Technical Memorandum - Final

Subject:	**Tuscany Meadows Off-site Sewerage Impacts Evaluation**
Prepared For:	Patricia Chapman, DDSD
Prepared by:	Chris van Lienden, RMC
Reviewed by:	Gisa Ju, RMC
Date:	January 30, 2013
Reference:	0013-027.03

1 Background

RMC was asked to analyze the impacts of proposed land use changes at the proposed Tuscany Meadows and Black Diamond Ranch developments on sewerage conveyance through the Delta Diablo Sanitation District (DDSD) conveyance system. As part of DDSD's 2010 Conveyance System Master Plan Update, the current and future capacity of the conveyance system was evaluated using a hydraulic model developed using the Infoworks CS™ software. Model construction and development of model loads is described in the Master Plan Update report. As described in that report, model loads from the site of the proposed Tuscany Meadows and Black Diamond Ranch developments were estimated based on general plans and other information provided at the time by the Cities of Pittsburg and Antioch.

As part of the current evaluation, the model was used to evaluate the impacts of proposed land use changes at Tuscany Meadows and Black Diamond Ranch developments under future "buildout" conditions. The purpose of this memorandum is to evaluate the capacity of the Pittsburg-Antioch Interceptor to handle the projected wastewater flows with the proposed land use.

2 Hydraulic Model Modifications

The capacity evaluation presented in this memorandum was conducted using an existing hydraulic model of DDSD's conveyance system. The proposed developments are located in the "Pittsburg Antioch 4" drainage basin (Basin 3-3), which in the Master Plan Update model was loaded to DDSD manhole PA39I00 near the upstream end of the Pittsburg-Antioch Interceptor.

The proposed development would modify model loads and loading point for a portion of the Pittsburg-Antioch 4 basin. Land use and piping used to develop model loads and load points for the developments were provided by DDSD and are included in Appendix A. Projected average base wastewater flow (ABWF) for the proposed land use was estimated based on the number of proposed dwelling units in the developments and square feet of commercial area, and loading factors presented in the Master Plan Update. Model loads for the proposed developments are summarized and compared to original model estimates in Table 2-1 and Table 2-2 for Tuscany Meadows and Black Diamond Ranch, respectively. Note that flow from Black Diamond Ranch is anticipated to decrease slightly from original model estimates. No change in rainfall dependent infiltration & inflow (RDI/I) from the previous model was assumed. The locations of the developments and the loading manholes with respect to DDSD's conveyance system are indicated in Figure 1.

Table 2-1: Original & Proposed Flow Projections from Tuscany Meadows

Model Load Point		Proposed Land Use		Original Model Loads
		# Units	ABWF[a] (gpd)	ABWF[a] (gpd)
PA39I00	Residential	-	-	98,340
	Non-Residential	-	-	100,000
PA36I00	Single Family Residential	729 Dwelling Units	220,420	-
	Multi-Family Residential	365 Dwelling Units[b]		
	Non-Residential	-	-	-
PA40I00	Single Family Residential	356 Dwelling Units	78,320	-
	Non-Residential	-	-	-
	Total		**298,740**	**198,340**

Footnotes:

a. Per Master Plan Update, ABWF is estimated to be 220 gpd per single family dwelling unit, 170 gpd per multi-family dwelling unit, and 0.1 gpd per square foot of non-residential floor space.

b. 1,085 single family dwelling units less 356 units west of Tuscany Meadows Drive routing to manhole PA40I00.

Table 2-2: Original & Proposed Flow Projections from Black Diamond Ranch

Model Load Point		Proposed Land Use		Original Model Loads
		# Units	ABWF[a] (gpd)	ABWF (gpd)
PA39I00	Residential	-	-	81,620[b]
	Non-Residential	-	-	10,000
PA36I00	Single Family Residential	346 Dwelling Units	76,120	-
	Non-Residential	10,000 sf	1,000	-
	Total		**77,120**	**91,620**

Footnotes:

a. Per Master Plan Update, ABWF is estimated to be 220 gpd per single family dwelling unit, 170 gpd per multi-family dwelling unit, and 0.1 gpd per square foot of non-residential floor space.

b. 371 Future EDUs modeled based on general plan designations for undeveloped parcels.

3 Model Results

The flow projections summarized in Table 2-1 and Table 2-2, along with the diurnal curves and RDI/I parameters described in the Master Plan Update report, were used to simulate new wastewater flowrates from the Tuscany Meadows and Black Diamond Ranch developments. Table 3-1 summarizes the resulting new peak wastewater flowrates. As indicated in the table, the proposed developments result in an increase in PWWF of about 0.13 mgd.

Table 3-1: Total Modeled Wastewater Flowrates

	Original Model (mgd) PA39I00	Proposed Land Use (mgd)		
		PA 36I00	PA40I00	Total
ABWF	0.29	0.30	0.08	**0.38**
Peak Dry Weather Flow (PDWF)	0.49	0.48	0.12	**0.60**
Peak Wet Weather Flow (PWWF)	0.57	0.56	0.14	**0.70**

The original capacity analysis indicated no improvements were needed along the Pittsburg-Antioch Interceptor. Some surcharge at the lower end of the interceptor was noted in the model due to backup from the wastewater treatment plant (WWTP) influent sewer. Since that analysis was performed, model elevations for the sewers at the downstream end of the Pittsburg-Antioch Interceptor have been adjusted to match new data provided by DDSD, resulting in lowered rim elevations. As a result of the new pipe data, the model now predicts an overflow at the downstream end of the Pittsburg-Antioch Interceptor under buildout flow conditions due to the backup from the WWTP influent sewer. However, the model does not predict any capacity deficiencies in the Pittsburg-Antioch Interceptor itself. DDSD has reported that solution recommendations for the projected future deficiency in the WWTP influent sewer will be developed as part of the WWTP Headworks Improvements Project predesign, currently scheduled to be performed in 2013.

As a result of the change in land use at Tuscany Meadows and Black Diamond Ranch, no new capacity deficiencies were identified, either under peak dry weather or peak wet weather conditions. The model-predicted backup surcharge and resulting overflow at the downstream end of the Pittsburg Antioch Interceptor would not be significantly affected by the increase in flows from the two developments.

