) This survey is a draft only. Monuments have not been set or upgraded. Monuments will be set and or upgraded prior to plat finalizing and recording.

NOTICE

ALL RESPONSIBILITIES AND COSTS OF OPERATION, MAINTENANCE AND RECONSTRUCTION OF THE PRIVATE STREETS AND/OR DRIVES LOCATED ON THE PRIVATE PROPERTY THAT IS THE SUBJECT OF THIS PLAT SHALL BE BORNE BY THE OWNERS OF SAID PROPERTY, EITHER INDIVIDUALLY, OR COLLECTIVELY, THROUGH A PROPERTY OWNERS' ASSOCIATION, IF APPLICABLE. THE CITY OF FORT COLLINS SHALL HAVE NO OBLIGATION OF OPERATION, MAINTENANCE OR RECONSTRUCTION OF SUCH PRIVATE STREETS AND/OR DRIVES NOR SHALL THE CITY HAVE ANY OBLIGATION TO ACCEPT SUCH STREETS AND/OR DRIVES AS PUBLIC STREETS OR DRIVES.

OWNER/APPLICANT

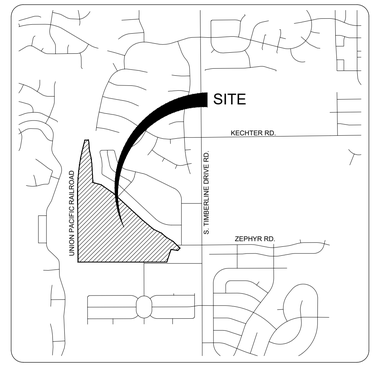
JD Padilla
Post Modern Development
144 North Mason St., Suite 4
Fort Collins, Colorado 80524
(970) 407-7808

SITE ENGINEER

Danny Weber, PE
Northern Engineering Services, Inc.
301 North Howes Street, Sutie 100
Fort Collins, Colorado 80521
(970) 221-4158

SURVEYOR

Bob Tessely, PLS
Northern Engineering Services, Inc.
301 North Howes Street, Sutie 100
Fort Collins, Colorado 80521
(970) 221-4158



NORTH VICINITY MAP
1"=1500'

WILLIAMSON DITCH LATERAL APPROVAL

BY: _____ DATE _____

BY: _____ DATE _____

SURVEYOR'S STATEMENT

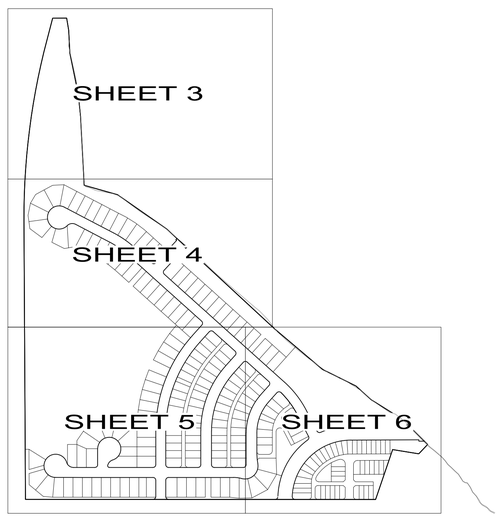
I, Robert C. Tessely, a Colorado Registered Professional Land Surveyor, do hereby state that this Subdivision Plat was prepared from an actual survey under my personal supervision, that the monumentation as indicated hereon were found or set as shown, and that the foregoing plat is an accurate representation thereof, all to the best of my knowledge, information and belief.

DRAFT 12-24-19

For and on Behalf of Northern Engineering
Robert C. Tessely
Colorado Registered Professional
Land Surveyor No. 38470

SHEET INDEX

NORTH



NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years after the date of the certificate shown hereon.

SECTION: 7
TOWNSHIP: 6N
RANGE: 68 W of the 6th PM

NORTHERN ENGINEERING
970.221.4158
northernengineering.com
FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631

DATE: 12/24/19
SCALE: N.A.
REVIEWED BY: R. Tessely
PROJECT: 1204-003
CLIENT: Post Modern Development
DRAWN BY: L. Smith

RENNAT SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

Sheet
1
Of 6 Sheets

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RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

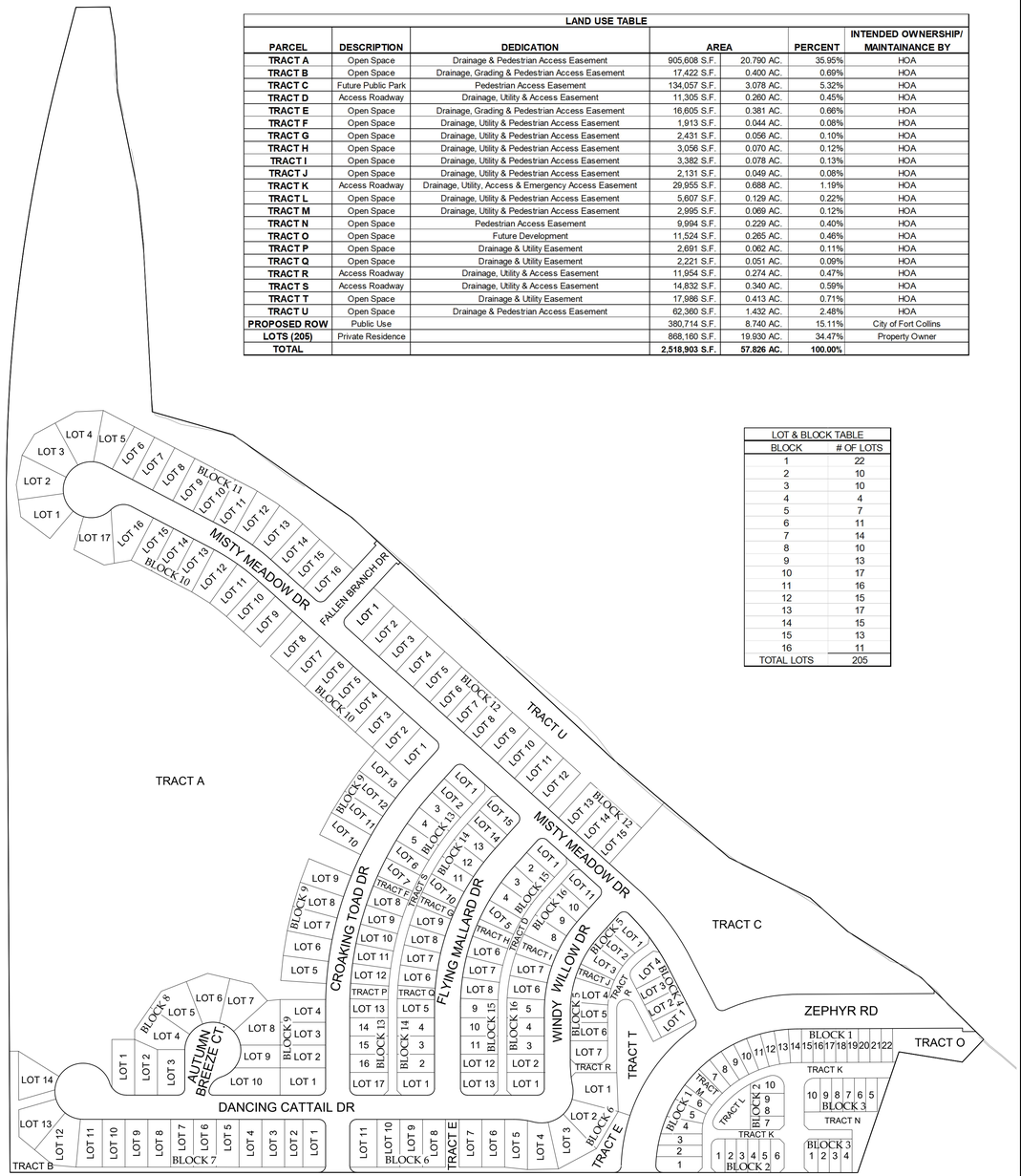
CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C1	40°17'46"	147.50'	103.74'	N82°32'33"W	101.61'
C2	14°19'25"	500.00'	125.00'	N55°13'58"W	124.67'
C3	20°45'16"	500.00'	181.12'	N37°41'37"W	180.13'
C4	59°06'24"	350.00'	361.06'	S29°39'57"W	345.26'
C5	30°30'12"	350.00'	186.33'	S74°28'15"W	184.14'
C6	40°17'46"	147.50'	103.74'	S69°50'59"E	101.61'
C7	90°00'08"	35.00'	54.98'	N45°00'04"E	49.50'
C8	41°55'44"	275.00'	201.24'	N20°57'52"E	196.78'
C9	41°55'44"	489.00'	357.85'	N20°57'52"E	349.92'
C10	41°55'44"	730.00'	534.21'	S20°57'52"W	522.37'
C11	89°59'52"	15.00'	23.56'	S44°59'56"E	21.21'
C12	252°32'34"	61.50'	271.07'	S36°16'23"W	99.17'
C13	72°32'33"	38.50'	48.74'	N53°43'36"W	45.55'
C14	90°00'21"	15.00'	23.56'	S44°59'57"W	21.21'
C15	252°50'20"	61.50'	271.39'	N53°35'04"W	98.98'
C16	62°25'35"	38.50'	41.95'	N41°37'19"E	39.90'
C17	100°24'24"	8.50'	14.90'	N39°47'40"W	13.06'
C18	90°00'08"	15.00'	23.56'	S45°00'04"W	21.21'
C19	41°55'44"	756.50'	553.61'	S20°57'52"W	541.34'
C20	90°00'00"	15.00'	23.56'	S03°04'15"E	21.21'
C21	14°19'25"	473.50'	118.37'	S55°13'58"E	118.06'
C22	72°32'33"	38.50'	48.74'	N81°20'04"E	45.55'
C23	252°32'33"	61.50'	271.07'	S08°39'56"E	99.17'
C24	14°19'25"	526.50'	131.62'	N55°13'58"W	131.28'
C25	89°08'00"	15.00'	23.34'	S87°21'45"W	21.05'
C26	90°52'00"	15.00'	23.79'	N02°38'15"W	21.37'
C27	20°45'16"	526.50'	190.72'	N37°41'37"W	189.68'
C28	87°06'20"	15.00'	22.80'	N70°52'09"W	20.67'
C29	24°08'40"	388.00'	163.50'	S77°39'01"W	162.30'
C30	87°27'44"	312.00'	476.27'	N45°59'29"E	431.36'
C31	92°14'35"	15.00'	24.15'	N43°51'41"W	21.62'
C32	52°04'12"	388.00'	352.61'	S27°42'18"W	340.60'
C33	81°03'24"	15.00'	21.22'	S13°12'43"W	19.49'
C34	4°52'10"	473.50'	40.24'	S29°45'04"E	40.23'
C35	14°06'19"	144.50'	35.57'	N47°07'50"E	35.48'
C36	67°48'55"	20.00'	23.67'	N06°10'20"E	22.31'
C37	152°41'01"	20.00'	53.30'	N76°20'30"E	38.87'
C38	90°00'08"	15.00'	23.56'	N45°00'04"E	21.21'
C39	15°03'27"	163.50'	42.97'	N82°28'09"W	42.84'
C40	115°55'12"	69.50'	140.61'	S47°05'59"W	117.83'
C41	10°51'37"	265.50'	50.32'	S05°25'48"E	50.25'
C42	89°59'52"	15.00'	23.56'	N44°59'56"W	21.21'
C43	41°55'44"	703.50'	514.82'	N20°57'52"E	503.41'
C44	90°00'00"	15.00'	23.56'	N86°55'45"E	21.21'
C45	41°55'44"	619.50'	453.35'	S20°57'52"W	443.30'
C46	41°55'44"	599.50'	438.71'	N20°57'52"E	428.99'
C47	90°00'00"	15.00'	23.56'	S03°04'15"E	21.21'
C48	41°55'44"	517.50'	378.71'	S20°57'52"W	370.31'
C49	90°00'08"	15.00'	23.56'	S45°00'04"W	21.21'
C50	89°59'52"	15.00'	23.56'	N44°59'56"W	21.21'
C51	41°55'44"	460.50'	336.99'	N20°57'52"E	329.52'
C52	90°00'00"	15.00'	23.56'	N86°55'45"E	21.21'
C53	41°55'44"	378.50'	276.99'	S20°57'52"W	270.85'
C54	41°55'44"	358.50'	262.35'	N20°57'52"E	256.54'
C55	90°00'00"	15.00'	23.56'	S03°04'15"E	21.21'
C56	41°55'44"	303.50'	222.10'	S20°57'52"W	217.18'
C57	90°00'08"	15.00'	23.56'	S45°00'04"W	21.21'
C58	41°55'44"	246.50'	180.39'	N20°57'52"E	176.39'
C59	92°31'24"	15.03'	24.27'	N88°18'57"E	21.72'
C60	8°16'11"	473.50'	68.34'	S41°10'12"E	68.28'
C61	54°11'00"	164.50'	155.56'	S27°05'30"W	149.83'
C62	90°00'00"	20.00'	31.42'	S45°00'00"W	28.28'
C63	35°10'49"	85.00'	52.19'	S17°36'26"W	51.38'
C64	54°31'30"	238.00'	226.49'	S62°27'36"W	218.04'
C65	90°00'00"	15.00'	23.56'	N45°01'02"E	21.21'
C66	110°27'16"	15.00'	28.92'	N34°45'20"W	24.64'
C67	14°43'33"	65.00'	16.71'	N27°50'05"E	16.66'
C68	38°14'45"	218.00'	145.52'	N54°19'14"E	142.83'
C69	106°34'26"	25.00'	46.50'	S53°16'11"E	40.08'
C70	89°42'19"	21.00'	32.88'	N44°52'12"E	29.62'
C71	26°18'36"	218.00'	100.10'	N48°21'09"E	99.23'
C72	11°56'09"	218.00'	45.41'	N67°28'31"E	45.33'
C73	7°54'31"	358.50'	49.48'	N30°14'29"E	49.45'
C74	3°34'28"	312.00'	19.46'	N04°02'51"E	19.46'
C75	4°38'20"	312.00'	25.26'	N08°09'15"E	25.25'
C76	4°42'34"	312.00'	25.65'	N12°49'42"E	25.64'
C77	7°27'13"	312.00'	40.59'	N18°54'36"E	40.56'
C78	7°48'58"	312.00'	42.56'	N26°32'42"E	42.53'
C79	6°54'11"	312.00'	37.59'	N33°54'16"E	37.57'
C80	8°26'00"	312.00'	45.92'	N41°34'21"E	45.88'

CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C81	5°45'44"	312.00'	31.38'	N48°40'14"E	31.36'
C82	5°45'44"	312.00'	31.38'	N54°25'57"E	31.36'
C83	5°45'44"	312.00'	31.38'	N60°11'41"E	31.36'
C84	5°45'44"	312.00'	31.38'	N65°57'25"E	31.36'
C85	5°45'44"	312.00'	31.38'	N71°43'08"E	31.36'
C86	5°45'44"	312.00'	31.38'	N77°28'52"E	31.36'
C87	5°45'44"	312.00'	31.38'	N83°14'36"E	31.36'
C88	3°35'53"	312.00'	19.59'	N87°55'24"E	19.59'
C89	11°03'33"	85.00'	16.41'	S05°32'48"W	16.38'
C90	14°50'27"	85.00'	22.02'	S18°29'48"W	21.96'
C91	9°16'49"	85.00'	13.77'	S30°33'26"W	13.75'
C92	2°09'30"	238.00'	8.97'	S36°16'36"W	8.97'
C93	8°26'00"	238.00'	35.03'	S41°34'21"W	35.00'
C94	5°45'44"	238.00'	23.94'	S48°40'14"W	23.93'
C95	5°45'44"	238.00'	23.94'	S54°25'57"W	23.93'
C96	5°45'44"	238.00'	23.94'	S60°11'41"W	23.93'
C97	5°45'44"	238.00'	23.94'	S65°57'25"W	23.93'
C98	5°45'44"	238.00'	23.94'	S71°43'08"W	23.93'
C99	5°45'44"	238.00'	23.94'	S77°28'52"W	23.93'
C100	5°45'44"	238.00'	23.94'	S83°14'36"W	23.93'
C101	3°35'53"	238.00'	14.95'	S87°55'24"W	14.94'
C102	7°11'49"	303.50'	38.12'	S36°32'41"W	38.10'
C103	7°09'56"	303.50'	37.96'	S29°21'48"W	37.93'
C104	6°44'02"	303.50'	35.67'	S22°24'49"W	35.65'
C105	7°09'36"	303.50'	37.93'	S15°28'00"W	37.90'
C106	7°10'41"	303.50'	38.02'	S08°17'52"W	38.00'
C107	4°42'31"	303.50'	24.94'	S02°21'16"W	24.94'
C108	90°01'02"	15.00'	23.57'	S45°00'31"W	21.22'
C109	89°58'58"	15.00'	23.56'	N44°59'29"W	21.21'
C110	16°39'19"	388.00'	112.79'	S09°59'52"W	112.39'
C111	35°24'54"	388.00'	239.83'	S36°01'58"W	236.03'
C112	17°58'52"	473.50'	148.60'	N36°18'25"W	147.99'
C113	4°50'31"	473.50'	40.02'	S34°35'39"E	40.00'
C114	7°44'00"	358.50'	48.39'	N38°03'44"E	48.35'
C115	13°28'13"	164.50'	38.67'	S43°52'23"W	38.59'
C116	12°47'36"	164.50'	36.73'	S30°44'28"W	36.65'
C117	6°58'13"	164.50'	20.01'	S20°51'33"W	20.00'
C118	12°35'43"	164.50'	36.16'	S11°04'35"W	36.09'
C119	4°46'43"	164.50'	13.72'	S02°23'22"W	13.72'
C120	4°47'29"	246.50'	20.61'	N39°32'00"E	20.61'
C121	12°12'50"	246.50'	52.55'	N31°01'51"E	52.45'
C122	7°33'00"	246.50'	32.48'	N21°08'56"E	32.46'
C123	12°35'43"	246.50'	54.19'	N11°04'35"E	54.08'
C124	4°46'43"	246.50'	20.56'	N02°23'22"E	20.55'
C125	10°35'10"	163.50'	30.21'	S84°42'17"E	30.17'
C126	4°28'17"	163.50'	12.76'	S77°10'34"E	12.76'
C127	27°25'31"	69.50'	33.27'	S88°39'10"E	32.95'
C128	31°26'38"	69.50'	38.14'	N61°54'45"E	37.66'
C129	31°26'38"	69.50'	38.14'	N30°28'07"E	37.66'
C130	25°36'25"	69.50'	31.06'	N01°56'36"E	30.80'
C131	34°24'26"	61.50'	36.93'	S67°38'48"E	36.38'
C132	34°24'26"	61.50'	36.93'	S33°14'21"E	36.38'
C133	18°58'40"	61.50'	20.37'	S06°32'48"E	20.28'
C134	28°59'29"	61.50'	31.12'	S17°26'17"W	30.79'
C135	55°35'04"	38.50'	37.35'	N62°12'20"W	35.90'
C136	1°17'10"	61.50'	1.38'	S00°38'22"W	1.38'
C137	33°15'22"	61.50'	35.70'	S17°54'38"W	35.20'
C138	34°24'26"	61.50'	36.93'	S51°44'32"W	36.38'
C139	34°24'26"	61.50'	36.93'	S86°08'58"W	36.38'
C140	34°24'26"	61.50'	36.93'	N59°26'35"W	36.38'
C141	31°35'12"	61.50'	33.90'	N26°26'46"W	33.48'
C142	49°34'00"	61.50'	53.20'	N14°07'50"E	51.56'
C143	33°55'17"	61.50'	36.41'	N55°52'28"E	35.88'
C144	1°09'38"	756.50'	15.32'	S00°34'49"W	15.32'
C145	3°41'18"	756.50'	48.70'	S05°39'19"W	48.69'
C146	3°41'18"	756.50'	48.70'	S09°20'38"W	48.69'
C147	3°41'18"	756.50'	48.70'	S13°01'56"W	48.69'
C148	3°41'18"	756.50'	48.70'	S16°43'15"W	48.69'
C149	3°41'18"	756.50'	48.70'	S20°24'33"W	48.69'
C150	3°41'18"	756.50'	48.70'	S27°57'01"W	48.69'
C151	3°41'18"	756.50'	48.70'	S35°19'38"W	48.69'
C152	3°41'18"	756.50'	48.70'	S39°00'57"W	48.69'
C153	1°04'08"	756.50'	14.11'	S41°23'40"W	14.11'
C154	3°41'18"	756.50'	48.70'	S31°38'20"W	48.69'
C155	6°38'08"	473.50'	54.84'	S51°23'19"E	54.81'
C156	7°16'24"	473.50'	60.11'	S58°20'35"E	60.07'
C157	0°24'52"	473.50'	3.43'	S62°11'14"E	3.43'
C158	61°01'25"	61.50'	65.50'	N75°34'30"E	62.45'
C159	24°13'22"	61.50'	26.00'	S61°48'07"E	25.81'
C160	41°51'33"	61.50'	44.93'	S28°45'40"E	43.94'

CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C161	34°24'26"	61.50'	36.93'	S09°22'20"W	36.38'
C162	35°02'23"	61.50'	37.61'	S44°05'45"W	37.03'
C163	32°55'56"	61.50'	35.35'	S78°04'54"W	34.86'
C164	23°03'28"	61.50'	24.75'	N73°55'24"W	24.58'
C165	2°38'01"	526.50'	24.20'	N61°04'39"W	24.20'
C166	5°20'07"	526.50'	49.03'	N57°05'35"W	49.01'
C167	5°35'41"	526.50'	51.41'	N51°37'41"W	51.39'
C168	0°45'35"	526.50'	6.98'	N48°27'03"W	6.98'
C169	7°26'32"	358.50'	46.57'	N22°33'57"E	46.53'
C170	7°54'31"	358.50'	49.48'	N14°53'26"E	49.45'
C171	7°54'31"	358.50'	49.48'	N06°58'55"E	49.45'
C172	3°01'39"	358.50'	18.94'	N01°30'50"E	18.94'
C173	1°22'28"	703.50'	16.87'	N00°41'14"E	16.87'
C174	2°46'30"	703.50'	34.07'	N02°45'43"E	34.07'
C175	3°35'19"	703.50'	44.06'	N05°56'37"E	44.06'
C176	3°35'19"	703.50'	44.06'	N09°31'56"E	44.06'
C177	3°35'19"	703.50'	44.06'	N13°07'15"E	44.06'
C178	3°35'19"	703.50'	44.06'	N16°42'34"E	44.06'
C179	3°35'19"	703.50'	44.06'	N20°17'54"E	44.06'
C180	1°58'22"	703.50'	24.22'	N23°04'44"E	24.22'
C181	3°35'19"	703.50'	44.06'	N25°51'34"E	44.06'
C182	3°35'19"	703.50'	44.06'	N29°26'54"E	44.06'
C183	3°35'19"	703.50'	44.06'	N33°02'13"E	44.06'
C184	3°35'19"	703.50'	44.06'	N36°37'32"E	44.06'
C185	3°30'33"	619.50'	37.94'	S40°10'28"W	37.94'
C186	3°35'19"	619.50'	38.80'	S36°37'32"W	38.80'
C187	3°35'19"	619.50'	38.80'	S33°02'13"W	38.80'
C188	3°35'19"	619.50'	38.80'	S29°26'54"W	38.80'
C189	3°35'19"	619.50'	38.80'	S25°51'34"W	38.80'
C190	1°58'22"	619.50'	21.33'	S23°04'44"W	21.33'
C191	3°35'19"	619.50'	38.80'	S20°17'54"W	38.80'
C192	3°35'19"	619.50'	38.80'	S16°42'34"W	38.80'
C193	3°35'19"	619.50'	38.80'	S13°07'15"W	38.80'
C194	3°35'19"	619.50'	38.80'	S09°31'56"W	38.80'
C195	3°35'19"	619.50'	38.80'	S05°56'37"W	38.80'
C196	2°46'30"	619.50'	30.00'	S02°45'43"W	30.00'
C197	1°22'28"	619.50'	14.86'	S00°41'14"W	14.86'
C198	2°39'02"	756.50'	35.00'	S02°29'09"W	34.99'
C199	16°57'29"	38.50'	11.39'	N25°56'04"W	11.35'
C200	130°36'39"	61.50'	140.19'	N82°45'39"W	111.75'
C201	3°51'10"	756.50'	50.87'	S24°10'47"W	50.86'
C202	3°30'33"	703.50'	43.09'	N40°10'28"E	43.08'
C203	1°39'13"	599.50'	17.30'	N00°49'37"E	17.30'
C204	2°46'44"	599.50'	29.08'	N03°02'35"E	29.07'
C205	4°19'08"	599.50'	45.19'	N06°35'31"E	45.18'
C206	4°19'08"	599.50'	45.19'	N10°54'39"E	45.18'
C207	4°19'08"	599.50'	45.19'	N15°13'47"E	45.18'
C208	4°19'08"	599.50'	45.19'	N19°32'55"E	45.18'
C209	3°02'29"	599.50'	31.82'	N23°13'43"E	31.82'
C210	4°19'08"	599.50'	45.19'	N26°54'32"E	45.18'
C211	4°19'08"	599.50'	45.19'	N31°13'39"E	45.18'
C212	4°19'08"	599.50'	45.19'	N35°32'47"E	45.18'
C213	4°13'23"	599.50'	44.19'	N39°49'03"E	44.18'
C214	4°13'23"	517.50'	38.14'	S39°49'03"W	38.14'
C215	4°19'08"	517.50'	39.01'	S35°32'47"W	39.00'
C216	4°19'08"	517.50'	39.01'	S31°13'39"W	39.00'
C217	4°19'08"	517.50'	39.01'	S26°54'32"W	39.00'
C218	3°02'29"	517.50'	27.47'	S23°13'43"W	27.47'
C219	4°19'08"	517.50'	39.01'	S19°32'55"W	39.00'
C220	4°19'08"	517.50'	39.01'	S15°13'47"W	39.00'
C221	4°19'08"	517.50'	39.01'	S10°54'39"W	39.00'
C222	4°19'08"	517.50'	39.01'	S06°35'31"W	39.00'
C223	2°46'44"	517.50'	25.10'	S03°02'35"W	25.10'
C224	1°39'13"	517.50'	14.94'	S00°49'37"W	14.94'
C225	2°13'04"	460.50'	17.82'	N01°06'32"E	17.82'
C226	5°47'30"	460.50'	46.55'	N05°06'49"E	46.53'
C227	5°47'30"	460.50'	46.55'	N10°54'19"E	46.53'
C228	5°47'30"	460.50'	46.55'	N16°41'49"E	46.53'
C229	5°05'22"	460.50'	40.91'	N22°08'15"E	40.89'
C230	5°47'30"	460.50'	46.55'	N27°34'42"E	46.53'
C231	5°47'30"	460.50'	46.55'	N33°22'12"E	46.53'
C232	5°39'48"	460.50'	45.52'	N39°05'51"E	45.50'
C233	5°38'06"	378.50'	37.22'	S39°06'42"W	37.21'
C234	5°49'12"	378.50'	38.45'	S33°23'03"W	38.43'
C235	5°47'30"	378.50'	38.26'	S27°34'42"W	38.24'
C236	5°05'22"	378.50'	33.62'	S22°08'15"W	33.61'
C237	5°47'30"	378.50'	38.26'	S16°41'49"W	38.24'
C238	5°47'30"	378.50'	38.26'	S10°54'19"W	38.24'
C239	5°47'30"	378.50'	38.26'	S05°06'49"W	38.24'
C240	2°13'04"	378.50'	14.65'	S01°06'32"W	14.65'

CURVE TABLE					
CURVE	DELTA	RADIUS	LENGTH	BEARING	CHORD
C241	3°55'31"	265.50'	18.19'	N08°53'52"W	18.19'
C242	6°56'06"	265.50'	32.14'	N03°28'03"W	32.12'
C243	13°10'45"	15.00'	3.45'	S06°35'23"W	3.44'
C244	13°05'22"	15.00'	3.43'	N06°32'41"W	3.42'
C245	76°50'17"	15.00'	20.12'	S51°35'54"W	18.64'
C246	76°53'36"	15.00'	20.13'	N51°32'10"W	18.65'
C247	88°20'50"	15.00'	23.13'	S45°50'37"W	20.91'
C248	5°08'53"	61.50'	5.53'	S87°25'27"E	5.52'
C249	1°47'09"	303.50'	9.46'	S41°02'10"W	9.46'
C250	3°34'30"	164.50'	10.26'	S52°23'45"W	10.26'

LINE TABLE		
LINE	LENGTH	BEARING
L1	14.14'	S45° 01' 02"W
L2	14.14'	N44° 58' 58"W
L3	14.14'	N45° 01' 02"E
L4	14.14'	S44° 58' 58"E
L5	25.65'	S54° 11' 00"W
L6	25.23'	N54° 11' 00"E
L7	3.96'	S00° 06' 45"W
L8	74.00'	S00° 16' 39"E
L9	74.00'	S00° 16' 39"E
L10	14.15'	N44° 58' 58"W
L11	14.14'	S45° 01' 02"W
L12	14.14'	N44° 58' 58"W
L13	14.14'	S45° 01' 02"W
L14	20.00'	N00° 01' 02"E
L15	74.00'	S89° 58' 58"E
L16	74.00'	S89° 58' 58"E
L17	74.01'	S00° 01' 02"W
L18	74.01'	S00° 01' 02"W
L19	14.15'	N45° 01' 26"W
L20	13.40'	N42° 04' 19"E
L21	14.08'	N08° 52' 51"E
L22	13.76'	N79° 18' 14"W
L23	14.14'	S03° 04' 15"E
L24	14.14'	N86° 55' 45"E
L25	14.14'	S03° 04' 15"E
L26	14.14'	N86° 55' 45"E
L27	5.50'	N47° 12' 15"W
L28	8.73'	N42° 47' 45"E
L29	5.50'	N47° 12' 15"W
L30	6.58'	S42° 47' 45"W
L31	74.01'	S00° 01' 02"W
L32	74.01'	S00° 01' 02"W
L33	74.00'	S00° 16' 39"E
L34	82.03'	N63° 54' 50"W
L35	82.00'	N72° 37' 33"W
L36	82.00'	S65° 15' 02"E
L37	82.00'	S68° 17' 31"E
L38	84.00'	S65° 56' 05"E
L39	84.00'	S67° 54' 27"E
L40	27.33'	N71° 40' 29"W
L41	7.09'	S00° 16' 39"E
L42	7.70'	S00° 16' 39"E
L43	28.00'	N89° 43' 21"E
L44	0.97'	N00° 16' 39"W
L45	74.01'	S00° 01' 02"W
L46	74.01'	S00° 01' 02"W
L47	20.00'	S42° 47' 45"W
L48	37.48'	S02° 12' 15"E
L49	34.97'	S42° 47' 45"W
L50	74.00'	S00° 01' 02"W
L51	74.00'	S00° 01' 02"W
L52	38.01'	S48° 10' 12"E



LAND USE TABLE					
PARCEL	DESCRIPTION	DEDICATION	AREA	PERCENT	INTENDED OWNERSHIP/ MAINTAINANCE BY
TRACT A	Open Space	Drainage & Pedestrian Access Easement	905,608 S.F. 20.790 AC.	35.95%	HOA
TRACT B	Open Space	Drainage, Grading & Pedestrian Access Easement	17,422 S.F. 0.400 AC.	0.69%	HOA
TRACT C	Future Public Park	Pedestrian Access Easement	134,057 S.F. 3.078 AC.	5.32%	HOA
TRACT D	Access Roadway	Drainage, Utility & Access Easement	11,305 S.F. 0.260 AC.	0.45%	HOA
TRACT E	Open Space	Drainage, Grading & Pedestrian Access Easement	16,605 S.F. 0.381 AC.	0.66%	HOA
TRACT F	Open Space	Drainage, Utility & Pedestrian Access Easement	1,913 S.F. 0.044 AC.	0.08%	HOA
TRACT G	Open Space	Drainage, Utility & Pedestrian Access Easement	2,431 S.F. 0.056 AC.	0.10%	HOA
TRACT H	Open Space	Drainage, Utility & Pedestrian Access Easement	3,056 S.F. 0.070 AC.	0.12%	HOA
TRACT I	Open Space	Drainage, Utility & Pedestrian Access Easement	3,382 S.F. 0.078 AC.	0.13%	HOA
TRACT J	Open Space	Drainage, Utility & Pedestrian Access Easement	2,131 S.F. 0.049 AC.	0.08%	HOA
TRACT K	Access Roadway	Drainage, Utility, Access & Emergency Access Easement	29,955 S.F. 0.688 AC.	1.19%	HOA
TRACT L	Open Space	Drainage, Utility & Pedestrian Access Easement	5,607 S.F. 0.129 AC.	0.22%	HOA
TRACT M	Open Space	Drainage, Utility & Pedestrian Access Easement	2,995 S.F. 0.069 AC.	0.12%	HOA
TRACT N	Open Space	Pedestrian Access Easement	9,994 S.F. 0.229 AC.	0.40%	HOA
TRACT O	Open Space	Future Development	11,524 S.F. 0.265 AC.	0.46%	HOA
TRACT P	Open Space	Drainage & Utility Easement	2,691 S.F. 0.062 AC.	0.11%	HOA
TRACT Q	Open Space	Drainage & Utility Easement	2,221 S.F. 0.051 AC.	0.09%	HOA
TRACT R	Access Roadway	Drainage, Utility & Access Easement	11,954 S.F. 0.274 AC.	0.47%	HOA
TRACT S	Access Roadway	Drainage, Utility & Access Easement	14,832 S.F. 0.340 AC.	0.59%	HOA
TRACT T	Open Space	Drainage & Utility Easement	17,986 S.F. 0.413 AC.	0.71%	HOA
TRACT U	Open Space	Drainage & Pedestrian Access Easement	62,360 S.F. 1.432 AC.	2.48%	HOA
PROPOSED ROW	Public Use		380,714 S.F. 8.740 AC.	15.11%	City of Fort Collins
LOTS (205)	Private Residence		868,160 S.F. 19.930 AC.	34.47%	Property Owner
TOTAL			2,518,903 S.F. 57.826 AC.	100.00%	

LOT & BLOCK TABLE	
BLOCK	# OF LOTS
1	22
2	10
3	10
4	4
5	7
6	11
7	14
8	10
9	13
10	17
11	16
12	15
13	17
14	15
15	13
16	11
TOTAL LOTS	205

NORTH

150 0 150 300 450 Feet

(IN U.S. SURVEY FEET)
1 inch = 150 ft.

PRELIMINARY

Robert C. Tessely
Registered Professional Land Surveyor
Colorado Registration No. 38470
For and on behalf of Northern Engineering Services, Inc.

NOTICE:
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SECTION: 7
TOWNSHIP: 6N
RANGE: 68 W of the 6th PM

NORTHERN ENGINEERING
CERT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

PROJECT: 1204-003
CLIENT: Post Modern Development
DATE: 12/24/19
SCALE: 1"=150'
DRAWN BY: L. Smith
REVIEWED BY: R. Tessely

RENNAT SUBDIVISION

CITY OF FORT COLLINS
STATE OF COLORADO

Sheet
2
Of 6 Sheets

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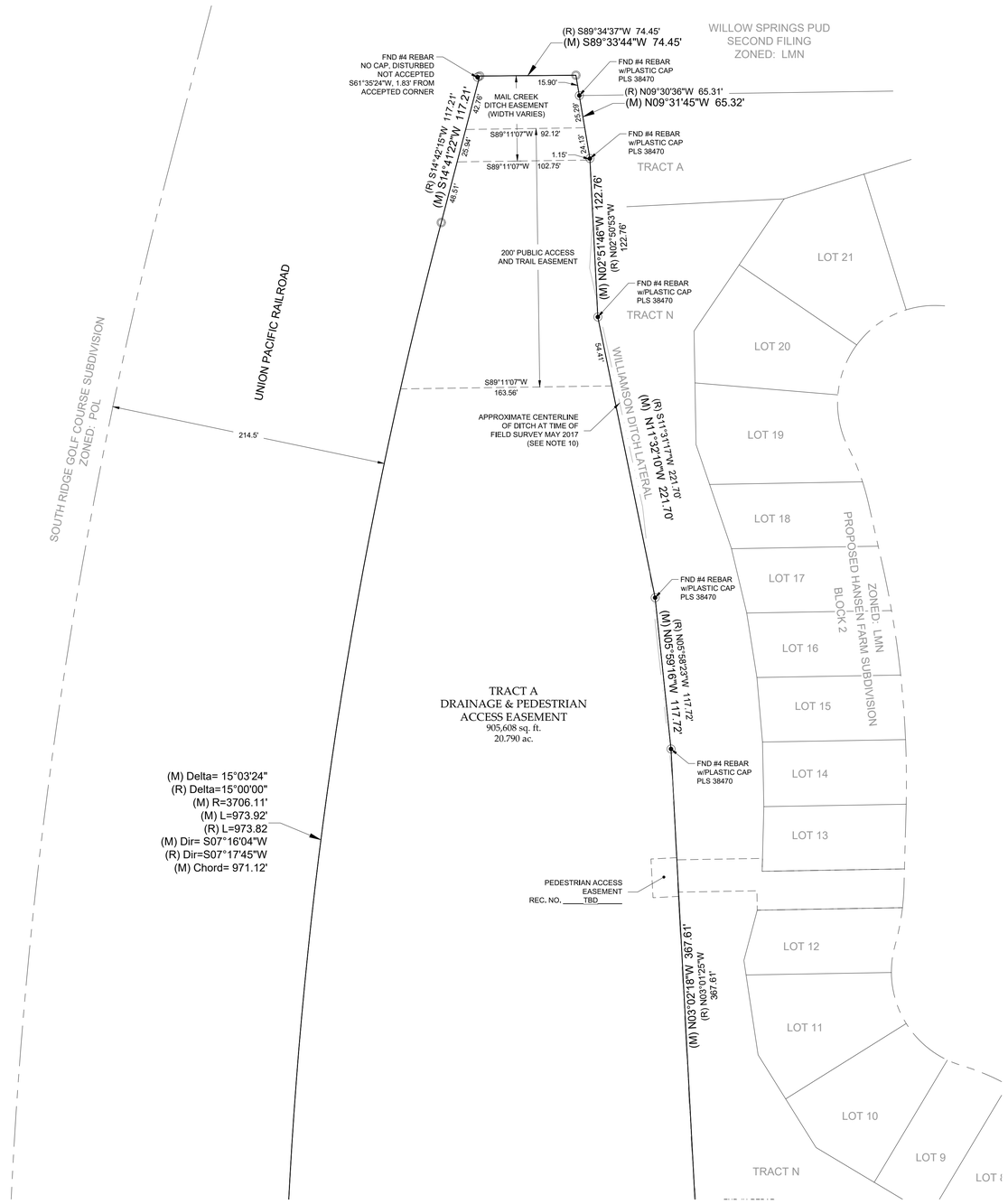
RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO



LEGEND

	EASEMENT LINE
	EXISTING RIGHT-OF-WAY
	BOUNDARY LINE
	LOT LINE
	SECTION LINE
⊙	FOUND PROPERTY CORNER AS DESCRIBED
○	SET 18" #4 REBAR WITH BLUE PLASTIC CAP, PLS 38470
⊕	FOUND SECTION CORNER AS DESCRIBED
UE	UTILITY EASEMENT
DGE	DRAINAGE & GRADING EASEMENT
DUE	DRAINAGE & UTILITY EASEMENT
PAE	PEDESTRIAN ACCESS EASEMENT
DU&AE	DRAINAGE, UTILITY & ACCESS EASEMENT
DUA&EAE	DRAINAGE, UTILITY, ACCESS & EMERGENCY ACCESS EASEMENT
DU&PAE	DRAINAGE, UTILITY & PEDESTRIAN ACCESS EASEMENT
DG&PAE	DRAINAGE, GRADING & PEDESTRIAN ACCESS EASEMENT
LMN	LOW DENSITY MIXED USE
MMN	MEDIUM DENSITY MIXED USE
NC	NEIGHBORHOOD CONSERVATION LOW DENSITY
POL	PUBLIC OPEN LANDS
(M)	MEASURED BEARING/DISTANCE
(R)	RECORDED BEARING/DISTANCE

NORTH

50 0 50 100 150 Feet

(IN U.S. SURVEY FEET)
1 inch = 50 ft.

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FORT COLLINS: 301 North Howes Street, Suite 100, 80521
GREELEY: 820 8th Street, 80631
970.221.4158
northernengineering.com

DATE: 12/24/19
SCALE: 1"=50'
REVIEWED BY: R. Tessely
PROJECT: 1204-003
CLIENT: Post Modern Development
DRAWN BY: L. Smith

RENNAT SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

Sheet
3
Of 6 Sheets

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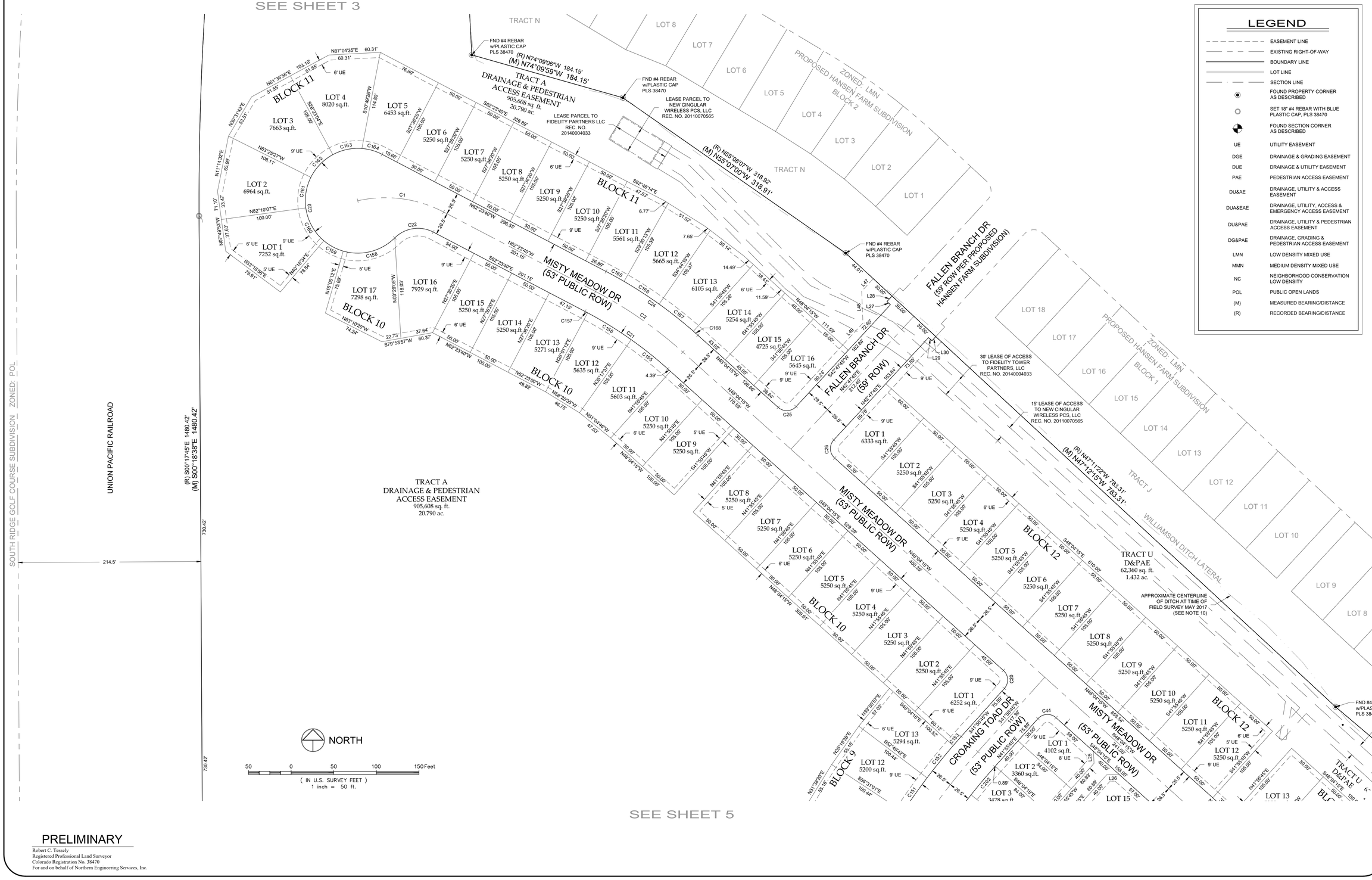
RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

SEE SHEET 3



LEGEND

- EASEMENT LINE
- EXISTING RIGHT-OF-WAY
- BOUNDARY LINE
- LOT LINE
- SECTION LINE
- FOUND PROPERTY CORNER AS DESCRIBED
- SET 18" #4 REBAR WITH BLUE PLASTIC CAP, PLS 38470
- FOUND SECTION CORNER AS DESCRIBED
- UE — UTILITY EASEMENT
- DGE — DRAINAGE & GRADING EASEMENT
- DUE — DRAINAGE & UTILITY EASEMENT
- PAE — PEDESTRIAN ACCESS EASEMENT
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- LMN — LOW DENSITY MIXED USE
- MMN — MEDIUM DENSITY MIXED USE
- NC — NEIGHBORHOOD CONSERVATION LOW DENSITY
- POL — PUBLIC OPEN LANDS
- (M) — MEASURED BEARING/DISTANCE
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PROJECT: 1204-003
CLIENT: Post Modern Development
DRAWN BY: L. Smith
DATE: 12/24/19
SCALE: 1"=50'
REVIEWED BY: R. Tessely

RENNAT SUBDIVISION

CITY OF FORT COLLINS
STATE OF COLORADO

Sheet 4
Of 6 Sheets

PRELIMINARY

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Registered Professional Land Surveyor
Colorado Registration No. 38470
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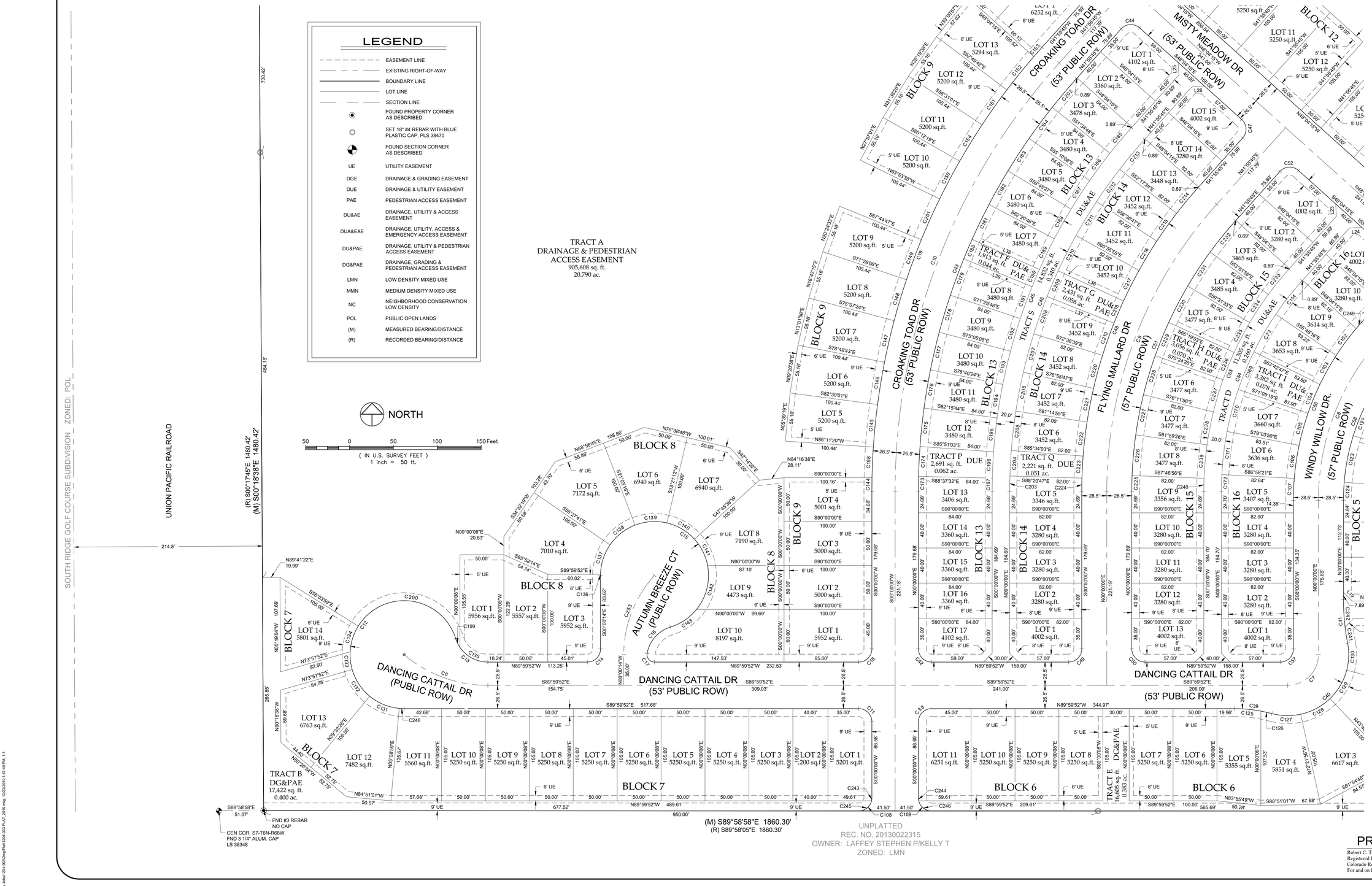
RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO

SEE SHEET 4



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DATE: 12/24/19
SCALE: 1"=50'
REVIEWED BY: R. Tessely
PROJECT: 1204-003
CLIENT: Post Modern Development
DRAWN BY: L. Smith

RENNAT SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

Sheet 5
Of 6 Sheets

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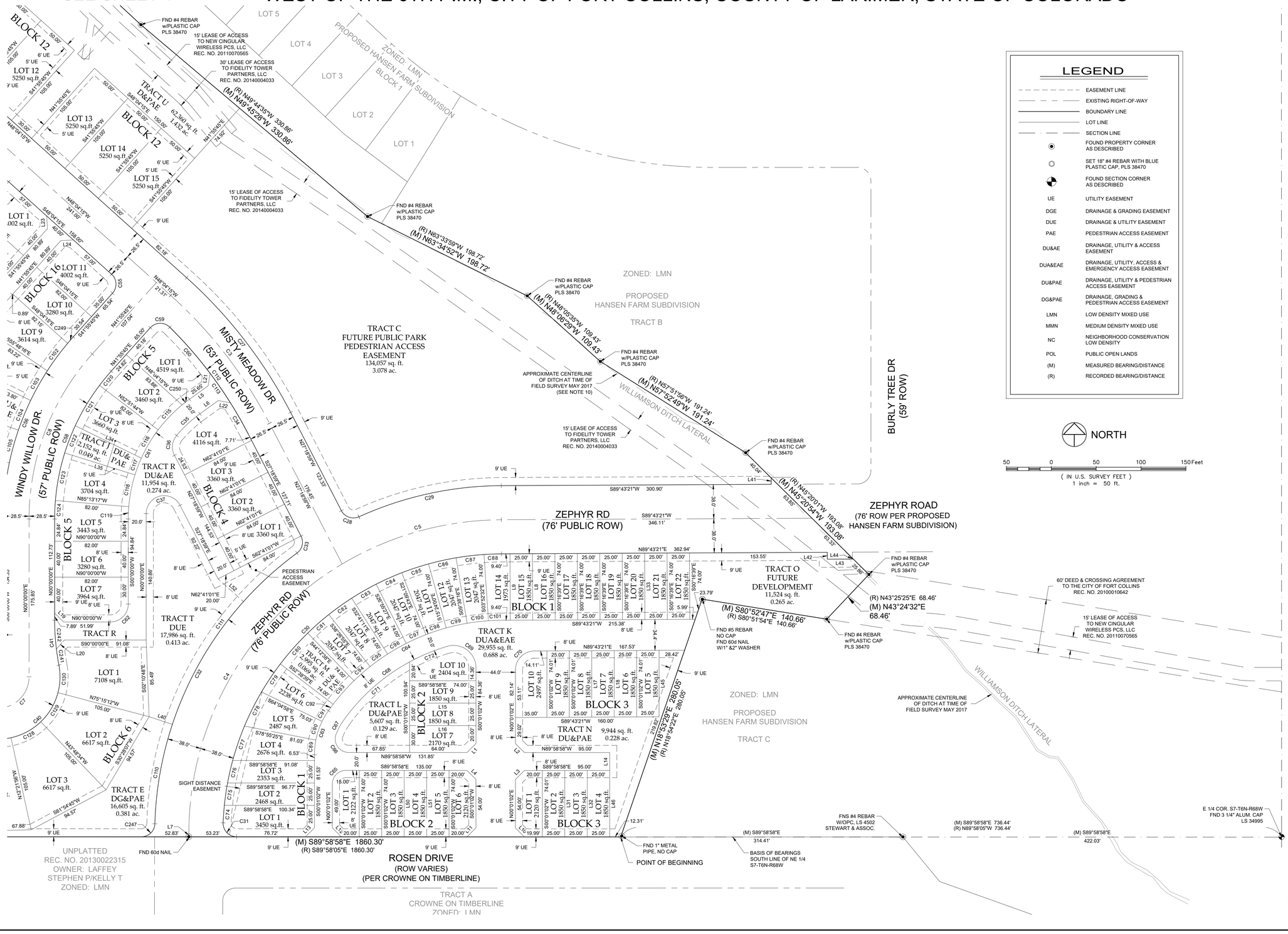
RENNAT SUBDIVISION

A TRACT OF LAND LOCATED IN THE EAST HALF OF SECTION 7, TOWNSHIP 6 NORTH, RANGE 68 WEST OF THE 6TH P.M., CITY OF FORT COLLINS, COUNTY OF LARIMER, STATE OF COLORADO



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NORTH

50 0 50 100 150 Feet

(IN U.S. SURVEY FEET)
1 inch = 50 ft.

