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DIVISION OF  
ADMINISTRATIVE  
HEARINGS

STATE OF FLORIDA  
DIVISION OF ADMINISTRATIVE HEARINGS

IN RE: FLORIDA POWER AND LIGHT  
COMPANY BOBWHITE-MANATEE  
230 KV TRANSMISSION LINE PROJECT  
TRANSMISSION LINE SITING APPLICATION  
NO. TA07-14,

Petitioner,

DOAH Case No.:  
07-0105 TL

and

OGC Case No.:  
07-0026

SCHROEDER-MANATEE RANCH, INC.; LAKE  
CLUB INVESTORS, LLC; GUM SLOUGH  
PRESERVATION FOUNDATION, INC.;  
MANASOTA-88, INC.; JOHN FALKNER;  
TAYLOR AND FULTON, INC.; MYAKKA RANCH  
HOLDINGS, LLC; FC, LLC; CONCESSION  
LAND DEVELOPMENT, LLC; CONCESSION GOLF  
CLUB, LLC; KITTIE L. CHAPMAN; PACIFIC  
LAND, LTD, JOHN CANNON HOMES-EASTMOOR,  
LLC; SCHWARTZ FARMS, INC.; MICHAEL D.  
and JOANNE SCHWARTZ; SARASOTA ONE,  
LLC; EAST COUNTY HOMEOWNERS  
ORGANIZATION, INC.; MICHAEL HUNSADER,  
DAVID HUNSADER, and DONALD HUNSADER;  
and HI HAT RANCH, LLLP,

Intervenors.

VOLUME 9

TRANSCRIPT OF HEARING, October 29, 2007

BEFORE: HONORABLE BRAM D. E. CANTER  
ADMINISTRATIVE LAW JUDGE

Stenographically Reported by:  
Mary Jo Armour McGill  
Registered Diplomate Reporter

1       DATE TAKEN:                   October 29, 2007  
2       TIME:                        8:37 a.m.- 11:49 a.m.  
3       PLACE:                       Sarasota Cay Club Resort  
4                                    and Marina  
5                                    Harborside Room  
6                                    7150 North Tamiami Trail  
7                                    Sarasota, Florida

8                                    APPEARANCES:  
9

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## I N D E X

WITNESS	PAGE
Called by Florida Power & Light:	
ROBERT HAHN	1029
DIRECT EXAMINATION BY MS. RAEPPLE	1029
CERTIFICATE OF REPORTER	1128

## E X H I B I T S

NO.	RECEIVED IN EVIDENCE	PAGE
	FPL Exhibit NO. 26	1102
	FPL Exhibit NO. 21	1117

## P R O C E E D I N G S

THE COURT: All right. This is a continuation of DOAH case number 070105 TL, Florida Power and Light Company Bobwhite-Manatee 230 Kilovolt Transmission Line Project, Transmission Line Siting Application.

Does any party wish to raise a preliminary matter before we begin the presentation of evidence?

All right. Ms. Raepple, I see you have a witness.

Sir, will you raise your right hand?

ROBERT HAHN, called as a witness by the Florida Power and Light, having been first duly sworn, testified as follows:

THE WITNESS: I do.

THE COURT: State your name, please.

THE WITNESS: My name is Robert Hahn, H-a-h-n.

## D I R E C T   E X A M I N A T I O N

BY MS. RAEPPLE:

Q. Mr. Hahn, where are you employed?

A. I'm employed with Florida Power & Light.

Q. What is your position there?

A. I am currently the manager of generation interconnection for Florida Power and Light.

Q. What was your position prior to that?

1           A.    Prior to that, I was a transmission engineer in  
2 the transmission siting and permitting group. On this  
3 project I was the project engineer for the  
4 Bobwhite-Manatee project.

5           Q.    Would you please describe your educational  
6 background?

7           A.    I have an associate's degree in electrical  
8 engineering technology and a bachelor's degree in  
9 electrical engineering from Penn State University, and a  
10 masters of science in engineering management from the  
11 University of South Florida.

12          Q.    Do you have any professional work experience  
13 related to electrical transmission line siting,  
14 permitting, and engineering?

15          A.    Yes. I have been in the electric utility  
16 business with Florida Power & Light for 27 years. Since  
17 1997 -- from 1997 to 2002, I was a transmission line  
18 engineer and working on designing and engineering  
19 transmission facilities throughout all of Florida  
20 Power & Light's service territory. From 2000 to June of  
21 2007, I was in the transmission line siting and  
22 permitting group.

23          Q.    What were your duties in the transmission line  
24 siting and permitting group?

25          A.    My duties were to identify appropriate

1 locations for transmission lines, usually as a member of  
2 a multidisciplinary team, to assist in the design of new  
3 transmission lines throughout the FPL service territory,  
4 to obtain or to work with permitting agencies to obtain  
5 permits, to construct, operate, and maintain  
6 transmission facilities, and to provide support for  
7 construction of new transmission lines.

8 Q. Can you give us a number, an idea of the number  
9 of miles of transmission lines that you have been  
10 involved in, either designing, siting, or permitting?

11 A. Around 200 miles.

12 Q. Have you ever been involved in a transmission  
13 line project, certified under the Transmission Line  
14 Siting Act?

15 A. Yes, I have.

16 Q. Which one was that?

17 A. I was a -- assisted on two projects that were  
18 certified under the Transmission Line Siting Act. The  
19 first one was the Collier Orange River project in  
20 54-mile TLISA project, siting of the 230kv line in  
21 Collier and Lee Counties. The second was the St. Johns  
22 Pellicer Pringle, which was a 26-mile 230kv line that  
23 was sited up in Flagler and St. John's Counties.

24 Q. Do you belong to any professional organizations  
25 related to transmission line siting, permitting and



1 engineering?

2 A. I am a member of the IEEE, the Institute of  
3 Electrical and Electronic Engineers.

4 Q. Would you please refer to Exhibit FPL 59, which  
5 has already been received into the record, and tell  
6 me -- tell us, is this an accurate copy of your resume?

7 A. Yes, it is.

8 MS. RAEPPLE: Your Honor, at this time, Florida  
9 Power & Light offers Mr. Hahn as an expert in the  
10 field of electrical transmission line siting,  
11 permitting, and engineering.

12 THE COURT: All right. Consistent with my  
13 earlier ruling with Ms. Mayes, I would -- I think  
14 the offer would be -- well, it's your offer, but my  
15 acceptance would be in the area of electrical  
16 engineering and his experience specifically in the  
17 areas of electrical transmission line siting and  
18 permitting and engineering would be his -- would be  
19 an emphasis within his expertise for which I would  
20 give greater weight to his answers.

21 MS. RAEPPLE: Thank you.

22 THE COURT: Is there any objection?

23 MR. HALL: With the limitation you just stated,  
24 Your Honor, no.

25 THE COURT: All right. He's accepted in those

1 areas I just mentioned.

2 MS. RAEPPLE: Thank you.

3 THE COURT: In that one area with those  
4 specialties.

5 BY MS. RAEPPLE:

6 Q. Mr. Hahn, would you please describe your role  
7 in the Bobwhite-Manatee project?

8 A. I was the transmission line engineering member  
9 of the three-member multidisciplinary team that  
10 identified the alternative segments and ultimately  
11 identified FPL's preferred corridor. I assisted in the  
12 preparation of the application for corridor  
13 certification and evaluated the constructability of all  
14 of the segments and alternately the routes that were  
15 presented. I also provided the cost analysis for the  
16 project.

17 In addition, I was a member of the community  
18 outreach team, attended all three of the community  
19 advisory panel, and two of the open houses that were  
20 presented within the study area.

21 In addition, I attended numerous homeowners  
22 associations and individual property owners' homes  
23 throughout the study area to discuss the project with  
24 them and to listen to their concerns as a part of the  
25 outreach process.

1           After the alternate corridors were filed, I  
2 provided the -- I determined the constructability of the  
3 alternates and provided the cost analysis for those  
4 alternates.

5           Q.   Were you also the primary person responsible  
6 for answering e-mails that were directed to the project  
7 web site?

8           A.   Yes, I was. I was the primary contact for the  
9 e-mails that were sent in.

10          Q.   Would you now, please, refer to Exhibit FPL 2  
11 and tell us if that accurately reflects the sections of  
12 the site certification application, which is FPL 1, that  
13 you prepared?

14          A.   Yes, it does.

15          Q.   Do all of those applications sections for which  
16 you were responsible contain accurate information, or do  
17 you have any update you would like to provide us?

18          A.   I do have an update. If I could refer you to  
19 page 1-1.

20               The third paragraph where it says, the width of  
21 right of ways of the new -- width of the new right of  
22 way to be located within the corridor will typically  
23 range from 15 to 75 feet. Upon investigating the route,  
24 the corridors itself, I think the corridors can be as  
25 small as ten feet along road right of way. So that is a

1 slight change to the package.

2 Q. That's the right of way can be as small as ten  
3 feet?

4 A. Yes.

5 Q. When the line is placed adjacent to a public  
6 road?

7 A. Correct, yes.

8 Q. Could you now, please, refer to the document  
9 that's been received into the record that is marked  
10 Exhibit FPL 47 and tell us what this shows?

11 A. Can you put that up on the screen?

12 This figure that's up on the screen represents  
13 a transmission network that I typically use to explain  
14 how power systems work.

15 Q. And could you please describe for us the  
16 primary functions of an electrical transmission system?

17 A. If we start up in this upper left-hand corner,  
18 you have a power generation plant. The power is stepped  
19 up in the station, and for this project's purpose, this  
20 is the Manatee Energy Center. From the Manatee Energy  
21 Center, the power is transmitted down the transmission  
22 line, and the transmission line is used for bulk power  
23 transfer. It's transmitted at 230kv.

24 One of the ways I typically like to describe  
25 the way it works is if you can think of your water

1 system in your house. The 230kv is the pressure that is  
2 exuded on the water, and the water is the current that  
3 transmits down through the line.

4 The transmission line system here is for  
5 transmitting bulk power, or large quantities of power  
6 between transmission stations, typically.

7 Q. Could you tell us what is a substation in the  
8 context of an electrical transmission project?

9 A. Within the context of the Bobwhite-Manatee  
10 line, we have two transmission substations; one at  
11 Manatee Energy Center, and the other one at Bobwhite.

12 The second type of distribution station that  
13 you would find are typically connected between those two  
14 sites, and they're distribution stations.

15 The transmission station is where transmission  
16 lines come together, essentially, for distribution  
17 across great distances, the different regions within the  
18 state.

19 At Manatee Energy, for example, there are  
20 several transmission lines that intertie us with Tampa  
21 Electric that go east over to the east coast of Florida,  
22 and then south into the Ringling Bobwhite area.

23 The same is true for Bobwhite, once we tie it  
24 into the system, it will serve the same functions.

25 Distribution stations, on the other hand, are

1 where the voltage is stepped down, in this case from 230  
2 kilovolts down to something like 13 or 23kv for  
3 distribution out into the neighborhoods where the load  
4 is needed.

5 It's sent out along the distribution feeders  
6 along the roadways or through developments, and then it  
7 is stepped down within the development one more layer,  
8 to where it can be used to feed the individual homes and  
9 customers in those areas.

10 Q. And does that final step down of the power  
11 occur at the transformer in the neighborhood?

12 A. Yes. The transformer in the neighborhood is  
13 where it would go from either 23kv or 13kv down to 220  
14 or 240 that's needed for the homes to function with.

15 Q. And in your response describing this system,  
16 you are using the word "station." Is that a synonym for  
17 substation?

18 A. Yes, it is, substation.

19 Q. Do you know whether the Public Service  
20 Commission identified the starting and ending point for  
21 the Bobwhite-Manatee transmission line?

22 A. Yes, they have.

23 Q. Do you know what those end points are?

24 A. Can we refer to FPL Exhibit 22?

25 Q. Sure.

1       A.    The starting and end points are at the northern  
2 end of the Manatee Energy Center and at the southern end  
3 of the Bobwhite-Manatee substation site.

4       Q.    In the application for corridor certification  
5 which is Exhibit FPL 1, is the Public Service  
6 Commissions' need determination order found in  
7 Appendix A?

8       A.    Yes, it is.

9       Q.    Could you please briefly describe Florida  
10 Power & Light's objectives for this Bobwhite-Manatee  
11 transmission project?

12       A.    There are three main objectives for this  
13 project: To provide for additional transmission  
14 reinforcement between the Manatee Energy Center and  
15 Ringling substation -- there was a day in my life I  
16 could read all of that over there. It should be right  
17 about here -- Ringling substation to -- that's the first  
18 objective.

19               The second objective is to serve the increased  
20 load and customer base south of the Manatee Energy  
21 Center, north of the Bobwhite substation, and east of  
22 I-75.

23               And the third objective is to provide for  
24 another electrical feed between the Manatee Energy  
25 Center and Ringling substation to provide for a diverse

1 path.

2 Q. Are there any intermediate substations planned  
3 for the Bobwhite-Manatee transmission line?

4 A. If I can refer you back to Page 1-1 of the  
5 application.

6 Q. Which is FPL Exhibit 1?

7 A. Yes. The bottom sentence is that FPL is  
8 proposing no intermediate substations for this project.

9 Q. Are you aware of any plans by Florida  
10 Power & Light or others for future substations in the  
11 project area?

12 A. We are aware of three FPL distribution  
13 substations planned within this area. One PRECO  
14 distribution substation, and one PRECO transmission  
15 substation within this area. Their locations have yet  
16 to be determined and won't be determined until sometime  
17 in the future. And it's going to depend on the growth  
18 pattern within the area, and that analysis won't be  
19 conducted until a later time.

20 The locations of these substations did not play  
21 a major -- a primary role in the development of the FPL  
22 preferred corridor.

23 Q. When you refer to PRECO, is that the Peace  
24 River Electric Co-Operative?

25 A. Yes, the Peace River Electric Co-Op.



1 Q. Does Florida Power & Light provide power that  
2 is distributed by PRECO?

3 A. It provides transmission service to PRECO.

4 Q. So it delivers the power to PRECO that PRECO  
5 then distributes; is that correct?

6 A. Yes, it does.

7 Q. Can the Bobwhite-Manatee transmission line be  
8 used to integrate future substations into the  
9 transmission grid?

10 A. Yes, it can. And so can all of the  
11 alternatives proposed. But it is my opinion that the  
12 FPL preferred corridor will provide for the best  
13 opportunity to make those connections in the future,  
14 based on Ms. Mayes' testimony on the density within this  
15 service area.

16 Q. And you're pointing to the area south of State  
17 Road 64 down to the Bobwhite substation; is that  
18 correct?

19 A. That is correct.

20 Q. Did you participate in the study described by  
21 Ms. Analee Mayes that was performed to determine the  
22 appropriate location for this new transmission line?

23 A. Yes, I did.

24 Q. Were you a member of the multidisciplinary  
25 team?

1       A.    I was the engineering member of the  
2 multidisciplinary team.

3       Q.    Would you please generally describe your role  
4 on that multidisciplinary team in the early steps of the  
5 route selection process?

6       A.    In the early steps of the route selection  
7 process, I was involved with determining the study area  
8 boundaries, ensuring that each of the segments that were  
9 determined were buildable. I also determined that right  
10 of way width that would be required within each of the  
11 segments and estimated the costs to construct each of  
12 the segments.

13       Q.    After the preferred corridor was selected, did  
14 you participate in drawing the corridor boundaries  
15 around a preferred route?

16       A.    Yes, I did.

17       Q.    Referring to this map in Exhibit FPL 22, did  
18 you have any primary considerations from an engineering  
19 perspective in the drawing of those corridor boundaries?

20       A.    One of the main themes you will hear from an  
21 engineering perspective from me is flexibility, and the  
22 ability to maneuver around within the corridors to  
23 construct the line in the future. If I can point out at  
24 the north end.

25       Q.    That is north of where the corridor first

1 intersects County Road 675 proceeding north of town?

2 A. Right. We'll start up here at the Manatee  
3 Energy Center, you will notice that the corridor is  
4 large in this area. And this box up in this area is  
5 this size to allow for flexibility and the ability for  
6 us to either come down an existing corridor that's up at  
7 the northern end of here, or come out on the State  
8 Road 62 over to this north-south run that runs between  
9 State Road 62 and County Road 675.

10 The corridor is wide in this, in the area  
11 between State Road 64 and County Road 65 for  
12 flexibility, the ability to avoid both natural and  
13 manmade constraints within the area, the ability to work  
14 with the underlying landowner to determine where the  
15 line could be, and the ability to minimize environmental  
16 impact that we may run into within that area.

17 When you get to the County Road 675 and State  
18 Road 64, the corridor narrows to about 200 feet either  
19 side of the center line of that corridor. The intent  
20 along road rights of way would be to place the  
21 structures either just within or just outside of the  
22 road right of way.

23 Another engineering issue that we looked at was  
24 the crossing of the Manatee River. It was important  
25 that we crossed at a location that minimized the impact

1 at an existing impact so that we would minimize that  
2 effect.

3 When you run from -- when you get over here to  
4 where -- on State Road 64, this area between State Road  
5 64 and University Parkway is, again, wide to allow for  
6 flexibility to collocate with the proposed Dam Road  
7 extension, and for the same reasons as in the other  
8 cross-country area, to, again, have the flexibility to  
9 minimize impact with natural and manmade issues.

10 One other key point of the service territory is  
11 this is State Road 70. And we talked about the Peace  
12 River Electric Co-Op. And essentially what happens is  
13 north of State Road 70 is the Peace River Electric  
14 Company's service territory. And they have distribution  
15 facilities along many of the roads in that -- in that  
16 region north of State Road 70. South of State Road 70  
17 is Florida Power and Light service territory.

18 One of the advantages to the road south of  
19 State Road 70 is that it affords us, from an engineering  
20 perspective, the opportunity to consolidate with the FPL  
21 distribution facilities within the FPL service  
22 territory.

23 And the final engineering constraint is that  
24 here at Bobwhite substation, you will notice that the  
25 corridor expands to include the existing transmission.

1 corridor that runs from the northwest to the southeast,  
2 and that's an important consideration in the location of  
3 Bobwhite substation. It was an important factor in  
4 determining that ultimate location so that we have the  
5 ability to incorporate Bobwhite, the Bobwhite-Manatee  
6 line and the Bobwhite substation into the rest of the  
7 transmission grid system.

8 Q. You mentioned that flexibility was needed,  
9 among other things, to minimize impacts to natural  
10 features.

11 Would a wetland be such a natural feature?

12 A. It would, but in the terms of -- I have tended  
13 to functionalize, calling the environmental aspects of  
14 it a different criteria that we looked at.

15 From my perspective, I was thinking more like  
16 drainage ditches, fences, people -- some of the  
17 landowners in this area have wells and sheds. Those  
18 types of -- well, natural -- I guess those would be  
19 considered more man-made.

20 So the natural facilities might be trees or  
21 wetlands, yes.

22 Q. You mentioned, also, the need for flexibility  
23 at the crossing of the Manatee River. Is the corridor  
24 widened at that location to provide additional  
25 flexibility?

1       A.    The corridor goes from 400 feet wide typically  
2   along the state roads to 500 feet wide in that area.  It  
3   was placed in there to give us a little bit more  
4   flexibility in the placement of the structures across  
5   those bridges.

6       Q.    In the -- at the intersection of University  
7   Boulevard and Lorraine Road, Ms. Mayes described that  
8   angle of the intersection as a sharp angle.  Can that  
9   angle be accommodated in the construction of this  
10  Bobwhite-Manatee transmission line?

11      A.    Yes, it can.  There are several engineering  
12  approaches that can be used to make a turn greater than  
13  90 degrees.  I believe Ms. Mayes had talked about the  
14  corridor being wider in this area to allow for guying of  
15  the structures.

16            Another potential that can be used with the  
17  corridor being wide in this area is turning someplace  
18  else other than at that intersection with Lorraine Road  
19  and University.

20            We may have the ability to turn back in this  
21  area here east, east of Lorraine Road.  And depending --  
22  and once we get into the detailed engineering and look  
23  at the soil conditions, it may be possible to build that  
24  corner without guying.  But in all cases, there are  
25  technical solutions for turns whose angles are greater

1 than 90 degrees.

2 Q. If the solution was to turn east of the  
3 University and Lorraine intersection, would Florida  
4 Power & Light work with the landowner in identifying an  
5 appropriate location?

6 A. Yes, it would. And that holds true throughout  
7 all of these routes, we would work with the underlying  
8 landowner as a part of determining where the route would  
9 ultimately be placed within the corridor.

10 Q. Was the presence of existing distribution lines  
11 within the FPL preferred corridor another engineering  
12 consideration?

13 A. Yes. As I had mentioned, north of State Road  
14 70, the distribution facilities that run alongside of  
15 the roads are Peace River Electric Co-Op.

16 In general, Florida Power & Light does not want  
17 to collocate their facilities with another utility  
18 company, in this case, Peace River Electric Co-Op.

19 It creates operational concerns that are  
20 difficult to overcome, and we would prefer to avoid it,  
21 if we could.

22 THE COURT: Would you help me know where that  
23 is?

24 THE WITNESS: This is State Road 70, sir.

25 THE COURT: Uh-huh.

1 THE WITNESS: And essentially, everything north  
2 of State Road 70, 675, I guess the other corridor  
3 we're talking about is 70 and 675 and State Road 64  
4 for the purposes of this hearing are where the Peace  
5 River Electric Co-Op facilities are.

6 BY MS. RAEPPLE:

7 Q. And there are overhead distribution lines on  
8 State Road 70, County Road 675, both south and north of  
9 the river?

10 A. Yes.

11 Q. As well as State Road 64; is that correct?

12 A. Yes. State Road 62 is Florida Power & Light's  
13 service territory. So up near the Manatee Energy Center  
14 on State Road 62 is Florida Power & Light.

15 Q. Is there a similar concern with underbuilding  
16 Florida Power & Light distribution lines on the  
17 Bobwhite-Manatee transmission line?

18 A. No, we are the same operating company, so we  
19 have control of the transmission and the distribution  
20 component.

21 Q. Would you please look at the application for  
22 corridor certification, which is FPL 1, and look at the  
23 drawings in Figures 1.3-1 through 1.3-4, as well as the  
24 drawing in Figure 1.3-7, and tell us, please, what those  
25 drawings show.



1       A.    You don't have the ability to put up split  
2 screens, do you?

3       Q.    No, we don't.  We'll have to show them one at a  
4 time.

5       A.    Figures 1.3-1, 1.3-2 represent what we refer to  
6 as a vertical, single pole vertical construction --  
7 single pole spun concrete vertical design.

8               Figures 1.3-3 and 1.3-4 are also spun concrete  
9 poles.  We'll refer to this as a triangular design.

10              They are essentially the same structures,  
11 except for the way the insulator hardware are installed,  
12 this triangular configuration versus the vertical.  And  
13 if we could, I'll talk from the vertical configuration,  
14 because it is likely it will be the more prevalent  
15 design used on the Bobwhite-Manatee project.

16              Like I said, this is a spun concrete pole.  
17 Essentially what this is is a steel reinforced cage with  
18 concrete spun into it, high strength concrete.

19              The poles are, in general, we're representing  
20 it as 100-foot tall out of the ground, and it ranges  
21 anywhere from 18 to 25 feet below ground, depending on  
22 the soil conditions.

23              When they install these in the ground, they  
24 auger out a hole.  In general, a hole ranges anywhere  
25 from 54 inches to 60 inches wide.  The hole is dug down

1 20 feet, let's just say for discussion purposes. The  
2 pole is installed into the hole, and then a rock  
3 backfill is put in around the hole, around the pole and  
4 compacted.

5 The poles are tapered. So at the bottom they  
6 could be 48 inches or so wide, you know. Typically for  
7 a project like this, 43 to 48 inches wide. And as you  
8 go up the pole, the pole funnels down or tapers, and the  
9 top may only be 16 inches or so wide at the top.

10 At the top of the pole are the hardware. I  
11 actually have some toys to look at, if you want. Always  
12 bring toys along.

13 The insulator material -- and, Your Honor, I  
14 can bring these up to you, if you would like to look at  
15 them.

16 The insulator material are the devices that  
17 hold the conductor off from the pole. They're a polymer  
18 or a rubber-filled insulator that holds the conductor  
19 and that away from the pole. These insulators are about  
20 10 feet long, so needless to say, I didn't bring the  
21 whole thing with me.

22 And they are a polymer. In the past we used to  
23 use porcelain insulators, but these are a much more --  
24 these are much better design and much -- they hold up a  
25 lot longer than the old porcelain insulators. And we

1 went to these a number of years ago.

2 You will notice that there's a second insulator  
3 that shows on these diagrams, and one of the things that  
4 I wanted to point out, and nobody can read that, but on  
5 the drawings themselves, these are called braces. And  
6 you may hear me refer to them as braces.

7 We show them on a bundle design conductor,  
8 because on very long spans, probably in the 600 to  
9 750-foot range, we may need these struts to be installed  
10 on the structures. For shorter spans and lower  
11 structures, they may not be needed. So we show them  
12 just in case we need them. It's possible that we won't.

13 At the end of the insulator are the conductors.

14 And we're going to refer to this as a bundle  
15 conductor. And this is the conductor that will be used  
16 on the project. It's an aluminum conductor with a steel  
17 core in the middle, and the bundle represents the fact  
18 that there will be two of them, one on top of the other,  
19 clipped to the end of the insulator.

20 Are you interested --

21 THE COURT: There are two of them?

22 THE WITNESS: Yes, sir, there will be two of  
23 them or a bundle at the end of the insulator.

24 THE COURT: Is that typical? I mean, in the  
25 illustrations that we saw of other lines, was that

1       how it's done?

2               THE WITNESS: There may have been some of those  
3 lines that had two conductors on them. I don't  
4 recall the exact details of the picture, but on a  
5 circuit of this nature, it is typical for this type  
6 of a structure.

7               There is an example of it.

8 BY MS. RAEPPLE:

9               Q. Mr. Hahn, if you would look at FPL 9, which is  
10 a photograph. Does that photograph show a bundled  
11 conductor?

12              A. Yes, that is a bundle conductor. That's  
13 actually one of the projects that I designed in the  
14 past. That is the Charlotte Widden 230kv line, and it  
15 uses this exact same structural design.

16              Q. And is this the photo that was used during  
17 public outreach to show the public what this project  
18 would like look?

19              A. Yes, it was.

20              THE COURT: Does each line carry 230 kilovolts?

21              THE WITNESS: Sir, the 230 kilovolt is a  
22 measurement of the voltage. And the measurement  
23 takes place from this point to this point or from  
24 this point to this point, so it's a measurement of  
25 voltage between those wires.

1           What the two wires do, it allows for a doubling  
2           of the current or a doubling of the amount of water  
3           you can push down the line. The pressure is related  
4           to the 230 kilovolts.

5           So the advantage of a bundled circuit is that  
6           in lieu of having a second circuit on the back of  
7           this, you put on a second set of conductors, and you  
8           get double the capacity capable of running down the  
9           lines.

10       BY MS. RAEPPLE:

11       Q.    Mr. Hahn, would you now look at Figures 1.3-1  
12           and compare it to 1.3-2 and similarly compare figure  
13           1.3-3 to 1.3-4 and tell us what the differences are  
14           between those figures, those sets of figures?

15       A.    The difference between 1.3-1 and 1.3-2 is that  
16           on 1.3-2 we show that these poles can be designed to  
17           accommodate underbuilt distribution facilities, FPL  
18           distribution facilities, or underbuilt communications  
19           cable, such as telephone or TV cable.

