



Town of Palm Beach

**TOWN-WIDE UTILITY UNDERGROUNDING
SEQUENCING
AND
PHASING REPORT**



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TOWN-WIDE UTILITY UNDERGROUNDING SEQUENCING AND PHASING REPORT

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Section 1

Executive Summary

The findings of this report are intended to address the Town's needs with respect to the pace of expenses associated with a Town-wide effort to convert all remaining above ground utilities to underground installations. The total project budget has already been estimated by the Town at 85.4 million. As such, when combined or overlaid with the scenarios outlined in this report, the results should portray a sufficiently clear picture of how much money, at what intervals and for how long should the Town be prepared to pay for this undertaking.

Based on all of the information gathered, interviews held and the production of the Individual Model Schedules, we have selected a series of seven undergrounding sequencing options with total durations of 10, 12 and 18 years. The Town is divided into 16, 10 and 16 phases respectively for those durations.

The 10 year option proposes two projects to be constructed simultaneously and for the individual project sizes to be roughly two pole miles or slightly more. Each of the other options propose only one project to be constructed at a time with individual project sizes of roughly two or three pole miles or more.

As a result of the comprehensive nature of the project, FPL has confirmed that projects with less than three pole miles will, in fact, qualify for the 25% incentive as long as they remain a part of the Town-wide multi-phase project.

Meaningful cost savings could occur as a result of coordination with Florida Public Utilities (FPU) who is already engaged on a Town-wide pipe replacement project. These savings, which are related to road restoration, while not immediately available, could be achieved in the later years.

We have gathered information, assessed the needs and desires of the stakeholders and utilized our relevant and recent experience in conversion projects within the Town in an effort to present the most realistic yet varied and flexible set of options possible. It should therefore be noted that the Town may wish to choose one or more of those options as an ideal approach and make adjustments as the project progresses and actual experiences hone the validity of the assumptions made.



REFERENCE MATERIAL:

“FPL General Rules & Regulations for Electric Service”

“Conversion of Aerial to Underground Utilities Analysis”, Final Report by R.W. Beck, November 2006

City of Rancho Palos Verdes Public Works Department “Guidelines to Underground Utilities in Residential Neighborhoods”, June 2005

FPL Primary Maps

Comcast Suggested Phase Boundaries

Palm Beach County Road Atlas

Town of Palm Beach Town Council Meeting Agenda for October 14th, 2014, includes Cost Estimate Meetings Held with Stakeholders as outlined in Exhibit 14 “Meeting Minutes”



Section 2

Introduction

2.1 BACKGROUND

The Town of Palm Beach has been focused and engaged in assessing the concept of “Undergrounding” towards the goal of protecting it’s above ground utilities comprising electric, phone and cable service over the last decade. In 2006, the Town commissioned a study titled “Conversion of Aerial to Underground Utilities Analysis” by “R.W. Beck, Inc.”. The purpose of this study was to “*perform a high level review of the current cost estimates the Town is utilizing in its analysis (Project)*”. At the time, the estimated cost for the undergrounding effort was “*roughly \$60.3 million*”. (*see Exhibit 17*). The current estimate for this undertaking is estimated at \$85.4 million by the Town (*see Exhibit 16*).

As a result of reasons unknown to the writer, this study did not trigger a Town-wide conversion process. In the following few years up to present times, the decision was made to perform undergrounding projects on an “as requested” basis by each neighborhood. While the pace of this effort has varied from year to year, it has indeed yielded a handful of completed projects and a few more are currently in the planning and design phase. Worth Avenue’s reconstruction also received the benefit of this approach. These smaller isolated projects have typically started with the efforts of a single motivated resident (The Champion). The Champion would then attempt to garner the support of his/her surrounding neighbors and through coordination with the then Deputy Assistant Town Manager, Tom Bradford, a logical project boundary would be determined. From that point, if two thirds of the residents within that boundary voted to go forward, the Town would proceed with the planning/design and construction process. The cost of the design and construction would then be assessed to all the residents of that particular street based on a model designed by “Willdan Financial Services” in October 2009 titled “Town of Palm Beach Utility Undergrounding Assessment Methodology”. That model determined a group of weighted factors that could be applied to each property within the Town.

While these projects have been successful, they have been on such a small scale that they have little effect on the overall appearance and utility reliability of the Town as a whole. Clearly a more comprehensive approach was needed.



In recent years there has clearly been increasing motivation by the residents of the Town to expand the undergrounding program to cover larger areas. This movement culminated in the October 14, 2014 Town Council meeting where FPL presented the need to improve or “Harden” large portions of the Town’s existing overhead utilities. That hardening effort, triggered by FPL’s recognition of their facilities’ conditions, would include replacement of many of the existing wood power poles with larger and taller concrete power poles. Within the context of previous and ongoing conversations between the residents, Council members, staff and consultant(s) regarding a more “regionalized rather than local” approach to undergrounding the Town, the hardening proposal by FPL became an added impetus to view the large scale undergrounding as an alternative whose time had perhaps come. (*see Exhibit 16*)

After in depth deliberations, the Council members and residents in attendance unanimously decided to again pursue the feasibility of undergrounding the entire Town.

The Town has consequently commissioned Keshavarz & Associates, Inc. (Consultant) to produce a **“Town-wide Utility Undergrounding Sequencing and Phasing Report”**. Given that the Town currently has a rough idea of the total costs involved, this report only focuses on how long it will take and how each yearly phase can progress into the next. The report, while prepared from a technical perspective, will additionally serve as a general schedule for the Town’s financial outlay per year through the completion of all phases; a schedule which was requested by Ms. Jane Struder, Town’s Director of Finance; a schedule that effects the financing of the budget for this endeavor in terms of timing the need for dispensation of funds.



2.2 OBJECTIVE

The primary objective of this report is to determine the timing milestones for expenses associated with the Town-wide effort of converting all remaining above ground electric, telephone communication and cable television to underground installations.

Our main goal in this report is to answer the question, “How long will it take to underground all the above ground utilities within the Town?” Secondary to that goal is answering the choices of starting points and how the phases can progress. While it may be necessary to allow construction activities outside of the usual Town mandated construction season, **our first consideration in this process is to minimize the inconvenience to the residents and business owners of the Town of Palm Beach.** To that end, our first assumption is that all intensive construction activities will be restricted to the construction season, being May 1st – November 30th. The next question then becomes, “How much work can be done each year?” or “how large a project can each phase be?”

The conclusions and findings of this report will ultimately assist the Town in determining the overall duration of this critical undertaking together with the milestones by which the cost of this undertaking will have to be expended.

It is not the objective of this report to estimate the cost of this Town-wide project since the Town has already estimated that cost at approximately \$85.4 million. (*see Exhibit 16*).