NOTICE:
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northernengineering.com

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CLIENT: Post Modern Development
DRAWN BY: L. Smith
DATE: 12/24/19
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RENNAT SUBDIVISION
CITY OF FORT COLLINS
STATE OF COLORADO

Sheet
6
Of 6 Sheets

PRELIMINARY

Robert C. Tessely
Registered Professional Land Surveyor
Colorado Registration No. 38470
For and on behalf of Northern Engineering Services, Inc.

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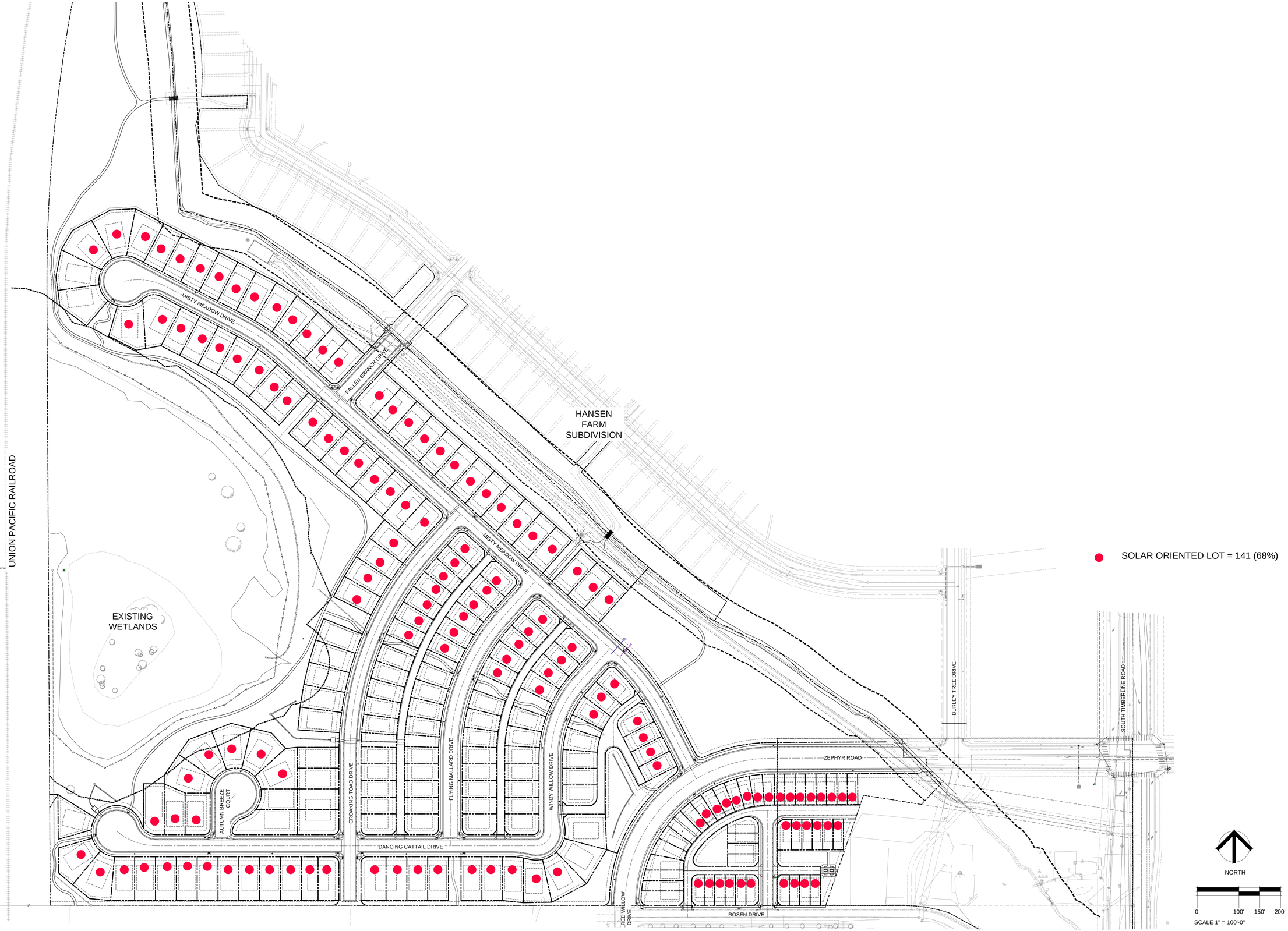

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landscape architecture | planning | illustration

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SEAL

PROJECT TITLE

RENNAT
SUBDIVISION

Preliminary
Development
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Ft Collins, Colorado

PREPARED FOR

POST MODERN DEVELOPMENT
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STAFF COMMENTS	12.23.19

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AUGUST 9, 2019

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SHEET INFORMATION

SHEET 1 OF 1

RENNAT PROPERTY
TRANSPORTATION IMPACT STUDY

FORT COLLINS, COLORADO

JULY 2019

Prepared for:

Post Modern Development
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Project #1941

TABLE OF CONTENTS

I. INTRODUCTION 1

II. EXISTING CONDITIONS 2
Land Use 2
Streets 2
Existing Traffic 5
Existing Operation 5
Pederstrian Facilities 8
Bicycle Facilities 11
Transit Facilities 11

III. PROPOSED DEVELOPMENT 12
Trip Generation 12
Trip Distribution 12
Background Traffic Projections 12
Trip Assignment 18
Signal Warrants 18
Geometry 23
Operation Analysis 23
Pedestrian Level of Service 28
Bicycle Level of Service 35
Transit Level of Service 35

IV. CONCLUSIONS 36

LIST OF TABLES

1. Current Peak Hour Operation 9
2. Trip Generation 14
3. Short Range (2024) Background Peak Hour Operation 26
4. Long Range (2040) Background Peak Hour Operation 29
5. Short Range (2024) Total Peak Hour Operation 31
6. Long Range (2040) Total Peak Hour Operation 33

LIST OF FIGURES

1. Site Location 3
2. Existing Intersection Geometry 4
3. Recent Peak Hour Traffic 6
4. Averaged/Balanced Recent Peak Hour Traffic 7
5. Site Plan 13
6. Trip Distribution 15
7. Short Range (2024) Background Peak Hour Traffic 16
8. Long Range (2040) Background Peak Hour Traffic 17
9. Short Range (2024) Site Generated Peak Hour Traffic 19
10. Long Range (2040) Site Generated Peak Hour Traffic 20
11. Short Range (2024) Total Peak Hour Traffic 21
12. Long Range (2040) Total Peak Hour Traffic 22
13. Short Range (2024) Geometry 24
14. Long Range (2040) Geometry 25

APPENDICES

A. Base Assumptions Form
B. Peak Hour Traffic Counts
C. Current Peak Hour Operation/Level of Service Descriptions/Fort Collins Motor Vehicle LOS Standards (Intersections)
D. Signal Warrant Data
E. Short Range (2024) Background Peak Hour Operation
F. Long Range (2040) Background Peak Hour Operation
G. Short Range (2024) Total Peak Hour Operation
H. Long Range (2040) Total Peak Hour Operation
I. Pedestrian/Bicycle Maps and Level of Service Worksheets

I. INTRODUCTION

This Transportation Impact Study (TIS) addresses the capacity, geometric, and control requirements for the proposed Rennat Property. The proposed Rennat Property is located on the west side of Timberline Road and south of Kechter Road-Willow Springs Way in Fort Collins, Colorado.

During the course of the analysis, numerous contacts were made with the project developer (Post Modern Development), project planning consultant (TB Group), the project engineer (Northern Engineering), and the City of Fort Collins Traffic Operations Engineer. The Transportation Impact Study Base Assumptions form and related documents are provided in Appendix A. This study generally conforms to the format set forth in the Fort Collins TIS Guidelines in the "Larimer County Urban Area Street Standards" (LCUASS). A scoping discussion was held with the Fort Collins Traffic Engineering staff. The study involved the following steps:

- Collect physical, traffic, and development data;
- Perform trip generation, trip distribution, and trip assignment;
- Determine peak hour traffic volumes;
- Conduct capacity and operational level of service analyses on key intersections;
- Analyze signal warrants;
- Conduct level of service evaluation of pedestrian, bicycle, and transit modes of transportation

II. EXISTING CONDITIONS

The location of the Rennat Property is shown in Figure 1. It is important that a thorough understanding of the existing conditions be presented.

Land Use

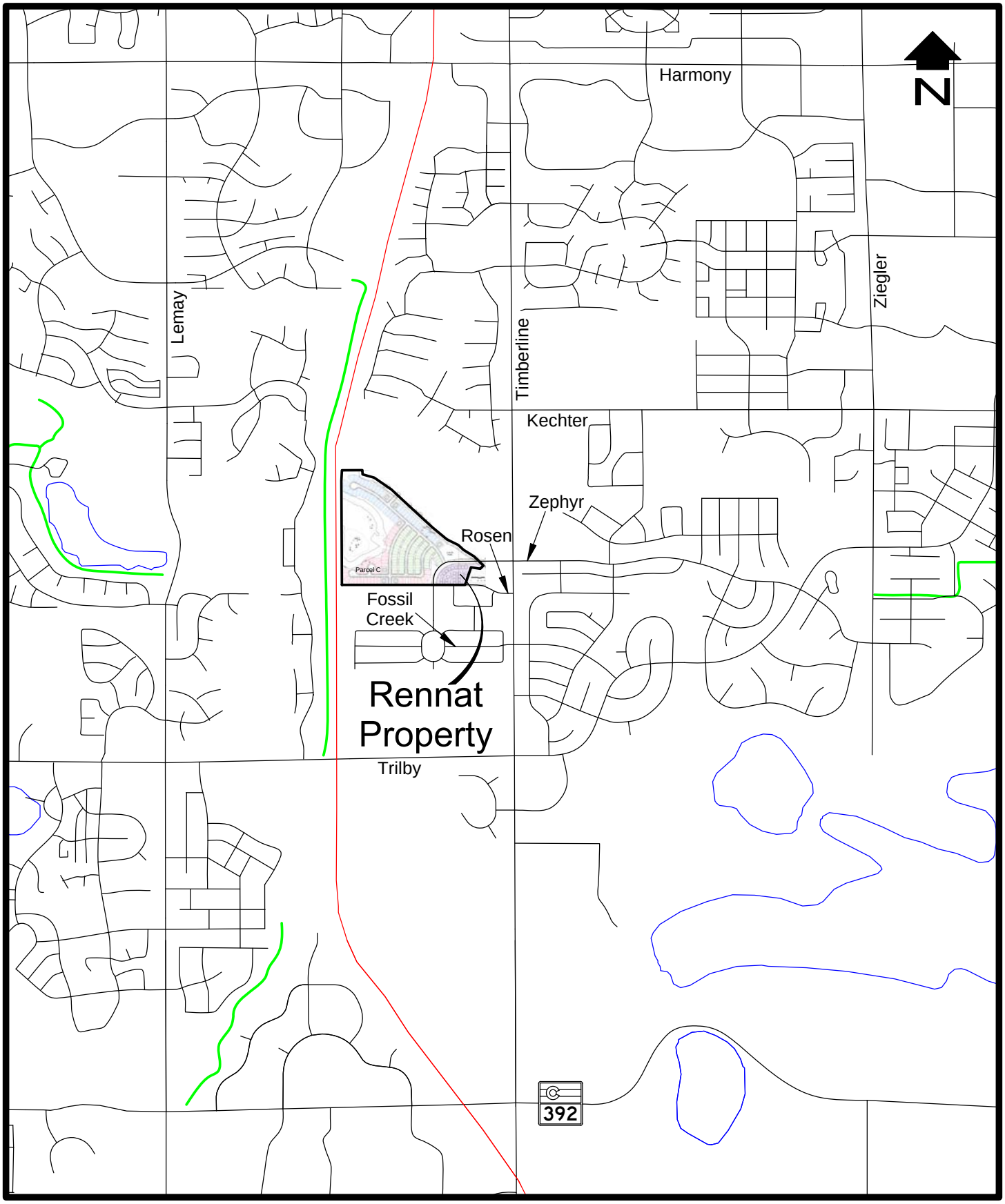
Land uses in the area are primarily residential, institutional (school), or open. There are residential uses to the east and north of the site. Bacon Elementary is to the east of the site. Kechter Farms (a residential use) to the east of the site and is nearly built out. The center of Fort Collins lies to the northwest of the proposed Rennat Property site.

Streets

The primary streets near the Rennat Property site are Timberline Road, Trilby Road, Fossil Creek Parkway, Zephyr Road, and Kechter Road. Figure 2 shows the current geometry at the key intersections.

Timberline Road is east of (adjacent to) the proposed Rennat Property site. It is a north-south street classified as a four-lane arterial street, north of Trilby Road and a two-lane arterial street, south of Trilby Road on the Fort Collins Master Street Plan. Currently, Timberline Road has a two-lane cross section (with center lane) in this area. At the Timberline/Trilby intersection, Timberline Road has northbound and southbound left-turn lanes, one through lane in each direction, and northbound and southbound right-turn lanes. The Timberline/Trilby intersection has signal control. At the Timberline/Fossil Creek intersection, Timberline Road has northbound and southbound left-turn lanes (two-way continuous left-turn lanes), a northbound through/right-turn lane, a southbound through lane, and a southbound right-turn lane. At the Timberline/Rosen intersection, Timberline Road has a northbound left-turn lane (two-way continuous left-turn lane), one through lane in each direction, and a southbound right-turn lane. At the Timberline/Zephyr intersection, Timberline Road has a southbound left-turn lane, one through lane in each direction, and a northbound right-turn lane. The Timberline/Fossil Creek, Timberline/Rosen, and Timberline/Zephyr intersections have stop sign control on the minor streets. At the Timberline/Kechter-Willow Springs intersection, Timberline Road has northbound and southbound left-turn lanes, one through lane in each direction, and northbound and southbound right-turn lanes. The Timberline/Kechter-Willow Springs intersection has signal control. The posted speed limit on Timberline Road is 40 mph in this area.

Trilby Road is south of the proposed Rennat Property site. It is an east-west street classified as a four-lane arterial, west of Timberline Road and a collector street, east of Timberline Road on the Fort Collins Master Street Plan. Currently, Trilby Road has a two-lane cross section. At the Timberline/Trilby intersection, Trilby Road has



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SITE LOCATION

Figure 1

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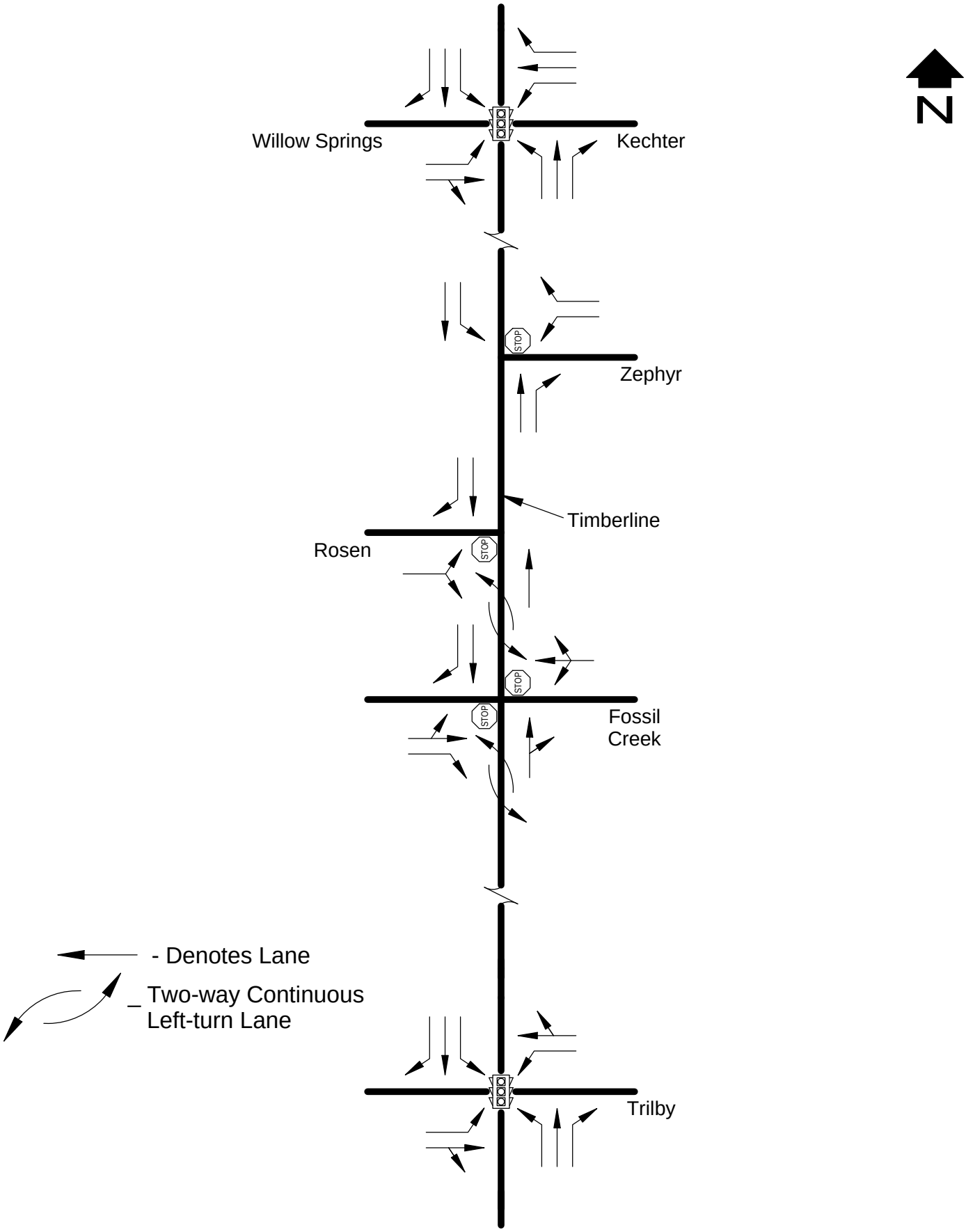


EXISTING INTERSECTION GEOMETRY Figure 2

eastbound and westbound left-turn lanes and a through/right-turn lane in each direction. The posted speed limit on Trilby Road is 40 mph, west of Timberline Road and 25 mph, east of Timberline Road.

Fossil Creek Parkway is south of the proposed Rennat Property site. It is an east-west street classified as a local street on the Fort Collins Master Street Plan. Currently, Fossil Creek Parkway has a two-lane cross section. At the Timberline/Fossil Creek intersection, Fossil Creek Parkway has all westbound movements combined into a single lane. The west leg (eastbound) of Fossil Creek Parkway is wide enough that right-turning vehicles bypass the through/left-turning vehicles. There is a pedestrian signal at this intersection.

Zephyr Road is east of the proposed Rennat Property site. It is an east-west street classified as a two-lane collector street on the Fort Collins Master Street Plan. Currently, Zephyr Road has a two-lane cross section. Zephyr Road only has an east leg at the Timberline/Zephyr intersection. At the Timberline/Zephyr intersection, Zephyr Road has a westbound left-turn lane and a westbound right-turn lane. The posted speed limit on Zephyr Road is 25 mph.

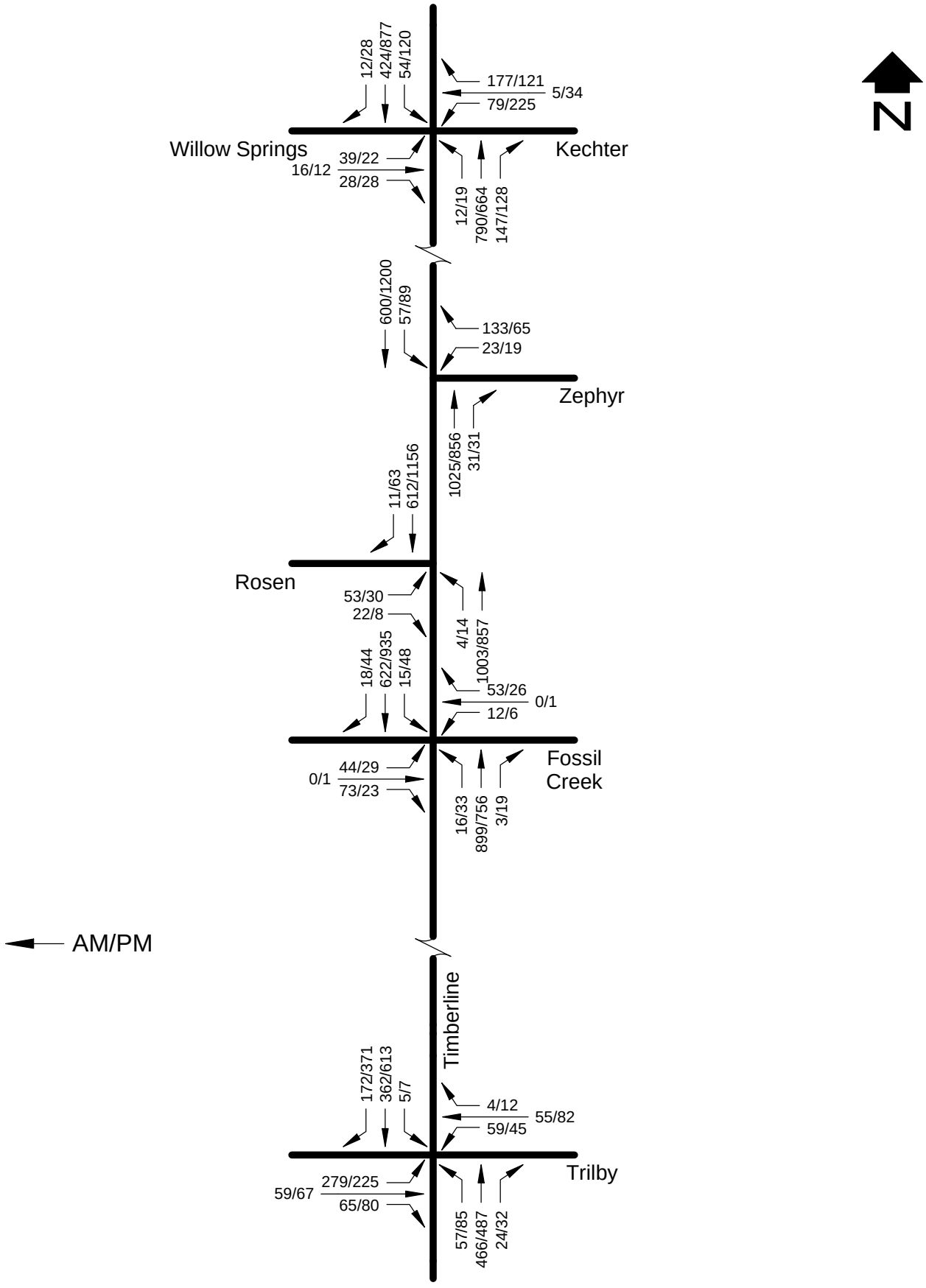
Kechter Road-Willow Springs Way is north of the proposed Rennat Property site. Kechter Road is an east-west street classified as a two-lane arterial east of Timberline Road on the Fort Collins Master Street Plan. Currently, Kechter Road has a two-lane cross section. At the Timberline/Kechter-Willow Springs intersection, Kechter Road-Willow Springs Way has eastbound and westbound left-turn lanes, one through lane in each direction, and a westbound right-turn lane. The posted speed limit on Kechter Road is 40 mph.

Existing Traffic

Recent peak hour traffic volumes at the Timberline/Trilby, Timberline/Fossil Creek, Timberline/Rosen, Timberline/Zephyr, and Timberline/Kechter-Willow Springs intersections are shown in Figure 3. The counts at the Timberline/Trilby and Timberline/Kechter-Willow Springs intersections were obtained in June 2017. The counts at the Timberline/Fossil Creek, Timberline/Rosen, and Timberline/Zephyr intersections were obtained in May 2019. Raw traffic count data is provided in Appendix B. Since the counts were collected on different days, the volumes at the Timberline/Fossil Creek, Timberline/Rosen, and Timberline/Zephyr intersections were averaged/balanced and are shown in Figure 4. Traffic volumes at the Timberline/Trilby and Timberline/Kechter-Willow Springs intersections were adjusted to reflect the more recent counts at the other key intersections.

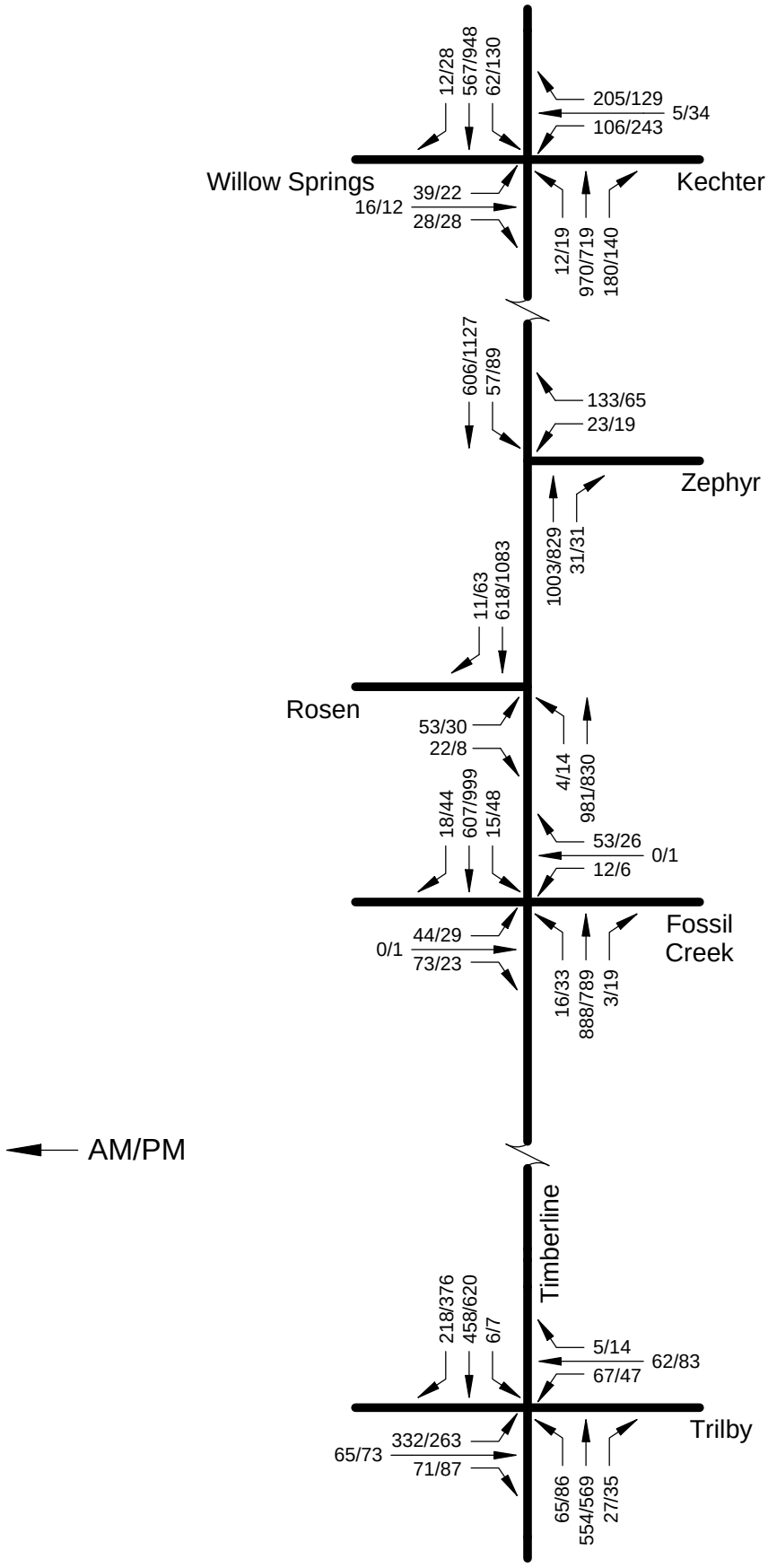
Existing Operation

The Timberline/Trilby, Timberline/Fossil Creek, Timberline/Rosen, Timberline/Zephyr, and Timberline/Kechter-Willow Springs intersections were evaluated using techniques provided in the 2016 Highway Capacity Manual, 6th Edition. Using the



RECENT PEAK HOUR TRAFFIC

Figure 3



AVERAGED/BALANCED RECENT PEAK HOUR TRAFFIC

Figure 4

morning and afternoon peak hour traffic shown in Figure 4, the peak hour operation is shown in Table 1. Calculation forms are provided in Appendix C. A description of level of service for signalized and unsignalized intersections from the 2016 Highway Capacity Manual and a table showing the Fort Collins Motor Vehicle LOS Standards (Intersections) are also provided in Appendix C. Acceptable operation at signalized intersections during the peak hours is defined as level of service E or better for each movement and leg, and level of service D or better overall. At arterial/arterial unsignalized intersections, acceptable operation is considered to be at level of service F for any approach leg and level of service E overall. At arterial/local unsignalized intersections, acceptable operation is considered to be at level of service F for any approach leg and level of service D overall. In such areas, it is expected that there would be substantial delays to the minor street movements at unsignalized intersections during the peak hours. This is considered to be normal in urban areas. The key intersections currently meet the Fort Collins operational criteria with existing control and geometry in the morning and afternoon peak hours, except for the eastbound left-turn at the Timberline/Trilby intersection in the afternoon peak hour. Adjustments to the City's current signal timing resulted in acceptable operation of the intersection with regard to delay (EB left-turn: 66.9 seconds = LOS E). This operation is also shown in Table 1.

It is important to note that at the Timberline/Trilby intersection, the eastbound left-turn volume exceeds the 300+ vehicles per hour "rule of thumb" that would require dual left-turn lanes. However, the operation of the Timberline/Trilby intersection meets the Fort Collins operational criteria with a single eastbound left-turn lane.

Over a number of years, Delich Associates has conducted research comparing the calculated delay (measure of Level of Service (LOS)) and observed delay at stop sign controlled intersections. This was applied to the minor (stop sign controlled) movements (left turns and right turns) at both four-leg intersections and three-leg intersections. That research indicated that an intersection where delay to the minor street movements were relatively short (LOS A, B, C), the calculated delay reasonably matched the observed delay. However, when the major street traffic increased substantially (>1500 vph), the calculated delay to the minor street movements (using the HCM techniques) were longer than the observed delays. This research was conducted using LOS techniques in the 2000 Highway Capacity Manual. Comparisons have not yet been extended to the 2016 Highway Capacity Manual techniques in a rigorous fashion. However, casual comparisons indicate that the differences may be similar. This information is provided to the reviewer in consideration of drawing conclusions based upon the LOS and calculated delay at the Timberline/Fossil Creek, Timberline/Rosen, and Timberline/ Zephyr intersections.

Pedestrian Facilities

There are sidewalks along the east side of Timberline Road (between Trilby Road and Zephyr Road), along Zephyr Road, along Fossil Creek Parkway, along Trilby Road (east of Timberline), and the west side of Timberline Road (near the Timberline/

TABLE 1 Current Peak Hour Operation			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Timberline/Trilby (signal)	EB LT	E (63.1 secs)	F (89.8 secs)
	EB T/RT	C	D
	EB APPROACH	E (55.7 secs)	E (74.2 secs)
	WB LT	D	D
	WB T/RT	D	E (58.4 secs)
	WB APPROACH	D	E (56.9 secs)
	NB LT	B	A
	NB T	B	B
	NB RT	A	A
	NB APPROACH	B	B
	SB LT	B	A
	SB T	B	B
	SB RT	B	A
	SB APPROACH	B	B
	OVERALL	C	C
Timberline/Trilby (signal with adjusted timing)	EB LT	N/A	E (66.9 secs)
	EB T/RT		D
	EB APPROACH		E (58.0 secs)
	WB LT		D
	WB T/RT		E (58.4 secs)
	WB APPROACH		E (56.9 secs)
	NB LT		B
	NB T		B
	NB RT		A
	NB APPROACH		B
	SB LT		A
	SB T		B
	SB RT		B
	SB APPROACH		B
	OVERALL		C

Continued on next page

Continued from previous page

TABLE 1
Current Peak Hour Operation

Intersection	Movement	Level of Service	
		AM	PM
Timberline/Fossil Creek (stop sign)	EB LT/T	F (288.0 secs)	F (359.8 secs)
	EB RT	B	C
	EB APPROACH	F (117.6 secs)	F (212.2 secs)
	WB LT/T/RT	F (50.8 secs)	F (51.2 secs)
	NB LT	A	B
	SB LT	B	A
	OVERALL	A	A
Timberline/Rosen (stop sign)	EB LT/RT	F (133.9 secs)	F (99.5 secs)
	NB LT	A	B
	OVERALL	A	A
Timberline/Zephyr (stop sign)	WB LT	F (118.8 secs)	F (178.2 secs)
	WB RT	E (47.6 secs)	C
	WB APPROACH	F (58.1 secs)	F (54.2 secs)
	SB LT	B	B
	OVERALL	A	A
Timberline/Kechter-Willow Springs (signal)	EB LT	D	D
	EB T/RT	D	D
	EB APPROACH	D	D
	WB LT	D	D
	WB T	D	D
	WB RT	D	D
	WB APPROACH	D	D
	NB LT	A	B
	NB T	B	B
	NB RT	A	A
	NB APPROACH	B	B
	SB LT	B	B
	SB T	A	C
	SB RT	A	A
	SB APPROACH	A	C
	OVERALL	B	C

Rosen intersection). There are also sidewalks along Timberline Road, south of Kechter Road, extending for approximately 500 feet on the east side and approximately 1,100 feet on the west side of Timberline Road. North of Kechter Road, there are sidewalks along Timberline Road extending for approximately 550 feet on the east side and extending to Harmony Road on the west side of Timberline Road. There is a short segment (≈300 feet) of sidewalk on the north side of Kechter Road. Sidewalks will be incorporated within and adjacent to this development.

Bicycle Facilities

There are bicycle lanes along Timberline Road, Zephyr Road, Trilby Road (east of Timberline Road), and Kechter Road within the study area.

Transit Facilities

Currently, this area of Fort Collins is not served by Transfort. The closest route is Route 16 that runs along Harmony Road.

III. PROPOSED DEVELOPMENT

The Rennat Property is a residential development, located along the west side of Timberline Road, between Kechter Road and Fossil Creek Parkway in Fort Collins. Figure 5 shows a site plan of the Rennat Property. The proposed Rennat Property will consist of 44 single family detached dwelling units (Parcel A), 67 single family attached dwelling units (Parcel B), 42 single family detached dwelling units (Parcel C), 48 single family attached dwelling units (Parcel D), and 14 single family attached dwelling units (Parcels E).

The short range analysis (Year 2024) includes development of the Rennat Property site and an appropriate increase in background traffic due to normal growth and other potential developments in the area. The site plan shows that the Rennat Property development will have access to/from Zephyr Road. The long range analysis (Year 2040) includes development of the Rennat Property and an appropriate increase in background traffic due to normal growth and in general accordance with the Fort Collins Structure Plan. In the future (beyond the year 2024), it is expected/assumed that Red Willow Drive will connect to a future signal at the Timberline/Zephyr intersection from the properties to the south. It is expected/assumed that Red Willow Drive will also extend south to Trilby Road, by/before 2040.

Trip Generation

Trip generation is important in considering the impact of a development such as this upon the existing and proposed street system. A compilation of trip generation information contain in Trip Generation, 10th Edition, ITE was used to estimate the trips that would be generated by the proposed/expected uses at the Rennat Property site. A trip is defined as a one-way vehicle movement from origin to destination. Table 2 shows the expected trip generation on a daily and peak hour basis. The trip generation of the Rennat Property development resulted in 2030 daily trip ends, 159 morning peak hour trip ends, and 213 afternoon peak hour trip ends.

Trip Distribution

Trip distribution for the Rennat Property was based on existing/future travel patterns, land uses in the area, consideration of trip attractions/productions in the area, and engineering judgment. Figure 6 shows the trip distribution for the short range (2024) and long range (2040) analysis futures. The trip distribution was agreed to by City of Fort Collins staff.

Background Traffic Projections

Figures 7 and 8 show the short range (2024) and long range (2040) background traffic projections, respectively. Background traffic projections for the short range (2024) future horizon were obtained by reviewing the North Front Range Regional

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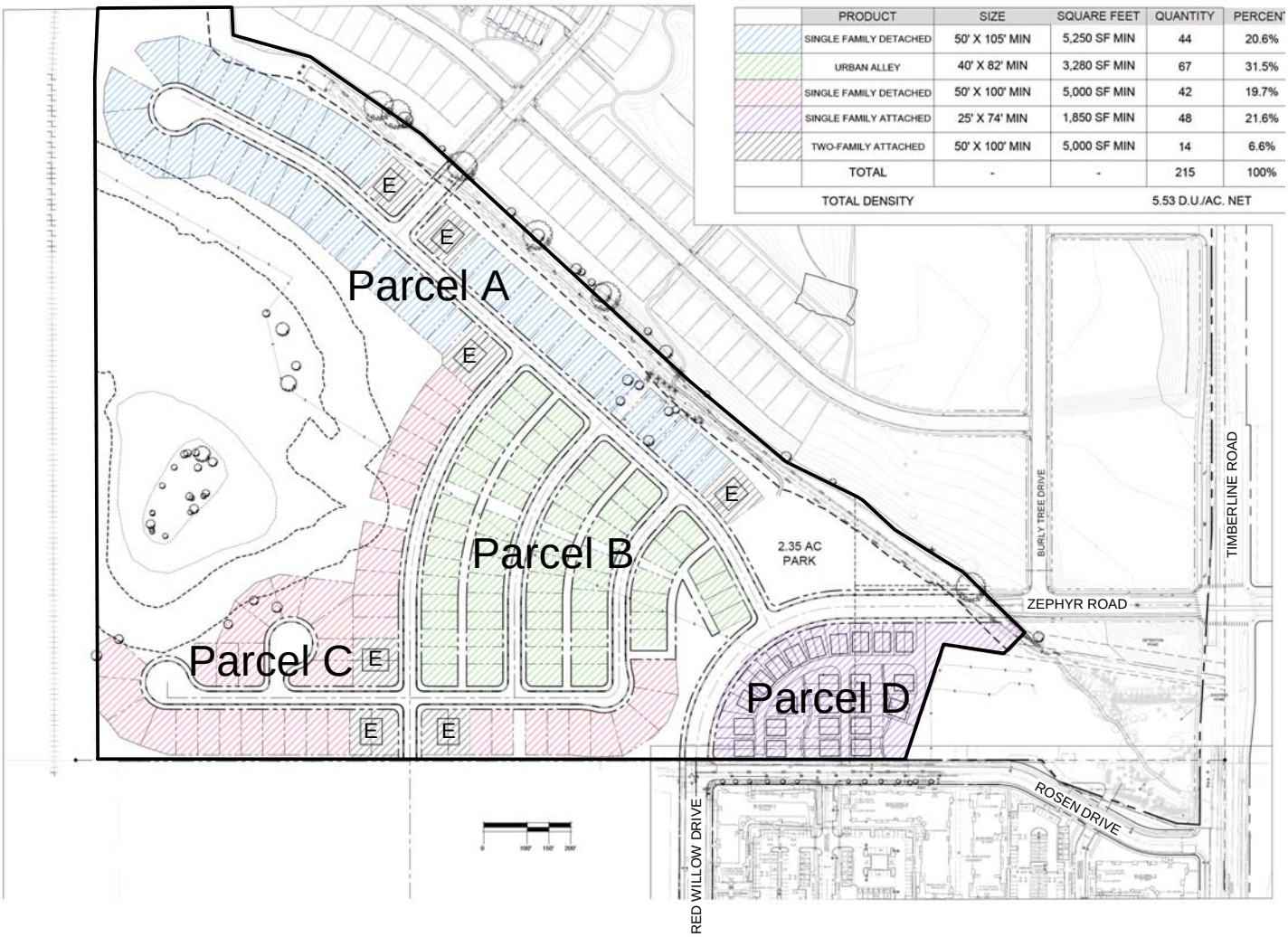


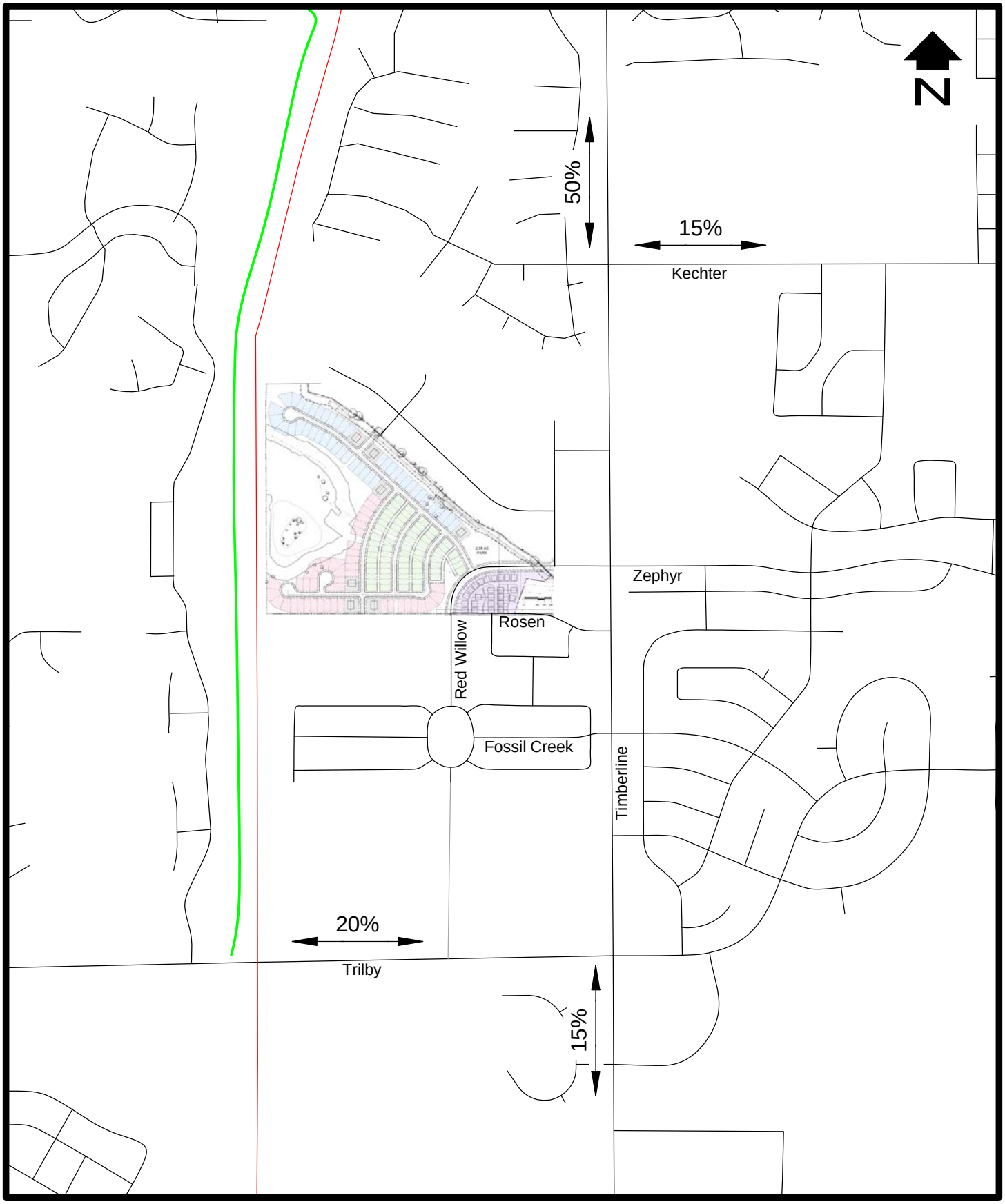
SITE PLAN

Figure 5

DELICH ASSOCIATES

TABLE 2
Trip Generation

Code	Use	Size	AWDTE		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	In	Rate	Out	Rate	In	Rate	Out
Parcel A												
210	Single Family Detached	44 D.U.	9.44	416	0.19	8	0.55	25	0.62	27	0.37	16
Parcel B												
210	Single Family Attached	67 D.U.	9.44	632	0.19	13	0.55	37	0.62	41	0.37	25
Parcel C												
210	Single Family Detached	42 D.U.	9.44	396	0.19	8	0.55	23	0.62	26	0.37	16
Parcel D												
210	Single Family Attached	48 D.U.	9.44	454	0.19	9	0.55	26	0.62	30	0.37	18
Parcels E												
210	Single Family Attached	14 D.U.	9.44	132	0.19	2	0.55	8	0.62	9	0.37	5
Total				2030		40		119		133		80



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TRIP DISTRIBUTION

Figure 6

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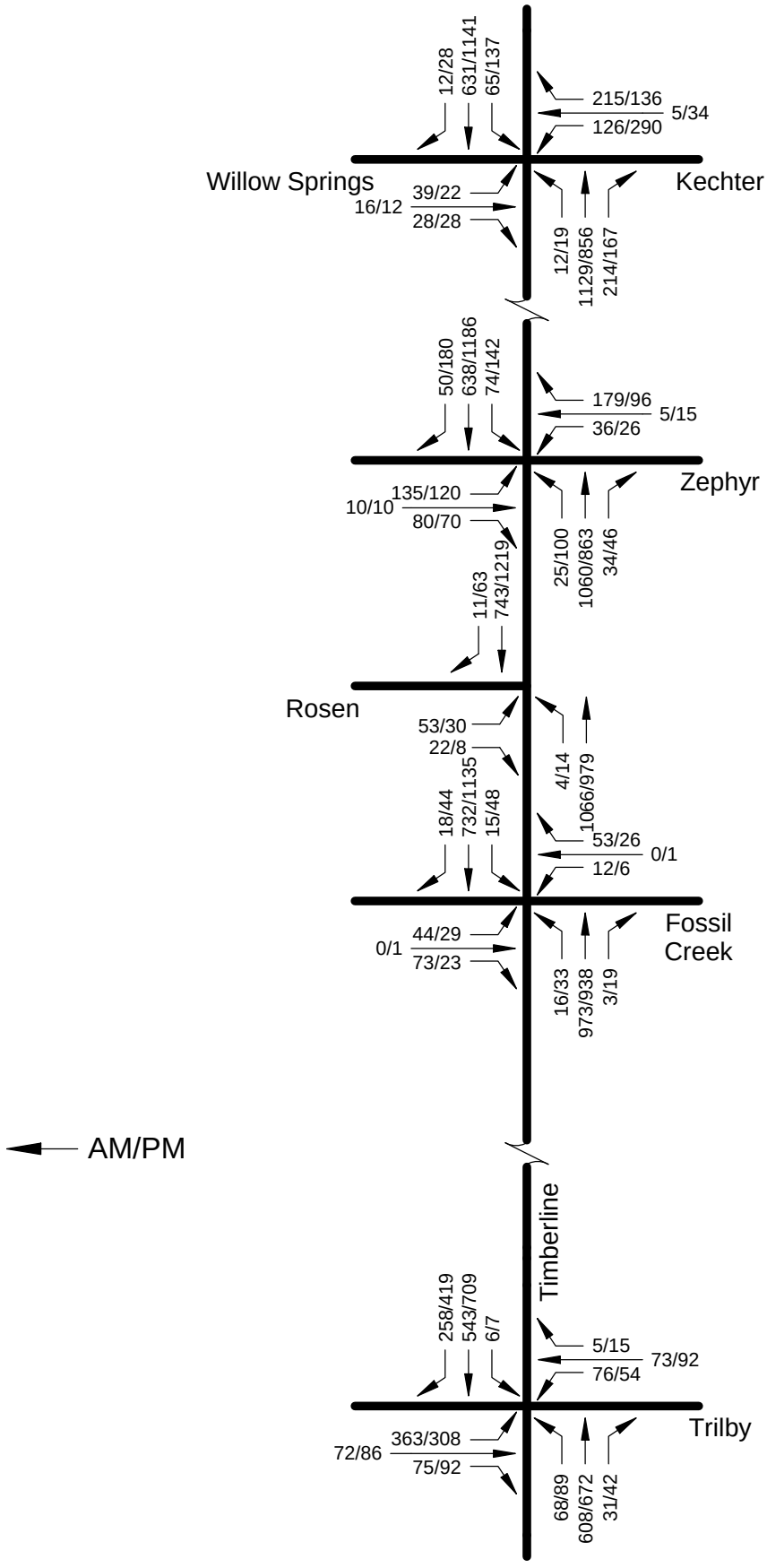
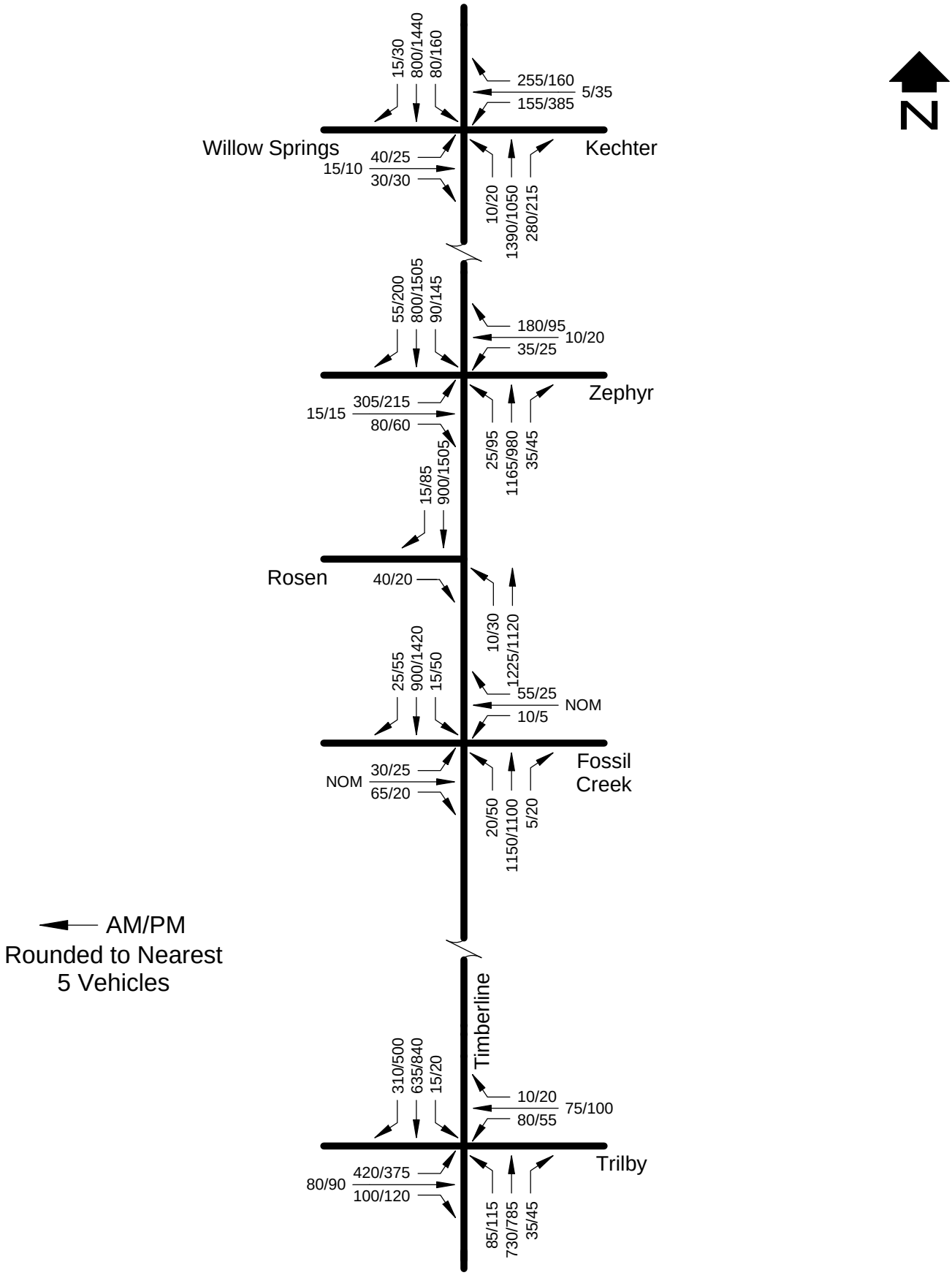


SHORT RANGE (2024) BACKGROUND PEAK HOUR TRAFFIC

Figure 7



LONG RANGE (2040) BACKGROUND PEAK HOUR TRAFFIC

Figure 8

Transportation Plan and various traffic studies prepared for this area of Fort Collins. Based upon these sources, it was determined that traffic volumes on Timberline Road, Kechter Road, and Trilby Road would increase by approximately 1.0% per year plus other developments in the area. The developments included in the short range (2024) future are the remainder of Kechter Farms, the remainder of Mail Creek Crossing, and the Hansen Property. According to City staff, Timberline Road will be improved to a four-lane arterial in the near future. In addition to this, it is likely that a signal will be warranted at the Timberline/Zephyr intersection with the development of the Hansen Property. However, in the short range (2024) future, Red Willow Drive will not extend north to Zephyr Road.