Hydraulic profiles for upper and lower portions of the Pittsburg-Antioch interceptor to to the WWTP under original and proposed modeled buildout scenarios are shown in **Attachment 2.**

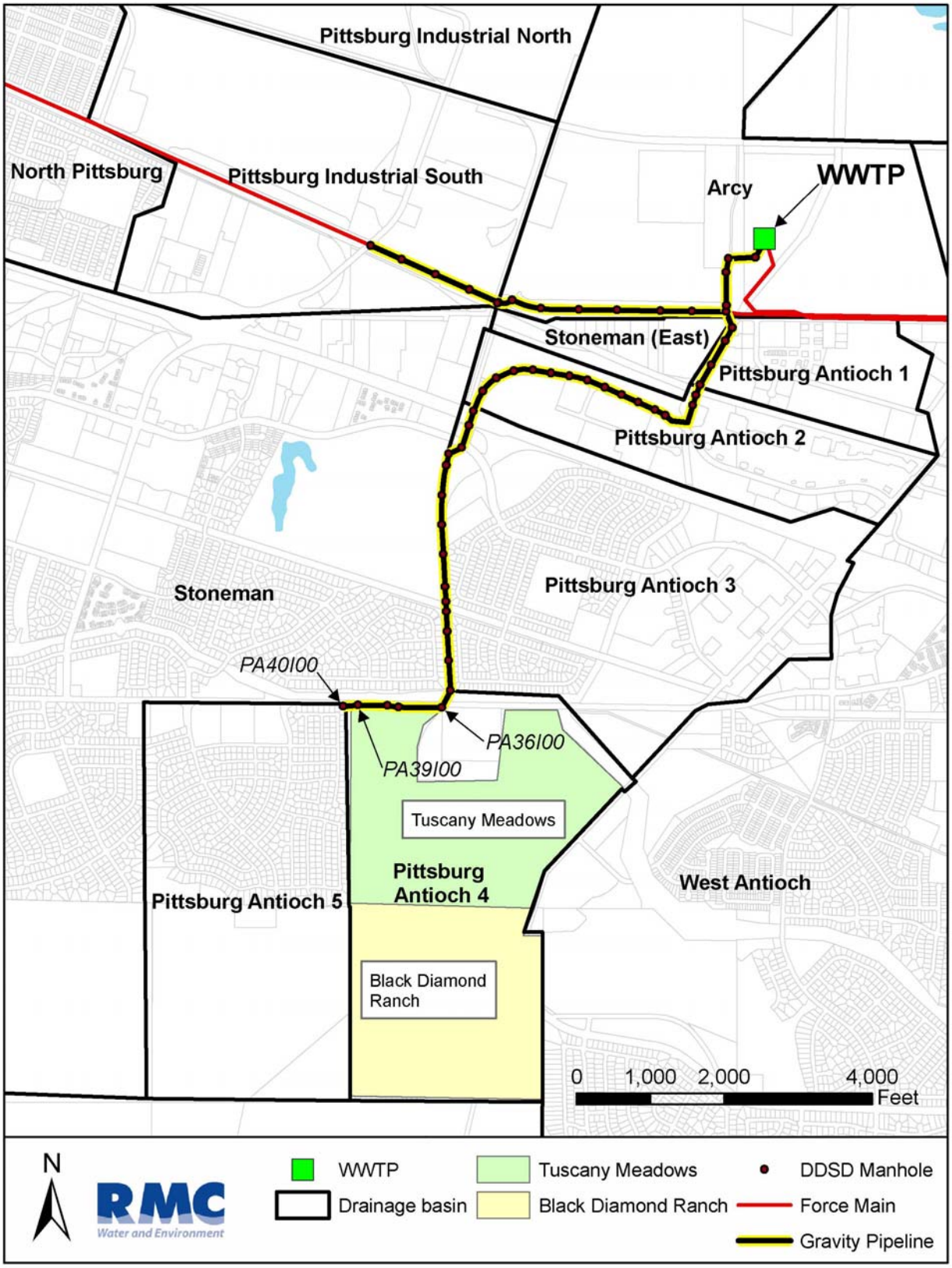
4 Conclusions

The proposed change in land use in Tuscany Meadows and Black Diamond Ranch is not anticipated to result in any new capacity deficiencies at buildout or significantly worsen the backup surcharge condition at the downstream end of the Pittsburg-Antioch Interceptor. As the predicted overflow is a result of the updated pipe data incorporated after the Master Plan Update was finalized, no solution recommendations were included in the Master Plan Update report. As noted in Section 3, solution recommendations for the projected future capacity deficiencies in the WWTP influent sewer will be developed as part of the WWTP Headworks Improvements Project predesign in 2013. However, it is not anticipated that the proposed land use changes would significantly impact any potential projects that might be required to address this issue.

5 References

DDSD, 2010, “Conveyance System Master Plan Update”

Figure 1 – Bay Point Buildout Conditions Design Storm Model Results



Attachment 1
Land Use and Loading Projections

LAND USE INFORMATION FOR DDSD HYDRAULIC ANALYSIS
OF PITTSBURG-ANTIOCH INTERCEPTOR
DECEMBER 2012

Land use planning information for use in the 2012 Pittsburg-Antioch Interceptor hydraulic model analysis is provided in Table 1, below.

Table 1: Land Use Information Update for DDSD Basin 3-3 Sewer Flow Projection Hydraulic Analysis

Subarea of DDSD Basin 3-3	Service Area	Contributing Area (acres)	SFR (DUs)	MFR (DUs)	Apts. (DUs)	Non-residential (sf)	Commercial Acreage	Industrial Acres
Black Diamond Ranch	*Antioch*		*346 Includes 60 units for The Point future development. Approx 250 existing.*	*0*	*0*	*10,000 SF, parcel C*	*See Nonresidential*	
Tuscany Meadows	*Proposed Pittsburg*	*169.67*	*1,085 Based on 155 acres @ 7 du/acre*	*365 Based on 14.6 acres @ 25 du/acre*	*0*	*0*		
Chevron parcel	*Proposed Pittsburg*	*23.9*				*n.a. per City of Pittsburg*		
TOTAL			*1,431*	*365*	*0*	*10,000*		

The preliminary grading plan for Tuscany Meadows Subdivision 8654 vesting tentative map dated 8/27/12, attached, shows preliminary sewer connection locations. The 356 lots west of Tuscany Meadows Drive are shown as routing flows through the existing Highlands Ranch Subd. 8532 (DDSD Basin 2-18) and then to the District's Pittsburg-Antioch Interceptor manhole no. PA40I00. All other areas appear to connect to the District system at Pittsburg-Antioch Interceptor manhole no. PA36I00.