2.3 METHODOLOGY

The following steps comprise our approach methodology to preparing this report;

1. **Preliminary Meetings/Interviews and Coordination**
This is an information gathering effort at its heart. The critical issues and the stakeholders were identified based on our experience with a number of undergrounding projects we are involved with in the Town and elsewhere. Meetings were first held with the Town's staff and then with each of the stakeholders.
2. **Individual Model Project Sequencing plan**
In order to author a realistic schedule and sequencing plan, an example project was chosen representing actual boundaries and conditions. The project was analyzed with respect to various opportunities and constraints yielding a realistic schedule. That schedule was then extrapolated to the other projects in the Town to arrive at a total duration. This "model" schedule is the most important part of our effort as all of the yearly schedules and sequencing options are built upon two variations of "model" schedule, being two and three pole mile options. This schedule was prepared based on our experience, the review and input of the stakeholders and a contractor familiar with undergrounding. The schedule was also discussed during a second stakeholders meeting (Step 4 below) on March 25, 2015 (*see Exhibit 15*).
3. **Draft Preliminary Sequencing and Phasing Report**
The Town-wide Undergrounding Report includes all of our findings and the recommended options. It was first issued to Town staff for review and comment, and then to other stakeholders for information and comment.
4. **Project Stakeholders Consensus / Coordination Meeting**
This meeting held on March 25, 2015 was crucially important as it was this venue in which all assumptions, conditions and expectations outlined in the Program Sequencing Report were discussed with stakeholders towards the goal of securing commitments to the overall program.
5. **Finalize Preliminary Town of Palm Beach Town-wide Utility Undergrounding Sequencing and Phasing Report**
The subject report is now finalized after necessary revisions arising from steps 3 and 4 above. The finalized report is being submitted to Town staff for use in their presentation to Town Council.



Section 3

Stakeholders

STAKEHOLDERS – THEIR EXPECTATIONS, NEEDS AND LIMITATIONS

Meetings were held with all of the stakeholders to establish their expectations, needs and limitations. The issues discussed in these meetings were not limited to those affecting only scheduling matters, rather comprehensive discussions were held regarding the process of collaboration, design, construction, scheduling and funding. The meeting minutes attached as *Exhibit 15* outline all items discussed during each meeting. This section will sum up the stakeholder's input with a focus on our needs in producing this report.

For the purpose of producing this report, the Town of Palm Beach staff represented the interests of the Town's residents, property and business owners. As such, any reference in this report to the Town of Palm Beach as a stakeholder implies the collective interest of those patrons and Town staff as their representatives.

The stakeholders are as follows:

The Town of Palm Beach

Florida Power and Light (FPL)

Comcast

AT&T

The City of West Palm Beach (WPB)

Florida Public Utilities (FPU)

Florida Department of Transportation (FDOT)

The City of Lake Worth



3.1 Town of Palm Beach

Town staff recognizes that Town-wide undergrounding will be a crucial and significant effort. Design and initial coordination will be critically important steps, though staff is most concerned with the construction phase as the activities in that phase can result in significant inconvenience to the residents and business owners of the Town.

The Town staff understands the need for and has expressed willingness to support a plan that includes selective construction activities outside of the mandated construction season (May 1 through Nov. 30). However, they did make it clear the only plan which could be considered for this purpose is one that confines all heavy construction to their construction season. Regardless of these restrictions and all others that arise through the information gathered from the stakeholders, Town staff emphasized that the schedule, while realistic, must be tolerable by the residents and business owners.

The Town will also wish to seize this opportunity and implement concurrent drainage and roadway improvements into each phase. This approach will serve a duality of purpose which will result in minimization of interruption to the daily lives of patrons, as well as cost savings that are a result of doing all the necessary construction at one time. The magnitude of additional improvements that can be included will be determined during the preliminary investigation of each phase. This will be an intense effort and the Town has made it clear that these needs are best addressed by utilizing a Construction Manager at Risk.

The Town is inviting all other utility providers within the Town to utilize this opportunity and share in the cost of road restoration while updating their respective facilities along with this project. FPU has already engaged the Town in a cost sharing program. Further, the Town has offered to design and construct the City of WPB proposed Water System improvements as a part of the project, assuming that all costs associated with the Water System design and construction will be reimbursed by the City.



3.2 Florida Power and Light

All undergrounding projects in the Town have and will continue to be highly influenced by the rules and allowances outlined in FPL's "General Rules and Regulations for Electric Service". Historically, FPL offers a 25% discount for projects that underground at least three pole miles of existing overhead utilities. Naturally, this significant financial incentive must be considered when deciding how to split up the Town into manageable phases. It was, however, verified that the three pole mile requirement to get the 25% discount does not apply to each phase of a multi-phase project. As long as each phase starts where the previous left off and there is no more than one year lag between phases, the 25% discount is still applicable.

The FPL design team will be more involved in the design of these larger scale projects than they typically are with smaller projects. They do welcome collaboration, but all electrical engineering design decisions are ultimately made by FPL.

The following are items discussed that directly affect the timeline in the "Individual Model Project Schedule";

- FPL requires a detailed route and underground survey, depicting all existing utilities, to be used as a base map;
- This project will be managed by John Lehr with FPL and his team;
- FPL requires a deposit before they will begin the design work. That deposit is calculated by multiplying the overhead pole miles to be converted by \$1.20;
- FPL's design may take as much as 24 weeks to prepare;
- The Town will have 180 days from the time FPL provides the "Binding Cost Estimate" to obtain all required easements.
- Preliminary investigation into possible easement locations and collaboration with FPL can begin before the binding cost estimate is issued;
- An allowance of 16 weeks should be considered for delivery of special equipment. This includes the "Vista" switch cabinets which may be desirable over the standard switch cabinet as they are lower profile and easier to mask with landscaping;



- After the underground feeder lines, primary lines and transformers are activated, the Town will have 180 days to have all secondary services connected to homes and businesses. At that time the existing overhead lines will be deactivated and demolition of those lines could begin;
- FPL prefers the point of project commencement to be the north, south or both *ends* of the Town.
- FPL has stated that the work to switch over the feeder cables needs to be performed during December or January. The hotter weather during the construction season results in heavier electric demand and that can complicate the switching process.
- FPL has reviewed the project schedules and concurs that they are obtainable but aggressive for the following reasons:
 - o The major construction occurs during the storm season and FPL may have to send their crews to other areas in the event of an emergency; upon return from an emergency, FPL's priority is new service accounts versus underground conversions
 - o Removal of aerial facilities is contingent upon the other utility providers as they would need to have their facilities removed from the poles prior to the removal of the poles. This process has resulted in some delays in the past.

In general, FPL is concerned about their ability to confine their work to the Town's construction season. For this reason FPL has suggested that the majority of work be performed by the Town's contractor. Resident notification process and easement acquisitions can also be very time consuming. In spite of knowing this effort to be fairly challenging, FPL has pledged to assist as much as possible to achieve the project's goals.



3.3 AT&T

AT&T would prefer to begin design after FPL completes its design, although they are willing to be flexible and start design earlier as may be necessary. Similar to FPL, AT&T requires a deposit to begin design. The design could take 9 to 13 weeks to complete.

AT&T is also of the opinion that the ideal starting point would be the north or south ends of the island, then continue phases progressing from there. This would minimize service interruptions and would have less impact on the residents or the Town functions. Additionally, AT&T provides service to some other companies through their network. Alarm companies are an example. This represents another level of complication in both design and construction. AT&T does not allow independent contractors to perform its installation work. Conduit installation may be performed by the Town's contractor but all other work will be performed by AT&T union contractors. AT&T requires a significant lead time, up to 180 days to notify customers per their service agreements with the other companies prior to conversion.

“On ground” equipment requires an easement, smaller but similar to FPL transformers. These will need to be considered along with locations of easements for FPL and Comcast equipment. AT&T and Comcast facilities can share the same easement. It was suggested that FPL be responsible for removal of the power poles that are owned by AT&T which would significantly simplify the final stages of demolition of the existing overhead facilities. FPL has agreed to this option.



