



# Pets Return Home Site Design



Ruff Engineering

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CENE476

12/6/2019

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# Purpose

## CREATE:

- Site design for expansion of the kennel space
- Drainage plan for sanitary sewer runoff

# Client

- Mark Happe: Co-founder
- Pets Return Home



Figure 1: Pets Return Home logo  
Photo credit: Pets Return Home [1]

# Location

4555 N. Peyton Place

**City:** Clarkdale

**County:** Yavapai County

**State:** Arizona



# Project Site



Figure 4: Highlighted region depicts project site within property boundaries.

Photo Credit: Google Maps [3]



Figure 5: Pre-existing structures and available space for development.

Photo Credit: Google Maps [3]

# Existing Conditions



Figure 6: North Kennels Facing NE.  
Photo Credit: C. Saline



Figure 7: South Kennels Facing SE.  
Photo Credit: C. Saline



Figure 8: Proposed Run Space South  
Side Facing SW  
Photo Credit: C. Saline

# Task 1: Zoning Due Diligence

## 1.1 Zoning Due Diligence

- Adhering to zoning ordinances

## 1.2 Arizona 811

- Locate underground lines on site
- Identify structures within site boundaries



Figure 9: Whiskey photobombed by Gorgon  
Photo Credit: Allyson Fedor

# Task 2: Surveying

## 2.1 Survey

- Collection of survey data

## 2.2 Topographic Map

- Created using the survey data gathered



Figure 10: Blue from the Pets Return Home Sanctuary.

Photo Credit: Allyson Fedor

# Task 3: Field Investigation

3.1 Sampling Plan

3.2 Safety Plan

3.3 Geotechnical Sampling

3.4 Infiltration Testing

3.5 Existing Slab Analysis

- Composition
- Placement
- Dimensions



Figure 11: Soil sample collecting.  
Photo Credit: Photodune [4]



# Task 4: Hydrology

## 4.1 Previous Studies

## 4.2 Basin Delineation

### 4.2.1 Major Basin Delineation

### 4.2.2 Sub-Basin Delineation

## 4.3 Sub-Basin Variables

### 4.3.1 Time of Concentration

### 4.3.2 Flow Routing

### 4.3.3 Weighted Curve Number Determination

### 4.3.4 Sub-Basin Storage

## 4.4 Hydrograph Development

## 4.5 Storm Event Runoff Determination

### 4.5.1 Existing

### 4.5.2 Proposed

# Task 5: Hydraulics

## 5.1 Previous Studies

## 5.2 Proposed Channel Hydraulic Analysis

- Capacity of the proposed channel
- Flow rate of the drainage



Figure 12: Blue from the Pets Return Home Sanctuary.  
Photo Credit: Abigail Autieri

# Task 6: Geotechnical Analysis

## 6.1 Previous Studies

## 6.2 Laboratory Testing

- Field moisture contents (ASTM D2216)
- In-situ soil density (ASTM D2937)
- Remolded swell potential (ARIZ 249)
- Compression (modified ASTM D2435)
- Liquid limit and plasticity index (ASTM D4318)
- Compressive strength test of rock sample (ASTM D698)



Figure 13: Assorted geotechnical lab equipment.

Photo Credit: Exporters India [5]