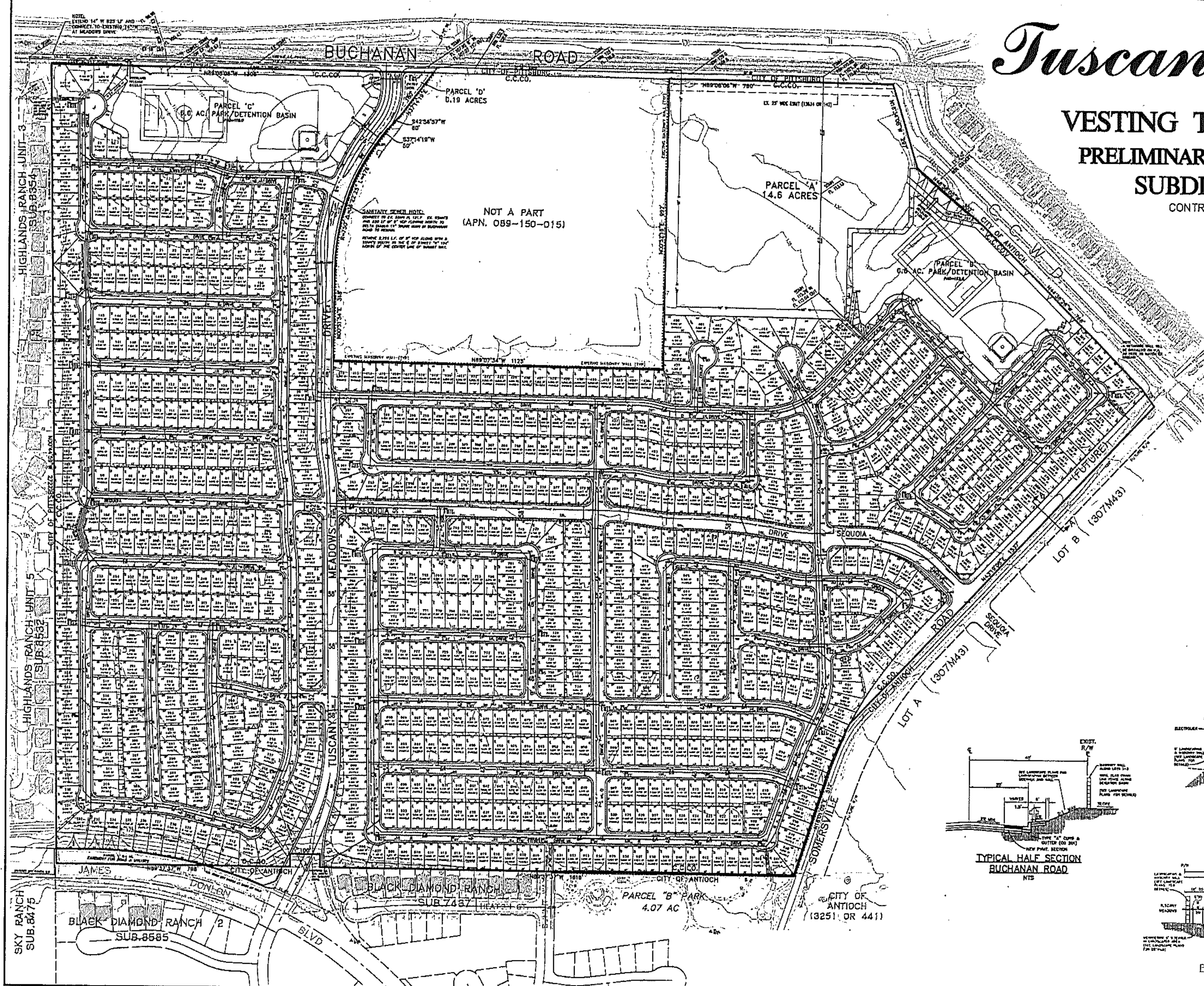
Attachments

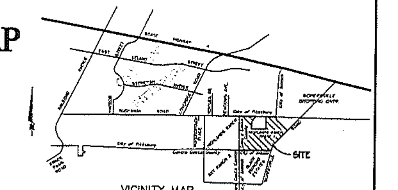
1. Tuscany Meadows Vesting Tentative Map and Preliminary Grading Plan dated 8/27/12
2. Markup of Tuscany Meadow Map with DDSD manhole numbers shown.
3. Correspondence from City of Antioch
4. Correspondence from City of Pittsburg

Tuscany Meadows

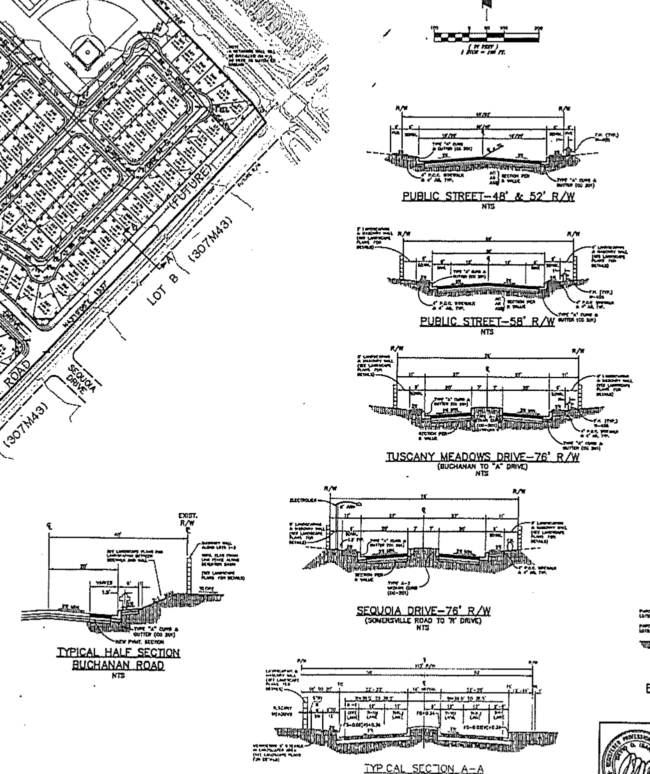
VESTING TENTATIVE MAP & PRELIMINARY GRADING PLAN
SUBDIVISION 8654

CONTRA COSTA COUNTY
AUGUST 2012





VICINITY MAP
NOT TO SCALE



PUBLIC STREET–48' & 52' R/W
NTS

PUBLIC STREET–58' R/W
NTS

TUSCANY MEADOWS DRIVE–76' R/W
(BUCHANAN TO "A" DRIVE)
NTS

TYPICAL HALF SECTION
BUCHANAN ROAD
NTS

SEQUOIA DRIVE–76' R/W
(SOMERSVILLE ROAD TO 'R' DRIVE)
NTS

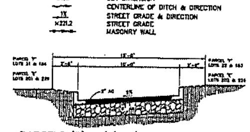
TYPICAL SECTION A–A
PROPOSED SOMERSVILLE RD.–110' R/W
TO BE CONSTRUCTED BY OTHERS
NTS

GENERAL NOTES:

1. OWNERS: WEST COAST HOME BUILDERS, INC. AND
   4021 PORT CHICAGO HIGHWAY
   CONCORD, CA. 94524–4113
   (925) 871–7711
2. CIVIL ENGINEER: ISAKSON & ASSOCIATES
   2255 YGNACIO VALLEY RD SUITE "C"
   WALNUT CREEK, CA 94598
   (925) 937–9333
3. SOILS ENGINEER: WALLACE KUHL & ASSOC.
   3050 INDUSTRIAL BLVD.
   WEST SACRAMENTO, CA. 95691
   (916) 372–2565
4. EXISTING LAND USES: URBAN
5. EXISTING GENERAL PLAN:
   LOW DENSITY RESIDENTIAL (1–7 DU/AC.)
   HIGH DENSITY RESIDENTIAL (14–25 DU/AC.)
6. PRESENT ZONING: RS–4 & RH
7. WATER SUPPLY: CITY OF PITTSBURG / CONTRA COSTA WATER DISTRICT
   A PORTION IS WITHIN ZONE 2 ASSESSMENT DIST. 1974–1
8. SEWAGE: DELTA DIABLO SEWER DISTRICT / CITY OF PITTSBURG
9. CONTOURS: 5' INTERVALS
10. ASSESSORS PARCEL: 089–150–013
11. TOTAL PROJECT AREA=188.7 AC.
    LOW DENSITY RESIDENTIAL AREA=141.11 AC.
    PARCEL 'A' (HIGH DENSITY RESIDENTIAL)=14.6 AC.
    PARCEL 'B' (PARK/DETENTION)=6.6 AC.
    PARCEL 'C' (PARK/DETENTION)=6.6 AC.
    PARCEL 'D' (ENTRY MON/LANDSCAPING)=0.19 AC.
    PARCELS 'E' (LOTS 187–212); & 'F' (LOTS 16–168)
    (OVERLAND RELEASE/UTILITIES)=0.1 AC.
    PARCELS 'G' (LOT 3); & 'H' (LOT 173); & 'J' (LOT 846);
    & 'K' (LOT 571)/UTILITIES=0.1 AC.
    PARCEL 'I' (LOT 819) PED ACCESS/UTILITIES=0.1 AC.
    PARCEL 'L' (JAMES DONLON R/W)=0.4 AC.
12. TOTAL NO. OF LOTS 963
    MIN. LOT SIZE: 4000 SF
    LARGEST LOT: 10,767 SF (LOT 232)
    SMALLEST LOT: 4,006 SF (LOT 438)
    AVERAGE LOT: 4,442± SF
13. GROSS DENSITY $\frac{963 \text{ D.U.}}{141.11 \text{ AC. (RES AREA)}}$ =6.84 DU/AC.
14. PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT, THE OWNER RESERVES THE RIGHT TO FILE MULTIPLE FINAL MAPS ON THE LANDS SHOWN ON THIS MAP.
15. THERE ARE NO TREES OR STRUCTURES ON THE PROPERTY

LEGEND:

	PROJECT BOUNDARY
	RIGHT–OF–WAY LINES
	PROPERTY LINES
891	LOT NUMBER
4,325 SF	LOT AREA
P=160.4	PAD GRADE
51.8'	LOT DIMENSION
	CENTERLINE OF DITCH & DIRECTION
1%	STREET GRADE & DIRECTION
x221.2	STREET GRADE
	MASONRY WALL



PARCELS 'E' & 'F' 15' PATH & UTILITY EASEMENTS AND OVERLAND RELEASE
NTS

Tuscany Meadows
SUBDIVISION 8654
Isakson & Assoc. Inc.
civil engineering & land surveying