3.4 Comcast

Comcast would prefer to begin design after FPL completes its design, although they are willing to be flexible and start design earlier as may be necessary. Similar to FPL, Comcast requires a deposit to begin design. The design could take 9 to 13 weeks to complete.

Comcast has only two cable feeds into the Town, one on the north and one on the south end. Because of this, it is especially important to them that those be the starting points and as such, are somewhat insistent in commencing the process either from the north or south side of the Town. Comcast has provided a map that shows potential boundary lines.

“On ground” equipment requires an easement, smaller but similar to FPL transformers. These will need to be considered along with locations of easements for FPL and AT&T equipment. AT&T and Comcast facilities can share the same easement. Comcast has stated that they will be taking advantage of undergrounding and would attempt to upgrade all of their facilities to fiber optic, which will significantly improve the quality of their service.



3.5 City of West Palm Beach

The City of West Palm Beach owns and maintains the water distribution system in the Town of Palm Beach. Similar to the Town, the City will want to include system improvements where possible. This may be done in an opportunistic manner and concurrent with the undergrounding projects. The extent of improvements to be included will be determined during the preliminary investigation of each phase.

The City has expressed the desire for water main improvements to be constructed prior to undergrounding construction. This may be possible to be done in the same construction season though in some cases it may be necessary for water main construction to occur during the previous year. The Town has confirmed that in those instances, they would allow milling and overlay to be postponed until the next year in order to share costs. Extensive coordination between the Town and the City will be necessary in order to take advantage of as many of these opportunities as possible.

Currently, the Town is in an inter-local agreement with the City through which the City deposits funds into the “City Renewal and Replacement Fund” dedicated to the capital improvements of its infrastructure assets located within the Town. It is perhaps through this arrangement that the Town’s selected contractor for the undergrounding can also be compensated for the work on the City’s assets.

The City is in the process of developing a priority list of proposed water main improvements within the Town and will share this with the Town when completed.



3.6 Florida Public Utilities

FPU began the 10-year federal program “Bare Steel Replacement Project” over three years ago and has completed a large area of pipe replacement at the north end of the Town. FPU has approximately 7 years remaining under this federal program.

The scales of each of FPU’s yearly projects are similar to the phases proposed for utility undergrounding. It is our opinion that it will be much too intense a project to directly overlap our two construction efforts. However, if any of the undergrounding phases were to precede or follow a gas main replacement project, there may be an opportunity to split the cost of the milling and overlay. Obviously, the overlay would be performed after the second project was completed. Because FPU is already underway with yearly reconstruction, it will not be possible to coordinate phases until later in the overall undergrounding project. In as much as the shared overlay cost approach can yield to significant cost savings for the Town, special attention to an undergrounding sequencing approach conducive to realizing these savings is strongly advised.



3.7 Florida Department of Transportation

FDOT owns and maintains Royal Poinciana Way, Royal Palm Way, Southern Boulevard and State Road A1A. State Road A1A is common with South Ocean Boulevard south of Clarendon Avenue, and with South County Road between Clarendon Avenue and Royal Poinciana Way.

FDOT does not have any immediate plans for improvements to any of its roadways in the Town of Palm Beach which affect this project. They do however have plans to execute “Maintenance Activities” on all bridges. FDOT will allow installation of underground facilities within their rights-of-way. While a “Utility Installation Permit” will be required, no “Right-of-Way Agreement” will be required for undergrounding activities in their right-of-way’s. Switch cabinets and other above ground equipment can also be installed in FDOT right-of-way as long as the locations comply with clear zone requirements.



3.8 City of Lake Worth

The City of Lake Worth's Casino Building and Beach Complex is located in a land pocket within the Town's limits. Overhead feeder lines within the FDOT right-of-way fronting it service the entire complex.

Due to the limited potential of technical complexity of converting this facility to underground utilities, no meetings were held with the City of Lake Worth. It is assumed that their property will be viewed as any other property in the Town from a technical conversion standpoint. However, special considerations may be necessary from a fiscal standpoint.



Section 4

Analysis

4.1 INDIVIDUAL MODEL PROJECT SCHEDULE

Given the task at hand, our primary objective in this process was to minimize the inconvenience to the residents and business owners of the Town of Palm Beach. Though some construction activities will need to be performed outside of the Town's mandated construction season, our recommended scheduling and sequencing plan will only allow for light impact construction outside of the May 1st through November 30th time frame. At this time a great deal of coordination and discussions, with respect to defining the "Light Impact" as opposed to "Heavy Construction", has been had with the Town and other stakeholders. While a clear understanding regarding the allowable activities during the November to May season is in place amongst the stakeholders, some modifications may be implemented as a result of actual execution of those tasks once the projects begin.

Our next objective was to understand and follow the requirements and capture the financial allowances for large scale undergrounding projects as outlined in "FPL's General Rules and Regulations for Electric Service". FPL offers incentives for larger projects, up to 25% contributions towards construction and materials cost, if the project is to underground at least three pole miles of overhead feeder and primary lines. Through our preliminary meeting process, we discussed this scale project in detail and asked all appropriate parties about the feasibility of constructing this size project within the Town's construction season.

For real time evaluation and discussion purposes, we established an "Individual Model Project" area that includes mostly single family homes with a few multifamily properties and commercial properties generally located north of Royal Poinciana Way. This area was chosen because of its mixed use and the assumption is that it represents a moderate to difficult project setting relative to other areas in the Town. Given the need to include Town infrastructure improvements and City owned water main improvements, the stakeholders are concerned that a three pole mile project in any of the single family or commercial areas would be too large and intensive to confine heavy construction to the Town construction season.

Subsequent input from FPL has made clear that as long as the customer, in this case the Town, shows clear intent to ultimately construct a project larger than three pole miles, it can be phased with individual projects of less than three pole miles, yet still receive the 25% incentive. To qualify, each consecutive phase would need to be contiguous and separated by no more than one year.



In as much as our first consideration was to minimize the inconvenience to the residents and business owners, the total duration of the project did need to be minimized to the extent possible. Knowing this, and considering stakeholder's input, we came to the conclusion that a project of two or slightly more pole miles is ideal from various standpoints and also feasible within most of the Town. This individual project size minimizes the total impact in any one area at any one time and offers the added opportunity to construct two projects simultaneously.

Longer pole mile projects are feasible in the southern portions of the Town where there are fewer lateral lines. Both three pole mile projects and smaller projects will be addressed in our phasing options. Additionally, it may be possible to have two of these smaller projects constructed simultaneously, thus minimizing the impact to the residents. This approach also bodes well in accelerating the overall Town-wide undergrounding effort. While this would be an intense effort, the stakeholders agree that these needs must be made clear to the prospective bidders so that a contractor would be able to plan and mobilize accordingly. The Town has made it clear and we concur that these needs are best addressed by utilizing a Construction Manager at Risk.

All of these considerations have been incorporated into our Individual Model Project Schedule. This schedule confines all heavy construction and right-of-way restoration within the Town mandated construction season. Light construction and some of the work on private property is planned to be conducted outside the construction season.