In the long range (2040) future with a signal at the Timberline/Zephyr intersection, a significant amount of existing (and future) traffic making a left turn from Fossil Creek Parkway and Rosen Drive will choose to utilize the signal. The long range (2040) background traffic volumes shown in Figure 8 reflect this redistribution of traffic.

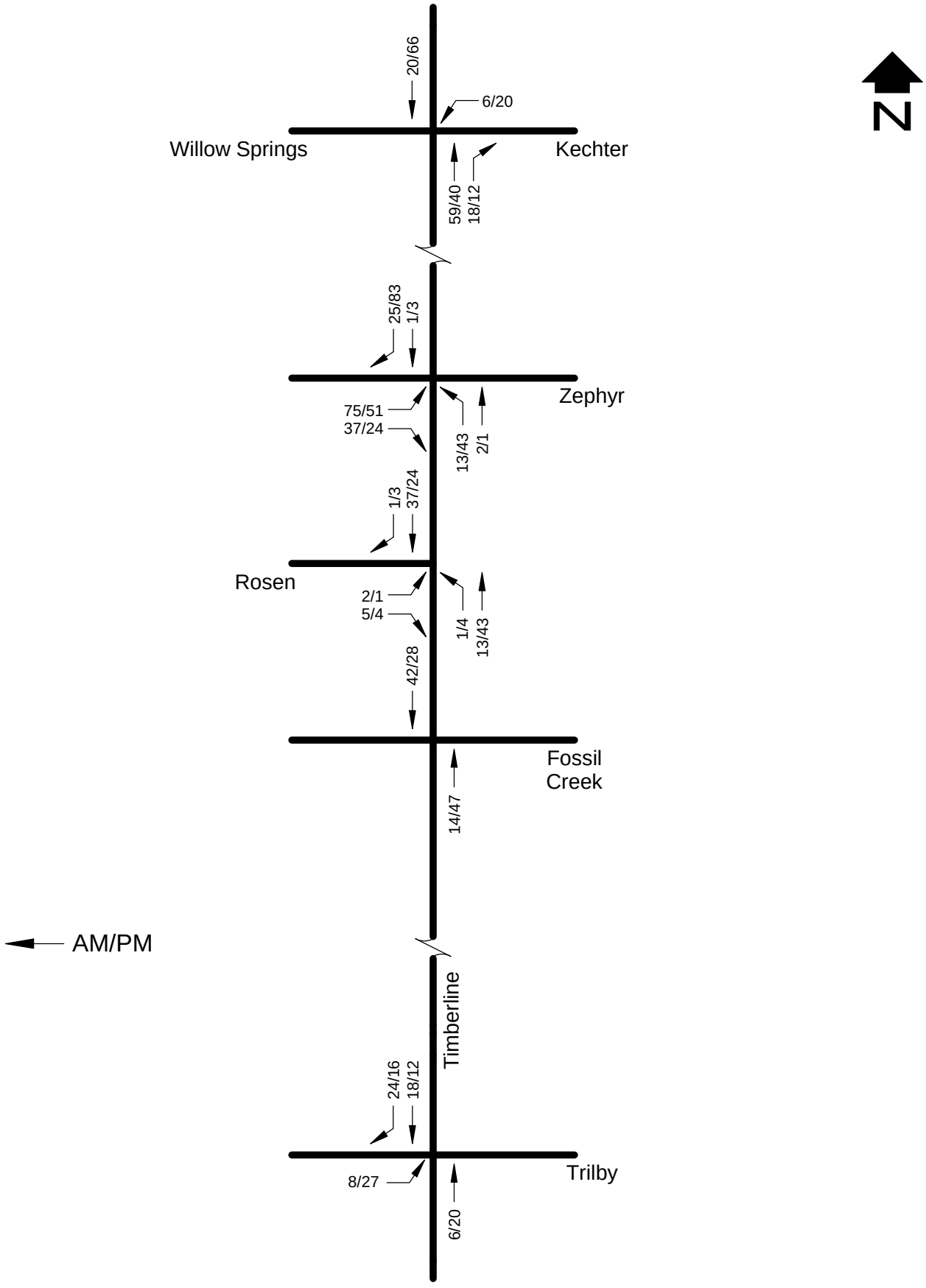
Trip Assignment

Trip assignment is how the generated and distributed trips are expected to be loaded on the street system. The assigned trips are the resultant of the trip distribution process. Figures 9 and 10 show the short range (2024) and long range (2040) site generated peak hour traffic assignment, respectively. Figures 11 and 12 show the respective short range (2024) and long range (2040) total (site plus background) peak hour traffic assignment.

Signal Warrants

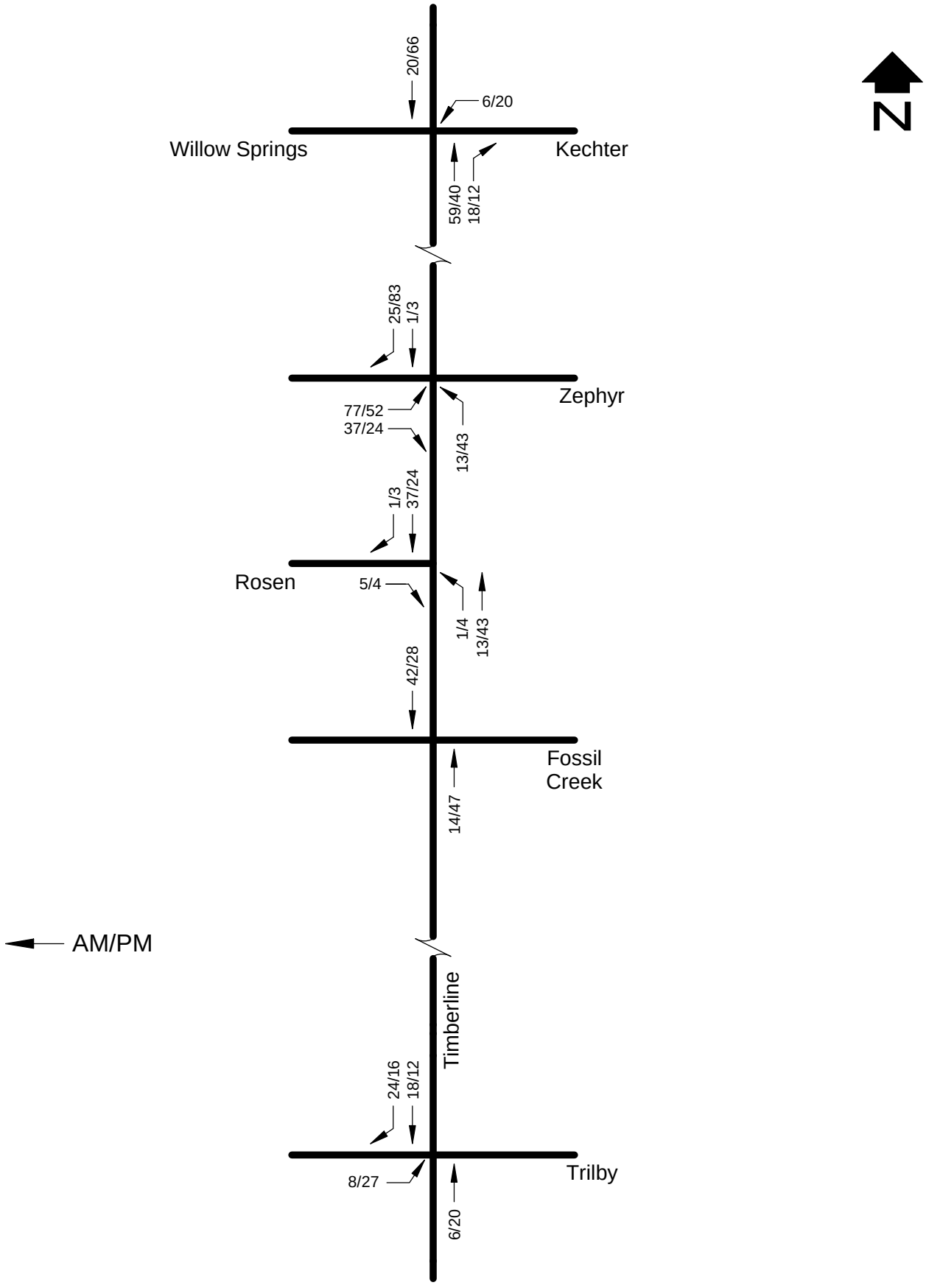
As a matter of policy, traffic signals are not installed at any location unless warrants are met according to the Manual on Uniform Traffic Control Devices. The Timberline/ Trilby and Timberline/Kechter-Willow Springs intersections are currently signalized. For the roads in the vicinity of the Rennat Property development, four hour and/or eight hour signal warrants are applicable. These warrants require much data and are applied when the traffic is actually on the area road system. It is acknowledged that peak hour signal warrants should not be applied, but since the peak hour forecasts are readily available in a traffic impact study, it is reasonable to use them to estimate whether other signal warrants may be met. If peak hour signal warrants will not be met at a given intersection, it is reasonable to conclude that it is not likely that other signal warrants would be met. If peak hour signal warrants are met, it merely indicates that further evaluation should occur in the future as the development occurs. However, a judgment can be made that some intersections will likely meet other signal warrants.

Using the short range (2024) background peak hour traffic (Figure 7), the peak hour signal warrant will likely be met in the afternoon peak hour at the Timberline/Zephyr intersection. This was called out in the Hansen Property TIS. Based on the peak hour signal warrant, it is likely that other volume based signal warrants would be met at the



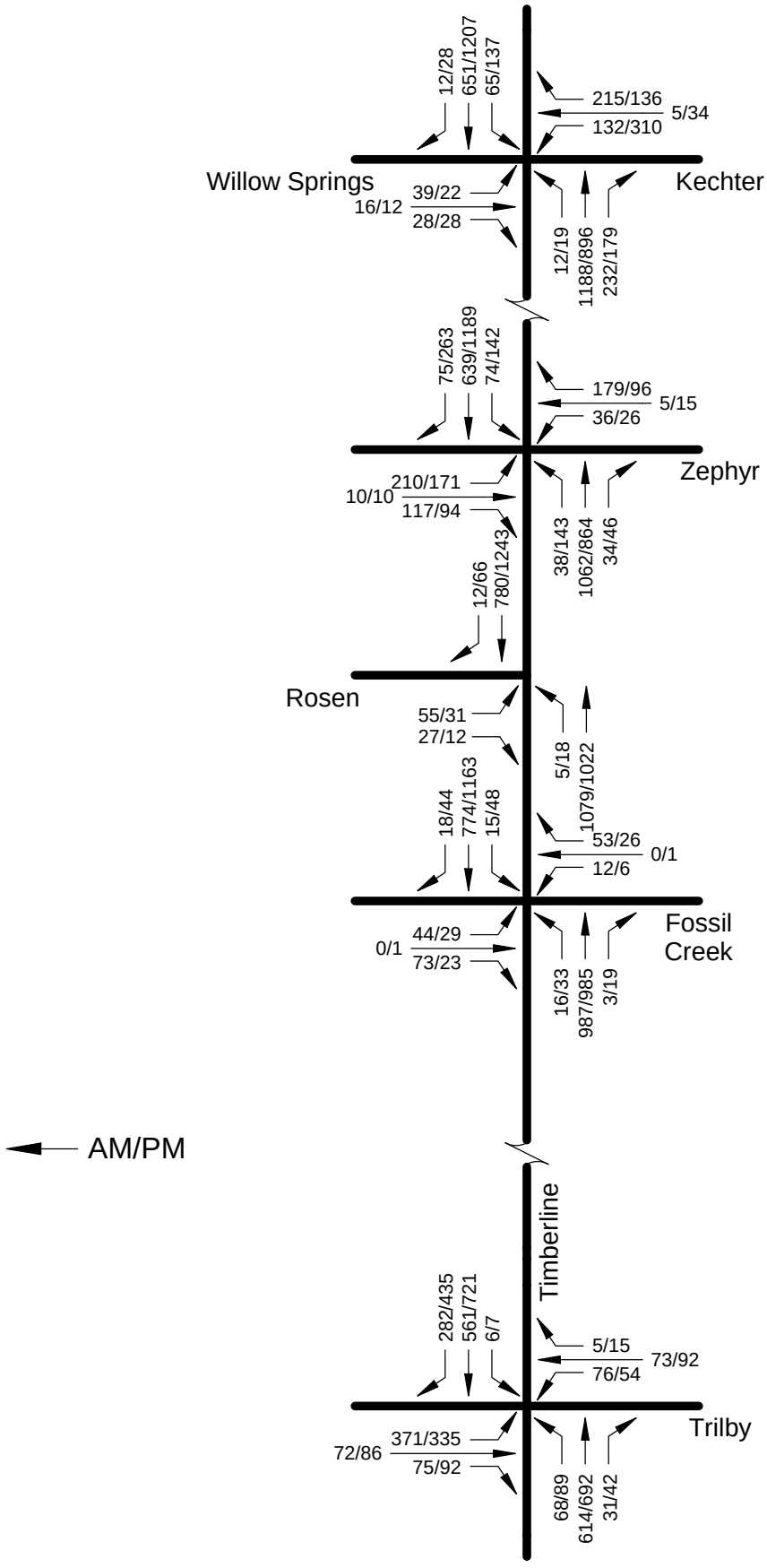
SHORT RANGE (2024) SITE GENERATED PEAK HOUR TRAFFIC

Figure 9



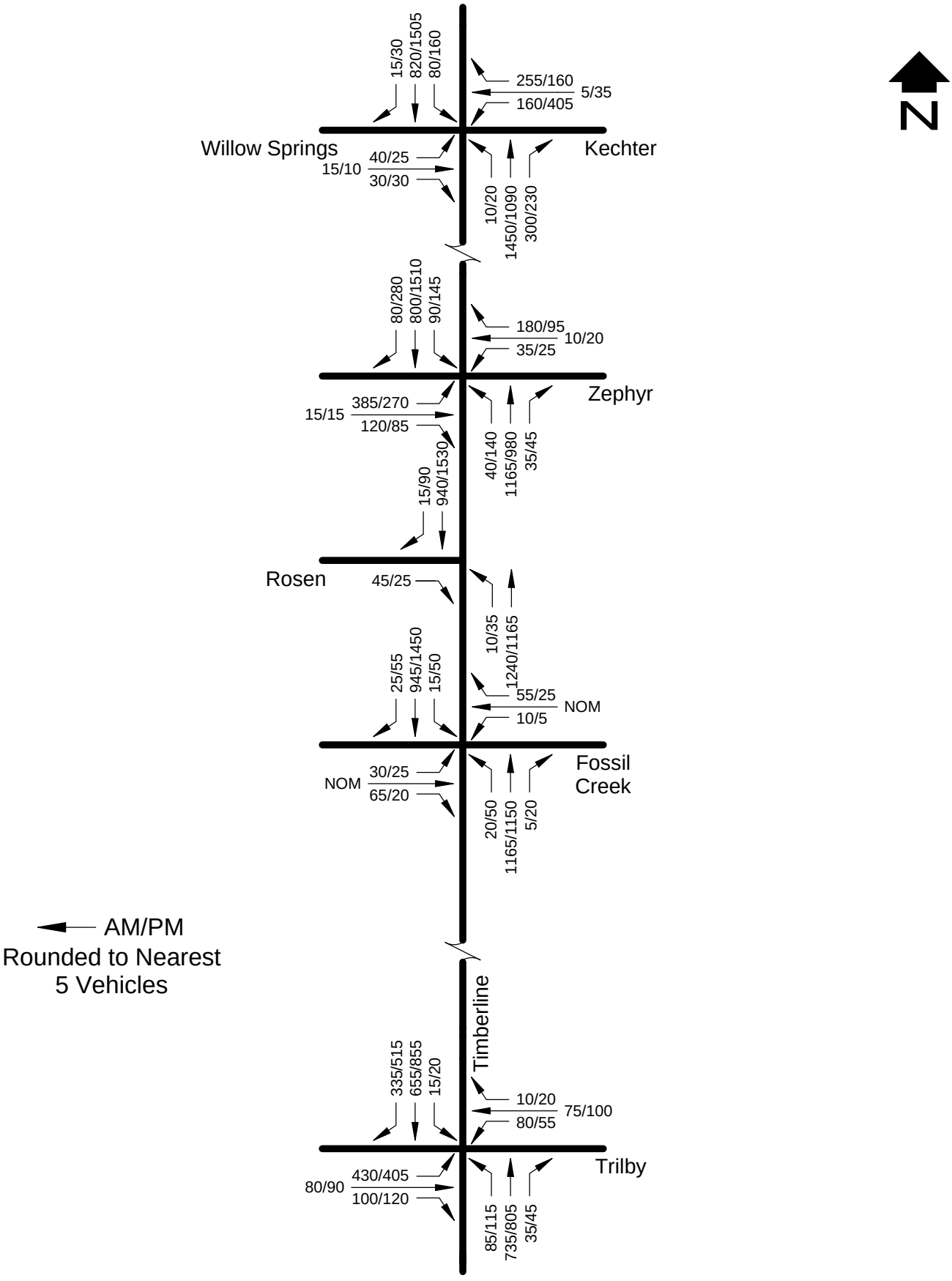
LONG RANGE (2040) SITE
GENERATED PEAK HOUR TRAFFIC

Figure 10



SHORT RANGE (2024) TOTAL PEAK HOUR TRAFFIC

Figure 11



LONG RANGE (2040) TOTAL PEAK HOUR TRAFFIC

Figure 12

Timberline/Zephyr intersection in the short range (2024) future. The distance from Kechter Road to Trilby Road (each signalized intersections) is one mile. Zephyr Road is approximately 2300 feet from Kechter Road and approximately 2980 feet from Trilby Road. While this is not at one-half mile spacing, a future signal at the Timberline/Zephyr intersection has generally been expected by the City. The only other, somewhat major, intersection along this section of Timberline Road is at Fossil Creek Parkway. This intersection is approximately 1250 feet south of Zephyr Road. This separation would not meet the desired spacing of signalized intersections. Using the short range (2024) background and total peak hour traffic (Figures 7 & 11), the peak hour signal warrant will not be met in the afternoon peak hour at the Timberline/Fossil Creek intersection. The City is not likely to introduce another signal in this segment of Timberline Road. The peak hour signal warrant analyses are provided in Appendix D.

Geometry

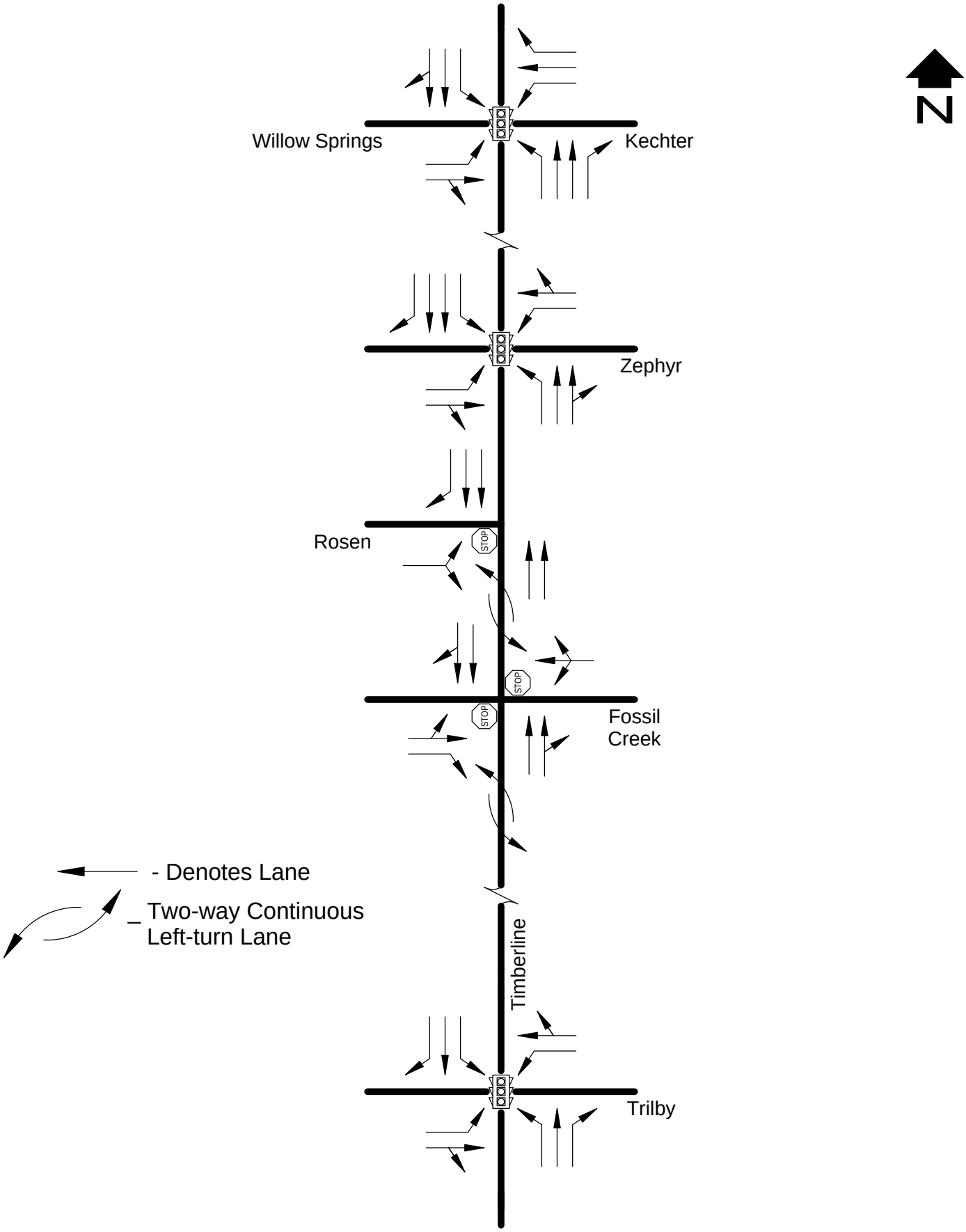
Figure 13 shows a schematic of the minimum short range (2024) intersection geometry. According to City staff, Timberline Road will be improved to a four-lane arterial from north of Kechter Road to Trilby Road in the near future. At the Timberline/ Trilby intersection, the eastbound left-turn volume exceeds the 300+ vehicles per hour "rule of thumb" that would require dual left-turn lanes. However, a single eastbound left-turn lane was analyzed in this TIS for the short range (2024) future. Similarly at the Timberline/Kechter-Willow Springs intersection, the westbound left-turn volume exceeds the 300+ vehicles per hour "rule of thumb" in the afternoon peak hour that would require dual left-turn lanes. However, a single westbound left-turn lane was analyzed in this TIS for the short range (2024) future.

Figure 14 shows a schematic of the long range (2040) geometry. The geometry at the key intersections in the long range future was determined based upon achieving acceptable operation, meeting the geometric criteria in LCUASS, and the City of Fort Collins Master Street Plan.

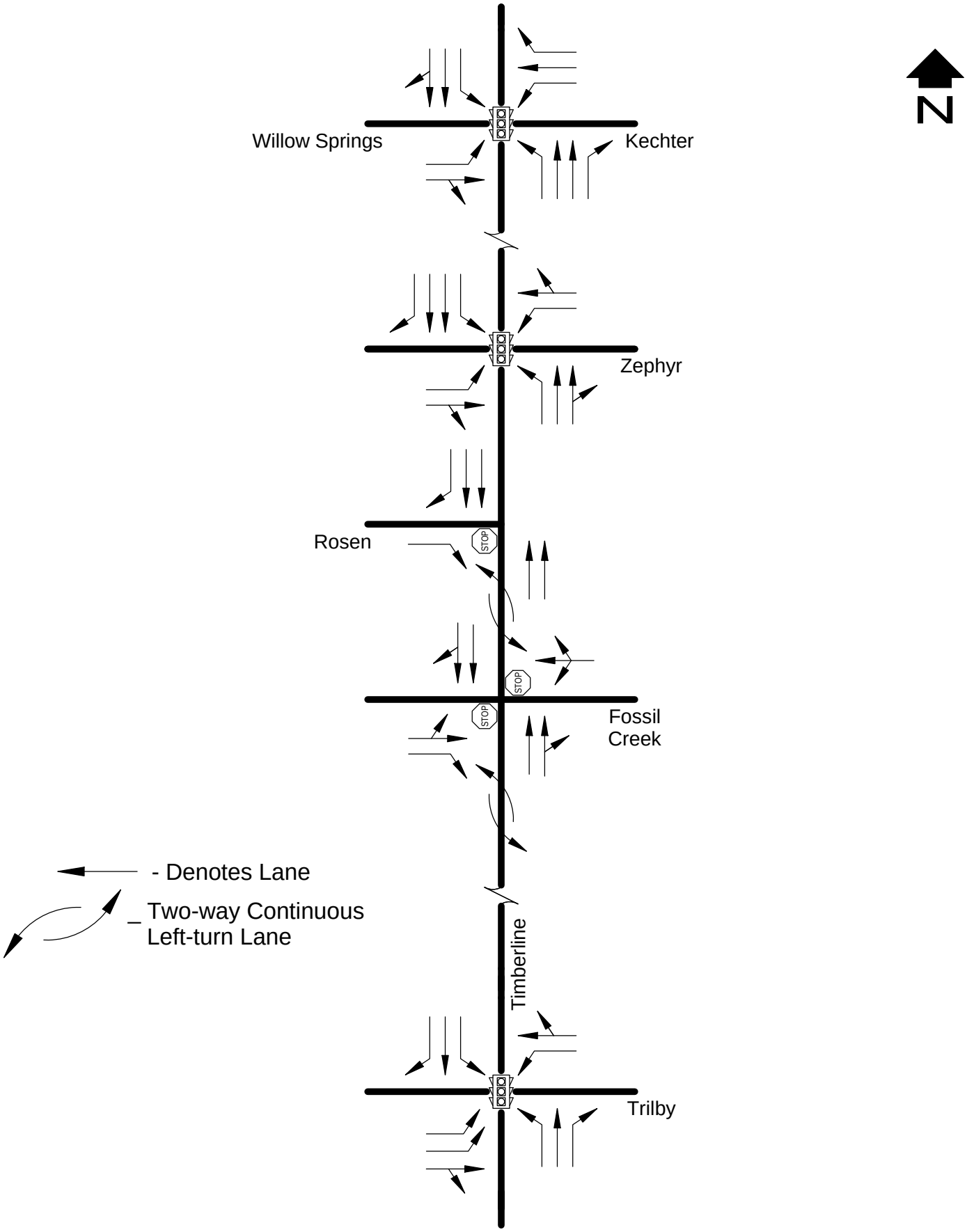
Operation Analysis

Operation analyses were performed at the Timberline/Trilby, Timberline/Site Access, Timberline/Fossil Creek, Timberline/Rosen, and Timberline/Zephyr intersections. As mentioned earlier, Timberline Road will be improved to a four-lane arterial in the near future. The operations analyses were conducted for the short range future, reflecting a year 2024 condition, and long range future, reflecting a year 2040 condition. In light of the potential differences in calculated delay versus observed delay mentioned earlier, conclusions with regard to delay at stop sign controlled intersections should be tempered. The long range (2040) analysis is provided for informational purposes and to identify potential operational and/or geometric issues.

Using the short range (2024) background traffic volumes shown in Figure 7, the Timberline/Trilby, Timberline/Fossil Creek, Timberline/Rosen, and Timberline/Zephyr intersections operate as indicated in Table 3. Calculation forms for these analyses are



SHORT RANGE (2024) GEOEMTRY Figure 13



LONG RANGE (2040) GEOEMTRY

Figure 14

TABLE 3 Short Range (2024) Background Peak Hour Operation			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Timberline/Trilby (signal)	EB LT	E (70.4 secs)	E (66.8 secs)
	EB T/RT	C	D
	EB APPROACH	E (60.7 secs)	E (57.1 secs)
	WB LT	D	D
	WB T/RT	D	E (58.4 secs)
	WB APPROACH	D	E (56.8 secs)
	NB LT	B	B
	NB T	C	B
	NB RT	A	A
	NB APPROACH	B	B
	SB LT	B	B
	SB T	C	C
	SB RT	B	B
	SB APPROACH	C	B
	OVERALL	C	C
Timberline/Fossil Creek (stop sign)	EB LT/T	F (119.5 secs)	F (294.4 secs)
	EB RT	B	B
	EB APPROACH	F (52.6 secs)	F (172.7 secs)
	WB LT/T/RT	D	E (37.6 secs)
	NB LT	A	B
	SB LT	B	B
	OVERALL	A	A
Timberline/Rosen (stop sign)	EB LT/RT	F (63.2 secs)	F (82.9 secs)
	NB LT	A	B
	OVERALL	A	A

Continued on next page

Continued from previous page

TABLE 3
Short Range (2024) Background Peak Hour Operation

Intersection	Movement	Level of Service	
		AM	PM
Timberline/Zephyr (signal)	EB LT	D	D
	EB T/RT	D	D
	EB APPROACH	D	D
	WB LT	D	D
	WB T/RT	D	D
	WB APPROACH	D	D
	NB LT	A	A
	NB T	B	A
	NB T/RT	B	A
	NB APPROACH	B	A
	SB LT	A	A
	SB T	A	A
	SB RT	A	A
	SB APPROACH	A	A
	OVERALL	B	A
Timberline/Kechter-Willow Springs (signal)	EB LT	D	D
	EB T/RT	D	C
	EB APPROACH	D	C
	WB LT	D	D
	WB T	D	C
	WB RT	D	C
	WB APPROACH	D	D
	NB LT	A	B
	NB T	A	A
	NB RT	A	A
	NB APPROACH	A	A
	SB LT	A	A
	SB T	A	B
	SB RT	A	B
	SB APPROACH	A	B
	OVERALL	A	B

provided in Appendix E. At the key stop sign controlled intersections, the calculated delay for the minor street left turns is commensurate with level of service F. Since it is likely that a signal will be installed at the Timberline/Zephyr intersection with the approved Hansen Property, the operation analysis was conducted for this condition.

Using the long range (2040) background traffic volumes shown in Figure 8, the key intersections operate as indicated in Table 4. Calculation forms for these analyses are provided in Appendix F. The key intersections will meet the Fort Collins operational criteria, overall.

Using the short range (2024) total traffic volumes shown in Figure 11, the key intersections operate as indicated in Table 5. Calculation forms for these analyses are provided in Appendix G. The Timberline/Trilby, Timberline/Site Access, Timberline/ Rosen, and Timberline/Zephyr intersections will meet the Fort Collins operational criteria. At the Timberline/Fossil Creek intersection during both peak hours, the calculated delay for the eastbound left-turn/through movement and eastbound leg was commensurate with level of service F. The calculated delay for the westbound leg during the morning and afternoon peak hours was commensurate with level of service E and F, respectively. As mentioned earlier, the Timberline/Site Access intersection is expected to be restricted to right-in/right-out movements. However, there is currently a two-way continuous left-turn lane on Timberline Road in this area. So, northbound left-turn entrances at the Site Access could occur.

Using the long range (2040) total traffic volumes shown in Figure 12, the key intersections operate as indicated in Table 6. Calculation forms for these analyses are provided in Appendix H. The key intersections will meet the Fort Collins operational criteria, overall.

Pedestrian Level of Service

Appendix I shows a map of the area that is within 1320 feet of the Rennat Property development. The Union Pacific railroad tracks create a barrier that has no pedestrian crossings or underpasses. Therefore, the pedestrian influence area stops at the railroad tracks. There will be four pedestrian destinations within 1320 feet of the Rennat Property development. These are: 1) the residential/commercial neighborhood to the north of the site, 2) Bacon Elementary School, 3) the residential area to the east of the site, and 4) the residential area to the south of the site. Appendix I also contains a map that shows the existing/planned pedestrian facilities within the influence area. This site is in an area type termed “other.” The minimum level of service for “other” is C. In this pedestrian analysis, it is assumed that all of the sidewalks related to the Hansen Property are built, since it is an approved development.

- **Directness** – The distance ratio to all pedestrian destinations is less than 1.2 (LOS A)
- **Continuity** – The continuity to pedestrian destinations 1 and 4 will be acceptable at LOS B, since there will be direct connection of the sidewalk system to the north and to the south. The continuity to pedestrian destinations 2 and 3 is at

TABLE 4 Long Range (2040) Background Peak Hour Operation			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Timberline/Trilby (signal)	EB LT	E (70.6 secs)	E (61.9 secs)
	EB T/RT	D	D
	EB APPROACH	E (65.4 secs)	E (57.2 secs)
	WB LT	E (68.1 secs)	E (63.7 secs)
	WB T/RT	E (59.3 secs)	E (58.6 secs)
	WB APPROACH	E (63.7 secs)	E (60.3 secs)
	NB LT	B	C
	NB T	B	C
	NB RT	A	A
	NB APPROACH	B	C
	SB LT	B	B
	SB T	B	C
	SB RT	B	B
	SB APPROACH	B	C
	OVERALL	C	C
Timberline/Fossil Creek (stop sign)	EB LT/T	F (148.6 secs)	F (911.6 secs)
	EB RT	B	C
	EB APPROACH	F (56.7 secs)	F (522.3 secs)
	WB LT/T/RT	E (38.8 secs)	F (75.3 secs)
	NB LT	B	B
	SB LT	B	B
	OVERALL	A	A
Timberline/Rosen (RT-in/RT-out/LT-in)	EB RT	B	C
	NB LT	B	C
	OVERALL	A	A

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TABLE 4
Long Range (2040) Background Peak Hour Operation

Intersection	Movement	Level of Service	
		AM	PM
Timberline/Zephyr (signal)	EB LT	D	D
	EB T/RT	C	D
	EB APPROACH	D	D
	WB LT	C	D
	WB T/RT	C	D
	WB APPROACH	C	D
	NB LT	B	A
	NB T	C	B
	NB T/RT	C	B
	NB APPROACH	C	B
	SB LT	B	A
	SB T	A	A
	SB RT	A	A
	SB APPROACH	A	A
	OVERALL	B	B
Timberline/Kechter-Willow Springs (signal)	EB LT	D	C
	EB T/RT	D	C
	EB APPROACH	D	C
	WB LT	D	E (55.0 secs)
	WB T	D	C
	WB RT	D	C
	WB APPROACH	D	D
	NB LT	A	B
	NB T	A	A
	NB RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T	A	C
	SB RT	A	C
	SB APPROACH	A	C
	OVERALL	A	C

TABLE 5 Short Range (2024) Total Peak Hour Operation			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Timberline/Trilby (signal)	EB LT	E (75.6 secs)	E (73.5 secs)
	EB T/RT	C	D
	EB APPROACH	E (64.8 secs)	E (62.0 secs)
	WB LT	D	D
	WB T/RT	D	E (58.4 secs)
	WB APPROACH	D	E (56.8 secs)
	NB LT	B	B
	NB T	C	B
	NB RT	A	A
	NB APPROACH	B	B
	SB LT	B	B
	SB T	C	C
	SB RT	B	B
	SB APPROACH	C	C
	OVERALL	C	C
Timberline/Fossil Creek (stop sign)	EB LT/T	F (143.5 secs)	F (359.8 secs)
	EB RT	B	B
	EB APPROACH	F (61.8 secs)	F (209.8 secs)
	WB LT/T/RT	D	E (43.0 secs)
	NB LT	A	B
	SB LT	B	B
	OVERALL	A	A
Timberline/Rosen (stop sign)	EB LT/RT	F (76.5 secs)	F (94.4 secs)
	NB LT	A	B
	OVERALL	A	A

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TABLE 5
Short Range (2024) Total Peak Hour Operation

Intersection	Movement	Level of Service	
		AM	PM
Timberline/Zephyr (signal)	EB LT	D	D
	EB T/RT	C	D
	EB APPROACH	D	D
	WB LT	C	D
	WB T/RT	C	D
	WB APPROACH	C	D
	NB LT	A	A
	NB T	B	B
	NB T/RT	B	B
	NB APPROACH	B	A
	SB LT	B	A
	SB T	A	A
	SB RT	A	A
	SB APPROACH	A	A
	OVERALL	B	A
Timberline/Kechter-Willow Springs (signal)	EB LT	D	C
	EB T/RT	D	C
	EB APPROACH	D	C
	WB LT	D	D
	WB T	D	C
	WB RT	D	C
	WB APPROACH	D	D
	NB LT	A	B
	NB T	A	A
	NB RT	A	A
	NB APPROACH	A	A
	SB LT	A	A
	SB T	A	B
	SB RT	A	B
	SB APPROACH	A	B
	OVERALL	A	B

TABLE 6 Long Range (2040) Total Peak Hour Operation			
Intersection	**Movement**	**Level of Service**	
		AM	**PM**
Timberline/Trilby (signal)	EB LT	E (74.5 secs)	E (65.9 secs)
	EB T/RT	D	D
	EB APPROACH	E (68.5 secs)	E (60.1 secs)
	WB LT	E (68.1 secs)	E (63.7 secs)
	WB T/RT	E (59.3 secs)	E (58.6 secs)
	WB APPROACH	E (63.7 secs)	E (60.3 secs)
	NB LT	B	C
	NB T	B	C
	NB RT	A	A
	NB APPROACH	B	C
	SB LT	B	B
	SB T	B	C
	SB RT	B	B
	SB APPROACH	B	C
	OVERALL	C	C
Timberline/Fossil Creek (stop sign)	EB LT/T	F (175.7 secs)	F (1100.0 secs)
	EB RT	B	C
	EB APPROACH	F (65.7 secs)	F (629.0 secs)
	WB LT/T/RT	E (42.6 secs)	F (93.1 secs)
	NB LT	B	C
	SB LT	B	B
	OVERALL	A	B
Timberline/Rosen (RT-in/RT-out/LT-in)	EB RT	B	C
	NB LT	B	C
	OVERALL	A	A

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TABLE 6
Long Range (2040) Total Peak Hour Operation

Intersection	Movement	Level of Service	
		AM	PM
Timberline/Zephyr (signal)	EB LT	E (65.7 secs)	D
	EB T/RT	C	C
	EB APPROACH	E (60.6 secs)	D
	WB LT	C	D
	WB T/RT	C	D
	WB APPROACH	C	D
	NB LT	B	B
	NB T	C	B
	NB T/RT	C	B
	NB APPROACH	C	B
	SB LT	B	B
	SB T	A	A
	SB RT	A	A
	SB APPROACH	A	A
	OVERALL	C	B
Timberline/Kechter-Willow Springs (signal)	EB LT	D	C
	EB T/RT	D	C
	EB APPROACH	D	C
	WB LT	D	E (61.3 secs)
	WB T	D	C
	WB RT	D	C
	WB APPROACH	D	E (55.1 secs)
	NB LT	A	B
	NB T	A	A
	NB RT	A	A
	NB APPROACH	A	A
	SB LT	A	B
	SB T	A	C
	SB RT	A	C
	SB APPROACH	A	C
	OVERALL	A	C

LOS B as well, since there will be direct connection of the sidewalk system with the anticipated signal at the Timberline/Zephyr intersection and a sidewalk between the Rennat Property and the pedestrian signal at the Timberline/Fossil Creek intersection.

- **Street Crossings** – The street crossings to pedestrian destinations 1 and 4 will be acceptable at LOS B, since the street crossings are all at local residential streets. The street crossings to pedestrian destinations 2 and 3 is also at LOS B, since there is an anticipated signal at the Timberline/Zephyr intersection and a sidewalk between the Rennat Property and the pedestrian signal at the Timberline/Fossil Creek intersection. .
- **Visual Interest and Amenity** – The visual interest and amenity to pedestrian destinations 1, 2, 3, and 4 is acceptable at LOS B, since most of the sidewalks have some landscaped parkways and a residential neighborhood character.
- **Security** – The security to pedestrian destinations 1, 2, 3, and 4 is acceptable at LOS A, since most of the sidewalks are adjacent to residential land uses and the area has a residential neighborhood character.

Acceptable pedestrian level of service will be achieved for all pedestrian destinations within 1320 feet of the Rennat Property. The Pedestrian LOS Worksheet is provided in Appendix I. The future signal at the Timberline/Zephyr intersection will provide safe crossing of Timberline Road for students attending Bacon Elementary School.

Bicycle Level of Service

Appendix I shows a map of the area that is within 1320 feet of the Rennat Property development. There will be one bicycle destination near the Rennat Property development. This is: 1) Bacon Elementary School to the northeast of the site. The Bicycle LOS Worksheet is provided in Appendix I. The minimum level of service for this site is C. This site is connected to Timberline Road. Therefore, it is concluded that level of service B can be achieved.

Transit Level of Service

Expansion of Transfort service to this area will likely be made by the City of Fort Collins, when appropriate.

IV. CONCLUSIONS

This study assessed the impacts of the Rennat Property on the street system in the vicinity of the proposed development in the short range (2024) and long range (2040) futures. As a result of this analysis, the following is concluded:

- The development of the Rennat Property is feasible from a traffic engineering standpoint. At full development, the Rennat Property will generate approximately 2030 daily trip ends, 159 morning peak hour trip ends, and 213 afternoon peak hour trip ends.

- Currently, the key intersections are currently operating acceptably with existing control and geometry in the morning and afternoon peak hours, except for the eastbound left-turn at the Timberline/Trilby intersection in the afternoon peak hour. Adjustments to the City's current signal timing resulted in acceptable operation of the intersection with regard to delay.

- The Timberline/Trilby intersection is currently signalized. The Timberline/Zephyr intersection is likely to meet signal warrants in the short range (2024) future and was called out in the Hansen Property TIS.

- In the short range (2024) future, given development of the Rennat Property development and an increase in background traffic, the Timberline/Trilby, Timberline/Site Access, Timberline/Rosen, and Timberline/Zephyr intersections will meet the Fort Collins operational criteria. At the Timberline/Fossil Creek intersection during both peak hours, the calculated delay for the eastbound left-turn/through movement and eastbound leg was commensurate with level of service F. At the Timberline/Trilby intersection, the eastbound left-turn volume exceeds the 300+ vehicles per hour "rule of thumb" that would require dual left-turn lanes. However, a single eastbound left-turn lane was analyzed in this TIS for the short range (2024) future. The calculated delay for the eastbound leg during the morning and afternoon peak hours was commensurate with level of service E. Similarly at the Timberline/Kechter-Willow Springs intersection, the westbound left-turn volume exceeds the 300+ vehicles per hour "rule of thumb" in the afternoon peak hour that would require dual left-turn lanes. However, a single westbound left-turn lane was analyzed in this TIS for the short range (2024) future. The calculated delay for the westbound leg during the morning and afternoon peak hours was commensurate with level of service D.

- In the long range (2040) future, given development of the Rennat Property development and an increase in background traffic, the key intersections will meet the Fort Collins operational criteria, overall, with the recommended geometry and control.

- The short range (2024) geometry is shown in Figure 13. According to City staff, Timberline Road will be improved to a four-lane arterial in the near future. At the Timberline/Trilby intersection, the eastbound left-turn volume exceeds the 300+

vehicles per hour “rule of thumb” that would require dual left-turn lanes. In addition to this at the Timberline/Kechter-Willow Springs intersection, the westbound left-turn volume exceeds the 300+ vehicles per hour “rule of thumb” in the afternoon peak hour. However, single eastbound and westbound left-turn lanes were analyzed at these intersections in this TIS for the short range (2024) future.

- The long range (2040) geometry is shown in Figure 14.

- Acceptable level of service is achieved for bicycle and transit modes based upon the measures in the multi-modal transportation guidelines and future improvements to the street system in the area. Acceptable pedestrian level of service can be achieved for all pedestrian destinations. The pedestrian signal at the future Timberline/Zephyr intersection will provide safe crossing of Timberline Road for students attending Bacon Elementary School.

APPENDIX A

Attachment A
Transportation Impact Study
Base Assumptions

Project Information			
Project Name	RENNAT PROPERTY		
Project Location	WEST OF T-LINE/ZEPHYR INTERSECTION		
TIS Assumptions			
Type of Study	Full: YES		Intermediate: NO
Study Area Boundaries	North: ~~ZEPHYR~~ (KECHTER X)		South: TRILBY
	East: T-LINE		West: T-LINE
Study Years	Short Range: 2024		Long Range: 2040
Future Traffic Growth Rate	1%/YEAR PAUS HANSEN		
Study Intersections	1. All access drives	5. T-LINE/TRILBY	
	2. T-LINE/ZEPHYR	6.	
	3. T-LINE/ROSEN	7.	
	4. T-LINE/FOSSIL CREEK	8.	
Time Period for Study	(AM: 7:00-9:00) ~~PM: 4:00-6:00~~		Sat Noon: NO
Trip Generation Rates	ATTACHED		
Trip Adjustment Factors	Passby: PER T.G. HANDBOOK FOR C-STORE	Captive Market: N/A (NOMINAL)	
Overall Trip Distribution	SEE ATTACHED SKETCH		
Mode Split Assumptions	N/A		
Committed Roadway Improvements	WIDEN T-LINE		
Other Traffic Studies	HANSON TIS YES * SOUTH TIMBERLINE TIS **		
Areas Requiring Special Study	FUTURE SIGNAL AT T-LINE/ZEPHYR		

Date: MAY 10, 2019

Traffic Engineer: DELICH ASSOCIATES

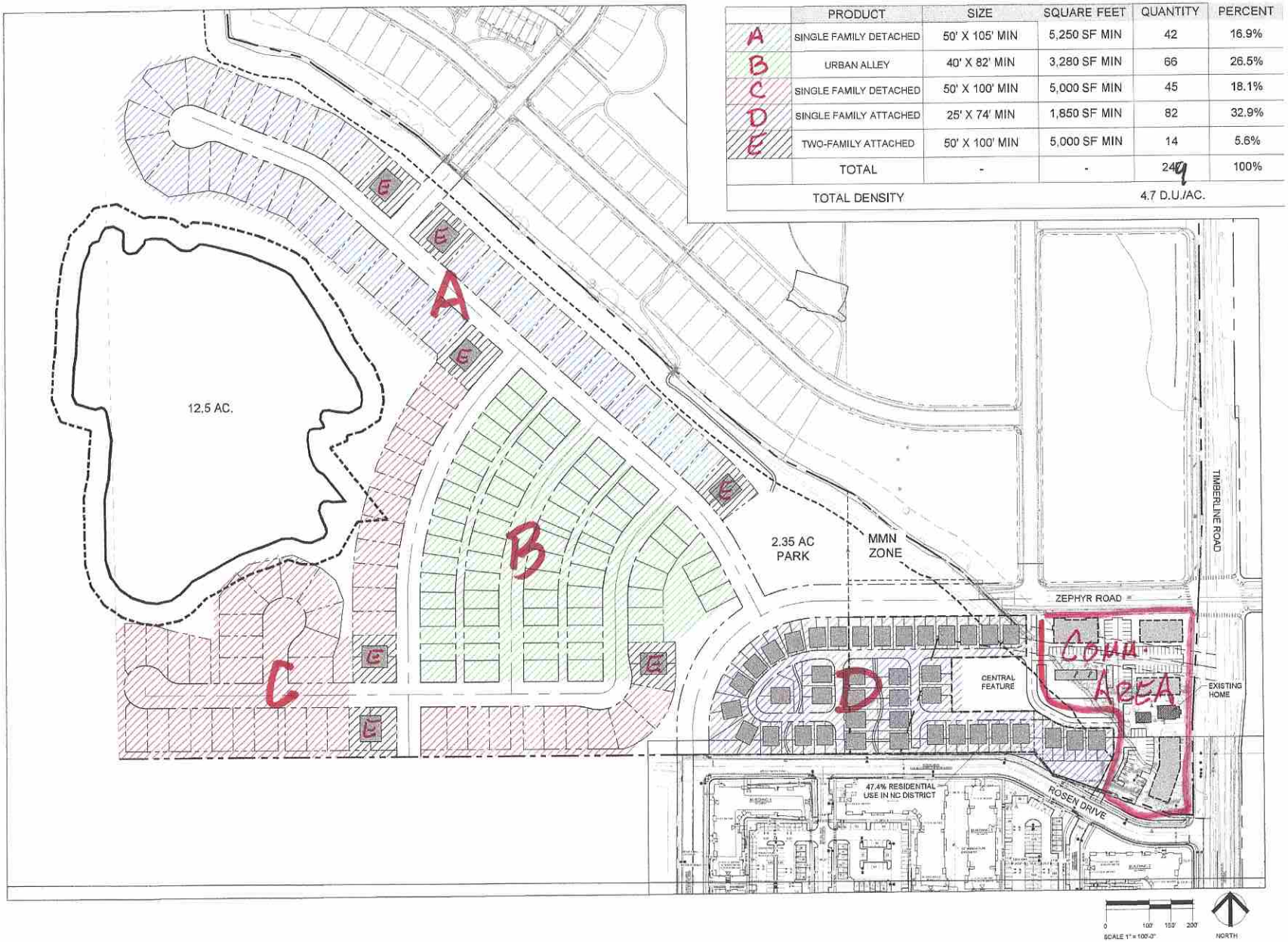
Local Entity Engineer: [signature] 5.16.19

1941 BAF

* SAME COMMERCIAL WAS IN HANSON [PEAK HOUR T.G. ALMOST SAME]

** WILL NOT BE INCLUDED, SINCE NOT AN APPROVED PROJECT

	PRODUCT	SIZE	SQUARE FEET	QUANTITY	PERCENT
A	SINGLE FAMILY DETACHED	50' X 105' MIN	5,250 SF MIN	42	16.9%
B	URBAN ALLEY	40' X 82' MIN	3,280 SF MIN	66	26.5%
C	SINGLE FAMILY DETACHED	50' X 100' MIN	5,000 SF MIN	45	18.1%
D	SINGLE FAMILY ATTACHED	25' X 74' MIN	1,850 SF MIN	82	32.9%
E	TWO-FAMILY ATTACHED	50' X 100' MIN	5,000 SF MIN	14	5.6%
	TOTAL	-	-	249	100%
TOTAL DENSITY				4.7 D.U./AC.	