DATE 08–27–2012	DESIGNED DOI	DRAWN STAFF	CHECKED DOI	JOB NO. 201002	SHEET 1 OF 1

201002 - VESTING TENTATIVE MAP & PRELIMINARY GRADING PLAN - TUSCANY MEADOWS - 08-27-2012

date 8/27/2012

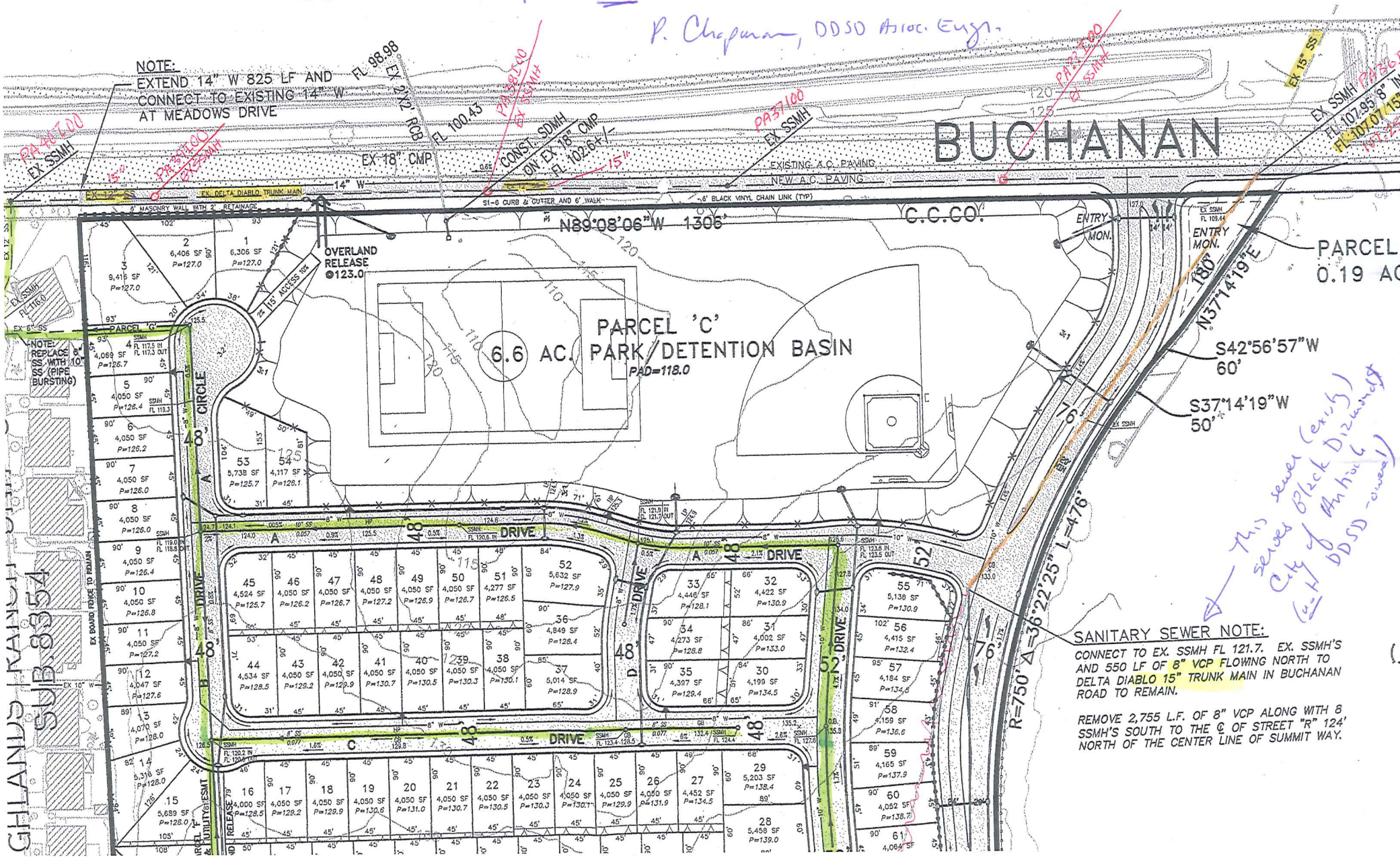
PA 40100

Lots 1 to 357 annexed to Highlands Ranch then to PA 40100

3/27/12

2012 Markup of Vesting Tentative Map
to show location of existing DDSD MH's on P-A Interceptor
DDSD MH's have prefix PA

P. Chapman, DDSD Assoc. Engr.



This sewer (only) serves Black Diamond City of Antioch & DDSD - owned

Chapman, Patricia

From: Wehrmeister, Tina <cwehrmeister@ci.antioch.ca.us>
Sent: Thursday, November 29, 2012 4:13 PM
To: Chapman, Patricia
Subject: RE: Land Use Information Request - Status

Patricia – The table needs to be updated for Black Diamond Ranch. Discovery Builders is proposing an additional 60 units within this subdivision in a separate project called The Point. The City of Pittsburg can confirm the Tuscany Meadows information as they are processing that project. I am still waiting for confirmation from our Engineering Division on the sewer route and will forward when I receive.

TINA WEHRMEISTER
COMMUNITY DEVELOPMENT DIRECTOR, CITY OF ANTIOCH
925.779.7038 | twehrmeister@ci.antioch.ca.us | www.ci.antioch.ca.us

City offices are closed every Friday. The Community Development Department has the following operating hours:

8:00am – 11:30am: Full service counter hours
12:00pm – 1:00pm: Closed for lunch
1:00pm – 5:00pm: By appointment only

From: Chapman, Patricia [mailto:patriciac@ddsd.org]
Sent: Wednesday, November 28, 2012 9:18 PM
To: Wehrmeister, Tina
Subject: RE: Land Use Information Request - Status

Hi Tina-

Just checking in. Hope you had a Happy Thanksgiving. Will it be possible for you to get a response to me by Tuesday, December 4 or sooner? I am hoping to get the consultant started on hydraulic analysis work early next week.

Patricia

Patricia Chapman, Associate Engineer
Delta Diablo Sanitation District
2500 Pittsburg-Antioch Highway
Antioch, CA 94509

(925) 756-1939 phone
(925) 756-1960 FAX

From: Wehrmeister, Tina [mailto:cwehrmeister@ci.antioch.ca.us]
Sent: Thursday, November 15, 2012 12:53 PM
To: Chapman, Patricia
Subject: RE: Land Use Information Request - Status

I was out of the office early in the week and am out next week. I won't be able to respond until after Thanksgiving.

Chapman, Patricia

From: Louis Parsons <LParsons@discoverybuilders.com>
Sent: Friday, November 30, 2012 6:23 PM
To: Chapman, Patricia
Cc: Eckerson, Dean; admin@isaksonandassociates.com; dsestero@seenohomes.com
Subject: RE: RE: Tuscany Meadows - Dynamic Sewer Model Update

Patricia-
That is correct. There is a 60 unit subdivision pending approval It is not approved at this time, but may be in the future so we should account for this. The 60 lots are in addition to the 286.

Let me know if you have any other questions and have a nice weekend

Louis Parsons
Discovery Builders, Inc.
4061 Port Chicago Highway, Suite H
Concord, CA 94520
Office (925) 682-6419
Cellular (925) 250-7101
Fax (925) 689-2047
LParsons@discoverybuilders.com

>>> "Chapman, Patricia" <patriciac@ddsd.org> 11/29/2012 6:39 PM >>>
Louis-

The information you provided was forwarded to Antioch to have the City confirm planning numbers. We also requested that City confirm there are no City sewers that direct flows to the east rather than toward District's pipeline in Buchanon Road.

I've received a reply to the planning numbers from Antioch today -- in addition to the numbers you provided, they indicate that Discovery Builders is proposing an additional 60 units within Black Diamond Subdivision called The Pointe. Can you tell me how The Pointe/ 60 Units relates to the 286 lots/250 permits pulled/ 36 lots remaining units for Black Diamond. Do you have a map?

I am out of the office tomorrow and will look for your reply on Monday. Thank you.

Patricia

Patricia Chapman, Associate Engineer
Delta Diablo Sanitation District
2500 Pittsburg-Antioch Highway
Antioch, CA 94509

(925) 756-1939 phone
(925) 756-1960 FAX

City of Pittsburg

Planning Department
65 Civic Avenue
Pittsburg, CA 94565-3814

November 16, 2012

Delta Diablo Sanitation District
Attention: Patricia Chapman
2500 Pittsburg-Antioch Highway
Antioch, CA 94509

Re: LAND USE INFORMATION FOR DEVELOPMENT IN THE VICINITY OF PROPOSED TUSCANY MEADOWS SUBDIVISON 8654 (APNs 089-150-013 and 089-150-015)

Patricia:

City of Pittsburg Planning staff is in receipt of your letter dated November 8, 2012 requesting updated General Plan and potential land use information related to the Tuscany Meadows Subdivision (former Chevron East property). The site is split into two parcels: APN 089-150-013 (169.67 acres), and 089-150-015 (23.9 acres).

The General Plan land use designation on the parcel identified as APN 189-150-015 is *Industrial*. City staff understands that the parcel will remain under the ownership of Chevron, and will continue to operate as an industrial land use.

The General Plan land use designation on the parcel identified as APN 189-150-013 is a combination of *Low Density Residential* (one to seven units per acre) and *High Density Residential* (14 to 25 units per acre). However, according to the most recent Vesting Tentative Map currently under review, approximately 150.2 acres would be developed with a combination of low and high density residential uses, and the remaining approximately 19.47 acres would be allocated to parks, detention basins, and easements. Please see the table below for the maximum allowable and proposed development for the Tuscany Meadows site utilizing gross acreage.