# Task 7: Site Design

7.1 Develop Alternatives

7.2 Decision Matrix

7.3 Drainage Plan

7.3.1 Grading

7.3.2 Cut/Fill

7.4 Construction Drawings

7.5 Cost Estimate



Figure 14: Ally with Blue  
Photo Credit: Ryann DuBose

# Task 8: Impacts

8.1 Environmental Impacts

8.2 Economic Impacts

8.3 Social Impacts

8.3.1 Aesthetics

8.3.2 Quality of life

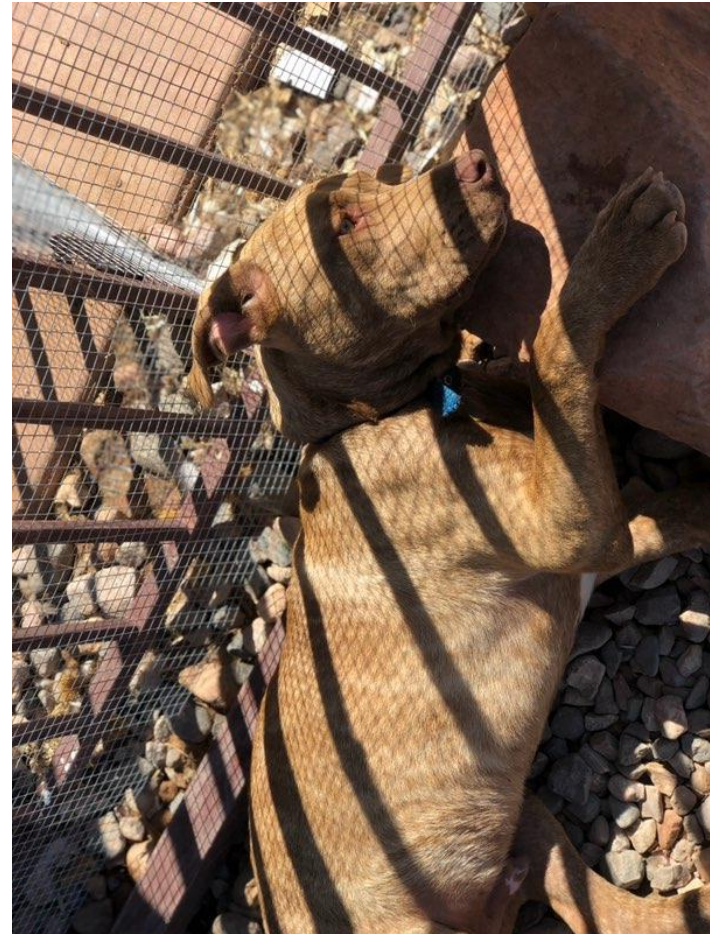


Figure 15: Deuce (formerly Gorgon) about to take a nap.