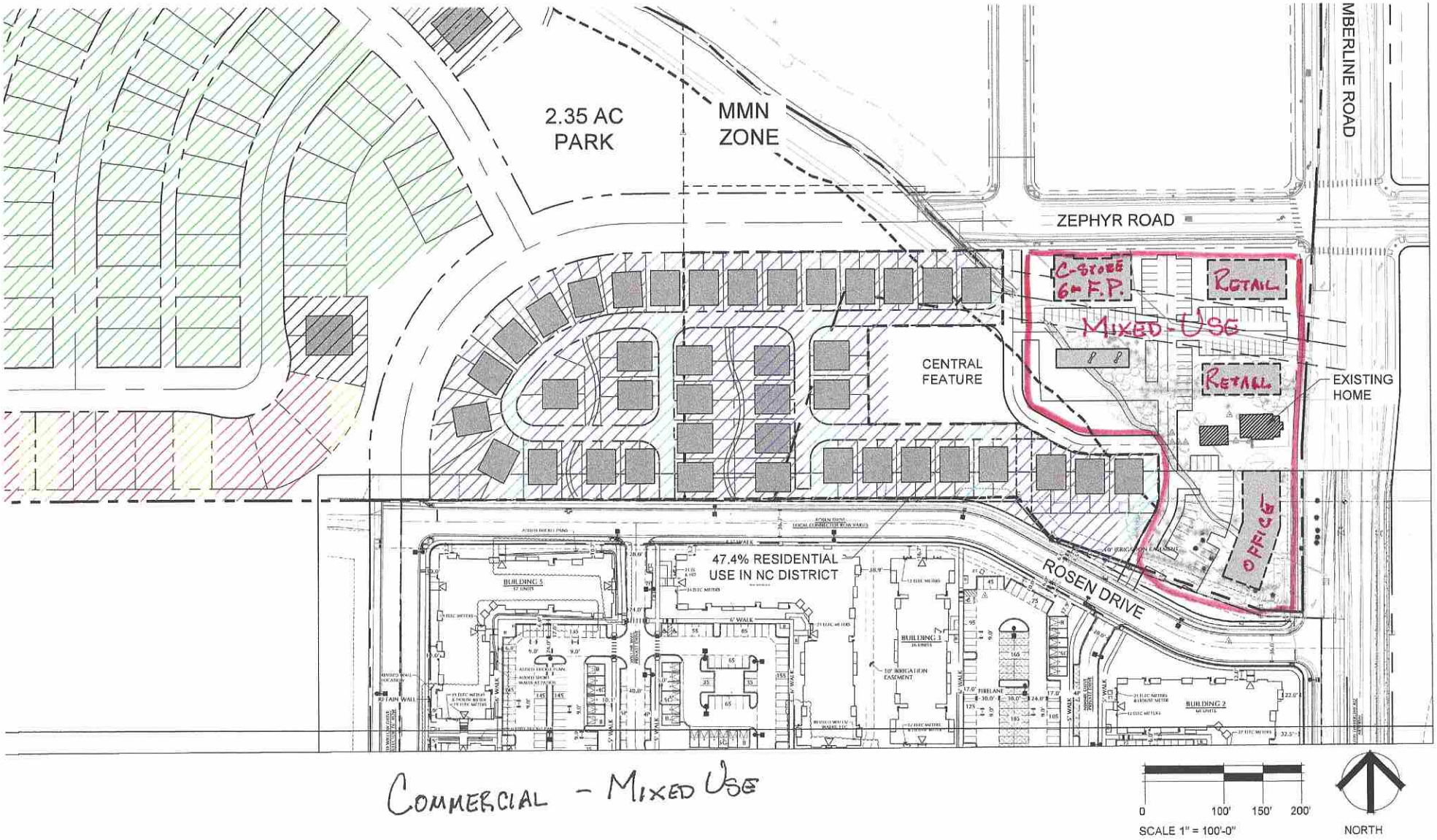
RENNAT PROPERTY

FORT COLLINS, CO

04/25/19

Sheet Number:

Of:



COMMERCIAL - MIXED USE

Trip Generation

Code	Use	Size	AWDTE		AM Peak Hour				PM Peak Hour			
			Rate	Trips	Rate	In	Rate	Out	Rate	In	Rate	Out
210	A S-F- DETACHED	42 D.U.	9.44	396	0.19	8	0.55	23	0.62	26	0.37	16
210	B URBAN ALLEY S-F- DET-	66 D.U.	9.44	624	0.19	12	0.55	36	0.62	41	0.37	24
210	C S-F- DETACHED	45 D.U.	9.44	424	0.19	8	0.55	25	0.62	28	0.37	17
210 ~~220~~	D S-F- ATTACHED	82 D.U.	9.44	774	0.19	16	0.55	45	0.62	51	0.37	30
210 ~~220~~	E S-F- ATTACHED	14 D.U	9.44	132	0.19	3	0.55	8	0.62	9	0.37	5
	RESIDENTIAL SUBTOTAL			2350		47		137		155		92
945	C-STORE/GAS	6 F.P.	205.36	1232	6.36	38	6.11	37	7.13	43	6.86	41
820	MIXED-USE NORTH RETAIL	8 KSF	37.75	302	0.58	5	0.36	3	1.83	15	1.98	16
710	SOUTH OFFICE	8.2 KSF	9.74	80	1.00	8	0.16	1	0.18	1	0.97	8
	COMMERCIAL SUBTOTAL			1614		51		41		59		65
	TOTAL			3964		98		178		214		157


Trip Distribution
Legend
5%
Zephyr Rd
Crossview Dr
Copper Crest Ln
Spruce Creek Dr
Treestead Rd
Clymer Cir
Westchase
East Co Road 36
Stetson Creek
Kechter Rd
Regal Rd
Dolan St
Harvest St
Tilden St
Rock Castle Ln
Carmichael St
11
S Timberline Rd
34E
40%
25%
Harmony Crossing
Willow Springs
Linden Park
Fossil Creek Pkwy
Prairie Hill Dr
Rosemary Ct
Feltleaf Ct
Golden Willow Dr
Power Trail
SITE
20%
Saffron Ct
Keenland Dr
Mcmurry Ave
Fairway 6 Dr
Front 9 Dr
Southridge Greens Blvd
Twin Oak Ct
Wheaton Dr
Oakridge Village
Southridge Greens
Paragon Point
E Trilby Rd
Stanton
Paragon Pl
Pheasant Ct
St Thomas
Antigua Dr
Google Earth
© 2018 Google
3000 ft
N

APPENDIX B

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 6/22/2017 Observer: City of Fort Collins

Day: Thursday Jurisdiction: Fort Collins

Intersection: Timberline/Trilby

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Trilby				Westbound: Trilby				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	15	113	4	132	2	100	45	147	279	64	10	16	90	16	11	1	28	118	397
7:45	16	136	4	156	0	105	55	160	316	89	17	21	127	21	15	1	37	164	480
8:00	8	106	5	119	2	83	33	118	237	61	10	10	81	10	15	1	26	107	344
8:15	18	111	11	140	1	74	39	114	254	65	22	18	105	12	14	1	27	132	386
7:30-8:30	57	466	24	547	5	362	172	539	1086	279	59	65	403	59	55	4	118	521	1607
PHF	0.79	0.86	0.55	0.88	0.63	0.86	0.78	0.84		0.78	0.67	0.77	0.79	0.7	0.92	1	0.8		0.84
4:30	15	107	6	128	1	149	84	234	362	40	16	22	78	9	18	5	32	110	472
4:45	21	117	4	142	0	157	92	249	391	61	19	14	94	13	18	3	34	128	519
5:00	24	127	13	164	3	173	88	264	428	52	16	22	90	12	21	3	36	126	554
5:15	25	136	9	170	3	134	107	244	414	72	16	22	110	11	25	1	37	147	561
4:30-5:30	85	487	32	604	7	613	371	991	1595	225	67	80	372	45	82	12	139	511	2106
PHF	0.85	0.9	0.62	0.89	0.58	0.89	0.87	0.94		0.78	0.88	0.91	0.85	0.87	0.82	0.6	0.94		0.94

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 5/9/2019 Observer: Vickie

Day: Thursday Jurisdiction: Fort Collins

Intersection: Timberline/Westchase

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Driveway				Westbound: Westchase				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	0	227	0	227	4	200	0	204	431	0	0	0	0	2	0	4	6	6	437
7:45	0	214	4	218	3	179	0	182	400	0	0	0	0	3	0	2	5	5	405
8:00	0	211	1	212	1	131	0	132	344	0	0	0	0	4	0	7	11	11	355
8:15	0	210	2	212	5	143	0	148	360	0	0	0	0	2	0	3	5	5	365
7:30-8:30	0	862	7	869	13	653	0	666	1535	0	0	0	0	11	0	16	27	27	1562
PHF	n/a	0.95	0.44	0.96	0.65	0.82	n/a	0.82		n/a	n/a	n/a	n/a	0.69	n/a	0.57	0.61		0.89
4:30	0	188	3	191	9	215	0	224	415	0	0	0	0	1	0	1	2	2	417
4:45	0	228	3	231	7	239	0	246	477	0	0	0	0	0	0	5	5	5	482
5:00	0	203	1	204	3	277	0	280	484	0	0	0	0	2	0	3	5	5	489
5:15	0	214	4	218	11	263	0	274	492	0	0	0	0	2	0	2	4	4	496
4:30-5:30	0	833	11	844	30	994	0	1024	1868	0	0	0	0	5	0	11	16	16	1884
PHF	n/a	0.91	0.69	0.91	0.68	0.9	n/a	0.91		n/a	n/a	n/a	n/a	0.63	n/a	0.55	0.8		0.95

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 5/7/2019 Observer: Vickie

Day: Tuesday Jurisdiction: Fort Collins

Intersection: Timberline/Fossil Creek

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Fossil Creek				Westbound: Fossil Creek				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	4	256	0	260	1	156	7	164	424	13	0	33	46	6	0	21	27	73	497
7:45	4	220	1	225	5	197	3	205	430	7	0	16	23	3	0	12	15	38	468
8:00	5	186	1	192	2	139	4	145	337	11	0	10	21	2	0	8	10	31	368
8:15	3	237	1	241	7	130	4	141	382	13	0	14	27	1	0	12	13	40	422
7:30-8:30	16	899	3	918	15	622	18	655	1573	44	0	73	117	12	0	53	65	182	1755
PHF	0.8	0.88	0.75	0.88	0.54	0.79	0.64	0.8		0.85	n/a	0.55	0.64	0.5	n/a	0.63	0.6		0.88
4:30	5	167	3	175	9	221	6	236	411	6	0	4	10	1	0	7	8	18	429
4:45	10	213	6	229	13	252	6	271	500	5	0	4	9	2	0	2	4	13	513
5:00	7	177	5	189	17	234	19	270	459	11	0	6	17	0	1	6	7	24	483
5:15	11	199	5	215	9	228	13	250	465	7	1	9	17	3	0	11	14	31	496
4:30-5:30	33	756	19	808	48	935	44	1027	1835	29	1	23	53	6	1	26	33	86	1921
PHF	0.75	0.89	0.79	0.88	0.71	0.93	0.58	0.95		0.66	0.25	0.64	0.78	0.5	0.25	0.59	0.59		0.94

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 5/8/2019 Observer: Vickie

Day: Wednesday Jurisdiction: Fort Collins

Intersection: Timberline/Rosen

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Rosen				Westbound:				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	1	310		311		194	2	196	507	17		7	24				0	24	531
7:45	0	285		285		141	2	143	428	10		1	11				0	11	439
8:00	1	200		201		146	5	151	352	15		3	18				0	18	370
8:15	2	208		210		131	2	133	343	11		11	22				0	22	365
7:30-8:30	4	1003	0	1007	0	612	11	623	1630	53	0	22	75	0	0	0	0	75	1705
PHF	0.5	0.81	n/a	0.81	n/a	0.79	0.55	0.79		0.78	n/a	0.5	0.78	n/a	n/a	n/a	n/a		0.8
4:30	3	223		226		293	16	309	535	7		2	9				0	9	544
4:45	4	192		196		265	12	277	473	6		3	9				0	9	482
5:00	3	199		202		322	20	342	544	8		2	10				0	10	554
5:15	4	243		247		276	15	291	538	9		1	10				0	10	548
4:30-5:30	14	857	0	871	0	1156	63	1219	2090	30	0	8	38	0	0	0	0	38	2128
PHF	0.88	0.88	n/a	0.88	n/a	0.9	0.79	0.89		0.83	n/a	0.67	0.95	n/a	n/a	n/a	n/a		0.96

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 5/8/2019 Observer: Vickie

Day: Wednesday Jurisdiction: Fort Collins

Intersection: Timberline/Zephyr

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Driveway				Westbound: Zephyr				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	0	321	6	327	13	191	0	204	531	0	0	0	0	5	0	30	35	35	566
7:45	0	287	8	295	28	141	0	169	464	0	0	0	0	2	0	32	34	34	498
8:00	0	213	2	215	12	145	0	157	372	0	0	0	0	6	0	54	60	60	432
8:15	0	204	15	219	4	123	0	127	346	0	0	0	0	10	0	17	27	27	373
7:30-8:30	0	1025	31	1056	57	600	0	657	1713	0	0	0	0	23	0	133	156	156	1869
PHF	n/a	0.8	0.52	0.81	0.51	0.79	n/a	0.81		n/a	n/a	n/a	n/a	0.58	n/a	0.62	0.65		0.83
4:30	0	222	8	230	13	305	0	318	548	0	0	0	0	4	0	13	17	17	565
4:45	0	194	4	198	20	274	0	294	492	0	0	0	0	3	0	12	15	15	507
5:00	0	198	9	207	28	339	0	367	574	0	0	0	0	3	0	26	29	29	603
5:15	0	242	10	252	28	282	0	310	562	0	0	0	0	9	0	14	23	23	585
4:30-5:30	0	856	31	887	89	1200	0	1289	2176	0	0	0	0	19	0	65	84	84	2260
PHF	n/a	0.88	0.78	0.88	0.79	0.88	n/a	0.88		n/a	n/a	n/a	n/a	0.53	n/a	0.63	0.72		0.94

DELICH ASSOCIATES
2272 GLEN HAVEN DRIVE
LOVELAND, CO 80538
Phone: (970) 669-2061

TABULAR SUMMARY OF VEHICLE COUNTS

Date: 6/22/2017 Observer: City of Fort Collins

Day: Thursday Jurisdiction: Fort Collins

Intersection: Timberline/Kechter-Willow Springs

R = right turn
S = straight
L = left turn

Time	Northbound: Timberline				Southbound: Timberline				Total	Eastbound: Willow Spring				Westbound: Kechter				Total	Total
Begins	L	S	R	Total	L	S	R	Total	north/south	L	S	R	Total	L	S	R	Total	east/west	All
7:30	3	193	24	220	18	122	3	143	363	9	3	11	23	16	1	33	50	73	436
7:45	3	246	42	291	13	109	3	125	416	18	6	9	33	27	3	60	90	123	539
8:00	3	178	41	222	8	103	4	115	337	4	4	3	11	13	0	31	44	55	392
8:15	3	173	40	216	15	90	2	107	323	8	3	5	16	23	1	53	77	93	416
7:30-8:30	12	790	147	949	54	424	12	490	1439	39	16	28	83	79	5	177	261	344	1783
PHF	1	0.8	0.88	0.82	0.75	0.87	0.75	0.86		0.54	0.67	0.64	0.63	0.73	0.42	0.74	0.73		0.83
4:30	3	147	20	170	30	208	8	246	416	7	3	4	14	44	9	33	86	100	516
4:45	5	161	29	195	22	223	5	250	445	6	3	11	20	52	7	31	90	110	555
5:00	6	177	42	225	33	237	10	280	505	6	4	8	18	57	7	24	88	106	611
5:15	5	179	37	221	35	209	5	249	470	3	2	5	10	72	11	33	116	126	596
4:30-5:30	19	664	128	811	120	877	28	1025	1836	22	12	28	62	225	34	121	380	442	2278
PHF	0.79	0.93	0.76	0.9	0.86	0.93	0.7	0.92		0.79	0.75	0.64	0.78	0.78	0.77	0.92	0.82		0.93

APPENDIX C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	332	65	71	67	62	5	65	554	27	6	458	218
Future Volume (veh/h)	332	65	71	67	62	5	65	554	27	6	458	218
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	391	76	40	79	73	2	76	652	0	7	539	90
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	427	325	171	182	165	5	448	1089	923	377	1028	872
Arrive On Green	0.16	0.28	0.28	0.09	0.09	0.09	0.05	0.58	0.00	0.02	0.55	0.55
Sat Flow, veh/h	1781	1154	607	1276	1812	50	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	391	0	116	79	0	75	76	652	0	7	539	90
Grp Sat Flow(s),veh/h/ln	1781	0	1761	1276	0	1861	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	18.0	0.0	5.6	6.6	0.0	4.2	1.9	24.6	0.0	0.2	20.0	3.0
Cycle Q Clear(g_c), s	18.0	0.0	5.6	6.6	0.0	4.2	1.9	24.6	0.0	0.2	20.0	3.0
Prop In Lane	1.00		0.34	1.00		0.03	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	427	0	496	182	0	169	448	1089	923	377	1028	872
V/C Ratio(X)	0.92	0.00	0.23	0.44	0.00	0.44	0.17	0.60	0.00	0.02	0.52	0.10
Avail Cap(c_a), veh/h	427	0	688	321	0	372	488	1089	923	475	1028	872
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.8	0.0	30.4	48.4	0.0	47.4	10.8	14.7	0.0	12.4	15.7	11.8
Incr Delay (d2), s/veh	24.3	0.0	0.2	1.6	0.0	1.8	0.2	2.4	0.0	0.0	1.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	2.3	2.1	0.0	2.0	0.7	10.2	0.0	0.1	8.5	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	63.1	0.0	30.6	50.1	0.0	49.2	11.0	17.2	0.0	12.4	17.6	12.1
LnGrp LOS	E	A	C	D	A	D	B	B	A	B	B	B
Approach Vol, veh/h		507			154			728			636	
Approach Delay, s/veh		55.7			49.6			16.5			16.7	
Approach LOS		E			D			B			B	

Timer - Assigned Phs	1	2		4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.5	65.5		36.0	5.0	69.0	21.0	15.0
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	7.0	45.0		42.0	7.0	45.0	17.0	21.0
Max Q Clear Time (g_c+I1), s	3.9	22.0		7.6	2.2	26.6	20.0	8.6
Green Ext Time (p_c), s	0.0	3.6		0.6	0.0	4.0	0.0	0.4

Intersection Summary		
HCM 6th Ctrl Delay		28.9
HCM 6th LOS		C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	11	51	48	11	51	21	27
Maximum Split (%)	10.0%	46.4%	43.6%	10.0%	46.4%	19.1%	24.5%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	89	100	41	89	100	41	62
End Time (s)	100	41	89	100	41	62	89
Yield/Force Off (s)	96	35	83	96	35	58	83
Yield/Force Off 170(s)	96	20	70	96	21	58	71
Local Start Time (s)	54	65	6	54	65	6	27
Local Yield (s)	61	0	48	61	0	23	48
Local Yield 170(s)	61	95	35	61	96	23	36

Intersection Summary

Cycle Length	110	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 35 (32%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	391	160	79	79	76	652	32	7	539	256
v/c Ratio	0.69	0.24	0.53	0.35	0.21	0.67	0.04	0.02	0.64	0.30
Control Delay	34.2	15.6	57.3	45.4	13.1	24.8	0.1	13.0	27.9	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	15.6	57.3	45.4	13.1	24.8	0.1	13.0	27.9	4.9
Queue Length 50th (ft)	196	43	53	50	26	346	0	2	270	0
Queue Length 95th (ft)	291	89	92	87	42	482	0	m6	355	53
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		250
Base Capacity (vph)	566	714	244	370	366	974	880	330	856	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.22	0.32	0.21	0.21	0.67	0.04	0.02	0.63	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	73	87	47	83	14	86	569	35	7	620	376
Future Volume (veh/h)	263	73	87	47	83	14	86	569	35	7	620	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	78	52	50	88	9	91	605	0	7	660	205
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	291	224	149	161	134	14	419	1236	1048	497	1178	999
Arrive On Green	0.11	0.21	0.21	0.08	0.08	0.08	0.05	0.66	0.00	0.02	0.63	0.63
Sat Flow, veh/h	1781	1047	698	1260	1669	171	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	280	0	130	50	0	97	91	605	0	7	660	205
Grp Sat Flow(s),veh/h/ln	1781	0	1745	1260	0	1840	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	13.0	0.0	7.6	4.6	0.0	6.1	2.0	19.5	0.0	0.2	24.2	6.6
Cycle Q Clear(g_c), s	13.0	0.0	7.6	4.6	0.0	6.1	2.0	19.5	0.0	0.2	24.2	6.6
Prop In Lane	1.00		0.40	1.00		0.09	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	291	0	373	161	0	148	419	1236	1048	497	1178	999
V/C Ratio(X)	0.96	0.00	0.35	0.31	0.00	0.66	0.22	0.49	0.00	0.01	0.56	0.21
Avail Cap(c_a), veh/h	291	0	611	333	0	399	453	1236	1048	585	1178	999
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.3	0.0	40.1	52.8	0.0	53.6	9.2	10.2	0.0	8.5	12.7	9.4
Incr Delay (d2), s/veh	42.5	0.0	0.6	1.1	0.0	4.9	0.3	1.4	0.0	0.0	1.9	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.4	0.0	3.3	1.5	0.0	3.0	0.7	7.6	0.0	0.1	9.8	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	89.8	0.0	40.6	53.9	0.0	58.4	9.5	11.6	0.0	8.6	14.6	9.9
LnGrp LOS	F	A	D	D	A	E	A	B	A	A	B	A
Approach Vol, veh/h		410			147			696			872	
Approach Delay, s/veh		74.2			56.9			11.3			13.5	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	80.6		30.6	5.0	84.3	16.0	14.6				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	7.0	56.0		41.0	7.0	56.0	12.0	25.0				
Max Q Clear Time (g_c+I1), s	4.0	26.2		9.6	2.2	21.5	15.0	8.1				
Green Ext Time (p_c), s	0.0	5.4		0.7	0.0	4.2	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	27.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	11	62	47	11	62	16	31
Maximum Split (%)	9.2%	51.7%	39.2%	9.2%	51.7%	13.3%	25.8%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	88	99	41	88	99	41	57
End Time (s)	99	41	88	99	41	57	88
Yield/Force Off (s)	95	35	82	95	35	53	82
Yield/Force Off 170(s)	95	20	69	95	21	53	70
Local Start Time (s)	53	64	6	53	64	6	22
Local Yield (s)	60	0	47	60	0	18	47
Local Yield 170(s)	60	105	34	60	106	18	35

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	80	

Offset: 35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	280	171	50	103	91	605	37	7	660	400
v/c Ratio	0.65	0.31	0.39	0.52	0.26	0.54	0.04	0.02	0.68	0.40
Control Delay	42.0	23.1	57.9	55.8	10.6	17.3	0.1	12.3	29.1	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	23.1	57.9	55.8	10.6	17.3	0.1	12.3	29.1	6.7
Queue Length 50th (ft)	162	62	37	71	29	286	0	2	371	20
Queue Length 95th (ft)	#298	133	76	125	43	408	0	m4	m467	m94
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		250
Base Capacity (vph)	431	634	261	400	358	1120	992	454	970	1007
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.27	0.19	0.26	0.25	0.54	0.04	0.02	0.68	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	263	73	87	47	83	14	86	569	35	7	620	376
Future Volume (veh/h)	263	73	87	47	83	14	86	569	35	7	620	376
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	78	52	50	88	9	91	605	0	7	660	205
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	321	241	161	161	134	14	403	1205	1021	477	1147	972
Arrive On Green	0.13	0.23	0.23	0.08	0.08	0.08	0.05	0.64	0.00	0.02	0.61	0.61
Sat Flow, veh/h	1781	1047	698	1260	1669	171	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	280	0	130	50	0	97	91	605	0	7	660	205
Grp Sat Flow(s),veh/h/ln	1781	0	1745	1260	0	1840	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	15.0	0.0	7.4	4.6	0.0	6.1	2.1	20.4	0.0	0.2	25.3	6.9
Cycle Q Clear(g_c), s	15.0	0.0	7.4	4.6	0.0	6.1	2.1	20.4	0.0	0.2	25.3	6.9
Prop In Lane	1.00		0.40	1.00		0.09	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	321	0	402	161	0	148	403	1205	1021	477	1147	972
V/C Ratio(X)	0.87	0.00	0.32	0.31	0.00	0.66	0.23	0.50	0.00	0.01	0.58	0.21
Avail Cap(c_a), veh/h	321	0	640	333	0	399	436	1205	1021	565	1147	972
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	0.0	38.4	52.8	0.0	53.6	10.2	11.2	0.0	9.4	13.9	10.3
Incr Delay (d2), s/veh	22.3	0.0	0.5	1.1	0.0	4.9	0.3	1.5	0.0	0.0	2.1	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	3.2	1.5	0.0	3.0	0.7	8.1	0.0	0.1	10.4	2.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.9	0.0	38.9	53.9	0.0	58.4	10.5	12.7	0.0	9.4	16.0	10.8
LnGrp LOS	E	A	D	D	A	E	B	B	A	A	B	B
Approach Vol, veh/h		410			147			696			872	
Approach Delay, s/veh		58.0			56.9			12.4			14.7	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	78.6		32.6	5.0	82.3	18.0	14.6				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	7.0	54.0		43.0	7.0	54.0	14.0	25.0				
Max Q Clear Time (g_c+I1), s	4.1	27.3		9.4	2.2	22.4	17.0	8.1				
Green Ext Time (p_c), s	0.0	5.3		0.7	0.0	4.1	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	25.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

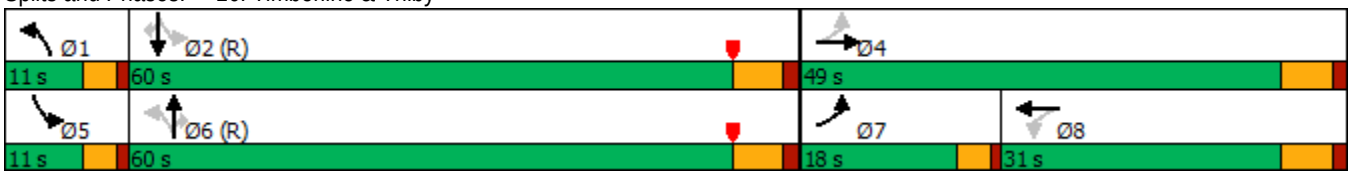
Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	11	60	49	11	60	18	31
Maximum Split (%)	9.2%	50.0%	40.8%	9.2%	50.0%	15.0%	25.8%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	90	101	41	90	101	41	59
End Time (s)	101	41	90	101	41	59	90
Yield/Force Off (s)	97	35	84	97	35	55	84
Yield/Force Off 170(s)	97	20	71	97	21	55	72
Local Start Time (s)	55	66	6	55	66	6	24
Local Yield (s)	62	0	49	62	0	20	49
Local Yield 170(s)	62	105	36	62	106	20	37

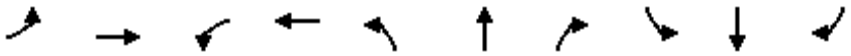
Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	80	

Offset: 35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	280	171	50	103	91	605	37	7	660	400
v/c Ratio	0.64	0.31	0.39	0.52	0.26	0.54	0.04	0.02	0.69	0.40
Control Delay	40.8	22.5	57.9	55.8	11.0	17.7	0.1	12.7	28.9	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.8	22.5	57.9	55.8	11.0	17.7	0.1	12.7	28.9	7.0
Queue Length 50th (ft)	162	62	37	71	29	286	0	2	357	18
Queue Length 95th (ft)	265	129	76	125	45	425	0	m4	m470	m99
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		250
Base Capacity (vph)	437	662	261	400	354	1114	986	450	960	994
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.26	0.19	0.26	0.26	0.54	0.04	0.02	0.69	0.40

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Intersection												
Int Delay, s/veh	10											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	0	73	12	0	53	16	888	3	15	607	18
Future Vol, veh/h	44	0	73	12	0	53	16	888	3	15	607	18
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	-	-	75	-	-	-	150	-	-	150	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	0	83	14	0	60	18	1009	3	17	690	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1801	1772	690	1823	1791	1011	710	0	0	1012	0	0
Stage 1	724	724	-	1047	1047	-	-	-	-	-	-	-
Stage 2	1077	1048	-	776	744	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	62	83	445	60	81	291	889	-	-	685	-	-
Stage 1	417	430	-	276	305	-	-	-	-	-	-	-
Stage 2	265	305	-	390	421	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 47	79	445	47	77	291	889	-	-	685	-	-
Mov Cap-2 Maneuver	~ 47	79	-	47	77	-	-	-	-	-	-	-
Stage 1	409	419	-	270	299	-	-	-	-	-	-	-
Stage 2	206	299	-	309	410	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	117.6	50.8	0.2	0.2
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	889	-	-	47	445	149	685	-	-
HCM Lane V/C Ratio	0.02	-	-	1.064	0.186	0.496	0.025	-	-
HCM Control Delay (s)	9.1	-	-	288	14.9	50.8	10.4	-	-
HCM Lane LOS	A	-	-	F	B	F	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	4.5	0.7	2.4	0.1	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection												
Int Delay, s/veh	6.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	1	23	6	1	26	33	789	19	48	999	44
Future Vol, veh/h	29	1	23	6	1	26	33	789	19	48	999	44
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	-	-	75	-	-	-	150	-	-	150	-	200
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1	24	6	1	28	35	839	20	51	1063	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2099	2094	1063	2120	2131	849	1110	0	0	859	0	0
Stage 1	1165	1165	-	919	919	-	-	-	-	-	-	-
Stage 2	934	929	-	1201	1212	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	38	52	271	37	50	361	629	-	-	782	-	-
Stage 1	237	268	-	325	350	-	-	-	-	-	-	-
Stage 2	319	346	-	226	255	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	31	46	271	30	44	361	629	-	-	782	-	-
Mov Cap-2 Maneuver	31	46	-	30	44	-	-	-	-	-	-	-
Stage 1	224	251	-	307	330	-	-	-	-	-	-	-
Stage 2	277	327	-	191	238	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	212.2	51.2	0.4	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	629	-	-	31	271	112	782	-	-
HCM Lane V/C Ratio	0.056	-	-	1.03	0.09	0.313	0.065	-	-
HCM Control Delay (s)	11.1	-	-	$ 359.8	19.6	51.2	9.9	-	-
HCM Lane LOS	B	-	-	F	C	F	A	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.5	0.3	1.2	0.2	-	-

Intersection						
Int Delay, s/veh	5.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	22	4	981	618	11
Future Vol, veh/h	53	22	4	981	618	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	26	5	1154	727	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1891	727	740	0	-	0
Stage 1	727	-	-	-	-	-
Stage 2	1164	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	77	424	867	-	-	-
Stage 1	478	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	77	424	867	-	-	-
Mov Cap-2 Maneuver	77	-	-	-	-	-
Stage 1	475	-	-	-	-	-
Stage 2	297	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	133.9	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	867	-	101	-	-
HCM Lane V/C Ratio	0.005	-	0.874	-	-
HCM Control Delay (s)	9.2	-	133.9	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0	-	5	-	-

Intersection						
Int Delay, s/veh	1.9					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	8	14	830	1083	63
Future Vol, veh/h	30	8	14	830	1083	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	31	8	15	865	1128	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2023	1128	1194	0	-	0
Stage 1	1128	-	-	-	-	-
Stage 2	895	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	64	249	585	-	-	-
Stage 1	309	-	-	-	-	-
Stage 2	399	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	249	585	-	-	-
Mov Cap-2 Maneuver	62	-	-	-	-	-
Stage 1	301	-	-	-	-	-
Stage 2	399	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	99.5	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	585	-	74	-	-
HCM Lane V/C Ratio	0.025	-	0.535	-	-
HCM Control Delay (s)	11.3	-	99.5	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2.3	-	-

Intersection	
Int Delay, s/veh	5.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	23	133	1003	31	57	606
Future Vol, veh/h	23	133	1003	31	57	606
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	125	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	27	156	1180	36	67	713

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2027	1180	0	0	1216	0
Stage 1	1180	-	-	-	-	-
Stage 2	847	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	63	232	-	-	573	-
Stage 1	292	-	-	-	-	-
Stage 2	420	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	56	232	-	-	573	-
Mov Cap-2 Maneuver	56	-	-	-	-	-
Stage 1	292	-	-	-	-	-
Stage 2	371	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	58.1	0	1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	56	232	573	-
HCM Lane V/C Ratio	-	-	0.483	0.674	0.117	-
HCM Control Delay (s)	-	-	118.8	47.6	12.1	-
HCM Lane LOS	-	-	F	E	B	-
HCM 95th %tile Q(veh)	-	-	1.9	4.3	0.4	-

Intersection	
Int Delay, s/veh	2.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	19	65	829	31	89	1127
Future Vol, veh/h	19	65	829	31	89	1127
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	-	125	150	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	20	69	882	33	95	1199

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	2271	882	0	0	915	0
Stage 1	882	-	-	-	-	-
Stage 2	1389	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	44	345	-	-	745	-
Stage 1	405	-	-	-	-	-
Stage 2	231	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	38	345	-	-	745	-
Mov Cap-2 Maneuver	38	-	-	-	-	-
Stage 1	405	-	-	-	-	-
Stage 2	201	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	54.2	0	0.8
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	38	345	745	-
HCM Lane V/C Ratio	-	-	0.532	0.2	0.127	-
HCM Control Delay (s)	-	-	178.2	18	10.5	-
HCM Lane LOS	-	-	F	C	B	-
HCM 95th %tile Q(veh)	-	-	1.9	0.7	0.4	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	16	28	106	5	205	12	970	180	62	567	12
Future Volume (veh/h)	39	16	28	106	5	205	12	970	180	62	567	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	19	0	125	6	65	14	1141	167	73	667	0
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	230	237	0	230	237	201	567	1336	1132	266	1383	1172
Arrive On Green	0.13	0.13	0.00	0.13	0.13	0.13	0.02	0.71	0.71	0.05	0.74	0.00
Sat Flow, veh/h	1329	1870	0	1393	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	46	19	0	125	6	65	14	1141	167	73	667	0
Grp Sat Flow(s),veh/h/ln	1329	1870	0	1393	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	3.5	1.0	0.0	9.6	0.3	4.1	0.2	49.1	3.7	1.0	15.9	0.0
Cycle Q Clear(g_c), s	3.8	1.0	0.0	10.5	0.3	4.1	0.2	49.1	3.7	1.0	15.9	0.0
Prop In Lane	1.00		0.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	230	237	0	230	237	201	567	1336	1132	266	1383	1172
V/C Ratio(X)	0.20	0.08	0.00	0.54	0.03	0.32	0.02	0.85	0.15	0.27	0.48	0.00
Avail Cap(c_a), veh/h	370	434	0	376	434	367	652	1336	1132	356	1383	1172
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.00
Uniform Delay (d), s/veh	43.7	42.4	0.0	47.0	42.1	43.7	4.6	11.5	5.0	17.0	5.8	0.0
Incr Delay (d2), s/veh	0.4	0.1	0.0	2.0	0.0	0.9	0.0	7.1	0.3	0.5	1.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.5	0.0	3.4	0.1	1.6	0.1	18.5	1.1	1.0	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.1	42.5	0.0	49.0	42.1	44.6	4.6	18.6	5.3	17.6	7.0	0.0
LnGrp LOS	D	D	A	D	D	D	A	B	A	B	A	A
Approach Vol, veh/h		65			196			1322			740	
Approach Delay, s/veh		43.7			47.4			16.8			8.1	
Approach LOS		D			D			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	85.8		18.5	8.5	83.1		18.5				
Change Period (Y+Rc), s	4.0	5.5		5.5	4.0	5.5		5.5				
Max Green Setting (Gmax), s	7.0	63.5		24.5	10.0	60.5		24.5				
Max Q Clear Time (g_c+I1), s	2.2	17.9		5.8	3.0	51.1		12.5				
Green Ext Time (p_c), s	0.0	4.9		0.2	0.1	6.0		0.4				
Intersection Summary												
HCM 6th Ctrl Delay			17.3									
HCM 6th LOS			B									

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	11	69	30	14	66	30
Maximum Split (%)	10.0%	62.7%	27.3%	12.7%	60.0%	27.3%
Minimum Split (s)	9.5	22.5	24.5	9.5	24.5	22.5
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	30.5	41.5	0.5	30.5	44.5	0.5
End Time (s)	41.5	0.5	30.5	44.5	0.5	30.5
Yield/Force Off (s)	37.5	105	25	40.5	105	25
Yield/Force Off 170(s)	37.5	95	13	40.5	93	15
Local Start Time (s)	35.5	46.5	5.5	35.5	49.5	5.5
Local Yield (s)	42.5	0	30	45.5	0	30
Local Yield 170(s)	42.5	100	18	45.5	98	20

Intersection Summary

Cycle Length	110	
Control Type	Actuated-Coordinated	
Natural Cycle	100	

Offset: 105 (95%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter





Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	46	52	125	6	241	14	1141	212	73	667	14
v/c Ratio	0.22	0.18	0.62	0.02	0.62	0.03	0.89	0.19	0.35	0.49	0.01
Control Delay	41.1	20.1	55.7	36.2	19.5	4.1	25.8	4.4	10.9	9.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	20.1	55.7	36.2	19.5	4.1	25.8	4.4	10.9	9.5	0.0
Queue Length 50th (ft)	29	12	84	4	41	2	402	17	10	141	0
Queue Length 95th (ft)	56	40	128	14	98	m5	#1026	63	33	341	0
Internal Link Dist (ft)		790		807			2203			1632	
Turn Bay Length (ft)	75		200		165	170		200	225		200
Base Capacity (vph)	325	416	312	431	502	576	1277	1124	254	1361	1174
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.40	0.01	0.48	0.02	0.89	0.19	0.29	0.49	0.01

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	12	28	243	34	129	19	719	140	130	948	28
Future Volume (veh/h)	22	12	28	243	34	129	19	719	140	130	948	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	13	5	261	37	27	20	773	103	140	1019	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	335	285	109	357	414	351	228	1154	978	375	1200	1017
Arrive On Green	0.22	0.22	0.21	0.22	0.22	0.22	0.03	0.62	0.62	0.05	0.64	0.64
Sat Flow, veh/h	1338	1286	495	1395	1870	1585	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	24	0	18	261	37	27	20	773	103	140	1019	4
Grp Sat Flow(s),veh/h/ln	1338	0	1781	1395	1870	1585	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	1.7	0.0	1.0	21.7	1.9	1.6	0.5	32.4	3.2	3.2	51.4	0.1
Cycle Q Clear(g_c), s	3.6	0.0	1.0	22.7	1.9	1.6	0.5	32.4	3.2	3.2	51.4	0.1
Prop In Lane	1.00		0.28	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	335	0	394	357	414	351	228	1154	978	375	1200	1017
V/C Ratio(X)	0.07	0.00	0.05	0.73	0.09	0.08	0.09	0.67	0.11	0.37	0.85	0.00
Avail Cap(c_a), veh/h	485	0	594	514	623	528	326	1154	978	532	1200	1017
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	36.9	45.7	37.1	37.0	17.8	15.0	9.4	12.7	16.9	7.7
Incr Delay (d2), s/veh	0.1	0.0	0.0	3.0	0.1	0.1	0.2	3.1	0.2	0.6	7.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.4	7.6	0.9	0.6	0.2	13.4	1.1	1.2	21.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	38.7	0.0	36.9	48.7	37.2	37.1	17.9	18.1	9.6	13.3	24.5	7.7
LnGrp LOS	D	A	D	D	D	D	B	B	A	B	C	A
Approach Vol, veh/h		42			325			896			1163	
Approach Delay, s/veh		37.9			46.5			17.1			23.1	
Approach LOS		D			D			B			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	82.0		31.5	9.4	79.1		31.5				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	9.0	56.0		39.0	16.0	49.0		39.0				
Max Q Clear Time (g_c+I1), s	2.5	53.4		5.6	5.2	34.4		24.7				
Green Ext Time (p_c), s	0.0	1.7		0.1	0.2	4.8		0.9				

Intersection Summary	
HCM 6th Ctrl Delay	24.3
HCM 6th LOS	C

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	13	62	45	20	55	45
Maximum Split (%)	10.8%	51.7%	37.5%	16.7%	45.8%	37.5%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	35.5	48.5	110.5	35.5	55.5	110.5
End Time (s)	48.5	110.5	35.5	55.5	110.5	35.5
Yield/Force Off (s)	44.5	104.5	29.5	51.5	104.5	29.5
Yield/Force Off 170(s)	44.5	94.5	17.5	51.5	92.5	19.5
Local Start Time (s)	51	64	6	51	71	6
Local Yield (s)	60	0	45	67	0	45
Local Yield 170(s)	60	110	33	67	108	35

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 104.5 (87%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter





Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	24	43	261	37	139	20	773	151	140	1019	30
v/c Ratio	0.07	0.10	0.78	0.08	0.28	0.11	0.75	0.16	0.41	0.86	0.03
Control Delay	31.5	14.7	57.3	31.8	6.4	8.6	28.0	6.0	11.3	30.0	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	14.7	57.3	31.8	6.4	8.6	28.0	6.0	11.3	30.0	0.4
Queue Length 50th (ft)	14	8	190	22	0	5	509	11	33	526	0
Queue Length 95th (ft)	33	33	259	45	45	m11	#859	m45	73	#1150	3
Internal Link Dist (ft)		790		807			2203			1632	
Turn Bay Length (ft)	75		200		165	170		200	225		200
Base Capacity (vph)	455	575	452	621	620	234	1030	920	419	1181	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.07	0.58	0.06	0.22	0.09	0.75	0.16	0.33	0.86	0.03

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

UNSIGNALIZED INTERSECTIONS

Level-of-Service	Average Total Delay sec/veh
A	≤ 10
B	> 10 and ≤ 15
C	> 15 and ≤ 25
D	> 25 and ≤ 35
E	> 35 and ≤ 50
F	> 50

SIGNALIZED INTERSECTIONS

Level-of-Service	Average Total Delay sec/veh
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Table 4-3
Fort Collins (GMA and City Limits)
Motor Vehicle LOS Standards (Intersections)

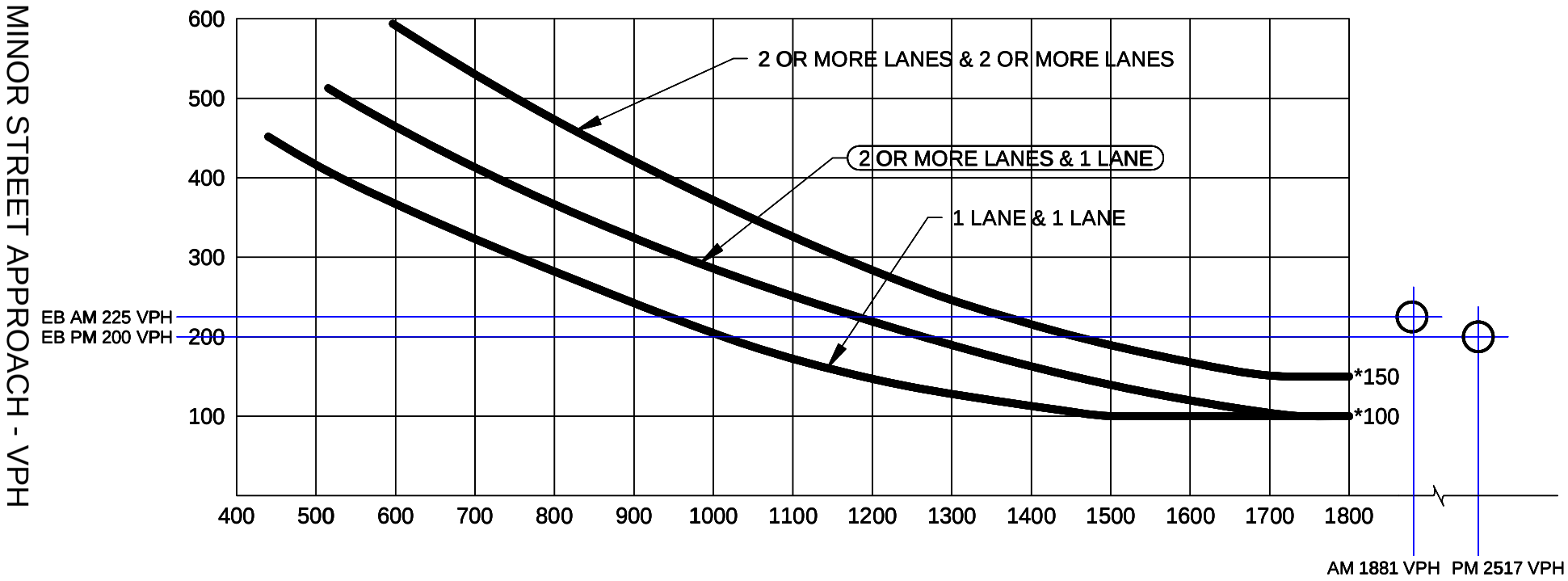
	Overall	Any Approach Leg	Any Movement
Signalized	D[1]	E	E[2]
Unsignalized Arterial/Arterial Collector/Collector	E[3]	F[4]	
Unsignalized Arterial/Collector Arterial/Local Collector/Local Local/Local	D[3]	F[4]	
Roundabout	E[3,5]	E[5,4]	E[5]

[1] In mixed use district including downtown as defined by structure plan, overall LOS E is acceptable
[2] Applicable with at least 5% of total entering volume
[3] Use weighed average to identify overall delay
[4] Mitigation may be required
[5] Apply unsignalized delay value thresholds to determine LOS

APPENDIX D

FIGURE 4C-3. WARRANT 3, PEAK HOUR

MUTCD, 2003 EDITION, PAGE 4C-7



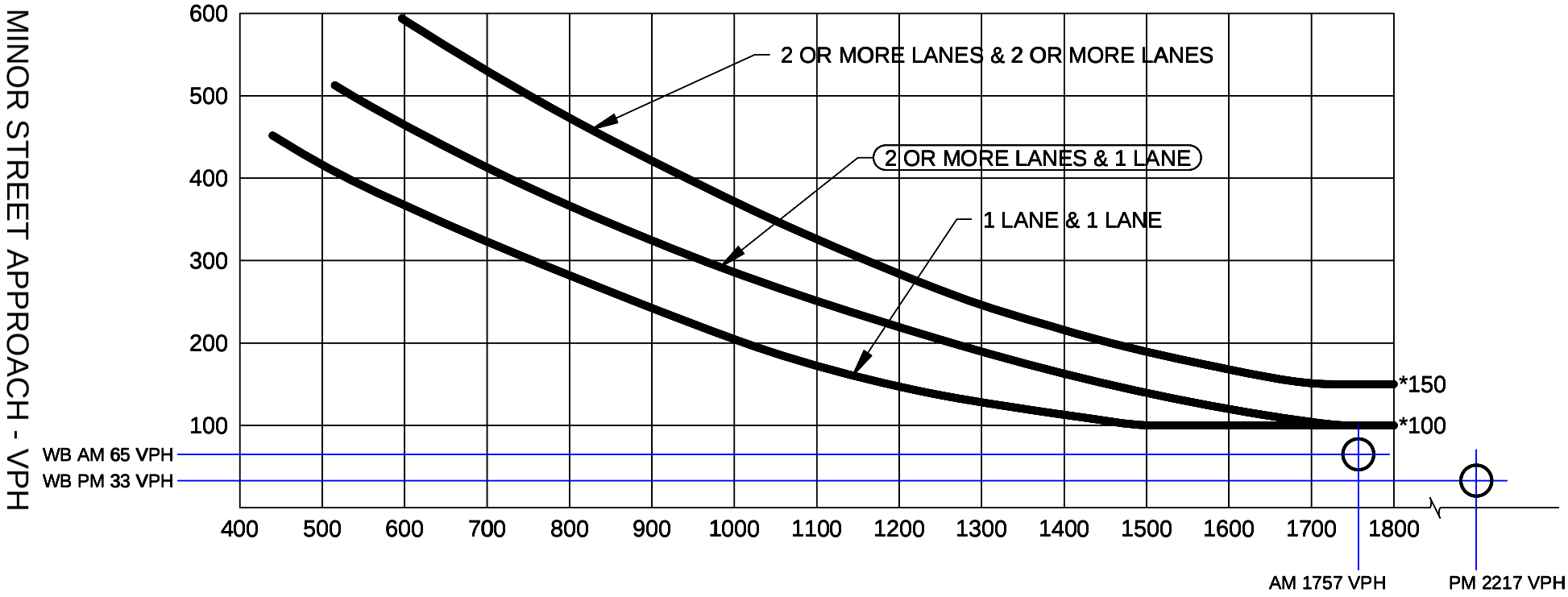
MAJOR STREET - TOTAL OF BOTH APPROACH -
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

SHORT RANGE (2024) BACKGROUND PEAK HOUR WARRANT
AT TIMBERLINE/ZEPHYR

FIGURE 4C-3. WARRANT 3, PEAK HOUR

MUTCD, 2003 EDITION, PAGE 4C-7



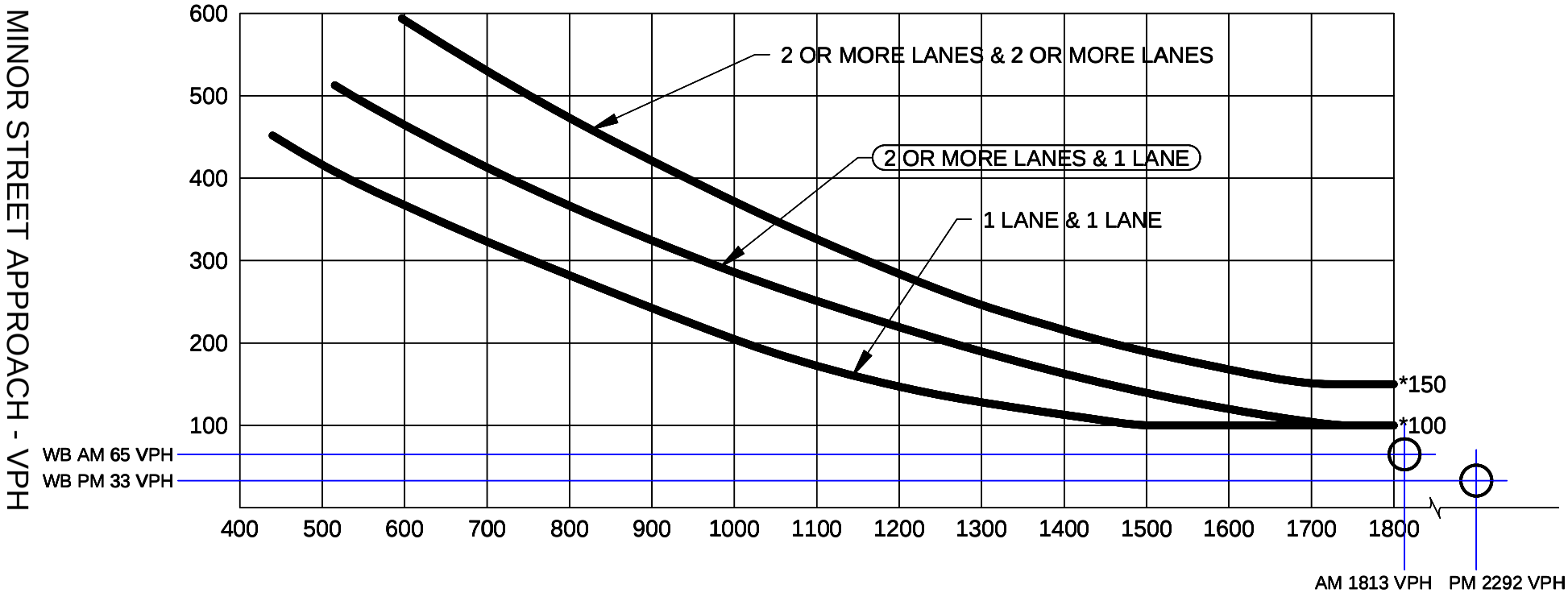
MAJOR STREET - TOTAL OF BOTH APPROACH -
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