Land Use	Acres (gross)	Maximum Allowable Development	Proposed Development
Low Density Residential	155.07	1085 single family units	917 single family units
High Density Residential	14.6	365 multi-family units	365 multi-family units
Industrial	23.9	Not applicable	Not applicable

LAND USE INFORMATION FOR DEVELOPMENT IN THE VICINITY OF PROPOSED TUSCANY MEADOWS SUBDIVISON 8654 (APNs 089-150-013 and 089-150-015)

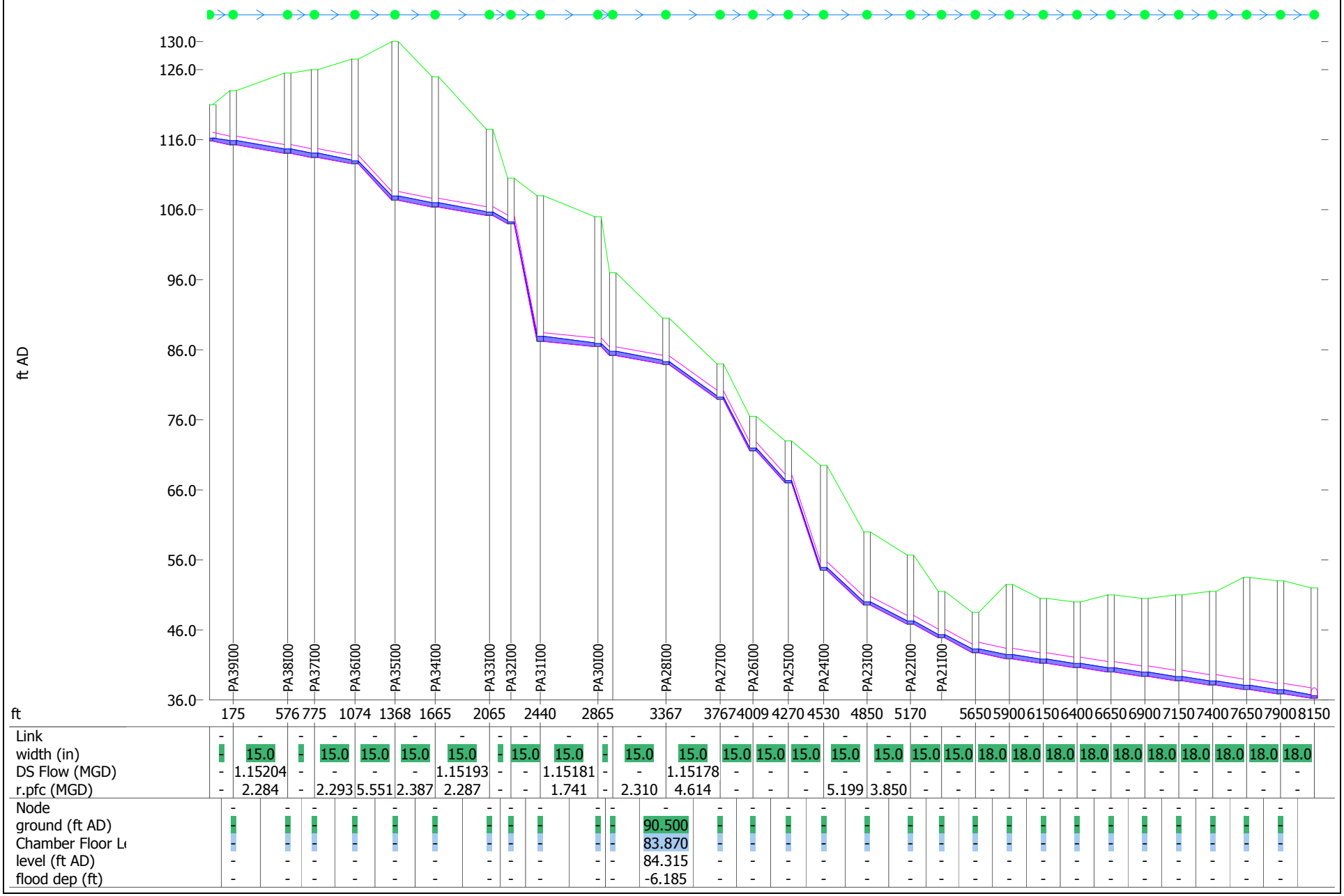
November 16, 2012

Attached please find the proposed tentative map that is currently under review by the City of Pittsburg. Please note that this is a draft tentative map that is subject to change but does reflect the most current information on the project. Please feel free to contact me at lschmidt@ci.pittsburg.ca.us or at 925-252-4015 if you have any further questions. Sincerely,

