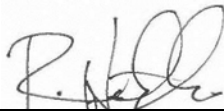
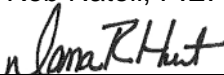


Prepared By:



Rob Natoli, P.E.

Reviewed By:



Dana Hunt, P.E.

CITY OF SUNNYVALE

MASTER PLAN AND PRIMARY TREATMENT DESIGN

TECHNICAL MEMORANDUM

**EXISTING UTILITIES:
MASTER PLAN**

FINAL
May 2014



CITY OF SUNNYVALE
MASTER PLAN AND PRIMARY TREATMENT DESIGN

TECHNICAL MEMORANDUM

**EXISTING UTILITIES:
MASTER PLAN**

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EXISTING UTILITIES PLAN: MASTER PLAN

1.0 INTRODUCTION

The City of Sunnyvale’s (City) overall goal for its Master Plan is to provide a 20-year plan for the renovation of the existing Water Pollution Control Plant (WPCP). The renovated WPCP will allow the City to meet all regulatory and permit requirements through best practices, sustainability, and cost-effectiveness, with a bias toward reducing overall lifecycle costs, and being good stewards of the land and public trust. The renovated facilities at the WPCP will be able to address expected and new challenges by being reliable, flexible, and adaptable. Because of the amount of renovation, an understanding of the existing utilities infrastructure is crucial to the future planning considerations.

2.0 PURPOSE

The purpose of the existing utilities plan is to consolidate site utility information at the City of Sunnyvale (City) water pollution control plant (WPCP) from existing record drawings, existing design drawings, potholing records and plant operations staff knowledge. It is anticipated that the City will provide these existing utility plans to design engineers and construction contractors of future projects. This technical memorandum summarizes the work that went into the creating of the utility plans and the intended use of the mapping.

3.0 BACKGROUND

The initial step for the preparation of the existing utilities plans included a review of the WPCP record and design drawings from past plant projects. The drawings ranged in age from 1955 to 2012 and over 60 sets of record or design drawings were reviewed in total. Based on a review of the drawings, 31 sets of drawings contained information that was used in identification and placement of site utilities. 13 of the 31 sets of drawings were used for utility elevation information. Table 1 outlines the 31 sets of drawings that were used.

Table 1 Existing Record and Design Drawings Summary Table Master Plan and Primary Treatment Design City of Sunnyvale			
Year	Project Number	Project Description	Datum Conversion to NAVD 1988 ¹
1955	STP-1955	Sewage Treatment Works	-2.05
1955	SS-17	Temporary Sewer Bypass for Disposal Plant	
1961	STP-1961	Sewage Treatment Plant Enlargement	-2.05

Table 1 Existing Record and Design Drawings Summary Table Master Plan and Primary Treatment Design City of Sunnyvale			
Year	Project Number	Project Description	Datum Conversion to NAVD 1988 ¹
1965	PR-65-1A	Sewage Treatment Works – Oxidation Pond Additions	
1969	PR-69-5	Sewage Treatment Works 1969 Enlargements and Modifications	-2.05
1973	PR-73-2	WPCP – Tertiary Facilities	-2.05
1973	PR-73-2b	WPCP – Tertiary Chlorination Facilities	-2.05
1979	PR-79-3	WPCP Primary Effluent Pipeline	-2.05
1980	PR-80-16	WPCP Addition of Dual Media Filter No. 4	-2.05
1982	PR-82-4	WPCP Capacity Expansion and Process Improvements – C1	-2.05
1982	PR-82-6	WPCP Capacity Expansion and Process Improvements – Primary Facilities – C2	-2.05
1982		Oxidation Pond Improvements (Design Markups) – C3	
1988	UY-88-2	WPCP Fire Line, Project 79646	
1993	UW-93-01	WPCP Water Recycling Program Interim Pump Station	
1993	PR-93-10	WPCP – Sludge Dewatering Improvements	
1995	PR-95-02	WPCP – Power Generation Facility	-2.47
1995	UW-95-02	Polymer Feed System Improvements	
1995	PR-95-02 (G)	WPCP – Power Generation Facility Improvements Digester Gas Flare	
1996	UW-96-01	Tertiary Plant Improvements	
1999	PR-98-10-99	WPCP Admin Bldg Improvements – Upgrade of Electrical system	
2002	UY-02-02-03	WPCP Chemical System Improvements	
2002	UY-00-02-01	WPCP Chlorination-Dechlorination Equipment replacement	
2002	UY-00-06-01	WPCP Air Floatation Tank Gate Actuators	
2003	UY-03-01-05	WPCP Digester Lid and Drain Line Rehabilitation Digester No. 3 Record Drawings	-2.47
2005	UY-00-05-01	WPCP Energy Recovery Facilities	

Table 1 Existing Record and Design Drawings Summary Table Master Plan and Primary Treatment Design City of Sunnyvale			
Year	Project Number	Project Description	Datum Conversion to NAVD 1988 ¹
2008	UY-05-04-06	Tertiary Plant Tank Drainage System Modifications	
2009	UY-08-01-09	Rehabilitation of WPCP Digester No. 4	-2.47
2009	UY-09/01-10	WPCP Sodium Bisulfite System	
2012	UY-10/02-10	Flare Station Equipment Replacement	
2012	UY-08-03-09	Emergency Bypass Pipeline Project 90%	-2.05 ²
2013	UT-11-01-12	Digester 1&2 Final Plans	0.00
Notes:			
(1) Drawing sets with a -2.05 shift are on the U.S Coast and Geodetic Survey Datum (1950 releveling). Drawing sets with a -2.47 shift are on the NGVD 1929 datum. Drawing sets without a datum shift were not used for elevation information.			
(2) The Emergency Bypass Pipeline Project 90% drawings note that existing utility invert elevations are based on 1975 Tertiary Facility Drawings. The 1975 Tertiary Facility Drawings are City Project number PR-73-2 and PR-73-2b in Table 1.			

The datum shifts listed in Table 1 were developed based on comparisons of concrete structure elevations in the record and/or design drawing sets and the July 2013 aerial survey of the WPCP performed for the Master Plan. The existing utility plans being completed under this effort and July 2013 aerial survey are on NAVD 1988 datum. The datum conversions used do not match the standard/expected datum conversions between the noted datums. This is likely due to the settlement of the site and concrete structures since design and record drawings were completed. To convert to NAVD 1988 (current datum), take the elevation from record/design drawing and add the datum adjustment specified in Table 1 (i.e. NGVD 1929 + (-2.47) = NAVD 1988). All elevations have had 100-feet added to them to prevent negative elevations. This additional 100 feet is typical in the referenced record and design drawings.