20           Generally, you will see this type of design  
21           used on road right of way alternatives to allow for  
22           collocation opportunities with the underlying -- the  
23           other facilities along the route.

24           The same holds true for the triangular  
25           configuration, the difference between 1.3-3 and 1.3-4 is

1 the same. The difference is one is illustrated without  
2 underbuilt facilities. And then this one, the 1.3-4,  
3 has the underbuilt distribution facilities.

4 Q. Thank you.

5 Would you now refer to Figure 1.3-7 as well as  
6 Figures 3.1-2 and 3.1-3 and describe the typical access  
7 road and structure pad that will be used for the  
8 Bobwhite-Manatee transmission line?

9 MR. HALL: Could we get a page number, please,  
10 Ms. Raepple, for the figures that begin with 3.

11 MS. RAEPPLE: Yes. It's page 3-4 and page 3-5  
12 contain Figure 3.1-2 and 3.1-3.

13 MR. HALL: Thank you.

14 A. Figure 1.3-7 is a representation of a typical  
15 access road that Florida Power & Light would use on  
16 cross-country segments. The typical access road is  
17 about 14-foot wide, and it's constructed with -- it's a  
18 dirt fill. It is an unpaved surface.

19 One of the things that we look at is -- that's  
20 important in constructing access roads is that the  
21 natural water flow underneath or near these access roads  
22 is maintained. So there are provisions for culverts to  
23 be installed under access roads where -- where necessary  
24 to maintain the natural flow within the area.

25 They are typically about six inches -- one of

1 the alternatives that we use is typically about six  
2 inches above the road surface. Another alternative that  
3 we have been working with the DEP on, or we call them at  
4 grade roads, where you go in and you lower the area, and  
5 then you put in a hard pan type of surface, and you  
6 build the road back up to the existing grade that was  
7 there originally.

8 In both cases, the important aspect of any of  
9 these access roads is to maintain the existing water  
10 flow pattern within the area.

11 If I can refer you then to Figure 3.1-2, we  
12 talk about access roads and structure pads. That was  
13 the access road component of it.

14 And the access road would typically be  
15 represented by the area over here, the access road. At  
16 locations where the soil conditions don't warrant the  
17 ability to hold our maintenance vehicles up, soft soil  
18 conditions or wet, there may be a need for what's called  
19 an access pad.

20 And, in general, they are a work area around  
21 the structures that enable the crews to set their  
22 vehicles up, like bucket trucks or cranes, whatever they  
23 may need to both, first to construct the line, and then  
24 to maintain them in the future.

25 These areas are typically about 20 feet around

1 to allow for the outriggers to be set up on the  
2 equipment. So that's the key.

3 They are kept to a minimum. The key is during  
4 the detailed design when we are laying these out is that  
5 the crews have the ability to install the pole and  
6 maintain them in the future.

7 As is the case with the access road, the  
8 structure pad locations can and would be designed with  
9 culverts underneath them to maintain the natural flow.

10 In addition to that, there are options to build  
11 these at grade, so long as they dig out the area and put  
12 in an at grade subbase that would hold the vehicles up.  
13 And that would be another alternative that we could use  
14 in these areas for the structure pads.

15 Q. And you mentioned the culverts maintaining  
16 preconstruction flows, will the location and sizing of  
17 culverts be subject to regulatory review in the post  
18 certification review by the Department of Environmental  
19 Protection under the conditions of certification?

20 A. Yes, they will.

21 Q. With regard to pole height that you described  
22 in referring to these figures, are there circumstances  
23 when the pole height may be something other than 100  
24 feet?

25 A. Yes. One of the things you are going to hear



1 consistently is the flexibility of the design throughout  
2 these areas. Pole heights can vary, depending on both  
3 natural and man-made constraints along the route. For  
4 example, when you are crossing a road or the Manatee  
5 River, for example, it's possible in order to minimize  
6 or mitigate any wetland impacts, that the spans may have  
7 to increase, therefore, the height of the pole would go  
8 up to maintain the height -- the minimum height  
9 requirements as required by the permitting agencies.

10 Q. That's the minimum height requirements of the  
11 conductors?

12 A. Correct. And -- correct. So the height of the  
13 pole may be higher in areas like that.

14 Or if they wanted to -- if there was a bridge  
15 being built over some other road and we needed to get  
16 over a bridge or distribution facilities that were  
17 fairly high, the pole height could vary in an upward  
18 direction.

19 The other side of that is, for example, along  
20 Fruitville Road where there are airstrips along  
21 Fruitville Road. In areas like that, the poles would be  
22 shorter in order to allow for the ability for the  
23 airstrips to continue their use. So the variability in  
24 heights will depend on ultimately where the route is and  
25 what the conditions are to maintain all of the

1 applicable height requirements.

2 THE COURT: Ms. Raepple, I wonder if we could  
3 have Mr. Hahn tell us what that range is.

4 BY MS. RAEPPLE:

5 Q. Sure. Could you tell us the approximate range  
6 of heights that the Bobwhite-Manatee transmission line  
7 poles could be on any of the corridors under  
8 consideration in this proceeding, recognizing that it  
9 has not been finally designed. So give us  
10 approximations, please.

11 A. Again, based on the actual design not being  
12 completed, the range from what I've looked at being at  
13 the -- along the airstrips near Fruitville Road in the  
14 range of 55 to 60 feet, in that range, to 100, 105 feet  
15 probably is where we would be on the high end, based on  
16 what's there today.

17 THE COURT: Thank you. That helps.

18 BY MS. RAEPPLE:

19 Q. When the pole is lower to address something  
20 like an airstrip, does that minimize or eliminate the  
21 ability to underbuild distribution on the pole?

22 A. Whenever you get much lower than about 85 feet,  
23 it's going to become very difficult to allow for  
24 underbuilt facilities on it.

25 The other aspect of lowering poles or raising

1 poles, it's sort of like a three-dimensional model.  
2 When you raise poles, spans can be made bigger. When  
3 you lower poles, you need more poles in order to  
4 maintain the minimum height. So the lower you go, the  
5 more poles there will be along the route.

6 And in addition to that, the right of way may  
7 get wider in order to assure that you comply with all of  
8 the applicable requirements for the line, such as EMF  
9 and NESC codes. So, generally, there are tradeoffs  
10 associated with every aspect of it.

11 Q. And the EMF requirements are the electric and  
12 magnetic field standards that have been adopted by the  
13 Department of Environmental Protection; is that correct?

14 A. Yes.

15 Q. And NESC is the National Electrical Safety  
16 Code, which you are required to comply with pursuant to  
17 Public Service Commission regulations; is that correct?

18 A. That is correct.

19 Q. Can a 138kV structure be similar in height and  
20 design to a 230kv structure?

21 A. Yes, it can. As is the case with 230kV,  
22 there's a lot of variability depending on where the  
23 138kV line is placed and what type of constraints it's  
24 trying to avoid or mitigate. The range of 138kV heights  
25 overlap with 230kv for any application you can consider.

1 Q. Did you see the photographs that Ms. Mayes  
2 presented during her testimony?

3 A. Yes, I did.

4 Q. Were the structures that were depicted in those  
5 photographs generally representative of the visual  
6 presentation of the Bobwhite-Manatee design?

7 A. Generally, yes.

8 Q. Are there any advantages of using a bundled  
9 conductor, which is, as you have explained, the two  
10 wires per phase, rather than a single conductor per  
11 phase?

12 A. As I had stated earlier, the main benefit to  
13 the bundle is the ability to double the current through  
14 the line.

15 Q. What will be the typical span length between  
16 the Bobwhite-Manatee transmission line structures?

17 A. What we've modeled in the application are 450  
18 foot spans along road rights of way, and 600 foot spans  
19 on the cross-country rights of ways. Those will likely  
20 vary, depending on what we find -- where the ultimate  
21 route is placed and what the underlying constraints will  
22 be within that area. There is flexibility in those  
23 sizings.

24 Q. Will the typical range of spanned length be  
25 between 250 feet and 750 feet?

1 A. Yes, that's what we placed in the application.

2 Q. What are some of the design considerations that  
3 could cause the span length to vary between structures?

4 A. The main item that will control the span length  
5 are the types of underlying constraints that you are  
6 faced with, the ability to span wetlands or avoid  
7 wetlands by adjusting the spans longer or shorter, the  
8 ability to avoid drainage ditches or farm operations or  
9 wells on underlying landowners, the ability to move in  
10 different directions within the corridor, that  
11 flexibility exists in adjusting span length. The  
12 heights of the poles that are requested could also  
13 affect the spans.

14 Q. Can the distance between poles be shortened or  
15 lengthened to accommodate the crossings of other  
16 transmission lines or highways, waterways, distribution  
17 lines in other aerial utilities?

18 A. Yes. In this study area, it's predominantly  
19 going to be used for crossing roads and distribution  
20 facilities, adjusting -- for example, at the airstrips  
21 along Fruitville Road, as the poles would come down in  
22 our earlier discussion, those spans will get to be very  
23 short in those areas, probably in the 250 foot range.  
24 Down there would be an example of what we would do  
25 there.

1           Q.    You showed us the typical access road and  
2           structure pad designs. Do you anticipate constructing  
3           such access roads and structure pads throughout the  
4           Bobwhite-Manatee transmission line?

5           A.    No. Based on my observations of the majority  
6           of the study area, I think there will be some, but there  
7           will be minimum.

8                    We will do all that we can to minimize where  
9           those types of structure -- structure pads and access  
10          roads go. In general, the majority of the area is  
11          relatively high and dry.

12          Q.    Can you tell us where you anticipate the need  
13          to build access roads and structure pads for the  
14          Bobwhite-Manatee transmission line?

15          A.    In general, along road rights of way there  
16          would be no need for access roads. It is possible at  
17          some locations along -- even along road rights of way  
18          where the drainage ditches alongside of the road prevent  
19          access, that we may need to construct an access pad,  
20          even along road rights of way. But based on my  
21          observations, I think there may be only a -- two or  
22          three locations where that may even be possible.

23                   On the cross-country routes where the soil  
24          conditions are good, dry, and it has the ability to  
25          support our vehicles, no structure pads or access roads

1 would be built. And that is the majority of this study  
2 area. In areas where the soil is not good or it's wet,  
3 then access roads would need to be built in areas like  
4 that. But it is my opinion that those will be rare on  
5 this project.

6 Q. Where the soil is wet or soft, do you also have  
7 an option of spanning those areas without the placement  
8 of an access road?

9 A. Yes. And in all cases, it will be our intent  
10 to avoid, to span, or relocate around and avoid wetland  
11 type of areas.

12 Q. Next, I would ask you to please refer to  
13 Exhibit FPL 48, which has been received into the record,  
14 and have you describe for us what this document shows.

15 A. This document, FPL Exhibit 48, is a schematic  
16 drawing that illustrates the steps in constructing a  
17 230kv line.

18 Q. Using FPL 25, would you please describe those  
19 stages of transmission line construction?

20 A. We're going to start in this upper left-hand  
21 corner.

22 Q. Excuse me. It's FPL 48?

23 A. 48.

24 We're going to start in this upper left-hand  
25 corner, and this all takes place after the corridor is

1 certified.

2 What will start first is that we'll start  
3 surveying the area. They will look for property lines,  
4 corners, existing easements and right of ways that may  
5 be out there that we may be able to utilize.

6 They will document natural and manmade  
7 facilities, such as ditches, barns, homes, buildings  
8 along the -- along the proposed route within the  
9 corridor.

10 Concurrently, we will be working with the  
11 underlying landowners to determine where the right of  
12 way should be and where the poles should be located  
13 within the right of way.

14 Easement documents will be created to establish  
15 the legal rights to utilize the ultimate right of way.  
16 In addition to that, we'll be determining at that point  
17 where and if access roads and structure pads are needed,  
18 and where there would be -- where they would be located  
19 within that area.

20 And that's all representative in this upper  
21 left-hand corner. There's a lot of activities that take  
22 place once the certification begins.

23 Q. What is the next step of transmission line  
24 construction?

25 A. Once the right of way is established, right of



1 way prep is what takes place, and that's this little  
2 wording up here. That's this little area up here.

3 Right of way prep along road rights of way is  
4 fairly minimum. It's essentially trimming back -- tree  
5 trimming, and removal of trees that may interfere with  
6 the operation and maintenance of the line.

7 Similar to that along cross-country routes, you  
8 have that same activity where trees, in general, that  
9 will be greater than 14 feet in height would be removed  
10 from the right of way and upland type of areas, and the  
11 width of an access road, 14-foot wide, may be cleared to  
12 allow for the access vehicles to get in.

13 Beyond that 14-foot, trees and vegetation that  
14 won't exceed 14 feet in height will likely remain. So  
15 there will just be the 14-foot strip, and trees that  
16 won't grow greater than 14 feet in height.

17 Access roads would be constructed where they're  
18 needed. Culverts installed in areas where they are  
19 needed, also.

20 In wetland areas, herbaceous vegetation  
21 generally lower than 14 foot is left alone. We don't do  
22 much with the vegetation in wetland areas.

23 Similarly, though, any trees or brush that may  
24 get greater than 14 feet is selectively removed from  
25 wetland areas, so that it won't interfere with the

1 operation and maintenance of the line.

2 Q. Would you next describe the construction of the  
3 access roads and structure pads?

4 A. What happens with access roads and structure  
5 pads is the boundaries of the access road and the  
6 structure pad would be surveyed and staked out. The  
7 natural flow of the water, of the wetland areas that  
8 they are traversing would be mapped, and fresh fill  
9 would be hauled in from off set -- fresh clean fill  
10 would be hauled in from off site, the culverts  
11 installed, and the roads built over the culverted  
12 material.

13 Q. You mentioned the trimming and removal of some  
14 vegetation. What right of way clearing methods would be  
15 used for uplands and wetlands?

16 A. For uplands, chain saws would predominantly be  
17 used, and the work would be predominantly out of bucket  
18 trucks for that clearing.

19 For wetland, it's much more selective. In  
20 general, the herbaceous vegetation is left alone. Any  
21 trimming that does take place is done selectively by  
22 hand, in general, with very low pressure type of  
23 vehicles within the wetland areas.

24 Q. Will any techniques be used in wetlands to  
25 minimize the potential for erosion of fill that is used

1 in construction?

2 A. In all cases where we're constructing structure  
3 pads or roads, sedimentation control will be utilized.  
4 You see a lot of the little black strip paper along  
5 construction sites; turbidity control is one example of  
6 something we may use. In some situations we've used hay  
7 bales to control runoffs and spillage of the dirt from  
8 getting into the wetland areas.

9 Where we create slopes or banks, sodding or  
10 mulching will take place to control the sedimentation.

11 Q. Are the black strips referred to as "silt  
12 fences"?

13 A. I have heard them called turbidity screening,  
14 silt fences. I think it's a matter of who you talk to  
15 what they are called.

16 Q. Referring again to Exhibit FPL 38, what is the  
17 next step of construction?

18 A. The next step is called the material hauling  
19 and spotting. What generally happens in that case is  
20 the pole structures are brought out within the right of  
21 way and spotted along the right of way where they're  
22 going to be placed.

23 In some instances the crews come out and they  
24 will install the hardware while the -- the insulators  
25 and the clamps that hold the conductor at the end of the

1 insulators while the structures are on the ground.

2 Some crews, some companies will install the  
3 pole up in the air and then come back and put that  
4 hardware on at a later time. So it generally depends on  
5 the company that ends up doing the work.

6 The next piece is where you install the pole.  
7 And what happens then is a digger truck comes out, and  
8 it augers the hole. Again, it's, in general, a 60-inche  
9 wide hole. A hole is dug down about 20 feet, anywhere  
10 from 18 to 25 feet. The pole is stood up and then  
11 installed into the hole, rock backfill is placed around  
12 the pole and then vibrated in.

13 So now the pole is up in the air, and the  
14 insulators and the end clamps are hanging on the end of  
15 the insulator.

16 Q. On this FPL 48, the pole setting appears to be  
17 occurring at a heavy angle. Would anything further need  
18 to be installed at such a heavy angle?

19 A. Well, we'll make reference to the drawing. If  
20 this is the angle or the turn where the pole is going  
21 in, if it's a heavy angle, in general, guys will be  
22 installed out from the pole to accommodate the turn for  
23 the conductor.

24 And what the guys do is back up the conductor.  
25 The tension of the conductor has to be supported, and

1 the function of the guy is to support the tension of the  
2 wire in the opposite direction of the wire.

3 Q. What is done after the structures are erected?

4 A. Once the structures are up, the rest of it  
5 happens in fairly rapid succession. What you will see  
6 is the crews will install little rollers on the edge of  
7 the insulators. And these rollers -- sometimes you will  
8 hear the terminology dolly blocks or rollers. And they  
9 will be installed on all of the poles along where they  
10 are going to string in the conductor and the overhead  
11 ground wire.

12 You will see rope. At one end of the operation  
13 will be spools of wire. And, in general, the distance  
14 associated with this is about 10,000 feet. The magic of  
15 10,000 feet is that is about how much wire you can get  
16 on to a reel.

17 So at one end you will have the reels. At the  
18 other end you will have what is called tuggers or  
19 pullers.

20 Ropes will be rolled through the wheels, and  
21 then the ropes will pull the conductor through the  
22 wheels down to the other end where the tugger is.

23 The same thing with the overhead ground wire,  
24 it's pulled down to the far end where the tuggers are.

25 Once the wire is installed and it's all in

1 place, what they do to it is they tension it to the  
2 design standard for the conductor, and then they clip it  
3 into the end of the insulators, to the clamps on the end  
4 of the insulators, and then they move on. After that  
5 the line is tested and placed in service.

6 Q. You mentioned the overhead ground wire. Is  
7 that the very top wire on the transmission line?

8 A. Yes, the overhead ground wire is the top  
9 conductor. It's generally a smaller wire than this.  
10 It's typically an aluminum wire, and its function is to  
11 protect the line from lightning. It's essentially a  
12 lightning shield is what it is.

13 Q. When you say it is typically smaller than this,  
14 you are saying it's typically smaller in diameter than  
15 the conductor wire?

16 A. Yes. It's much smaller than the diameter of a  
17 conductor wire. I don't know exactly what size that  
18 will be. It will be determined during the final design  
19 stage. But it will definitely be smaller than this.

20 Q. While not shown on FPL 48, although I guess I  
21 see the words clean up. Is there another step to  
22 construction once the conductors and overhead ground  
23 wire are installed?

24 A. Once the line is completed, what the crews come  
25 back and do is they clean up the right of ways within

1 where -- on cross-country routes, for example, we may  
2 have rutted up the area. The ruts will be smoothed,  
3 smoothed out. Areas that need to be sodded will be  
4 sodded or seeded. And essentially what happens is the  
5 right of way is put back into its natural state.

6 Q. For a typical mile along the Bobwhite-Manatee  
7 transmission line, how long would a construction crew be  
8 in the area to complete each stage of construction,  
9 approximately?

10 A. The time any one area will see construction  
11 activities will vary. From a surveying perspective, it  
12 may be a couple of days. The right of way prep area may  
13 be a few more days here and there. The installation of  
14 the poles, typically they will do two or three in a day.  
15 So they will be moving along the right of way as they  
16 proceed.

17 The stringing operation may be a two-week  
18 process in where you may see the crews periodically  
19 throughout that two weeks.

20 In general, a good rule of thumb is about a  
21 month a mile is typically what you will see.

22 Q. In those locations where the preferred corridor  
23 is collocated with a state or county road within it,  
24 where would Florida Power & Light propose to place the  
25 Bobwhite-Manatee transmission line in relation to that

1 road?

2 A. If I can refer you back to this exhibit and  
3 this little road here at the bottom will be the state or  
4 county road.

5 Q. That exhibit being FPL 48?

6 A. Yes, ma'am. FPL 48. The poles would either be  
7 placed just inside road right of way, not on the road  
8 surface, or just outside of road right of way. In  
9 general, they will closely abut the edge of the right of  
10 way one side or the other.

11 Q. During construction along existing public  
12 roads, will Florida Power & Light comply with the  
13 Florida Department of Transportation's maintenance of  
14 traffic rules?

15 A. Yes, in all cases we will comply on state and  
16 county roads, we will comply with the FDOT, Florida  
17 Department of Transportation Utility Accommodation  
18 Guidelines for Traffic Control.

19 Q. In those areas where the transmission line is  
20 placed just immediately inside or outside of road right  
21 of ways, do you anticipate there to be any impact on  
22 vehicular traffic adjacent to those roads during  
23 construction?

24 A. Yes, I do. Most of the roads within the study  
25 area are narrow, are two-lane roads with small



1 shoulders. It is likely that there will be traffic  
2 impact during the installation of the poles where one  
3 lane of traffic will need to be blocked during the  
4 setting operations for the structures along the routes.

5 Q. Will that occur along -- do you anticipate lane  
6 closures along every two-lane road within the study  
7 area?

8 A. Yes, I think there will be -- there will be  
9 lane closures along all of the two-lane roads. Some of  
10 the areas, the shoulders are a little wider than others.  
11 But for the most part, there will be intermittent  
12 closures along all of the alternatives, along roads.

13 MR. HALL: Your Honor, would it be possible to  
14 take a short break at this point?

15 THE COURT: Okay. Let's take a ten-minute  
16 break.

17 (Recess.)

18 THE COURT: You may continue.

19 BY MS. RAEPPLE:

20 Q. Mr. Hahn, how long will the entire construction  
21 process take for the Bobwhite-Manatee transmission line?

22 A. Around 13 to 15 months it will take to  
23 construct the line.

24 Q. If the Bobwhite-Manatee transmission line is  
25 placed across agricultural land, will Florida

1 Power & Light be able to locate its poles to avoid  
2 drainage ditches, irrigation pipes, wells, and other  
3 farming infrastructure?

4 A. Yes, it will. The key theme is the  
5 flexibility. The corridors, especially on the  
6 cross-country segments are wide, so you have the ability  
7 to move, we'll call it from east to west.

8 The other aspect of flexibility was the span  
9 line. So we have the ability to adjust north to south,  
10 so to speak, also. That ability will allow us -- afford  
11 us the opportunity to work with the underlying  
12 landowners to avoid conflicts with drainage ditches and  
13 culverts, as you had mentioned.

14 Q. As well as the other farming infrastructure?

15 A. Yes.

16 Q. Will the Bobwhite-Manatee design allow farm  
17 equipment to pass beneath the conductors?

18 A. We will work with the underlying landowners to  
19 determine what their height requirements may be. We  
20 have similar types of situations in citrus groves and in  
21 sugar cane fields throughout the state where we actually  
22 went in and determined what the maximum height of their  
23 equipment was, and we designed the line to accommodate  
24 that equipment in light of OSHA type of requirements.

25 So, yes, we will work with the underlying

1 landowners to assure that works.

2 Q. Do you also have similar transmission lines  
3 that run through tomato fields elsewhere in Florida?

4 A. Yes, in fact the lines that come out of the  
5 Manatee Energy Center and go towards the west traverse  
6 tomato fields and...

7 Q. Would Florida Power & Light work with the  
8 underlying owners of the agricultural operations,  
9 similar to the way you said they have done in the past,  
10 to ensure that the farm equipment could pass beneath the  
11 conductors?

12 A. Yes, we will.

13 Q. Okay. If agricultural land is currently fenced  
14 with locked gates, will Florida Power & Light do  
15 anything to ensure that the secure nature of that  
16 agricultural area is maintained once the  
17 Bobwhite-Manatee transmission line is in place?

18 A. As is the case with the ability to work with  
19 the farm equipment, we will also work with the  
20 underlying landowners to assure that the security of  
21 their property is kept intact during the construction  
22 operation and maintenance of the Bobwhite-Manatee line.

23 Q. Does Florida Power & Light do that with any  
24 parcel of land that is fenced and then crossed by a new  
25 transmission line?

1           A.    Yes.  We do that with all the underlying  
2   landowners.  We are cognizant of what their uses are,  
3   and we work -- we do -- we work to assure that we comply  
4   with their needs to the best of our ability.

5           Q.    Will Florida Power & Light coordinate with any  
6   agricultural operations crossed by the Bobwhite-Manatee  
7   transmission line to ensure that utility personnel do  
8   not come on the agricultural land in a manner  
9   inconsistent with the label instructions for any  
10   pesticides used on the farm to the extent feasible?

11          A.    Yes, we will.

12          Q.    Will the transmission line, the  
13   Bobwhite-Manatee transmission line, be constructed,  
14   operated and maintained in compliance with any codes,  
15   standards or industry guidelines?

16          A.    Yes.  Several of the codes and standards that  
17   would be used, would be like the National Electric  
18   Safety Code.  Where we cross the Manatee River will have  
19   to be in compliance with the Army Corp of Engineers.  
20   North of State Road 64, we have the Southwest Florida  
21   Water Management District lands that we're going to be  
22   crossing.  The Florida Department of Environmental  
23   Protection standards for electric and -- electric and  
24   magnetic fields, any applicable Manatee and Sarasota  
25   County ordinances, such as the noise requirements, the

1 Florida Department of Transportation Utility  
2 Accommodation Manual, IEEE, the Institute of Electrical  
3 Electronics Engineers, and many of Florida  
4 Power & Light's own numerous design standards will all  
5 be adhered to.

6 Q. Are there any applicable design codes,  
7 standards, or industry guidelines for this type of a  
8 facility with which the Bobwhite-Manatee transmission  
9 line will not comply?

10 A. Not that I'm aware of.

11 Q. Would you next, please, describe for us the  
12 maintenance techniques that are proposed for the  
13 Bobwhite-Manatee transmission line?

14 A. Maintenance on these new structures is --  
15 they're very low maintenance. These are concrete poles  
16 with polymer insulators. There's not a lot that happens  
17 to these new lines.

18 Periodically, there would be patrols sent out  
19 along the route, either by small pickup truck or by air.  
20 They would look to see if there were any conflicts  
21 starting to arise, such as trees or other encumbrances  
22 growing in towards the line.

23 If problems were found, crews would be sent out  
24 to make repairs, but very low maintenance.

25 Q. What about maintenance of the right of way as

1     opposed to the transmission line itself? Could you  
2     please describe that?

3           A.     Well, the key importance to the maintenance of  
4     the right of way is two-fold. To maintain -- to  
5     continue the operation of the line in a safe and  
6     reliable manner and to assure that the crews have access  
7     to the facilities. Those are the two main reasons for  
8     right of way maintenance.

9           In general, right of way maintenance would  
10    consist of along road rights of way, general tree  
11    trimming types of activities along road rights of way.  
12    On cross-country, similar tree trimming type of  
13    activities for anything that may present an operational  
14    or reliability issue to the line.

15           In addition to that, the roads and culvert  
16    systems, if they needed to be repaired or maintained to  
17    assure that they were kept in the state that they were  
18    originally designed to function as.

19           Q.     Will the transmission line -- will the  
20    Bobwhite-Manatee transmission line comply with good  
21    engineering practices for the design of such a facility?

22           A.     Yes, it will.

23           Q.     Next, I would like to ask you to compare the  
24    Florida Power & Light preferred corridor to the  
25    alternate corridors offered by intervenors.

1 First, are you familiar with the alternate  
2 corridors proposed by Schroeder-Manatee Ranch and Lake  
3 Club Investors, as well as those proposed by Taylor and  
4 Fulton?

5 A. Yes, I am.

6 Q. I'm directing your attention to FPL 7 where  
7 those alternates are depicted; the SMR corridors in red,  
8 and the Taylor and Fulton in blue.

9 From an engineering perspective, are the  
10 alternate corridors proposed by SMR and Taylor and  
11 Fulton appropriate for placement of the Bobwhite-Manatee  
12 transmission line?