SHORT RANGE (2024) BACKGROUND PEAK HOUR WARRANT
AT TIMBERLINE/FOSSIL CREEK

FIGURE 4C-3. WARRANT 3, PEAK HOUR

MUTCD, 2003 EDITION, PAGE 4C-7



MAJOR STREET - TOTAL OF BOTH APPROACH -
VEHICLES PER HOUR (VPH)

*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

SHORT RANGE (2024) TOTAL PEAK HOUR WARRANT
AT TIMBERLINE/FOSSIL CREEK

APPENDIX E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	363	72	75	76	73	5	68	608	31	6	543	258
Future Volume (veh/h)	363	72	75	76	73	5	68	608	31	6	543	258
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	427	85	47	89	86	2	80	715	0	7	639	115
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	446	339	188	191	182	4	360	1055	894	314	994	842
Arrive On Green	0.17	0.30	0.30	0.10	0.10	0.10	0.05	0.56	0.00	0.02	0.53	0.53
Sat Flow, veh/h	1781	1132	626	1258	1820	42	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	427	0	132	89	0	88	80	715	0	7	639	115
Grp Sat Flow(s),veh/h/ln	1781	0	1758	1258	0	1863	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	19.0	0.0	6.3	7.5	0.0	4.9	2.1	29.7	0.0	0.2	26.8	4.0
Cycle Q Clear(g_c), s	19.0	0.0	6.3	7.5	0.0	4.9	2.1	29.7	0.0	0.2	26.8	4.0
Prop In Lane	1.00		0.36	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	446	0	527	191	0	186	360	1055	894	314	994	842
V/C Ratio(X)	0.96	0.00	0.25	0.47	0.00	0.47	0.22	0.68	0.00	0.02	0.64	0.14
Avail Cap(c_a), veh/h	446	0	687	306	0	356	383	1055	894	395	994	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.3	0.0	29.1	47.9	0.0	46.8	13.4	16.9	0.0	14.3	18.4	13.0
Incr Delay (d2), s/veh	32.1	0.0	0.2	1.8	0.0	1.9	0.3	3.5	0.0	0.0	3.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	0.0	2.6	2.4	0.0	2.3	0.8	12.6	0.0	0.1	11.5	1.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.4	0.0	29.4	49.7	0.0	48.6	13.8	20.4	0.0	14.4	21.6	13.4
LnGrp LOS	E	A	C	D	A	D	B	C	A	B	C	B
Approach Vol, veh/h		559			177			795			761	
Approach Delay, s/veh		60.7			49.2			19.8			20.2	
Approach LOS		E			D			B			C	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	63.4		38.0	5.0	67.0	22.0	16.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		42.0	6.0	46.0	18.0	20.0				
Max Q Clear Time (g_c+I1), s	4.1	28.8		8.3	2.2	31.7	21.0	9.5				
Green Ext Time (p_c), s	0.0	4.1		0.7	0.0	4.0	0.0	0.5				

Intersection Summary	
HCM 6th Ctrl Delay	32.2
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	10	52	48	10	52	22	26
Maximum Split (%)	9.1%	47.3%	43.6%	9.1%	47.3%	20.0%	23.6%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	54	64	6	54	64	6	28
End Time (s)	64	6	54	64	6	28	54
Yield/Force Off (s)	60	0	48	60	0	24	48
Yield/Force Off 170(s)	60	95	35	60	96	24	36
Local Start Time (s)	54	64	6	54	64	6	28
Local Yield (s)	60	0	48	60	0	24	48
Local Yield 170(s)	60	95	35	60	96	24	36

Intersection Summary

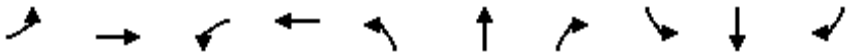
Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	427	173	89	92	80	715	36	7	639	304
v/c Ratio	0.76	0.26	0.57	0.38	0.28	0.73	0.04	0.03	0.75	0.34
Control Delay	38.1	17.0	57.7	45.3	14.2	27.4	0.1	13.8	31.7	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	17.0	57.7	45.3	14.2	27.4	0.1	13.8	31.7	6.5
Queue Length 50th (ft)	240	55	60	58	25	360	0	2	197	0
Queue Length 95th (ft)	311	95	100	96	47	#621	0	m9	428	77
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	559	712	230	354	284	973	878	268	862	893
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.24	0.39	0.26	0.28	0.73	0.04	0.03	0.74	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	308	86	92	54	92	15	89	672	42	7	709	419
Future Volume (veh/h)	308	86	92	54	92	15	89	672	42	7	709	419
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	328	91	61	57	98	11	95	715	1	7	754	249
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	364	273	183	167	143	16	314	1147	972	365	1088	922
Arrive On Green	0.15	0.26	0.26	0.09	0.09	0.09	0.05	0.61	0.61	0.02	0.58	0.58
Sat Flow, veh/h	1781	1044	700	1235	1652	185	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	328	0	152	57	0	109	95	715	1	7	754	249
Grp Sat Flow(s),veh/h/ln	1781	0	1744	1235	0	1837	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	18.0	0.0	8.5	5.3	0.0	6.9	2.4	28.7	0.0	0.2	33.9	9.4
Cycle Q Clear(g_c), s	18.0	0.0	8.5	5.3	0.0	6.9	2.4	28.7	0.0	0.2	33.9	9.4
Prop In Lane	1.00		0.40	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	364	0	456	167	0	159	314	1147	972	365	1088	922
V/C Ratio(X)	0.90	0.00	0.33	0.34	0.00	0.69	0.30	0.62	0.00	0.02	0.69	0.27
Avail Cap(c_a), veh/h	364	0	611	276	0	321	332	1147	972	439	1088	922
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.4	0.0	35.8	52.5	0.0	53.2	14.4	14.5	9.0	12.3	17.6	12.4
Incr Delay (d2), s/veh	24.4	0.0	0.4	1.2	0.0	5.1	0.5	2.6	0.0	0.0	3.6	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.1	0.0	3.6	1.7	0.0	3.4	0.9	11.9	0.0	0.1	14.5	3.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	66.8	0.0	36.3	53.7	0.0	58.4	14.9	17.1	9.0	12.3	21.2	13.2
LnGrp LOS	E	A	D	D	A	E	B	B	A	B	C	B
Approach Vol, veh/h		480			166			811			1010	
Approach Delay, s/veh		57.1			56.8			16.8			19.2	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	74.8		36.4	5.0	78.6	21.0	15.4				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	6.0	57.0		41.0	6.0	57.0	17.0	20.0				
Max Q Clear Time (g_c+I1), s	4.4	35.9		10.5	2.2	30.7	20.0	8.9				
Green Ext Time (p_c), s	0.0	6.0		0.8	0.0	5.0	0.0	0.5				

Intersection Summary	
HCM 6th Ctrl Delay	28.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	10	63	47	10	63	21	26
Maximum Split (%)	8.3%	52.5%	39.2%	8.3%	52.5%	17.5%	21.7%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	88	98	41	88	98	41	62
End Time (s)	98	41	88	98	41	62	88
Yield/Force Off (s)	94	35	82	94	35	58	82
Yield/Force Off 170(s)	94	20	69	94	21	58	70
Local Start Time (s)	53	63	6	53	63	6	27
Local Yield (s)	59	0	47	59	0	23	47
Local Yield 170(s)	59	105	34	59	106	23	35

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	328	189	57	114	95	715	45	7	754	446
v/c Ratio	0.74	0.33	0.43	0.55	0.35	0.65	0.05	0.02	0.80	0.45
Control Delay	44.9	24.4	58.6	56.8	13.1	21.3	0.1	4.6	24.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.9	24.4	58.6	56.8	13.1	21.3	0.1	4.6	24.7	5.7
Queue Length 50th (ft)	204	79	42	80	29	347	0	2	568	82
Queue Length 95th (ft)	#305	142	83	135	52	594	0	m2	#537	3
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	442	633	208	324	270	1095	972	342	944	988
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.30	0.27	0.35	0.35	0.65	0.05	0.02	0.80	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection												
Int Delay, s/veh	4.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	0	73	12	0	53	16	973	3	15	732	18
Future Vol, veh/h	44	0	73	12	0	53	16	973	3	15	732	18
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	0	83	14	0	60	18	1106	3	17	832	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1465	2021	426	1594	2030	555	852	0	0	1109	0	0
Stage 1	876	876	-	1144	1144	-	-	-	-	-	-	-
Stage 2	589	1145	-	450	886	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	89	57	577	72	57	475	783	-	-	625	-	-
Stage 1	310	365	-	213	273	-	-	-	-	-	-	-
Stage 2	461	272	-	558	361	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	75	54	577	59	54	475	783	-	-	625	-	-
Mov Cap-2 Maneuver	75	54	-	59	54	-	-	-	-	-	-	-
Stage 1	303	355	-	208	267	-	-	-	-	-	-	-
Stage 2	393	266	-	465	351	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	52.6	31.9	0.2	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	783	-	-	75	577	206	625	-	-
HCM Lane V/C Ratio	0.023	-	-	0.667	0.144	0.359	0.027	-	-
HCM Control Delay (s)	9.7	-	-	119.5	12.3	31.9	10.9	-	-
HCM Lane LOS	A	-	-	F	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	3	0.5	1.5	0.1	-	-

Intersection	
Int Delay, s/veh	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	1	23	6	1	26	33	938	19	48	1135	44
Future Vol, veh/h	29	1	23	6	1	26	33	938	19	48	1135	44
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1	24	6	1	28	35	998	20	51	1207	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1903	2421	627	1784	2434	509	1254	0	0	1018	0	0
Stage 1	1333	1333	-	1078	1078	-	-	-	-	-	-	-
Stage 2	570	1088	-	706	1356	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	42	32	426	52	31	509	551	-	-	677	-	-
Stage 1	162	221	-	233	293	-	-	-	-	-	-	-
Stage 2	474	290	-	393	216	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	35	28	426	43	27	509	551	-	-	677	-	-
Mov Cap-2 Maneuver	35	28	-	43	27	-	-	-	-	-	-	-
Stage 1	152	204	-	218	274	-	-	-	-	-	-	-
Stage 2	418	271	-	341	200	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	172.7	37.6	0.4	0.4
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	551	-	-	35	426	145	677	-	-
HCM Lane V/C Ratio	0.064	-	-	0.912	0.057	0.242	0.075	-	-
HCM Control Delay (s)	12	-	-	294.4	14	37.6	10.8	-	-
HCM Lane LOS	B	-	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.3	0.2	0.9	0.2	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	53	22	4	1066	743	11
Future Vol, veh/h	53	22	4	1066	743	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	62	26	5	1254	874	13

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1511	437	887	0	-	0
Stage 1	874	-	-	-	-	-
Stage 2	637	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	111	567	759	-	-	-
Stage 1	369	-	-	-	-	-
Stage 2	489	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	110	567	759	-	-	-
Mov Cap-2 Maneuver	110	-	-	-	-	-
Stage 1	366	-	-	-	-	-
Stage 2	489	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	63.2	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	759	-	144	-	-
HCM Lane V/C Ratio	0.006	-	0.613	-	-
HCM Control Delay (s)	9.8	-	63.2	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0	-	3.2	-	-

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	30	8	14	979	1219	63
Future Vol, veh/h	30	8	14	979	1219	63
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	31	8	15	1020	1270	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1810	635	1336	0	-	0
Stage 1	1270	-	-	-	-	-
Stage 2	540	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	70	421	512	-	-	-
Stage 1	228	-	-	-	-	-
Stage 2	548	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	68	421	512	-	-	-
Mov Cap-2 Maneuver	68	-	-	-	-	-
Stage 1	221	-	-	-	-	-
Stage 2	548	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	82.9	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	512	-	83	-	-
HCM Lane V/C Ratio	0.028	-	0.477	-	-
HCM Control Delay (s)	12.2	-	82.9	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	135	10	80	36	5	179	25	1060	34	74	638	50
Future Volume (veh/h)	135	10	80	36	5	179	25	1060	34	74	638	50
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	159	12	8	42	6	78	29	1247	38	87	751	30
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	260	202	135	321	22	287	570	2245	68	345	2321	1035
Arrive On Green	0.19	0.19	0.18	0.19	0.19	0.18	0.04	0.64	0.63	0.10	1.00	1.00
Sat Flow, veh/h	1314	1047	698	1392	114	1488	1781	3521	107	1781	3554	1585
Grp Volume(v), veh/h	159	0	20	42	0	84	29	629	656	87	751	30
Grp Sat Flow(s),veh/h/ln	1314	0	1745	1392	0	1603	1781	1777	1851	1781	1777	1585
Q Serve(g_s), s	12.9	0.0	1.0	2.8	0.0	5.0	0.6	21.8	21.9	1.7	0.0	0.0
Cycle Q Clear(g_c), s	17.9	0.0	1.0	3.8	0.0	5.0	0.6	21.8	21.9	1.7	0.0	0.0
Prop In Lane	1.00		0.40	1.00		0.93	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	260	0	336	321	0	309	570	1133	1180	345	2321	1035
V/C Ratio(X)	0.61	0.00	0.06	0.13	0.00	0.27	0.05	0.56	0.56	0.25	0.32	0.03
Avail Cap(c_a), veh/h	365	0	476	432	0	437	620	1133	1180	400	2321	1035
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	45.4	0.0	36.4	37.8	0.0	38.2	6.0	11.2	11.2	7.8	0.0	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.1	0.2	0.0	0.5	0.0	2.0	1.9	0.4	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.4	0.0	0.4	1.0	0.0	2.0	0.2	8.1	8.5	0.5	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.0	36.5	38.0	0.0	38.7	6.0	13.1	13.1	8.1	0.3	0.0
LnGrp LOS	D	A	D	D	A	D	A	B	B	A	A	A
Approach Vol, veh/h		179			126			1314			868	
Approach Delay, s/veh		46.5			38.5			13.0			1.1	
Approach LOS		D			D			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	76.8		26.2	8.6	75.1		26.2				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	59.0		29.0	8.0	57.0		29.0				
Max Q Clear Time (g_c+I1), s	2.6	2.0		19.9	3.7	23.9		7.0				
Green Ext Time (p_c), s	0.0	5.8		0.4	0.1	10.2		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	12.5
HCM 6th LOS	B

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	65	35	12	63	35
Maximum Split (%)	9.1%	59.1%	31.8%	10.9%	57.3%	31.8%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	51	6	41	53	6
End Time (s)	51	6	41	53	6	41
Yield/Force Off (s)	47	0	35	49	0	35
Yield/Force Off 170(s)	47	96	20	49	96	20
Local Start Time (s)	41	51	6	41	53	6
Local Yield (s)	47	0	35	49	0	35
Local Yield 170(s)	47	96	20	49	96	20

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	159	106	42	217	29	1287	87	751	59
v/c Ratio	0.89	0.25	0.15	0.47	0.06	0.60	0.29	0.33	0.06
Control Delay	85.0	9.8	33.6	15.7	8.6	21.2	9.8	8.9	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	85.0	9.8	33.6	15.7	8.6	21.2	9.8	8.9	1.2
Queue Length 50th (ft)	108	7	24	41	8	322	14	121	1
Queue Length 95th (ft)	#182	43	49	93	m14	483	31	143	6
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	225	508	343	539	505	2148	308	2255	1033
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.21	0.12	0.40	0.06	0.60	0.28	0.33	0.06

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	120	10	70	26	15	96	100	863	46	142	1186	180
Future Volume (veh/h)	120	10	70	26	15	96	100	863	46	142	1186	180
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	128	11	8	28	16	11	106	918	47	151	1262	126
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	223	132	96	229	135	93	424	2445	125	501	2529	1128
Arrive On Green	0.13	0.13	0.12	0.13	0.13	0.12	0.05	0.71	0.70	0.10	1.00	1.00
Sat Flow, veh/h	1383	1007	732	1393	1033	710	1781	3439	176	1781	3554	1585
Grp Volume(v), veh/h	128	0	19	28	0	27	106	474	491	151	1262	126
Grp Sat Flow(s),veh/h/ln	1383	0	1739	1393	0	1743	1781	1777	1839	1781	1777	1585
Q Serve(g_s), s	10.8	0.0	1.2	2.2	0.0	1.6	1.8	12.6	12.7	2.8	0.0	0.0
Cycle Q Clear(g_c), s	12.4	0.0	1.2	3.3	0.0	1.6	1.8	12.6	12.7	2.8	0.0	0.0
Prop In Lane	1.00		0.42	1.00		0.41	1.00		0.10	1.00		1.00
Lane Grp Cap(c), veh/h	223	0	228	229	0	229	424	1263	1307	501	2529	1128
V/C Ratio(X)	0.58	0.00	0.08	0.12	0.00	0.12	0.25	0.38	0.38	0.30	0.50	0.11
Avail Cap(c_a), veh/h	364	0	406	372	0	407	500	1263	1307	605	2529	1128
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.73	0.73	0.73
Uniform Delay (d), s/veh	51.5	0.0	46.0	47.2	0.0	46.2	3.7	6.8	6.9	4.4	0.0	0.0
Incr Delay (d2), s/veh	2.3	0.0	0.2	0.2	0.0	0.2	0.3	0.9	0.8	0.2	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.9	0.0	0.5	0.8	0.0	0.7	0.6	4.4	4.5	0.8	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.8	0.0	46.1	47.5	0.0	46.4	4.0	7.7	7.7	4.7	0.5	0.1
LnGrp LOS	D	A	D	D	A	D	A	A	A	A	A	A
Approach Vol, veh/h		147			55			1071			1539	
Approach Delay, s/veh		52.8			47.0			7.3			0.9	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.9	90.4		20.7	9.0	90.3		20.7				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	67.0		27.0	12.0	65.0		27.0				
Max Q Clear Time (g_c+I1), s	3.8	2.0		14.4	4.8	14.7		5.3				
Green Ext Time (p_c), s	0.1	13.3		0.3	0.2	7.0		0.1				

Intersection Summary	
HCM 6th Ctrl Delay	7.0
HCM 6th LOS	A

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	14	73	33	16	71	33
Maximum Split (%)	11.7%	60.8%	27.5%	13.3%	59.2%	27.5%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	39	53	6	39	55	6
End Time (s)	53	6	39	55	6	39
Yield/Force Off (s)	49	0	33	51	0	33
Yield/Force Off 170(s)	49	106	18	51	106	18
Local Start Time (s)	39	53	6	39	55	6
Local Yield (s)	49	0	33	51	0	33
Local Yield 170(s)	49	106	18	51	106	18

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	70	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	128	85	28	118	106	967	151	1262	191
v/c Ratio	0.72	0.27	0.14	0.35	0.31	0.42	0.33	0.54	0.17
Control Delay	68.8	13.6	42.0	13.2	5.6	10.1	7.0	12.8	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.8	13.6	42.0	13.2	5.6	10.1	7.0	12.8	4.2
Queue Length 50th (ft)	95	7	19	11	18	160	19	160	1
Queue Length 95th (ft)	154	49	44	59	m16	236	m66	350	47
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	263	434	305	456	376	2307	503	2348	1110
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.20	0.09	0.26	0.28	0.42	0.30	0.54	0.17

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	16	28	126	5	215	12	1129	214	65	631	12
Future Volume (veh/h)	39	16	28	126	5	215	12	1129	214	65	631	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	19	1	148	6	104	14	1328	158	76	742	13
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	247	254	13	253	270	229	570	2475	1104	402	2579	45
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	0.05	1.00	1.00	0.05	0.72	0.72
Sat Flow, veh/h	1283	1761	93	1392	1870	1585	1781	3554	1585	1781	3573	63
Grp Volume(v), veh/h	46	0	20	148	6	104	14	1328	158	76	369	386
Grp Sat Flow(s),veh/h/ln	1283	0	1854	1392	1870	1585	1781	1777	1585	1781	1777	1859
Q Serve(g_s), s	3.5	0.0	1.0	11.3	0.3	6.6	0.2	0.0	0.0	1.2	8.0	8.0
Cycle Q Clear(g_c), s	3.8	0.0	1.0	12.3	0.3	6.6	0.2	0.0	0.0	1.2	8.0	8.0
Prop In Lane	1.00		0.05	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	247	0	268	253	270	229	570	2475	1104	402	1282	1342
V/C Ratio(X)	0.19	0.00	0.07	0.58	0.02	0.45	0.02	0.54	0.14	0.19	0.29	0.29
Avail Cap(c_a), veh/h	359	0	430	375	434	367	655	2475	1104	491	1282	1342
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.73	0.73	0.73	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.0	0.0	40.7	46.0	40.4	43.1	4.3	0.0	0.0	3.3	5.4	5.4
Incr Delay (d2), s/veh	0.4	0.0	0.1	2.1	0.0	1.4	0.0	0.6	0.2	0.2	0.6	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.5	4.0	0.1	2.6	0.1	0.2	0.1	0.3	2.6	2.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	42.4	0.0	40.8	48.2	40.4	44.5	4.3	0.6	0.2	3.5	5.9	5.9
LnGrp LOS	D	A	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		66			258			1500			831	
Approach Delay, s/veh		41.9			46.5			0.6			5.7	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	83.9		20.4	8.5	81.1		20.4				
Change Period (Y+Rc), s	4.0	5.5		5.5	4.0	5.5		5.5				
Max Green Setting (Gmax), s	7.0	63.5		24.5	10.0	60.5		24.5				
Max Q Clear Time (g_c+I1), s	2.2	10.0		5.8	3.2	2.0		14.3				
Green Ext Time (p_c), s	0.0	5.0		0.2	0.1	14.6		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	7.7
HCM 6th LOS	A

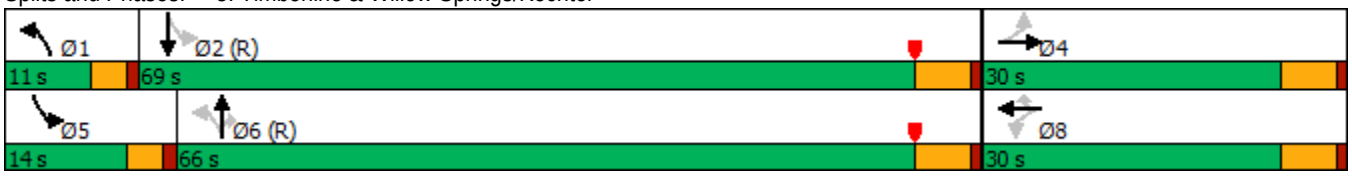
Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	11	69	30	14	66	30
Maximum Split (%)	10.0%	62.7%	27.3%	12.7%	60.0%	27.3%
Minimum Split (s)	9.5	22.5	24.5	9.5	24.5	22.5
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	30.5	41.5	0.5	30.5	44.5	0.5
End Time (s)	41.5	0.5	30.5	44.5	0.5	30.5
Yield/Force Off (s)	37.5	105	25	40.5	105	25
Yield/Force Off 170(s)	37.5	95	13	40.5	93	15
Local Start Time (s)	35.5	46.5	5.5	35.5	49.5	5.5
Local Yield (s)	42.5	0	30	45.5	0	30
Local Yield 170(s)	42.5	100	18	45.5	98	20

Intersection Summary

Cycle Length	110	
Control Type	Actuated-Coordinated	
Natural Cycle	65	

Offset: 105 (95%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	52	148	6	253	14	1328	252	76	756
v/c Ratio	0.20	0.17	0.66	0.02	0.65	0.03	0.56	0.22	0.24	0.30
Control Delay	39.1	19.1	56.2	34.6	24.3	8.3	17.6	6.8	5.9	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	19.1	56.2	34.6	24.3	8.3	17.6	6.8	5.9	7.3
Queue Length 50th (ft)	28	11	99	4	64	3	262	30	11	74
Queue Length 95th (ft)	55	39	146	14	124	m9	418	89	27	161
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	325	416	312	431	484	573	2375	1141	359	2524
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.47	0.01	0.52	0.02	0.56	0.22	0.21	0.30

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	12	28	290	34	136	19	856	167	137	1141	28
Future Volume (veh/h)	22	12	28	290	34	136	19	856	167	137	1141	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	13	6	312	37	33	20	920	89	147	1227	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	383	312	144	407	481	408	286	2051	915	484	2149	51
Arrive On Green	0.26	0.26	0.25	0.26	0.26	0.26	0.06	1.00	1.00	0.06	0.61	0.61
Sat Flow, veh/h	1331	1211	559	1393	1870	1585	1781	3554	1585	1781	3548	84
Grp Volume(v), veh/h	24	0	19	312	37	33	20	920	89	147	614	642
Grp Sat Flow(s),veh/h/ln	1331	0	1770	1393	1870	1585	1781	1777	1585	1781	1777	1855
Q Serve(g_s), s	1.7	0.0	1.0	26.0	1.8	1.9	0.5	0.0	0.0	3.8	25.0	25.0
Cycle Q Clear(g_c), s	3.5	0.0	1.0	27.0	1.8	1.9	0.5	0.0	0.0	3.8	25.0	25.0
Prop In Lane	1.00		0.32	1.00		1.00	1.00		1.00	1.00		0.05
Lane Grp Cap(c), veh/h	383	0	456	407	481	408	286	2051	915	484	1076	1124
V/C Ratio(X)	0.06	0.00	0.04	0.77	0.08	0.08	0.07	0.45	0.10	0.30	0.57	0.57
Avail Cap(c_a), veh/h	495	0	605	525	639	542	339	2051	915	546	1076	1124
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.89	0.89	0.89	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.1	0.0	33.6	43.6	33.8	33.8	11.1	0.0	0.0	8.0	14.3	14.3
Incr Delay (d2), s/veh	0.1	0.0	0.0	5.0	0.1	0.1	0.1	0.6	0.2	0.3	2.2	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.4	9.3	0.8	0.7	0.2	0.2	0.0	1.4	9.9	10.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	35.1	0.0	33.6	48.6	33.8	33.9	11.2	0.6	0.2	8.3	16.5	16.4
LnGrp LOS	D	A	C	D	C	C	B	A	A	A	B	B
Approach Vol, veh/h		43			382			1029			1403	
Approach Delay, s/veh		34.5			45.9			0.8			15.6	
Approach LOS		C			D			A			B	

Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	77.7		35.9	9.9	74.3		35.9				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	58.0		40.0	10.0	54.0		40.0				
Max Q Clear Time (g_c+I1), s	2.5	27.0		5.5	5.8	2.0		29.0				
Green Ext Time (p_c), s	0.0	9.6		0.1	0.1	7.9		0.9				

Intersection Summary			
HCM 6th Ctrl Delay		14.6	
HCM 6th LOS		B	

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	64	46	14	60	46
Maximum Split (%)	8.3%	53.3%	38.3%	11.7%	50.0%	38.3%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	36.5	46.5	110.5	36.5	50.5	110.5
End Time (s)	46.5	110.5	36.5	50.5	110.5	36.5
Yield/Force Off (s)	42.5	104.5	30.5	46.5	104.5	30.5
Yield/Force Off 170(s)	42.5	94.5	18.5	46.5	92.5	20.5
Local Start Time (s)	52	62	6	52	66	6
Local Yield (s)	58	0	46	62	0	46
Local Yield 170(s)	58	110	34	62	108	36

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	65	

Offset: 104.5 (87%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	24	43	312	37	146	20	920	180	147	1257
v/c Ratio	0.06	0.09	0.83	0.07	0.27	0.08	0.49	0.19	0.38	0.59
Control Delay	29.1	13.6	58.6	29.3	5.8	7.9	14.4	2.5	11.9	18.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	13.6	58.6	29.3	5.8	7.9	14.4	2.5	11.9	18.1
Queue Length 50th (ft)	14	7	225	21	0	3	151	2	40	271
Queue Length 95th (ft)	32	33	313	44	45	m13	253	29	79	475
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	466	589	463	636	636	268	1880	925	399	2134
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.07	0.67	0.06	0.23	0.07	0.49	0.19	0.37	0.59

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	420	80	100	80	75	10	85	730	35	15	635	310
Future Volume (veh/h)	420	80	100	80	75	10	85	730	35	15	635	310
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	442	84	63	84	79	6	89	768	0	16	668	169
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	490	145	109	120	123	9	399	1174	995	363	1132	960
Arrive On Green	0.14	0.15	0.15	0.07	0.07	0.07	0.05	0.63	0.00	0.03	0.61	0.61
Sat Flow, veh/h	3456	992	744	1781	1717	130	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	442	0	147	84	0	85	89	768	0	16	668	169
Grp Sat Flow(s),veh/h/ln	1728	0	1736	1781	0	1847	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	15.1	0.0	9.5	5.5	0.0	5.4	2.1	31.1	0.0	0.4	26.3	5.7
Cycle Q Clear(g_c), s	15.1	0.0	9.5	5.5	0.0	5.4	2.1	31.1	0.0	0.4	26.3	5.7
Prop In Lane	1.00		0.43	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	490	0	254	120	0	132	399	1174	995	363	1132	960
V/C Ratio(X)	0.90	0.00	0.58	0.70	0.00	0.64	0.22	0.65	0.00	0.04	0.59	0.18
Avail Cap(c_a), veh/h	490	0	420	134	0	323	417	1174	995	422	1132	960
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.7	0.0	47.8	54.8	0.0	54.2	10.8	14.1	0.0	11.7	14.5	10.5
Incr Delay (d2), s/veh	19.9	0.0	2.1	13.3	0.0	5.1	0.3	2.8	0.0	0.0	2.3	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	4.2	2.9	0.0	2.6	0.8	12.7	0.0	0.1	10.9	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	70.6	0.0	49.9	68.1	0.0	59.3	11.0	17.0	0.0	11.7	16.8	10.9
LnGrp LOS	E	A	D	E	A	E	B	B	A	B	B	B
Approach Vol, veh/h		589			169			857			853	
Approach Delay, s/veh		65.4			63.7			16.3			15.5	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.7	77.6	11.1	22.5	6.1	80.3	20.0	13.6				
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	6.0	58.0	8.0	28.0	6.0	58.0	16.0	20.0				
Max Q Clear Time (g_c+I1), s	4.1	28.3	7.5	11.5	2.4	33.1	17.1	7.4				
Green Ext Time (p_c), s	0.0	5.3	0.0	0.6	0.0	5.5	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	31.0
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

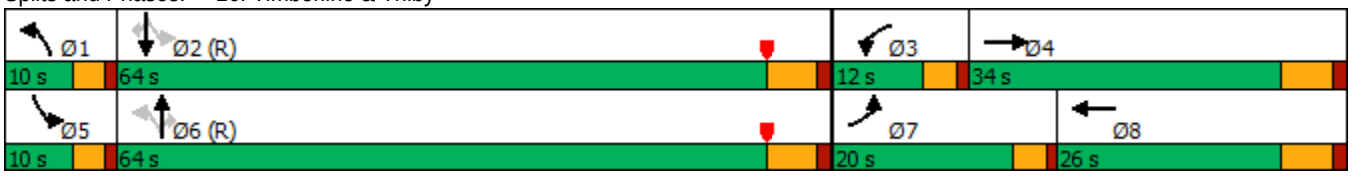
Phase Number	1	2	3	4	5	6	7	8
Movement	NBL	SBTL	WBL	EBT	SBL	NBTL	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes				
Recall Mode	None	C-Min	None	None	None	C-Min	None	None
Maximum Split (s)	10	64	12	34	10	64	20	26
Maximum Split (%)	8.3%	53.3%	10.0%	28.3%	8.3%	53.3%	16.7%	21.7%
Minimum Split (s)	9.5	28	9.5	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	3	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		15		13		14		12
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	62	6	18	52	62	6	26
End Time (s)	62	6	18	52	62	6	26	52
Yield/Force Off (s)	58	0	14	46	58	0	22	46
Yield/Force Off 170(s)	58	105	14	33	58	106	22	34
Local Start Time (s)	52	62	6	18	52	62	6	26
Local Yield (s)	58	0	14	46	58	0	22	46
Local Yield 170(s)	58	105	14	33	58	106	22	34

Intersection Summary

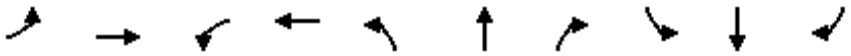
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	442	189	84	90	89	768	37	16	668	326
v/c Ratio	0.80	0.55	0.58	0.48	0.24	0.69	0.04	0.05	0.67	0.33
Control Delay	60.9	39.1	69.1	56.2	10.0	22.4	0.1	17.0	40.9	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.9	39.1	69.1	56.2	10.0	22.4	0.1	17.0	40.9	14.1
Queue Length 50th (ft)	164	98	62	63	26	382	0	10	532	133
Queue Length 95th (ft)	#270	172	#135	114	46	636	0	m19	559	143
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	550	449	149	324	366	1113	1000	325	994	992
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.42	0.56	0.28	0.24	0.69	0.04	0.05	0.67	0.33

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	375	90	120	55	100	20	115	785	45	20	840	500
Future Volume (veh/h)	375	90	120	55	100	20	115	785	45	20	840	500
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	395	95	82	58	105	15	121	826	0	21	884	335
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	474	166	143	89	147	21	249	1138	965	310	1100	932
Arrive On Green	0.14	0.18	0.18	0.05	0.09	0.09	0.05	0.61	0.00	0.03	0.59	0.59
Sat Flow, veh/h	3456	927	800	1781	1601	229	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	395	0	177	58	0	120	121	826	0	21	884	335
Grp Sat Flow(s),veh/h/ln	1728	0	1726	1781	0	1829	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	13.4	0.0	11.3	3.8	0.0	7.7	3.1	37.2	0.0	0.5	44.3	13.3
Cycle Q Clear(g_c), s	13.4	0.0	11.3	3.8	0.0	7.7	3.1	37.2	0.0	0.5	44.3	13.3
Prop In Lane	1.00		0.46	1.00		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	474	0	309	89	0	168	249	1138	965	310	1100	932
V/C Ratio(X)	0.83	0.00	0.57	0.65	0.00	0.72	0.49	0.73	0.00	0.07	0.80	0.36
Avail Cap(c_a), veh/h	490	0	417	134	0	320	264	1138	965	362	1100	932
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	45.1	56.0	0.0	53.0	19.8	16.5	0.0	14.1	19.3	12.9
Incr Delay (d2), s/veh	11.4	0.0	1.7	7.7	0.0	5.6	1.5	4.1	0.0	0.1	6.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.4	0.0	4.9	1.9	0.0	3.7	1.6	15.6	0.0	0.2	19.3	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	0.0	46.8	63.7	0.0	58.6	21.2	20.5	0.0	14.2	25.6	14.0
LnGrp LOS	E	A	D	E	A	E	C	C	A	B	C	B
Approach Vol, veh/h		572			178			947			1240	
Approach Delay, s/veh		57.2			60.3			20.6			22.3	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	75.5	9.0	26.5	6.5	78.0	19.5	16.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	58.0	8.0	28.0	6.0	58.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	5.1	46.3	5.8	13.3	2.5	39.2	15.4	9.7
Green Ext Time (p_c), s	0.0	5.7	0.0	0.7	0.0	5.6	0.1	0.3

Intersection Summary

HCM 6th Ctrl Delay	30.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

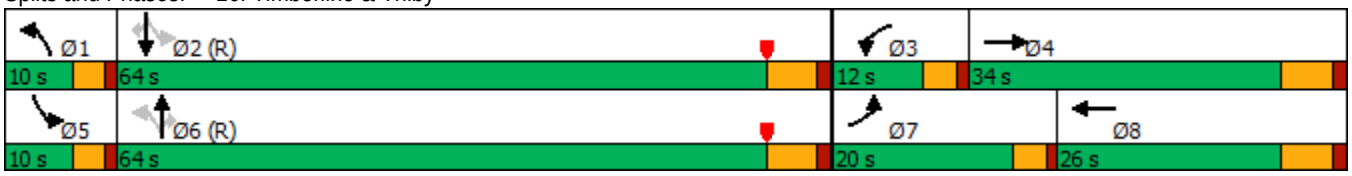
Phase Number	1	2	3	4	5	6	7	8
Movement	NBL	SBTL	WBL	EBT	SBL	NBTL	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes				
Recall Mode	None	C-Min	None	None	None	C-Min	None	None
Maximum Split (s)	10	64	12	34	10	64	20	26
Maximum Split (%)	8.3%	53.3%	10.0%	28.3%	8.3%	53.3%	16.7%	21.7%
Minimum Split (s)	9.5	28	9.5	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	3	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		15		13		14		12
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	62	6	18	52	62	6	26
End Time (s)	62	6	18	52	62	6	26	52
Yield/Force Off (s)	58	0	14	46	58	0	22	46
Yield/Force Off 170(s)	58	105	14	33	58	106	22	34
Local Start Time (s)	52	62	6	18	52	62	6	26
Local Yield (s)	58	0	14	46	58	0	22	46
Local Yield 170(s)	58	105	14	33	58	106	22	34

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	110

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	395	221	58	126	121	826	47	21	884	526
v/c Ratio	0.83	0.57	0.46	0.57	0.58	0.74	0.05	0.08	0.90	0.52
Control Delay	65.5	39.1	65.7	56.8	29.7	24.9	0.1	13.7	38.6	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.5	39.1	65.7	56.8	29.7	24.9	0.1	13.7	38.6	12.8
Queue Length 50th (ft)	155	121	44	88	35	394	0	7	411	108
Queue Length 95th (ft)	#227	196	89	146	#117	#827	0	m14	#917	219
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	486	450	132	323	207	1115	1002	280	985	1019
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.49	0.44	0.39	0.58	0.74	0.05	0.07	0.90	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection												
Int Delay, s/veh	3.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1	65	10	1	55	20	1150	5	15	900	25
Future Vol, veh/h	30	1	65	10	1	55	20	1150	5	15	900	25
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	1	68	11	1	58	21	1211	5	16	947	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1640	2250	487	1762	2261	608	973	0	0	1216	0	0
Stage 1	992	992	-	1256	1256	-	-	-	-	-	-	-
Stage 2	648	1258	-	506	1005	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	66	41	526	54	40	439	704	-	-	569	-	-
Stage 1	264	322	-	181	241	-	-	-	-	-	-	-
Stage 2	425	241	-	517	317	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	54	39	526	44	38	439	704	-	-	569	-	-
Mov Cap-2 Maneuver	54	39	-	44	38	-	-	-	-	-	-	-
Stage 1	256	313	-	176	234	-	-	-	-	-	-	-
Stage 2	356	234	-	436	308	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	56.7	38.8	0.2	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	704	-	-	53	526	174	569	-	-
HCM Lane V/C Ratio	0.03	-	-	0.616	0.13	0.399	0.028	-	-
HCM Control Delay (s)	10.3	-	-	148.6	12.9	38.8	11.5	-	-
HCM Lane LOS	B	-	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.5	0.4	1.8	0.1	-	-

Intersection												
Int Delay, s/veh	10											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	1	20	5	1	25	50	1100	20	50	1420	55
Future Vol, veh/h	25	1	20	5	1	25	50	1100	20	50	1420	55
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	1	21	5	1	26	53	1158	21	53	1495	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2316	2915	777	2129	2934	590	1553	0	0	1179	0	0
Stage 1	1630	1630	-	1275	1275	-	-	-	-	-	-	-
Stage 2	686	1285	-	854	1659	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 20	15	340	28	15	451	422	-	-	588	-	-
Stage 1	106	158	-	177	236	-	-	-	-	-	-	-
Stage 2	404	233	-	320	153	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 15	12	340	21	12	451	422	-	-	588	-	-
Mov Cap-2 Maneuver	~ 15	12	-	21	12	-	-	-	-	-	-	-
Stage 1	93	144	-	155	206	-	-	-	-	-	-	-
Stage 2	331	204	-	271	139	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 522.3	75.3	0.6	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	422	-	-	15	340	82	588	-	-
HCM Lane V/C Ratio	0.125	-	-	1.825	0.062	0.398	0.09	-	-
HCM Control Delay (s)	14.7	-	-	$ 911.6	16.3	75.3	11.7	-	-
HCM Lane LOS	B	-	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4.1	0.2	1.6	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	40	10	1225	900	15
Future Vol, veh/h	0	40	10	1225	900	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	42	11	1289	947	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	474	963	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	537	711	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	537	711	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.3	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	711	-	537	-	-
HCM Lane V/C Ratio	0.015	-	0.078	-	-
HCM Control Delay (s)	10.1	-	12.3	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	20	30	1120	1505	85
Future Vol, veh/h	0	20	30	1120	1505	85
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	21	32	1179	1584	89

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	792	1673	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	332	380	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	332	380	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.6	0.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	380	-	332	-	-
HCM Lane V/C Ratio	0.083	-	0.063	-	-
HCM Control Delay (s)	15.3	-	16.6	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.2	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	305	15	80	35	10	180	25	1165	35	90	800	55
Future Volume (veh/h)	305	15	80	35	10	180	25	1165	35	90	800	55
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	321	16	26	37	11	94	26	1226	35	95	842	26
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	410	205	333	472	54	460	452	1850	53	265	1919	856
Arrive On Green	0.32	0.32	0.31	0.32	0.32	0.31	0.03	0.52	0.52	0.10	1.00	1.00
Sat Flow, veh/h	1289	641	1042	1365	169	1442	1781	3528	101	1781	3554	1585
Grp Volume(v), veh/h	321	0	42	37	0	105	26	617	644	95	842	26
Grp Sat Flow(s),veh/h/ln	1289	0	1683	1365	0	1611	1781	1777	1852	1781	1777	1585
Q Serve(g_s), s	29.0	0.0	2.1	2.3	0.0	5.7	0.8	30.4	30.4	2.9	0.0	0.0
Cycle Q Clear(g_c), s	34.7	0.0	2.1	4.4	0.0	5.7	0.8	30.4	30.4	2.9	0.0	0.0
Prop In Lane	1.00		0.62	1.00		0.90	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	410	0	537	472	0	514	452	931	971	265	1919	856
V/C Ratio(X)	0.78	0.00	0.08	0.08	0.00	0.20	0.06	0.66	0.66	0.36	0.44	0.03
Avail Cap(c_a), veh/h	449	0	589	514	0	564	498	931	971	283	1919	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	42.4	0.0	28.7	30.1	0.0	30.1	12.0	20.8	20.8	15.5	0.0	0.0
Incr Delay (d2), s/veh	8.1	0.0	0.1	0.1	0.0	0.2	0.1	3.7	3.6	0.8	0.7	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	10.1	0.0	0.9	0.8	0.0	2.3	0.3	12.8	13.3	1.1	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.5	0.0	28.8	30.1	0.0	30.3	12.0	24.5	24.4	16.3	0.7	0.1
LnGrp LOS	D	A	C	C	A	C	B	C	C	B	A	A
Approach Vol, veh/h		363			142			1287			963	
Approach Delay, s/veh		48.0			30.3			24.2			2.2	
Approach LOS		D			C			C			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.9	69.8		43.3	8.8	67.9		43.3				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	57.0		41.0	6.0	57.0		41.0				
Max Q Clear Time (g_c+I1), s	2.8	2.0		36.7	4.9	32.4		7.7				
Green Ext Time (p_c), s	0.0	6.8		0.6	0.0	9.0		0.7				

Intersection Summary	
HCM 6th Ctrl Delay	20.0
HCM 6th LOS	B

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	63	47	10	63	47
Maximum Split (%)	8.3%	52.5%	39.2%	8.3%	52.5%	39.2%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	53	63	6	53	63	6
End Time (s)	63	6	53	63	6	53
Yield/Force Off (s)	59	0	47	59	0	47
Yield/Force Off 170(s)	59	106	32	59	106	32
Local Start Time (s)	53	63	6	53	63	6
Local Yield (s)	59	0	47	59	0	47
Local Yield 170(s)	59	106	32	59	106	32

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	75	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	321	100	37	200	26	1263	95	842	58
v/c Ratio	0.92	0.17	0.09	0.32	0.07	0.73	0.45	0.45	0.07
Control Delay	69.9	8.2	26.4	10.9	12.4	28.6	23.3	17.5	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.9	8.2	26.4	10.9	12.4	28.6	23.3	17.5	2.3
Queue Length 50th (ft)	223	8	18	32	7	333	26	266	4
Queue Length 95th (ft)	#408	46	44	90	m15	537	m74	196	m10
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	369	635	460	658	360	1763	209	1895	877
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.16	0.08	0.30	0.07	0.72	0.45	0.44	0.07

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	215	15	60	25	20	95	95	980	45	145	1505	200
Future Volume (veh/h)	215	15	60	25	20	95	95	980	45	145	1505	200
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	226	16	11	26	21	18	100	1032	45	153	1584	144
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	318	214	147	329	193	165	278	2184	95	405	2260	1008
Arrive On Green	0.21	0.21	0.20	0.21	0.21	0.20	0.05	0.63	0.62	0.07	0.85	0.85
Sat Flow, veh/h	1368	1033	710	1383	930	797	1781	3469	151	1781	3554	1585
Grp Volume(v), veh/h	226	0	27	26	0	39	100	529	548	153	1584	144
Grp Sat Flow(s),veh/h/ln	1368	0	1743	1383	0	1727	1781	1777	1843	1781	1777	1585
Q Serve(g_s), s	19.3	0.0	1.5	1.9	0.0	2.2	2.3	18.8	18.8	3.6	20.2	1.9
Cycle Q Clear(g_c), s	21.5	0.0	1.5	3.4	0.0	2.2	2.3	18.8	18.8	3.6	20.2	1.9
Prop In Lane	1.00		0.41	1.00		0.46	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	318	0	361	329	0	358	278	1119	1161	405	2260	1008
V/C Ratio(X)	0.71	0.00	0.07	0.08	0.00	0.11	0.36	0.47	0.47	0.38	0.70	0.14
Avail Cap(c_a), veh/h	377	0	436	389	0	432	295	1119	1161	412	2260	1008
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.47	0.47	0.47
Uniform Delay (d), s/veh	47.3	0.0	38.5	39.7	0.0	38.8	9.0	11.7	11.7	8.4	4.9	3.5
Incr Delay (d2), s/veh	5.0	0.0	0.1	0.1	0.0	0.1	0.8	1.4	1.4	0.3	0.9	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	0.7	0.6	0.0	1.0	0.8	7.2	7.5	1.2	3.9	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.3	0.0	38.6	39.8	0.0	38.9	9.8	13.1	13.1	8.7	5.8	3.7
LnGrp LOS	D	A	D	D	A	D	A	B	B	A	A	A
Approach Vol, veh/h		253			65			1177			1881	
Approach Delay, s/veh		50.8			39.3			12.8			5.9	
Approach LOS		D			D			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.8	81.3		29.9	9.6	80.6		29.9				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	69.0		29.0	6.0	69.0		29.0				
Max Q Clear Time (g_c+I1), s	4.3	22.2		23.5	5.6	20.8		5.4				
Green Ext Time (p_c), s	0.0	18.6		0.4	0.0	8.2		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	12.3
HCM 6th LOS	B

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	75	35	10	75	35
Maximum Split (%)	8.3%	62.5%	29.2%	8.3%	62.5%	29.2%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	51	6	41	51	6
End Time (s)	51	6	41	51	6	41
Yield/Force Off (s)	47	0	35	47	0	35
Yield/Force Off 170(s)	47	106	20	47	106	20
Local Start Time (s)	41	51	6	41	51	6
Local Yield (s)	47	0	35	47	0	35
Local Yield 170(s)	47	106	20	47	106	20

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	80	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr

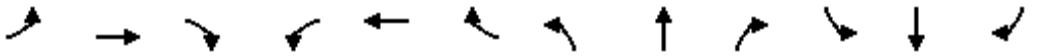


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	226	79	26	121	100	1079	153	1584	211
v/c Ratio	0.86	0.19	0.09	0.27	0.49	0.51	0.44	0.74	0.21
Control Delay	73.6	13.1	35.9	11.6	17.2	19.8	11.6	22.8	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	73.6	13.1	35.9	11.6	17.2	19.8	11.6	22.8	7.5
Queue Length 50th (ft)	164	10	16	13	23	251	43	393	23
Queue Length 95th (ft)	#286	49	40	61	m46	472	m72	540	m60
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	295	457	328	483	205	2130	351	2152	1027
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.17	0.08	0.25	0.49	0.51	0.44	0.74	0.21

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	15	30	155	5	255	10	1390	280	80	800	15
Future Volume (veh/h)	40	15	30	155	5	255	10	1390	280	80	800	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	16	4	163	5	159	11	1463	202	84	842	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	244	221	55	260	286	243	504	2456	1096	351	2563	46
Arrive On Green	0.15	0.15	0.14	0.15	0.15	0.15	0.04	1.00	1.00	0.05	0.72	0.72
Sat Flow, veh/h	1222	1444	361	1392	1870	1585	1781	3554	1585	1781	3572	64
Grp Volume(v), veh/h	42	0	20	163	5	159	11	1463	202	84	419	438
Grp Sat Flow(s),veh/h/ln	1222	0	1805	1392	1870	1585	1781	1777	1585	1781	1777	1859
Q Serve(g_s), s	3.6	0.0	1.1	13.6	0.3	11.3	0.2	0.0	0.0	1.5	10.5	10.5
Cycle Q Clear(g_c), s	3.9	0.0	1.1	14.8	0.3	11.3	0.2	0.0	0.0	1.5	10.5	10.5
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	244	0	276	260	286	243	504	2456	1096	351	1275	1334
V/C Ratio(X)	0.17	0.00	0.07	0.63	0.02	0.66	0.02	0.60	0.18	0.24	0.33	0.33
Avail Cap(c_a), veh/h	312	0	376	337	390	330	570	2456	1096	370	1275	1334
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.55	0.55	0.55	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.8	0.0	43.6	49.8	43.2	47.8	5.1	0.0	0.0	3.8	6.3	6.3
Incr Delay (d2), s/veh	0.3	0.0	0.1	2.5	0.0	3.0	0.0	0.6	0.2	0.3	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.5	4.8	0.1	4.6	0.1	0.2	0.1	0.5	3.6	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	45.1	0.0	43.7	52.3	43.2	50.8	5.1	0.6	0.2	4.1	7.0	6.9
LnGrp LOS	D	A	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		62			327			1676			941	
Approach Delay, s/veh		44.7			51.5			0.6			6.7	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	91.1		23.4	8.7	87.9		23.4				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	74.0		24.0	6.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	12.5		5.9	3.5	2.0		16.8				
Green Ext Time (p_c), s	0.0	5.9		0.2	0.0	18.3		0.6				

Intersection Summary	
HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

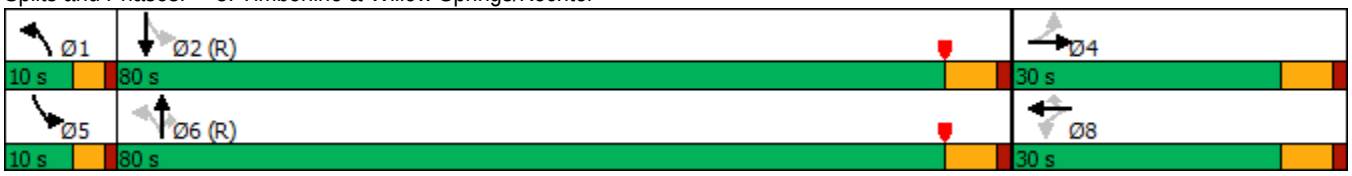
Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	80	30	10	80	30
Maximum Split (%)	8.3%	66.7%	25.0%	8.3%	66.7%	25.0%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	36.5	46.5	6.5	36.5	46.5	6.5
End Time (s)	46.5	6.5	36.5	46.5	6.5	36.5
Yield/Force Off (s)	42.5	0.5	30.5	42.5	0.5	30.5
Yield/Force Off 170(s)	42.5	110.5	18.5	42.5	108.5	20.5
Local Start Time (s)	36	46	6	36	46	6
Local Yield (s)	42	0	30	42	0	30
Local Yield 170(s)	42	110	18	42	108	20