Following development of initial existing utility plans based on existing record and design drawings, a site visit was conducted to observe differences between the existing conditions and the utility plans. Field observations were recorded and the utilities plans were updated based on site observations. Additionally, potholing information from the 2012 Emergency Bypass Pipeline Project and the ongoing Hypochlorite Conversion Project are shown on the utility plans.

4.0 USE OF UTILITY PLANS

The utility plans were created for use by plant staff, design engineers and construction contractors of future projects. The mapping summarizes the record and design information from past projects, field observations, potholing information and operator input (Note: WPCP staff input not included in 12-16-13 DRAFT submittal). However, the utility mapping should not be considered record information.

A circle inscribed with a triangle indicates an executed pothole location. These locations show verified utility information in the associated callout. Information in the aerial survey and supplemental ground survey can also be considered verified utility information. The supplemental ground survey included dipping manholes and determining invert elevations of associated utilities. All other utility information has not been verified.

Discrepancies between the utility plans and existing conditions could arise from inaccuracies on the referenced record and design drawings, datum shift issues, WPCP work that was not recorded and many other sources. Users of the utility plans should reference record drawings and perform additional potholing for critical underground utilities. The existing utility plans should be updated as additional information is gathered or additional projects are performed.

The first sheet of the utility plans includes a color legend, an abbreviation list, and additional user notes.

4.1 AutoCAD User Information

Table 2 provides a summary of AutoCAD files included on the enclosed CD.

Table 2 AutoCAD Files Summary Master Plan and Primary Treatment Design City of Sunnyvale	
File Name	Description
00C-BP01-EX02.dwg	Aerial Topographic Survey
207682_bdr.dwg	11 x 17 Figure Border
X-PIPE-LABEL-20SCALE.dwg	Utility Pipe Labeling
213932-00C-YP01-01.dwg	Yard Piping Utilities
213932-00C-EL01-01.dwg	Site Electrical Utilities
213932-00C-001.dwg	Utility Plan 1 ¹
213932-00C-002.dwg	Utility Plan 2 ¹
213932-00C-003.dwg	Utility Plan 3 ¹
213932-00C-004.dwg	Utility Plan 4 ¹
213932-00C-005.dwg	Utility Plan 5 ¹

Table 2 AutoCAD Files Summary Master Plan and Primary Treatment Design City of Sunnyvale	
File Name	Description
213932-00C-006.dwg	Utility Plan 6 ¹
Notes: (1) Utility Plans 1 – 6 AutoCAD files are included in several series. Series 000 (ending in 001 – 006) displays all existing utilities, series 100 (end in 101 – 106) displays process and sludge utilities, series 200 displays potable water utilities, series 300 displays non-potable/recycled water utilities, series 400 displays gas utilities, series 500 displays air and chemical utilities, and series 600 displays electrical utilities. Hardcopy PDFs of 000 series plans are included in Attachment 1. PDFs of all series are included on the enclosed CD.	

Table 3 provides a list of .jpg files that are embedded as external references in AutoCAD files. The sheet naming convention for the embedded .jpg files is the City Project Number_Sheet Number.jpg (i.e. the file name PR-69-5_G5.jpg is from City project number PR-69-5, sheet number is G5). The aerial topography survey and yard piping utilities files contains reference information for scaling and insertion of the .jpg files.

Table 3 Embedded .jpg Files Master Plan and Primary Treatment Design City of Sunnyvale	
File Name	Drawing Description
PR-69-5_G5	1969 Outside Piping
PR-73-2_G14.jpg	1975 Outside Piping Plan
PR-73-2_G15.jpg	1975 Outside Piping – Tertiary Facility Area
PR-73-2_M701.jpg	1975 Fixed Growth Reactors General Plan
PR-73-2_M752.jpg	1975 Air Flotation Tanks Outside Piping Plan
PR-80-16_G4.jpg	1980 Grading Plan, Cross Sections and Major Piping Plan
PR-82-4_M-2.jpg	1982 Air Floation Tank No. 4 – Outside Piping Plan and Details
PR-82-6_G5.jpg	1982 General Outside Piping
PR-82-6_M302.jpg	1982 Digester Plan
PR-95-02_C-2.jpg	2002 Civil Site Plan
UY-03-01_C-1.jpg	2005 Civil Site Plan and Yard Piping
UY-08-01-09_C-1.jpg	2009 Site Plan, Yard Piping and Sections
UY-08-01-09_M-1.jpg	2009 Digester No. 4 Bottom Plan
UY-08-03-09_C-1.jpg	2012 Emergency Bypass Pipeline Plan

4.2 Potholing Plan

There is a \$25,000 budget allowance for potholing for the overall master plan project. This equates to approximately 30 potholes (Note: 30 potholes does not equate to 30 utilities as it may take several potholes to find one utility).

The \$25,000 potholing allowance is the only potholing funds allocated to this project. Therefore, based on conversation with the City staff, it was agreed that the potholing budget would be utilized to locate connection points for the new headworks project and primary sedimentation tank (PST) project rather than for this work. The designers of the headworks and PST project station should take the lead in coordinating the potholing work needed for their designs.

APPENDIX A – UTILITY PLANS (1" = 20' SCALE)

NOTES:

- LOCATION OF UTILITIES ARE APPROXIMATE (EXCLUDING POTHOLES AND SURVEY INFORMATION) AND BASED ON:
 - RECORD AND DESIGN DRAWINGS OF VARYING ACCURACY.
 - SITE INVESTIGATIONS ON 10-31-2013 AND 02-04-2014.
 - AERIAL SURVEY PERFORMED JULY 2013.
 - SUPPLEMENTAL GROUND SURVEY PERFORMED SEPTEMBER 2013.

2. HORIZONTAL DATUM: CALIFORNIA COORDINATES SYSTEM ZONE 3, NORTH AMERICAN DATUM OF 1983.

3. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 1988) PLUS 100 FEET TO AVOID NEGATIVE ELEVATIONS. ALL ELEVATIONS SHOWN ON THESE DRAWINGS ARE APPROXIMATE UNLESS OTHERWISE NOTED.