All planning occurs in the previous year with bidding and preliminary construction activities occurring up to May 1. For the three pole mile project schedule, we are proposing that heavy construction may begin in April but after Easter. Our assumption is that an early start would be more acceptable than a late finish in order to avoid work during thanksgiving. After the intensive construction and through to the next construction season, the focus will be on transferring and connecting the utility services. The next construction season will include removal of the then deactivated aerial facilities, final landscape restoration and final certification. Depending on the intensity of the project, it may become necessary to move final milling and overlay to the second construction season. The overhead removal process may be as intense as the major construction since most of the aerial facilities are in the back lot areas and existing easements have not been maintained or enforced. The Individual Model Project Schedule runs for just under three years for the two or more pole mile options and for just over three years for the three or more pole mile options.



4.1.1 STARTING POINT

The answer to the question of “where to start” has been essentially arrived at by the needs of the three overhead utility owners. Older plans for Town-wide Undergrounding proposed to start at the north end of the island and progress south. This is still a viable option and the stakeholders each verified that is the ideal starting point. Comcast was especially clear on this as they do not have periodic feeds to the Town from the City of West Palm, rather only two feeds at the north and south ends of the Town. We suggest that a plan that starts from the south end of the island offers the same advantages.

All three utilities also cite the need to minimize “end conditions”. Any phased undergrounding project will require temporary transitions from the newly undergrounded utilities to the existing overhead utilities. This “end condition” typically involves the installation of a new concrete power pole with guy wires and one or two riser cables that connect the new underground cable to the existing overhead cable. The first phase of a plan that starts at the north end of the island would have one or two end conditions at its south boundary. The second phase would then remove those end conditions and construct one or two at its south boundary. Any other starting point other than the north or south ends would essentially double the number of “end conditions” for that first phase.

4.2 PHASING AND SEQUENCING

After much deliberations and analysis, we concluded that the simple answer to how the phases can progress, whether the starting point is the north or the south or both, is to simply progress inward from either end of the Town, with each phase starting where the previous left off. This is a viable option, although there are several issues to consider.

First, if the starting point is one end or the other, the residents on the opposite end of the Town will not see results until the final phases of the project. In *as* much as we have avoided political considerations in this report, the Town may see this as more significant an issue than the engineering/construction nuances focused on by the stakeholders. The plan of building two projects simultaneously alleviates this issue in part. No matter how the phases are sequenced, someone will be last.

The second issue to consider is if the project starts at both ends of the Town and progresses inward, the final two phases will be very close if not connected resulting in a large and somewhat central part of the Town to be under construction. This may represent a more than tolerable inconvenience to the residents and business owners of the Town.



The third issue to consider is the work being performed by Florida Public Utilities (FPU). FPU is currently replacing much of its gas mains throughout the Town in a sequence similar to what we are proposing for utility undergrounding. We advise against any proposal *under which* our project could overlap any of their phases and the stakeholders also agree that would simply be too much work being done in one area. Concurrently FPU's schedule is only determined through 2017. Further coordination will be required.

However, if a phase of undergrounding could precede or follow an FPU replacement phase, there could be considerable savings on restoration costs like milling and overlay. It may be possible to sequence some of the middle or later phases of undergrounding to capture these savings. This could contradict the effort to minimize end conditions, though the restoration savings would likely outweigh the expense and design effort involved in those end conditions. The sequencing options presented in this report will represent these possibilities.

The selection of phase lines is based on several factors. First the lines are selected to split phases into the desired pole mile length for that phasing option. We then looked at the overhead utilities around the phase lines. A sequencing plan from north or south inward will minimize end conditions but there are other ways to minimize end conditions with adjustment of the phase lines throughout the Town. Lastly, Comcast has prepared a map that shows potential phase boundaries. Where possible we have adjusted phase lines to accommodate Comcast's suggestions, though priority was given to FPL overhead facilities in this effort.

The existing FPL Intracoastal Waterway crossings were also mapped out and considered in the phasing protocol. All three overhead utilities are flexible in how phase boundaries can be cut, though there are ways to minimize expenses and equipment where new underground facilities will connect to the existing overhead facilities. These phase lines are our best approximation at this stage and they will likely be adjusted during the design of each phase.

4.3 TOTAL PROJECT DURATION

The total duration of the project is also a critical point of focus in terms of inconvenience to the Town. Knowing that there is slightly more than thirty-five (35) miles of overhead feeder and primary pole lines within the Town, and given the individual project size limitations agreed on by the stakeholders, we are anticipating the total effort could be divided into as many as 16 phases. Given the nearly three year duration of the Individual Model Project Schedule, it is clear that each phase will need to overlap with the next to achieve a realistic overall duration.

The overall schedule will be arranged so that similar work does not occur at the same time in close proximity. We will present an option with two simultaneous phases underway in distant areas of the Town, though we believe this is only possible with each of the two phases being two or slightly more pole miles. Our options present durations that range from 10 to 18 years. We believe that any schedule duration less than 10 years will lead to intense an effort for the majority of stakeholders to manage. This is based on stakeholder input and applying the individual schedule over the 16 two or slightly more pole mile phases. We also believe that any more than 18 years will simply be unacceptable to the patrons in the Town.



Section 5

Options

Our Phasing plan options are based on the two different individual phase sizes; Two or more pole mile projects, and three or more pole mile projects.

For each of those phase sizes we present a variety of overall phasing options. A total of seven (7) options were analyzed using four (4) two or more and three (3) three or more pole lines. We believe the two or more pole mile option is the only one of the two that presents an opportunity to construct two phases simultaneously as represented in Option A2. Regardless of what option is implemented it will be critical during the bidding phase to make clear to the contractor(s) the Town limitations and expectations.

Depending on whether one or two contractors are engaged for this approach, given these parameters, each contractor should be able to plan and mobilize accordingly. The role of the Contract Manager will be of utmost importance in monitoring progress through each individual phase. In the course of preparing this report we have consulted with a contractor regarding the feasibility of our assumptions.

It should also be noted that as each phase progresses there will be a learning curve to overcome. Large construction in the Town of Palm Beach will have a set of unique obstacles to overcome. It may be necessary to adjust the yearly phasing plan on an ongoing basis throughout the overall project, potentially adjusting from one phasing option to another.

The following is a brief explanation of each phasing option that has been analyzed and presented for review and consideration. Once the scope of the Town and City's infrastructure improvements for each phase are determined, a better, more realistic assessment of the planned schedule's feasibility will be made. Since those scopes are determined before the undergrounding design phase would begin, the opportunity will exist to adjust the overall scope to stay within the planned schedule.



5.1 Option A2

This option is based on two or more pole mile phases and progresses generally from both south to north and from north to south with two phases being constructed simultaneously. The total duration of this option is anticipated to be 10 years.

We believe this option represents the best opportunity to save on restoration costs by opportunistically following and preceding FPU construction phases in the mid to later phases of undergrounding.

5.2 Option B2

This option is based on two or more pole mile phases done one at a time and progresses from north to south. The total duration of this option is anticipated to be 18 years.

5.3 Option C2

This option is based on two or more pole mile phases done one at a time and progresses from south to north. The total duration of this option is anticipated to be 18 years.

5.4 Option D2

This option is based on two or more pole mile phases done one at a time and progresses in a manner that alternates from north to south. The total duration of this option is anticipated to be 18 years.