Photo Credit: Allyson Fedor

# Task 9: Deliverables

## 9.1 30% Submittal

9.1.1 Report

9.1.2 Presentation

## 9.2 60% Submittal

9.2.1 Report

9.2.2 Presentation



Figure 16: Deuce  
Photo Credit: Ryann DuBose

## 9.3 90% Submittal

9.3.1 Report

9.3.2 Presentation

9.3.3 Website

## 9.4 Final Submittal

9.4.1 Final Report

9.4.2 Construction Documents

9.4.3 Final Presentation

9.4.4 Final Website

# Task 10: Project Management

## 10.1 Meetings

10.1.1 Grading Instructor

10.1.2 Technical Advisor

10.1.3 Client

10.1.4 Team

## 10.2 Schedule/Resource Management

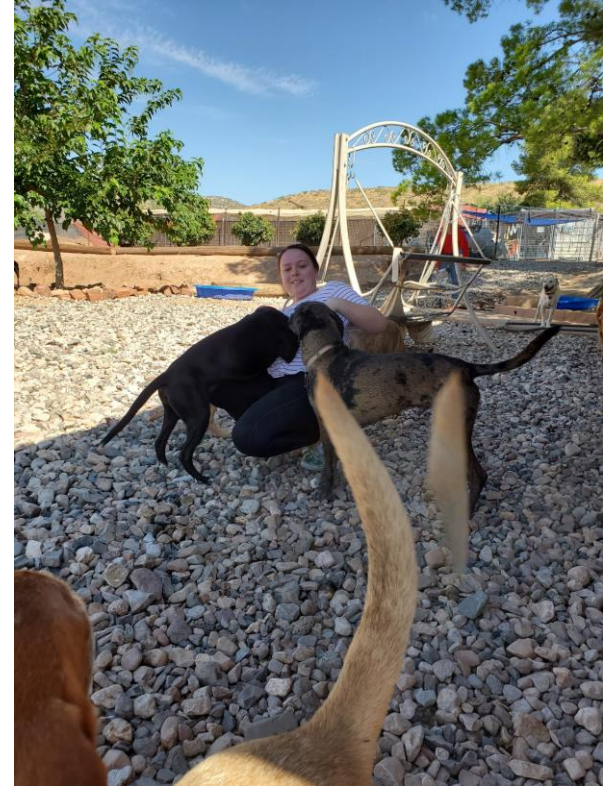


Figure 17: Ryann playing with the dogs of Pets Return Home.  
Photo Credit: Ally Fedor

# Exclusions

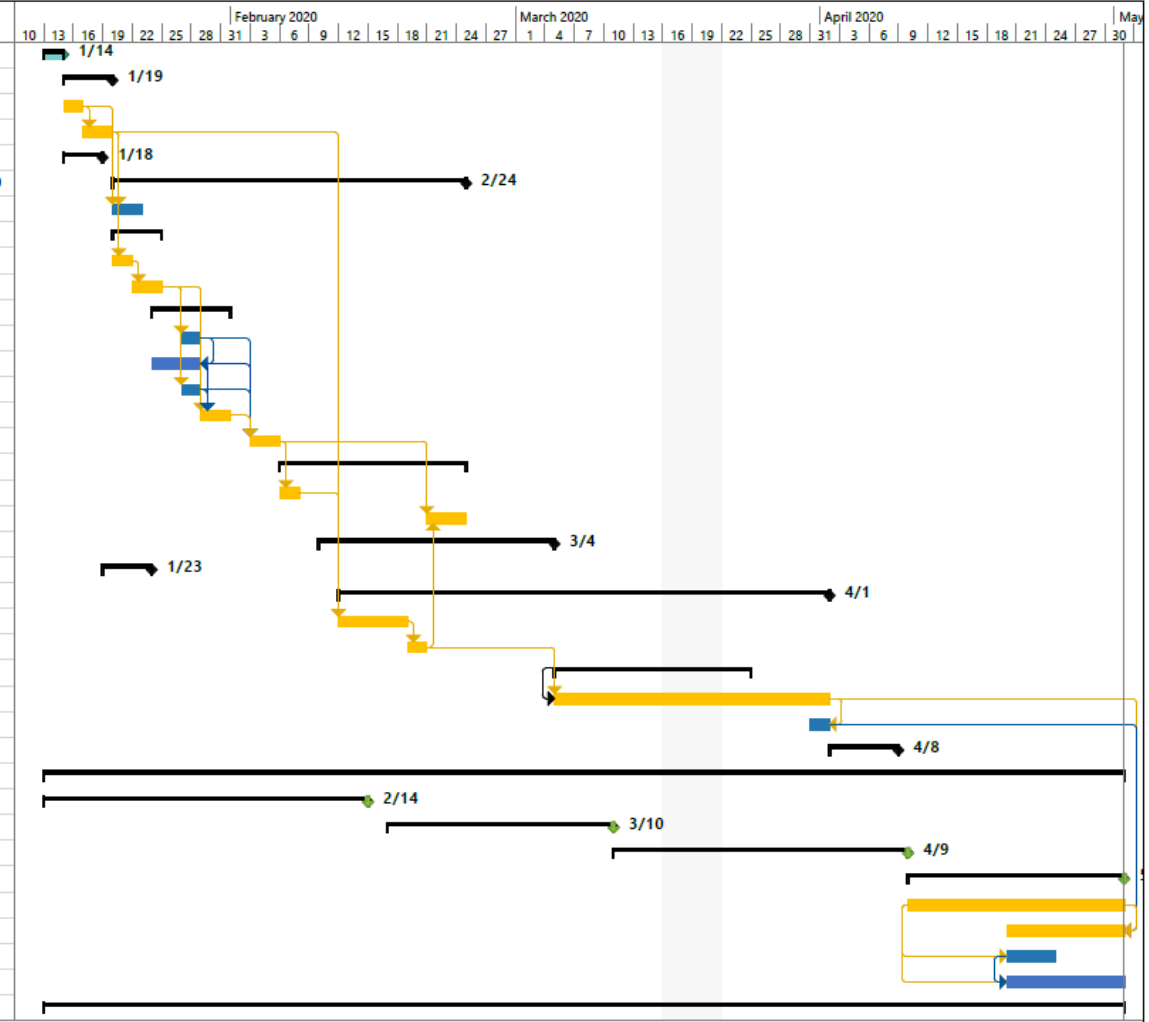
- Floodplain Mapping
- Structural Engineering
- Construction