4. UTILITY COLOR LEGEND:

UTILITY TYPE	COLOR
ELECTRICAL/COMMUNICATIONS	ORANGE
ALL PROCESS PIPING THROUGH TERTIARY, SLUDGE/SECONDARY/SEWER	BROWN
RAW SLUDGE/GRIT	BLACK
GAS	RED
POLYMER/CHEMICAL	DARK GREEN
#1W, #2W, PW, FIREWATER	BLUE
#3 WATER, BACKWASH WATER, RECLAIMED WATER	PURPLE
AIR	GREEN

5. ABBREVIATIONS:

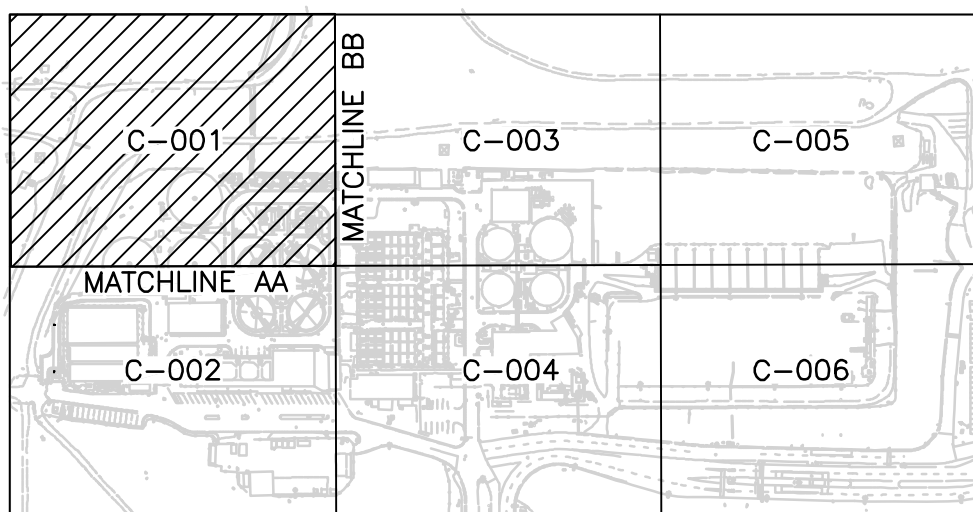
1W	NO 1 WATER	IE	INVERT ELEVATION
2W	NO 2 WATER	LFG	LIQUID FLARE GAS
3W	NO 3 WATER	MH	MANHOLE
3WHP	NO 3 WATER HIGH PRESSURE	MG	MIXED GAS
3WLP	NO 3 WATER LOW PRESSURE	NG	NATURAL GAS
AL	ALUMINUM SULPHATE (ALUM)	OF	OVERFLOW, OUTFALL
ALF	ALGAE FLOAT	PD	PUMPED DRAIN
AP	APPLIED WATER (FILTER INFLUENT PIPES)	PE	PRIMARY EFFLUENT
ASPH	ASPHALT	PI	PRIMARY INFLUENT
BA	BACKWASH AIR	PSO	POLYMER SOLUTION
BD	BOTTOM DRAIN	PW	POTABLE WATER
BW	BACKWASH WATER	RCP	REINFORCED CONCRETE PIPE
CD	CONDENSATE DRAIN, CHEMICAL DRAIN	RS	RAW SLUDGE
CL	CHLORINE GAS, CENTER LINE	RW	RECLAIMED WATER
CLV	CHLORINE GAS UNDER VACUUM	S	SCREENINGS
CMP	CORRUGATED METAL PIPE	SA	SERVICE AIR
CS	CIRCULATED SLUDGE	SD	SANITARY DRAIN
CSO	CAUSTIC SODA	SE	SECONDARY EFFLUENT
D	DRAIN	SFM	SEWER FORCEMAIN
DG	DIGESTER GAS	SH	SODIUM HYPOCHLORITE
DI	DRAIN INLET, DUCTILE IRON	SN	SUPERNATANT
DS	DIGESTER SLUDGE	SOV	SULFUR DIOXIDE VACUUM
ED	EQUIPMENT DRAIN	SS	SANITARY SEWER
EL	ELEVATION	STD	STORM DRAIN
FBP	FILTER BYPASS	TD	TANK DRAIN
FE	FINAL EFFLUENT	VCP	VITRIFIED CLAY PIPE
FGRE	FIXED GROWTH REACTOR EFFLUENT	WAS	WASTE ACTIVATED SLUDGE
FM	FORCEMAIN	3W	RECLAIMED WATER
FW	FIRE WATER, FILTERED WATER	WP	WATER POTABLE
HSO	SULFURIC ACID	WW	WASTE WATER

6. SYMBOLS LEGEND

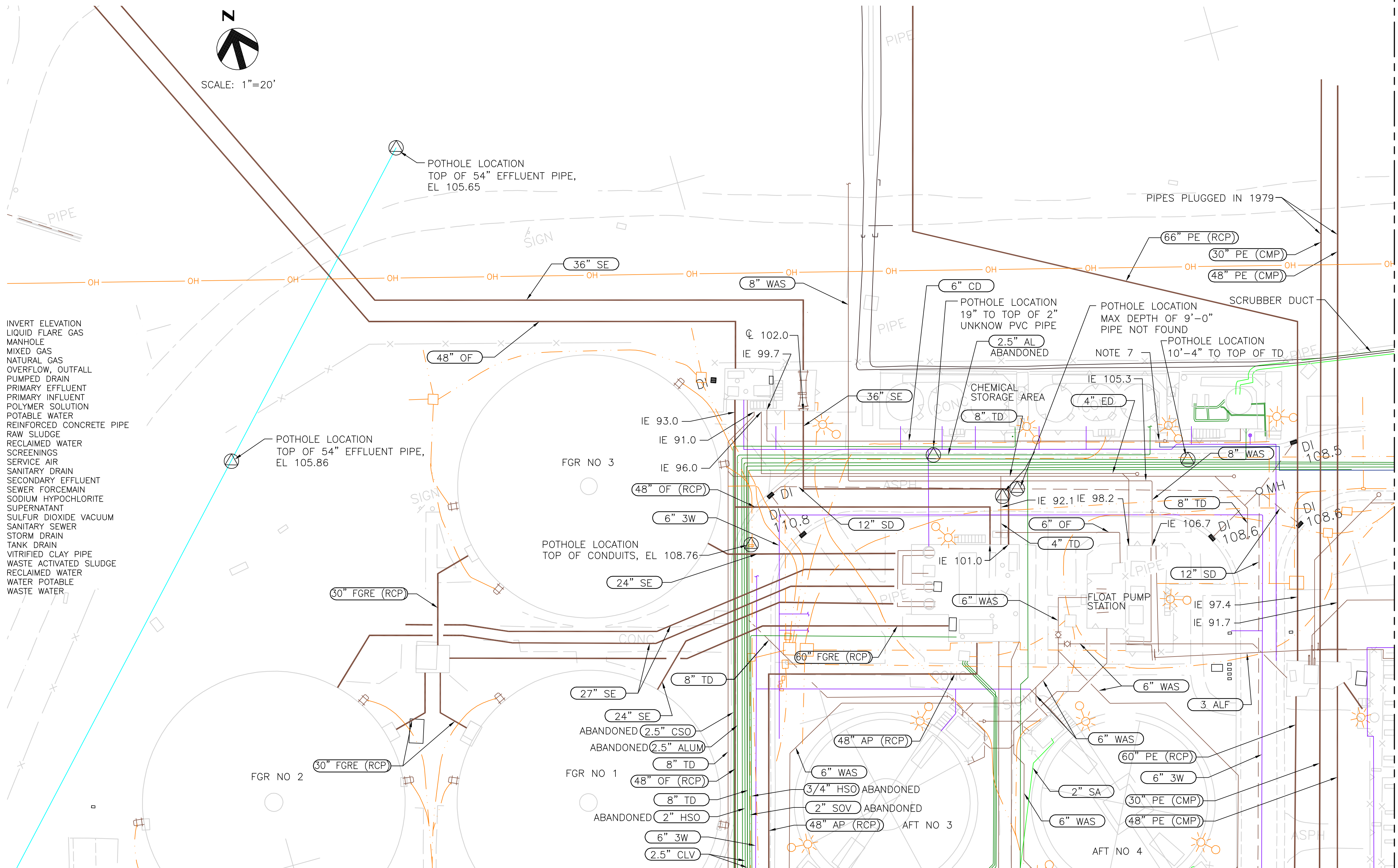
- POTHOLE LOCATION
- DRAINAGE INLET/CATCH BASIN
- LIGHT
- MANHOLE
- VAULTS OR PULLBOXES