5.5 Option A3

This option is based on three or more pole mile phases and progresses from north to south. The total duration of this option is anticipated to be 12 years. We believe this options best represents FPL's intent in its efforts to estimate costs in the 2006 R W Beck report.

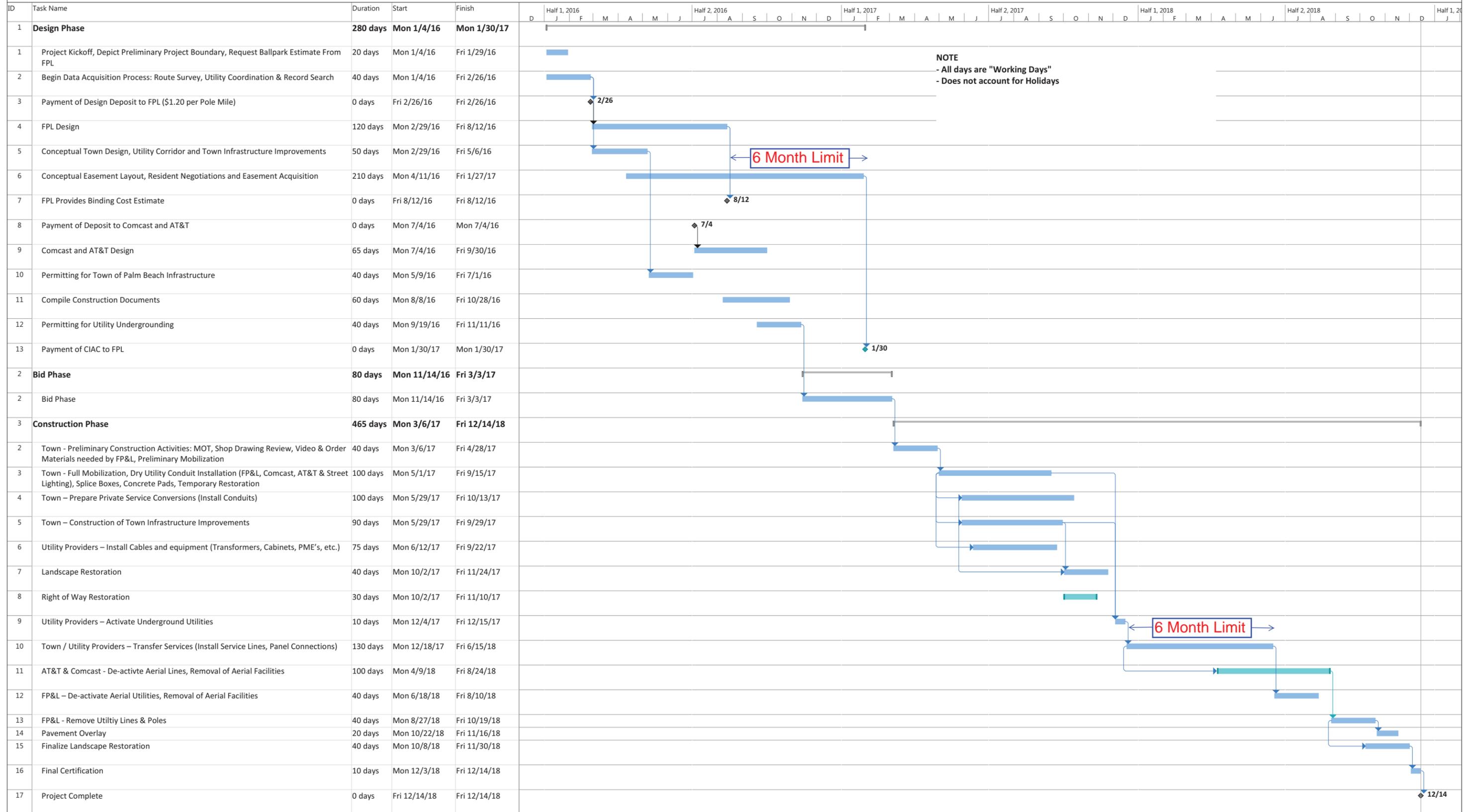
5.6 Option B3

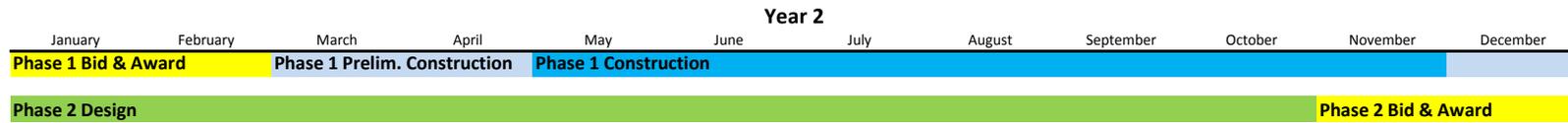
This option is based on three or more pole mile phases and progresses from south to north. The total duration of this option is anticipated to be 12 years.

5.7 Option C3

This option is based on three or more pole mile phases and progresses in a manner that alternates from north to south. The total duration of this option is anticipated to be 12 years.

TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING INDIVIDUAL PROJECT SCHEDULE 2(+)-POLE MILE PROJECTS EXHIBIT 1





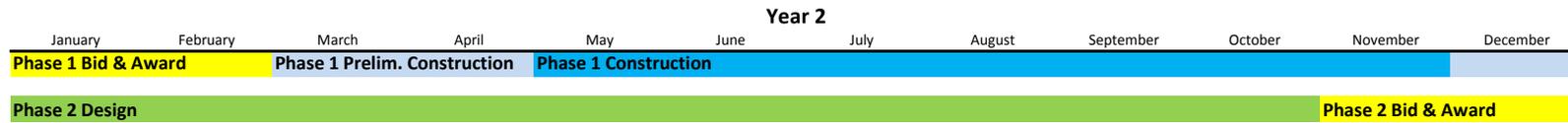
**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT A2 (2) SIMULTANIOUS PHASES, EXHIBIT 2**