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	70	

Offset: 0.5 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	42	48	163	5	268	11	1463	295	84	858
v/c Ratio	0.18	0.16	0.73	0.02	0.73	0.02	0.61	0.25	0.31	0.33
Control Delay	42.8	20.3	65.4	38.8	36.5	7.8	23.2	7.5	7.2	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	20.3	65.4	38.8	36.5	7.8	23.2	7.5	7.2	6.9
Queue Length 50th (ft)	28	11	120	3	106	3	541	73	14	101
Queue Length 95th (ft)	59	43	190	14	195	m5	474	m74	31	201
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	292	374	281	388	428	509	2406	1164	269	2590
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.58	0.01	0.63	0.02	0.61	0.25	0.31	0.33

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	10	30	385	35	160	20	1050	215	160	1440	30
Future Volume (veh/h)	25	10	30	385	35	160	20	1050	215	160	1440	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	11	10	405	37	61	21	1105	111	168	1516	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	442	278	253	477	577	489	187	1834	818	417	1973	40
Arrive On Green	0.31	0.31	0.30	0.31	0.31	0.31	0.06	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1297	902	820	1391	1870	1585	1781	3554	1585	1781	3561	73
Grp Volume(v), veh/h	26	0	21	405	37	61	21	1105	111	168	755	792
Grp Sat Flow(s),veh/h/ln	1297	0	1723	1391	1870	1585	1781	1777	1585	1781	1777	1857
Q Serve(g_s), s	1.7	0.0	1.0	34.5	1.7	3.3	0.6	0.0	0.0	5.0	39.6	39.8
Cycle Q Clear(g_c), s	3.4	0.0	1.0	35.5	1.7	3.3	0.6	0.0	0.0	5.0	39.6	39.8
Prop In Lane	1.00		0.48	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	442	0	531	477	577	489	187	1834	818	417	984	1029
V/C Ratio(X)	0.06	0.00	0.04	0.85	0.06	0.12	0.11	0.60	0.14	0.40	0.77	0.77
Avail Cap(c_a), veh/h	442	0	531	477	577	489	238	1834	818	445	984	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.80	0.80	0.80	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	29.2	41.5	29.3	29.9	17.5	0.0	0.0	10.6	20.8	20.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	13.5	0.0	0.1	0.2	1.2	0.3	0.6	5.7	5.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.4	13.2	0.8	1.3	0.3	0.3	0.1	1.9	16.7	17.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	0.0	29.3	55.0	29.3	30.0	17.7	1.2	0.3	11.3	26.5	26.3
LnGrp LOS	C	A	C	E	C	C	B	A	A	B	C	C
Approach Vol, veh/h		47			503			1237			1715	
Approach Delay, s/veh		30.0			50.1			1.4			24.9	
Approach LOS		C			D			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	71.5		42.0	11.1	66.9		42.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	62.0		36.0	9.0	59.0		36.0				
Max Q Clear Time (g_c+I1), s	2.6	41.8		5.4	7.0	2.0		37.5				
Green Ext Time (p_c), s	0.0	10.8		0.1	0.1	10.5		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	68	42	13	65	42
Maximum Split (%)	8.3%	56.7%	35.0%	10.8%	54.2%	35.0%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	48.5	58.5	6.5	48.5	61.5	6.5
End Time (s)	58.5	6.5	48.5	61.5	6.5	48.5
Yield/Force Off (s)	54.5	0.5	42.5	57.5	0.5	42.5
Yield/Force Off 170(s)	54.5	110.5	30.5	57.5	108.5	32.5
Local Start Time (s)	48	58	6	48	61	6
Local Yield (s)	54	0	42	57	0	42
Local Yield 170(s)	54	110	30	57	108	32

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 0.5 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	26	43	405	37	168	21	1105	226	168	1548
v/c Ratio	0.06	0.08	0.90	0.06	0.27	0.13	0.65	0.26	0.60	0.80
Control Delay	28.6	13.2	62.8	28.3	7.3	6.8	14.7	1.7	19.9	26.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.6	13.2	62.8	28.3	7.3	6.8	14.7	1.7	19.9	26.0
Queue Length 50th (ft)	13	5	277	18	8	5	206	6	60	492
Queue Length 95th (ft)	37	33	#512	46	60	m7	248	m11	82	618
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	453	570	450	618	627	167	1777	899	282	1947
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.08	0.90	0.06	0.27	0.13	0.62	0.25	0.60	0.80

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX G

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	371	72	75	76	73	5	68	614	31	6	561	282
Future Volume (veh/h)	371	72	75	76	73	5	68	614	31	6	561	282
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	436	85	47	89	86	2	80	722	0	7	660	131
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	446	339	188	191	182	4	345	1055	894	309	994	842
Arrive On Green	0.17	0.30	0.30	0.10	0.10	0.10	0.05	0.56	0.00	0.02	0.53	0.53
Sat Flow, veh/h	1781	1132	626	1258	1820	42	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	436	0	132	89	0	88	80	722	0	7	660	131
Grp Sat Flow(s),veh/h/ln	1781	0	1758	1258	0	1863	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	19.0	0.0	6.3	7.5	0.0	4.9	2.1	30.2	0.0	0.2	28.1	4.6
Cycle Q Clear(g_c), s	19.0	0.0	6.3	7.5	0.0	4.9	2.1	30.2	0.0	0.2	28.1	4.6
Prop In Lane	1.00		0.36	1.00		0.02	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	446	0	527	191	0	186	345	1055	894	309	994	842
V/C Ratio(X)	0.98	0.00	0.25	0.47	0.00	0.47	0.23	0.68	0.00	0.02	0.66	0.16
Avail Cap(c_a), veh/h	446	0	687	306	0	356	368	1055	894	391	994	842
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	0.0	29.1	47.9	0.0	46.8	13.9	17.0	0.0	14.5	18.7	13.2
Incr Delay (d2), s/veh	36.9	0.0	0.2	1.8	0.0	1.9	0.3	3.6	0.0	0.0	3.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.0	0.0	2.6	2.4	0.0	2.3	0.8	12.8	0.0	0.1	12.2	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.6	0.0	29.4	49.7	0.0	48.6	14.2	20.6	0.0	14.5	22.2	13.6
LnGrp LOS	E	A	C	D	A	D	B	C	A	B	C	B
Approach Vol, veh/h		568			177			802			798	
Approach Delay, s/veh		64.8			49.2			20.0			20.7	
Approach LOS		E			D			B			C	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.6	63.4		38.0	5.0	67.0	22.0	16.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	6.0	46.0		42.0	6.0	46.0	18.0	20.0				
Max Q Clear Time (g_c+I1), s	4.1	30.1		8.3	2.2	32.2	21.0	9.5				
Green Ext Time (p_c), s	0.0	4.2		0.7	0.0	4.0	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	10	52	48	10	52	22	26
Maximum Split (%)	9.1%	47.3%	43.6%	9.1%	47.3%	20.0%	23.6%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	54	64	6	54	64	6	28
End Time (s)	64	6	54	64	6	28	54
Yield/Force Off (s)	60	0	48	60	0	24	48
Yield/Force Off 170(s)	60	95	35	60	96	24	36
Local Start Time (s)	54	64	6	54	64	6	28
Local Yield (s)	60	0	48	60	0	24	48
Local Yield 170(s)	60	95	35	60	96	24	36

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	436	173	89	92	80	722	36	7	660	332
v/c Ratio	0.78	0.26	0.57	0.38	0.30	0.74	0.04	0.03	0.77	0.37
Control Delay	39.6	17.1	57.7	45.3	14.4	27.4	0.1	14.3	41.9	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.6	17.1	57.7	45.3	14.4	27.4	0.1	14.3	41.9	10.2
Queue Length 50th (ft)	252	56	60	58	24	355	0	3	391	46
Queue Length 95th (ft)	320	95	100	96	47	#631	0	m7	446	83
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	556	711	230	354	270	976	881	265	864	903
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.24	0.39	0.26	0.30	0.74	0.04	0.03	0.76	0.37

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	86	92	54	92	15	89	692	42	7	721	435
Future Volume (veh/h)	335	86	92	54	92	15	89	692	42	7	721	435
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	356	91	62	57	98	11	95	736	0	7	767	261
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	379	280	191	167	143	16	298	1131	959	342	1073	909
Arrive On Green	0.16	0.27	0.27	0.09	0.09	0.09	0.05	0.60	0.00	0.02	0.57	0.57
Sat Flow, veh/h	1781	1037	706	1234	1652	185	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	356	0	153	57	0	109	95	736	0	7	767	261
Grp Sat Flow(s),veh/h/ln	1781	0	1743	1234	0	1837	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	19.0	0.0	8.4	5.3	0.0	6.9	2.4	30.8	0.0	0.2	35.6	10.1
Cycle Q Clear(g_c), s	19.0	0.0	8.4	5.3	0.0	6.9	2.4	30.8	0.0	0.2	35.6	10.1
Prop In Lane	1.00		0.41	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	379	0	470	167	0	159	298	1131	959	342	1073	909
V/C Ratio(X)	0.94	0.00	0.33	0.34	0.00	0.69	0.32	0.65	0.00	0.02	0.71	0.29
Avail Cap(c_a), veh/h	379	0	625	276	0	321	316	1131	959	415	1073	909
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	42.5	0.0	35.1	52.5	0.0	53.2	15.4	15.5	0.0	13.2	18.5	13.1
Incr Delay (d2), s/veh	31.0	0.0	0.4	1.2	0.0	5.1	0.6	2.9	0.0	0.0	4.1	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	3.6	1.7	0.0	3.4	0.9	12.9	0.0	0.1	15.3	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	73.5	0.0	35.5	53.7	0.0	58.4	16.0	18.4	0.0	13.2	22.6	13.9
LnGrp LOS	E	A	D	D	A	E	B	B	A	B	C	B
Approach Vol, veh/h		509			166			831			1035	
Approach Delay, s/veh		62.0			56.8			18.1			20.3	
Approach LOS		E			E			B			C	
Timer - Assigned Phs	1	2		4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.8	73.8		37.4	5.0	77.6	22.0	15.4				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0	4.0	6.0				
Max Green Setting (Gmax), s	6.0	56.0		42.0	6.0	56.0	18.0	20.0				
Max Q Clear Time (g_c+I1), s	4.4	37.6		10.4	2.2	32.8	21.0	8.9				
Green Ext Time (p_c), s	0.0	5.9		0.8	0.0	5.1	0.0	0.5				

Intersection Summary

HCM 6th Ctrl Delay	30.3
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

Phase Number	1	2	4	5	6	7	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	EBL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag
Lead-Lag Optimize							
Recall Mode	None	C-Min	None	None	C-Min	None	None
Maximum Split (s)	10	62	48	10	62	22	26
Maximum Split (%)	8.3%	51.7%	40.0%	8.3%	51.7%	18.3%	21.7%
Minimum Split (s)	9.5	28	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0
Walk Time (s)		7	7		7		7
Flash Dont Walk (s)		15	13		14		12
Dual Entry	No	Yes	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	89	99	41	89	99	41	63
End Time (s)	99	41	89	99	41	63	89
Yield/Force Off (s)	95	35	83	95	35	59	83
Yield/Force Off 170(s)	95	20	70	95	21	59	71
Local Start Time (s)	54	64	6	54	64	6	28
Local Yield (s)	60	0	48	60	0	24	48
Local Yield 170(s)	60	105	35	60	106	24	36

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 35 (29%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	356	189	57	114	95	736	45	7	767	463
v/c Ratio	0.79	0.33	0.43	0.55	0.37	0.68	0.05	0.02	0.82	0.47
Control Delay	47.6	24.1	58.6	56.8	13.9	22.5	0.1	5.9	24.3	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	24.1	58.6	56.8	13.9	22.5	0.1	5.9	24.3	4.7
Queue Length 50th (ft)	234	82	42	80	27	343	0	1	559	98
Queue Length 95th (ft)	#347	140	83	135	53	634	0	m3	#750	47
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	452	647	208	324	254	1085	964	319	935	983
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.29	0.27	0.35	0.37	0.68	0.05	0.02	0.82	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection												
Int Delay, s/veh	4.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	44	0	73	12	0	53	16	987	3	15	774	18
Future Vol, veh/h	44	0	73	12	0	53	16	987	3	15	774	18
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	50	0	83	14	0	60	18	1122	3	17	880	20

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1521	2085	450	1634	2094	563	900	0	0	1125	0	0
Stage 1	924	924	-	1160	1160	-	-	-	-	-	-	-
Stage 2	597	1161	-	474	934	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	81	52	556	67	52	470	751	-	-	617	-	-
Stage 1	290	346	-	208	268	-	-	-	-	-	-	-
Stage 2	456	268	-	540	343	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	68	49	556	55	49	470	751	-	-	617	-	-
Mov Cap-2 Maneuver	68	49	-	55	49	-	-	-	-	-	-	-
Stage 1	283	336	-	203	262	-	-	-	-	-	-	-
Stage 2	388	262	-	447	333	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	61.8	34.1	0.2	0.2
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	751	-	-	68	556	196	617	-	-
HCM Lane V/C Ratio	0.024	-	-	0.735	0.149	0.377	0.028	-	-
HCM Control Delay (s)	9.9	-	-	143.5	12.6	34.1	11	-	-
HCM Lane LOS	A	-	-	F	B	D	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	3.3	0.5	1.6	0.1	-	-

Intersection												
Int Delay, s/veh	5.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	29	1	23	6	1	26	33	985	19	48	1163	44
Future Vol, veh/h	29	1	23	6	1	26	33	985	19	48	1163	44
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	94	94	94	94	94	94	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1	24	6	1	28	35	1048	20	51	1237	47

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1958	2501	642	1849	2514	534	1284	0	0	1068	0	0
Stage 1	1363	1363	-	1128	1128	-	-	-	-	-	-	-
Stage 2	595	1138	-	721	1386	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	38	28	417	46	28	491	536	-	-	648	-	-
Stage 1	156	214	-	218	278	-	-	-	-	-	-	-
Stage 2	458	275	-	385	209	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	31	24	417	37	24	491	536	-	-	648	-	-
Mov Cap-2 Maneuver	31	24	-	37	24	-	-	-	-	-	-	-
Stage 1	146	197	-	204	260	-	-	-	-	-	-	-
Stage 2	402	257	-	332	192	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	209.8	43	0.4	0.4
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	536	-	-	31	417	129	648	-	-
HCM Lane V/C Ratio	0.065	-	-	1.03	0.059	0.272	0.079	-	-
HCM Control Delay (s)	12.2	-	-	$ 359.8	14.2	43	11	-	-
HCM Lane LOS	B	-	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.2	-	-	3.5	0.2	1	0.3	-	-

Intersection						
Int Delay, s/veh	3.2					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	55	27	5	1079	780	12
Future Vol, veh/h	55	27	5	1079	780	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	65	32	6	1269	918	14

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1565	459	932	0	-	0
Stage 1	918	-	-	-	-	-
Stage 2	647	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	102	549	730	-	-	-
Stage 1	349	-	-	-	-	-
Stage 2	483	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	101	549	730	-	-	-
Mov Cap-2 Maneuver	101	-	-	-	-	-
Stage 1	346	-	-	-	-	-
Stage 2	483	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	76.5	0	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	730	-	138	-	-
HCM Lane V/C Ratio	0.008	-	0.699	-	-
HCM Control Delay (s)	10	-	76.5	-	-
HCM Lane LOS	A	-	F	-	-
HCM 95th %tile Q(veh)	0	-	4	-	-

Intersection						
Int Delay, s/veh	1.8					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	31	12	18	1022	1243	66
Future Vol, veh/h	31	12	18	1022	1243	66
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	13	19	1065	1295	69

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1866	648	1364	0	-	0
Stage 1	1295	-	-	-	-	-
Stage 2	571	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	64	413	500	-	-	-
Stage 1	221	-	-	-	-	-
Stage 2	529	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	62	413	500	-	-	-
Mov Cap-2 Maneuver	62	-	-	-	-	-
Stage 1	213	-	-	-	-	-
Stage 2	529	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	94.4	0.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	500	-	81	-	-
HCM Lane V/C Ratio	0.038	-	0.553	-	-
HCM Control Delay (s)	12.5	-	94.4	-	-
HCM Lane LOS	B	-	F	-	-
HCM 95th %tile Q(veh)	0.1	-	2.4	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	10	117	36	5	179	38	1062	34	74	639	75
Future Volume (veh/h)	210	10	117	36	5	179	38	1062	34	74	639	75
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	247	12	26	42	6	93	45	1249	38	87	752	40
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	342	138	299	402	25	395	531	1999	61	298	2047	913
Arrive On Green	0.26	0.26	0.25	0.26	0.26	0.25	0.04	0.57	0.56	0.10	1.00	1.00
Sat Flow, veh/h	1296	526	1139	1370	97	1503	1781	3521	107	1781	3554	1585
Grp Volume(v), veh/h	247	0	38	42	0	99	45	630	657	87	752	40
Grp Sat Flow(s),veh/h/ln	1296	0	1665	1370	0	1600	1781	1777	1851	1781	1777	1585
Q Serve(g_s), s	20.4	0.0	1.9	2.6	0.0	5.4	1.1	26.1	26.2	2.1	0.0	0.0
Cycle Q Clear(g_c), s	25.8	0.0	1.9	4.5	0.0	5.4	1.1	26.1	26.2	2.1	0.0	0.0
Prop In Lane	1.00		0.68	1.00		0.94	1.00		0.06	1.00		1.00
Lane Grp Cap(c), veh/h	342	0	438	402	0	420	531	1009	1051	298	2047	913
V/C Ratio(X)	0.72	0.00	0.09	0.10	0.00	0.24	0.08	0.62	0.63	0.29	0.37	0.04
Avail Cap(c_a), veh/h	355	0	454	415	0	436	568	1009	1051	353	2047	913
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.94	0.94	0.94
Uniform Delay (d), s/veh	42.0	0.0	30.9	32.3	0.0	32.3	8.5	15.9	16.0	11.6	0.0	0.0
Incr Delay (d2), s/veh	6.7	0.0	0.1	0.1	0.0	0.3	0.1	2.9	2.8	0.5	0.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.1	0.0	0.8	0.9	0.0	2.1	0.4	10.5	10.9	0.8	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.8	0.0	30.9	32.4	0.0	32.5	8.6	18.8	18.8	12.1	0.5	0.1
LnGrp LOS	D	A	C	C	A	C	A	B	B	B	A	A
Approach Vol, veh/h		285			141			1332			879	
Approach Delay, s/veh		46.4			32.5			18.5			1.6	
Approach LOS		D			C			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.7	68.4		33.9	8.6	67.4		33.9				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	59.0		29.0	8.0	57.0		29.0				
Max Q Clear Time (g_c+I1), s	3.1	2.0		27.8	4.1	28.2		7.4				
Green Ext Time (p_c), s	0.0	5.9		0.1	0.1	9.8		0.6				

Intersection Summary	
HCM 6th Ctrl Delay	16.6
HCM 6th LOS	B

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	65	35	12	63	35
Maximum Split (%)	9.1%	59.1%	31.8%	10.9%	57.3%	31.8%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	51	6	41	53	6
End Time (s)	51	6	41	53	6	41
Yield/Force Off (s)	47	0	35	49	0	35
Yield/Force Off 170(s)	47	96	20	49	96	20
Local Start Time (s)	41	51	6	41	53	6
Local Yield (s)	47	0	35	49	0	35
Local Yield 170(s)	47	96	20	49	96	20

Intersection Summary

Cycle Length	110	
Control Type	Actuated-Coordinated	
Natural Cycle	70	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	247	150	42	217	45	1289	87	752	88
v/c Ratio	0.83	0.26	0.12	0.37	0.11	0.71	0.36	0.40	0.10
Control Delay	60.3	7.5	29.5	12.8	11.1	28.6	16.5	14.4	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.3	7.5	29.5	12.8	11.1	28.6	16.5	14.4	1.9
Queue Length 50th (ft)	156	6	21	36	14	428	22	201	2
Queue Length 95th (ft)	#300	47	49	93	m21	482	46	141	10
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	297	588	356	588	415	1920	250	1980	924
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.26	0.12	0.37	0.11	0.67	0.35	0.38	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	171	10	94	26	15	96	143	864	46	142	1189	263
Future Volume (veh/h)	171	10	94	26	15	96	143	864	46	142	1189	263
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	182	11	15	28	16	15	152	919	46	151	1265	174
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	276	123	168	280	152	143	400	2296	115	472	2373	1058
Arrive On Green	0.17	0.17	0.16	0.17	0.17	0.16	0.05	0.67	0.66	0.11	1.00	1.00
Sat Flow, veh/h	1378	717	978	1385	888	833	1781	3444	172	1781	3554	1585
Grp Volume(v), veh/h	182	0	26	28	0	31	152	474	491	151	1265	174
Grp Sat Flow(s),veh/h/ln	1378	0	1694	1385	0	1721	1781	1777	1839	1781	1777	1585
Q Serve(g_s), s	15.4	0.0	1.6	2.1	0.0	1.8	3.1	14.6	14.6	3.2	0.0	0.0
Cycle Q Clear(g_c), s	17.2	0.0	1.6	3.6	0.0	1.8	3.1	14.6	14.6	3.2	0.0	0.0
Prop In Lane	1.00		0.58	1.00		0.48	1.00		0.09	1.00		1.00
Lane Grp Cap(c), veh/h	276	0	291	280	0	295	400	1185	1226	472	2373	1058
V/C Ratio(X)	0.66	0.00	0.09	0.10	0.00	0.10	0.38	0.40	0.40	0.32	0.53	0.16
Avail Cap(c_a), veh/h	361	0	395	365	0	401	471	1185	1226	570	2373	1058
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.68	0.68	0.68
Uniform Delay (d), s/veh	49.2	0.0	42.1	43.3	0.0	42.1	5.2	9.1	9.1	6.0	0.0	0.0
Incr Delay (d2), s/veh	2.8	0.0	0.1	0.2	0.0	0.2	0.6	1.0	1.0	0.3	0.6	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	0.7	0.7	0.0	0.8	1.1	5.4	5.6	1.0	0.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.0	0.0	42.2	43.5	0.0	42.3	5.8	10.1	10.1	6.2	0.6	0.2
LnGrp LOS	D	A	D	D	A	D	A	B	B	A	A	A
Approach Vol, veh/h		208			59			1117			1590	
Approach Delay, s/veh		50.8			42.9			9.5			1.1	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.3	85.1		25.6	9.4	85.0		25.6				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	10.0	67.0		27.0	12.0	65.0		27.0				
Max Q Clear Time (g_c+I1), s	5.1	2.0		19.2	5.2	16.6		5.6				
Green Ext Time (p_c), s	0.1	13.7		0.4	0.2	7.0		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	14	73	33	16	71	33
Maximum Split (%)	11.7%	60.8%	27.5%	13.3%	59.2%	27.5%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	39	53	6	39	55	6
End Time (s)	53	6	39	55	6	39
Yield/Force Off (s)	49	0	33	51	0	33
Yield/Force Off 170(s)	49	106	18	51	106	18
Local Start Time (s)	39	53	6	39	55	6
Local Yield (s)	49	0	33	51	0	33
Local Yield 170(s)	49	106	18	51	106	18

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	70

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	182	111	28	118	152	968	151	1265	280
v/c Ratio	0.80	0.28	0.12	0.30	0.47	0.45	0.35	0.58	0.26
Control Delay	70.1	10.8	38.5	11.6	9.0	12.8	8.2	15.2	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.1	10.8	38.5	11.6	9.0	12.8	8.2	15.2	4.1
Queue Length 50th (ft)	134	7	18	10	30	249	24	200	1
Queue Length 95th (ft)	211	53	43	58	m32	273	m58	311	45
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	275	455	282	459	343	2169	476	2183	1076
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.24	0.10	0.26	0.44	0.45	0.32	0.58	0.26

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	39	16	28	132	5	215	12	1188	232	65	651	12
Future Volume (veh/h)	39	16	28	132	5	215	12	1188	232	65	651	12
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	46	19	1	155	6	109	14	1398	177	76	766	13
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	253	263	14	260	279	237	553	2457	1096	380	2563	43
Arrive On Green	0.15	0.15	0.14	0.15	0.15	0.15	0.05	1.00	1.00	0.05	0.72	0.72
Sat Flow, veh/h	1277	1761	93	1392	1870	1585	1781	3554	1585	1781	3576	61
Grp Volume(v), veh/h	46	0	20	155	6	109	14	1398	177	76	381	398
Grp Sat Flow(s),veh/h/ln	1277	0	1854	1392	1870	1585	1781	1777	1585	1781	1777	1859
Q Serve(g_s), s	3.5	0.0	1.0	11.9	0.3	6.9	0.2	0.0	0.0	1.2	8.5	8.5
Cycle Q Clear(g_c), s	3.8	0.0	1.0	12.9	0.3	6.9	0.2	0.0	0.0	1.2	8.5	8.5
Prop In Lane	1.00		0.05	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	253	0	277	260	279	237	553	2457	1096	380	1273	1333
V/C Ratio(X)	0.18	0.00	0.07	0.60	0.02	0.46	0.03	0.57	0.16	0.20	0.30	0.30
Avail Cap(c_a), veh/h	358	0	430	375	434	367	638	2457	1096	469	1273	1333
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.61	0.61	0.61	1.00	1.00	1.00
Uniform Delay (d), s/veh	41.6	0.0	40.3	45.8	39.9	42.7	4.5	0.0	0.0	3.4	5.6	5.6
Incr Delay (d2), s/veh	0.3	0.0	0.1	2.2	0.0	1.4	0.0	0.6	0.2	0.3	0.6	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.5	4.2	0.1	0.1	0.1	0.2	0.1	0.3	2.8	2.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	41.9	0.0	40.4	47.9	40.0	44.1	4.5	0.6	0.2	3.6	6.2	6.2
LnGrp LOS	D	A	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		66			270			1589			855	
Approach Delay, s/veh		41.4			46.2			0.6			6.0	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	83.3		20.9	8.5	80.6		20.9				
Change Period (Y+Rc), s	4.0	5.5		5.5	4.0	5.5		5.5				
Max Green Setting (Gmax), s	7.0	63.5		24.5	10.0	60.5		24.5				
Max Q Clear Time (g_c+I1), s	2.2	10.5		5.8	3.2	2.0		14.9				
Green Ext Time (p_c), s	0.0	5.2		0.2	0.1	16.1		0.5				

Intersection Summary	
HCM 6th Ctrl Delay	7.6
HCM 6th LOS	A

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	11	69	30	14	66	30
Maximum Split (%)	10.0%	62.7%	27.3%	12.7%	60.0%	27.3%
Minimum Split (s)	9.5	22.5	24.5	9.5	24.5	22.5
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1	1	1	1	1
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	30.5	41.5	0.5	30.5	44.5	0.5
End Time (s)	41.5	0.5	30.5	44.5	0.5	30.5
Yield/Force Off (s)	37.5	105	25	40.5	105	25
Yield/Force Off 170(s)	37.5	95	13	40.5	93	15
Local Start Time (s)	35.5	46.5	5.5	35.5	49.5	5.5
Local Yield (s)	42.5	0	30	45.5	0	30
Local Yield 170(s)	42.5	100	18	45.5	98	20

Intersection Summary

Cycle Length	110
Control Type	Actuated-Coordinated
Natural Cycle	70

Offset: 105 (95%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	46	52	155	6	253	14	1398	273	76	780
v/c Ratio	0.19	0.17	0.68	0.02	0.65	0.03	0.59	0.24	0.26	0.31
Control Delay	38.7	19.0	56.8	34.6	25.0	8.2	22.9	8.4	6.3	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.7	19.0	56.8	34.6	25.0	8.2	22.9	8.4	6.3	7.5
Queue Length 50th (ft)	28	11	104	4	67	4	485	78	11	79
Queue Length 95th (ft)	55	39	152	14	129	m7	449	m86	27	166
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	325	416	312	431	479	557	2362	1139	338	2510
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.50	0.01	0.53	0.03	0.59	0.24	0.22	0.31

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	12	28	310	34	136	19	896	179	137	1207	28
Future Volume (veh/h)	22	12	28	310	34	136	19	896	179	137	1207	28
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	24	13	7	333	37	34	20	963	94	147	1298	29
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	403	312	168	428	509	432	258	1993	889	463	2099	47
Arrive On Green	0.27	0.27	0.26	0.27	0.27	0.27	0.06	1.00	1.00	0.06	0.59	0.59
Sat Flow, veh/h	1329	1144	616	1392	1870	1585	1781	3554	1585	1781	3554	79
Grp Volume(v), veh/h	24	0	20	333	37	34	20	963	94	147	649	678
Grp Sat Flow(s),veh/h/ln	1329	0	1760	1392	1870	1585	1781	1777	1585	1781	1777	1856
Q Serve(g_s), s	1.6	0.0	1.0	27.8	1.8	1.9	0.5	0.0	0.0	3.9	28.2	28.3
Cycle Q Clear(g_c), s	3.4	0.0	1.0	28.8	1.8	1.9	0.5	0.0	0.0	3.9	28.2	28.3
Prop In Lane	1.00		0.35	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	403	0	479	428	509	432	258	1993	889	463	1050	1096
V/C Ratio(X)	0.06	0.00	0.04	0.78	0.07	0.08	0.08	0.48	0.11	0.32	0.62	0.62
Avail Cap(c_a), veh/h	495	0	601	524	639	542	311	1993	889	523	1050	1096
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86	1.00	1.00	1.00
Uniform Delay (d), s/veh	33.7	0.0	32.3	42.7	32.4	32.5	12.5	0.0	0.0	8.7	15.8	15.8
Incr Delay (d2), s/veh	0.1	0.0	0.0	6.0	0.1	0.1	0.1	0.7	0.2	0.4	2.7	2.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.4	10.0	0.8	0.7	0.2	0.2	0.1	1.5	11.3	11.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.7	0.0	32.3	48.7	32.5	32.5	12.6	0.7	0.2	9.1	18.6	18.5
LnGrp LOS	C	A	C	D	C	C	B	A	A	A	B	B
Approach Vol, veh/h		44			404			1077			1474	
Approach Delay, s/veh		33.1			45.9			0.9			17.6	
Approach LOS		C			D			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.4	75.9		37.7	10.0	72.3		37.7				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	58.0		40.0	10.0	54.0		40.0				
Max Q Clear Time (g_c+I1), s	2.5	30.3		5.4	5.9	2.0		30.8				
Green Ext Time (p_c), s	0.0	10.1		0.1	0.1	8.5		0.9				
Intersection Summary												
HCM 6th Ctrl Delay			15.6									
HCM 6th LOS			B									

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	64	46	14	60	46
Maximum Split (%)	8.3%	53.3%	38.3%	11.7%	50.0%	38.3%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	36.5	46.5	110.5	36.5	50.5	110.5
End Time (s)	46.5	110.5	36.5	50.5	110.5	36.5
Yield/Force Off (s)	42.5	104.5	30.5	46.5	104.5	30.5
Yield/Force Off 170(s)	42.5	94.5	18.5	46.5	92.5	20.5
Local Start Time (s)	52	62	6	52	66	6
Local Yield (s)	58	0	46	62	0	46
Local Yield 170(s)	58	110	34	62	108	36

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	70	

Offset: 104.5 (87%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	24	43	333	37	146	20	963	192	147	1328
v/c Ratio	0.06	0.09	0.85	0.07	0.26	0.08	0.52	0.21	0.41	0.63
Control Delay	28.4	13.3	59.7	28.6	5.6	11.3	18.0	5.1	12.9	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.4	13.3	59.7	28.6	5.6	11.3	18.0	5.1	12.9	19.7
Queue Length 50th (ft)	13	7	240	21	0	3	162	2	42	308
Queue Length 95th (ft)	32	33	338	44	45	m17	370	62	79	516
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	466	589	463	636	636	241	1840	913	373	2096
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.07	0.72	0.06	0.23	0.08	0.52	0.21	0.39	0.63

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX H

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	430	80	100	80	75	10	85	735	35	15	655	335
Future Volume (veh/h)	430	80	100	80	75	10	85	735	35	15	655	335
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	453	84	63	84	79	6	89	774	0	16	689	187
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	490	145	109	120	123	9	383	1174	995	360	1132	960
Arrive On Green	0.14	0.15	0.15	0.07	0.07	0.07	0.05	0.63	0.00	0.03	0.61	0.61
Sat Flow, veh/h	3456	992	744	1781	1717	130	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	453	0	147	84	0	85	89	774	0	16	689	187
Grp Sat Flow(s),veh/h/ln	1728	0	1736	1781	0	1847	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	15.5	0.0	9.5	5.5	0.0	5.4	2.1	31.5	0.0	0.4	27.6	6.3
Cycle Q Clear(g_c), s	15.5	0.0	9.5	5.5	0.0	5.4	2.1	31.5	0.0	0.4	27.6	6.3
Prop In Lane	1.00		0.43	1.00		0.07	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	490	0	254	120	0	132	383	1174	995	360	1132	960
V/C Ratio(X)	0.93	0.00	0.58	0.70	0.00	0.64	0.23	0.66	0.00	0.04	0.61	0.19
Avail Cap(c_a), veh/h	490	0	420	134	0	323	401	1174	995	418	1132	960
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.9	0.0	47.8	54.8	0.0	54.2	11.2	14.2	0.0	11.8	14.8	10.6
Incr Delay (d2), s/veh	23.6	0.0	2.1	13.3	0.0	5.1	0.3	2.9	0.0	0.1	2.4	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.2	0.0	4.2	2.9	0.0	2.6	0.8	12.9	0.0	0.1	11.5	2.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	74.5	0.0	49.9	68.1	0.0	59.3	11.5	17.1	0.0	11.8	17.2	11.0
LnGrp LOS	E	A	D	E	A	E	B	B	A	B	B	B
Approach Vol, veh/h		600			169			863			892	
Approach Delay, s/veh		68.5			63.7			16.5			15.8	
Approach LOS		E			E			B			B	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	8.7	77.6	11.1	22.5	6.1	80.3	20.0	13.6
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	58.0	8.0	28.0	6.0	58.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	4.1	29.6	7.5	11.5	2.4	33.5	17.5	7.4
Green Ext Time (p_c), s	0.0	5.6	0.0	0.6	0.0	5.6	0.0	0.2

Intersection Summary

HCM 6th Ctrl Delay	31.8
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

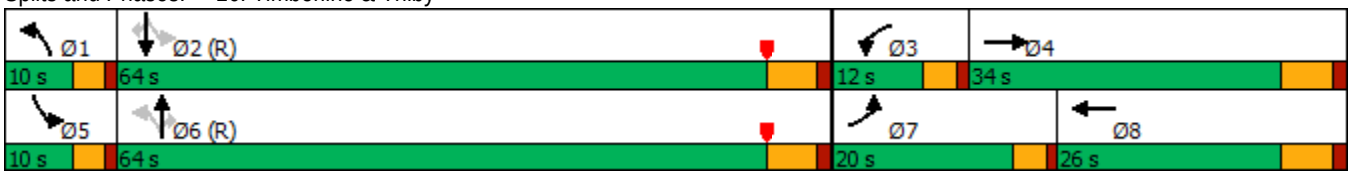
Phase Number	1	2	3	4	5	6	7	8
Movement	NBL	SBTL	WBL	EBT	SBL	NBTL	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes				
Recall Mode	None	C-Min	None	None	None	C-Min	None	None
Maximum Split (s)	10	64	12	34	10	64	20	26
Maximum Split (%)	8.3%	53.3%	10.0%	28.3%	8.3%	53.3%	16.7%	21.7%
Minimum Split (s)	9.5	28	9.5	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	3	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		15		13		14		12
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	62	6	18	52	62	6	26
End Time (s)	62	6	18	52	62	6	26	52
Yield/Force Off (s)	58	0	14	46	58	0	22	46
Yield/Force Off 170(s)	58	105	14	33	58	106	22	34
Local Start Time (s)	52	62	6	18	52	62	6	26
Local Yield (s)	58	0	14	46	58	0	22	46
Local Yield 170(s)	58	105	14	33	58	106	22	34

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	453	189	84	90	89	774	37	16	689	353
v/c Ratio	0.81	0.54	0.58	0.48	0.26	0.70	0.04	0.05	0.70	0.35
Control Delay	60.7	38.5	70.0	56.2	10.3	22.8	0.1	17.1	45.6	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.7	38.5	70.0	56.2	10.3	22.8	0.1	17.1	45.6	17.4
Queue Length 50th (ft)	168	96	62	63	27	396	0	10	548	143
Queue Length 95th (ft)	#280	172	#135	114	46	646	0	m17	577	153
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	561	449	147	324	345	1106	995	316	988	996
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.42	0.57	0.28	0.26	0.70	0.04	0.05	0.70	0.35

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	405	90	120	55	100	20	115	805	45	20	855	515
Future Volume (veh/h)	405	90	120	55	100	20	115	805	45	20	855	515
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	426	95	82	58	105	15	121	847	0	21	900	346
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	490	170	147	89	147	21	237	1130	958	292	1091	924
Arrive On Green	0.14	0.18	0.18	0.05	0.09	0.09	0.05	0.60	0.00	0.03	0.58	0.58
Sat Flow, veh/h	3456	927	800	1781	1601	229	1781	1870	1585	1781	1870	1585
Grp Volume(v), veh/h	426	0	177	58	0	120	121	847	0	21	900	346
Grp Sat Flow(s),veh/h/ln	1728	0	1726	1781	0	1829	1781	1870	1585	1781	1870	1585
Q Serve(g_s), s	14.5	0.0	11.2	3.8	0.0	7.7	3.1	39.3	0.0	0.6	46.4	14.0
Cycle Q Clear(g_c), s	14.5	0.0	11.2	3.8	0.0	7.7	3.1	39.3	0.0	0.6	46.4	14.0
Prop In Lane	1.00		0.46	1.00		0.13	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	490	0	316	89	0	168	237	1130	958	292	1091	924
V/C Ratio(X)	0.87	0.00	0.56	0.65	0.00	0.72	0.51	0.75	0.00	0.07	0.83	0.37
Avail Cap(c_a), veh/h	490	0	417	134	0	320	252	1130	958	344	1091	924
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.4	0.0	44.6	56.0	0.0	53.0	21.2	17.2	0.0	15.0	20.1	13.3
Incr Delay (d2), s/veh	15.5	0.0	1.6	7.7	0.0	5.6	1.7	4.6	0.0	0.1	7.1	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.2	0.0	4.9	1.9	0.0	3.7	1.8	16.7	0.0	0.2	20.5	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.9	0.0	46.2	63.7	0.0	58.6	22.9	21.8	0.0	15.1	27.2	14.5
LnGrp LOS	E	A	D	E	A	E	C	C	A	B	C	B
Approach Vol, veh/h		603			178			968			1267	
Approach Delay, s/veh		60.1			60.3			21.9			23.6	
Approach LOS		E			E			C			C	

Timer - Assigned Phs	1	2	3	4	5	6	7	8
Phs Duration (G+Y+Rc), s	9.0	75.0	9.0	27.0	6.5	77.5	20.0	16.0
Change Period (Y+Rc), s	4.0	6.0	4.0	6.0	4.0	6.0	4.0	6.0
Max Green Setting (Gmax), s	6.0	58.0	8.0	28.0	6.0	58.0	16.0	20.0
Max Q Clear Time (g_c+I1), s	5.1	48.4	5.8	13.2	2.6	41.3	16.5	9.7
Green Ext Time (p_c), s	0.0	5.1	0.0	0.7	0.0	5.5	0.0	0.3

Intersection Summary

HCM 6th Ctrl Delay	32.5
HCM 6th LOS	C

Notes

User approved pedestrian interval to be less than phase max green.

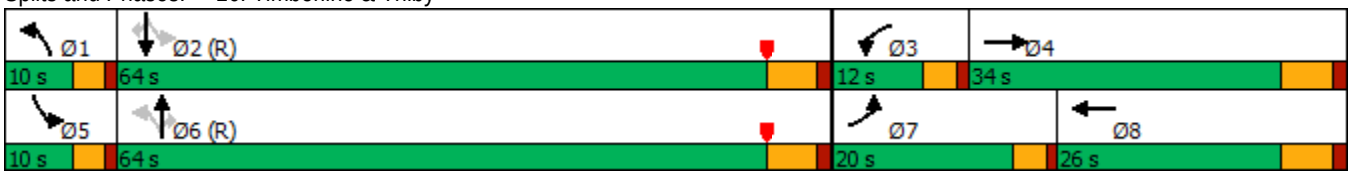
Phase Number	1	2	3	4	5	6	7	8
Movement	NBL	SBTL	WBL	EBT	SBL	NBTL	EBL	WBT
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize			Yes	Yes				
Recall Mode	None	C-Min	None	None	None	C-Min	None	None
Maximum Split (s)	10	64	12	34	10	64	20	26
Maximum Split (%)	8.3%	53.3%	10.0%	28.3%	8.3%	53.3%	16.7%	21.7%
Minimum Split (s)	9.5	28	9.5	26	9.5	27	10.5	26
Yellow Time (s)	3	4.5	3	4.5	3	4.5	3	4.5
All-Red Time (s)	1	1.5	1	1.5	1	1.5	1	1.5
Minimum Initial (s)	5	5	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0	0	0
Walk Time (s)		7		7		7		7
Flash Dont Walk (s)		15		13		14		12
Dual Entry	No	Yes	No	Yes	No	Yes	No	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	52	62	6	18	52	62	6	26
End Time (s)	62	6	18	52	62	6	26	52
Yield/Force Off (s)	58	0	14	46	58	0	22	46
Yield/Force Off 170(s)	58	105	14	33	58	106	22	34
Local Start Time (s)	52	62	6	18	52	62	6	26
Local Yield (s)	58	0	14	46	58	0	22	46
Local Yield 170(s)	58	105	14	33	58	106	22	34

Intersection Summary

Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	110

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 16: Timberline & Trilby





Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	426	221	58	126	121	847	47	21	900	542
v/c Ratio	0.88	0.57	0.46	0.57	0.59	0.76	0.05	0.08	0.92	0.53
Control Delay	70.3	38.8	65.7	56.8	30.7	25.9	0.1	14.2	42.4	14.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.3	38.8	65.7	56.8	30.7	25.9	0.1	14.2	42.4	14.0
Queue Length 50th (ft)	169	121	44	88	36	413	0	7	487	146
Queue Length 95th (ft)	#255	196	89	146	#120	#860	0	m14	#941	226
Internal Link Dist (ft)		909		738		1193			874	
Turn Bay Length (ft)	250		170		350		350	275		
Base Capacity (vph)	486	450	132	323	206	1111	999	261	981	1019
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.49	0.44	0.39	0.59	0.76	0.05	0.08	0.92	0.53

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Intersection												
Int Delay, s/veh	4.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	30	1	65	10	1	55	20	1165	5	15	945	25
Future Vol, veh/h	30	1	65	10	1	55	20	1165	5	15	945	25
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	32	1	68	11	1	58	21	1226	5	16	995	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1696	2313	511	1801	2324	616	1021	0	0	1231	0	0
Stage 1	1040	1040	-	1271	1271	-	-	-	-	-	-	-
Stage 2	656	1273	-	530	1053	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	60	37	508	50	37	433	675	-	-	562	-	-
Stage 1	246	306	-	178	237	-	-	-	-	-	-	-
Stage 2	421	237	-	500	301	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	49	35	508	40	35	433	675	-	-	562	-	-
Mov Cap-2 Maneuver	49	35	-	40	35	-	-	-	-	-	-	-
Stage 1	238	297	-	172	230	-	-	-	-	-	-	-
Stage 2	352	230	-	419	293	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	65.7	42.6	0.2	0.2
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	675	-	-	48	508	163	562	-	-
HCM Lane V/C Ratio	0.031	-	-	0.68	0.135	0.426	0.028	-	-
HCM Control Delay (s)	10.5	-	-	175.7	13.2	42.6	11.6	-	-
HCM Lane LOS	B	-	-	F	B	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	-	2.7	0.5	1.9	0.1	-	-

Intersection												
Int Delay, s/veh	11.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	25	1	20	5	1	25	50	1150	20	50	1450	55
Future Vol, veh/h	25	1	20	5	1	25	50	1150	20	50	1450	55
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	-	-	75	-	-	-	150	-	-	150	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	26	1	21	5	1	26	53	1211	21	53	1526	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2373	2999	792	2198	3018	616	1584	0	0	1232	0	0
Stage 1	1661	1661	-	1328	1328	-	-	-	-	-	-	-
Stage 2	712	1338	-	870	1690	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	~ 18	13	332	25	13	433	411	-	-	561	-	-
Stage 1	101	153	-	164	223	-	-	-	-	-	-	-
Stage 2	389	220	-	313	148	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 13	10	332	18	10	433	411	-	-	561	-	-
Mov Cap-2 Maneuver	~ 13	10	-	18	10	-	-	-	-	-	-	-
Stage 1	88	139	-	143	194	-	-	-	-	-	-	-
Stage 2	317	192	-	263	134	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 629	93.1	0.6	0.4
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	411	-	-	13	332	71	561	-	-
HCM Lane V/C Ratio	0.128	-	-	2.105	0.063	0.46	0.094	-	-
HCM Control Delay (s)	15	-	-	$ 1100	16.6	93.1	12.1	-	-
HCM Lane LOS	C	-	-	F	C	F	B	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4.2	0.2	1.8	0.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection						
Int Delay, s/veh	0.3					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	45	10	1240	940	15
Future Vol, veh/h	0	45	10	1240	940	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	47	11	1305	989	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	495	1005	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	520	685	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	520	685	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.6	0.1	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	685	-	520	-	-
HCM Lane V/C Ratio	0.015	-	0.091	-	-
HCM Control Delay (s)	10.3	-	12.6	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.3	-	-

Intersection						
Int Delay, s/veh	0.4					

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	25	35	1165	1530	90
Future Vol, veh/h	0	25	35	1165	1530	90
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	-	0	150	-	-	150
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	26	37	1226	1611	95

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	806	1706	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.94	4.14	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	0	325	369	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	325	369	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.1	0.5	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	369	-	325	-	-
HCM Lane V/C Ratio	0.1	-	0.081	-	-
HCM Control Delay (s)	15.8	-	17.1	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.3	-	0.3	-	-

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	385	15	120	35	10	180	40	1165	35	90	800	80
Future Volume (veh/h)	385	15	120	35	10	180	40	1165	35	90	800	80
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	405	16	45	37	11	102	42	1226	35	95	842	37
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	444	152	426	496	55	508	442	1738	50	245	1784	796
Arrive On Green	0.35	0.35	0.34	0.35	0.35	0.34	0.04	0.49	0.48	0.10	1.00	1.00
Sat Flow, veh/h	1280	433	1218	1341	157	1452	1781	3528	101	1781	3554	1585
Grp Volume(v), veh/h	405	0	61	37	0	113	42	617	644	95	842	37
Grp Sat Flow(s),veh/h/ln	1280	0	1651	1341	0	1609	1781	1777	1852	1781	1777	1585
Q Serve(g_s), s	36.0	0.0	3.0	2.3	0.0	6.0	1.4	32.4	32.5	3.1	0.0	0.0
Cycle Q Clear(g_c), s	42.0	0.0	3.0	5.3	0.0	6.0	1.4	32.4	32.5	3.1	0.0	0.0
Prop In Lane	1.00		0.74	1.00		0.90	1.00		0.05	1.00		1.00
Lane Grp Cap(c), veh/h	444	0	578	496	0	563	442	875	912	245	1784	796
V/C Ratio(X)	0.91	0.00	0.11	0.07	0.00	0.20	0.10	0.71	0.71	0.39	0.47	0.05
Avail Cap(c_a), veh/h	444	0	578	496	0	563	475	875	912	262	1784	796
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.92	0.92	0.92
Uniform Delay (d), s/veh	42.9	0.0	26.6	28.1	0.0	27.6	13.4	23.7	23.7	17.8	0.0	0.0
Incr Delay (d2), s/veh	22.8	0.0	0.1	0.1	0.0	0.2	0.1	4.8	4.6	0.9	0.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.9	0.0	1.2	0.8	0.0	2.3	0.5	14.0	14.6	1.2	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.7	0.0	26.7	28.2	0.0	27.8	13.5	28.4	28.3	18.8	0.8	0.1
LnGrp LOS	E	A	C	C	A	C	B	C	C	B	A	A
Approach Vol, veh/h		466			150			1303			974	
Approach Delay, s/veh		60.6			27.9			27.9			2.5	
Approach LOS		E			C			C			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	65.2		47.0	8.9	64.1		47.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	57.0		41.0	6.0	57.0		41.0				
Max Q Clear Time (g_c+I1), s	3.4	2.0		44.0	5.1	34.5		8.0				
Green Ext Time (p_c), s	0.0	6.8		0.0	0.0	8.7		0.8				
Intersection Summary												
HCM 6th Ctrl Delay			24.6									
HCM 6th LOS			C									

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize	Yes	Yes		Yes	Yes	
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	63	47	10	63	47
Maximum Split (%)	8.3%	52.5%	39.2%	8.3%	52.5%	39.2%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	53	63	6	53	63	6
End Time (s)	63	6	53	63	6	53
Yield/Force Off (s)	59	0	47	59	0	47
Yield/Force Off 170(s)	59	106	32	59	106	32
Local Start Time (s)	53	63	6	53	63	6
Local Yield (s)	59	0	47	59	0	47
Local Yield 170(s)	59	106	32	59	106	32

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr



6: Timberline & Zephyr



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	405	142	37	200	42	1263	95	842	84
v/c Ratio	0.96	0.20	0.08	0.28	0.14	0.81	0.57	0.52	0.11
Control Delay	72.0	6.8	25.7	10.4	13.3	34.8	35.4	22.4	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.0	6.8	25.7	10.4	13.3	34.8	35.4	22.4	2.6
Queue Length 50th (ft)	307	8	18	32	12	344	25	268	6
Queue Length 95th (ft)	#546	52	45	90	m22	538	m86	196	m13
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	422	711	475	710	305	1705	167	1710	808
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.96	0.20	0.08	0.28	0.14	0.74	0.57	0.49	0.10

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	15	85	25	20	95	140	980	45	145	1510	280
Future Volume (veh/h)	270	15	85	25	20	95	140	980	45	145	1510	280
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	284	16	20	26	21	22	147	1032	44	153	1589	192
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	371	187	234	378	207	217	253	2033	87	379	2086	930
Arrive On Green	0.25	0.25	0.24	0.25	0.25	0.24	0.06	0.59	0.58	0.08	0.78	0.78
Sat Flow, veh/h	1364	756	945	1372	836	876	1781	3473	148	1781	3554	1585
Grp Volume(v), veh/h	284	0	36	26	0	43	147	528	548	153	1589	192
Grp Sat Flow(s),veh/h/ln	1364	0	1700	1372	0	1713	1781	1777	1844	1781	1777	1585
Q Serve(g_s), s	24.4	0.0	2.0	1.8	0.0	2.3	3.9	21.0	21.1	4.1	29.0	3.8
Cycle Q Clear(g_c), s	26.7	0.0	2.0	3.7	0.0	2.3	3.9	21.0	21.1	4.1	29.0	3.8
Prop In Lane	1.00		0.56	1.00		0.51	1.00		0.08	1.00		1.00
Lane Grp Cap(c), veh/h	371	0	421	378	0	424	253	1040	1080	379	2086	930
V/C Ratio(X)	0.76	0.00	0.09	0.07	0.00	0.10	0.58	0.51	0.51	0.40	0.76	0.21
Avail Cap(c_a), veh/h	374	0	425	381	0	428	256	1040	1080	379	2086	930
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	0.39	0.39	0.39
Uniform Delay (d), s/veh	45.1	0.0	34.9	36.1	0.0	35.0	16.1	14.7	14.7	10.7	8.6	5.8
Incr Delay (d2), s/veh	9.0	0.0	0.1	0.1	0.0	0.1	3.2	1.8	1.7	0.3	1.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	0.0	0.8	0.6	0.0	1.0	1.8	8.4	8.7	1.4	6.1	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	54.2	0.0	35.0	36.2	0.0	35.1	19.3	16.4	16.4	11.0	9.7	6.0
LnGrp LOS	D	A	C	D	A	D	B	B	B	B	A	A
Approach Vol, veh/h		320			69			1223			1934	
Approach Delay, s/veh		52.0			35.5			16.8			9.4	
Approach LOS		D			D			B			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.8	75.4		34.7	10.0	75.3		34.7				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	69.0		29.0	6.0	69.0		29.0				
Max Q Clear Time (g_c+I1), s	5.9	31.0		28.7	6.1	23.1		5.7				
Green Ext Time (p_c), s	0.0	17.6		0.0	0.0	8.2		0.2				