7. EYEWASH SHOWER SUPPLY LOCATION UNKNOWN, PIPING FROM SEDIMENTATION TANKS ISOLATED AND EYEWASH STILL FUNCTIONS.

8. CONDUIT FOR INTERCOMM PROJECT, PHONE LINE RUNS AND NETWORK PATHS, ROUTING FOR THESE LINES IS UNKNOWN.



KEY PLAN



MATCHLINE AA - FOR CONTINUATION SEE C-002

MATCHLINE BB - FOR CONTINUATION SEE C-003



ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

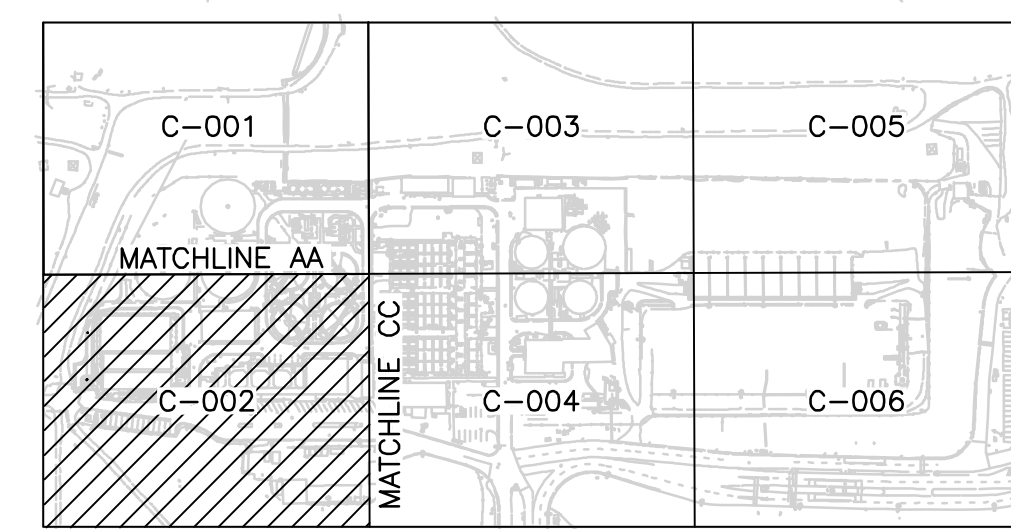
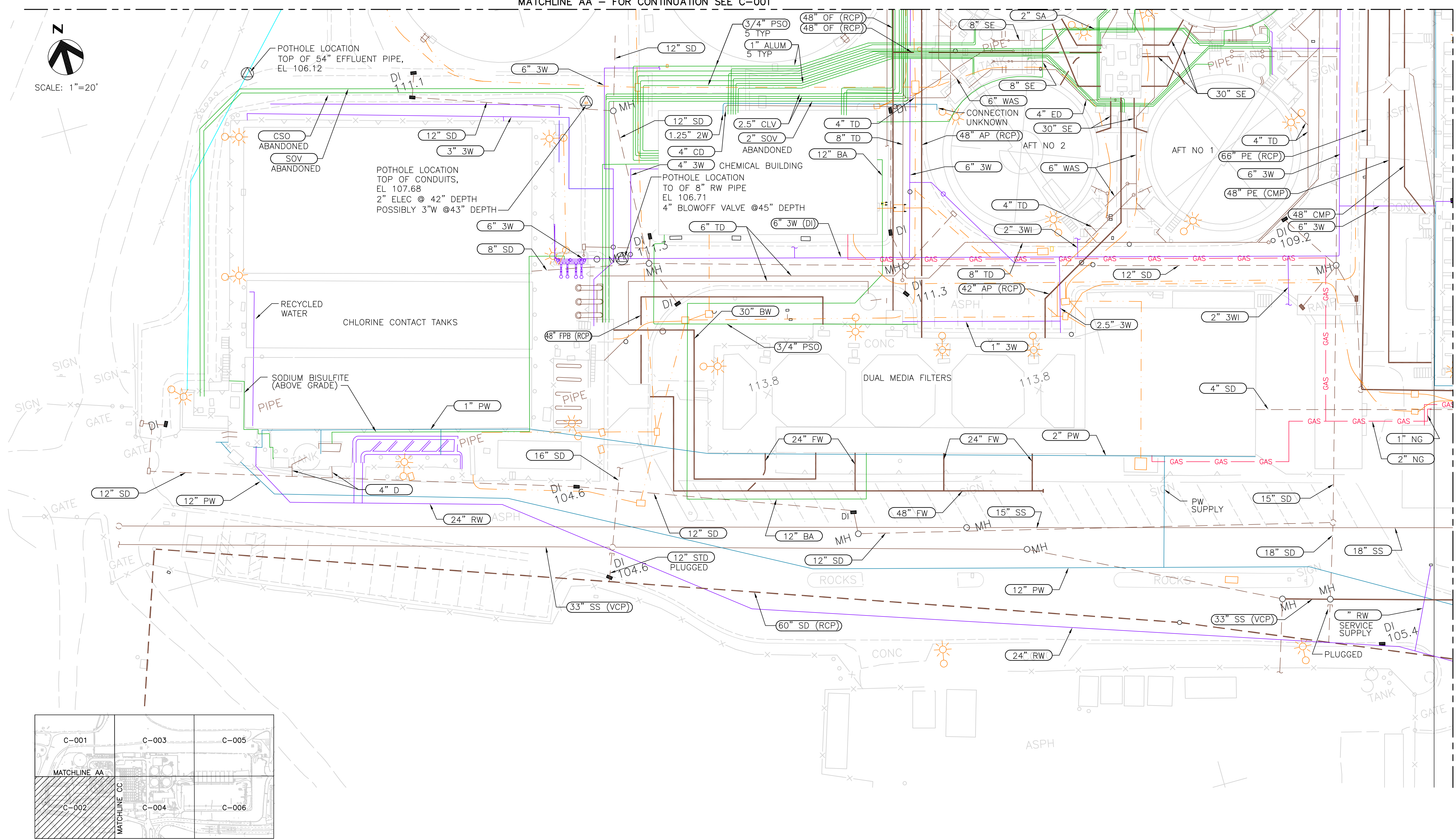
EXISTING UTILITY PLANS ARE **NOT** RECORD DRAWINGS. THESE PLANS WERE DEVELOPED BASED ON WPCP RECORD DRAWINGS, DESIGN DRAWINGS, FIELD VISITS AND WPCP STAFF INPUT. EXISTING UTILITY PLANS DO NOT SUBSTITUTE FOR FIELD VERIFICATION OF UTILITY LOCATIONS.



CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
WPCP MASTER PLAN

UTILITY PLAN 1	
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MATCHLINE AA - FOR CONTINUATION SEE C-001




KEY PLAN



ISSUE	DATE	DESCRIPTION


PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

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CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
WPCP MASTER PLAN

UTILITY PLAN 2



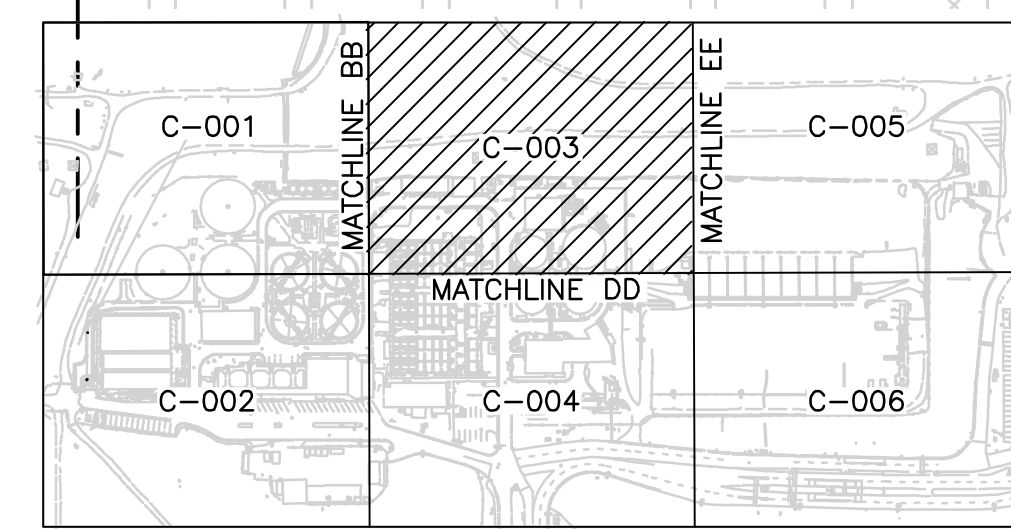
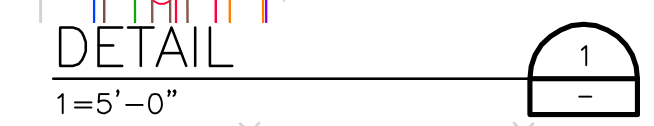
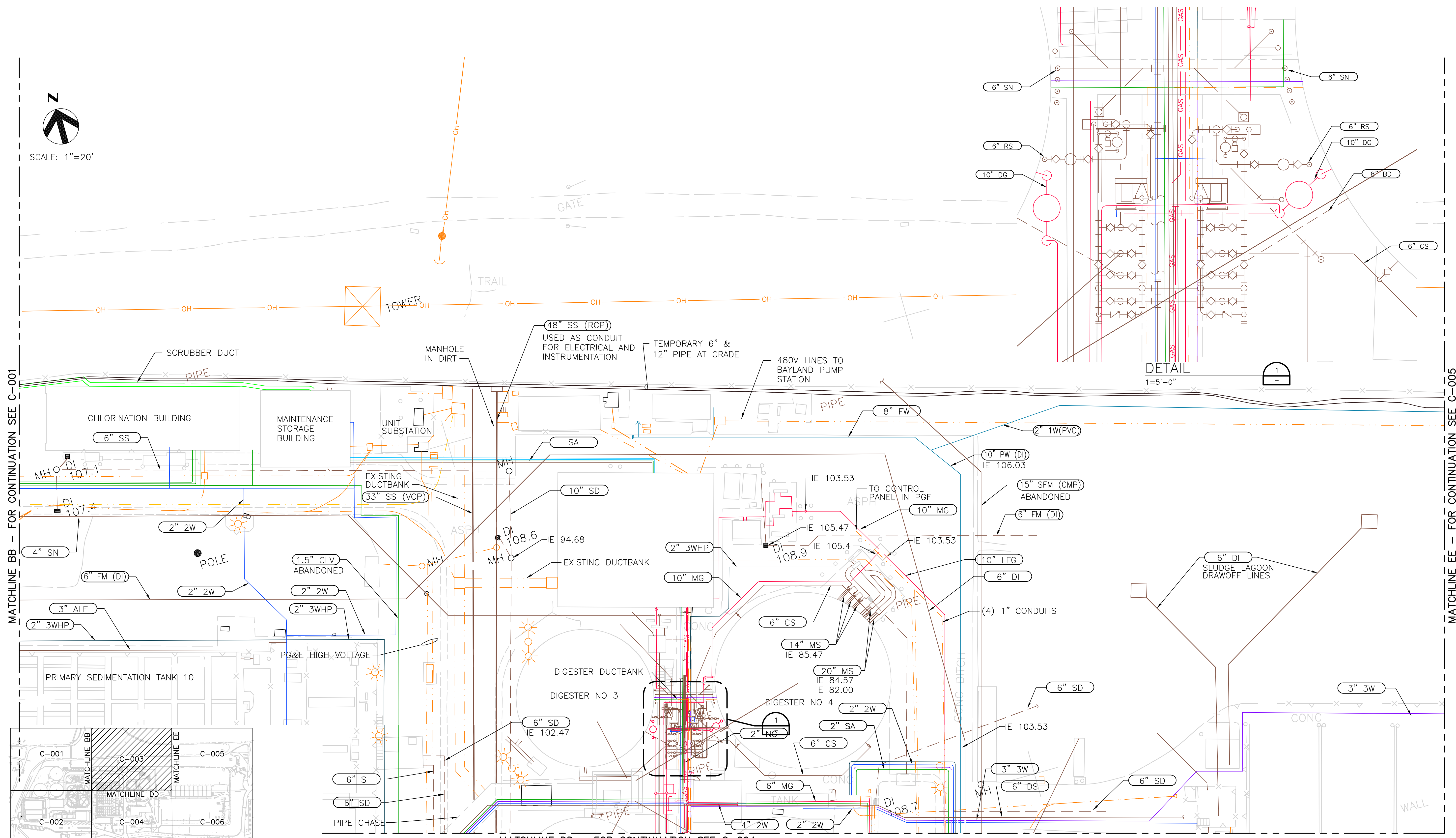
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SCALE	1" = 20'		