13 A. Yes, all the corridors available for  
14 certification are appropriate for transmission lines.

15 It is my opinion, however, that the Florida  
16 Power & Light provides for the best overall balance.

17 Q. Are you familiar with this Exhibit FPL 21,  
18 which is a chart comparing the FPL preferred corridor to  
19 the alternate corridors?

20 A. Yes, I am.

21 Q. Did you participate in the preparation of this  
22 chart?

23 A. I participated in Row E, Row F, Row G, and  
24 Row H.

25 Q. That's on the first page of FPL 21?

1 A. Yes, it is.

2 Q. Using this exhibit, could you please describe  
3 the differences from an engineering perspective between  
4 Florida Power & Light's preferred corridor and the SMR  
5 Alternate Number 1?

6 A. Yes, I could. The way I think, from an  
7 efficiency perspective, if we can go back to FPL -- is  
8 it FPL 7? And what I will do is I will compare them  
9 side by side.

10 Q. Thank you.

11 A. And what we are going to compare first is the  
12 first sheet, which is the FPL preferred corridor. And  
13 primarily, the comparison will take place from where  
14 they differ.

15 So the FPL preferred runs along State Road 64,  
16 the cross-country piece for the collocation with the  
17 Dam Road extension, University Parkway, and then  
18 Lorraine Road, versus SMR 1 that comes down County  
19 Road 675, State Road 70, Verna Road, and then  
20 Fruitville Road back into the substation.

21 First of all, the FPL preferred corridor, from  
22 an engineering perspective, is about 4.1 miles shorter  
23 than SMR 1.

24 On State Road 64, SMR 1, one of my concerns  
25 with State Road 64 is two-fold. Along State Road 64,



1 this is the Peace River Electric Co-Op service  
2 territory. And there are Peace River facilities on the  
3 north side of State Road 64, and they serve houses along  
4 the south side of State Road 64 and the park on the  
5 north side.

6 One advantage to SMR Number 1 is that it  
7 departs from State Road 64 just to the west of the  
8 crossing of the Manatee River. On the south side of  
9 this Manatee River, there are no PRECO distribution  
10 facilities. So PRECO avoids my concern with the  
11 collocational constraint of PRECO in this area.

12 Next --

13 Q. I'm sorry. I didn't understand that.

14 Where is the constraint with PRECO avoided?

15 A. Essentially, on the south side of this bridge,  
16 where we cross the bridge, there are no distribution  
17 facilities on the south side of that bridge. What is  
18 there are communications cables, telephone lines. The  
19 PRECO distribution facilities are on the north side of  
20 this area.

21 Q. This area being the east-west run of the FPL  
22 preferred corridor?

23 A. Correct. The east-west run of State Road 64 of  
24 the FPL preferred corridor.

25 It is my intention or my preference to cross

1 the river on the south side of the bridge in that area,  
2 and on the south side of that bridge in that area there  
3 are no PRECO distribution facilities.

4 So SMR along State Road 64 avoids the PRECO  
5 distribution facilities before it turns south on County  
6 Road 675. The FPL preferred corridor does not.

7 The next comparison is from State Road 64 to  
8 University Parkway, a cross-country segment for Florida  
9 Power & Light is in a -- first of all, the corridor is  
10 very wide, and there's a lot of flexibility to minimize  
11 and mitigate conflicts that we run into, such as  
12 environmental conflicts and other natural or manmade  
13 areas down through there. We have the ability to be in  
14 a wide four-lane right of way down through that segment  
15 through here.

16 On the FPL -- on the SMR corridor, this is an  
17 existing two-lane road with relatively narrow shoulders.  
18 As I had stated earlier, and that goes true for State  
19 Road 70, for both of these roads, there will be road  
20 blockage during construction when we are installing the  
21 line.

22 PRECO distribution facilities essentially run  
23 the entire length of both of these runs. In fact, it's  
24 on the west side to just south of an area near what's  
25 called Hunsader Farms. And then it jumps back and forth

1 down the road the rest of the way down County Road 675.

2 In addition, the PRECO distribution facilities  
3 serve both sides of the road. It is likely that FPL  
4 will avoid collocating with PRECO distribution  
5 facilities.

6 So what this would afford is that the FPL  
7 facilities would be on one side of the road, and the  
8 PRECO distribution facilities would be on the other, or  
9 the FPL facilities would jump back and forth.

10 It is very unlikely that our operations group  
11 will agree to collocate with the distribution  
12 facilities, the PRECO distribution facilities.

13 The same holds true for --

14 MR. HALL: Your Honor, I am going to make a  
15 belated objection to his testimony about what other  
16 people in the operations may or may not agree to. I  
17 don't think a foundation has been laid for that, and  
18 it is hearsay.

19 THE COURT: Well, his answer -- his answer  
20 seemed to contain both an engineering aspect of  
21 what -- of an engineering concern and likely -- and  
22 the engineering practice, as well as futuristic  
23 concept. But I'm going to overrule, because I think  
24 it does.

25 I took it to be an engineering analysis of the

1           problem and FPL's past practice with regard to that  
2           problem.

3 BY MS. RAEPPLER:

4           Q.    Mr. Hahn, would you continue with your  
5 description of the State Road 70 situation with regard  
6 to existing PRECO distribution lines?

7           A.    On State Road 70, the PRECO distribution  
8 facilities run along the north side of the road for  
9 about a half mile, and then they transfer back over to  
10 the south side and run along the south side.

11                   In this area here, the PRECO distribution  
12 facilities do also feed both sides of the road.

13                   From a construction perspective and an  
14 engineering perspective, State Road 70 has, I believe  
15 it's a 55 mile an hour speed limit. A lot of heavy  
16 truck traffic running along this road, and the shoulders  
17 are relatively narrow, and they drop off pretty rapidly  
18 in this area.

19                   For all the pole locations constructed within  
20 this area, we will need to block one lane of traffic  
21 along State Road 70 within this area.

22           Q.    Now, I want to ask you a couple of follow-up  
23 questions. You mentioned Hunsader Farms in your  
24 description of County Road 675. Is that located a  
25 little north of the mid point from north to south on

1 County Road 675?

2 A. It's, in general, in this area, if you would  
3 follow the Taylor and Fulton alternative back to the  
4 east, it essentially is in this area east of the Taylor  
5 and Fulton alternative.

6 Q. So it's east of the notch in the Taylor and  
7 Fulton Alternate 2; is that correct?

8 A. Yes, it is. And I was using it more as a point  
9 of reference to where the PRECO lines transition back to  
10 the other side of the road.

11 Q. I understand. You were pointing to it, though,  
12 and I wanted to make sure the record was clear about  
13 where that transition occurred.

14 Also you've mentioned County Road 675 and State  
15 Road 70 right of ways in this area being narrow, and the  
16 shoulders being narrow and the need to close one lane of  
17 traffic.

18 Could you please compare those road rights of  
19 way to the right of way that exists in State Road 64 in  
20 the east-west run within the FPL preferred corridor?

21 A. Along State Road 64, one of my preferences is  
22 to be on the north side of State Road 64. And the  
23 reason for that is two-fold; the shoulders of the road  
24 along the north side of State Road 64 are larger than  
25 they are on the south side of State Road 64.

1           Our ability to construct the line on that north  
2 side would lessen the opportunities for having to have  
3 road closures. It may not eliminate the need for road  
4 closures, but I think there are a lot of opportunities  
5 along the north side of that road to construct the  
6 facilities and stay off of the road.

7           That differs from 675 in that the shoulders are  
8 more narrow along this portion of 675 south of State  
9 Road 64. There may be situations where we can install a  
10 pole without road closures, but it is my opinion that  
11 the majority of the locations will require one lane to  
12 be closed through this area.

13           And along State Road 70, I believe that all of  
14 the locations will require lane closures as we install  
15 along State Road 70.

16           On the FPL preferred corridor, the traffic  
17 situations aren't there, because the road is not there  
18 yet. We have an opportunity to work with the underlying  
19 landowner and the county to layout the location of the  
20 road and the location of the poles and the lines  
21 throughout this area.

22           Q. All right. Would you please continue with your  
23 comparison of the FPL preferred corridor and SMR 1 from  
24 an engineering perspective?

25           A. The next area we want to talk about is I want

1 to compare University Parkway and the Lorraine Road  
2 segment to Verna Road and Fruitville Road.

3 One of the advantages to both the FPL preferred  
4 corridor and SMR 1 in this area is that we are now south  
5 of State Road 70. So we have the opportunity to  
6 consolidate the existing distribution lines on to the  
7 structures that will be used for the transmission line.

8 FPL distribution runs along the east side of  
9 Verna Road and the south side of Fruitville Road. We  
10 would consolidate those facilities onto the same  
11 structures that would be used for the line.

12 Verna Road and Fruitville Road are two-lane  
13 roads. The shoulder along Verna Road is fairly wide.  
14 And although I still believe some locations will need --  
15 will require intermittent road closures, there are a  
16 number of locations that will not require road closures,  
17 one-lane closures.

18 Fruitville Road, on the other hand, is --  
19 exists as a fairly narrow road right of way, and the  
20 shoulder on the south side of Fruitville Road is fairly  
21 small.

22 For the first two miles in particular --

23 Q. That's the eastern two miles?

24 A. From the eastern end, the first two miles from  
25 the eastern end will likely require every location to

1 have a one-lane closure.

2 Once you get past that point, the shoulder on  
3 the south side does get bigger, and the opportunities  
4 for not closing the shoulder get better as you move  
5 west.

6 The other aspect of SMR 1 is that there are two  
7 airstrips in this area. We'll refer to one of them as  
8 Plank Airstrip and the other one is the Schwartz farm  
9 airstrip.

10 Q. And you said the two airstrips are in this  
11 area. Is that in the eastern half of the Fruitville run  
12 of SMR 1?

13 A. It is just to the east of this curve in  
14 Fruitville Road. In this general vicinity east of this  
15 curve.

16 The airports are in the area of Oakford Road, I  
17 believe is the name of the road that's out there that  
18 they are near.

19 Along University and Lorraine --

20 Q. Excuse me. Before you leave the airstrips,  
21 what is the other airstrip?

22 A. The other airstrip is Schwartz Farms. It's  
23 just to the west of Plank, and it -- both airstrips run  
24 perpendicular to the road. And what they present to me  
25 is an increased reliability risk to the line. From an



1 engineering perspective, we do have the ability to  
2 construct underneath their respective glide slopes, but  
3 it introduces a reliability risk to the project that  
4 does not exist on the segment from University Parkway to  
5 Lorraine.

6 Q. And what is that reliability risk?

7 A. Well, I met out there with the owner of Plank  
8 airstrip, and he told me that he utilizes that airstrip  
9 on occasion.

10 MR. HALL: Object to the hearsay; move to  
11 strike.

12 THE COURT: Sustained.

13 BY MS. RAEPPLE:

14 Q. Mr. Hahn, did you observe the Plank airstrip  
15 and the Schwartz farm airstrip?

16 A. Yes, I did.

17 Q. Are there windsocks at those airstrips?

18 A. There is a windsock at the Plank airstrip. I  
19 do not recall one at the Schwartz airstrip.

20 Q. Does the presence of that windsock indicate  
21 anything to you?

22 A. It is what caught my attention that there was  
23 an airstrip there when I was riding on the road. But  
24 beyond that, you know --

25 Q. Would you expect a windsock to be hanging at an

1 inactive airstrip?

2 MR. HALL: Object to the leading.

3 THE COURT: It's not leading, although I don't  
4 know what his special knowledge of windsocks would  
5 be.

6 MR. HALL: I will amend my objection to include  
7 that, Your Honor.

8 BY MS. RAEPPLE:

9 Q. Mr. Hahn, when you are siting transmission  
10 lines, is an airstrip or airport something that you  
11 routinely look for in the field?

12 A. Yes, it is.

13 Q. And do you, when you find an apparent airstrip  
14 or airport, do you do anything to determine if that  
15 airstrip is in active use?

16 A. We, in general, like -- we talk to the owner of  
17 the facility to determine its usage.

18 Q. And did you do that in this case?

19 A. Yes, I personally met with Mr. Plank and talked  
20 to him about how he utilizes that airstrip.

21 Q. When you routinely look at airstrips in the  
22 field, do you look for signs of usage?

23 A. I look at it more from the perspective that it  
24 could be used. And that's the approach that I take with  
25 them. Whether they are used or not at the time that I

1 find them, I have no way to determine whether they  
2 wouldn't be used later. So my assumptions are based on  
3 the fact that there's a physical presence there that  
4 could be used as an airport, either in the future or  
5 now.

6 Q. You said that the presence of airstrips  
7 perpendicular to the Bobwhite-Manatee, in your judgment,  
8 presented a reliability risk.

9 Could you explain what that reliability risk  
10 is, please?

11 A. When you are looking for the balance between,  
12 for example, these two corridors, the presence of an  
13 airstrip introduces a variable of risk to that segment  
14 where, to say the least, they could miss and hit the  
15 line as they are landing on the strip.

16 Q. And could that cause damage to the transmission  
17 line resulting in it being taken out of service?

18 A. Yes, it would take the line out of service.

19 Q. Could you continue with your comparison of  
20 SMR 1 and the FPL preferred, please?

21 A. I'm trying to remember where I was.

22 Q. I believe after you spoke about the airstrips,  
23 you were going to go and talk about University and  
24 Lorraine.

25 A. On University and Lorraine, as is the case with

1 SMR 1, FPL distribution facilities follow the south side  
2 of University Parkway, and then they run along the west  
3 side of Lorraine.

4 The FPL corridor is wide down through this area  
5 to afford flexibility and working with the underlying  
6 landowner and to minimize environmental impacts along  
7 those routes.

8 The SMR Number 1 corridor is more narrow and  
9 doesn't afford for a lot of flexibility to minimize or  
10 mitigate environmental impacts along the edges of the  
11 roads.

12 The SMR 1 Alternative is about 4.1 million  
13 dollars -- let me make sure of that -- it's about four  
14 million dollars less expensive than the FPL corridor.

15 One other aspect of Verna Road that's sort of a  
16 little mix is there's some consternation over the  
17 ownership of Verna Road.

18 The way we have modeled Verna Road in our  
19 costing estimate is to assume that it is a county-owned  
20 road. There is some debate as to whether it is a  
21 private ownership that we would -- and that -- the  
22 difference would mean we would need to expand the size  
23 of the easement requirements along Verna Road. If we  
24 did, it would add about 1.3 million dollars more cost to  
25 the SMR 1 Alternative.

1 But for now, we've left it as a ten-foot wide  
2 strip until we can get the final ruling on what kind of  
3 road that actually is.

4 Q. If Verna Road is physically there, but it is in  
5 private ownership as opposed to being a public road, why  
6 would you need to expand the right of way width adjacent  
7 to it?

8 A. Along private roads, I may -- or excuse me.  
9 Along public roads I'm allowed to take advantage of that  
10 public road to account for a lot of the code  
11 requirements that I have to adhere to.

12 In particular, the Florida -- the Florida  
13 Department of Environmental Protection Standards on EMF,  
14 electromagnetic fields.

15 What I have to be able to do is fit, if it's a  
16 private road, I have to be able to fit all of those  
17 requirements in my -- inside my easement. So my  
18 easement will need to be wider in this area. Instead of  
19 ten-foot, it may need to be 60, or some function of that  
20 60, in order to make it all fit inside the easement in  
21 that area.

22 But for now the model that we are using is that  
23 it is road right of way, and that we are able to utilize  
24 a ten-foot strip. But that is a variable that we still  
25 aren't 100 percent sure of. And I believe that's my

1 comparison of FPL --

2 Q. You mentioned that SMR 1 is, I believe you said  
3 4.1 miles longer than the FPL preferred, but it's about  
4 four million dollars less expensive than the FPL  
5 preferred. Could you explain why the longer line is  
6 less costly?

7 A. It's two main -- there are two main reasons for  
8 the difference. The SMR 1 runs along road right of way.  
9 So the size of the easement required along road right of  
10 way is ten foot.

11 Along the cross-country segments, even though  
12 there are proposed roads in this area, we assume the  
13 easement to be 60-foot wide, because likely we would be  
14 there before the road. So we assumed in our cost models  
15 that it was a 60-foot wide road right of way.

16 In addition, the SMR 1 being along road right  
17 of way, there is no need for access roads in the costing  
18 model along there. The FPL preferred from Bobwhite sub  
19 to University, and then again from University up to  
20 State Road 64, assumes an access road for half of the  
21 distance between those two points.

22 It is unlikely that we would need that amount  
23 of road right of way, but embedded in the initial  
24 estimate was access road for half of the distance on  
25 cross-country routes.

1 Q. And by cross-country, does the model assume any  
2 place where a public road is not present to be a  
3 cross-country route?

4 A. Correct. And the example of that would be this  
5 section here where we are looking at it to collocate  
6 with Dam Road. The Dam Road extension, it's not there  
7 yet. So we assumed that cross-country 60-foot wide  
8 easement through that area in the model.

9 Q. And similarly even though Lorraine Road is  
10 physically there, at least as an unpaved road for its  
11 entire distance, the model assumes that's a  
12 cross-country route; is that correct?

13 A. Yes, it does.

14 Q. You also mention the presence of airstrips  
15 along Fruitville Road in SMR 1, and you previously had  
16 mentioned in the vicinity of an airstrip you would --  
17 you may have to use shorter structures and more  
18 structures to accommodate getting beneath a glide slope  
19 for an airstrip.

20 Was the -- would that be more expensive than  
21 the typical design of the Bobwhite-Manatee transmission  
22 line, to have shorter and more frequent structures?

23 A. The fact that they are shorter would not have a  
24 significant, if any, effect on it. But the additional  
25 structures would add cost to that area.

1           The other aspect of lowering those structures  
2     in that area, in fact, lowering them as low as we had to  
3     do, we have to widen the right of way about another ten  
4     additional feet.

5           So in that area near the airport, the right of  
6     way would go from a ten-foot strip to a twenty-foot  
7     strip for one or two spans within the area of the  
8     airport.

9           Q.     In the cost comparison that you provided, does  
10    it reflect the added cost from additional poles in the  
11    area of the airstrips or the wider right of way in the  
12    area of the airstrips?

13          A.     No, it does not.

14          Q.     Let me ask you, please, to refer to FPL 49,  
15    which has been received into the record, and ask you if  
16    you can tell us what this chart shows.

17          A.     This is a roadway comparison chart that --

18          Q.     Excuse me. I'm asking you to refer to FPL 49.

19          A.     Tabs are on the wrong side. I'm sorry.

20                 This is a summary document of the costs that  
21    were used for each of the segments for the routing of  
22    the FPL preferred corridor and the four remaining  
23    alternatives.

24          Q.     Can you tell us, please, what is included in  
25    these cost estimates?



1           A.    These cost estimates include the costs  
2 associated with engineering, labor and materials for the  
3 physical line itself. It includes easement sizing and  
4 the costs to acquire those easements. It includes an  
5 estimated value for mitigation costs. It assumes survey  
6 costs. Underground exploration costs along road right  
7 of way where pole locations may be. Access road  
8 construction throughout the project area.

9           They are based -- these estimates are based on  
10 engineering estimating model that FPL uses for projects  
11 of this type throughout its system.

12          Q.    Does this FPL 49 reflect the cost estimates  
13 that you previously described when you were comparing  
14 the FPL preferred corridor and SMR Alternate 1?

15          A.    Yes. The numbers are reflective on the final  
16 column.

17                The final column here, the 2008 total route  
18 cost between FPL and SMR 1; SMR 1 at 21.7 million, and  
19 FPL at 25.5 million.

20          Q.    Was there a cost estimate used during the  
21 quantitative comparison of the 1,275 alternates when the  
22 multidisciplinary team was narrowing down the number of  
23 alternates to carry forward to the detailed analysis?

24          A.    Yes. They --

25          Q.    How does the cost estimate in the right-hand

1 column of FPL 49 compare to the cost estimate used  
2 during that quantitative analysis?

3 A. The cost estimates that were used during the  
4 GENCOR runs or the cost analysis are the ones that are  
5 reflected in the 2006 columns. And those were the  
6 numbers that we used in all the GENCOR runs.

7 In about July of 2007, the transmission  
8 engineering department came out with their 2008  
9 estimating model. And what I wanted to do was take that  
10 model and just see how it affected the original numbers  
11 and how it affected the relative ranking of the routes  
12 that were remaining.

13 So what the new numbers represent are the  
14 utilization of that 2008 model. And incorporated into  
15 that, I took the right of way on cross-country segments  
16 from 75 feet down to 60 feet for the cross-country  
17 segments, and from 15 feet down to 10 feet along the  
18 road rights of way.

19 In addition, based on having viewed a large  
20 amount of the area, I took the roads -- initially, we  
21 had assumed roads for the entire length of the  
22 cross-country segments. And after viewing most of the  
23 area, I cut the roads -- the road requirement in half.  
24 It's likely we will still need roads in certain areas  
25 throughout the route, but it wasn't going to be the

1 entire route.

2 So to assure enough flexibility in the -- when  
3 they go to design, I have left half of the road distance  
4 in there.

5 Q. And in that discussion of roads, you are  
6 talking about access roads that Florida Power & Light  
7 would construct?

8 A. Access roads that Florida Power & Light would  
9 construct, essentially on the cross-country segments.

10 Q. And you said you left in the cross-country  
11 segments an estimate of 50 percent requiring access  
12 roads. In your judgment, will there be 50 percent --  
13 will access roads be required in 50 percent of the  
14 length of cross-country segments within the FPL  
15 preferred corridor?

16 A. I don't believe so, no.

17 Q. Do you think it will be more or less?

18 A. I think it will be significantly less, but I  
19 wanted to make sure I left enough in there to allow for  
20 that flexibility in case they were needed.

21 Q. You also said that in the updated numbers,  
22 which are reflected in the last column of FPL 49, you  
23 reduced the right of way acquisition need from 15 feet  
24 to 10 feet along public roads and from 75 feet to 60  
25 feet in cross-country segments. What was the basis for

1 making that reduction?

2 A. Along road rights of way, in the initial  
3 summary we were looking at 600 foot spans along the road  
4 right of way. We approached it from a more generic  
5 perspective. When you ride the road rights of way in  
6 this area, there are a lot of trees and encumbrances  
7 like trees along the route.

8 So we will likely shrink the spans up to about  
9 450 feet. And when you shrink the spans to 450 feet, it  
10 shrinks the amount of easement that you need. So from  
11 600 foot down to 450, the right of way went from 15 foot  
12 adjacent to the road back down to 10.

13 On the cross-country segments, initially when  
14 we were looking at this, I allowed for guyed structures.  
15 We talk guyed structures on the corners. Corner  
16 structures will still stay guyed. But in the initial  
17 look at this area, not having a feel for the soil  
18 conditions, I had assumed that the tangent structures,  
19 the intermediate structures between the corners would  
20 also have guys to them.

21 Most of this area is high and dry. The need  
22 for tangent structures that are guyed, likely very few,  
23 if any of them, will be guyed.

24 So as a result, needing a 75-foot wide easement  
25 to accommodate guys, we don't need that size any more.

1 We shrunk it down to 60-foot wide. And we would expand  
2 it only in areas where we would need guy wires on the  
3 tangent structures. So those were the two reasons for  
4 the shrinkage of the right of ways.

5 Q. Does the cost differential that is estimated on  
6 FPL 49 between the FPL preferred corridor and SMR  
7 Alternate Number 1 make SMR Alternate Number 1  
8 preferable to the FPL preferred corridor, in your  
9 opinion, from an engineering perspective?

10 A. No.

11 Q. Why not?

12 A. These costs, at this stage of the process,  
13 these costs are used as relative comparisons of segment  
14 to segment and route to route.

15 The actual costs won't be known until we know  
16 where the route, actual route of the line is going to be  
17 and detailed engineering takes place.

18 Q. That's the actual right of way?

19 A. The actual right of way is determined and the  
20 detailed design is complete.

21 In addition to that, the corridor selection  
22 team determined that costs were not as important in  
23 determining what -- which route to ultimately work on.  
24 And the cost differential is not substantial in light of  
25 the overall costs for this project.

1           The important portion of this part is that  
2 they -- the estimates are applied consistently across  
3 all of the segments so that you have a fair, relative  
4 comparison of what is going on within the different  
5 routes.

6           Q.   Is the relative length of SMR Alternate Number  
7 1 compared to the FPL preferred corridor important in  
8 your judgment from an engineering perspective?

9           A.   Yes.

10          Q.   Why?

11          A.   From my perspective, it relates to two issues:  
12 Greater line loss because of the distance of the line,  
13 it's a 4.1 additional miles of line lost; and secondly,  
14 it's 4.1 miles more of greater exposure to reliability  
15 related issues, such as lightning or tree impact.

16          Q.   You mentioned line loss. What is line loss?

17          A.   Line loss is any -- there are losses associated  
18 with transmitting electric energy across any distances.  
19 And the longer that distance, the greater the losses  
20 that there are to the electric system.

21                It's an engineering component. One of the  
22 advantages to the FPL preferred corridor is that it is a  
23 shorter route. And that is a consideration that I  
24 looked at.

25          Q.   Would you please refer to Exhibit FPL 26, which

1 is a roadway comparison chart that's already been  
2 received into the record.

3 Were you responsible for the preparation of any  
4 portion of this chart?

5 A. I was responsible for the final column, the  
6 location of the PRECO distribution facilities.

7 Q. Does this final column of FPL 26 accurately  
8 reflect the presence of distribution lines along the  
9 roadways in the FPL preferred corridor and the alternate  
10 corridors under consideration in this proceeding?

11 A. Yes, it does.

12 Q. Thank you.

13 Actually, I stand corrected, this document has  
14 not yet been received into the record, because I was  
15 waiting for you to testify about that final column.

16 MS. RAEPPLE: At this time I would offer FPL 26  
17 into the record.

18 MR. HALL: No objection.

19 THE COURT: FPL 26 is admitted.

20 (FPL EXHIBIT NO. 26 FOR IDENTIFICATION was  
21 received in Evidence.)

22 BY MS. RAEPPLE:

23 Q. Turning back to FPL 21, the corridor comparison  
24 chart, have you explained all of the engineering  
25 considerations comparing the FPL preferred corridor to.

1 SMR Alternate Number 1?

2 A. I believe so, yes.

3 Q. During the public outreach program that you  
4 participated in, were there any concerns expressed by  
5 members of the public for traffic impacts during  
6 construction?

7 A. Yes. One of the things we did hear from -- at  
8 many, if in not all of the public outreach meetings, was  
9 a concern of the general public for --

10 MR. MOYLE: This is all hearsay. Object on the  
11 ground this is hearsay.

12 THE COURT: He can say what he did. He can't  
13 say what he heard. Sustained.

14 BY MS. RAEPPLE:

15 Q. Mr. Hahn, do you have a concern for traffic  
16 impacts during construction?

17 A. Yes, I do.

18 Q. And what are those concerns?

19 A. Well, I've traveled Fruitville Road and  
20 Verna Road many times, and there are construction  
21 activities going on along those roads now with the  
22 improvements that they are making to the eastern end on  
23 the north side of the road. And it's a narrow -- it's a  
24 narrow two-lane road. And the ability to --

25 There are no alternatives, once you get on that



1 road as you are traveling it, you are on it, and if a  
2 lane is blocked, there are no places to go. You just  
3 sit and wait.

4 And it's going to create public impact along  
5 that road, if we were to construct it along  
6 Fruitville Road, Verna, State Road 70 and 675. There  
7 will be traffic impact.