Intersection Summary	
HCM 6th Ctrl Delay	16.3
HCM 6th LOS	B

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	75	35	10	75	35
Maximum Split (%)	8.3%	62.5%	29.2%	8.3%	62.5%	29.2%
Minimum Split (s)	9.5	27	28	9.5	27	28
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		14	15		14	15
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	41	51	6	41	51	6
End Time (s)	51	6	41	51	6	41
Yield/Force Off (s)	47	0	35	47	0	35
Yield/Force Off 170(s)	47	106	20	47	106	20
Local Start Time (s)	41	51	6	41	51	6
Local Yield (s)	47	0	35	47	0	35
Local Yield 170(s)	47	106	20	47	106	20

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 0 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 6: Timberline & Zephyr

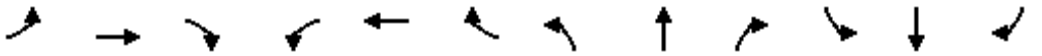


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	284	105	26	121	147	1079	153	1589	295
v/c Ratio	0.92	0.22	0.08	0.25	0.79	0.54	0.48	0.79	0.29
Control Delay	78.1	11.0	35.1	11.3	42.9	20.2	12.6	25.9	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	11.0	35.1	11.3	42.9	20.2	12.6	25.9	7.2
Queue Length 50th (ft)	215	9	15	12	58	279	37	335	19
Queue Length 95th (ft)	#389	54	40	61	m#96	m472	m69	m543	m77
Internal Link Dist (ft)		337		353		400		2203	
Turn Bay Length (ft)	75		75		150		150		200
Base Capacity (vph)	313	488	327	497	186	2055	322	2064	1018
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.22	0.08	0.24	0.79	0.53	0.48	0.77	0.29

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	40	15	30	160	5	255	10	1450	300	80	820	15
Future Volume (veh/h)	40	15	30	160	5	255	10	1450	300	80	820	15
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	42	16	4	168	5	164	11	1526	220	84	863	15
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	248	226	57	265	293	248	491	2444	1090	334	2552	44
Arrive On Green	0.16	0.16	0.15	0.16	0.16	0.16	0.04	1.00	1.00	0.05	0.71	0.71
Sat Flow, veh/h	1216	1444	361	1392	1870	1585	1781	3554	1585	1781	3574	62
Grp Volume(v), veh/h	42	0	20	168	5	164	11	1526	220	84	429	449
Grp Sat Flow(s),veh/h/ln	1216	0	1805	1392	1870	1585	1781	1777	1585	1781	1777	1859
Q Serve(g_s), s	3.6	0.0	1.1	14.0	0.3	11.7	0.2	0.0	0.0	1.5	10.9	10.9
Cycle Q Clear(g_c), s	3.9	0.0	1.1	15.2	0.3	11.7	0.2	0.0	0.0	1.5	10.9	10.9
Prop In Lane	1.00		0.20	1.00		1.00	1.00		1.00	1.00		0.03
Lane Grp Cap(c), veh/h	248	0	283	265	293	248	491	2444	1090	334	1269	1328
V/C Ratio(X)	0.17	0.00	0.07	0.63	0.02	0.66	0.02	0.62	0.20	0.25	0.34	0.34
Avail Cap(c_a), veh/h	311	0	376	337	390	330	558	2444	1090	354	1269	1328
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.41	0.41	0.41	1.00	1.00	1.00
Uniform Delay (d), s/veh	44.5	0.0	43.3	49.6	42.8	47.6	5.3	0.0	0.0	3.9	6.5	6.5
Incr Delay (d2), s/veh	0.3	0.0	0.1	2.5	0.0	3.0	0.0	0.5	0.2	0.4	0.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	0.0	0.5	5.0	0.1	4.7	0.1	0.2	0.1	0.5	3.8	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	44.8	0.0	43.4	52.2	42.8	50.6	5.3	0.5	0.2	4.3	7.2	7.2
LnGrp LOS	D	A	D	D	D	D	A	A	A	A	A	A
Approach Vol, veh/h		62			337			1757			962	
Approach Delay, s/veh		44.3			51.3			0.5			6.9	
Approach LOS		D			D			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.5	90.7		23.8	8.7	87.5		23.8				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	74.0		24.0	6.0	74.0		24.0				
Max Q Clear Time (g_c+I1), s	2.2	12.9		5.9	3.5	2.0		17.2				
Green Ext Time (p_c), s	0.0	6.1		0.2	0.0	20.0		0.6				

Intersection Summary	
HCM 6th Ctrl Delay	8.8
HCM 6th LOS	A

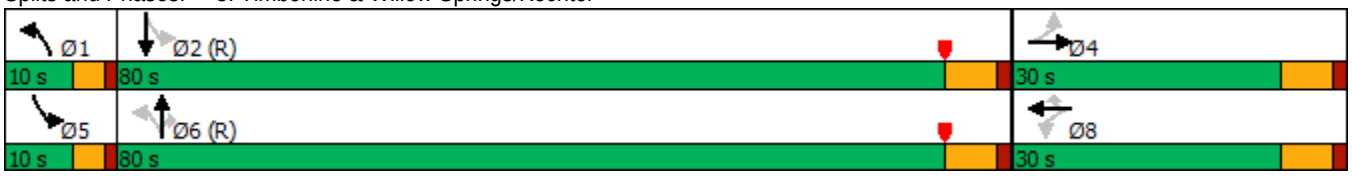
Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	80	30	10	80	30
Maximum Split (%)	8.3%	66.7%	25.0%	8.3%	66.7%	25.0%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	36.5	46.5	6.5	36.5	46.5	6.5
End Time (s)	46.5	6.5	36.5	46.5	6.5	36.5
Yield/Force Off (s)	42.5	0.5	30.5	42.5	0.5	30.5
Yield/Force Off 170(s)	42.5	110.5	18.5	42.5	108.5	20.5
Local Start Time (s)	36	46	6	36	46	6
Local Yield (s)	42	0	30	42	0	30
Local Yield 170(s)	42	110	18	42	108	20

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	75	

Offset: 0.5 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	42	48	168	5	268	11	1526	316	84	879
v/c Ratio	0.18	0.15	0.73	0.02	0.73	0.02	0.64	0.27	0.34	0.34
Control Delay	42.3	20.1	65.1	38.4	37.1	7.6	20.8	6.8	7.9	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	20.1	65.1	38.4	37.1	7.6	20.8	6.8	7.9	7.1
Queue Length 50th (ft)	28	10	124	3	110	3	562	76	14	107
Queue Length 95th (ft)	59	43	196	14	200	m5	m498	m70	31	207
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	292	374	281	388	424	497	2398	1164	251	2575
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.13	0.60	0.01	0.63	0.02	0.64	0.27	0.33	0.34

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	10	30	405	35	160	20	1090	230	160	1505	30
Future Volume (veh/h)	25	10	30	405	35	160	20	1090	230	160	1505	30
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	26	11	10	426	37	67	21	1147	122	168	1584	31
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	440	278	253	477	577	489	174	1834	818	405	1975	39
Arrive On Green	0.31	0.31	0.30	0.31	0.31	0.31	0.06	1.00	1.00	0.07	0.55	0.55
Sat Flow, veh/h	1290	902	820	1391	1870	1585	1781	3554	1585	1781	3565	70
Grp Volume(v), veh/h	26	0	21	426	37	67	21	1147	122	168	788	827
Grp Sat Flow(s),veh/h/ln	1290	0	1723	1391	1870	1585	1781	1777	1585	1781	1777	1858
Q Serve(g_s), s	1.7	0.0	1.0	36.0	1.7	3.7	0.6	0.0	0.0	5.0	42.7	42.9
Cycle Q Clear(g_c), s	3.4	0.0	1.0	37.0	1.7	3.7	0.6	0.0	0.0	5.0	42.7	42.9
Prop In Lane	1.00		0.48	1.00		1.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	440	0	531	477	577	489	174	1834	818	405	984	1029
V/C Ratio(X)	0.06	0.00	0.04	0.89	0.06	0.14	0.12	0.63	0.15	0.41	0.80	0.80
Avail Cap(c_a), veh/h	440	0	531	477	577	489	225	1834	818	434	984	1029
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00	0.75	0.75	0.75	1.00	1.00	1.00
Uniform Delay (d), s/veh	30.5	0.0	29.2	42.4	29.3	30.0	18.5	0.0	0.0	10.6	21.5	21.5
Incr Delay (d2), s/veh	0.1	0.0	0.0	18.9	0.0	0.1	0.2	1.2	0.3	0.7	6.8	6.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	0.0	0.4	14.8	0.8	1.4	0.3	0.3	0.1	1.9	18.2	19.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	30.5	0.0	29.3	61.3	29.3	30.1	18.8	1.2	0.3	11.3	28.3	28.1
LnGrp LOS	C	A	C	E	C	C	B	A	A	B	C	C
Approach Vol, veh/h		47			530			1290			1783	
Approach Delay, s/veh		30.0			55.1			1.4			26.6	
Approach LOS		C			E			A			C	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.5	71.5		42.0	11.1	66.9		42.0				
Change Period (Y+Rc), s	4.0	6.0		6.0	4.0	6.0		6.0				
Max Green Setting (Gmax), s	6.0	62.0		36.0	9.0	59.0		36.0				
Max Q Clear Time (g_c+I1), s	2.6	44.9		5.4	7.0	2.0		39.0				
Green Ext Time (p_c), s	0.0	10.2		0.1	0.1	11.2		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	21.9
HCM 6th LOS	C

Phase Number	1	2	4	5	6	8
Movement	NBL	SBTL	EBTL	SBL	NBTL	WBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	10	68	42	13	65	42
Maximum Split (%)	8.3%	56.7%	35.0%	10.8%	54.2%	35.0%
Minimum Split (s)	9.5	23	25	9.5	25	23
Yellow Time (s)	3	4.5	4.5	3	4.5	4.5
All-Red Time (s)	1	1.5	1.5	1	1.5	1.5
Minimum Initial (s)	5	5	5	5	5	5
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		10	12		12	10
Dual Entry	No	Yes	Yes	No	Yes	Yes
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	48.5	58.5	6.5	48.5	61.5	6.5
End Time (s)	58.5	6.5	48.5	61.5	6.5	48.5
Yield/Force Off (s)	54.5	0.5	42.5	57.5	0.5	42.5
Yield/Force Off 170(s)	54.5	110.5	30.5	57.5	108.5	32.5
Local Start Time (s)	48	58	6	48	61	6
Local Yield (s)	54	0	42	57	0	42
Local Yield 170(s)	54	110	30	57	108	32

Intersection Summary

Cycle Length	120	
Control Type	Actuated-Coordinated	
Natural Cycle	90	

Offset: 0.5 (0%), Referenced to phase 2:SBTL and 6:NBTL, Start of Yellow

Splits and Phases: 3: Timberline & Willow Springs/Kechter



3: Timberline & Willow Springs/Kechter

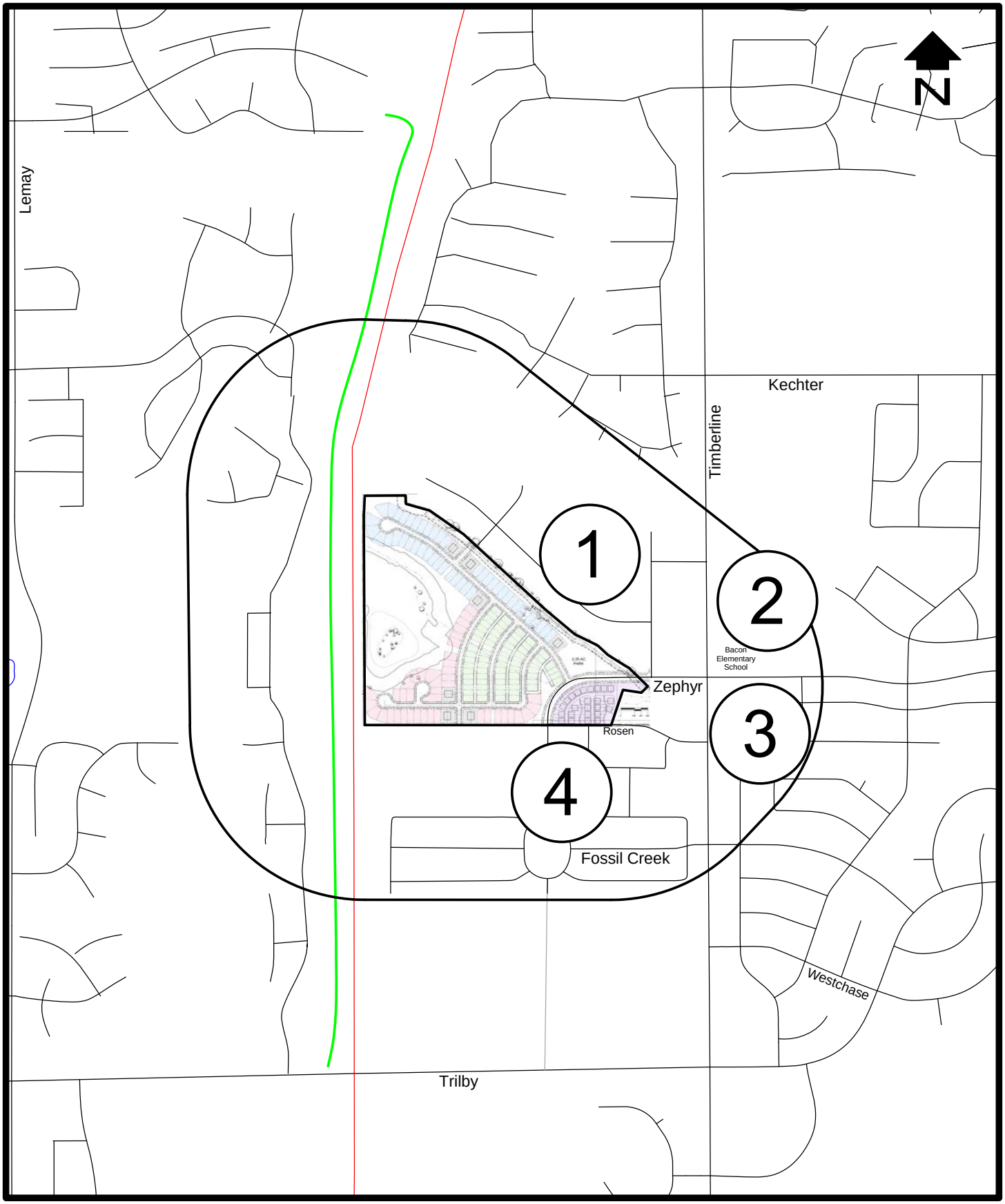
Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	26	43	426	37	168	21	1147	242	168	1616
v/c Ratio	0.06	0.07	0.92	0.06	0.26	0.13	0.69	0.28	0.65	0.85
Control Delay	29.1	13.4	65.5	28.8	8.0	6.5	16.4	1.8	24.5	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	13.4	65.5	28.8	8.0	6.5	16.4	1.8	24.5	28.7
Queue Length 50th (ft)	14	6	318	19	12	4	240	7	54	481
Queue Length 95th (ft)	37	33	#551	46	64	m6	m268	m13	98	668
Internal Link Dist (ft)		790		807			2203			1632
Turn Bay Length (ft)	75		200		165	170		200	225	
Base Capacity (vph)	465	586	463	636	636	167	1769	899	262	1912
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.07	0.92	0.06	0.26	0.13	0.65	0.27	0.64	0.85

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

APPENDIX I



SCALE: 1"=1000'

PEDESTRIAN INFLUENCE AREA

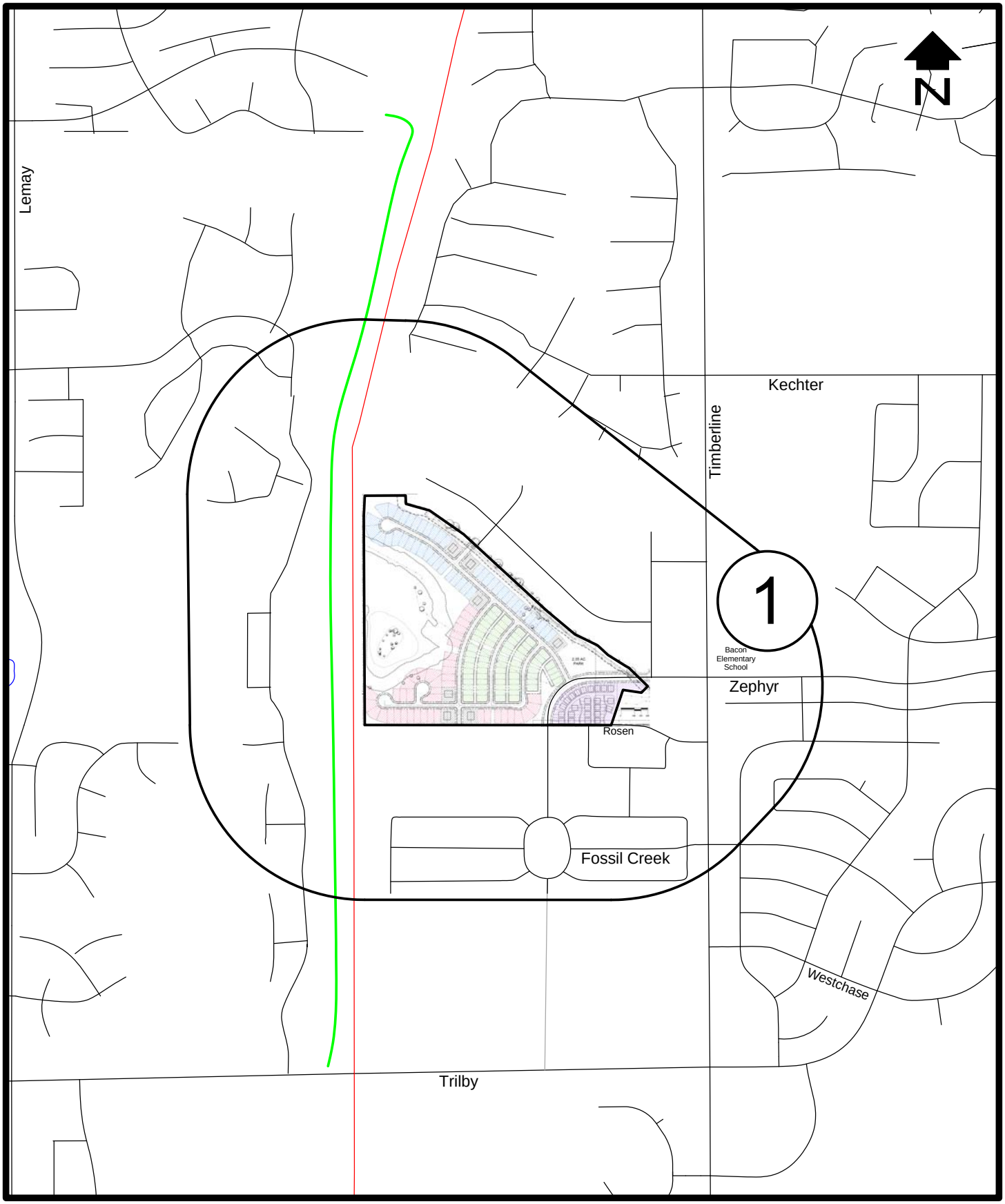
DELICH ASSOCIATES

Rennat Property TIS, July 2019

Pedestrian LOS Worksheet

Project Location Classification: Other/School Walking Area

	Description of Applicable Destination Area Within 1320'	Destination Area Classification		Level of Service (minimum based on project location classification)				
				Directness	Continuity	Street Crossings	Visual Interest & Amenities	Security
1	Residential/commercial neighborhood to the north of the site	Residential	Minimum	C	C	C	C	C
			Actual	A	B	B	B	A
			Proposed	A	B	B	B	A
2	Bacon Elementary School	Institutional	Minimum	B	B	B	C	B
			Actual	A	B	B	B	A
			Proposed	A	B	B	B	A
3	Residential neighborhood to the east of the site	Residential	Minimum	C	C	C	C	C
			Actual	A	B	B	B	A
			Proposed	A	B	B	B	A
4	Residential neighborhood to the south of the site	Residential	Minimum	C	C	C	C	C
			Actual	A	B	B	B	A
			Proposed	A	B	B	B	A
5			Minimum					
			Actual					
			Proposed					
6			Minimum					
			Actual					
			Proposed					
7			Minimum					
			Actual					
			Proposed					
8			Minimum					
			Actual					
			Proposed					
9			Minimum					
			Actual					
			Proposed					
10			Minimum					
			Actual					
			Proposed					



SCALE: 1"=1000'

BICYCLE INFLUENCE AREA

DELICH ASSOCIATES

Rennat Property TIS, July 2019

Bicycle LOS Worksheet

				Level of Service – Connectivity		
				Minimum	Actual	Proposed
		Base Connectivity:		C	B	B
	Specific connections to priority sites:					
	Description of Applicable Destination Area Within 1320'	Destination Area Classification				
1	Bacon Elementary School	Institutional		C	B	B
2						
3						
4						
5						
6						
7						
8						

ECOLOGICAL CHARACTERIZATION STUDY

FOR THE

RENNAT PROPERTY

IN

FORT COLLINS, COLORADO

Prepared for:

Post Modern Development, Inc.
144 North Mason Street, Suite 5
Fort Collins, CO 80524

Prepared by:

Professional Wetlands Consulting, Inc.
20 Rim Road
Boulder, CO 80302

October 18, 2019

Introduction

This Ecological Characterization Study documents the ecological characteristics for the Rennat residential development project area located on 57.83 acres of land on the west side of Timberline Road at Zephyr Road in Fort Collins, Colorado. This study conforms to Section 3.4.1 (D) (1) of the Land Use Code of the City of Fort Collins regarding the preparation of an Ecological Characterization Study (ECS).

Methods

Background and data review was conducted prior to field work to gather existing information and assist in the evaluation of sensitive and natural biological resources within the project. The data review included an evaluation of online resources, review of agency publications, and coordination with agency staff to determine the presence or potential occurrence of sensitive natural and biological resources at the project. The background review for the Rennat property included:

· USFWS Federally Listed and Proposed Endangered, Threatened, and Candidate Species and Critical Habitat in Larimer County as identified by the USFWS Information, Planning, and Conservation System (IPaC) Official Species List and Critical Habitat Mapper;

· Review for the potential occurrence of Migratory Bird Treaty Act, and BGEPA protected species, as identified on the IPAC Trust Resources Report;

· Completion of an online Colorado Natural Heritage Program database search for the presence of statewide species for Larimer County, Colorado, Potential Conservation Areas, and Rare and Imperiled Animals, Plants, and Plant Communities, animals and plants of Special Concern;

· Colorado Parks and Wildlife Threatened and Endangered List including USFWS and Colorado State Threatened, Endangered, and species of Special Concern;

· Species identified as in need of protection in the City of Fort Collins Natural Areas Policy Plan and City of Fort Collins Land Use Code, Natural Habitats, and Features considered sensitive;

· Review of Natural Resources Conservation Service (NRCS) soils and ecological site data to identify soils and habitats present within the vicinity capable of supporting sensitive or specially valued species (Completed November 11, 2015);

· Review of the USFWS National Wetlands Inventory (NWI) Wetlands Mapper for the occurrence of known or suspected U.S. Army Corps of Engineers jurisdictional wetlands and waterbodies;

· Review of soils surveys and U.S. Department of Agriculture, Natural Resources Conservation Service National List of Hydric Soils to aid in the determination for the presence of wetlands;

· Review and analysis of current and historical aerial photography;

· Field survey and site review of the Rennat property was conducted by David Steinmann with Professional Wetlands Consulting, Inc. on June 10th, 2019, and a field meeting was held that day with Stephanie Blochowiak from the City of Fort Collins. The field survey work included walking the entire project area for the purpose of identifying wetlands, sensitive and specially valued species, habitat capable of supporting these species, avian roosting and nesting sites, general wildlife habitat, existing vegetation, and other natural or naturalized features which could support wildlife. Wetlands were delineated following the Corps of Engineers Wetlands Delineation Manual (1987). Wetlands boundaries were flagged with sequentially numbered flagging and surveyed by a licensed surveyor.

Site Description

The proposed Rennat project encompasses 57.83 acres of agricultural plains grassland with an old livestock pond and wetlands on the west side of the site (Figure 1). The Rennat project is bounded by roads, residential development, and undeveloped land. Railroad tracks border the west property boundary. The primary use of the land has been agricultural, with hay meadows and livestock pasturing occurring. The Rennat project is located in Section 7, Township 6 North, Range 68 West of the 6th Principal Meridian in Larimer County, Colorado. Photographs are on Figures 2 - 4.

The elements of the Ecological Characterization Study are summarized in this section in the order listed in Section 3.4.1 (D) (1) of the Land Use Code. According to the City of Fort Collins Natural Habitat and Features Map, the Rennat project site contains aquatic habitat and non-native grasslands.

The aquatic habitat is the small livestock pond. The pond was dry at the time of the field survey in June of 2019. The wetlands surrounding the pond also qualify as a Natural Habitat and Feature. There is an irrigation ditch that flows across the subject property from west to east and this ditch is a Special Feature. The majority of the Rennat project site is an agricultural field with non-native grasses that was used to support livestock and haying.

(a) Wildlife

The wildlife value of the project site is moderate due to the Rennat project's suburban location, the proximity to major roads, railroad tracks, lack of native vegetation, and the past agricultural disturbances. The site was historically used for agriculture, with livestock grazing and haying being the most recent activities. The Rennat project is mostly treeless and the land consists principally of an open field with non-native grasses and other exotic species. Trees are growing along the irrigation ditch and on the island in the middle of the wetland area. Most wildlife use at the site can be expected to be transitional and moving through the property, except for rodents and small mammals that may occupy the property year round. Large and small mammals, birds and insects likely travel along the irrigation ditch corridor. Wildlife will utilize the wetlands and the irrigation ditch more than other parts of the property.

Mammals such as eastern cottontail rabbit (*Sylvilagus floridanus*), mice, voles, fox squirrel (*Sciurus niger*), foxes, racoons, coyotes, and deer likely utilize the Rennat project area during all seasons. Common reptiles such as garter snakes (*Thamnophis sirtalis*), bull snakes, and lizards also utilize the site. Structural habitat and cover are not present at the site for most species. The open meadows are regularly cut and hayed which limits wildlife habitat. Wildlife values are low to moderate and include feeding, watering and cover. The only wildlife observed onsite were rabbits.

Seasonal and/or year-round use can be expected by a number of birds including American robins (*Turdus migratorius*), mourning doves *(Zenaidura macroura),* magpies *(Pica pica),* swallows, crows *(Corvus brachyrhynchos),* chickadees, juncos, sparrows, and ravens *(Corvus corax).* No raptor nests were observed at the site or in any of the trees in the wetlands and along the ditch. Raptors utilize the site for hunting rabbits, rodents, birds and small animals. No waterfowl were observed.

(b) Wetlands

Wetlands occur on the west side of the site where there are wet meadow and emergent wetlands surrounding an old livestock pond. There was no water in the pond at the time of the field visit. The boundaries of the wetlands were flagged and surveyed, as shown on Figure 1. The total area of the wetlands is 8.37 acres. The wetlands are moderate to high quality wetlands with a diversity of native vegetation. Wetlands will be preserved and protected, and there is a 100' wetlands buffer zone.

Dominant wetlands vegetation at the Rennat property includes plains cottonwood trees (*Populus deltoides*), peachleaf willow trees (*Salix amygdaloides*), sandbar willows (*Salix exigua*), reed canary grass (*Phalaris arundinacea*), smartweed (*Polygonum* species), spikerush (*Eleocharis palustris*), curly dock (*Rumex crispus*), duckweed (*Lemna* species), Nebraska sedges (*Carex nebrascensis*), hard stem bulrushes (*Schoenoplectus acutus*), three square (*Schoenoplectus americanus*), baltic rushes (*Juncus balticus*), scouring rush (*Equisetum hyemale*), and cattails (*Typha latifolia*).

Hydric soils are present in the wetlands, with soil colors corresponding to 10yr 3/2, and 10yr 2/2 on the Munsell Soil Color Charts. Redoxymorphic features are generally present in the wetland soils, and soil texture is sandy loam with gravel and cobbles. Wetlands hydrology sources include irrigation ditch water, stormwater drainage, and groundwater seepage.

The Rennat property wetlands are classified as Palustrine, Emergent Wetland. Functions and values of the wetlands include shoreline anchoring, within basin food chain support, flood storage, groundwater discharge, wildlife habitat, passive recreation, long term nutrient retention, and short term nutrient retention. Wetlands Determination Data Forms are attached.

The Colorado Division of Water Resources does not have records or other information regarding the existing pond that have been identified to date. Recently, the pond has been dry with no water.

(c) Prominent Views

There are no prominent views from or across the property because the land is relatively flat with no hilltops or ridgelines. There are views of the foothills to the west. Development of the site will not interfere with or obstruct any prominent views.

(d) Native Trees and Vegetation

The site has native cottonwood trees and peach leaf willow trees along the irrigation ditch and on the island in the middle of the pond. The majority of the property is an open field that has been used for agriculture purposes. There is native wetlands vegetation growing in the wetlands on the property, as listed above. Vegetation in the open field areas is dominated by non-native species.

There are some native upland grasses in the upland fields, although most upland vegetation is non-native and introduced. The most abundant native upland vegetation on the property is western wheatgrass (*Pascopyrum smithii*). Native vegetation is a minor and non-dominant component of the total vegetation cover in the upland field areas.

(e) Non-native Trees and Vegetation

Non-native vegetation is the dominant upland plant cover at the Rennat property. There are Russian olive trees (*Elaeagnus angustifolia*) growing along the ditch and on the pond island. The non-native Russian olive trees do not provide significant wildlife habitat benefits nor do they contribute significantly to the site's ecological, shade, canopy, aesthetic or cooling values. Non-native willow trees also occur on the property.

The majority of the Rennat property is an abandoned and weedy agricultural field. The dominant non-native upland vegetation includes smooth brome (*Bromus inermis*), meadow fescue (*Festuca pratensis*) and orchard grass (*Dactylis glomerata*).

Other introduced species that are present include Canadian thistle (*Cirsium arvense*), field bindweed (*Convolvulus arvensis*), alfalfa (*Medicago sativa*), chicory (*Cichorium* spp.), ragweed (*Ambrosia psilostachya*), cheatgrass (*Bromus tectorum*), reed canary grass (*Phalaris arundinacea*), burdock (*Arctium lappa*), Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), crested wheatgrass (*Agropyron cristatum*), bluegrass (*Poa pratensis*), and knapweed (*Centaurea* species).

(f) Top of Bank, Shoreline and High Water Mark of Perennial Water

The site does not contain any perennial water sources. The aquatic pond and irrigation ditch are both seasonal and do not hold water year round. The 50' buffer zone from the top of the bank for the irrigation ditch is shown on Figure 1.

According to FEMA, the Rennat project is outside of the floodplain as shown at the following link: http://www.fcgov.com/utilities/what-we-do/stormwater/flooding/floodplain-maps-documents.

(g) Sensitive and Specially Valued Species

There are no known occurrences or habitats for sensitive and specially valued species on the Rennat project site. The USFWS Information, Planning and Conservation System (IPAC) was accessed to determine species of concern in Larimer County, which include the Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Ute lady's tresses orchid (*Spiranthes diluvialis*) and Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*), all of which are associated with riparian and wetland areas. Additionally, the site was closely examined for potential habitat for the above listed species.

No known occupied habitat or potential habitat occurs at the Rennat site for the Preble's Meadow Jumping Mouse, the Ute Ladies' Tresses Orchid, or the Colorado Butterfly Plant. The proposed site development will not adversely impact any listed Threatened & Endangered species.

According to the U.S. Fish and Wildlife Service, all trapping for the Preble's meadow jumping mouse (PMJM) in Fort Collins has been negative. Typical habitat for PMJM is composed of well-developed willow and riparian vegetation with adjacent, relatively undisturbed grassland communities and a water source. Riparian habitat should include a combination of grasses, forbs and shrubs. Based on these habitat requirements and the negative trapping data, the PMJM does not occur on the site and development of the Rennat project will not adversely affect PMJM.

The Ute lady's tresses and the Colorado butterfly plant do not occur on the site. The closest known occurrences of these plants are near the northwest boundary of Fort Collins (Ute lady's tresses) and at the City-managed Soapstone Prairie Natural Area near Wyoming (Colorado butterfly plant). Suitable habitat is not present within the Rennat project area for either of these listed plant species.

(h) Special Habitat Features

At the Rennat property, the surveyed wetlands and the aquatic pond on the west side of the site both qualify as Natural Communities or Habitats. The only Special Feature observed at the Rennat project is the irrigation ditch that serves as a wildlife corridor.

The Natural Habitat and Features Map provided by the City of Fort Collins identifies the following Natural Communities, Habitats and special features:

Natural Communities or Habitats:
a) Aquatic (e.g., rivers, streams, lakes, ponds).
b) Wetland and wet meadow.
c) Native grassland.
d) Riparian forest.
e) Urban plains forest.
f) Riparian shrubland.
g) Foothills forest

Special Features as outlined in the City of Fort Collins Land Use Code are:
a) Significant remnants of native plant communities.
b) Potential habitats and known locations of rare, threatened or endangered plants.
c) Potential habitats and known locations of rare, threatened or endangered animals.
d) Raptor habitat features, including nest sites, communal roost sites and key concentration areas.
e) Concentration areas for nesting and migratory shorebirds and waterfowl.
f) Migratory songbird concentration areas.
g) Key nesting areas for grassland birds.
h) Fox and coyote dens.
i) Mule deer winter concentration areas.
j) Prairie dog colonies over fifty (50) acres in size.
k) Concentration areas for rare, migrant or resident butterflies.
l) Areas of high terrestrial or aquatic insect diversity.
m) Areas of significant geological or paleontological interest.
n) Irrigation ditches that serve as wildlife corridors.

(i) Wildlife Movement Corridors

The irrigation ditch along the northern boundary of the site is a wildlife corridor that can be followed by small mammals, birds, insects, butterflies and pollinators. There are trees and shrubs along the ditch, and the ditch provides seasonal water. The top of bank of the ditch was surveyed and a 50' buffer zone from the ditch is provided for.

(J) General Ecological Functions

The Rennat site consists of plains grassland that provides bird and wildlife habitat as well as agricultural benefits. The wetlands on the west side also help to filter sediment and nutrients in runoff from the property, and they provide flood storage during heavy rainstorms. The majority of the Rennat project site consists of agricultural fields dominated by non-native plants, with low to moderate wildlife habitat value that is characteristic of agricultural land.

(k) Timing of Development in Relation to Ecological Character

The primary concern for the timing of development is the protection of nesting birds that may occur at the Rennat project. Under the Migratory Bird Treaty Act of 1918, it is unlawful for anyone to take, possess, import, export, transport, sell, purchase, barter or offer for sale, purchase or barter, any migratory bird or the parts, nests or eggs of such a bird. The removal of any trees should be timed to avoid disturbing nesting birds, with the nesting period being February 1 to July 31.

(l) Mitigation Measures

No mitigation measures are currently proposed because the wetlands will be preserved, and the only impacts to the irrigation ditch will be from the Zephyr Road improvements which will impact a short section of the ditch near the east end. Potential restoration opportunities include creating new wetlands to filter stormwater runoff, restoration of native grasslands, and planting native trees.

Summary

No significant ecological resources will be adversely impacted by the proposed development of the Rennat project. The wetlands are being protected and preserved, and the irrigation ditch will remain along with the majority of the trees. Site development and construction will be timed to avoid disturbing any nesting birds that may occur at the site. The buffer zones for the wetlands and the irrigation ditch will provide additional protection for the Natural Communities and Habitats and the Special Features identified at the Rennat property.

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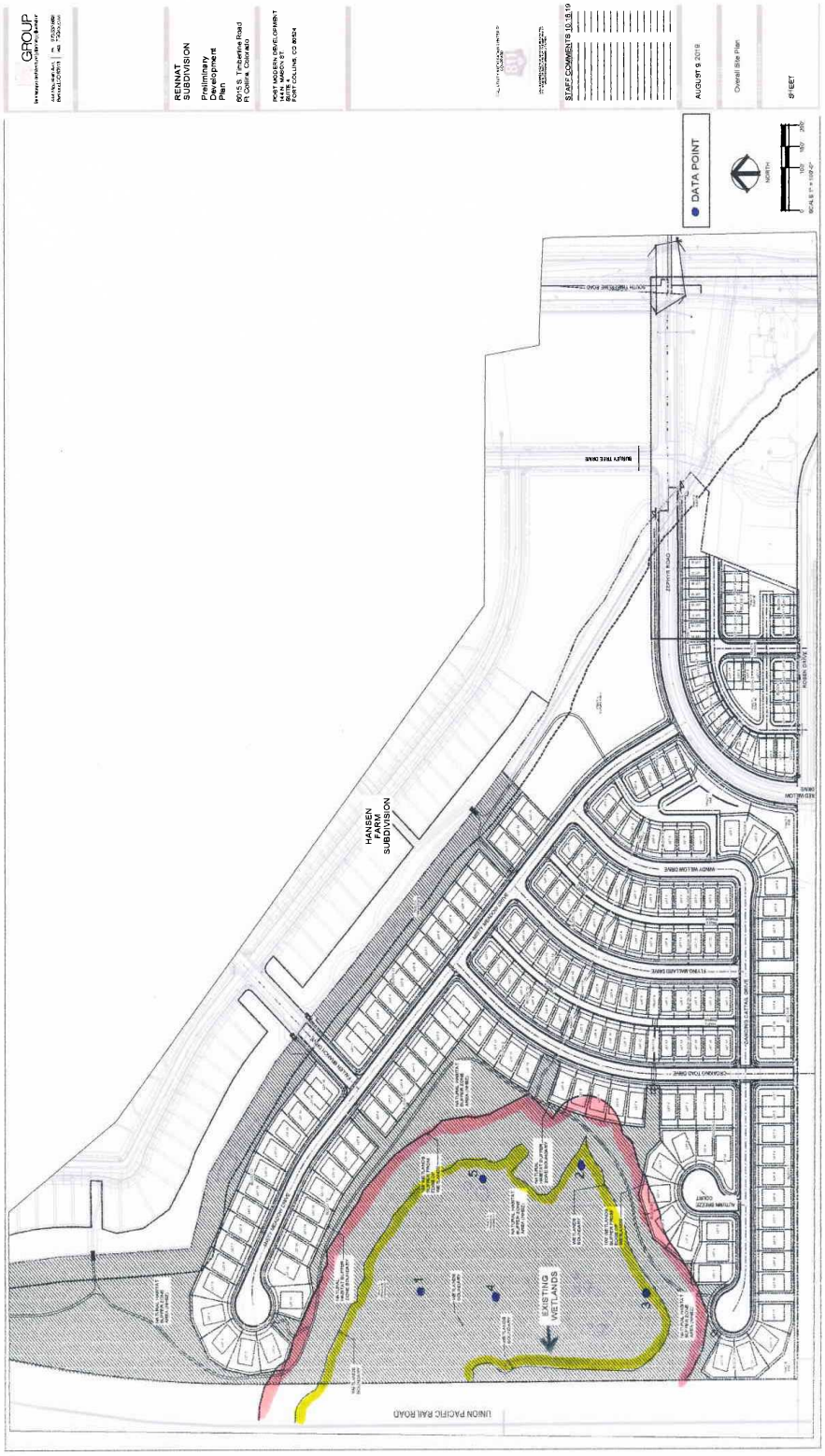


Figure 1. Rennat Property - Wetlands and 100' Buffer Zone.



Figure 2. Photographs of the Rennat property wetlands looking north (top), and west.



Figure 3. Photographs of the wet meadow wetlands looking east with plains cottonwood trees and willow trees (top), and looking north towards the irrigation ditch.



Figure 4. Looking south towards the wetlands with non-native thistles in foreground (top), and looking east at the non-native grassland habitat at the Rennat project site.

Rennat PDP – Environmental Planning Staff Report Section – S. Blochowiak 1/16/2020

LUC 3.4.1, Natural Habitats and Features

a. Section 3.4.1(C) ***General Standard*:**

"To the maximum extent feasible, the development plan shall be designed and arranged to be compatible with and to protect natural habitats and features and the plants and animals that inhabit them and integrate them within the developed landscape of the community by: (1) directing development away from sensitive resources, (2) minimizing impacts and disturbance through the use of buffer zones, (3) enhancing existing conditions, or (4) restoring or replacing the resource value lost to the community (either on-site or off-site) when a development proposal will result in the disturbance of natural habitats or features."

b. Section 3.4.1(E)(1)(a-i) ***Buffer Zone Performance Standards*** allow the decision maker [Hearing Officer] to determine buffer zones that may be multiple and noncontiguous. The general buffer zone distance for each natural habitat or feature is established in the quantitative buffer zone table, but the Hearing Officer may reduce or enlarge any portion of the general buffer zone distance in order to ensure qualitative performance standards are achieved.

Background: The locations of onsite natural habitats and features is informed by an Ecological Characterization Study (ECS) provided July 2019. The property vegetation is dominated by hayfield plants including alfalfa (*M. sativa*) and non-native grasses, primarily smooth brome (*B. inermis*). Onsite features include one ditch lateral, cottonwood trees, one large wetland and small pocket wetlands. To determine wetland boundaries, the City requires consultants use the "standards and guidelines and/or professional recommendations of the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Colorado Natural Heritage Program, and/or the Colorado Division of Wildlife in establishing such boundaries." Total on-site wetlands equal 8.37 acres.

The large wetland is a high-quality urban wetland. This is due to the hydrology, soils and the vegetation found in the wetland area. For example, desired native plant species observed at this site include: cottonwood trees (*P. deltoides*), peachleaf willow trees (*S. amygdaloides*), Sandbar willows (*S. exigua*), spikerush (*E. palustris*), Nebraska sedges (*C. nebrascensis*), hard stem bulrushes (*S. acutus*), three square (*S.americanus*), Baltic rushes (*J. balticus*), and scouring rush (*E. hyemale*). The diversity of native wetland species is unusual for an urban wetland in Fort Collins that are often dominated by only 2-3 wetland plant species.

The general buffer zone standard is one-hundred feet (100 ft) for wetlands greater than one-third acre (> 0.33 ac) in size without significant use by waterfowl. The general standard is fifty feet (50 ft) from "top of bank" for ditches serving as wildlife corridors. A 2019 United States Army Corps of Engineers (USACE) letter confirms on-site wetlands are not considered jurisdictional federal waters (Corps File No. NWO-2019-01850-DEN). The grove of trees in the middle of the large wetland supports a wide diversity of bird life including Red-winged Blackbirds, Killdeer and Chickadees as observed by Environmental Planner during site visits. Environmental Planner also observed birds of pretty utilizing the site including one Great Horned Owl and two Red-tailed Hawks. No stick nests were observed.

Resource Protection: Water (hydrology) is the number one factor supporting a wetland habitat, followed then by vegetation and soils. The large high-quality palustrine emergent wetland will be protected in place and with a 100-ft buffer from edge of wetlands except for encroachment into buffer of 20-ft to 30-ft by three southern single family detached lots

and four single family attached lots. The hydrology of the wetland will likely continue to be capable of supporting the wetland but there will be changes in hydrology due to development impacts. The ditch lateral along the northern portion of the property will be protected in place with a 50-ft buffer from ditch “top-of-bank” except for 5-ft to 10-ft of encroachment by northern single family detached lots 5-7. The ditch has some low-quality fringe wetlands. The ditch is dominated by the non-native grass smooth brome and supports some pockets of native grasses including blue grama (*B. gracilis)* and western wheatgrass (*P. smithii*).

Development Proposal: Where the proposed project site and landscape encroaches into the general buffer zone standard setbacks, the natural habitat buffer zone design is expanded elsewhere to offset the encroached areas. The largest and highest ecological value feature, the 8 acre emergent wetland, is protected in place. It is clear the hydrology of the large wetland will be altered. The full impact of the alteration of the wetland hydrology is not understood.

Performance Standards: The applicant proposes meeting LUC 3.4.1(E) natural habitat buffer zone performance standards, which, are as follows:

(a) The project shall be designed to preserve or enhance the ecological character or function and wildlife use of the natural habitat or feature and to minimize or adequately mitigate the foreseeable impacts of development.

NHBZ Design: The largest and highest ecological feature at the site is a high-quality palustrine emergent wetland requiring a specific hydrological regime in order to continue into the future, whether fed by groundwater, surface runoff or precipitation and/or a combination of the three. While a 100-ft buffer is shown on project plans, there is no certainty the hydrology of the wetland will be maintained to support such a large and high-quality wetland after development. The total amount of water annually getting to the wetland area must be enough to support that of a palustrine emergent wetland.

(b) The project, including, by way of example and not by way of limitation, its fencing, pedestrian/bicycle paths and roadways, shall be designed to preserve or enhance the existence of wildlife movement corridors between natural habitats and features, both within and adjacent to the site.

NHBZ Design:: The proposed fencing should not inhibit wildlife movement. The proposed pedestrian walkways and trails align with the Nature in the City Strategic Plan by providing residents with appropriate access to nature, including nature-viewing opportunities and in this case, the fencing should discourage people and pets from entering the high-quality wetland area.

(c) The project shall be designed to preserve existing trees and vegetation that contribute to the site's ecological, shade, canopy, aesthetic, habitat and cooling value. Notwithstanding the requirements of Section 3.2.1(F), all trees and vegetation within the Limits of Development must be preserved or, if necessary, mitigated based on the values established by the Ecological Characterization Study or the City Environmental Planner. Such mitigation, if necessary, shall include trees, shrubs, grasses, or any combination thereof, and must be planted within the buffer zone.

NHBZ Design: All high-quality desired tree, shrub and other vegetation species within the emergent wetland and 100-ft buffer are to remain in place. It is possible to enhance the buffer zone by removing invasive species vegetation including noxious weeds.

(d) The project shall be designed to protect from adverse impact species utilizing special habitat features such as key raptor habitat features, including nest sites, night

roosts and key feeding areas as identified by the Colorado Parks and Wildlife Division ("CPW") or the Fort Collins Natural Areas Department ("NAD"); key production areas, wintering areas and migratory feeding areas for waterfowl; heron rookeries; key use areas for wading birds and shorebirds; key use areas for migrant songbirds; key nesting areas for grassland birds; fox and coyote dens; mule deer winter concentration areas as identified by the CPW or NAD; prairie dog colonies one (1) acre or greater in size; key areas for rare, migrant or resident butterflies as identified by the NAD; areas of high terrestrial or aquatic insect diversity as identified by the NAD; remnant native prairie habitat; mixed foothill shrubland; foothill ponderosa pine forest; plains cottonwood riparian woodlands; and wetlands of any size.

NHBZ Design: The special features at the site are the palustrine emergent wetland and native woody trees and shrubs. While a 100-ft buffer is shown on project plans, there is no certainty the hydrology of the wetland will be maintained to support such a large and high-quality wetland after development. The total amount of water annually getting to the wetland area must be enough to support that of a palustrine emergent wetland.

(e) The project shall be designed so that the character of the proposed development in terms of use, density, traffic generation, quality of runoff water, noise, lighting and similar potential development impacts shall minimize the degradation of the ecological character or wildlife use of the affected natural habitats or features.

NHBZ Design: Several stormwater management features including rain gardens are designed within the 100-ft wetland buffer to filter water runoff prior to its entering the protected wetland.

(f) The project shall be designed to integrate with and otherwise preserve existing site topography, including, but not limited to, such characteristics as steepness of slopes, existing drainage features, rock outcroppings, river and stream terraces, valley walls, ridgelines and scenic topographic features.

NHBZ Design: The project proposes leaving the ditch lateral canal open and this supports Policy LU6 of the Nature in the City Strategic Plan.

(g) The project shall be designed to enhance the natural ecological characteristics of the site. If existing landscaping within the buffer zone is determined by the decision maker to be incompatible with the purposes of the buffer zone, then the applicant shall undertake restoration and mitigation measures such as regrading and/or the replanting of native vegetation.

NHBZ Design: It is not clear if the total amount of water annually getting to the wetland area must be enough to support that of a palustrine emergent wetland well into the future. The ponding of water that historically occurred is unlikely to continue and plantings will be needed within the exposed mud bottom of the historic seasonal pond.

(h) The project may be designed to provide appropriate human access to natural habitats and features and their associated buffer zones in order to serve recreation purposes, provided that such access is compatible with the ecological character or wildlife use of the natural habitat or feature.

NHBZ Design: The proposed pedestrian walkways and trails align with the Nature in the City Strategic Plan by providing residents with appropriate access to nature, including nature-viewing opportunities.

(i) Fencing associated with the project shall be designed to be compatible with the ecological character and wildlife use of the natural habitat or feature.

NHBZ Design: The proposed fencing should not inhibit wildlife movement. The proposed pedestrian walkways and trails align with the Nature in the City Strategic Plan by providing residents with appropriate access to nature, including nature-viewing opportunities and in this case, the fencing should discourage people and pets from entering the high-quality wetland area.

***Summary*:** The highest ecological value onsite is located within the existing wetland that will be kept largely in place, however, the hydrologic regime will be altered. Hydrology is the most important environmental factor supporting a wetland habitat. The proposed PDP provides natural habitat and feature protections and enhancements. City Environmental Planning Staff recommend one condition of approval to ensure the project can meet LUC 3.4.1(E) buffer zone standards. Generally a project development plan development agreement (DA) includes requirements for a minimum of three years of wetland monitoring post-construction and after issuance of Development Construction Permit (DCP). City Environmental Planner recommends wetland monitoring begin prior to issuance of DCP for this potential development project should it proceed and due to the uncertainty of hydrologic regime maintenance for the high-quality palustrine emergent wetland at the site. Proposed condition of approval and as communicated to Applicant in December 2019:

The Rennat project will complete monthly monitoring of at least 8 total and equally distributed monitoring plot locations of both vegetation transects and groundwater monitoring piezometers for a minimum of one (1) growing season pre-construction and minimum of two (2) years post-construction, or until the natural habitat buffer zone is accepted by the City Environmental Planner, for the project to demonstrate wetlands protection and meeting performance standards success criteria.

TB GROUP
landscape architecture | planning | illustration

August 09, 2019

Administrative Hearing Officer
c/o City of Fort Collins
Current Planning Department
281 North College Ave.
Fort Collins, CO 80524

Re: Rennat Subdivision

Please accept this request for a Modification of Standards to **Section 4.5(D)(2)(c)** of the Land Use Code.

Background

This proposal is for to a residential subdivision for the Rennat property located west of South Timberline Road at the intersection of Zephyr Road. The property contains 57.8 acres and is zoned Low Density Mixed-Use Neighborhood Zone District (LMN). 215 lots are proposed and the property will be developed in one phase. Overall net density is 5.54 d.u. per acre. The housing mix is as follows:

Single-family detached dwellings – 86
Single-family detached dwellings with rear loaded garages – 67
Single-family attached dwellings - 62

The area adjacent to the project contains single and multi-family housing, a school, a golf course and other vacant undeveloped land. There are two areas of ecological significance – an irrigation lateral and a wetland. The required setbacks and protection are provided and shown on the drawings.

All new streets will be designed to meet City street standards. The intention is to provide a safe, functional and visually appealing street network. Shade trees and landscaping will be included throughout the development's street network. In addition to street sidewalks and internal trails, there will be several trail connections to the Hansen Farm development to the north and the future Power Regional Trail and overpass.