**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. A2 (2) SIMULTANIOUS PHASES, EXHIBIT 2**





**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. B2,C2&D2, EXHIBIT 3**





**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. B2,C2&D2, EXHIBIT 3**





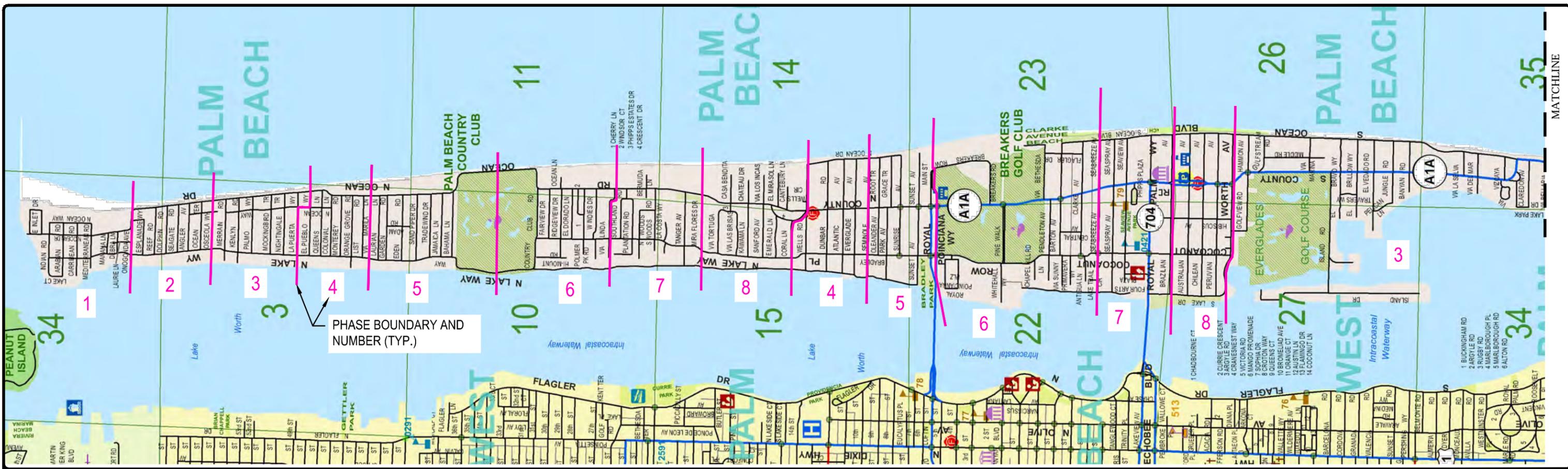
**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. B2,C2&D2, EXHIBIT 3**





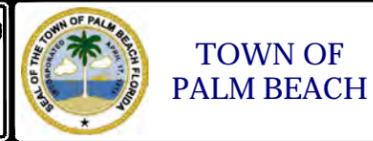
**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. B2,C2&D2, EXHIBIT 3**





TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
 OPTION A2 SEQUENCING MAP
 2 SIMULTANEOUS PHASES

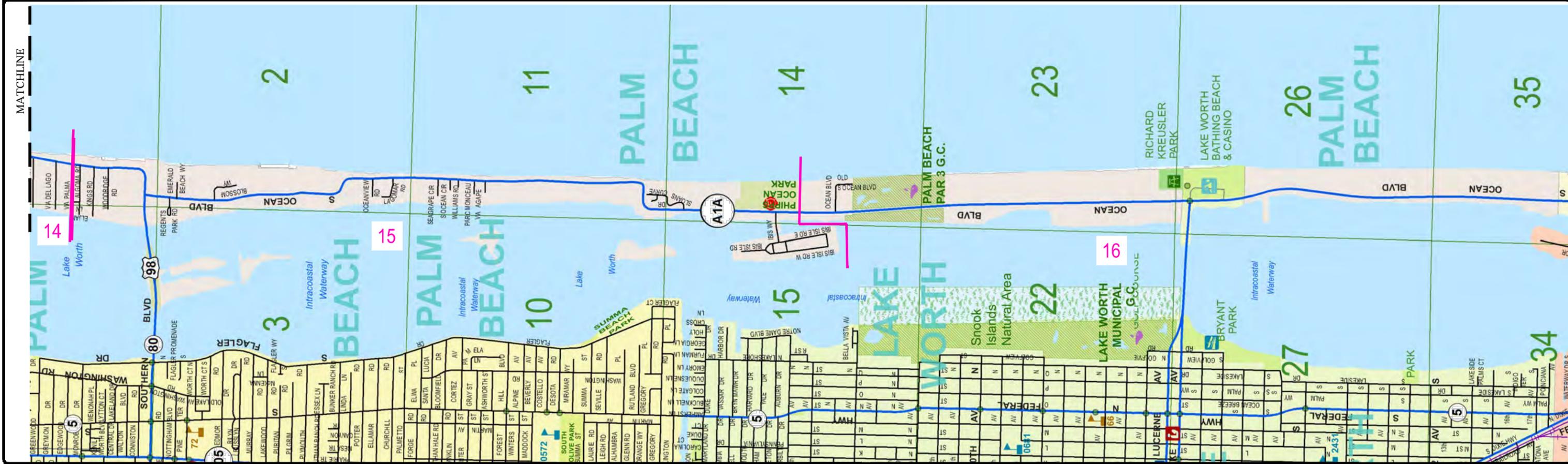
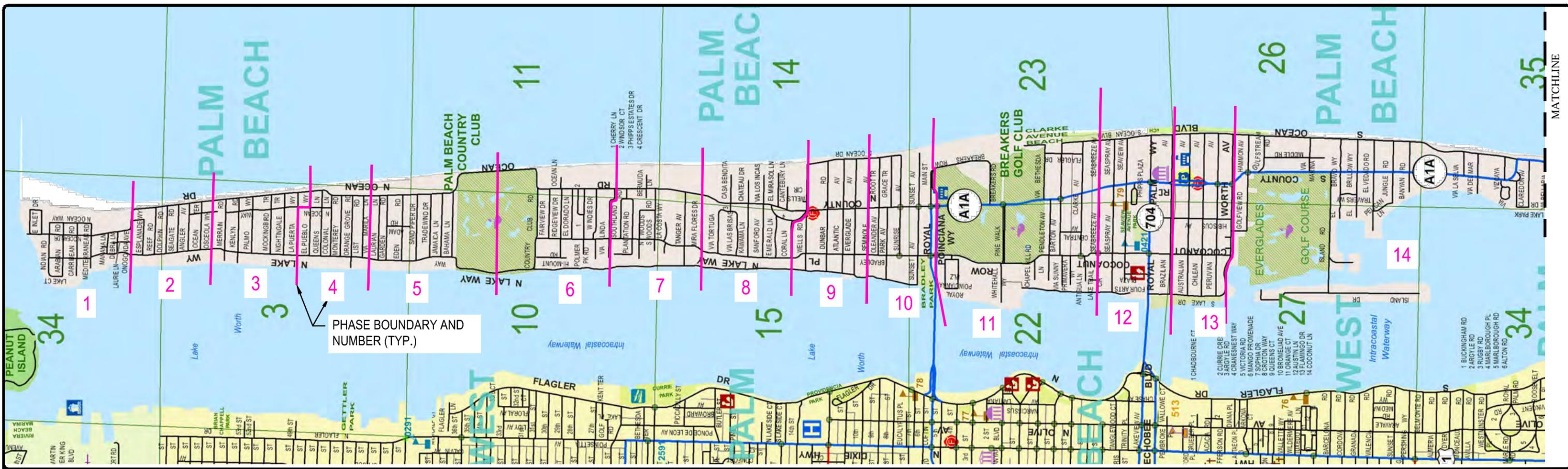
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 P.E. 67401
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TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION B2 SEQUENCING MAP