SCALE: 1"=20'

MATCHLINE BB - FOR CONTINUATION SEE C-001

MATCHLINE EE - FOR CONTINUATION SEE C-005



KEY PLAN

MATCHLINE DD - FOR CONTINUATION SEE C-004



ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

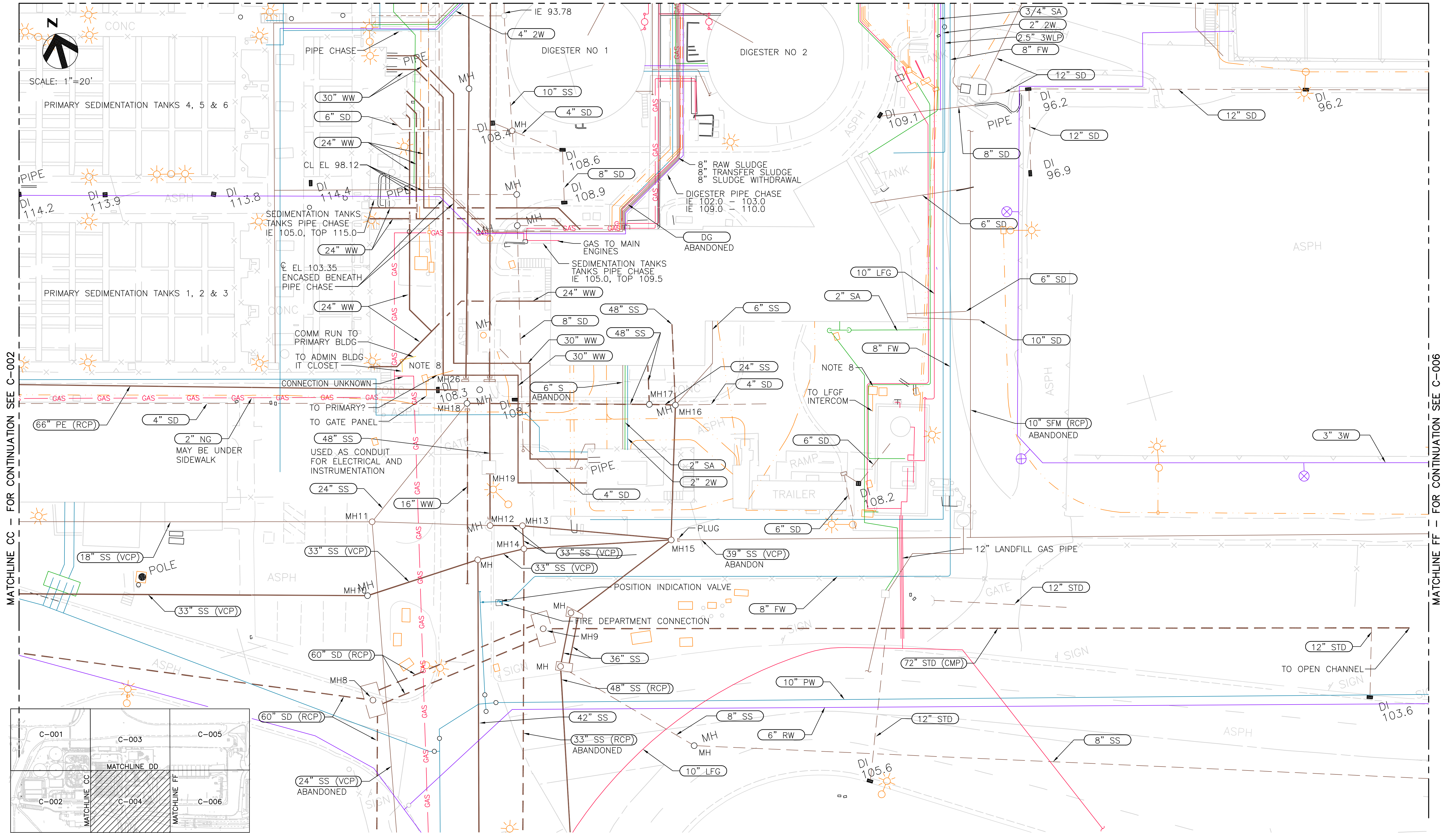
EXISTING UTILITY PLANS ARE **NOT** RECORD DRAWINGS. THESE PLANS WERE DEVELOPED BASED ON WPCP RECORD DRAWINGS, DESIGN DRAWINGS, FIELD VISITS AND WPCP STAFF INPUT. EXISTING UTILITY PLANS DO NOT SUBSTITUTE FOR FIELD VERIFICATION OF UTILITY LOCATIONS.



CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
WPCP MASTER PLAN

UTILITY PLAN 3		FILENAME	213932-00C-003.dwg	SHEET	C-003
		SCALE	1" = 20'		

MATCHLINE DD - FOR CONTINUATION SEE C-003



SCALE: 1" = 20'

MATCHLINE CC - FOR CONTINUATION SEE C-002

MATCHLINE FF - FOR CONTINUATION SEE C-006

KEY PLAN



ISSUE	DATE	DESCRIPTION

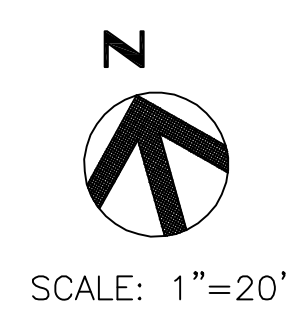
PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

EXISTING UTILITY PLANS ARE **NOT** RECORD DRAWINGS. THESE PLANS WERE DEVELOPED BASED ON WPCP RECORD DRAWINGS, DESIGN DRAWINGS, FIELD VISITS AND WPCP STAFF INPUT. EXISTING UTILITY PLANS DO NOT SUBSTITUTE FOR FIELD VERIFICATION OF UTILITY LOCATIONS.