Figure 18: Blue sitting on Deuce's face.  
Photo Credit: PRH Instagram



ID	Task Name	Duration	Start	Finish
1	Task 1: Due Diligence	2 days	Mon 1/13/20	Tue 1/14/20
4	Task 2: Surveying	5 days	Wed 1/15/20	Sun 1/19/20
5	Task 2.1: Survey	2 days	Wed 1/15/20	Thu 1/16/20
6	Task 2.2: Topographic Map	3 days	Fri 1/17/20	Sun 1/19/20
7	Task 3 Field Investigation	4 days	Wed 1/15/20	Sat 1/18/20
13	Task 4: Hydrology	26 days	Mon 1/20/20	Mon 2/24/20
14	Task 4.1: Previous Studies	3 days	Mon 1/20/20	Wed 1/22/20
15	Task 4.2: Basin Delineation	5 days	Mon 1/20/20	Fri 1/24/20
16	Task 4.2.1: Major Basin Delineation	2 days	Mon 1/20/20	Tue 1/21/20
17	Task 4.2.2: Sub-Basin Delineation	3 days	Wed 1/22/20	Fri 1/24/20
18	Task 4.3: Sub-Basin Variables	6 days	Fri 1/24/20	Fri 1/31/20
19	Task 4.3.1: Flow Routing	2 days	Mon 1/27/20	Tue 1/28/20
20	Task 4.3.2: Time of Concentration	3 days	Fri 1/24/20	Tue 1/28/20
21	Task 4.3.3: Weighted Curve Number	2 days	Mon 1/27/20	Tue 1/28/20
22	Task 4.3.4: Sub-basin Storage	3 days	Wed 1/29/20	Fri 1/31/20
23	Task 4.4: Hydrograph Development	3 days	Mon 2/3/20	Wed 2/5/20
24	Task 4.5: Storm Event Runoff Deter.	13 days	Thu 2/6/20	Mon 2/24/20
25	Task 4.5.1: Existing	2 days	Thu 2/6/20	Fri 2/7/20
26	Task 4.5.2: Proposed	2 days	Fri 2/21/20	Mon 2/24/20
27	Task 5: Hydraulics	18 days	Mon 2/10/20	Wed 3/4/20
31	Task 6: Geotechnical Analysis	5 days	Sun 1/19/20	Thu 1/23/20
34	Task 7: Site Design	31 days	Wed 2/12/20	Wed 4/1/20
35	Task 7.1: Develop Alternatives	5 days	Wed 2/12/20	Tue 2/18/20
36	Task 7.2: Decision Matrix	2 days	Wed 2/19/20	Thu 2/20/20
37	Task 7.3: Drainage Plan	9 days	Thu 3/5/20	Tue 3/24/20
40	Task 7.4 Construction Drawings	15 days	Thu 3/5/20	Wed 4/1/20
41	Task 7.5 Cost Estimate	2 days	Tue 3/31/20	Wed 4/1/20
42	Task 8: Impacts	5 days	Thu 4/2/20	Wed 4/8/20
46	Task 9: Deliverables	77 days	Mon 1/13/20	Fri 5/1/20
47	Task 9.1: 30% Submittal	27 days	Mon 1/13/20	Fri 2/14/20
50	Task 9.2: 60% Submittal	17 days	Mon 2/17/20	Tue 3/10/20
53	Task 9.3: 90% Submittal	17 days	Wed 3/11/20	Thu 4/9/20
56	Task 9.4: Final Submittal	16 days	Fri 4/10/20	Fri 5/1/20
57	Task 9.4.1: Final Report	16 days	Fri 4/10/20	Fri 5/1/20
58	Task 9.4.2: Final Construction Doc.	10 days	Mon 4/20/20	Fri 5/1/20
59	Task 9.4.3: Final Presentation	5 days	Mon 4/20/20	Fri 4/24/20
60	Task 9.4.4: Final Website	10 days	Mon 4/20/20	Fri 5/1/20
61	Task 10: Project Management	77 days?	Mon 1/13/20	Fri 5/1/20