8 Q. Did members of the public express similar  
9 concerns to you during the public outreach program?

10 MR. MOYLE: Objection; hearsay.

11 MS. RAEPPLE: Your Honor, in Chapter 120 of  
12 Administrative Proceeding, hearsay is allowed to  
13 corroborate other competent evidence. And I believe  
14 statements of the members of the public do  
15 corroborate Mr. Hahn's own concerns.

16 THE COURT: That's not how I apply the term  
17 "corroborate" in my ruling. So it has to  
18 corroborate the statement made and not -- the  
19 statement is what he does. What somebody else does  
20 is not corroboration.

21 But what I was trying to say is he can say what  
22 he -- what changes he might have made in response to  
23 his view of the -- at the public participation, any  
24 changes he made because he was incorporating his  
25 perception of public concerns. That's different

1       than saying, here is what the public concerns were  
2       that I heard.

3 BY MS. RAEPPLE:

4       Q.   All right. Well, let me ask you this question,  
5       Mr. Hahn.

6               Is your assessment of the FPL preferred  
7       corridor as compared to SMR Alternate Number 1 based in  
8       part on input that you received from the public during  
9       the public outreach program?

10       A.   Yes, it is.

11       Q.   And can you tell us what some of that input was  
12       that formed the basis for your opinion of preferring the  
13       FPL preferred corridor over SMR Number 1?

14       A.   If I can refer back to FPL 7 as an exhibit.

15               One of the things that it forced me to consider  
16       or that it enabled me to consider was that from this  
17       area south of State Road 64 down to the Bobwhite  
18       substation area, the traffic impacts through this  
19       segment, this portion of the corridor, will be  
20       significantly less than they will be on this corridor.

21       Q.   "This corridor" being?

22       A.   The SMR 1 from State Road 64 down 675 across 70  
23       and Verna and Fruitville Road. It was -- it played a  
24       role in my decision to put forth the FPL preferred  
25       corridor.

1 Q. Put it forth in preference to the SMR Alternate  
2 Number 1?

3 A. Yes.

4 Q. Would you now turn to Page 2 of FPL 21 and tell  
5 us what portions of this page you were responsible for?

6 A. I was responsible for C, D, and E on this --  
7 Page 2 of this exhibit.

8 Q. Would you summarize your comparison of the FPL  
9 preferred corridor to the SMR Alternate Number 10 from  
10 an engineering perspective?

11 A. Can we put back up Exhibit 7, please?

12 Q. Yes.

13 THE COURT: Let's take a ten-minute break. I  
14 want to talk to hotel management about an issue. So  
15 ten-minute break.

16 (Recess.)

17 THE COURT: You may continue, Ms. Raepple.

18 BY MS. RAEPPLE:

19 Q. Mr. Hahn, referring to the second page of  
20 Exhibit FPL 21, could you please provide us a comparison  
21 from an engineering perspective of the FPL preferred  
22 corridor and SMR Alternate Number 10?

23 A. Can we put up FPL Exhibit 7?

24 Q. Yes.

25 A. From an engineering perspective, the

1 differences between the FPL preferred corridor and  
2 SMR 10 are a close call. There are not a lot of  
3 difference between these corridors. They are the same  
4 corridor down to where they contact University Parkway.  
5 At that point, SMR 10 goes cross-country through the --  
6 this development on the south side of this section north  
7 of Fruitville Road, and then it runs for about two miles  
8 along Fruitville Road into Bobwhite substation.

9 I have three main issues of difference between  
10 these two corridors. One, the FPL preferred corridor  
11 along University Parkway and Lorraine is wider and  
12 allows for greater flexibility within the corridor to  
13 work with the underlying landowners.

14 The FPL preferred -- excuse me -- the SMR 10 is  
15 a narrow corridor and does not afford for a great deal  
16 of flexibility in avoiding environmental impacts within  
17 it.

18 Secondly, the SMR corridor will have the  
19 traffic impacts for a short distance along  
20 Fruitville Road, about two miles. In this area the  
21 shoulders are relatively wide, and the need for blocking  
22 of traffic will be less. There are locations within  
23 that area that it's likely that we would be able to  
24 construct, install the poles without blocking traffic.  
25 The road gets more narrow as you progress east. But in

1 this area west of where SMR 10 intersects  
2 Fruitville Road, it's a wider area, although the traffic  
3 counts are higher in that area, also.

4 From a cost perspective, the differences are  
5 almost equal. The FPL preferred corridor is around 25.5  
6 million. The SMR alternative is 25.8 million. They are  
7 essentially the same costs. So from an engineering  
8 perspective, those are the three differences that I see  
9 between the two corridors.

10 Q. Turning to the third page of Exhibit FPL 21,  
11 could you please describe the comparison of the FPL  
12 preferred corridor with the Taylor and Fulton Alternates  
13 1 and 2 from an engineering perspective?

14 Excuse me. On the third page of FPL Exhibit  
15 21, what rows are you responsible for, please?

16 A. I was responsible for B, G, and H.

17 Q. All right. Now, would you provide the  
18 comparison, please?

19 A. All right. If we can go back to FPL Exhibit 7.

20 Q. Yes.

21 A. The Taylor and Fulton -- I want to talk in  
22 terms of Taylor and Fulton 1, initially.

23 Taylor and Fulton 1 is this area marked in blue  
24 from State Road 64. It traverses about three miles  
25 south straight down through to a point about -- it's

1 actually 15,500 feet south, or about three miles south,  
2 and then it turns west for about 8,000 feet back into  
3 the FPL preferred corridor.

4 It is essentially a mirror image of the FPL  
5 preferred corridor from a distance perspective. So the  
6 distances are essentially the same. And the costs for  
7 those two alternatives, the FPL preferred in that region  
8 and the Taylor and Fulton Number 1, are essentially the  
9 same costs.

10 The main differences between Taylor and Fulton  
11 1 and FPL preferred is that the FPL preferred corridor  
12 is wide. It has that, the term, flexibility, the  
13 ability to minimize and mitigate environmental impacts;  
14 the ability to work with the underlying landowners; and  
15 all of those same issues that were mentioned earlier  
16 about the wide corridor.

17 The Taylor and Fulton corridor is 500 foot  
18 wide, and it doesn't afford for a great deal of  
19 flexibility and placement of the transmission  
20 structures.

21 One of the things -- one of the other things  
22 that Taylor and Fulton Alternate 1 and 2 really do is  
23 they get us off of State Road 64 sooner.

24 They turn south prior to the entrance to the  
25 state park. From an engineering perspective, it reduces

1 that constraint in dealing with PRECO along State Road  
2 64, and it also minimizes the traffic impacts along  
3 State Road 64.

4 Q. Minimizes the potential for traffic impacts  
5 along State Road 64?

6 A. Yes, it does. Because it shortens the distance  
7 along State Road 64 by 8,000 feet, about a mile and a  
8 half.

9 Taylor and Fulton Number 2 has that same  
10 effect. It shortens the distance along State Road 64.  
11 It has the same issue with the comparison between the  
12 wide FPL preferred corridor versus the narrow preferred  
13 corridor. Taylor and Fulton --

14 Q. Excuse me. You mean the narrow Taylor and  
15 Fulton Number 2?

16 A. Taylor and Fulton Number 2 is the same 500-foot  
17 wide corridor. The main difference between Taylor and  
18 Fulton Number 1 and Taylor and Fulton Number 2, and you  
19 may have heard it described as the notch. And what that  
20 notch does is it goes around -- it prevents the  
21 bisecting of adjacent property owners. Taylor and  
22 Fulton Number 2 is entirely on Taylor and Fulton  
23 property.

24 Q. It's entirely on Taylor and Fulton property,  
25 other than the one property owner just south of the

1 State Road 64; is that correct?

2 A. You're right. The Desoto County Speedway owns  
3 a small Section of the northern end of the corridor  
4 where Taylor and Fulton 1 and 2 intersect with State  
5 Road 64.

6 THE COURT: It's Number 2 that stays on Taylor  
7 and Fulton property?

8 THE WITNESS: Yes, sir.

9 MS. RAEPPLE: Yes.

10 A. Taylor and Fulton Number 1 bisects the adjacent  
11 property owners. Taylor and Fulton Number 2 is on -- or  
12 the notch alternative is on Taylor and Fulton property.

13 Unlike Taylor and Fulton Number 1 where it was  
14 a mirror image, essentially the same distance and the  
15 same cost, the notch creates an additional one mile of  
16 line length for Taylor and Fulton Number 2. And that  
17 line length translates to about an additional million  
18 dollars worth of costs associated with the construction  
19 of that line.

20 In addition to that, there's 16 acres  
21 additional easement required for Taylor and Fulton  
22 Number 2 compared to Taylor and Fulton Number 1.

23 BY MS. RAEPPLE:

24 Q. And why is that?

25 A. The main difference is when you are traversing



1 along State Road 64, the easement is only ten-foot wide  
2 along road right of way. When you're transversing the  
3 distance associated with both Taylor and Fulton Number 1  
4 and Taylor and Fulton Number 2, the easement is set at  
5 60-foot wide for the cross-country components.

6 Q. Perhaps I misunderstood, but let's make sure  
7 the record is clear.

8 The 16 additional acres required for Taylor and  
9 Fulton Number 2, is that compared to the preferred  
10 corridor, FPL preferred corridor, or to Taylor and  
11 Fulton 1?

12 A. It is compared to the FPL preferred corridor.

13 Q. Thank you.

14 A. All of our comparisons are FPL preferred to  
15 Taylor and Fulton Number 1, or FPL preferred to Taylor  
16 and Fulton Number 2. I do not compare Taylor and Fulton  
17 1 to Taylor and Fulton 2.

18 Those are the differences from an engineering  
19 perspective.

20 Q. Do you have an opinion as to which of the  
21 corridors under consideration in this proceeding best  
22 meets the electrical energy needs of the state in an  
23 orderly, economical, and timely fashion?

24 A. Yes, I do.

25 Q. And what is that opinion?

1           A.    It is my opinion that the FPL preferred  
2 corridor provides -- that meets the electrical energy  
3 needs of the state in the most affordably and economical  
4 manner.

5                   All of the corridors will -- all of the  
6 corridors meet the needs for reinforcing of the network  
7 between the Manatee Energy Center and Ringling  
8 substation. All of the corridors will serve the  
9 increased load within the study boundaries. And all of  
10 the corridors will create another electrical feed via a  
11 diverse path.

12                   All of them can also be accomplished by  
13 December of 2011, which is put forth in the need  
14 determination.

15                   The difference mainly is that the FPL preferred  
16 corridor is a more direct route. The line length is  
17 shorter. And it's closer to what would be the future  
18 load center of this area in the future. And that's the  
19 main difference between them, from an engineering  
20 perspective.

21           Q.    And when you say closer to the load center, are  
22 you saying that a route that's further to the west is  
23 closer to the load center?

24           A.    Yes, based on Ms. Mayes' testimony for the --  
25 for where the density will be in the future, the load

1 center would be further to the west.

2 Q. Are you familiar with the stipulated conditions  
3 of certification attached to the prehearing stipulation  
4 in this proceeding?

5 A. Yes, I am.

6 Q. In your opinion, will the design, construction,  
7 operation and maintenance of the Bobwhite-Manatee  
8 transmission line be able to comply with the stipulated  
9 conditions of certification in any of the proposed  
10 corridors?

11 A. Yes, I do.

12 Q. What is that opinion?

13 A. Would you repeat the question, please?

14 Q. Well, in your opinion, will the design,  
15 construction, operation and maintenance of the  
16 Bobwhite-Manatee transmission line be able to comply  
17 with the stipulated conditions of certification in any  
18 of the proposed corridors?

19 A. Yes, it will.

20 Q. Do you have an opinion as to which of the  
21 corridors proffered for certification for the  
22 Bobwhite-Manatee transmission line will have the least  
23 impact upon the public from an engineering perspective?

24 A. Yes, I do.

25 Q. What is that opinion?

1       A.    It is my opinion that the FPL preferred  
2   corridor will have the least impact on the public.  The  
3   issues raised about the traffic concerns, the  
4   collocation constraints with the PRECO distribution  
5   facilities, the potential for there to be structures on  
6   both sides of the road in area where the PRECO  
7   distribution facilities are, the FPL proposed corridor  
8   is proposed for collocation along roads with wider  
9   rights of way than the other alternatives.  We avoid the  
10  airstrip concerns along Fruitville Road.  The shorter  
11  overall length of the line as compared to the other  
12  alternatives, and the consolidation opportunities with  
13  FPL distribution in the area south of the State Road 70.

14           MS. RAEPPLE:  At this time, FPL would move  
15   Exhibits FPL 21 and 26 into the record.  I'm sorry.  
16   I have already done 26.  It's just 21.

17           THE COURT:  21 is the --

18           MS. RAEPPLE:  21 is the corridor comparison  
19   chart.

20           THE COURT:  Any objection?

21           MR. HALL:  Your Honor, I have one relatively  
22   minor objection to 21, and that is on the first page  
23   in Row G, in the right-hand column, second from the  
24   bottom there's a reference to unsettled ownership of  
25   Verna Road.

1           And I understand Mr. Hahn testified that his  
2           understanding is that there is such a question, but  
3           I don't believe that there's been any evidentiary  
4           basis to establish that as a matter of fact at this  
5           point, and I don't want to not object to this  
6           exhibit and have that taken to be that we concede at  
7           this point or agree that there's an unsettled  
8           ownership of Verna Road. We've seen no surveys.  
9           We've heard no one who did a title search or  
10          reviewed the documents. That's my only objection.

11           THE COURT: Do you wish to be heard?

12           MS. RAEPPLE: Yes. Perhaps let me ask Mr. Hahn  
13          a couple of questions and see if we can clear this  
14          up.

15          BY MS. RAEPPLE:

16           Q. Mr. Hahn, can you explain to us the basis for  
17          your understanding that the ownership is unsettled with  
18          regard to Verna Road?

19           A. The information that I have received on  
20          Verna Road, it comes from our corporate real estate  
21          department. They are in the process of researching what  
22          the underlying ownership of the road is. And that's  
23          where my information comes from, based on my  
24          understanding of that road.

25           Q. And is that the type of information that

1 transmission line engineers evaluating various routes  
2 for a new transmission line relies on in formulating  
3 their opinion as to which route is preferable?

4 A. Yes, it is one of the factors that we look at  
5 for determining where transmission lines should be  
6 constructed.

7 THE COURT: That inquiry, which works with  
8 technical data, I don't think will work in this for  
9 a legal -- a legal issue, Ms. Raepple.

10 I'm accepting the testimony exactly as it was  
11 given, which is that this is -- these comparisons  
12 were made with the information provided by others  
13 that there is unsettled ownership of Verna Road.  
14 I'm accepting it as reasonable. It was reasonable  
15 for him to rely on it. Whether or not it's true  
16 that it's unsettled or not, I don't think this  
17 witness could say.

18 MS. RAEPPLE: All right.

19 THE COURT: So with that understanding, Number  
20 21 is admitted.

21 (FPL EXHIBIT NO. 21 FOR IDENTIFICATION was  
22 received in Evidence.)

23 BY MS. RAEPPLE:

24 Q. Mr. Hahn, in his opening statement, Mr. Moyle  
25 stated that it is hard to locate a transmission line

1 along a meandering road. Do you agree with that  
2 statement?

3 A. In the case of this study area, no.

4 Q. First of all, why don't you tell us, in giving  
5 that answer, what you interpret to be a meandering road.

6 A. Well, the term meandering can mean lots of  
7 things. From an engineering perspective, my  
8 understanding of what the definition of meandering is in  
9 the context of this project is the ability to follow  
10 roads of similar construction that are already in use  
11 within this development, and in comparing the project  
12 planning documents that Ms. Mayes have presented, the  
13 curvy nature of the roads.

14 And in looking at that definition for  
15 meandering, in light of what I have seen on those  
16 drawings and the roads, such as Lakewood Ranch Road that  
17 I have driven inside the development, roads of those  
18 nature do not present any particular design difficulties  
19 for following or being built adjacent to, in my opinion.

20 Q. Given that definition, do you consider  
21 Lorraine Road to be a meandering road as it presently  
22 exists?

23 A. Lorraine Road is of similar construction to the  
24 other roads, such as Lakewood Ranch Boulevard. I guess  
25 the definition, yes, it could be considered a meandering

1 road in light of what we've seen.

2 Q. Do you consider it a meandering road in giving  
3 your opinion that this transmission line can be  
4 constructed -- that it is not hard to construct a  
5 transmission line adjacent to a meandering road?

6 THE COURT: Let me interrupt, because I think  
7 meander is kind of a worthless term in this context.

8 If you saw the In-Laws -- I think it was called  
9 the In-laws -- remember "serpentine"? That to me  
10 with hairpin turns, that starts to -- you know, I  
11 can visualize potential problems with the  
12 transmission line turning, unless the spans are  
13 almost next to each other.

14 So I think the question needs to be related to  
15 the aerial specifically and not to the term meander,  
16 which in different people's minds could be anything  
17 from any road that makes a couple of turns to, you  
18 know, extremely serpentine.

19 MS. RAEPPLE: I understand. I was trying to  
20 use the term that Mr. Moyle used in his opening  
21 statement, that's why I was having Mr. Hahn define  
22 it. But I can certainly move --

23 THE COURT: Who knows what Mr. Moyle meant. We  
24 don't.

25 MS. RAEPPLE: Who knows.



1 THE COURT: We don't know what's in his mind.  
2 So that's the only way that's going to be useful to  
3 me.

4 BY MS. RAEPPLE:

5 Q. Okay. Mr. Hahn, would it be difficult to  
6 locate the Bobwhite-Manatee transmission line along  
7 Lorraine Road?

8 A. No, it would not.

9 Q. Would it be difficult to locate the  
10 Bobwhite-Manatee transmission line along the Dam Road  
11 extensions as depicted on the plans in FPL 35 or 36,  
12 which were discussed by Ms. Mayes during her testimony?

13 Ms. Dailey, could you put those up so he can  
14 look at them?

15 Dam Road is on the east side of this FPL 35.

16 A. No, that presents no design challenge.

17 Q. What about the Dam Road extension shown in FPL  
18 36?

19 A. No, that doesn't present any design challenges  
20 either.

21 Q. Would it be hard to collocate the  
22 Bobwhite-Manatee transmission line along any of the  
23 existing roads in the FPL preferred corridor?

24 I'm sorry. Existing or proposed roads in the  
25 FPL preferred corridor?

1 MR. HALL: I'm going to object to the extent  
2 this has been asked and answered, and now it's being  
3 asked in a broader context, and I think it's vague  
4 in that context.

5 He's already addressed State Road 64 and other  
6 roads in the FPL preferred corridor. I think  
7 address those in more detail than simply ask if it  
8 would be hard.

9 THE COURT: I do agree that I think I heard his  
10 answer to be already generalized to the corridors.  
11 But if you intended something different, I will  
12 allow it. My memory isn't great on that.

13 In other words, my understanding of the record  
14 and Mr. Hahn's testimony is that there is no  
15 proposed route or corridor that cannot be followed  
16 by the transmission line.

17 MS. RAEPPLE: That's right. I will move on.

18 BY MS. RAEPPLE:

19 Q. Mr. Hahn, in the public hearing, there were  
20 some suggestions by members of the public that the  
21 Bobwhite-Manatee transmission line should be placed  
22 underground.

23 Have you evaluated the possibility of placing  
24 all or a portion of the Bobwhite-Manatee transmission  
25 line underground?

1 A. No, I have not.

2 Q. Why not?

3 A. Undergrounding of the Bobwhite-Manatee  
4 transmission line was not in the case presented before  
5 the Public Service Commission. It was -- it is not a  
6 part of the application that we present for a corridor  
7 certification now.

8 Q. Does Florida Power & Light have any underground  
9 230kv transmission lines?

10 A. Yes, it does. But underground transmission  
11 lines, in general, account for just a little over one  
12 percent of the transmission network that Florida  
13 Power & Light has.

14 Q. Do you have an opinion as to whether placing  
15 the Bobwhite-Manatee transmission line underground would  
16 be practicable?

17 MR. MOYLE: Let me object. I think he just  
18 testified he hasn't done any analysis. I'm not sure  
19 how, given the fact he hasn't done any analysis,  
20 whether he can answer whether it's practicable or  
21 not.

22 THE COURT: I don't know. That's usually a  
23 good indicator. But perhaps there's -- perhaps  
24 there are some engineering constraints that are so  
25 obvious to an electrical engineer that you don't do

1 any further analysis, so I will allow that kind of  
2 question.

3 MS. RAEPPLE: Yes. This is a general question  
4 as opposed to specifically has he evaluated placing  
5 this specific transmission line.

6 BY MS. RAEPPLE:

7 Q. Do you have an opinion as to whether  
8 undergrounding a line such as the Bobwhite-Manatee  
9 transmission line in this study area would be practical?

10 A. Yes, I do.

11 Q. What is that opinion?

12 A. It is my opinion that placing a 230kv line of  
13 this nature would be impractical to place it  
14 underground.

15 Like I said earlier, about one percent of FPL's  
16 transmission network is underground. And that concept  
17 holds true throughout Florida. Overhead is the standard  
18 in Florida.

19 The design construction and maintenance of  
20 underground facilities are much more complex than  
21 overhead facilities.

22 To install this type of facility in this area  
23 would be a -- it would take two forms. It would  
24 generally be an open-cut type of an installation where  
25 you cut the ground open, ten-foot hole, and you place

1 the conductors and pipe cable inside that hole.

2 The other aspect of it for, like, the river  
3 crossings or wetland crossings, would be a directional  
4 drill.

5 In both cases, those applications are much  
6 more -- will cause much more damage to the -- to the  
7 environment.

8 Unlike overhead lines where you can span  
9 wetland areas, undergrounding of transmission facilities  
10 does not allow for that. And even the directional  
11 drilling has environmental impacts.

12 The impact to the communities are significantly  
13 greater during the construction of underground  
14 facilities.

15 Unlike pole locations where you are at one  
16 location that's throughout certain times during the  
17 construction process, when you open-cut an area for an  
18 underground installation, that construction takes place  
19 over a wider area and lasts in terms of weeks and months  
20 for the construction of those components.

21 The other -- from a technical perspective,  
22 conflicts with other underground utilities, such as  
23 water and sewer pipes along the way, create technical  
24 difficulties that are sometimes difficult to overcome.

25 The easements associated with underground

1 transmission facilities need to be exclusive. And by  
2 exclusive, I mean that the ability to collocate other  
3 heat-generating sources in the same easement with the  
4 underground transmission is very unlikely.

5 And from an encumbrance perspective also on an  
6 easement, you can't place anything on top of that  
7 easement that would interfere with the ability to get at  
8 the line in the future.

9 Although reliability of distribution -- of  
10 underground transmission and overhead transmission  
11 facilities are somewhat comparable, outages associated  
12 with underground lines, the repair times for outages for  
13 underground lines are in terms of weeks and months, as  
14 compared to overhead facilities, which are in terms of  
15 hours or days.

16 There's always a risk of dig-ins from other  
17 utilities; phone, cable, water, sewer, in the area,  
18 digging in and causing outages for underground  
19 facilities.

20 In addition to all of those, costs are very  
21 high for underground facilities. In most cases, the  
22 cost differential between overhead and underground is 10  
23 to 15 times what an underground -- what an overhead  
24 facility would be.

25 Underground costs cannot be passed on to the

1 rate payer, as ordered by the Public Service Commission,  
2 since there is no benefit to the rate payer.

3 Any person or entity that wishes to have  
4 something underground has to pay for the studies and  
5 then pay the cost differential between the overhead and  
6 underground.

7 It is my opinion that it's a very expensive  
8 tradeoff between overhead and underground facilities.

9 Q. In what type of area does Florida Power & Light  
10 consider using underground construction for a line such  
11 as Bobwhite-Manatee 230kv?

12 A. The majority of FPL's underground facilities  
13 are in metropolitan areas, such as downtown Miami. In  
14 fact, I believe all of the 230kv facilities are in  
15 downtown Miami.

16 Q. And what is the significance of --

17 What is the characteristic of downtown Miami  
18 that led to the underground placement of the 230kv  
19 lines?

20 A. In general, what leads to the decision to  
21 underground a transmission facility is that there are  
22 no -- no viable above-ground solutions. In the case of  
23 downtown Miami, you have large, multi-story buildings  
24 that are right up against the edge of road right of way,  
25 and there's a great deal of underground conflict; water,

1 sewer, fiber optics, cable in the ground..

2           So when you look to place transmission  
3 structure into the ground in a metropolitan area,  
4 there's no place to put it. And you run into clearance  
5 issues with the building.

6           So, in general, FPL has put transmission lines  
7 underground, but the way it occurs is when there are no  
8 viable, above-ground technical solutions.

9           MS. RAEPPLE: Thank you. I tender the witness  
10 for cross examination.

11           THE COURT: Let's take our lunch break. One  
12 hour. Be back here at ten to 1:00.

13           THEREUPON, a luncheon recess was had at 11:49 a.m.  
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CERTIFICATE OF REPORTER

STATE OF FLORIDA

COUNTY OF SARASOTA

I, Mary Jo Armour McGill, Registered Diplomate Reporter, do hereby certify that I was authorized to and did report in Stenotypy and electronically the foregoing proceedings and evidence in the captioned case and that the foregoing pages constitute a true and correct transcription of my recordings thereof.

IN WITNESS WHEREOF, I have hereunto affixed my hand this OCT 29 2007, at Sarasota, Sarasota County, Florida.