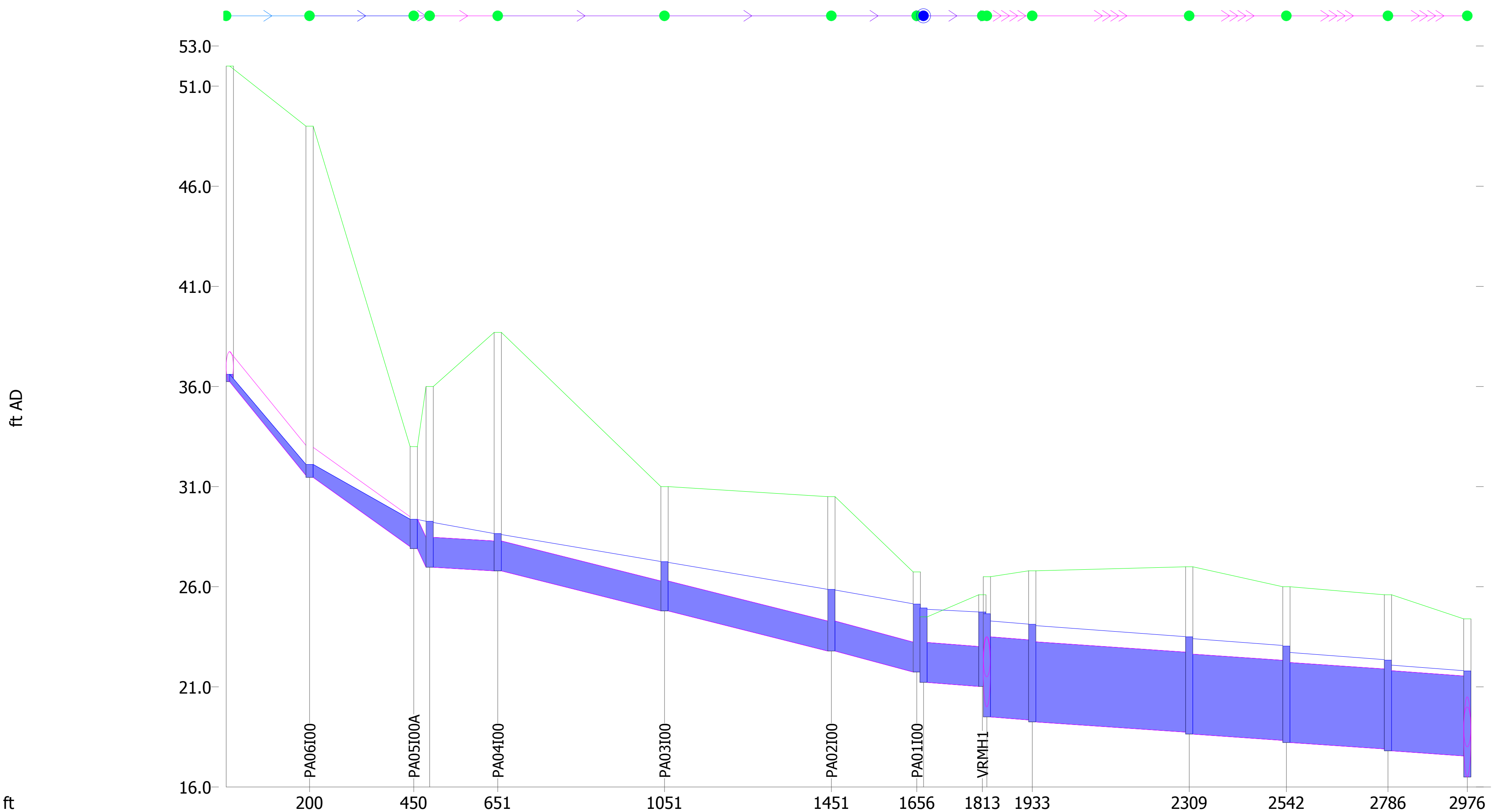
Leigha Schmidt
Associate Planner

Attachment 2
Hydraulic Model Profiles

Long Section for Network - Alternative BH1A2S3B1P1_rev	Print Date - 1/2/2013 4:12:57 PM
Selection - Upper PA (PA10I00)	Buildout PWWF with original land use assumptions



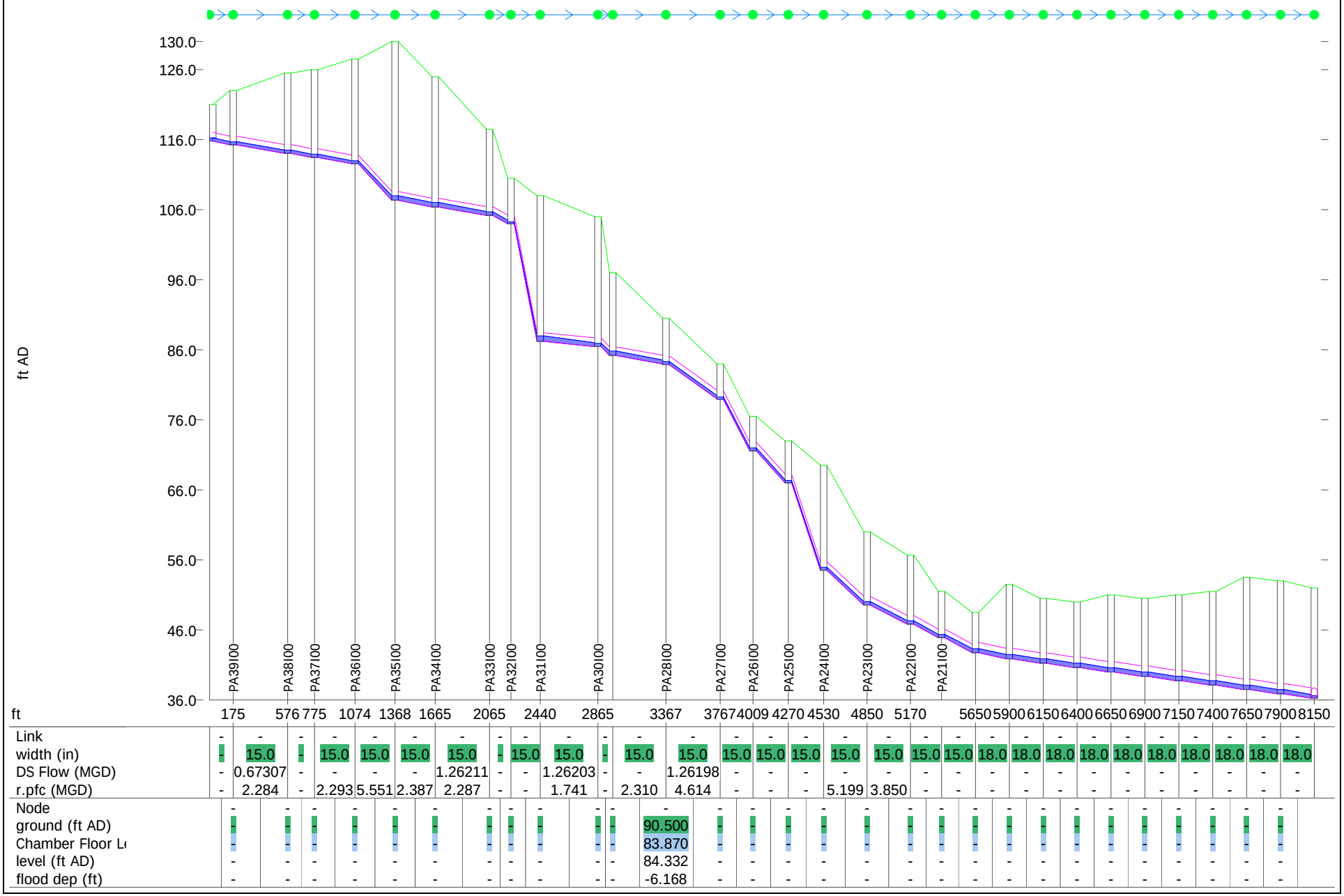
Long Section for Network - Alternative BH1A2S3B1P1_rev	Print Date - 1/2/2013 4:12:09 PM
Selection - PA + WWTP Influent Sewer	Buildout PWWF with original land use assumptions



Link	PA10I00.1	PA06I00.1	-	PA04I00.1	PA03I00.1	PA02I00.1	-	-	WWPCF_MH5.1	-	-	-
width (in)	18.0	18.0	18.0	18.0	18.0	18.0	24.0	48.0	48.0	48.0	48.0	48.0
DS Flow (MGD)	1.15125	2.97259	3.92126	3.92100	3.92078	3.92061	-	-	35.45973	35.45974	35.45974	35.45974
r.pfc (MGD)	10.387	7.988	2.254	4.801	4.801	4.862	5.507	-	34.186	33.867	33.659	34.310