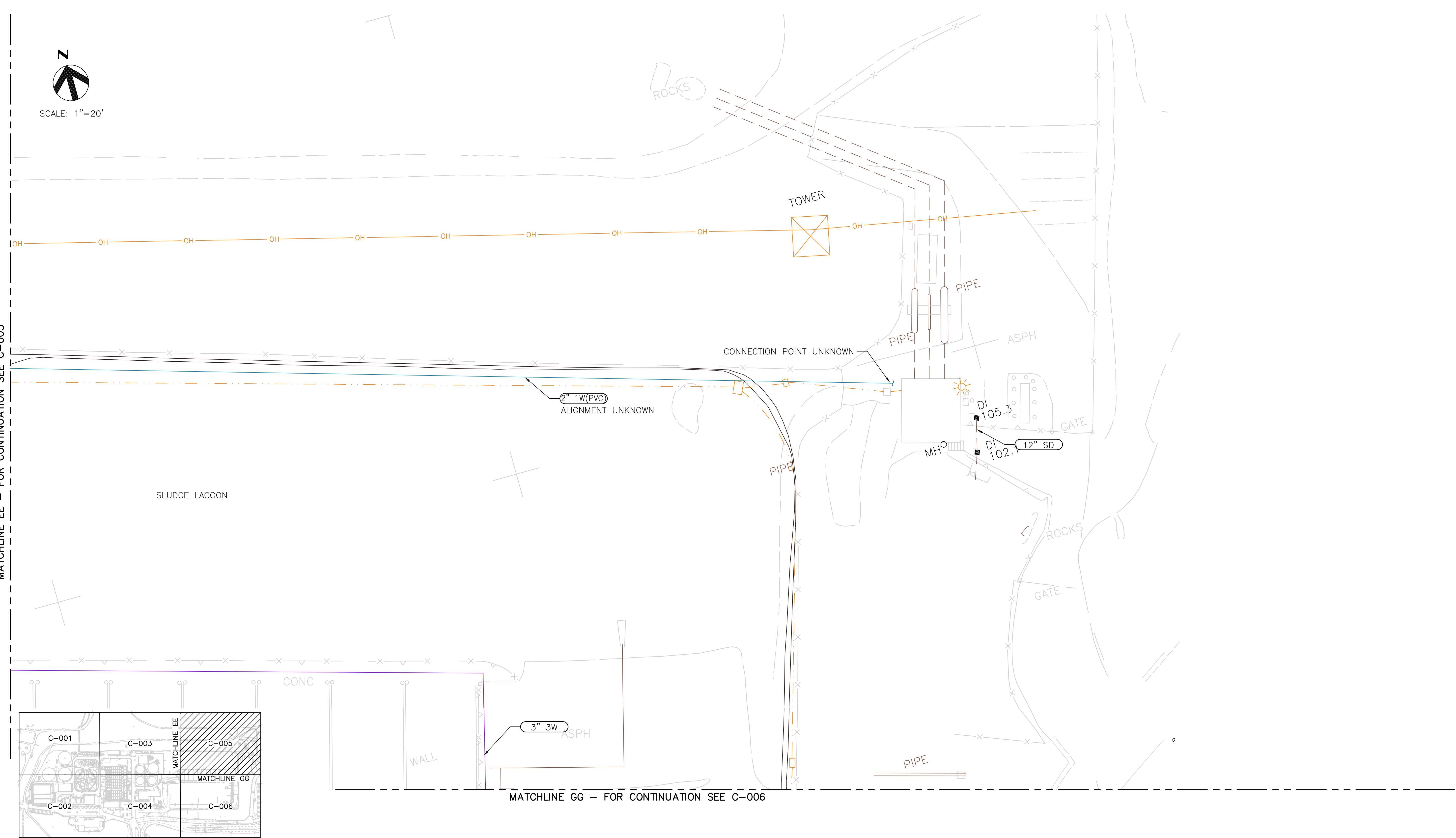


CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
 WPCP MASTER PLAN

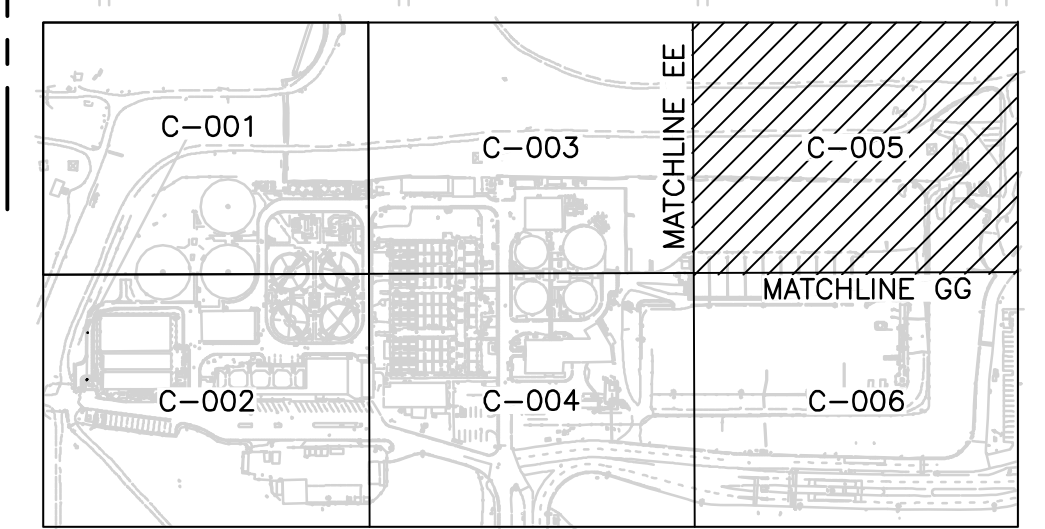
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UTILITY PLAN 4		