Mary Jo Armour McGill, RDR

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A			
<b>ability</b> 1041:22 1042:5,12 1042:13,15 1044:5 1045:20 1048:1 1054:17 1055:5 1056:22 1057:21 1059:13 1060:6,8,9 1061:24 1073:6,9,10 1074:18 1075:4 1081:13 1085:1 1088:1 1103:24 1109:13,14 1118:9 1125:2,7 <b>able</b> 1063:5 1073:1 1092:15,16,23 1107:23 1114:8,16 <b>above-ground</b> 1126:22 1127:8 <b>abut</b> 1071:9 <b>acceptance</b> 1032:15 <b>accepted</b> 1032:25 <b>accepting</b> 1117:10,14 <b>access</b> 1053:6,15,16,20,21 1053:23 1054:9,12,13 1054:14,15,19 1055:7 1061:1,3,9,13,16,19,19 1061:25 1062:3,8 1063:17 1064:11,12,17 1065:3,4,5 1077:6 1093:17,20,24 1096:7 1098:6,8,11,13 <b>accommodate</b> 1052:17 1060:15 1067:22 1073:23 1094:18 1099:25 <b>accommodated</b> 1045:9 <b>Accommodation</b> 1071:17 1076:2 <b>accomplished</b> 1113:12 <b>account</b> 1092:10 1122:11 <b>accurate</b> 1032:6 1034:16 <b>accurately</b> 1034:11 1102:7 <b>acquire</b> 1096:4 <b>acquisition</b> 1098:23 <b>acres</b> 1111:20 1112:8 <b>Act</b> 1031:14,18 <b>active</b> 1089:15 <b>activities</b> 1063:21 1070:11 1077:11,13 1103:21 <b>activity</b> 1064:8 <b>actual</b> 1057:11 1100:15 1100:16,18,19 <b>Adams</b> 1027:10 <b>add</b> 1091:24 1094:25 <b>added</b> 1095:10 <b>addition</b> 1033:17,21	1055:10 1058:6 1063:16 1077:15 1082:2 1093:16 1097:19 1100:21 1111:20 1125:20 <b>additional</b> 1038:13 1044:24 1094:24 1095:4,10 1101:13 1111:15,17,21 1112:8 <b>address</b> 1057:19 1121:7 <b>addressed</b> 1121:5 <b>adhere</b> 1092:11 <b>adhered</b> 1076:5 <b>adjacent</b> 1035:5 1071:22 1092:6 1099:12 1110:21 1111:10 1118:19 1119:5 <b>adjust</b> 1073:9 <b>adjusting</b> 1060:7,11,20 <b>Administrative</b> 1024:1,21 1104:12 <b>admitted</b> 1102:19 1117:20 <b>adopted</b> 1058:12 <b>advantage</b> 1052:5 1080:6 1092:9 <b>advantages</b> 1043:18 1059:8 1086:3 1101:22 <b>advisory</b> 1033:19 <b>aerial</b> 1060:17 1119:15 <b>affect</b> 1060:13 <b>affixed</b> 1128:12 <b>afford</b> 1073:10 1082:6 1091:5,9 1107:15 1109:18 <b>affordably</b> 1113:3 <b>affords</b> 1043:19 <b>agencies</b> 1031:4 1056:9 <b>ago</b> 1050:1 <b>agree</b> 1082:11,16 1116:7 1118:1 1121:9 <b>agricultural</b> 1072:25 1074:8,13,16 1075:6,8 <b>air</b> 1067:3,13 1076:19 <b>airport</b> 1089:10,14 1090:4 1095:5,8 <b>airports</b> 1087:16 <b>airstrip</b> 1057:20 1087:8,9 1087:21,22 1088:8,8,14 1088:15,18,19,23 1089:1,10,13,15,20 1090:13 1094:16,19 1115:10 <b>airstrips</b> 1056:20,23 1057:13 1060:20 1087:7,10,20,23 1088:17 1089:21	1090:6,22 1094:14 1095:11,12 <b>allow</b> 1042:5 1043:5 1045:14 1052:21 1055:1 1056:22 1057:23 1064:12 1073:10,16 1098:19 1121:12 1123:1 1124:10 <b>allowed</b> 1092:9 1099:14 1104:12 <b>allows</b> 1052:1 1107:12 <b>alongside</b> 1046:14 1061:18 <b>alternate</b> 1034:1 1077:25 1078:1,10,19 1079:5 1084:7 1096:14 1100:7 1100:7 1101:6 1102:9 1103:1 1105:7 1106:1,9 1106:22 1109:22 <b>alternately</b> 1033:14 <b>alternates</b> 1034:3,4 1078:7 1096:21,23 1108:12 <b>alternative</b> 1033:10 1054:2 1055:13 1084:3 1084:5 1091:12,25 1108:6 1111:12 <b>alternatives</b> 1040:11 1052:21 1054:1 1072:12 1095:23 1103:25 1109:7 1115:9 1115:12 <b>aluminum</b> 1050:16 1069:10 <b>amend</b> 1089:6 <b>amount</b> 1052:2 1093:22 1097:20 1099:10 <b>Analee</b> 1040:21 <b>analysis</b> 1033:15 1034:3 1039:18 1082:25 1096:23 1097:2,4 1122:18,19 1123:1 <b>angle</b> 1045:8,8,9 1067:17 1067:18,20,21 <b>angles</b> 1045:25 <b>answer</b> 1082:19,19 1118:5 1121:10 1122:20 <b>answered</b> 1121:2 <b>answering</b> 1034:6 <b>answers</b> 1032:20 <b>anticipate</b> 1061:2,12 1071:21 1072:5 <b>apparent</b> 1089:13 <b>APPEARANCES</b> 1025:7 1026:1 1027:1	<b>appears</b> 1067:16 <b>Appendix</b> 1038:7 <b>applicable</b> 1057:1 1058:8 1075:24 1076:6 <b>application</b> 1024:4 1029:6 1033:12 1034:12 1038:4 1039:5 1047:21 1058:25 1059:17 1060:1 1122:6 <b>applications</b> 1034:15 1124:5 <b>applied</b> 1101:2 <b>apply</b> 1104:16 <b>approach</b> 1089:24 <b>approached</b> 1099:4 <b>approaches</b> 1045:12 <b>appropriate</b> 1030:25 1040:22 1046:5 1078:11,14 <b>approximate</b> 1057:5 <b>approximately</b> 1070:9 <b>approximations</b> 1057:10 <b>area</b> 1032:15 1033:3,20 1033:23 1036:22 1039:11,13,15,18 1040:15,16 1041:7 1042:4,4,10,13,16 1043:4,8 1044:17 1045:2,14,17,21 1053:24 1054:4,10,15 1054:20 1055:11 1059:22 1060:18 1061:6,10 1062:2 1063:3,19 1064:2 1070:2,8,10,12 1071:25 1072:7 1074:16 1080:11,20,21 1081:1,2 1081:24 1083:11,18,20 1083:21 1084:2,4,15 1085:12,21,25 1086:4 1087:7,11,16 1091:4 1092:18,21 1093:12 1094:8,25 1095:2,5,7 1095:11,12 1096:8 1097:20,23 1099:6,17 1099:21 1105:17,18 1107:20,23 1108:1,2,3 1108:23 1113:18 1115:6,13 1118:3 1123:9,22 1124:17,19 1125:17 1126:9 1127:3 <b>areas</b> 1032:17 1033:1 1037:9 1054:25 1055:14 1056:2,13,21 1060:23 1062:2,3,7,11 1064:10,18,20,22,25 1065:7,23 1066:8

1070:3 1071:19 1072:10 1081:13 1097:24 1100:2 1124:9 1126:13 <b>Armour</b> 1024:24 1128:6 1128:18 <b>Army</b> 1075:19 <b>asked</b> 1121:2,3 <b>asking</b> 1095:18 <b>aspect</b> 1054:8 1057:25 1058:10 1073:8 1082:20 1087:6 1091:15 1095:1 1124:2 <b>aspects</b> 1044:13 <b>Assenderp</b> 1027:10 <b>assessment</b> 1105:6 <b>assist</b> 1031:2 <b>Assistant</b> 1027:4 <b>assisted</b> 1031:17 1033:11 <b>associated</b> 1058:10 1068:14 1096:2 1101:17 1111:18 1112:3 1124:25 1125:11 <b>associate's</b> 1030:7 <b>associations</b> 1033:22 <b>assume</b> 1091:19 1093:12 1094:1 <b>assumed</b> 1093:14 1094:7 1097:21 1099:18 <b>assumes</b> 1093:20 1094:11 1096:5 <b>assumptions</b> 1090:2 <b>assure</b> 1058:7 1074:1,20 1075:3 1077:6,17 1098:2 <b>attached</b> 1114:3 <b>attended</b> 1033:18,21 <b>attention</b> 1078:6 1088:22 <b>auger</b> 1048:24 <b>augers</b> 1067:8 <b>authorized</b> 1128:7 <b>available</b> 1078:13 <b>Avenue</b> 1026:19,23 <b>avoid</b> 1042:12 1046:20 1058:24 1060:6,8 1062:10,10 1073:1,12 1082:4 1115:9 <b>avoided</b> 1080:14 <b>avoiding</b> 1107:16 <b>avoids</b> 1080:10 1081:4 <b>aware</b> 1039:9,12 1076:10 <b>a.m</b> 1025:2,2 1127:13	1039:4 1045:20 1052:6 1054:6 1064:4 1067:3,24 1069:25 1070:5 1071:2 1079:7 1079:20 1081:25 1082:9 1083:9 1084:3,9 1099:12 1102:23 1105:14 1106:11 1108:19 1109:2 1127:12 <b>backfill</b> 1049:3 1067:11 <b>background</b> 1030:6 <b>balance</b> 1078:16 1090:11 <b>bales</b> 1066:7 <b>banks</b> 1066:9 <b>BARBARA</b> 1027:14 <b>barns</b> 1063:7 <b>base</b> 1038:20 <b>based</b> 1040:14 1057:11 1057:15 1061:5,20 1090:2 1096:9,9 1097:19 1105:7 1113:24 1116:23 <b>basis</b> 1098:25 1105:12 1116:4,16 <b>Beach</b> 1027:15 <b>begins</b> 1063:22 <b>belated</b> 1082:15 <b>believe</b> 1045:13 1083:14 1085:13 1086:14 1087:17 1090:22 1092:25 1093:2 1098:16 1103:2 1104:13 1116:3 1126:14 <b>belong</b> 1031:24 <b>beneath</b> 1073:17 1074:10 1094:18 <b>benefit</b> 1059:12 1126:2 <b>best</b> 1040:12 1075:4 1078:16 1112:21 <b>better</b> 1049:24 1087:4 <b>beyond</b> 1064:13 1088:24 <b>bigger</b> 1058:2 1087:3 <b>bisecting</b> 1110:21 <b>bisects</b> 1111:10 <b>bit</b> 1045:3 <b>black</b> 1066:4,11 <b>block</b> 1083:20 <b>blockage</b> 1081:20 <b>blocked</b> 1072:3 1104:2 <b>blocking</b> 1107:21,24 <b>blocks</b> 1068:8 <b>blue</b> 1078:8 1108:23 <b>Bobwhite</b> 1036:11,22,23 1038:21 1040:17 1043:24 1044:3,5,6	1093:18 1105:17 1107:8 <b>Bobwhite-Manatee</b> 1024:3 1029:4 1030:4 1033:7 1036:9 1037:21 1038:3,10 1039:3 1040:7 1044:5 1045:10 1047:17 1048:15 1053:8 1057:6 1059:6 1059:16 1061:4,14 1070:6,25 1072:21,24 1073:16 1074:17,22 1075:6,13 1076:8,13 1077:20 1078:11 1090:7 1094:21 1114:7 1114:16,22 1120:6,10 1120:22 1121:21,24 1122:3,15 1123:8 1126:11 <b>bottom</b> 1039:7 1049:5 1071:3 1115:24 <b>Boulevard</b> 1025:20 1027:5 1045:7 1118:24 <b>boundaries</b> 1041:8,14,19 1065:5 1113:9 <b>box</b> 1042:4 <b>Boy</b> 1025:20 <b>braces</b> 1050:5,6 <b>Bradenton</b> 1026:20 <b>BRAM</b> 1024:20 <b>break</b> 1072:14,16 1106:13,15 1127:11 <b>Breton</b> 1026:13 <b>bridge</b> 1056:14,16 1080:15,16,17 1081:1,2 <b>bridges</b> 1045:5 <b>briefly</b> 1038:9 <b>bring</b> 1049:12,14,20 <b>Broad</b> 1026:8 <b>broader</b> 1121:3 <b>brought</b> 1066:20 <b>brush</b> 1064:23 <b>bucket</b> 1054:22 1065:17 <b>build</b> 1045:23 1054:6 1055:10 1061:13 <b>buildable</b> 1041:9 <b>building</b> 1127:5 <b>buildings</b> 1063:7 1126:23 <b>built</b> 1056:15 1062:1,3 1065:11 1118:19 <b>bulk</b> 1035:22 1036:5 <b>bundle</b> 1050:7,14,17,23 1051:12 1059:13 <b>bundled</b> 1051:10 1052:5 1059:8 <b>business</b> 1030:16	<b>C</b> <b>C</b> 1025:11 1026:12 1029:1 1106:6 <b>cable</b> 1052:19,19 1124:1 1125:17 1127:1 <b>cables</b> 1080:18 <b>cage</b> 1048:17 <b>Calhoun</b> 1025:12 <b>call</b> 1054:3 1073:7 1107:2 <b>called</b> 1028:4 1029:12 1050:5 1054:18 1066:13,15,18 1068:18 1081:25 1119:8 <b>calling</b> 1044:13 <b>cane</b> 1073:21 <b>Cannon</b> 1024:12 1026:16 <b>CANTER</b> 1024:20 <b>capable</b> 1052:8 <b>capacity</b> 1052:8 <b>captioned</b> 1128:9 <b>Carlton</b> 1025:16,19 <b>CAROLYN</b> 1025:10 <b>carry</b> 1051:20 1096:23 <b>case</b> 1024:6,7 1029:3 1037:1 1046:18 1050:12 1055:7 1058:21 1066:19 1074:18 1089:18 1090:25 1098:20 1118:3 1122:4 1126:22 1128:9 <b>cases</b> 1045:24 1054:8 1062:9 1066:2 1071:15 1124:5 1125:21 <b>Cassel</b> 1026:8 <b>caught</b> 1088:22 <b>cause</b> 1060:3 1090:16 1124:6 <b>causing</b> 1125:18 <b>Cay</b> 1025:3 <b>center</b> 1035:20,21 1036:11 1038:2,14,21 1038:25 1042:3,19 1047:13 1074:5 1113:7 1113:18,21,23 1114:1 <b>certain</b> 1097:24 1124:16 <b>certainly</b> 1119:22 <b>CERTIFICATE</b> 1028:8 1128:1 <b>certification</b> 1033:13 1034:12 1038:4 1047:22 1055:18,19 1063:22 1078:14 1114:3,9,17,21 1122:7 <b>certified</b> 1031:13,18 1063:1 <b>certify</b> 1128:7
---	---	--	---

**B**

**B** 1028:12 1108:16  
**bachelor's** 1030:8  
**back**

chain 1065:16	1060:21 1066:23	concerns 1033:24	1122:24
challenge 1120:16	1067:3 1069:24 1074:4	1046:19 1079:24	construct 1031:5 1041:11
challenges 1120:19	1075:8	1103:4,18 1104:9,15,25	1041:23 1054:23
change 1035:1	comes 1067:7 1079:18	1105:1 1115:3,10	1061:19 1072:23
changes 1104:22,24	1116:20,23	Concession 1024:10,11	1085:1,5 1088:2 1098:7
Chapman 1024:11 1027:8	Commission 1037:20	1026:11,11	1098:9 1104:5 1107:24
Chapter 1104:11	1058:17 1122:5 1126:1	concrete 1048:7,8,16,18	1119:4
characteristic 1126:17	Commissions 1038:6	1048:18 1076:15	constructability 1033:13
Charlotte 1051:14	Commonwealth 1027:5	Concurrently 1063:10	1034:2
chart 1078:18,22 1095:16	communications 1052:18	conditions 1045:23	constructed 1053:17
1095:17 1102:1,4,24	1080:18	1048:22 1054:16,18	1064:17 1075:13
1115:19	communities 1124:12	1055:19 1056:25	1083:19 1117:6 1119:4
circuit 1051:5 1052:5,6	community 1033:17,18	1061:24 1099:18	constructing 1053:20
circumstances 1055:22	compacted 1049:4	1114:2,9,17	1061:2 1062:16 1066:2
citrus 1073:20	companies 1067:2	conducted 1039:19	construction 1031:7
clamps 1066:25 1067:14	company 1024:3 1029:4	conductor 1049:17,18	1045:9 1048:6 1062:19
1069:3	1046:18 1047:18	1050:7,15,15,16	1063:24 1065:2 1066:1
clean 1065:9 1069:21,25	1067:5	1051:11,12 1059:9,10	1066:5,17 1069:22
clear 1084:12 1112:7	Company's 1043:14	1066:25 1067:23,24,25	1070:7,8,10 1071:11,23
1116:13	comparable 1125:11	1068:10,21 1069:2,9,15	1072:20 1074:21
clearance 1127:4	compare 1052:12,12	1069:17	1081:20 1083:13
cleared 1064:11	1077:23 1079:8,11	conductors 1050:13	1096:8 1103:6,16,20
clearing 1065:14,18	1084:18 1086:1 1097:1	1051:3 1052:7 1056:11	1111:18 1114:6,15
clip 1069:2	1112:16	1069:22 1073:17	1118:10,23 1123:19
clipped 1050:19	compared 1101:7 1105:7	1074:11 1124:1	1124:13,17,18,20
close 1084:16 1107:2	1111:22 1112:9,12	configuration 1048:12,13	1126:10
closed 1085:12	1115:11 1125:14	1052:25	contact 1034:8 1107:4
closely 1071:9	comparing 1078:18	conflict 1126:25	contain 1034:16 1053:12
closer 1113:17,21,23	1096:13 1102:25	conflicts 1073:12 1076:20	1082:20
closing 1087:4	1118:11	1081:11,12 1124:22	context 1036:8,9 1118:9
closure 1087:1	comparison 1079:13	connected 1036:13	1119:7 1121:3,4
closures 1072:6,9,12	1081:7 1085:23	connections 1040:13	continuation 1029:2
1085:3,4,10,14 1086:15	1090:19 1093:1 1095:9	consider 1058:25 1105:15	continue 1056:23 1072:18
1086:16,17	1095:17 1096:21	1105:16 1118:20	1077:5 1083:4 1085:22
Club 1024:8,11 1025:3,14	1101:4 1102:1,23	1119:2 1126:10	1090:19 1106:17
1026:11 1078:3	1106:8,20 1108:11,18	consideration 1044:2	continued 1026:1 1027:1
coast 1036:21	1110:11 1115:18	1046:12 1057:8	control 1047:19 1060:4
code 1058:16 1075:18	comparisons 1100:13	1101:23 1102:10	1066:3,5,7,10 1071:18
1092:10	1112:14 1117:11	1112:21	coordinate 1075:5
codes 1058:9 1075:14,16	competent 1104:13	considerations 1041:18	copy 1032:6
1076:6	complete 1070:8 1100:20	1060:2 1102:25	core 1050:17
cognizant 1075:2	completed 1057:12	considered 1044:19	corner 1035:17 1045:24
Cohn 1026:22,23	1069:24	1118:25	1062:21,25 1063:21
Collier 1031:19,21	complex 1123:20	consist 1077:10	1099:15
collocate 1043:6 1046:17	compliance 1075:14,19	Consistent 1032:12	corners 1063:4 1099:15
1082:11 1094:5	comply 1058:7,16	consistently 1056:1	1099:19
1120:21 1125:2	1071:12,15,16 1075:3	1101:2	Corp 1075:19
collocated 1070:23	1076:9 1077:20 1114:8	consolidate 1043:20	corporate 1116:20
collocating 1082:4	1114:16	1086:6,10	correct 1035:7 1040:5,18
collocation 1052:22	component 1047:20	consolidation 1115:12	1040:19 1047:11
1079:16 1115:4,8	1054:13 1101:21	consternation 1091:16	1056:12,12 1058:13,17
collocational 1080:11	components 1112:5	constitute 1128:10	1058:18 1080:23
column 1096:16,17	1124:20	constraint 1043:23	1084:7 1094:4,12
1097:1 1098:22 1102:5	concede 1116:6	1080:11,14 1110:1	1111:1 1128:10
1102:7,15 1115:23	concept 1082:23 1123:16	constraints 1042:13	corrected 1102:13
columns 1097:5	concern 1047:15 1080:10	1056:3 1058:23	corridor 1033:11,12
come 1036:16 1042:6,7	1082:21 1103:9,15	1059:21 1060:5 1115:4	1034:22 1038:4

1039:22 1040:12 1041:13,14,19,25 1042:3,6,10,18,19 1043:25 1044:1,23 1045:1,14,17 1046:9,11 1047:2,22 1060:10 1062:25 1063:9 1070:22 1077:24 1078:18 1079:4,12,21 1080:22,24 1081:6,9,16 1084:20 1085:16,23 1086:4 1091:4,8,14 1095:22 1096:14 1098:15 1100:6,8,21 1101:7,22 1102:9,23,25 1105:7,13,19,20,21,25 1106:9,22 1107:1,4,10 1107:12,15,18 1108:5 1108:12 1109:3,5,11,16 1109:17 1110:12,13,17 1111:3 1112:10,10,12 1113:2,16 1115:2,7,18 1120:23,25 1121:6,15 1122:6 <b>corridors</b> 1034:1,24,24 1041:22 1057:7 1073:5 1077:25 1078:2,7,10,13 1078:19 1090:12 1102:10 1107:3,10 1108:9 1112:21 1113:5 1113:6,8,10 1114:10,18 1114:21 1121:10 <b>corroborate</b> 1104:13,15 1104:17,18 <b>corroboration</b> 1104:20 <b>cost</b> 1033:15 1034:3 1091:24 1093:14 1094:25 1095:9,10,25 1096:1,12,18,20,25 1097:1,3,4 1100:5,24 1108:4 1111:15 1125:22 1126:5 <b>costing</b> 1091:19 1093:17 <b>costly</b> 1093:6 <b>costs</b> 1041:11 1095:20 1096:1,4,5,6,6 1100:12 1100:13,15,22,25 1108:7 1109:6,9 1111:18 1125:20,25 <b>Counsel</b> 1025:9,14 1026:3 1026:7,11,15,21 1027:3 1027:4,7,13 <b>Counties</b> 1031:21,23 <b>counts</b> 1108:3 <b>county</b> 1024:13 1027:8 1042:1,9,11,17 1047:8 1070:23 1071:4,16	1075:25 1079:18 1081:5 1082:1 1083:24 1084:1,14 1085:19 1111:2 1128:4,14 <b>county-owned</b> 1091:19 <b>couple</b> 1070:12 1083:22 1116:13 1119:17 <b>COURT</b> 1029:2,16 1032:12,22,25 1033:3 1046:22,25 1050:21,24 1051:20 1057:2,17 1072:15,18 1082:19 1088:12 1089:3 1102:19 1103:12 1104:16 1106:13,17 1111:6 1115:17,20 1116:11 1117:7,19 1119:6,23 1120:1 1121:9 1122:22 1127:11 <b>Co-Op</b> 1039:25 1043:12 1046:15,18 1047:5 1080:1 <b>Co-Operative</b> 1039:24 <b>cranes</b> 1054:22 <b>create</b> 1066:9 1104:4 1113:10 1124:23 <b>created</b> 1063:14 <b>creates</b> 1046:19 1111:15 <b>crew</b> 1070:7 <b>crews</b> 1054:21 1055:5 1066:23 1067:2 1068:6 1069:24 1070:18 1076:23 1077:6 <b>criteria</b> 1044:14 <b>cross</b> 1075:18 1080:16,25 1127:10 <b>crossed</b> 1042:25 1074:24 1075:6 <b>crossing</b> 1042:24 1044:23 1056:4 1060:19 1075:22 1080:8 <b>crossings</b> 1060:15 1124:3 1124:3 <b>cross-country</b> 1043:8 1053:16 1059:19 1061:23 1064:7 1070:1 1073:6 1077:12 1079:16 1081:8 1093:11,25 1094:1,3,7 1094:12 1097:15,16,22 1098:9,10,14,25 1099:13 1107:5 1112:5 <b>culvert</b> 1077:15 <b>culverted</b> 1065:11 <b>culverts</b> 1053:22 1055:9 1055:15,17 1064:18	1065:10 1073:13 <b>current</b> 1036:2 1052:2 1059:13 <b>currently</b> 1029:23 1074:13 <b>curve</b> 1087:13,15 <b>curvy</b> 1118:13 <b>customer</b> 1038:20 <b>customers</b> 1037:9 <b>cut</b> 1097:23 1123:25  <b>D</b> <b>D</b> 1024:12,20 1026:16 1028:1 1029:1 1106:6 <b>Dailey</b> 1025:11 1120:13 <b>Dam</b> 1043:6 1079:17 1094:6,6 1120:10,15,17 <b>damage</b> 1090:16 1124:6 <b>DANCAESCU</b> 1026:4 <b>data</b> 1117:8 <b>DATE</b> 1025:1 <b>DAUGHTON</b> 1026:8 <b>DAVID</b> 1024:14 1026:18 <b>day</b> 1038:15 1070:14 <b>days</b> 1070:12,13 1125:15 <b>deal</b> 1107:15 1109:18 1126:25 <b>dealing</b> 1110:1 <b>debate</b> 1091:20 <b>December</b> 1113:13 <b>decision</b> 1105:24 1126:20 <b>define</b> 1119:21 <b>definitely</b> 1069:19 <b>definition</b> 1118:8,14,20 1118:25 <b>degree</b> 1030:7,8 <b>degrees</b> 1045:13 1046:1 <b>delivers</b> 1040:4 <b>density</b> 1040:14 1113:25 <b>DEP</b> 1054:3 <b>department</b> 1027:3,5 1055:18 1058:13 1071:13,17 1075:22 1076:1 1092:13 1097:8 1116:21 <b>departs</b> 1080:7 <b>depend</b> 1039:17 1056:24 <b>depending</b> 1045:21 1048:21 1056:2 1058:22 1059:20 <b>depends</b> 1067:4 <b>depicted</b> 1059:4 1078:7 1120:11 <b>describe</b> 1030:5 1033:6 1035:15,24 1038:9 1041:3 1053:6 1062:14 1062:18 1065:2	1076:11 1077:2 1079:2 1108:11 <b>described</b> 1040:20 1045:7 1055:21 1096:13 1110:19 <b>describing</b> 1037:15 <b>description</b> 1083:5,24 <b>design</b> 1031:2 1048:7,9 1048:15 1049:24 1050:7 1051:15 1052:20 1055:4 1056:1 1057:11 1058:20 1059:6 1060:2 1069:2 1069:18 1073:16 1076:4,6 1077:21 1094:21 1098:3 1100:20 1114:6,14 1118:18 1120:16,19 1123:19 <b>designed</b> 1051:13 1052:16 1055:8 1057:9 1073:23 1077:18 <b>designing</b> 1030:18 1031:10 <b>designs</b> 1061:2 <b>Desoto</b> 1111:2 <b>detail</b> 1121:7 <b>detailed</b> 1045:22 1055:4 1096:23 1100:17,20 <b>details</b> 1051:4 <b>determination</b> 1038:6 1113:14 <b>determine</b> 1040:21 1042:14 1063:11 1073:19 1089:14,17 1090:1 <b>determined</b> 1034:2 1039:16,16 1041:9,9 1069:18 1073:22 1100:19,22 <b>determining</b> 1041:7 1044:4 1046:8 1063:16 1100:23 1117:5 <b>development</b> 1024:11 1026:11 1037:7 1039:21 1107:6 1118:11,17 <b>developments</b> 1037:6 <b>devices</b> 1049:16 <b>diagrams</b> 1050:3 <b>diameter</b> 1069:14,16 <b>DIANNE</b> 1025:19 <b>differ</b> 1079:14 <b>difference</b> 1052:15,25 1053:1 1091:22 1093:8 1107:3,9 1110:17 1111:25 1113:15,19
--	--	---	---