The modification requested is in accordance with the review procedures set forth in Section 2.8.2(H) of the Land Use Code as follows:

Modification to Section Section 4.5(D)(2)(c)

Code Language: Section (2) Mix of Housing states the following:

444 Mountain Ave.
Berthoud, CO 80513
TEL 970.532.5891
WEB TBGroup.us

Mix of Housing. A mix of permitted housing types shall be included in any individual development plan, to the extent reasonably feasible, depending on the size of the parcel. In order to promote such variety, the following minimum standards shall be met.

(c) The following list of housing types shall be used to satisfy this requirement:

1. Single-family detached dwellings with rear loaded garages.
2. Single-family detached dwellings with front or side loaded garages.
3. Small lot single-family detached dwellings (lots containing less than four thousand [4,000] square feet or with lot frontages of forty [40] feet or less) if there is a difference of at least two thousand (2,000) square feet between the average lot size for small lot single-family detached dwellings and the average lot size for single-family detached dwellings with front or side loaded garages.
4. Two-family dwellings.
5. Single-family attached dwellings.
6. Two-family attached dwellings, the placement of which shall be limited to no more than two (2) dwellings per two (2) consecutive individual lots.
7. Mixed-use dwelling units.
8. Multi-family dwellings containing more than three (3) to four (4) units per building;
9. Multi-family dwellings containing five (5) to seven (7) units per building.
10. Multi-family dwellings containing more than seven (7) units per building (limited to twelve [12] dwelling units per building).
11. Mobile home parks

Requested Modification: Since the property is over 30 acres, a minimum of four housing types is required. The project is requesting to count single-family attached with front loaded garages as a building type

Modification Criteria

The request of approval for this modification complies with the standards per Review Criteria 2.8.2 (H)(1) and (4) in the following ways:

1. The plan as submitted will promote the general purpose of the standard for which the modification is requested **equally well or better than** would a plan which complies with the standard for which a modification is requested.
2. The plan as submitted will not diverge form the standards of the Land Use Code except in a **nominal, inconsequential way** when considered from the perspective of the entire development plan and will continue to advance the purposes of the Land Use Code.

Further, we feel that the granting of the modification would **not be detrimental to the public good**.

Justification

- The Land Use Code currently does not have a provision for a product that is single-family attached and front loaded. Allowing this to be used as a product type gives the project four different building types.

- The number of lots is minimal (14) compared to the rest of the development and represents 6.6% of the total.

- The lots requesting the modification are located at the ends of blocks providing variety and visual interest along the street frontage by breaking up the rows of single-family detached homes. The purpose of the standard for which the modification is sought "… is to meet a wide range of needs of everyday living in neighborhoods that include a variety of housing choices, that invite walking to gathering places, services and conveniences, and that are fully integrated into the larger community by the pattern of streets, blocks, and other linkages." The Rennat property is providing a network of both on-street and off-street pedestrian and bike paths throughout the site and that being allowed to use this housing type promotes a diverse choice for the residents who will be moving here.

We look forward to working with you during this process and will be happy to answer any questions you may have.

Sincerely,



Cathy Mathis, APA
Project Manager, The Birdsall Group

OPERATION SERVICES
REAL ESTATE SERVICES
P.O. Box 580
300 Laporte Avenue, Bldg. B
Fort Collins, CO 80522

970.416.2276
fcgov.com

MEMORANDUM

To: Darin Atteberry, City Manager

Thru: Ingrid Decker, Senior Assistant City Attorney

From: Keith Hanson, Real Estate Services Manager

Date: November 7, 2010

Re: Notice of Alignment for Drainage at Southridge Golf Course

---

Dear Ingrid:

The City of Fort Collins Utility Department has recommended a Notice of Alignment for an existing swale that runs across the City-owned Southridge Golf Course at 5750 South Lemay Avenue. This swale has historically provided stormwater drainage from the adjacent property to the east (commonly referred to as the Rennat property) across the golf course into underground City stormwater infrastructure (see attached map).

The owner of the Rennat property intends to develop the property with residential housing and has submitted plans to the City for preliminary review. The development of the property changes the stormwater flow characteristics which triggers the City's requirement that the plans provide for sufficient stormwater drainage mitigation. This requirement is common for all developments and consistent with the legal advice by the City Attorney's Office. Both the Utility Department and the developer have considered all options for stormwater drainage and this option is the most feasible – physically and financially – for successful development of the property.

In order to establish a public record of the drainage swale on the City's property, the Notice of Alignment will be filed with the Larimer County Clerk and Recorder. If you would kindly review and sign the attached Notice and forward to Mr. Atteberry and the City Clerk for their respective signatures, it would be greatly appreciated.

Once all parties have signed the document on behalf of the City, please return to me via interoffice mail.

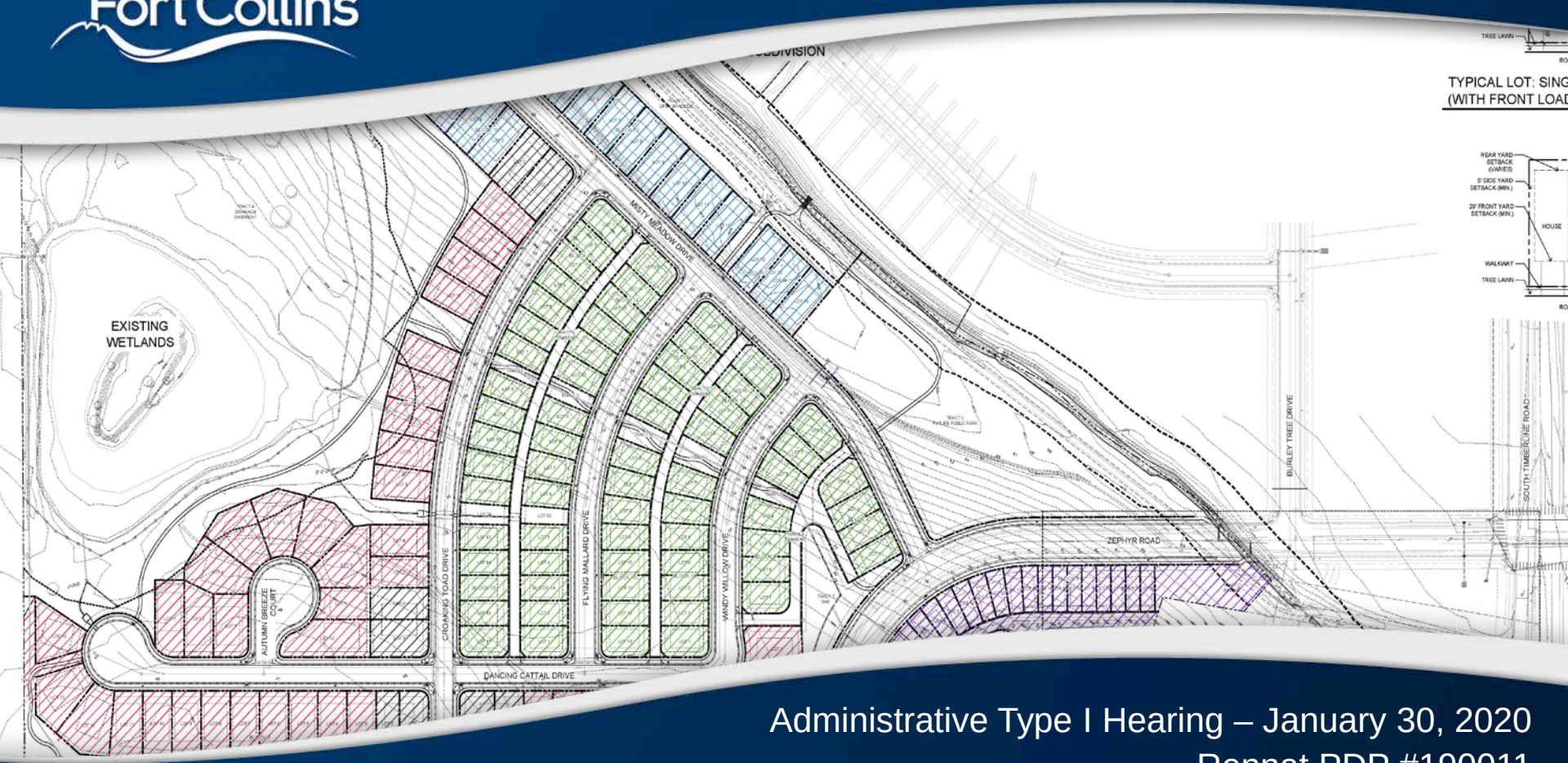
Sincerely,

Keith Hanson

DRAFT

Map of Swale Area at Southridge Golf Course





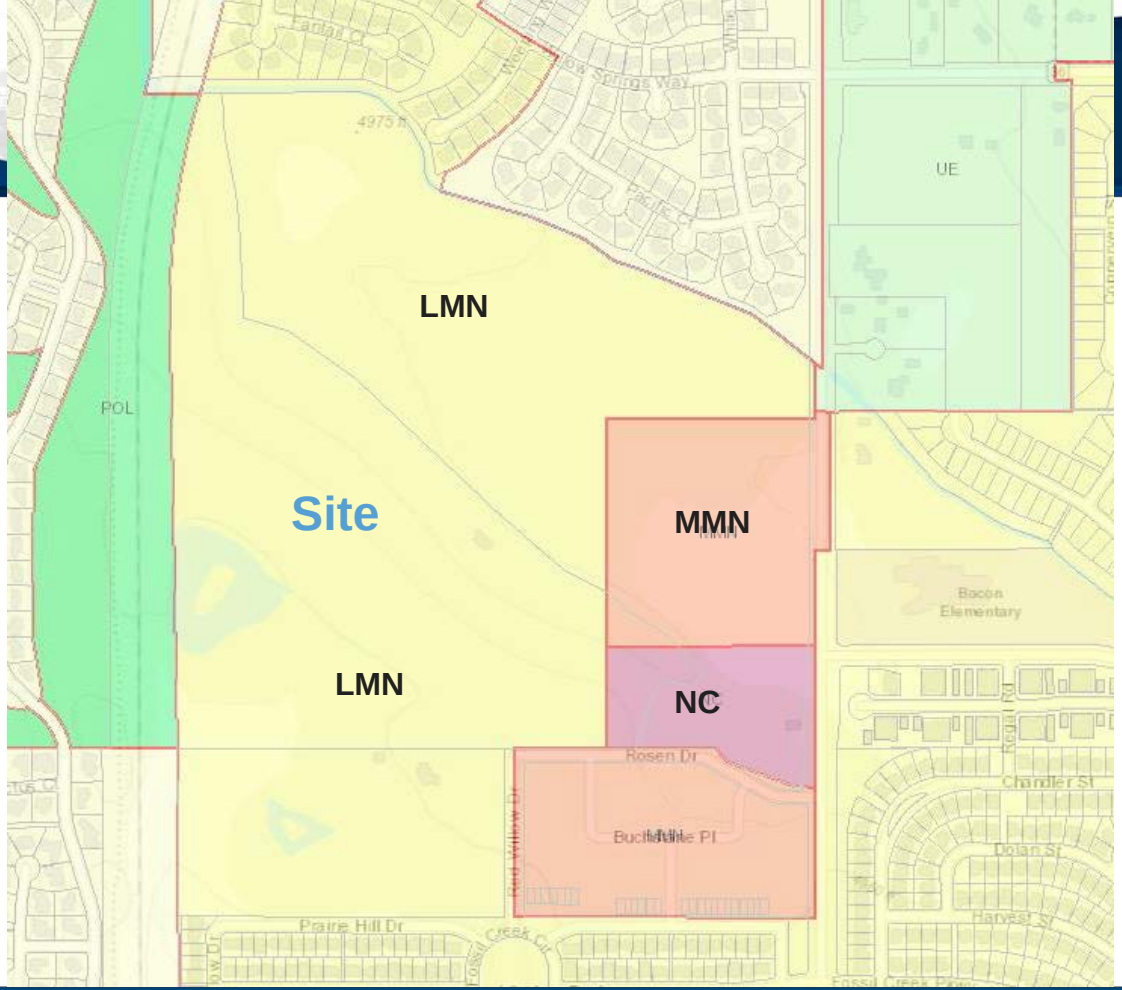
Administrative Type I Hearing – January 30, 2020

Rennat PDP #190011

Context


Willow Springs
Hansen Farm
South Ridge
S. Timberline Rd.
Bacon Elementary
Wetland/Buffer Area
Site
Future Park
Zephyr Rd.
The Timbers
Vacant
Crowne on Timberline

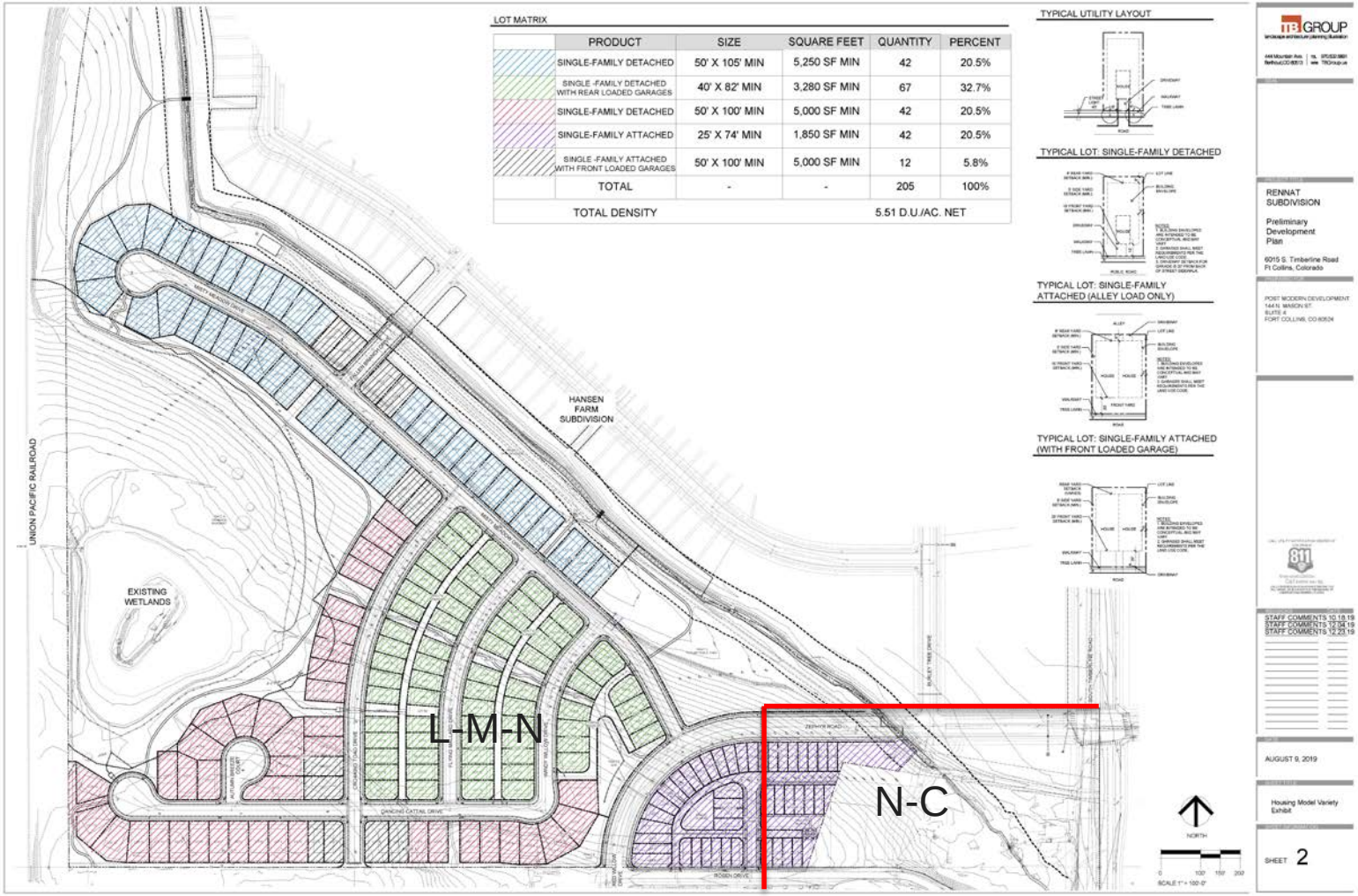
Rennat PDP



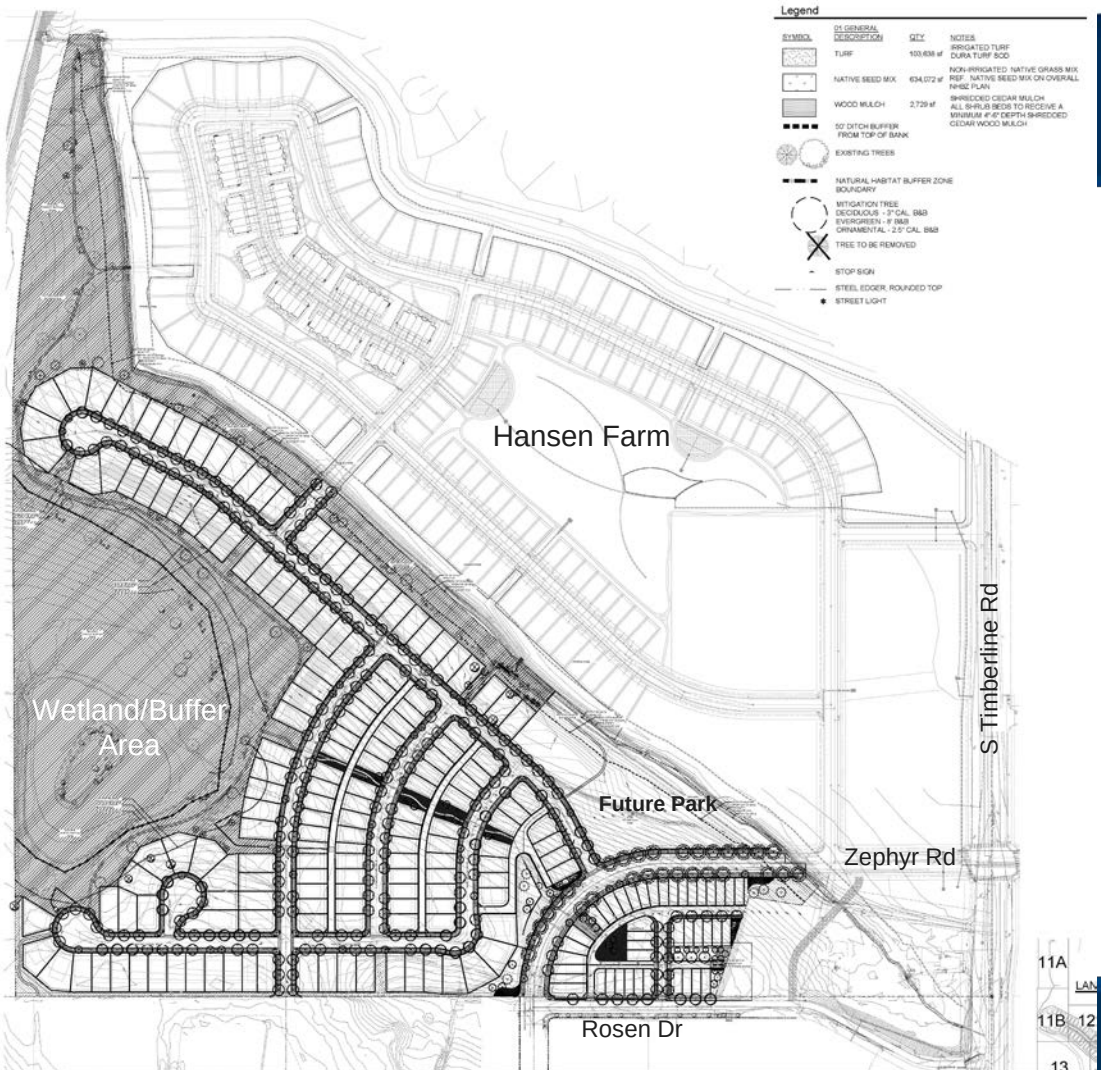
Zoning:

Low Density Mixed-Use Neighborhoods (LMN)

Neighborhood Commercial (N-C)


LOT MATRIX
PRODUCT | SIZE | SQUARE FEET | QUANTITY | PERCENT
SINGLE-FAMILY DETACHED | 50' X 105' MIN | 5,250 SF MIN | 42 | 20.5%
SINGLE -FAMILY DETACHED WITH REAR LOADED GARAGES | 40' X 82' MIN | 3,280 SF MIN | 67 | 32.7%
SINGLE-FAMILY DETACHED | 50' X 100' MIN | 5,000 SF MIN | 42 | 20.5%
SINGLE-FAMILY ATTACHED | 25' X 74' MIN | 1,850 SF MIN | 42 | 20.5%
SINGLE -FAMILY ATTACHED WITH FRONT LOADED GARAGES | 50' X 100' MIN | 5,000 SF MIN | 12 | 5.8%
TOTAL | - | - | 205 | 100%
TOTAL DENSITY 5.51 D.U./AC. NET
TYPICAL UTILITY LAYOUT
TYPICAL LOT: SINGLE-FAMILY DETACHED
TYPICAL LOT: SINGLE-FAMILY ATTACHED (ALLEY LOAD ONLY)
TYPICAL LOT: SINGLE-FAMILY ATTACHED (WITH FRONT LOADED GARAGE)
UNION PACIFIC RAILROAD
HANSEN FARM SUBDIVISION
EXISTING WETLANDS
L-M-N
N-C
RENNAT SUBDIVISION
Preliminary Development Plan
6015 S. Timberline Road Ft Collins, Colorado
STAFF COMMENTS 10.18.19
STAFF COMMENTS 12.04.19
STAFF COMMENTS 12.23.19
AUGUST 9, 2019
Housing Model Variety Exhibit
SHEET 2

Rennat PDP – Overall Plan



- 205 Single-Family Dwelling Units
- Stormwater Detention/Open Space
- Wetlands/Natural Habitat Buffer
- Primary access: Zephyr Rd/Rosen Dr
- Secondary access: Fallen Branch Dr/Croaking Toad Dr
- Pedestrian/bike path connections
- Future neighborhood park

Section 4.5(D)(1) – Density

- 205 dwelling units (D.U.) on 56.6-acres
- Gross density - 3.49 D.U. per gross acre
  (Max. allowed 9.00 D.U./acre)
- Net Density - 5.10 D.U./net acre
  (Min. required 3.00 D.U./acre)

L-M-M Zoning

Section 4.5(D)(2) – Mix of Housing:

Projects 30 acres or larger, four housing types are required.

Table 1 Mix of Housing

Housing Type	Lot Size	Number of Dwelling Units	% of Total
Single-Family Detached (front-loaded garages)	(6,000-8,000 Sf)	84	44.6 %
Single-Family Detached (rear-loaded garages)	(3,825 SF)	67	35.6 %
Single-Family Attached (rear-loaded garages)		25	13.3 %
Single-Family Attached (front-loaded garages) (See Request for Modification of Standards)		12	6.5 %
Total:		**188**	**100 %**

A. Modification Description:

1. Compliance with Section 4.5 (D) (2) (c) – *Mix of Housing*

The applicant requests a Modification to Section 4.5 (D) (2) (c) – *Mix of Housing*, to add a fourth housing type (single-family attached – front loaded garage) to list of required housing types.

1. Single-Family Detached (front-loaded garages)
2. Single-Family Detached (rear-loaded garages)
3. Single-Family Attached (rear-loaded garages)
4. Single-Family Attached (front-loaded garages)

Land Use Code Modification Criteria:

The decision maker may grant a modification of standards only if it finds that the granting of the modification would not be detrimental to the public good, and that:

1) …plan as submitted will promote the general purpose of the standard… **equally well or better than** would a plan which complies with the standard; or

2) …would, substantially **alleviate an existing, defined and described problem** of city-wide concern or would result in a **substantial benefit to the city;** or

3) **…**would result in unusual and exceptional practical difficulties, or **exceptional or undue hardship** upon the owner of such property; or

4) …will not diverge from the standards…except in a **nominal, inconsequential way…**

Applicant's Justification for Criterion 1 and 4:

1) *The Land Use Code currently does not have a provision for a product that is single-family attached and front loaded. Allowing this to be used as a product type gives the project four different building types.*

4) *The number of lots is minimal compared to the rest of the development. The lots requesting the modification are located at the ends of blocks providing variety and visual interest along the street frontage by breaking up the rows of single-family detached homes.*

- *Further, we feel that the granting of the modification would not be detrimental to the public good.*

Staff Finding

1. Not detrimental to public good - fourth housing type, should contribute to the vitality and quality of life in the area by supporting the overall mix of housing choices

2. 2.8.2(H)(1): "equally well or better than"

   - Four housing types comply with standard
   - The difference between a front-loaded and rear-loaded home product is recognizable and provides both visual and functional variety that contributes to the L-M-N District's purpose

3. 2.8.2(H)(4): "nominal, inconsequential way"

   - Inclusion of new fourth housing type complies with standard
   - 25 lots with this housing type represent 12% of the total lots within the P.D.P

Compliance with Section 2.8.2 (H) - Modification of Standards

SINGLE FAMILY ATTACHED WITH FRONT LOADED GARAGES



PLAN A



PLAN B

New Housing Type:
SF Attached (front-load)

SINGLE FAMILY ATTACHED WITH REAR LOADED GARAGES



PLAN C



PLAN D

Neighborhood Commercial N-C Zoning

B. Section 4.23(B)(2) – Permitted Uses

- single-family attached dwelling

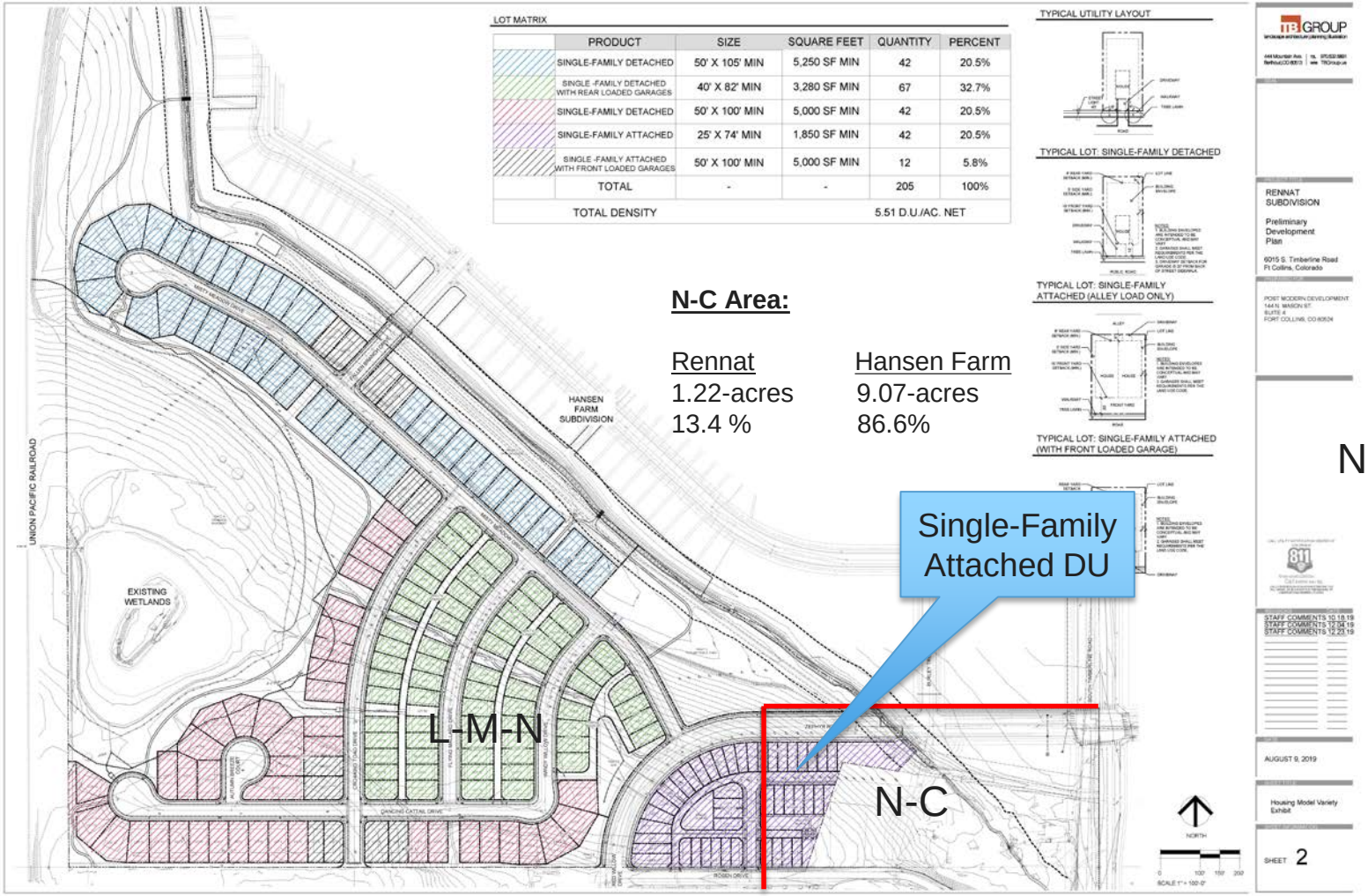
C. Section 4.23 (D) (2) – Secondary Uses

- P.D.P. portion of the N-C district of 1.22-acres and represents 13.4 % of the overall N-C area of 9.07-acres.

- P.D.P. includes single-family attached dwellings as a secondary use, less than the maximum allowed of 30%

D. Section 4.23 (E) (1) (b) – Central Feature or Gathering Place

- P.D.P. includes a centrally located plaza with pedestrian amenities of landscaping, benches and common turf area


LOT MATRIX
PRODUCT | SIZE | SQUARE FEET | QUANTITY | PERCENT
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TOTAL DENSITY 5.51 D.U./AC. NET
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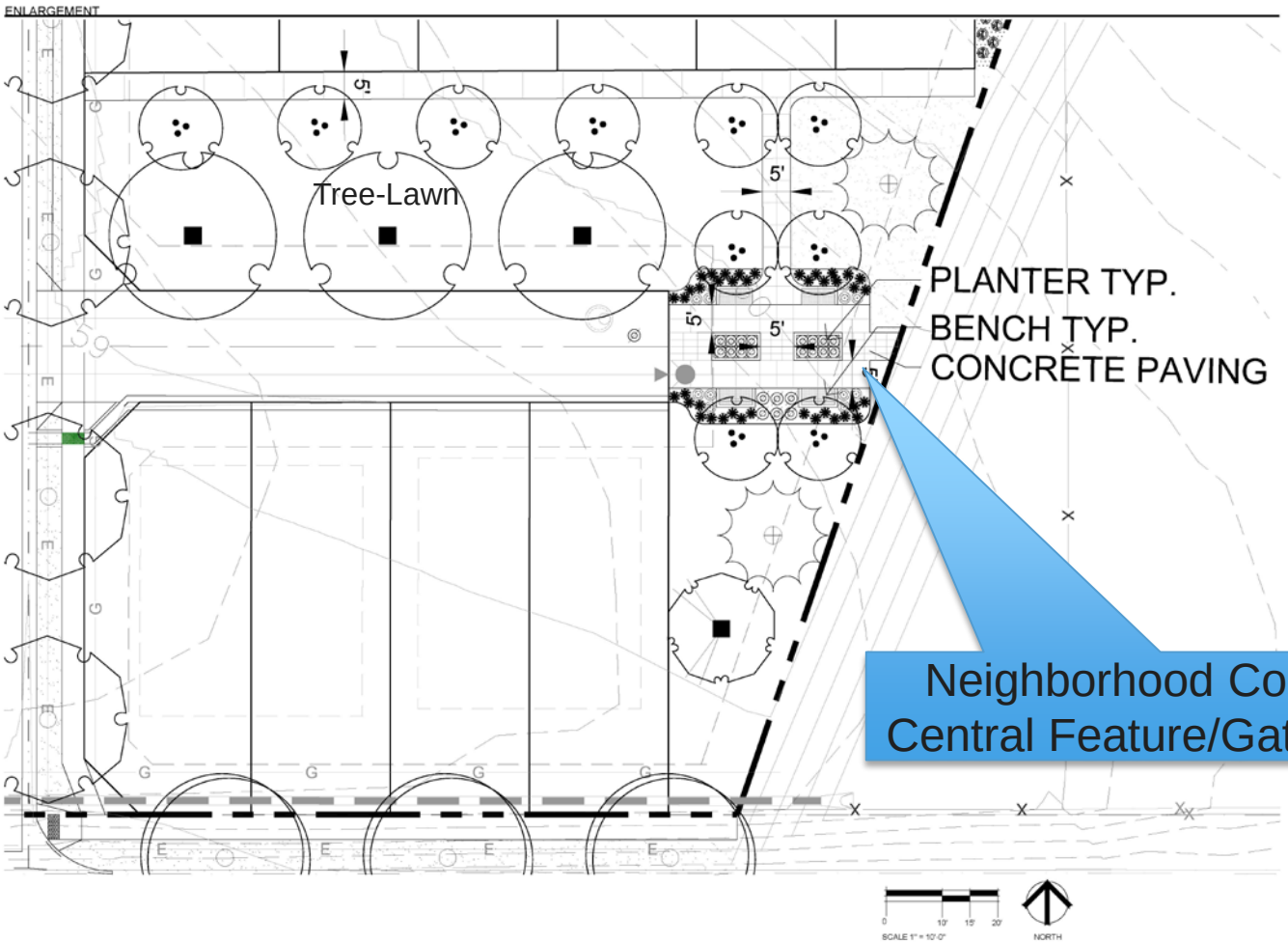
TYPICAL LOT: SINGLE-FAMILY ATTACHED (ALLEY LOAD ONLY)
TYPICAL LOT: SINGLE-FAMILY ATTACHED (WITH FRONT LOADED GARAGE)
N-C Area:
Rennat
1.22-acres
13.4 %
Hansen Farm
9.07-acres
86.6%
HANSEN FARM SUBDIVISION
UNION PACIFIC RAILROAD
EXISTING WETLANDS
L-M-N
N-C
Single-Family Attached DU
RENNAT SUBDIVISION
Preliminary Development Plan
6015 S. Timberline Road Ft Collins, Colorado
AUGUST 9, 2019
Housing Model Variety Exhibit
SHEET 2

N-C Zoning



Future N-C Area

F. Section 3.2.2(K)(1)(a) – Parking:

- 151 single family detached D.U. (two-car driveway and garage per unit), total 612 spaces required. P.D.P. providing a total of 612 spaces

- 45 single family attached D.U., standard requires compliance on a per bedroom-per unit basis

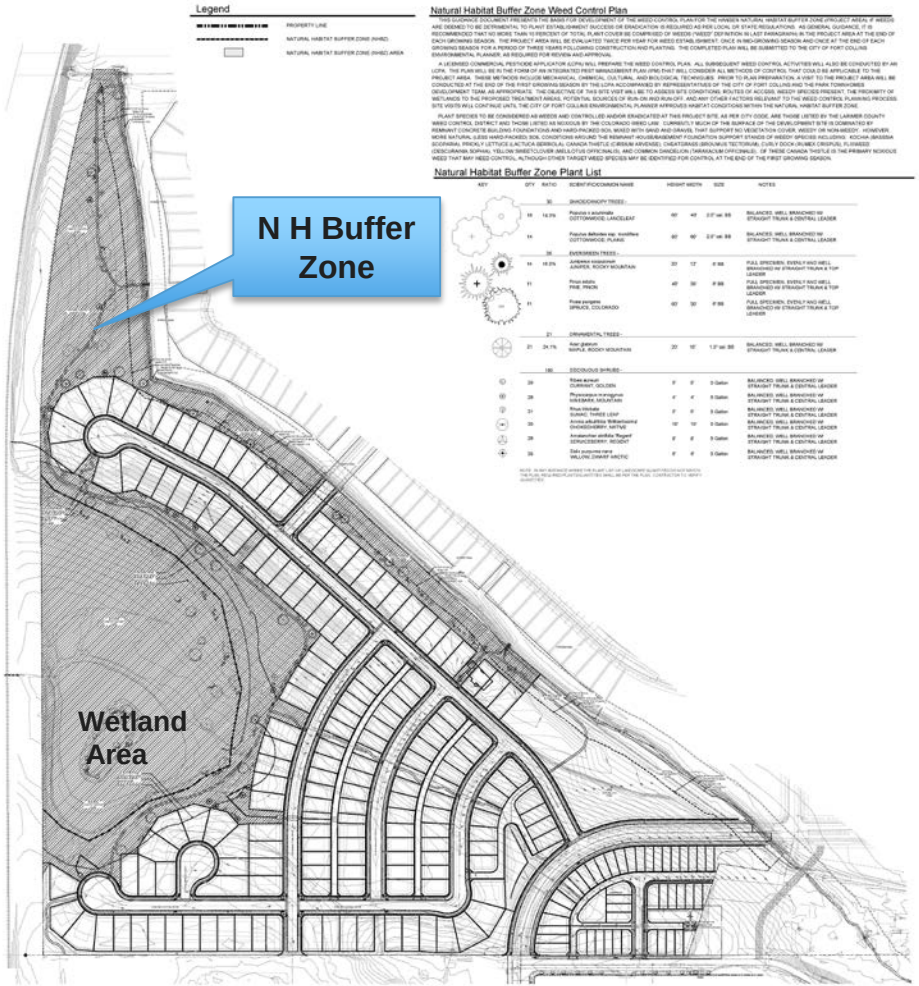
    - 45 2-bedroom units x 1.75 spaces = 78 required spaces
    - P.D.P. provides 78 spaces in garages

- On-street parking not part of calculations

***Section 3.4.1(E)(1) - Buffer Zone Performance Standards*.**

- Largest and highest ecological value feature, the 8-acre emergent wetland, is protected in place with a buffer that averages 100-feet in distance.
- PDP provides natural habitat and feature protections and enhancements.
- As a **Condition of Approval**, staff is requiring a robust monitoring plan that describes how the wetlands will be supported hydrologically, and a contingency mitigation plan, for the project to demonstrate wetlands protection and meeting performance standards success criteria.

Natural Habitat Buffer Zone



Condition of Approval No. 1 - Natural Habitat Buffer Zone:

- P.D.P. will complete monthly monitoring
- Minimum of one (1) growing season pre-construction and minimum of two (2) years post-construction
- Until the natural habitat buffer zone is accepted by the City Environmental Planner
- For project to demonstrate wetland protection and meet performance success criteria**.**

LOT MATRIX

	PRODUCT	SIZE	SQUARE FEET	QUANTITY	PERCENT
	SINGLE-FAMILY DETACHED	50' X 105' MIN	5,250 SF MIN	42	20.5%
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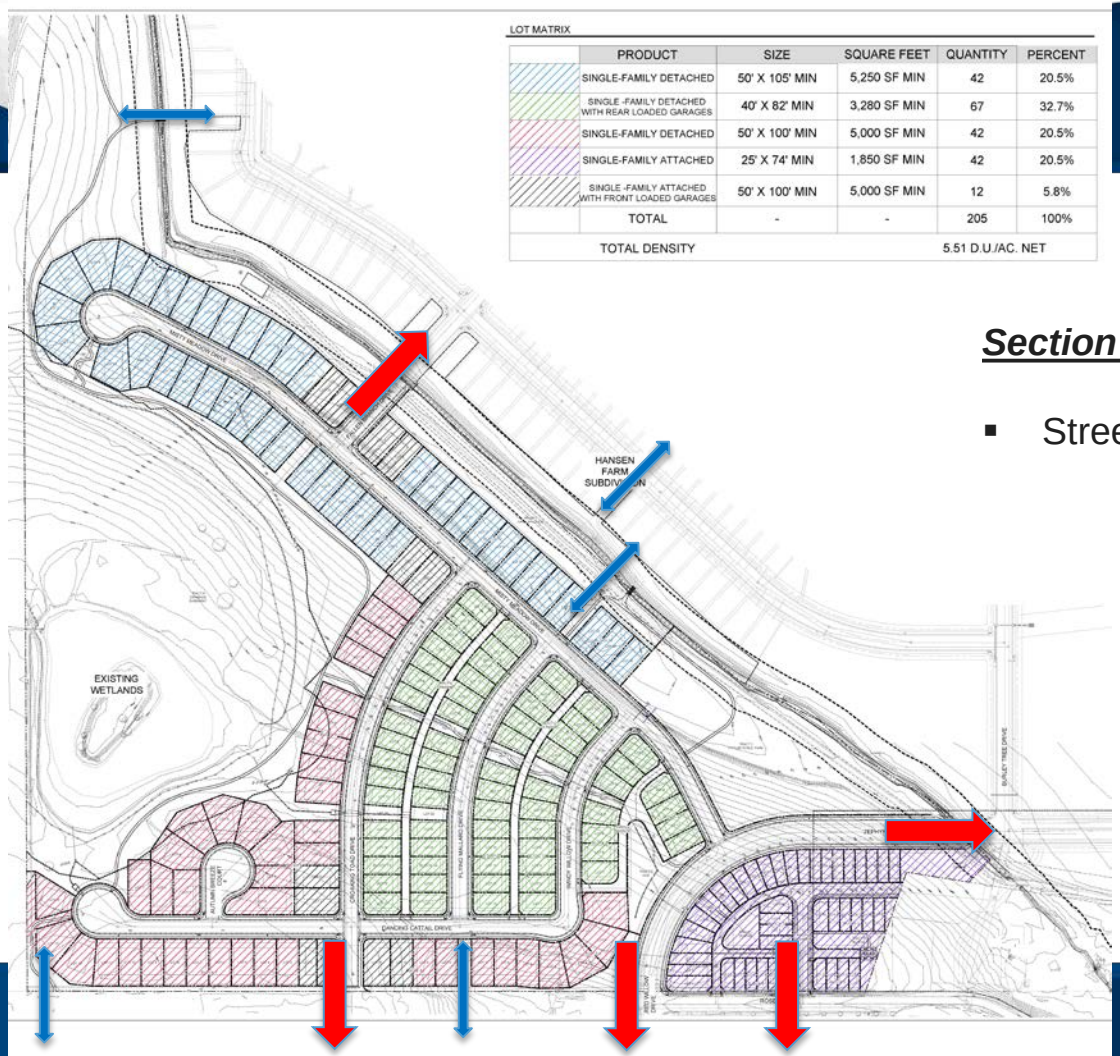
	TOTAL	-	-	205	100%
TOTAL DENSITY				5.51 D.U./AC. NET	



Section 3.6.3 (B) – Street Pattern/Connectivity

- Street and/or Pedestrian Connections (660 Feet)

- Street Stub-Out

- Pedestrian Path Stub-Out

L. Section 3.6.3(B) – Street Pattern and Connectivity Standards – General Standard

- P.D.P. allows the creation of a non-compliant street system in which a dead-end network of roads is established with only one connection to Zephyr Road/S. Timberline Road
- Emergency access is required for all lots
- Dead-end roads exceeding 660 feet in length are not permitted per fire code and Larimer County Urban Area Street Standards (LCUASS) standards.
- Without a second point of access provided, a residential fire sprinkler system is required on all dwelling units not specifically exempted
- Staff recommending as a **Condition of Approval** – until a second point of access is provided, any building permit for non-exempt lots will require residential fire sprinkler system.

Emergency Access

LOT MATRIX

	PRODUCT	SIZE	SQUARE FEET	QUANTITY	PERCENT
	SINGLE-FAMILY DETACHED	50' X 105' MIN	5,250 SF MIN	42	20.5%
	SINGLE -FAMILY DETACHED WITH REAR LOADED GARAGES	40' X 82' MIN	3,280 SF MIN	67	32.7%
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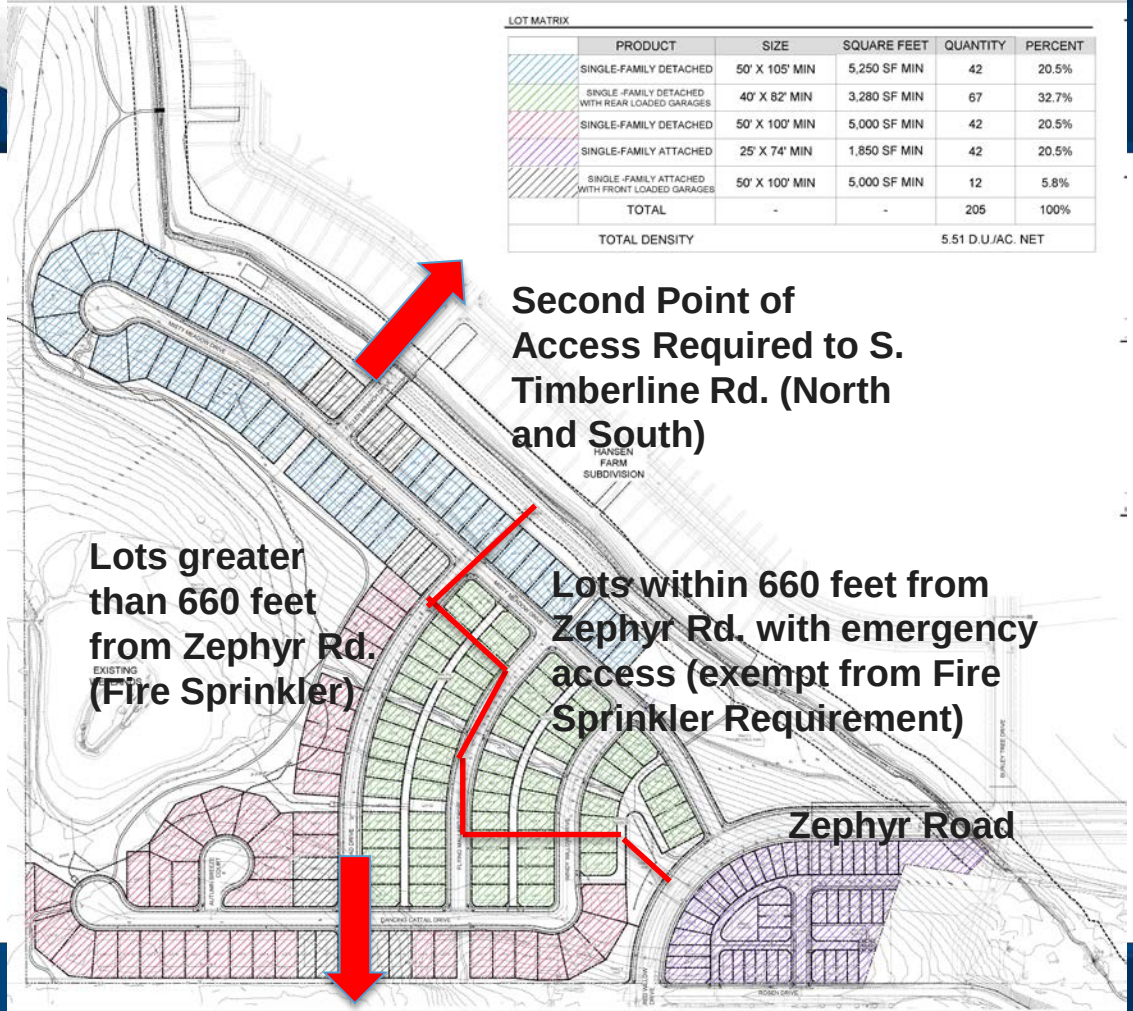

Rennat PDP – Conditions

Condition of Approval No. 2 - Emergency Access:

- Until such time a code compliant secondary point of access is provided via road connections through northern or southern properties, connecting the project to South Timberline Road
- Any building permit (except for lots within 660 feet of Zephyr Road and therefore specifically exempted)
- Will require the installation of a residential fire sprinkler system in any residence.

Stormwater Criteria Manual

- P.D.P meets all stormwater detention, water quality, and Low Impact Development (LID) requirements.
- Proposed LID includes rain garden and bio-swale.
- P.D.P. includes a sustainable wetland after development. All stormwater will feed the wetland.
- Letter of Intent from the City was granted for the drainage outfall through the golf course, west of site.
- Water/Sewer provided by Fort-Collins Loveland Water District and South Fort Collins Sanitation District.

Rennat PDP – Staff Findings

A. P.D.P. is consistent with *Fossil Creek Reservoir Area Plan*, and *City Plan*.

B. P.D.P. complies with the process located in Division 2.2 – of Article 2 – Administration.

C. P.D.P. complies with the applicable standards located in Division 4.5, Low Density Mixed-Use Neighborhood of Article Four – Districts, if the Modification of Standard to Section 4.5 (D) (2) (c) is approved.

D. Modification complies with process located in Division 2.2 – Common Development Review Procedures for Development Applications of Article 2 – Administration.

Rennat PDP – Staff Findings Cont.

D. Cont. - Modification of Standard to Section 4.5 (D) (2) (c) is justified by the applicable standards in 2.8.2(H) (1) (4).

E. P.D.P. complies with the applicable standards located in Division 4.23, Neighborhood Commercial of Article Four – Districts.

F. PD.P. complies with the applicable standards located in Article 3 - General Development Standards of Article Three, with two conditions of approval recommended by staff:

Rennat PDP – Staff Findings Cont.

Condition of Approval No. 1:

Natural Habitat Buffer Zone: The Rennat project will complete monthly monitoring of at least eight total and equally distributed monitoring plot locations of both vegetation transects and groundwater monitoring piezometers for a minimum of one (1) growing season pre-construction and minimum of two (2) years post-construction, or until the natural habitat buffer zone is accepted by the City Environmental Planner, for the project to demonstrate wetland protection and meet performance success criteria**.**

Condition of Approval No. 2:

Until such time a code compliant secondary point of access is provided to the Rennat Subdivision via road connections through northern or southern properties, connecting the project to South Timberline Road, any building permit (except for lots within 660 feet of Zephyr Road and therefore specifically exempted) will require the installation of a residential fire sprinkler system in any residence.

RECOMMENDATION:

A. Staff recommends approval of the Rennat #PDP190011, with conditions.

From: Martina Wilkinson
To: Pete Wray; Brandy Bethurem Harras
Cc: ccarabetta@yahoo.com
Subject: RE: Public Hearing regarding 6015 S. Timberline subdivision
Date: Tuesday, January 21, 2020 5:07:19 PM

Hi Catherine –

Thanks for your email regarding traffic concerns in the vicinity of Timberline and Zephyr Road.

The City is working on a capital project that will widen Timberline Road to 4-lanes (2 lanes in each direction and a center median/ left turn lane) from where it currently ends at Stetson Creek all the way to Trilby. Intersection improvements, including at Kechter, Zephyr (a signal) and Trilby are all a part of the project. The project is funded and design is underway.

Developments, as they come in, are either building their portion or providing funding to the City for their frontage along Timberline.

The expectation for timeline is that construction of the roadway and these future developments are happening somewhat concurrently.

I hope that helps to address your question.

Martina

Martina Wilkinson, P.E. PTOE
Traffic Engineer
City of Fort Collins Traffic Operations
mwilkinson@fcgov.com
970-221-6887

From: Pete Wray <PWRAY@fcgov.com>
Sent: Tuesday, January 21, 2020 3:16 PM
To: Brandy Bethurem Harras <BBethuremHarras@fcgov.com>; Martina Wilkinson <mwilkinson@fcgov.com>
Subject: FW: Public Hearing regarding 6015 S. Timberline subdivision

Martina, can you respond to Catherine below?

Thanks, Pete

From: Catherine Carabetta <ccarabetta@yahoo.com>
Sent: Tuesday, January 21, 2020 2:28 PM
To: NeighborhoodServices?CustomerService <NeighborhoodServices@fcgov.com>; Pete Wray <PWRAY@fcgov.com>

Subject: Public Hearing regarding 6015 S. Timberline subdivision

Dear Mr. Wray,

I received the notice of public hearing regarding the proposed development at 6015 S. Timberline. I live in Paragon Point, which is near the proposed neighborhood and would like to voice concern about additional traffic on Timberline. Does the city have a plan to expand Timberline? Traffic, especially during morning and evening commutes, is often very heavy. I cannot imagine Timberline after this development of 215 units is completed. If you could share a plan for traffic mitigation, I think it would be very useful to neighbors who are already concerned about congestion and road safety in this area.

I am unable to attend the hearing on January 30, so I hope that my concern can be addressed through email instead.

Thank you,
Catherine Carabetta
1418 Cactus Court
Ft. Collins 80525
312-339-3479