# Staffing Plan

STAFF HOURS					
Task	SENG	PE	Technician	EIT	Task Total
Task 1: Due Diligence	2	10	0	6	18
Task 2: Surveying	3	9	22	8	42
Task 3: Field Investigation	8	35	17	20	80
Task 4: Hydrology	12	126	0	84	222
Task 5: Hydraulics	3	26	0	20	49
Task 6: Geotechnical Analysis	3	3	20	4	30
Task 7: Site Design	7	35	23	28	93
Task 8: Impacts	6	36	0	30	72
Task 9: Deliverables	16	37	8	37	98
Task 10: Project Management	19	27	8	27	81
<b>TOTAL</b>	<b>71</b>	<b>309</b>	<b>81</b>	<b>244</b>	<b>705</b>

# Cost of Services

1.0 Personnel	Classification	Hours	Rate, \$/hr	Cost
	SENG	71	\$219	\$15,549
	PE	309	\$175	\$54,075
	EIT	244	\$110	\$26,840
	Technician	81	\$65	\$5,293
	Total Personnel			<b>\$101,757</b>
2.0 Travel	Classification	Item Total	Unit Cost	Cost
	4 meetings @ 140 mi (roundtrip)	560	\$0.58	\$325
	Vehicle Rental (per day/trip)	4	\$125.00	\$500
	Total Travel			<b>\$825</b>
3.0 Supplies	Classification	Days	Unit Cost (\$/day)	Cost
	Surveying	3	\$275	\$825
	Geotechnical			
	Equipment	3	\$200	\$600
	Lab	5	\$380	\$1,900
	Total Supplies			<b>\$3,325</b>
4.0 Total				<b>\$105,906</b>

# References

- [1] Pets return home (2019). Pet Return Home logo. [image] Available at: <https://www.petsreturnhome.org/> [Accessed 9 Oct. 2019].
- [2] "Yavapai Silent Witness= Home", *Yavapaisw.com*. [Online]. Available: <http://yavapaisw.com/>. [Accessed: 24- Sep- 2019].
- [3] Google. "4555 N. Peyton Place in Clarkdale, Arizona" [Online]. Available: <https://goo.gl/maps/oGF4dUhMb2ud5J6s8>. [Accessed: October 6, 2019].
- [4] Soil Sample Collection. (2019). [image] Available at: <https://photodune.net/item/soil-sampling-agronomist-taking-sample-with-soil-probe-sampler/23274857> [Accessed 7 Oct. 2019].
- [5] "CIVIL ENGINEERING LABS Manufacturer in Kerala India by V-Tech Instrumentation (India) Private Limited: ID - 2973718," *Exporters India*. [Online]. Available: <https://www.exportersindia.com/vtechinstrumentation/civil-engineering-labs-2973718.htm>. [Accessed: 03-Dec-2019].

# Questions?



Figure 18: Dr Bero with Angel.  
Photo Credit: Ryann DuBose



@petsreturnhome