<b>differences</b> 1052:13 1079:3 1107:1 1108:4,8 1109:10 1112:18 <b>different</b> 1036:17 1044:14 1060:10 1101:4 1104:25 1119:16 1121:11 <b>differential</b> 1100:5,24 1125:22 1126:5 <b>differs</b> 1085:7 <b>difficult</b> 1046:20 1057:23 1120:5,9 1124:24 <b>difficulties</b> 1118:18 1124:24 <b>dig</b> 1055:11 <b>digger</b> 1067:7 <b>digging</b> 1125:18 <b>dig-ins</b> 1125:16 <b>Diplomate</b> 1024:24 1128:6 <b>direct</b> 1028:7 1029:18 1113:16 <b>directed</b> 1034:6 <b>directing</b> 1078:6 <b>direction</b> 1056:18 1068:2 <b>directional</b> 1124:3,10 <b>directions</b> 1060:10 <b>dirt</b> 1053:18 1066:7 <b>discuss</b> 1033:23 <b>discussed</b> 1120:12 <b>discussion</b> 1049:1 1060:22 1098:5 <b>distance</b> 1060:14 1068:13 1093:21,24 1094:11 1098:3 1101:12,19 1107:19 1109:5 1110:6 1110:10 1111:14 1112:3 <b>distances</b> 1036:17 1101:18 1109:6 <b>distributed</b> 1040:2 <b>distributes</b> 1040:5 <b>distribution</b> 1036:12,14 1036:16,25 1037:3,5 1039:12,14 1043:14,21 1046:10,14 1047:7,16 1047:19 1052:17,18 1053:3 1056:16 1057:21 1060:16,19 1080:9,16,19 1081:3,5 1081:22 1082:2,4,8,11 1082:12 1083:6,7,11 1086:6,8 1091:1 1102:6 1102:8 1115:4,7,13 1125:9 <b>District</b> 1075:21 <b>ditches</b> 1044:16 1060:8	1061:18 1063:7 1073:2 1073:12 <b>diverse</b> 1038:25 1113:11 <b>DIVISION</b> 1024:1 <b>DOAH</b> 1024:6 1029:3 <b>document</b> 1035:8 1062:14 1062:15 1063:6 1095:20 1102:13 <b>documents</b> 1063:14 1116:10 1118:12 <b>doing</b> 1067:5 <b>dollars</b> 1091:13,14,24 1093:4 1111:18 <b>dolly</b> 1068:8 <b>DONALD</b> 1024:14 <b>double</b> 1052:8 1059:13 <b>doubling</b> 1052:1,2 <b>DOUGLAS</b> 1025:15 <b>downtown</b> 1126:13,15,17 1126:23 <b>drainage</b> 1044:16 1060:8 1061:18 1073:2,12 <b>drawing</b> 1041:14,19 1047:24 1062:16 1067:19 <b>drawings</b> 1047:23,25 1050:5 1118:16 <b>drill</b> 1124:4 <b>drilling</b> 1124:11 <b>driven</b> 1118:17 <b>drop</b> 1083:17 <b>dry</b> 1061:11,24 1099:21 <b>dug</b> 1048:25 1067:9 <b>duly</b> 1029:13 <b>duties</b> 1030:23,25	1087:14 1107:25 1120:15 <b>eastern</b> 1086:23,24,25 1087:11 1103:22 <b>east-west</b> 1080:21,23 1084:20 <b>economical</b> 1112:23 1113:3 <b>edge</b> 1068:6 1071:9 1126:24 <b>edges</b> 1091:10 <b>educational</b> 1030:5 <b>effect</b> 1043:2 1094:24 1110:10 <b>efficiency</b> 1079:7 <b>either</b> 1031:10 1037:13 1042:6,18,21 1071:6 1076:19 1090:4 1120:20 <b>electric</b> 1030:15 1036:21 1039:24,25 1043:12,13 1046:15,18 1047:5 1058:11 1075:17,23,23 1080:1 1101:18,20 <b>electrical</b> 1030:7,9,13 1032:3,10,15,17 1035:16 1036:8 1038:24 1058:15 1076:2 1112:22 1113:2 1113:10 1122:25 <b>electromagnetic</b> 1092:14 <b>Electronic</b> 1032:3 <b>electronically</b> 1128:8 <b>Electronics</b> 1076:3 <b>eliminate</b> 1057:20 1085:3 <b>embedded</b> 1093:23 <b>EMF</b> 1058:8,11 1092:13 <b>emphasis</b> 1032:19 <b>employed</b> 1029:20,21 <b>enable</b> 1054:21 <b>enabled</b> 1105:16 <b>encumbrance</b> 1125:5 <b>encumbrances</b> 1076:21 1099:6 <b>ends</b> 1067:5 <b>energy</b> 1035:20,20 1036:11,19 1038:2,14 1038:20,24 1042:3 1047:13 1074:5 1101:18 1112:22 1113:2,7 <b>engineer</b> 1030:1,3,18 1122:25 <b>engineering</b> 1030:8,9,10 1030:14,18 1032:1,11 1032:16,18 1033:8 1041:1,18,21 1042:23	1043:19,23 1045:11,22 1046:11 1077:21 1078:9 1079:3,22 1082:20,21,22,25 1083:14 1085:24 1088:1 1096:2,10 1097:8 1100:9,17 1101:8,21 1102:24 1106:10,21,25 1108:7 1108:13 1109:25 1112:18 1113:19 1114:23 1118:7 1122:24 <b>engineers</b> 1032:3 1075:19 1076:3 1117:1 <b>ensure</b> 1074:10,15 1075:7 <b>ensuring</b> 1041:8 <b>entire</b> 1072:20 1081:23 1094:11 1097:21 1098:1 <b>entirely</b> 1110:22,24 <b>entity</b> 1126:3 <b>entrance</b> 1109:24 <b>environment</b> 1124:7 <b>environmental</b> 1027:3,5 1042:15 1044:13 1055:18 1058:13 1075:22 1081:12 1091:6,10 1092:13 1107:16 1109:13 1124:11 <b>equal</b> 1108:5 <b>equipment</b> 1055:2 1073:17,23,24 1074:10 1074:19 <b>erected</b> 1068:3 <b>erosion</b> 1065:25 <b>especially</b> 1073:5 <b>ESQUIRE</b> 1025:10,11,15 1025:19 1026:4,8,12,18 1026:18,22 1027:4,9,14 <b>essentially</b> 1036:16 1043:12 1047:1 1048:10,17 1064:4 1069:11 1070:4 1080:15 1081:22 1084:4 1098:9 1108:7 1109:4,6,8 1111:14 <b>establish</b> 1063:14 1116:4 <b>established</b> 1063:25 <b>estate</b> 1116:20 <b>estimate</b> 1091:19 1093:24 1096:20,25 1097:1 1098:11 <b>estimated</b> 1041:11 1096:5 1100:5 <b>estimates</b> 1095:25 1096:1
--	---	---	---

1096:9,12 1097:3 1101:2 estimating 1096:10 1097:9 evaluated 1033:13 1121:23 1123:4 evaluating 1117:1 evidence 1028:14 1029:8 1102:21 1104:13 1117:22 1128:9 evidentiary 1116:3 exact 1051:4,15 exactly 1069:17 1117:10 examination 1028:7 1029:18 1127:10 example 1036:19 1051:7 1056:4,5,19 1060:20,24 1066:5 1070:1 1090:12 1094:4 exceed 1064:14 exclusive 1125:1,2 excuse 1062:22 1087:20 1092:8 1095:18 1107:14 1108:14 1110:14 exhibit 1028:16,17 1032:4 1034:10 1035:10 1037:24 1038:5 1039:6 1041:17 1062:13,15 1066:16 1071:2,5 1078:17 1079:2 1101:25 1102:20 1105:14 1106:7,11,20 1106:23 1108:10,14,19 1116:6 1117:21 Exhibits 1115:15 exist 1088:4 existing 1042:6 1043:1,25 1046:10 1054:6,9 1063:4 1071:11 1081:17 1083:6 1086:6 1120:23,24 exists 1060:11 1084:19 1086:19 1118:22 expand 1091:22 1092:6 1100:1 expands 1043:25 expect 1088:25 expensive 1091:14 1093:4 1094:20 1126:7 experience 1030:12 1032:16 expert 1032:9 expertise 1032:19 explain 1035:13 1090:9 1093:5 1116:16 explained 1059:9 1102:24	exploration 1096:6 exposure 1101:14 express 1104:8 expressed 1103:4 extension 1043:7 1079:17 1094:6 1120:17 extensions 1120:11 extent 1075:10 1121:1 extremely 1119:18 exuded 1036:2 e-mails 1034:6,9  <b>F</b> F 1078:23 faced 1060:6 facilities 1030:19 1031:6 1043:15,21 1044:20 1046:14,17 1047:5 1052:17,18,23 1053:2,3 1056:16 1057:24 1060:20 1063:7 1077:7 1080:2,10,17,19 1081:3 1081:5,22 1082:2,5,7,8 1082:9,12,12 1083:8,12 1085:6 1086:10 1091:1 1102:6 1115:5,7 1123:20,21 1124:9,14 1125:1,11,14,19,21 1126:8,12,14 facility 1076:8 1077:21 1089:17 1123:22 1125:24 1126:21 fact 1050:17 1074:4 1081:23 1090:3 1094:23 1095:2 1116:4 1122:19 1126:14 factor 1044:3 factors 1117:4 fair 1101:3 fairly 1056:17 1064:4 1068:5 1086:13,19,20 Falkner 1024:9 1026:21 familiar 1078:1,17 1114:2 far 1068:24 farm 1060:8 1073:16 1074:10,19 1075:10 1087:8 1088:15 farming 1073:3,14 Farms 1024:12 1026:16 1081:25 1083:23 1087:22 fashion 1112:23 FC 1024:10 1026:16 FDOT 1071:16 feasible 1075:10 feature 1044:11 features 1044:10 feed	1037:8 1038:24 1083:12 1113:10 feeders 1037:5 feel 1099:17 feet 1034:23,25 1035:3 1042:18 1045:1,2 1048:21 1049:1,20 1054:25 1055:24 1057:14,14,22 1059:25 1059:25 1064:9,14,16 1064:24 1067:9,10 1068:14,15 1095:4 1097:16,16,17,17 1098:23,24,24,25 1099:9,9 1109:1,2 1110:7 fenced 1074:13,24 fences 1044:16 1066:12 1066:14 fiber 1127:1 field 1032:10 1058:12 1089:11,22 fields 1025:16,19 1073:21 1074:3,6 1075:24 1092:14 figure 1035:12 1047:24 1052:12 1053:5,12,14 1054:11 figures 1047:23 1048:5,8 1052:11,14,14 1053:6 1053:10 1055:22 filed 1034:1 fill 1053:18 1065:8,9,25 final 1037:10 1043:23 1069:18 1092:2 1096:15,17 1102:5,7,15 finally 1057:9 find 1036:13 1059:20 1089:13 1090:1 first 1029:13 1031:19 1038:17 1041:25 1054:23 1063:2 1078:1 1078:25 1079:11,12,21 1081:9 1086:22,24 1115:22 1118:4 fit 1092:15,16,20 Flagler 1031:23 Flanigan 1026:13 flexibility 1041:21 1042:5 1042:12 1043:6,8 1044:8,22,25 1045:4 1056:1 1059:22 1060:11 1073:5,8 1081:10 1091:5,9 1098:2,20 1107:12,16 1109:12,19 Florida 1024:1,3 1025:5	1025:12,17,20 1026:5,9 1026:14,20,24 1027:6 1027:11,15 1028:4 1029:3,12,21,24 1030:11,16,19 1032:8 1036:21 1038:9 1039:9 1040:1 1043:17 1046:3 1046:16 1047:12,14,16 1053:15 1070:24 1071:12,13,16 1072:25 1074:3,7,14,23 1075:5 1075:20,22 1076:1,3 1077:24 1078:15 1079:4 1081:8 1092:12 1092:12 1098:6,8 1122:8,12 1123:17,18 1126:9 1128:3,14 flow 1053:21,24 1054:10 1055:9 1065:7 flows 1055:16 follow 1084:3 1091:1 1118:9 followed 1121:15 following 1118:19 follows 1029:14 follow-up 1083:22 foot 1059:18,18 1060:23 1064:21 1093:10 1099:3,11,11 1109:17 forced 1105:15 foregoing 1128:8,10 formed 1105:12 forms 1123:23 formulating 1117:2 forth 1081:25 1082:9 1105:24 1106:1 1113:13 forward 1096:23 found 1038:6 1076:23 foundation 1024:9 1027:8 1082:17 four 1091:13 1093:4 1095:22 four-lane 1081:14 FPL 1028:16,17 1031:3 1032:4 1034:10,12 1035:10 1037:24 1038:5 1039:6,7,12,21 1040:12 1041:17 1043:20,21 1046:11 1047:22 1051:9 1052:17 1062:13,15,18 1062:22 1066:16 1067:16 1069:20 1071:5,6 1078:6,17,18 1078:25 1079:7,8,12,15 1079:21 1080:21,24
---	--	--	--

1081:6,16 1082:3,6,9 1084:20 1085:16,23 1086:3,8 1090:20 1091:1,4,14 1093:1,3,4 1093:18 1095:14,18,22 1096:10,12,14,18,19 1097:1 1098:14,22 1100:6,6,8 1101:7,22 1101:25 1102:7,9,16,19 1102:20,23,25 1105:6 1105:13,14,24 1106:4,8 1106:20,21,23 1107:1 1107:10,14 1108:5,10 1108:11,14,19 1109:3,4 1109:7,11,11 1110:12 1112:10,12,14,15 1113:1,15 1115:1,7,13 1115:14,15 1117:21 1120:11,15,17,23,25 1121:6 1127:6 <b>FPL's</b> 1033:11 1083:1 1123:15 1126:12 <b>frequent</b> 1094:22 <b>fresh</b> 1065:8,9 <b>Fruitville</b> 1056:20,21 1057:13 1060:21 1079:20 1086:2,9,12,18 1086:20 1087:11,14 1094:15 1103:19 1104:6 1105:23 1107:7 1107:8,20 1108:2 1115:10 <b>Fulton</b> 1024:10 1026:3 1078:4,8,11 1084:3,5,7 1108:12,21,22,23 1109:8,10,17,22 1110:9 1110:13,15,16,18,18,22 1110:22,24 1111:4,7,10 1111:11,12,13,16,21,22 1112:3,4,9,11,15,16,16 1112:17 <b>function</b> 1037:14 1068:1 1069:10 1077:18 1092:19 <b>functionalize</b> 1044:13 <b>functions</b> 1035:16 1036:24 <b>funnels</b> 1049:8 <b>further</b> 1067:17 1113:22 1114:1 1123:1 <b>future</b> 1039:10,17 1040:8 1040:13 1041:23 1054:24 1055:6 1090:4 1113:17,18,25 1125:8 <b>futuristic</b> 1082:22	1029:1 1078:23 1108:16 1115:23 <b>Gadsden</b> 1026:13 <b>GASPER</b> 1027:14 <b>gates</b> 1074:14 <b>GENCOR</b> 1097:4,6 <b>general</b> 1027:4 1046:16 1048:19,24 1054:20 1061:10,15 1064:8 1065:20,22 1067:8,21 1068:13 1070:20 1071:9 1077:9,10 1084:2 1087:14 1089:16 1103:9 1122:11 1123:3 1126:20 1127:6 <b>generalized</b> 1121:10 <b>generally</b> 1041:3 1052:20 1058:9 1059:5,7 1064:21 1066:19 1067:4 1069:9 1123:24 <b>generation</b> 1029:23 1035:18 <b>generic</b> 1099:4 <b>getting</b> 1066:8 1094:18 <b>give</b> 1031:8 1032:20 1045:3 1057:9 <b>given</b> 1117:11 1118:20 1122:19 <b>giving</b> 1118:4 1119:2 <b>glide</b> 1088:2 1094:18 <b>go</b> 1036:21 1037:13 1049:8 1054:4 1056:7 1058:4 1061:10 1074:5 1079:7 1090:23 1095:6 1098:3 1104:2 1108:19 <b>goes</b> 1045:1 1081:18 1107:5 1110:20 <b>going</b> 1039:17 1050:14 1055:25 1057:23 1060:19 1062:20,24 1066:22 1067:20 1068:10 1075:21 1079:11 1082:14,23 1090:23 1097:25 1100:16 1101:4 1103:21 1104:4 1120:2 1121:1 <b>Golf</b> 1024:11 1026:11 <b>good</b> 1061:24 1062:2 1070:20 1077:20 1122:23 <b>grade</b> 1054:4,6 1055:11 1055:12 <b>GrayRobinson</b> 1026:4 <b>great</b> 1036:17 1107:15 1109:18 1121:12	1126:25 <b>greater</b> 1032:20 1045:12 1045:25 1064:9,16,24 1101:12,14,19 1107:12 1124:13 <b>Green</b> 1025:11 <b>grid</b> 1040:9 1044:7 <b>ground</b> 1048:20,21,23 1067:1 1068:11,23 1069:6,8,22 1103:11 1123:25 1127:1,3 <b>group</b> 1030:2,22,24 1082:10 <b>groves</b> 1073:20 <b>grow</b> 1064:16 <b>growing</b> 1076:22 <b>growth</b> 1039:17 <b>guess</b> 1044:18 1047:2 1069:20 1118:24 <b>guidelines</b> 1071:18 1075:15 1076:7 <b>Gum</b> 1024:8 1027:7 <b>guy</b> 1068:1 1100:2 <b>guyed</b> 1099:14,15,16,22 1099:23 <b>guying</b> 1045:14,24 <b>guys</b> 1067:21,24 1099:20 1099:25	1070:4 1076:16 <b>Harborside</b> 1025:4 <b>hard</b> 1054:5 1117:25 1119:4 1120:21 1121:8 <b>hardware</b> 1048:11 1066:24 1067:4 <b>hardwares</b> 1049:10 <b>HAT</b> 1024:15 <b>hauled</b> 1065:9,10 <b>hauling</b> 1066:18 <b>hay</b> 1066:6 <b>hear</b> 1041:20 1050:6 1055:25 1068:8 1103:7 <b>heard</b> 1066:13 1103:13 1105:2 1110:19 1116:9 1116:11 1121:9 <b>hearing</b> 1024:19 1047:4 1121:19 <b>HEARINGS</b> 1024:1 <b>hearsay</b> 1082:18 1088:10 1103:10,11 1104:10,12 <b>heat-generating</b> 1125:3 <b>heavy</b> 1067:17,18,21 1083:15 <b>height</b> 1055:21,23 1056:7 1056:8,8,10,12,17 1057:1 1058:4,19 1064:9,14,16 1073:19 1073:22 <b>heights</b> 1056:2,24 1057:6 1058:24 1060:12 <b>help</b> 1046:22 <b>helps</b> 1057:17 <b>HENNESSY</b> 1026:18 <b>herbaceous</b> 1064:20 1065:20 <b>hereunto</b> 1128:12 <b>HI</b> 1024:15 <b>high</b> 1048:18 1056:17 1057:15 1061:11 1099:21 1125:21 <b>higher</b> 1056:13 1108:3 <b>highways</b> 1060:16 <b>HINES</b> 1027:14 <b>hit</b> 1090:14 <b>hold</b> 1049:17,24 1054:17 1055:12 1066:25 <b>Holdings</b> 1024:10 1026:15 <b>holds</b> 1046:6 1049:18 1052:24 1082:13 1123:17 <b>hole</b> 1048:24,24,25 1049:2,3 1067:8,9,9,11 1123:25 1124:1 <b>Holmes</b> 1027:15 <b>homeowners</b> 1024:13
--	--	--	---

G



1027:8 1033:21 homes 1033:22 1037:8,14 1063:7 Homes-Eastmoor 1024:12 1026:16 Honor 1032:8,24 1049:13 1072:13 1082:14 1089:7 1104:11 1115:21 HONORABLE 1024:20 Hopping 1025:11 hotel 1106:14 hour 1083:15 1127:12 hours 1125:15 house 1036:1 houses 1033:19 1080:3 Hunsader 1024:14,14,14 1081:25 1083:23 H-a-h-n 1029:17	1095:24 includes 1096:3,4 inconsistent 1075:9 incorporate 1044:5 incorporated 1097:14 incorporating 1104:24 increase 1056:7 increased 1038:19 1087:25 1113:9 indicate 1088:20 indicator 1122:23 individual 1033:22 1037:8 industry 1075:15 1076:7 information 1034:16 1116:19,23,25 1117:12 infrastructure 1073:3,14 initial 1093:23 1099:2,16 initially 1097:20 1099:13 1108:22 input 1105:8,11 inquiry 1117:7 inside 1071:7,20 1092:17 1092:20 1118:17 1124:1 install 1048:23 1055:5 1066:24 1067:2,6 1068:6 1085:9,14 1107:24 1123:22 installation 1070:13 1072:2 1123:24 1124:18 installed 1048:11 1049:2 1050:9 1053:23 1064:18 1065:11 1067:11,18,22 1068:9 1068:25 1069:23 installing 1081:20 instances 1066:23 Institute 1032:2 1076:2 instructions 1075:9 insulator 1048:11 1049:13,16,18 1050:2 1050:13,19,23 1067:15 insulators 1049:19,23,25 1066:24 1067:1,14 1068:7 1069:3,4 1076:16 intact 1074:21 integrate 1040:8 intended 1121:11 intent 1042:19 1062:9 intention 1080:25 interconnection 1029:24 interested 1050:20 interfere 1064:5,25 1125:7	intermediate 1039:2,8 1099:19 intermittent 1072:11 1086:15 interpret 1118:5 interrupt 1119:6 intersect 1111:4 intersection 1045:6,8,18 1046:3 intersects 1042:1 1108:1 intertie 1036:20 Intervenor 1026:3,7,21 1027:13 intervenor 1024:16 1025:14 1026:11,15 1027:7 1077:25 introduces 1088:3 1090:13 investigating 1034:23 Investors 1024:8 1025:14 1078:3 involved 1031:10,12 1041:7 In-Laws 1119:8,9 irrigation 1073:2 issue 1042:23 1077:14 1106:14 1110:11 1117:9 issues 1043:9 1101:11,15 1107:9 1109:15 1115:3 1127:5 item 1060:4 I-75 1038:22	1073:4 1077:3 kilovolt 1029:4 1051:21 kilovolts 1037:2 1051:20 1052:4 kind 1092:2 1119:7 1123:1 Kittie 1024:11 1027:8 know 1037:19,23 1046:22 1049:6 1069:17 1088:24 1089:4 1100:15 1119:10,18 1120:1 1122:22 knowledge 1089:4 known 1100:15 knows 1119:23,25 Krasker 1026:13 KV 1024:4
I		J	L
idea 1031:8 IDENTIFICATION 1102:20 1117:21 identified 1033:10,11 1037:20 identify 1030:25 identifying 1046:4 IEEE 1032:2 1076:2 illustrated 1053:1 illustrates 1062:16 illustrations 1050:25 image 1109:4 1111:14 immediately 1071:20 impact 1042:16,25 1043:1 1043:9 1071:21 1072:2 1101:15 1104:4,7 1114:23 1115:2 1124:12 impacts 1044:9 1056:6 1091:6,10 1103:5,16 1105:18 1107:16,19 1109:13 1110:2,4 1124:11 importance 1077:3 important 1042:24 1044:2,3 1053:20 1054:8 1100:22 1101:1 1101:7 impractical 1123:13 improvements 1103:22 inactive 1089:1 inches 1048:25,25 1049:6 1049:7,9 1053:25 1054:2 include 1043:25 1089:6 1096:1 included		investigating 1034:23 Investors 1024:8 1025:14 1078:3 involved 1031:10,12 1041:7 In-Laws 1119:8,9 irrigation 1073:2 issue 1042:23 1077:14 1106:14 1110:11 1117:9 issues 1043:9 1101:11,15 1107:9 1109:15 1115:3 1127:5 item 1060:4 I-75 1038:22	L 1024:11 1027:4,8 label 1075:9 labor 1096:2 laid 1082:17 Lake 1024:8 1025:14 1078:2 Lakewood 1118:16,24 land 1024:11,12 1026:7 1026:11 1072:25 1074:13,24 1075:8 landing 1090:15 landowner 1042:14 1046:4,8 1085:19 1091:6 landowners 1044:17 1060:9 1063:11 1073:12,18 1074:1,20 1075:2 1107:13 1109:14 lands 1075:21 lane 1072:3,5,9 1083:20 1084:16 1085:11,14 1104:2 large 1036:5 1042:4 1097:19 1126:23 larger 1084:24 lasts 1124:19 LAW 1024:21 layer 1037:7 laying 1055:4 layout 1085:19 leading 1089:2,3 leads 1126:20 leave 1087:20 led 1126:18 Lee 1031:21 left 1064:21 1065:20 1092:1 1098:3,10,19 left-hand
		K	
		Katz 1026:13 kept 1055:3 1074:21 1077:17 KEVIN 1026:18 key 1043:10 1055:2,3	

1035:17 1062:20,24 1063:21 <b>legal</b> 1063:15 1117:9,9 <b>length</b> 1059:15,24 1060:3 1060:4,11 1081:23 1097:21 1098:14 1101:6 1111:16,17 1113:16 1115:11 <b>lengthened</b> 1060:15 <b>lessen</b> 1085:2 <b>let's</b> 1049:1 1072:15 1106:13 1112:6 1127:11 <b>Lewis</b> 1026:19 <b>lieu</b> 1052:6 <b>life</b> 1038:15 <b>light</b> 1024:3 1028:4 1029:4,13,21,24 1030:16 1032:9 1039:10 1040:1 1043:17 1046:4,16 1047:14,16 1053:15 1070:24 1071:12 1073:1,24 1074:7,14,23 1075:5 1077:24 1078:16 1081:9 1098:6 1098:8 1100:24 1118:15 1119:1 1122:8 1122:13 1126:9 <b>lightning</b> 1069:11,12 1101:15 <b>Light's</b> 1030:20 1038:10 1047:12 1076:4 1079:4 <b>limit</b> 1083:15 <b>limitation</b> 1032:23 <b>line</b> 1024:4,4 1029:5,5 1030:13,17,21,23 1031:13,13,18,20,22,25 1032:10,17 1033:8 1035:5,22,22 1036:3,4 1036:10 1037:21 1039:3 1040:7,22 1041:23 1042:15,19 1044:6 1045:10 1047:17 1051:14,20 1052:3 1053:8 1054:23 1057:6 1058:8,23 1059:14,16 1061:4,14 1062:17,19 1063:23 1064:6 1065:1 1069:5,7 1069:11,24 1070:7,25 1071:19 1072:21,23,24 1073:9,23 1074:17,22 1074:25 1075:7,12,13 1076:9,13,22 1077:1,5 1077:14,19,20 1078:12 1081:21 1085:1 1086:7	1086:11 1087:25 1090:15,17,18 1093:5 1094:22 1096:3 1100:16 1101:12,12,13 1101:16,16,17 1111:16 1111:17,19 1113:16 1114:8,16,22 1115:11 1117:1,2,25 1119:3,5 1119:12 1120:6,10,22 1121:16,21,25 1122:4 1122:15 1123:5,8,9,12 1125:8 1126:10 <b>lines</b> 1031:1,3,7,9 1036:16,20 1046:10 1047:7,16 1050:25 1051:3 1052:9 1060:16 1060:17 1063:3 1074:2 1074:4 1076:17 1078:14 1080:18 1083:6 1084:9 1085:20 1086:6 1089:10 1102:8 1117:5 1122:9,11 1124:8 1125:12,13 1126:19 1127:6 <b>listen</b> 1033:24 <b>little</b> 1045:3 1064:1,2 1066:4 1068:6 1071:3 1072:10 1083:25 1091:16 1122:11 <b>LLC</b> 1024:8,10,10,11,11 1024:12,13 1025:14 1026:11,11,15,16,16,17 <b>LLLP</b> 1024:15 <b>load</b> 1037:3 1038:20 1113:9,18,21,23,25 <b>locate</b> 1073:1 1117:25 1120:6,9 <b>located</b> 1034:22 1063:12 1063:18 1083:24 <b>location</b> 1040:22 1042:25 1044:2,4,24 1046:5 1055:16 1085:19,20 1086:25 1102:6 1124:16 <b>locations</b> 1031:1 1039:15 1039:20 1054:16 1055:8 1061:17,22 1070:22 1083:19 1085:11,14 1086:14,16 1096:7 1107:22 1124:15 <b>locked</b> 1074:14 <b>long</b> 1049:20 1050:8 1055:11 1070:7 1072:20 <b>longer</b> 1049:25 1060:7 1093:3,5 1101:19	<b>Longman</b> 1026:19 <b>look</b> 1045:22 1047:21,22 1049:11,14 1051:9,18 1052:11 1053:19 1063:3 1076:20 1089:11,21,22,23 1099:17 1117:4 1120:14 1127:2 <b>looked</b> 1042:23 1044:14 1057:12 1101:24 <b>looking</b> 1090:11 1094:5 1099:3,14 1118:14 <b>Lorraine</b> 1045:7,18,21 1046:3 1079:18 1086:1 1087:19 1088:5 1090:24,25 1091:3 1094:9 1107:11 1118:21,23 1120:7 <b>loss</b> 1101:12,16,16,17 <b>losses</b> 1101:17,19 <b>lost</b> 1101:13 <b>lot</b> 1049:25 1058:22 1063:21 1066:4 1076:16 1081:10 1083:15 1085:4 1091:9 1092:10 1099:6 1107:2 <b>lots</b> 1118:6 <b>low</b> 1065:22 1076:15,24 1095:2 <b>lower</b> 1050:10 1054:4 1057:19,22 1058:3,4 1064:21 <b>lowering</b> 1057:25 1095:1 1095:2 <b>lunch</b> 1127:11 <b>luncheon</b> 1127:13	1076:24,25 1077:3,8,9 1114:7,15 1123:19 <b>major</b> 1039:21 <b>majority</b> 1061:5,10 1062:1 1085:11 1126:12 <b>making</b> 1099:1 1103:22 <b>management</b> 1030:10 1075:21 1106:14 <b>manager</b> 1029:23 <b>ManaSota-88</b> 1024:9 1027:13 <b>Manatee</b> 1035:20,20 1036:11,19 1038:2,14 1038:20,24 1042:2,24 1044:23 1047:13 1056:4 1074:5 1075:18 1075:24 1080:8,9 1113:7 <b>maneuver</b> 1041:22 <b>manmade</b> 1042:13 1043:9 1063:6 1081:12 <b>manner</b> 1075:8 1077:6 1113:4 <b>Manual</b> 1076:2 <b>man-made</b> 1044:19 1056:3 <b>map</b> 1041:17 <b>mapped</b> 1065:8 <b>Marina</b> 1025:3 <b>marked</b> 1035:9 1108:23 <b>Mary</b> 1024:24 1128:6,18 <b>masters</b> 1030:10 <b>material</b> 1049:13,16 1065:12 1066:18 <b>materials</b> 1096:2 <b>matter</b> 1029:8 1066:14 1116:4 <b>MAUREEN</b> 1026:8 <b>maximum</b> 1073:22 <b>Mayes</b> 1032:13 1040:14 1040:21 1045:7,13 1059:1 1113:24 1118:12 1120:12 <b>ma'am</b> 1071:6 <b>McCARTHY</b> 1026:8 <b>McGill</b> 1024:24 1128:6 1128:18 <b>mean</b> 1050:24 1091:22 1110:14 1118:6 1125:2 <b>meander</b> 1119:7,15 <b>meandering</b> 1118:1,5,6,8 1118:15,21,25 1119:2,5 <b>meant</b> 1119:23 <b>measurement</b> 1051:22,22 1051:24 <b>meet</b> 1113:6
---	---	---	---