MATCHLINE EE - FOR CONTINUATION SEE C-003



MATCHLINE GG - FOR CONTINUATION SEE C-006



KEY PLAN



ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

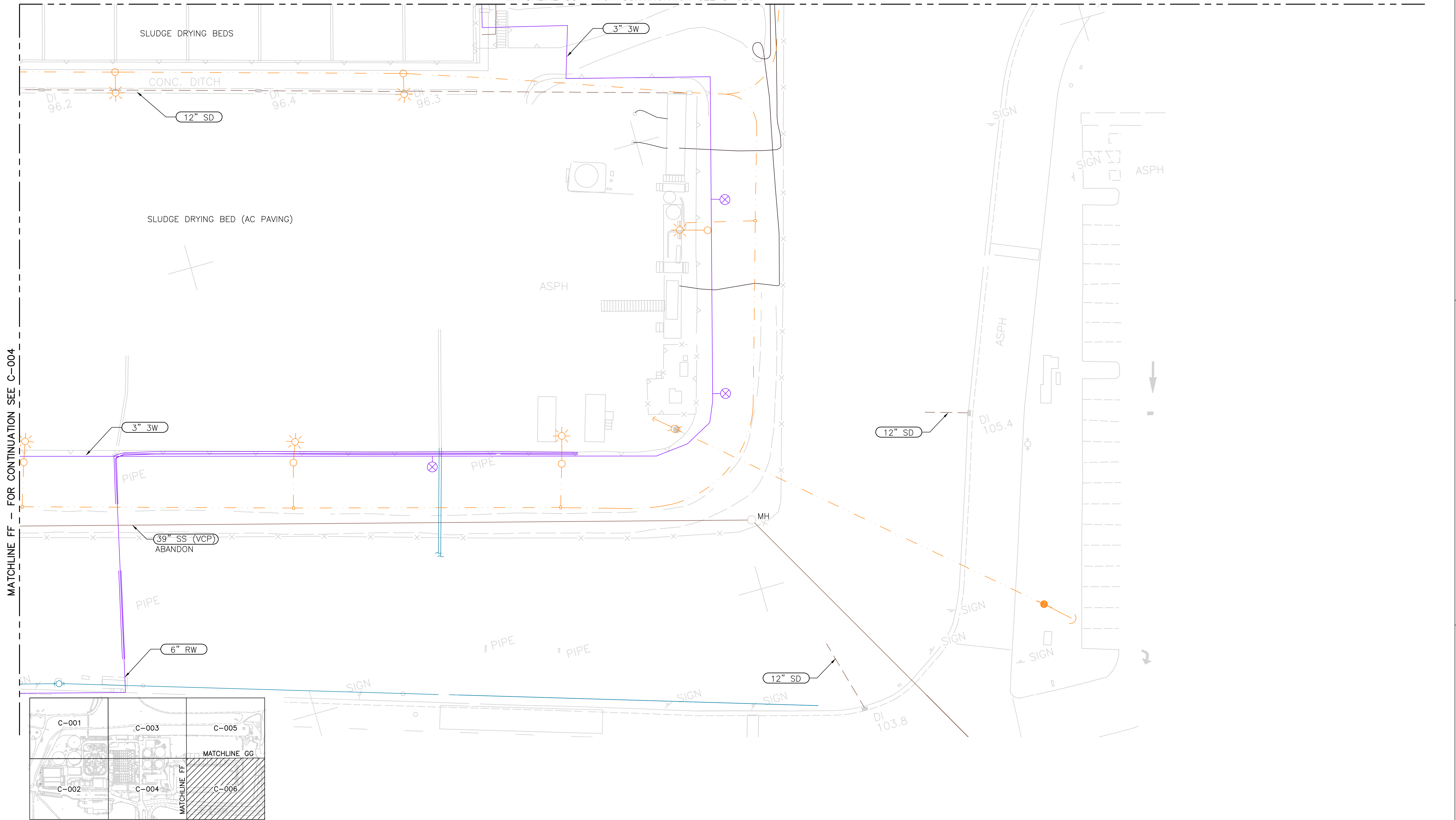
EXISTING UTILITY PLANS ARE **NOT** RECORD DRAWINGS. THESE PLANS WERE DEVELOPED BASED ON WPCP RECORD DRAWINGS, DESIGN DRAWINGS, FIELD VISITS AND WPCP STAFF INPUT. EXISTING UTILITY PLANS DO NOT SUBSTITUTE FOR FIELD VERIFICATION OF UTILITY LOCATIONS.



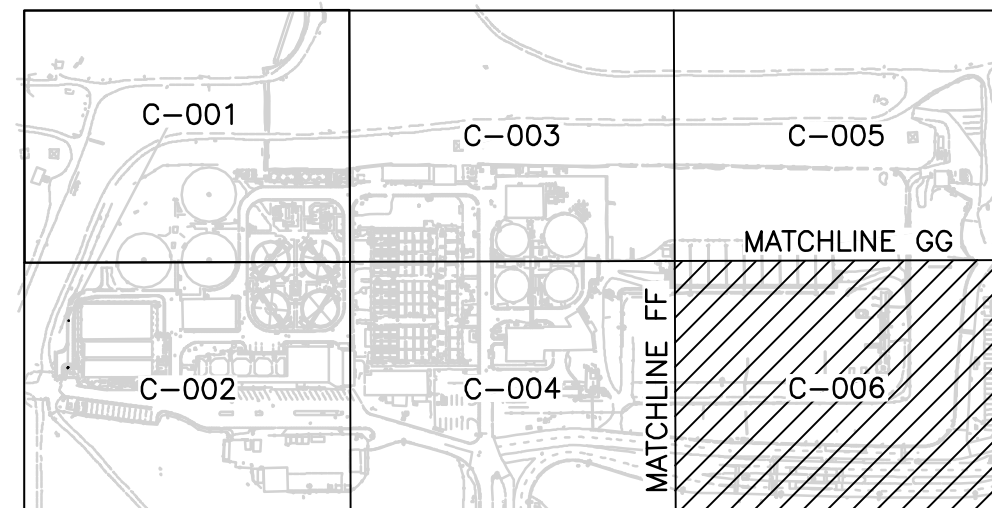
CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
WPCP MASTER PLAN

UTILITY PLAN 5	
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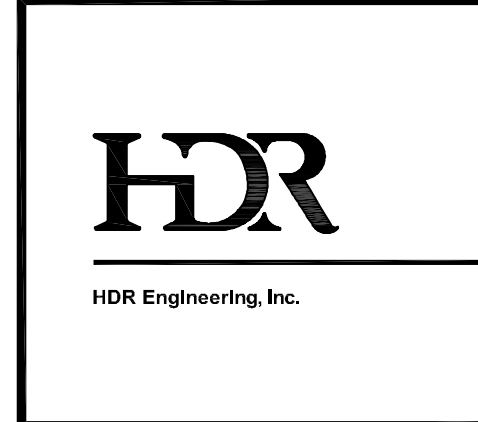
MATCHLINE GG - FOR CONTINUATION SEE C-005



MATCHLINE FF - FOR CONTINUATION SEE C-004



KEY PLAN



ISSUE	DATE	DESCRIPTION

PROJECT MANAGER	D. HUNT, P.E.
DESIGNED	
DESIGNED	
CHECKED	R. NATOLI
DRAWN	R. SNIDER
PROJECT NUMBER	213932

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CITY OF SUNNYVALE
WATER POLLUTION CONTROL PLANT
WPCP MASTER PLAN

UTILITY PLAN 6	
	FILENAME 213932-00C-006.dwg SCALE 1" = 20' SHEET C-006

**APPENDIX B – CD OF PDFS, AUTOCAD .DWG, AND .JPG
FILES**