Node	-	PA06I00	-	-	PA04I00	PA03I00	PA02I00	-	-	-	-	-	WWPCF_MH4	-	-	-
ground (ft AD)	-	49.000	33.000	-	38.700	31.000	30.500	-	-	-	-	26.800	27.000	26.000	25.600	-
Chamber Floor L	-	31.460	27.900	-	26.790	24.790	22.790	-	-	-	-	19.250	18.640	18.220	17.810	-
level (ft AD)	-	32.111	29.374	-	28.655	27.255	25.868	-	-	-	-	24.129	23.500	23.037	22.338	-
flood dep (ft)	-	-16.889	-3.626	-	-10.045	-3.745	-4.632	-	-	-	-	-2.671	-3.500	-2.963	-3.262	-

Long Section for Network - Alternative BH1A2S3B1P1_Tuscany	Print Date - 1/4/2013 1:34:04 PM
Selection - Upper PA (PA10I00)	Buildout PWWF with Proposed Developments



Long Section for Network - Alternative BH1A2S3B1P1_Tuscany	Print Date - 1/2/2013 4:10:33 PM
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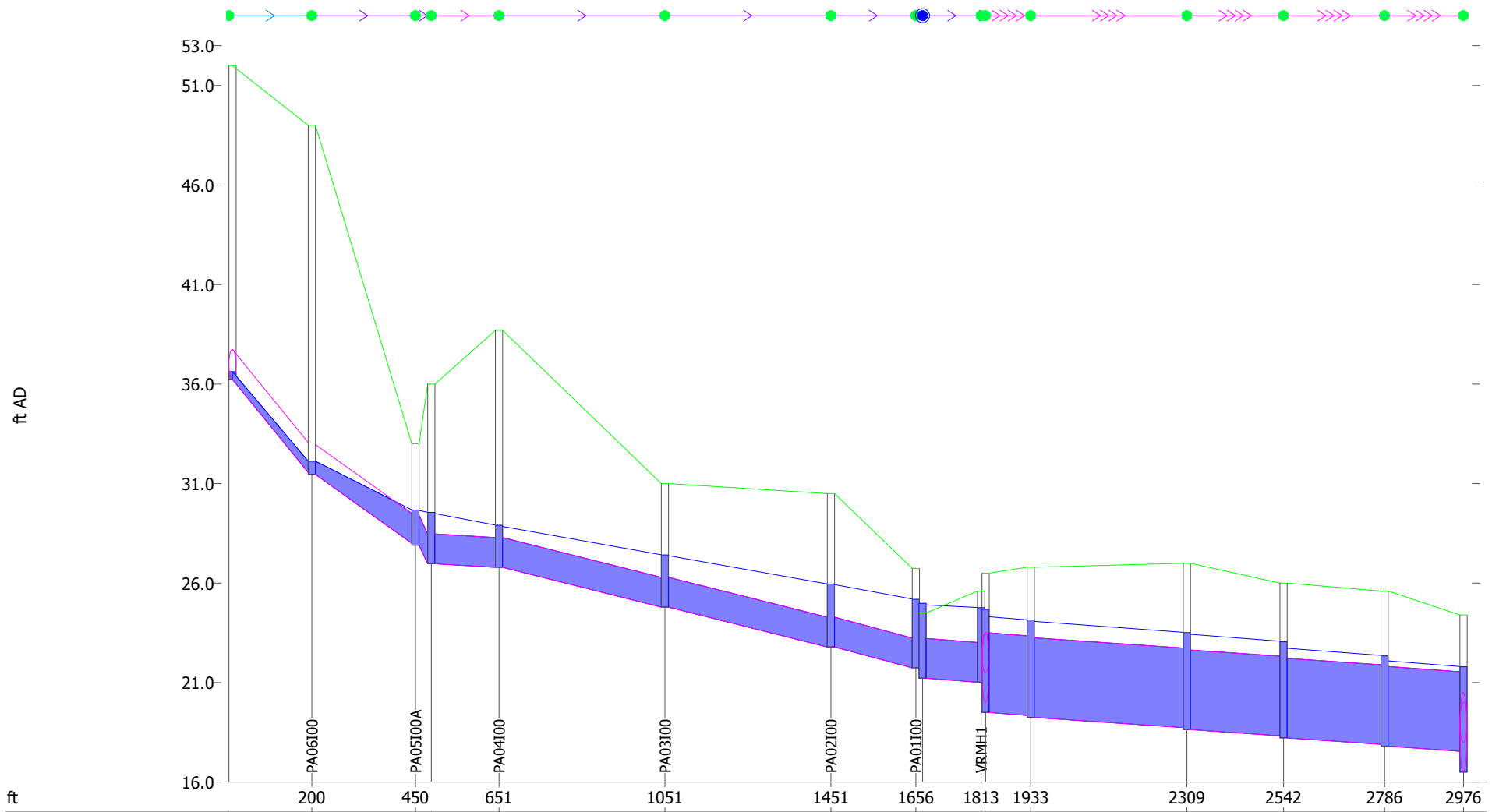

Link	PA10I00.1	PA06I00.1	-	PA04I00.1	PA03I00.1	PA02I00.1	-	-	WWPCF_MH5.1	-	-	-
width (in)	18.0	18.0	18.0	18.0	18.0	18.0	24.0	48.0	48.0	48.0	48.0	48.0
DS Flow (MGD)	1.26182	3.08307	4.03145	4.03119	4.03094	4.03076	-	-	35.56437	35.56437	35.56437	35.56437
r.pfc (MGD)	10.387	7.988	2.254	4.801	4.801	4.862	5.507	-	34.186	33.867	33.659	34.310

Node	-	PA06I00	-	-	PA04I00	PA03I00	PA02I00	-	-	-	-	-	WWPCF_MH4	-	-	-
ground (ft AD)	-	49.000	33.000	-	38.700	31.000	30.500	-	-	-	-	26.800	27.000	26.000	25.600	-
Chamber Floor L	-	31.460	27.900	-	26.790	24.790	22.790	-	-	-	-	19.250	18.640	18.220	17.810	-
level (ft AD)	-	32.123	29.676	-	28.910	27.420	25.957	-	-	-	-	24.150	23.516	23.049	22.344	-
flood dep (ft)	-	-16.877	-3.324	-	-9.790	-3.580	-4.543	-	-	-	-	-2.650	-3.484	-2.951	-3.256	-