1085:18 1086:5 <b>opposed</b> 1077:1 1092:5 1123:4 <b>opposite</b> 1068:2 <b>optics</b> 1127:1 <b>option</b> 1062:7 <b>options</b> 1055:10 <b>Orange</b> 1031:19 <b>order</b> 1038:6 1056:5,22 1058:3,7 1092:20 <b>ordered</b> 1126:1 <b>orderly</b> 1112:23 <b>ordinances</b> 1075:25 <b>Organization</b> 1024:14 1027:8 <b>organizations</b> 1031:24 <b>original</b> 1097:10 <b>originally</b> 1054:7 1077:18 <b>Orlando</b> 1026:5 <b>OSHA</b> 1073:24 <b>outages</b> 1125:11,12,18 <b>outreach</b> 1033:18,25 1051:17 1103:3,8 1104:9 1105:9 <b>outriggers</b> 1055:1 <b>outside</b> 1042:21 1071:8 1071:20 <b>overall</b> 1078:16 1100:25 1115:11 <b>overcome</b> 1046:20 1124:24 <b>overhead</b> 1047:7 1068:10 1068:23 1069:6,8,22 1123:17,21 1124:8 1125:10,14,22,23 1126:5,8 <b>overlap</b> 1058:25 <b>overrule</b> 1082:23 <b>owner</b> 1088:7 1089:16 1110:25 <b>owners</b> 1033:22 1074:8 1110:21 1111:11 <b>ownership</b> 1091:17,21 1092:5 1115:24 1116:8 1116:17,22 1117:13 <b>owns</b> 1111:2	1028:3,14 1034:19 1039:4 1053:9,11,11 1078:25 1106:4,5,7,19 1108:10,14 1115:22 <b>pages</b> 1128:10 <b>pan</b> 1054:5 <b>panel</b> 1033:19 <b>paper</b> 1066:4 <b>paragraph</b> 1034:20 <b>parcel</b> 1074:24 <b>park</b> 1080:4 1109:25 <b>Parkway</b> 1043:5 1079:17 1081:8 1086:1 1088:4 1091:2 1107:4,11 <b>part</b> 1033:24 1046:8 1072:11 1101:1 1105:8 1122:6 <b>participate</b> 1040:20 1041:14 1078:21 <b>participated</b> 1078:23 1103:4 <b>participation</b> 1104:23 <b>particular</b> 1086:22 1092:12 1118:18 <b>party</b> 1029:7 <b>pass</b> 1073:17 1074:10 1125:25 <b>passed</b> 1125:25 <b>path</b> 1039:1 1113:11 <b>patrols</b> 1076:18 <b>pattern</b> 1039:18 1054:10 <b>pay</b> 1126:4,5 <b>payer</b> 1126:1,2 <b>Peace</b> 1039:23,25 1043:11,13 1046:15,18 1047:4 1080:1,2 <b>Pellicer</b> 1031:22 <b>Penn</b> 1030:9 <b>people</b> 1044:16 1082:16 <b>people's</b> 1119:16 <b>percent</b> 1092:25 1098:11 1098:12,13 1122:12 1123:15 <b>perception</b> 1104:25 <b>performed</b> 1040:21 <b>periodically</b> 1070:18 1076:18 <b>permits</b> 1031:5 <b>permitting</b> 1030:2,14,22 1030:24 1031:4,10,25 1032:11,18 1056:9 <b>perpendicular</b> 1087:24 1090:7 <b>person</b> 1034:5 1126:3 <b>personally</b> 1089:19 <b>personnel</b> 1075:7 <b>perspective</b> 1041:19,21 1043:20 1044:15	1070:11 1078:9 1079:3 1079:7,22 1083:13,14 1085:24 1088:1 1089:23 1099:5 1100:9 1101:8,11 1106:10,21 1106:25 1108:4,8,13 1109:5,25 1112:19 1113:20 1114:23 1118:7 1124:21 1125:5 <b>pesticides</b> 1075:10 <b>Petitioner</b> 1024:6 1025:9 <b>phase</b> 1059:10,11 <b>phone</b> 1125:17 <b>photo</b> 1051:16 <b>photograph</b> 1051:10,10 <b>photographs</b> 1059:1,5 <b>physical</b> 1090:3 1096:3 <b>physically</b> 1092:4 1094:10 <b>pickup</b> 1076:19 <b>picture</b> 1051:4 <b>piece</b> 1067:6 1079:16 <b>Pine</b> 1026:5 <b>pipe</b> 1124:1 <b>pipes</b> 1073:2 1124:23 <b>place</b> 1025:3 1042:20 1051:23 1062:25 1063:22 1064:1 1065:21 1066:10 1069:1 1070:24 1074:17 1079:13 1094:2 1100:17 1123:13,25 1124:18 1125:6 1127:2,4 <b>placed</b> 1035:5 1045:3 1046:9 1058:23 1059:21 1060:1 1066:22 1067:11 1069:5 1071:7,20 1072:25 1121:21 <b>placement</b> 1045:4 1062:7 1078:11 1109:19 1126:18 <b>places</b> 1104:2 <b>placing</b> 1121:23 1122:14 1123:4,12 <b>Plank</b> 1087:8,23 1088:7 1088:14,18 1089:19 <b>planned</b> 1039:2,13 <b>planning</b> 1118:12 <b>plans</b> 1039:9 1120:11 <b>plant</b> 1035:18 <b>play</b> 1039:20 <b>played</b> 1105:23 <b>PLC</b> 1026:23 <b>please</b> 1029:16 1030:5 1032:4 1033:6 1034:10	1035:8,15 1038:9 1041:3 1047:21,24 1053:9 1057:10 1062:12,18 1076:11 1077:2 1079:2 1084:18 1085:22 1090:10,20 1095:14,24 1101:25 1106:11,20 1108:11,15 1108:18 1114:13 <b>point</b> 1037:20 1041:23 1043:10 1050:4 1051:23,23,24,24 1063:16 1072:14 1083:25 1084:8 1087:2 1107:5 1108:25 1116:5 1116:7 <b>pointing</b> 1040:16 1084:11 <b>points</b> 1037:23 1038:1 1093:21 <b>pole</b> 1048:6,7,16 1049:2,3 1049:8,8,10,17,19 1055:5,21,23 1056:2,7 1056:13,17 1057:19,21 1066:20 1067:3,6,10,12 1067:13,16,20,22 1083:19 1085:10 1096:7 1124:15 <b>poles</b> 1048:9,19 1049:5 1052:16 1056:21 1057:7,25 1058:1,2,3,3 1058:5 1060:12,14,21 1063:12 1068:9 1070:14 1071:6 1072:2 1073:1 1076:15 1085:20 1095:10 1107:24 <b>polymer</b> 1049:17,22 1076:16 <b>porcelain</b> 1049:23,25 <b>portion</b> 1085:8 1101:1 1102:4 1105:19 1121:24 <b>portions</b> 1106:5 <b>position</b> 1029:22,25 <b>possibility</b> 1121:23 <b>possible</b> 1045:23 1050:12 1056:5 1061:16,22 1072:13 <b>post</b> 1055:17 <b>potential</b> 1045:16 1065:25 1110:4 1115:5 1119:11 <b>power</b> 1024:3 1028:4 1029:3,13,21,24 1030:16,20 1032:9 1035:14,18,18,21,22 1036:5,5 1037:10
--	---	---	---

---

**P**


---

**P** 1029:1  
**Pacific** 1024:11 1026:7  
**package** 1035:1  
**pad** 1053:7 1054:19  
1055:8 1061:2,19  
1065:6  
**pads** 1054:12 1055:14  
1061:3,9,13,25 1063:17  
1065:3,5 1066:3  
**page**

1038:10 1039:10 1040:1,1,4 1043:17 1046:4,16 1047:12,14 1047:16 1053:15 1070:24 1071:12 1073:1 1074:7,14,23 1075:5 1076:4 1077:24 1078:16 1079:4 1081:9 1098:6,8 1122:8,13 1126:9 <b>practicable</b> 1122:16,20 <b>practical</b> 1123:9 <b>practice</b> 1082:22 1083:1 <b>practices</b> 1077:21 <b>PRECO</b> 1039:13,14,23 1040:2,3,4,4 1080:9,10 1080:11,14,19 1081:3,4 1081:22 1082:2,4,8,12 1083:6,7,11 1084:9 1102:6 1110:1 1115:4,6 <b>preconstruction</b> 1055:16 <b>predominantly</b> 1060:18 1065:16,17 <b>prefer</b> 1046:20 <b>preferable</b> 1100:8 1117:3 <b>preference</b> 1080:25 1106:1 <b>preferences</b> 1084:21 <b>preferred</b> 1033:11 1039:22 1040:12 1041:13,15 1046:11 1070:22 1077:24 1078:18 1079:4,12,15 1079:21 1080:22,24 1081:6 1084:20 1085:16,23 1086:3 1090:20 1093:3,5,18 1095:22 1096:14 1098:15 1100:6,8 1101:7,22 1102:9,25 1105:6,13,24 1106:9,21 1107:1,10,14 1108:5,12 1109:3,5,7,11,11 1110:12,12 1112:9,10 1112:12,14,15 1113:1 1113:15 1115:1 1120:23,25 1121:6 <b>preferring</b> 1105:12 <b>prehearing</b> 1114:3 <b>preliminary</b> 1029:7 <b>prep</b> 1064:1,3 1070:12 <b>preparation</b> 1033:12 1078:21 1102:3 <b>prepared</b> 1034:13 <b>presence</b> 1046:10 1088:20 1090:3,6,12 1094:14 1102:8	<b>present</b> 1077:13 1087:24 1094:2 1118:18 1120:19 1122:6 <b>presentation</b> 1029:8 1059:6 <b>presented</b> 1033:15,20 1059:2 1090:8 1118:12 1122:4 <b>presently</b> 1118:21 <b>presents</b> 1120:16 <b>Preservation</b> 1024:9 1027:7 <b>pressure</b> 1036:1 1052:3 1065:22 <b>pretty</b> 1083:17 <b>prevalent</b> 1048:14 <b>prevent</b> 1061:18 <b>prevents</b> 1110:20 <b>previously</b> 1094:15 1096:13 <b>primarily</b> 1079:13 <b>primary</b> 1034:5,8 1035:16 1039:21 1041:18 <b>Pringle</b> 1031:22 <b>prior</b> 1029:25 1030:1 1109:24 <b>private</b> 1091:21 1092:5,8 1092:16 <b>probably</b> 1050:8 1057:15 1060:23 <b>problem</b> 1083:1,2 <b>problems</b> 1076:23 1119:11 <b>proceed</b> 1070:16 <b>proceeding</b> 1042:1 1057:8 1102:10 1104:12 1112:21 1114:4 <b>proceedings</b> 1128:9 <b>process</b> 1033:25 1041:5,7 1070:18 1072:21 1100:12 1116:21 1124:17 <b>professional</b> 1030:12 1031:24 <b>proffered</b> 1114:21 <b>program</b> 1103:3 1104:9 1105:9 <b>progress</b> 1107:25 <b>project</b> 1024:4 1029:5 1030:3,3,4 1031:13,19 1031:20 1033:7,16,23 1034:6 1036:8 1038:11 1038:13 1039:8,11 1048:15 1049:7 1050:16 1051:17	1062:5 1088:3 1096:8 1100:25 1118:9,11 <b>projects</b> 1031:17 1051:13 1096:10 <b>project's</b> 1035:19 <b>property</b> 1033:22 1063:3 1074:21 1110:21,23,24 1110:25 1111:7,11,12 <b>propose</b> 1070:24 <b>proposed</b> 1040:11 1043:6 1063:8 1076:12 1078:2 1078:3,10 1093:12 1114:9,18 1115:7,8 1120:24 1121:15 <b>proposing</b> 1039:8 <b>protect</b> 1069:11 <b>Protection</b> 1027:3,5 1055:19 1058:13 1075:23 1092:13 <b>provide</b> 1031:6 1034:17 1038:13,23,25 1040:1 1040:12 1044:24 1106:20 1108:17 <b>provided</b> 1033:15 1034:2 1034:3 1095:9 1117:12 <b>provides</b> 1040:3 1078:16 1113:2 <b>provisions</b> 1053:22 <b>public</b> 1035:5 1037:19 1038:5 1051:17,17 1058:17 1071:11 1092:5,9,10 1094:2 1098:24 1103:3,5,8,9 1104:4,8,9,14,23,25 1105:1,8,9 1114:23 1115:2 1121:19,20 1122:5 1126:1 <b>pull</b> 1068:21 <b>pulled</b> 1068:24 <b>pullers</b> 1068:19 <b>purpose</b> 1035:19 <b>purposes</b> 1047:4 1049:1 <b>pursuant</b> 1058:16 <b>push</b> 1052:3 <b>put</b> 1035:11 1048:1 1049:3 1052:7 1054:5 1055:11 1067:3 1070:5 1105:24 1106:1,11,23 1113:13 1120:13 1127:4,6 <b>P.A.</b> 1025:11,16,19 1026:4 1026:13,19 1027:10	1105:4 1114:13 1116:2 1119:14 1123:2 1123:3 <b>questions</b> 1083:23 1116:13 <hr/> <b>R</b> <b>R</b> 1026:18 1029:1 <b>Raepple</b> 1025:10 1028:7 1029:9,19 1032:8,21 1033:2,5 1047:6 1051:8 1052:10 1053:10,11 1057:2,4,18 1072:19 1083:3 1088:13 1089:8 1102:16,22 1103:14 1104:11 1105:3 1106:17,18 1111:9,23 1115:14,18 1116:12,15 1117:9,18,23 1119:19 1119:25 1120:4 1121:17,18 1123:3,6 1127:9 <b>raise</b> 1029:7,11 1058:2 <b>raised</b> 1115:3 <b>raising</b> 1057:25 <b>Ranch</b> 1024:8,10,15 1025:14 1026:15 1078:2 1118:16,24 <b>range</b> 1034:23 1050:9 1057:3,5,12,14,14 1058:24 1059:24 1060:23 <b>ranges</b> 1048:20,24 <b>ranking</b> 1097:11 <b>rapid</b> 1068:5 <b>rapidly</b> 1083:17 <b>rare</b> 1062:4 <b>rate</b> 1126:1,2 <b>RDR</b> 1128:18 <b>read</b> 1038:16 1050:4 <b>real</b> 1116:20 <b>really</b> 1109:22 <b>reason</b> 1084:23 <b>reasonable</b> 1117:14,14 <b>reasons</b> 1043:7 1077:7 1093:7 1100:3 <b>recall</b> 1051:4 1088:19 <b>received</b> 1028:14 1032:5 1035:9 1062:13 1095:15 1102:2,14,21 1105:8 1116:19 1117:22 <b>recess</b> 1072:17 1106:16 1127:13 <b>recognizing</b> 1057:8 <b>record</b> 1032:5 1035:9 1062:13 1084:12
--	---	---	--

**Q**

**quantitative** 1096:21  
1097:2  
**quantities** 1036:5  
**question**

1095:15 1102:2,14,17 1112:7 1115:15 1121:13 recordings 1128:11 red 1078:7 reduced 1098:23 reduces 1109:25 reduction 1099:1 reel 1068:16 reels 1068:17 refer 1032:4 1034:10,18 1035:8 1037:24 1039:4 1039:23 1048:5,9 1050:6,14 1053:5 1054:11 1062:12 1071:2 1087:7 1095:14 1095:18 1101:25 1105:14 reference 1067:19 1084:9 1115:24 referred 1066:11 referring 1041:17 1055:22 1066:16 1106:19 reflect 1095:10 1096:12 1102:8 reflected 1097:5 1098:22 reflective 1096:15 reflects 1034:11 regard 1055:21 1083:1,5 1116:18 region 1043:16 1109:7 regions 1036:17 Registered 1024:24 1128:6 regulations 1058:17 regulatory 1055:17 reinforced 1048:17 reinforcement 1038:14 reinforcing 1113:6 related 1030:13 1031:25 1052:3 1101:15 1119:14 relates 1101:11 relation 1070:25 relative 1097:11 1100:13 1101:3,6 relatively 1061:11 1081:17 1083:17 1107:21 1115:21 reliability 1077:14 1087:25 1088:3,6 1090:8,9 1101:14 1125:9 reliable 1077:6 relies 1117:2 relocate 1062:10	rely 1117:15 remain 1064:14 remaining 1095:22 1097:12 remember 1090:21 1119:9 removal 1064:5 1065:13 removed 1064:9,24 repair 1125:12 repaired 1077:16 repairs 1076:24 repeat 1114:13 report 1128:8 Reported 1024:23 Reporter 1024:24 1028:8 1128:1,7 represent 1048:5 1097:13 representation 1053:14 representative 1059:5 1063:20 represented 1054:15 representing 1048:19 represents 1035:12 1050:17 requested 1060:12 require 1085:11,14 1086:15,16,25 required 1041:10 1056:9 1058:16 1093:9 1098:13 1111:21 1112:8 requirement 1097:23 requirements 1056:9,10 1057:1 1058:8,11 1073:19,24 1075:25 1091:23 1092:11,17 requiring 1098:11 researching 1116:21 Resort 1025:3 respective 1088:2 response 1037:15 1104:22 responsible 1034:5,16 1102:3,5 1106:5,6 1108:15,16 rest 1044:6 1068:4 1082:1 result 1099:24 resulting 1090:17 resume 1032:6 review 1055:17,18 reviewed 1116:10 ride 1099:5 riding 1088:23 right 1029:2,9,11 1032:12 1032:25 1034:21,21,25 1035:2 1038:16 1041:9 1042:2,22 1052:21	1058:6 1063:4,11,13,15 1063:25,25 1064:3,10 1065:14 1066:20,21 1069:25 1070:5,12,15 1071:7,8,9,20 1076:25 1077:4,8,9 1081:14 1084:15,19 1085:22 1086:19 1092:6,23 1093:8,9,15,16,23 1095:3,5,11 1096:6 1097:15 1098:23 1099:4,11 1100:4,18,19 1105:4 1108:17,19 1111:2 1112:2 1117:18 1121:17 1126:24,24 rights 1042:20 1059:18 1059:19 1061:15,17,20 1063:15 1064:3 1077:10,11 1084:18 1097:18 1099:2,5 1115:9 right-hand 1096:25 1115:23 Ringling 1036:22 1038:15 1038:17,25 1113:7 risk 1087:25 1088:3,6 1090:8,9,13 1125:16 river 1031:19 1039:24,25 1042:24 1043:12,13 1044:23 1046:15,18 1047:5,9 1056:5 1075:18 1080:1,2,8,9 1081:1 1124:2 road 1034:25 1035:6 1040:17 1042:1,8,9,9 1042:11,11,17,18,20,22 1043:4,4,6,11,13,16,16 1043:18,19 1045:7,18 1045:21 1046:13,24 1047:2,3,8,8,11,12,14 1052:21 1053:7,15,16 1054:2,6,13,14,15 1055:7 1056:4,15,20,21 1057:13 1059:18 1060:21 1061:1,15,17 1061:18,20 1062:8 1064:3,11 1065:5 1070:23 1071:1,3,4,7,7 1071:8,20 1072:6 1075:20 1077:10,11 1079:15,17,18,19,19,19 1079:20,24,25,25 1080:3,4,7,23 1081:4,6 1081:7,17,19,19 1082:1 1082:1,3,7 1083:5,7,8 1083:12,14,16,21,24 1084:1,10,14,15,18,19	1084:21,22,23,24,25 1085:3,3,5,6,9,10,13,15 1085:17,20 1086:1,2,2 1086:5,9,9,12,12,13,15 1086:16,18,19,20 1087:14,16,17,24 1088:23 1091:15,17,18 1091:20,23 1092:3,4,5 1092:10,16,23 1093:8,9 1093:14,15,16,20,20,23 1093:24 1094:2,6,6,9 1094:10,15 1096:6,7 1097:18,23 1098:3 1099:2,3,5,12 1103:19 1103:20,23,24 1104:1,5 1104:6,6 1105:17,22,23 1107:7,8,20,25 1108:2 1108:24 1109:23 1110:1,3,5,7,10 1111:1 1111:5 1112:1,2 1115:6 1115:10,13,25 1116:8 1116:18,20,22,24 1117:13 1118:1,5,16,21 1118:21,23 1119:1,2,5 1119:17 1120:7,10,15 1120:17 1121:5 1126:24 roads 1043:15 1045:2 1046:15 1053:20,21,23 1054:4,9,12 1060:19 1061:3,10,13,16,25 1062:3 1063:17 1064:17 1065:3,4,11 1066:3 1071:12,16,22 1071:24,25 1072:9,12 1077:15 1081:19 1086:13 1091:11 1092:8,9 1093:12,17 1097:20,21,23,24 1098:5,6,8,12,13,24 1103:21 1115:8 1118:10,13,16,17,24 1120:23,24 1121:6 roadway 1095:17 1102:1 roadways 1037:6 1102:9 Robert 1027:9 1028:6 1029:12,17 rock 1049:2 1067:11 role 1033:6 1039:21 1041:3 1105:24 rolled 1068:20 rollers 1068:6,7,8 Room 1025:4 rope 1068:12 ropes 1068:20,21 route 1034:23 1041:5,6 1041:15 1046:8
---	---	---	--

1052:23 1056:3,24 1058:5 1059:21 1063:8 1076:19 1094:3,12 1096:17 1097:25 1098:1 1099:7 1100:14 1100:14,16,16,23 1101:23 1113:16,22 1117:3 1121:15 routes 1033:14 1046:7 1061:23 1064:7 1070:1 1072:4 1091:7 1093:25 1097:11 1101:5 1117:1 routinely 1089:11,21 routing 1095:21 Row 1078:23,23,23,24 1115:23 rows 1108:15 Roy 1026:22,23 rubber-filled 1049:18 rule 1070:20 rules 1071:14 ruling 1032:13 1092:2 1104:17 run 1042:8,16 1043:3 1046:14 1074:3 1080:21,23 1081:11,22 1083:8,10 1084:20 1087:11,23 1091:2 1127:4 running 1052:8 1083:16 runoffs 1066:7 runs 1042:8 1044:1 1079:15 1081:23 1086:8 1093:8 1097:4,6 1107:7 ruts 1070:2 rutted 1070:2	1026:16,16 1087:8,22 1088:15,19 science 1030:10 Scout 1025:20 screen 1035:11,12 screening 1066:13 screens 1048:2 search 1116:9 second 1031:21 1036:12 1038:19 1050:2 1052:6 1052:7 1106:19 1115:23 secondly 1101:13 1107:18 section 1094:5 1107:6 1111:3 sections 1034:11,15 secure 1074:15 security 1074:20 sedimentation 1066:3,10 see 1029:9 1052:20 1059:1 1066:4 1068:5 1068:12 1069:21 1070:10,18,21 1076:20 1097:10 1108:8 1116:13 seeded 1070:4 seen 1116:8 1118:15 1119:1 segment 1081:8,14 1086:2 1088:4 1090:13 1100:13,14 1105:19 segments 1033:10,14 1041:8,11,12 1053:16 1073:6 1093:11 1095:21 1097:15,17,22 1098:9,11,14,25 1099:13 1101:3 selected 1041:13 selection 1041:5,6 1100:21 selective 1065:19 selectively 1064:24 1065:21 Senior 1027:4 sent 1034:9 1037:5 1076:18,23 sentence 1039:7 serpentine 1119:9,18 serve 1036:24 1038:19 1080:3 1082:3 1113:8 service 1030:20 1031:3 1037:19 1038:5 1040:3 1040:15 1043:10,14,17 1043:21 1047:13 1058:17 1069:5 1080:1 1090:17,18 1122:5 1126:1	set 1052:7 1054:21 1055:1 1065:9 1112:4 sets 1052:14 setting 1067:16 1072:4 sewer 1124:23 1125:17 1127:1 sharp 1045:8 sheds 1044:17 sheet 1079:12 shield 1069:12 short 1060:23 1072:14 1107:19 shortened 1060:14 shortens 1110:6,10 shorter 1050:10 1056:22 1060:7 1079:22 1094:17,22,23 1101:23 1113:17 1115:10 shoulder 1086:13,20 1087:2,4 shoulders 1072:1,10 1081:17 1083:16 1084:16,23 1085:7 1107:21 show 1047:25 1048:3 1050:7,11 1051:10,17 1052:16 showed 1061:1 shown 1069:20 1120:17 shows 1035:10 1050:3 1062:14 1095:16 shrink 1099:8,9 shrinkage 1100:4 shrinks 1099:10 shrunk 1100:1 side 1042:19 1056:19 1071:10 1079:9,9 1080:3,4,5,8,15,17,19 1081:1,2,24 1082:7 1083:8,10,10 1084:10 1084:22,24,25 1085:2,5 1086:8,9,20 1087:3 1091:1,3 1095:19 1103:23 1107:6 1120:15 sides 1082:3 1083:12 1115:6 significance 1126:16 significant 1094:24 significantly 1098:18 1105:20 1124:12 signs 1089:22 silt 1066:11,14 similar 1047:15 1058:19 1064:7 1073:20 1074:2 1074:9 1077:12 1104:8 1118:10,23	similarly 1052:12 1064:23 1094:9 simply 1121:7 single 1048:6,7 1059:10 sir 1029:11 1046:24 1050:22 1051:21 1111:8 sit 1104:3 site 1034:7,12 1038:3 1065:10 sited 1031:23 sites 1036:14 1066:5 siting 1024:4 1029:5 1030:2,13,21,24 1031:10,14,18,20,25 1032:10,17 1089:9 situation 1083:5 situations 1066:6 1073:20 1085:9,17 six 1053:25 1054:1 size 1042:5 1069:17 1091:22 1093:9 1099:25 sizing 1055:16 1096:3 sizings 1059:23 slight 1035:1 slope 1094:18 slopes 1066:9 1088:2 Slough 1024:8 1027:7 small 1034:25 1035:2 1071:25 1076:19 1086:21 1111:3 smaller 1069:9,13,14,16 1069:19 smoothed 1070:2,3 SMR 1078:7,10 1079:4 1079:18,23,24 1080:6 1081:4,16 1085:23 1086:4 1087:6,12 1090:20 1091:1,8,12,25 1093:2,8,16 1094:15 1096:14,18,18 1100:6,7 1101:6 1103:1 1105:7 1105:13,22 1106:1,9,22 1107:2,5,14,18 1108:1 1108:6 sodded 1070:3,4 sodding 1066:9 soft 1054:17 1062:6 soil 1045:23 1048:22 1054:16,17 1061:23 1062:2,6 1099:17 solution 1046:2 solutions 1045:25 1126:22 1127:8 somebody 1104:19 someplace 1045:17
---	--	--	---

<p>somewhat 1125:11  sooner 1109:23  sorry 1080:13 1095:19  1115:15 1120:24  sort 1058:1 1091:15  sources 1125:3  south 1025:16 1026:9  1027:10 1030:11  1036:22 1038:20  1040:16 1043:16,18  1047:8 1073:9 1080:4,8  1080:15,17 1081:1,2,5  1081:24 1083:10,10,25  1084:25 1085:8 1086:4  1086:9,20 1087:3  1091:1 1105:17 1107:6  1108:25 1109:1,1,24  1110:25 1115:13  southeast 1044:1  southern 1038:2  Southwest 1075:20  span 1059:15 1060:3,4,6  1060:11 1062:10  1073:8 1124:8  spanned 1059:24  spanning 1062:7  spans 1050:8,10 1056:6  1058:2 1059:18,18  1060:7,13,22 1095:7  1099:3,8,9 1119:12  speak 1073:10  special 1089:4  specialties 1033:4  specific 1123:5  specifically 1032:16  1119:15 1123:4  speed 1083:15  Speedway 1111:2  spillage 1066:7  split 1048:1  spoke 1090:22  spools 1068:13  spotted 1066:21  spotting 1066:19  spun 1048:7,8,16,18  St 1031:21,23  stage 1069:19 1070:8  1100:12  stages 1062:19  staked 1065:6  stand 1102:13  standard 1069:2 1123:17  standards 1058:12  1075:15,16,23 1076:4,7  1092:13  start 1035:17 1042:2  1062:20,24 1063:2,2</p>	<p>starting 1037:20 1038:1  1076:21  starts 1119:10  state 1024:1 1029:16  1030:9 1036:18  1040:16 1042:7,9,11,17  1043:4,4,11,13,16,16,19  1045:2 1046:13,24  1047:2,3,8,11,12,14  1070:5,23 1071:3,15  1073:21 1075:20  1077:17 1079:15,19,24  1079:25,25 1080:3,4,7  1080:23 1081:4,7,18  1083:5,7,14,21 1084:14  1084:19,21,22,24,25  1085:8,13,15 1086:5  1093:20 1104:6  1105:17,22 1108:24  1109:23,25 1110:1,3,5  1110:7,10 1111:1,4  1112:1,22 1113:3  1115:13 1121:5 1128:3  stated 1032:23 1059:12  1081:18 1117:25  statement 1104:18,19  1117:24 1118:2  1119:21  statements 1104:14  station 1035:19 1036:12  1036:15 1037:16  stations 1036:6,14,25  stay 1085:6 1099:16  stays 1111:6  steel 1048:17 1050:16  Stenographically 1024:23  Stenotypy 1128:8  step 1037:10 1063:23  1066:17,18 1069:21  stepped 1035:18 1037:1,7  steps 1041:4,6 1062:16  stipulated 1114:2,8,17  stipulation 1114:3  stood 1067:10  straight 1108:25  Street 1025:12,16 1026:5  1026:9,13 1027:10,14  strength 1048:18  strike 1088:11  string 1068:10  stringing 1070:17  strip 1064:15 1066:4  1090:15 1092:2,24  1095:6,7  strips 1066:11  structural 1051:15  structure 1051:6 1053:7</p>	<p>1054:12 1055:8,14  1058:19,20 1061:2,3,9  1061:9,13,25 1063:17  1065:3,4,6 1066:2  1127:3  structures 1042:21  1045:4,15 1048:10  1050:10,11 1054:21  1059:4,16 1060:3  1066:20 1067:1 1068:3  1068:4 1072:4 1076:14  1086:7,11 1094:17,18  1094:22,25 1095:1  1099:14,15,16,18,19,22  1100:3 1109:20 1115:5  struts 1050:9  studies 1126:4  study 1033:20,23 1040:20  1041:7 1060:18 1061:6  1062:1 1071:24 1072:6  1113:9 1118:3 1123:9  STURTEVANT 1027:4  sub 1093:18  subbase 1055:12  subject 1055:17  substantial 1100:24  substation 1036:7  1037:17,18 1038:3,15  1038:17,21,25 1039:14  1039:15 1040:17  1043:24 1044:3,6  1079:20 1105:18  1107:8 1113:8  substations 1036:10  1039:2,8,10,13,20  1040:8  succession 1068:5  sugar 1073:21  suggestions 1121:20  Suite 1025:16,20 1026:5,9  1026:19 1027:10  summarize 1106:8  summary 1095:20 1099:3  support 1031:6 1061:25  1068:1  supported 1067:25  sure 1037:25 1057:5  1084:12 1091:13  1092:25 1098:19  1112:6 1122:18  surface 1053:18 1054:2,5  1071:8  survey 1096:5  surveyed 1065:6  surveying 1063:3 1070:11  surveys 1116:8  Sustained 1088:12</p>	<p>1103:13  sworn 1029:13  synonym 1037:16  system 1035:16 1036:1,4  1036:24 1037:15  1044:7 1096:11  1101:20  systems 1035:14 1077:16</p> <hr/> <p style="text-align: center;">T</p> <hr/> <p>T 1028:12  Tabs 1095:19  take 1063:21 1065:21  1066:10 1072:14,15,21  1072:22 1079:13  1089:24 1090:18  1092:9 1097:9 1106:13  1123:23 1127:11  taken 1025:1 1090:17  1116:6  takes 1051:23 1062:25  1064:1 1100:17  1124:18  talk 1048:13 1054:12  1066:14 1085:25  1089:16 1090:23  1099:15 1106:14  1108:21  talked 1043:11 1045:13  1089:19  talking 1047:3 1098:6  tall 1048:20  Tallahassee 1025:12,17  1026:9,14 1027:6,11  Tamiami 1025:4  Tampa 1025:20 1026:24  1036:20  tangent 1099:18,22  1100:3  tapered 1049:5  tapers 1049:8  Taylor 1024:10 1026:3  1078:3,8,10 1084:3,4,6  1108:12,21,22,23  1109:8,10,17,22 1110:9  1110:13,14,16,17,18,21  1110:22,24 1111:4,6,10  1111:11,12,13,16,21,22  1112:3,4,8,10,15,15,16  1112:17  TA07-14 1024:5  team 1031:2 1033:9,18  1040:25 1041:2,4  1096:22 1100:22  technical 1045:25 1117:8  1124:21,23 1127:8  techniques 1065:24</p>
---	--	--	--



1076:12 technology 1030:8 telephone 1052:19 1080:18 tell 1032:5,6 1034:11 1035:10 1036:7 1047:24 1052:13 1057:3,5 1061:12 1095:16,24 1105:11 1106:4 1118:4 ten 1034:25 1035:2 1093:10 1095:3 1127:12 tended 1044:12 tender 1127:9 tension 1067:25 1068:1 1069:1 ten-foot 1092:1,19,24 1095:6 1112:1 1123:25 ten-minute 1072:15 1106:13,15 term 1104:16 1109:12 1118:6 1119:7,15,20 terminology 1068:8 terms 1044:12 1108:22 1124:19 1125:13,14 territory 1030:20 1031:3 1043:10,14,17,22 1047:13 1080:2 tested 1069:5 testified 1029:14 1116:1 1122:18 testify 1102:15 testimony 1040:14 1059:2 1082:15 1113:24 1117:10 1120:12 1121:14 Thank 1032:21 1033:2 1053:4,13 1057:17 1079:10 1102:12 1112:13 1127:9 theme 1073:4 themes 1041:20 thereof 1128:11 thing 1049:21 1068:23 things 1044:9 1050:3 1053:19 1055:25 1103:7 1105:15 1109:21,21 1118:7 think 1032:13 1034:24 1035:25 1061:6,21 1066:14 1072:8 1079:6 1082:17,23 1085:4 1098:17,18 1117:8,16 1119:6,8,14 1121:3,6,9 1122:17 thinking 1044:15	third 1034:20 1038:23 1108:10,14 three 1033:18 1038:12 1039:12 1061:22 1070:14 1107:9 1108:8 1108:24 1109:1 three-dimensional 1058:1 three-member 1033:9 thumb 1070:20 tie 1036:23 time 1025:2 1032:8 1039:19 1048:4 1067:4 1070:10 1089:25 1102:16 1115:14 timely 1112:23 times 1103:20 1124:16 1125:12,23 title 1116:9 TL 1024:6 1029:3 TLSA 1031:20 today 1057:16 told 1088:8 tomato 1074:3,6 TONI 1027:4 top 1049:9,9,10 1050:18 1069:7,8 1125:6 total 1096:17 town 1042:1 toys 1049:11,12 tradeoff 1126:8 tradeoffs 1058:9 traffic 1071:14,18,22 1072:1,3 1083:16,20 1084:17 1085:16 1103:5,15 1104:7 1105:18 1107:19,22,24 1108:2 1110:2,4 1115:3 Trail 1025:4 TRANSCRIPT 1024:19 transcription 1128:11 transfer 1035:23 1083:9 transformer 1037:11,12 transition 1084:9,13 translates 1111:17 transmission 1024:4,4 1029:5,5 1030:1,2,13 1030:17,19,21,23 1031:1,3,6,7,9,12,13,18 1031:25 1032:10,17 1033:8 1035:13,16,21 1035:22 1036:4,6,8,10 1036:15,15,20 1037:21 1038:11,13 1039:3,14 1040:3,7,9,22 1043:25 1044:7 1045:10 1047:17,19 1053:8 1057:6 1059:16	1060:16 1061:4,14 1062:19 1063:23 1069:7 1070:7,25 1071:19 1072:21,24 1074:2,17,25 1075:7,12 1075:13 1076:8,13 1077:1,19,20 1078:12 1078:14 1086:7 1089:9 1090:16 1094:21 1097:7 1109:19 1114:8 1114:16,22 1117:1,2,5 1117:25 1119:3,5,12 1120:6,10,22 1121:16 1121:21,24 1122:4,9,10 1122:12,15 1123:5,9,16 1124:9 1125:1,4,10,10 1126:21 1127:2,6 transmits 1036:3 transmitted 1035:21,23 transmitting 1036:5 1101:18 Transportation 1071:17 1076:1 Transportation's 1071:13 transversing 1112:2 traveled 1103:19 traveling 1104:1 traverse 1074:5 traverses 1108:24 traversing 1065:8 1111:25 tree 1064:4 1077:10,12 1101:15 trees 1044:20 1064:5,8,13 1064:15,23 1076:21 1099:6,7 triangular 1048:9,12 1052:24 trimming 1064:4,5 1065:13,21 1077:11,12 TRIPLITT 1025:19 truck 1067:7 1076:19 1083:16 trucks 1054:22 1065:18 true 1036:23 1046:6 1052:24 1081:18 1082:13 1117:15 1123:17 1128:10 trying 1058:24 1090:21 1104:21 1119:19 tugger 1068:22 tuggers 1068:18,24 turbidity 1066:5,13 turn 1045:12,20 1046:2 1067:20,22 1106:4 1109:24 turning 1045:17 1102:23	1108:10 1119:12 turns 1045:25 1081:5 1109:2 1119:10,17 TV 1052:19 twenty-foot 1095:6 two 1031:17 1033:19 1036:10,13 1050:18,21 1050:22 1051:3 1052:1 1059:9 1061:21 1070:14,19 1077:7 1086:22,23,24 1087:6 1087:10 1090:12 1093:7,7,21 1095:7 1100:3 1101:11 1107:7 1107:10,20 1108:9 1109:7 1123:23 two-fold 1077:4 1079:25 1084:23 two-lane 1071:25 1072:6 1072:9 1081:17 1086:12 1103:24 two-week 1070:17 type 1036:12 1051:5 1052:20 1054:5 1058:23 1062:11 1064:10 1065:22 1073:24 1076:7 1077:12 1096:11 1116:25 1123:22,24 1126:9 types 1044:18 1060:5 1061:9 1073:20 1077:11 typical 1050:24 1051:5 1053:6,14,16 1059:15 1059:24 1061:1 1070:6 1094:21 typically 1034:22 1035:13 1035:24 1036:6,13 1045:1 1049:6 1053:25 1054:1,14,25 1069:10 1069:13,14 1070:14,21
--	---	---	--

## U

Uh-huh 1046:25  
ultimate 1044:4 1059:20  
1063:15  
ultimately 1033:10  
1046:9 1056:24  
1100:23  
underbuild 1057:21  
underbuilding 1047:15  
underbuilt 1052:17,18  
1053:2,3 1057:24  
underground 1096:6  
1121:22,25 1122:8,10  
1122:15 1123:14,16,20

1124:13,18,22,25 1125:4,10,12,13,18,21 1125:22,23,25 1126:4,6 1126:8,10,12,18,21,25 1127:7 <b>undergrounding</b> 1122:3 1123:8 1124:9 <b>underlying</b> 1042:14 1046:7 1052:22 1059:21 1060:5,9 1063:11 1073:11,18,25 1074:8,20 1075:1 1085:18 1091:5 1107:13 1109:14 1116:22 <b>underneath</b> 1053:21 1055:9 1088:2 <b>understand</b> 1080:13 1084:11 1116:1 1119:19 <b>understanding</b> 1116:2,17 1116:24 1117:19 1118:8 1121:13 <b>University</b> 1030:9,11 1043:5 1045:6,19 1046:3 1079:17 1081:8 1086:1 1087:19 1088:4 1090:23,25 1091:2 1093:19,19 1107:4,11 <b>unpaved</b> 1053:18 1094:10 <b>unsettled</b> 1115:24 1116:7 1116:17 1117:13,16 <b>update</b> 1034:17,18 <b>updated</b> 1098:21 <b>upland</b> 1064:10 <b>uplands</b> 1065:15,16 <b>upper</b> 1035:17 1062:20 1062:24 1063:20 <b>upward</b> 1056:17 <b>usage</b> 1089:17,22 <b>use</b> 1035:13 1049:23 1053:15 1054:1 1055:13 1056:23 1066:6 1089:15 1094:17 1118:10 1119:20 <b>useful</b> 1120:2 <b>uses</b> 1051:15 1075:2 1096:10 <b>usually</b> 1031:1 1122:22 <b>utilities</b> 1060:17 1124:22 1125:17 <b>utility</b> 1030:15 1046:17 1071:17 1075:7 1076:1 <b>utilization</b> 1097:14 <b>utilize</b> 1063:5,15 1092:23 <b>utilized</b> 1066:3	<b>utilizes</b> 1088:8 1089:20 <hr/> <b>V</b> <b>V</b> 1026:4 <b>vague</b> 1121:3 <b>value</b> 1096:5 <b>van</b> 1027:10 <b>variability</b> 1056:23 1058:22 <b>variable</b> 1090:13 1092:24 <b>various</b> 1117:1 <b>vary</b> 1056:2,17 1059:20 1060:3 1070:11 <b>vegetation</b> 1064:13,20,22 1065:14,20 <b>vehicles</b> 1054:17,22 1055:12 1061:25 1064:12 1065:23 <b>vehicular</b> 1071:22 <b>Verna</b> 1079:19 1086:2,9 1086:12,13 1091:15,17 1091:18,23 1092:4 1103:20 1104:6 1105:23 1115:25 1116:8,18,20 1117:13 <b>versus</b> 1048:12 1079:18 1110:12 <b>vertical</b> 1048:6,6,7,12,13 <b>viable</b> 1126:22 1127:8 <b>vibrated</b> 1067:12 <b>vicinity</b> 1087:14 1094:16 <b>view</b> 1104:23 <b>viewed</b> 1097:19 <b>viewing</b> 1097:22 <b>VIRGINIA</b> 1025:11 <b>visual</b> 1059:5 <b>visualize</b> 1119:11 <b>voltage</b> 1037:1 1051:22 1051:25 <b>VOLUME</b> 1024:18 <hr/> <b>W</b> <b>W</b> 1025:15 1026:22,23 <b>wait</b> 1104:3 <b>waiting</b> 1102:15 <b>Walker</b> 1026:19 <b>want</b> 1046:16 1049:11 1083:22 1085:25,25 1106:14 1108:21 1116:5 <b>wanted</b> 1050:4 1056:14 1084:12 1097:9 1098:19 <b>warrant</b> 1054:16 <b>wasn't</b> 1097:25 <b>water</b> 1035:25 1036:2,2 1052:2 1053:21 1054:9 1065:7 1075:21	1124:23 1125:17 1126:25 <b>waterways</b> 1060:16 <b>Watrous</b> 1026:23 <b>way</b> 1034:22,25 1035:2 1035:25 1041:10 1042:20,22 1048:11 1052:21 1058:6 1059:18 1061:15,17,20 1063:12,13,15,25 1064:1,3,3,10 1065:14 1066:21,21 1070:5,12 1070:15 1071:7,8,10 1074:9 1076:25 1077:4 1077:8,9,10,11 1079:6 1081:14 1082:1 1084:19,19 1086:19 1090:1 1091:18 1092:6 1092:23 1093:8,10,15 1093:17,23 1095:3,6,11 1096:7 1097:15,18 1098:23 1099:2,4,5,11 1100:18,19 1112:2 1115:9 1120:2 1124:23 1126:24 1127:7 <b>ways</b> 1034:21 1035:24 1059:19 1063:4 1069:25 1071:21 1084:15 1100:4 <b>web</b> 1034:7 <b>weeks</b> 1070:19 1124:19 1125:13 <b>weight</b> 1032:20 <b>wells</b> 1044:17 1060:9 1073:2 <b>went</b> 1050:1 1073:22 1099:11 <b>west</b> 1025:20 1026:19 1073:7 1074:5 1080:7 1081:24 1087:5,23 1091:2 1108:1 1109:2 1113:22 1114:1 <b>wet</b> 1054:18 1062:2,6 <b>wetland</b> 1044:11 1056:6 1062:10 1064:20,22,25 1065:7,19,23 1066:8 1124:3,9 <b>wetlands</b> 1044:21 1060:6 1060:7 1065:15,24 <b>we'll</b> 1042:2 1048:3,9 1063:2,16 1067:19 1073:7 1087:7 <b>we're</b> 1047:3 1048:19 1050:14 1062:20,24 1066:2 1075:21 <b>we've</b> 1059:17 1066:6 1092:1 1116:8,9 1119:1	<b>wheels</b> 1068:20,22 <b>WHEREOF</b> 1128:12 <b>White</b> 1026:13 <b>Widden</b> 1051:14 <b>wide</b> 1042:10 1043:5 1045:1,2,17 1048:25 1049:6,7,9 1053:17 1064:11 1067:9 1073:6 1081:10,14 1086:13 1091:4 1092:1 1093:13 1093:15 1094:7 1099:24 1100:1 1107:21 1109:12,16,18 1110:12,17 1112:1,5 <b>widen</b> 1095:3 <b>widened</b> 1044:24 <b>wider</b> 1045:14 1058:7 1072:10 1092:18 1095:11 1107:11 1108:2 1115:8 1124:19 <b>width</b> 1034:20,21 1041:10 1064:11 1092:6 <b>windsock</b> 1088:18,20,25 <b>windsocks</b> 1088:17 1089:4 <b>wire</b> 1068:2,2,11,13,15,23 1068:25 1069:6,7,8,9 1069:10,15,17,23 <b>wires</b> 1051:25 1052:1 1059:10 1100:2 <b>wish</b> 1029:7 1116:11 <b>wishes</b> 1126:3 <b>witness</b> 1028:3 1029:10 1029:12,15,17 1046:24 1047:1 1050:22 1051:2 1051:21 1111:8 1117:17 1127:9 1128:12 <b>wonder</b> 1057:2 <b>word</b> 1037:16 <b>wording</b> 1064:2 <b>words</b> 1069:21 1121:13 <b>work</b> 1030:12 1031:4 1035:14 1042:13 1046:4,7 1054:20 1065:17 1067:5 1073:11,18,25 1074:7 1074:18,19 1075:3,3 1085:18 1100:23 1107:13 1109:14 1117:8 <b>working</b> 1030:18 1054:3 1063:10 1091:5 <b>works</b> 1035:25 1074:1 1117:7 <b>worth</b> 1111:18
---	--	---	---

worthless 1119:7 wouldn't 1090:2 WRIGHT 1027:9 wrong 1095:19	1117 1028:17 1128 1028:8 117 1027:14 118 1026:13 120 1104:11 123 1025:12 13 1037:2 1072:22 13kv 1037:13 138kV 1058:19,23,24 14 1064:9,14,16,21,24 14-foot 1053:17 1064:11 1064:13,15 1400 1026:5 15 1034:23 1072:22 1097:17 1098:23 1099:11 1125:23 15,500 1109:1 16 1049:9 1111:20 1112:8 18 1048:21 1067:10 1997 1030:17,17	1026:23 25 1048:21 1062:18 1067:10 25.5 1096:19 1108:5 25.8 1108:6 250 1059:25 1060:23 26 1028:16 1101:25 1102:7,16,19,20 1115:15,16 26-mile 1031:22 27 1030:16 29 1024:19 1025:1	6 60 1048:25 1057:14 1092:19,20 1097:16 1098:24 60-foot 1093:13,15 1094:7 1100:1 1112:5 60-inche 1067:8 600 1050:8 1059:18 1099:3,11 62 1042:8,9 1047:12,14 64 1040:17 1042:11,18 1043:4,5 1047:3,11 1075:20 1079:15,24,25 1079:25 1080:3,4,7,23 1081:4,7 1084:19,21,22 1084:24,25 1085:9 1093:20 1105:17,22 1108:24 1109:23 1110:2,3,5,7,10 1111:1 1111:5 1112:1 1121:5 65 1042:11 670 1026:19 675 1042:1,9,17 1047:2,3 1047:8 1079:19 1081:6 1082:1 1083:24 1084:1 1084:14 1085:7,8 1104:6 1105:22	
X X 1028:1,12	Y years 1030:16 1050:1 Young 1027:10	3 3 1053:10 3rd 1026:19 3-4 1053:11 3-5 1053:11 3.1-2 1053:6,12 1054:11 3.1-3 1053:6,12 301 1026:5 32301 1025:12,17 1026:9 1026:14 1027:11 32399 1027:6 32801 1026:5 33607 1025:20 33629 1026:24 34205 1026:20 34217 1027:15 35 1027:5 1120:11,15 36 1120:11,18 38 1066:16 3900 1027:5	7 7 1078:6 1079:8 1105:14 1106:11,23 1108:19 70 1043:11,13,16,16,19 1046:14,24 1047:2,3,8 1079:19 1081:19 1083:5,7,14,21 1084:15 1085:13,15 1086:5 1104:6 1105:22 1115:13 7150 1025:4 75 1034:23 1097:16 1098:24 75-foot 1099:24 750 1059:25 750-foot 1050:9	
0 07-0026 1024:8 07-0105 1024:6 070105 1029:3	1 1 1034:12 1038:5 1039:6 1047:22 1079:5,18,23 1079:24 1080:6 1085:23 1086:4 1087:6 1087:12 1090:20 1091:1,8,12,25 1093:2 1093:8,16 1094:15 1096:14,18,18 1100:7,7 1101:7 1103:1 1105:7 1105:13,22 1106:2 1108:13,22,23 1109:8 1109:11,22 1110:18 1111:4,10,13,22 1112:3 1112:11,15,17 1,275 1096:21 1-1 1034:19 1039:4 1.3 1091:24 1.3-1 1047:23 1048:5 1052:11,15 1.3-2 1048:5 1052:12,15 1052:16 1.3-3 1048:8 1052:13,25 1.3-4 1047:23 1048:8 1052:13,25 1053:2 1.3-7 1047:24 1053:5,14 1:00 1127:12 10 1049:20 1097:17 1098:24 1099:12 1106:9,22 1107:2,5,14 1108:1 1125:22 10,000 1068:14,15 100 1055:23 1057:14 1092:25 100-foot 1048:20 1000 1025:20 1001 1026:19 1029 1028:6,7 105 1057:14 11:49 1025:2 1127:13 1102 1028:16	2 2 1034:10 1084:7 1106:4 1106:7 1108:13 1109:22 1110:9,15,16 1110:18,22 1111:4,6,11 1111:16,22 1112:4,9,16 1112:17 20 1049:1 1054:25 1067:9 200 1027:10 1031:11 1042:18 2000 1030:20 2002 1030:17 2006 1097:5 2007 1024:19 1025:1 1030:21 1097:7 2008 1096:17 1097:8,14 2011 1113:13 21 1028:17 1078:17,25 1102:23 1106:4,20 1108:10,15 1115:15,16 1115:17,18,22 1117:20 1117:21 21.7 1096:18 215 1025:16 1026:9 22 1037:24 1041:17 220 1037:13 225 1027:10 23kv 1037:2,13 230 1024:4 1029:4 1037:1 1051:20,21 1052:4 230kv 1031:20,22 1035:23 1036:1 1051:14 1058:20,21,25 1062:17 1122:9 1123:12 1126:11,14,18 240 1037:14 2406	4 4.1 1079:22 1091:12 1093:3 1101:13,14 400 1026:9 1045:1 4221 1025:20 43 1049:7 450 1059:17 1099:9,9,11 47 1035:10 48 1049:6,7 1062:13,15 1062:22,23 1067:16 1069:20 1071:5,6 49 1095:14,18 1096:12 1097:1 1098:22 1100:6	8 8,000 1109:2 1110:7 8:37 1025:2 81st 1027:14 85 1057:22
		5 50 1098:11,12,13 500 1025:16 1045:2 1109:17 500-foot 1110:16 54 1048:25 54-mile 1031:20 55 1057:14 1083:15 59 1032:4	9 9 1024:18 1051:9 90 1045:13 1046:1	

[illegible]