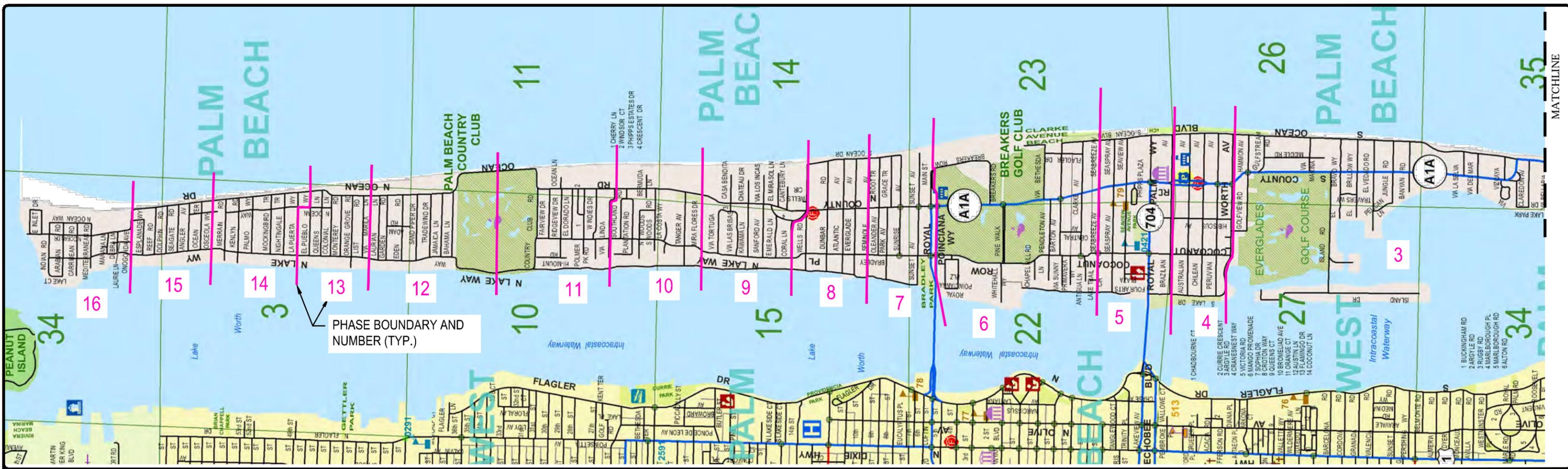
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EX. 5



TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION C2 SEQUENCING MAP

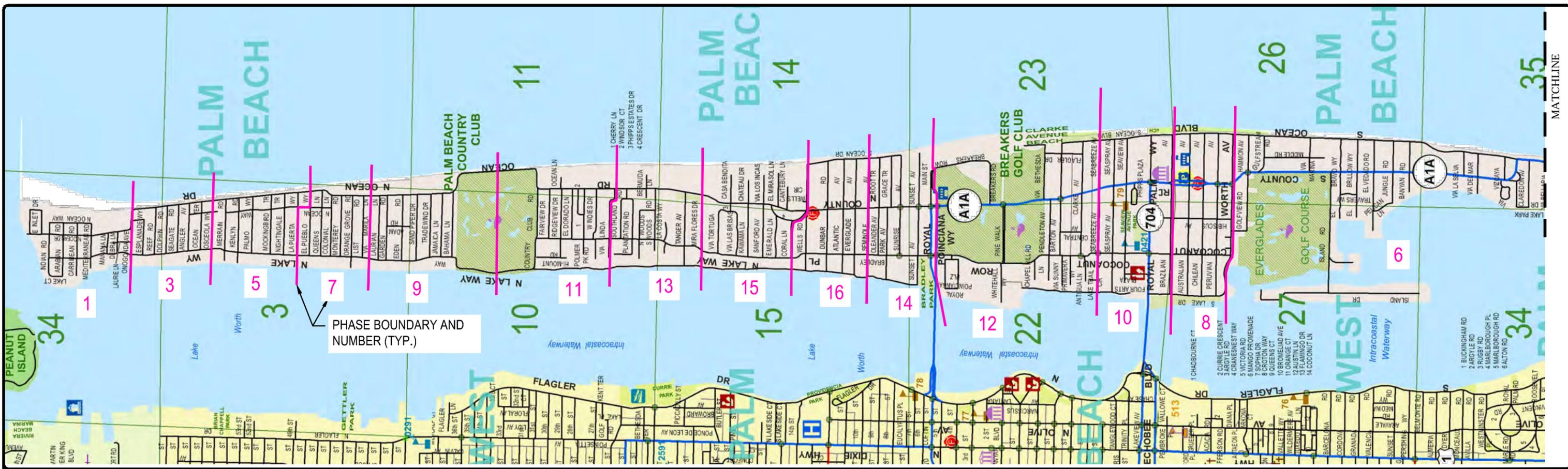
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EX. 6



TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION D2 SEQUENCING MAP

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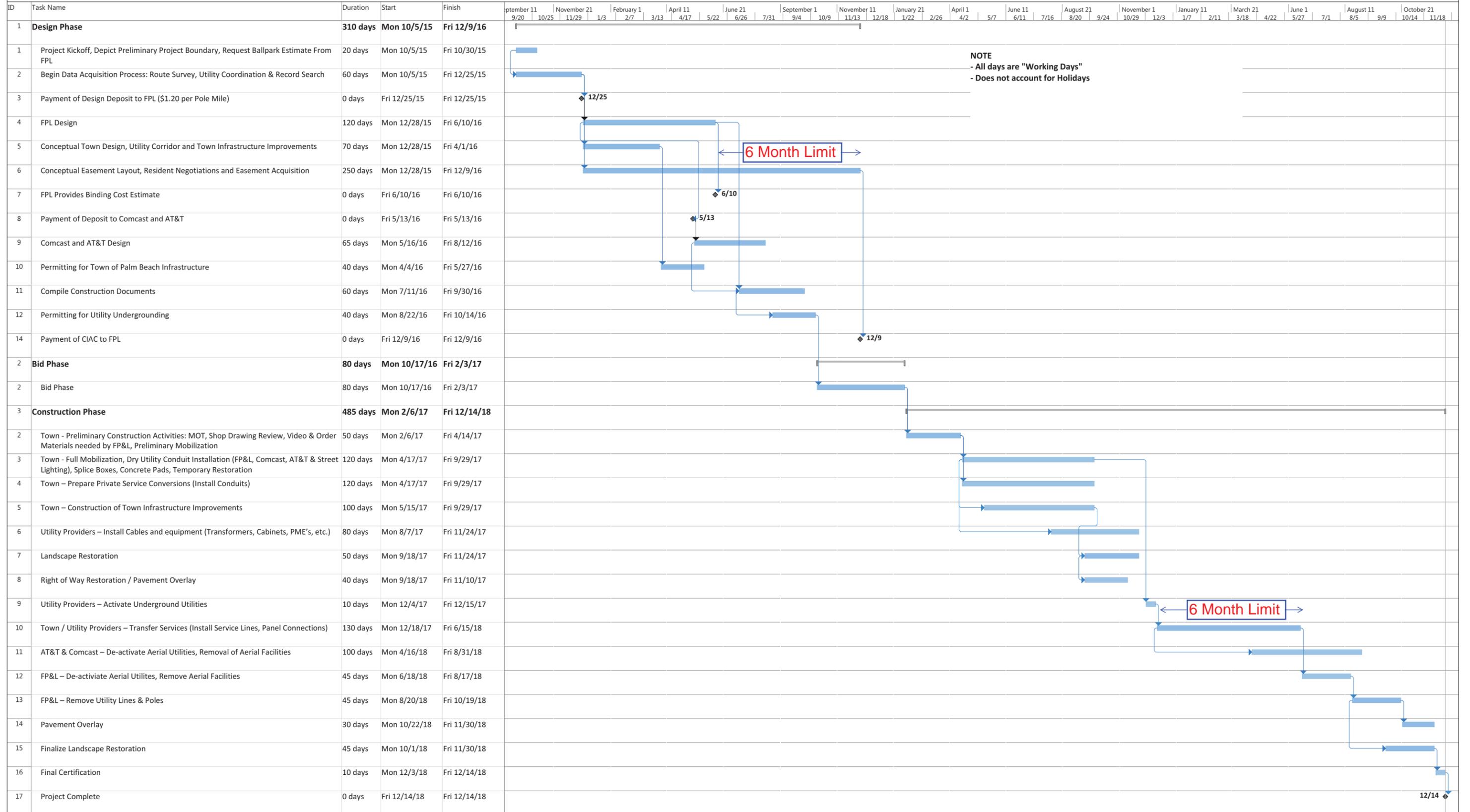
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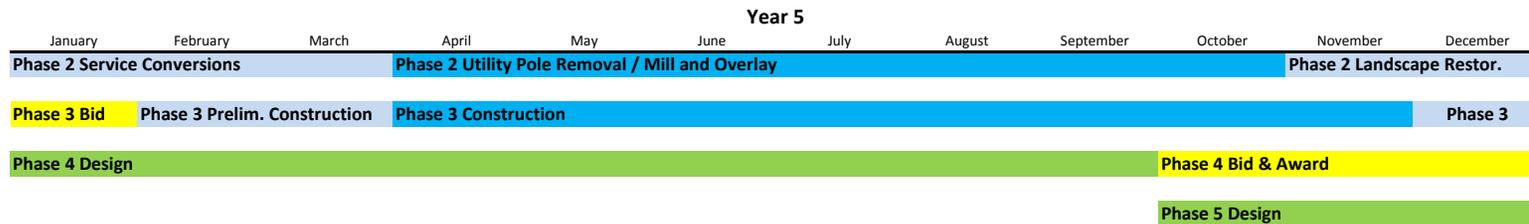
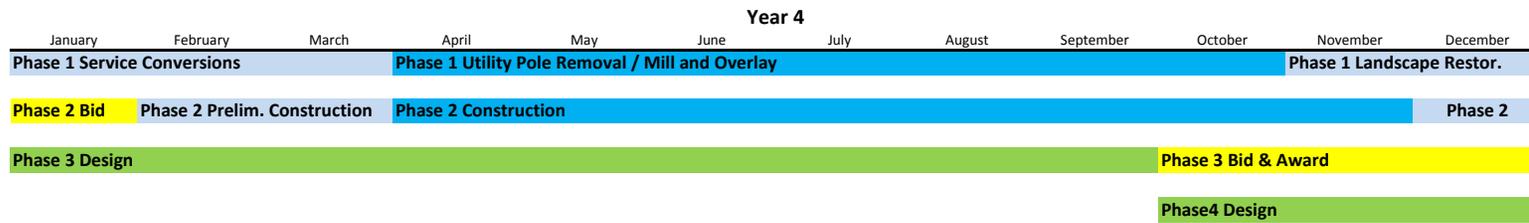
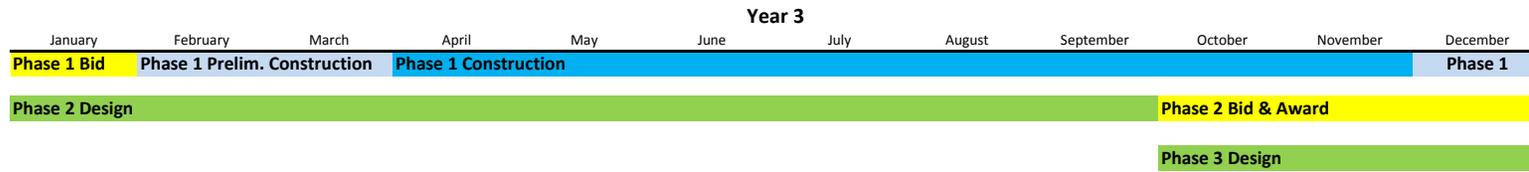
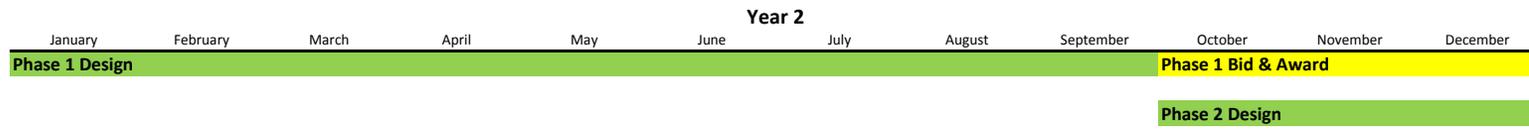
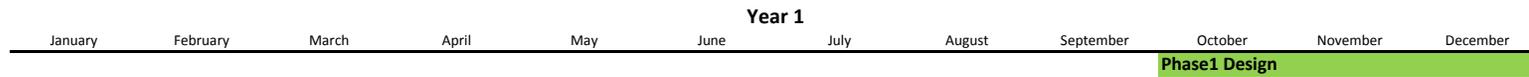
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SHEET No.
EX. 7

TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING INDIVIDUAL PROJECT SCHEDULE 3(+) POLE MILE PROJECTS EXHIBIT 8



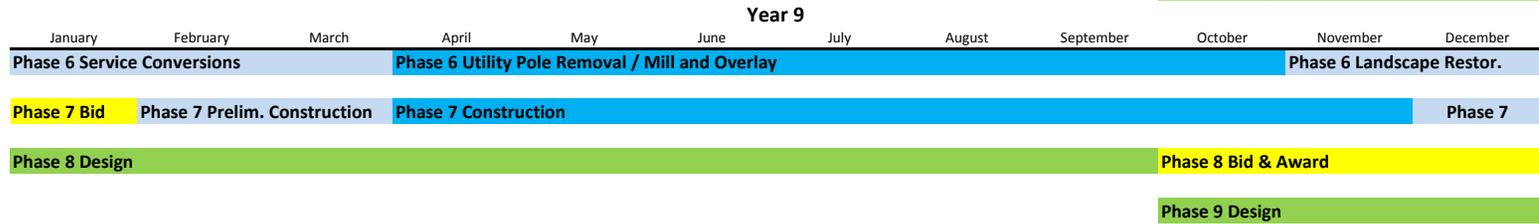
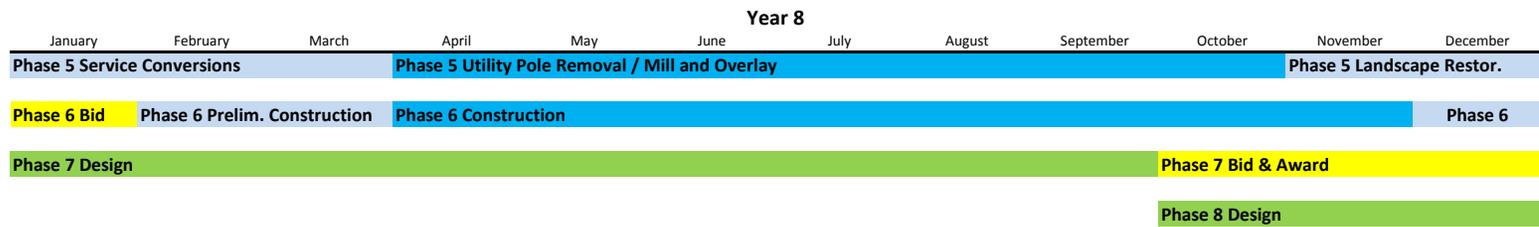
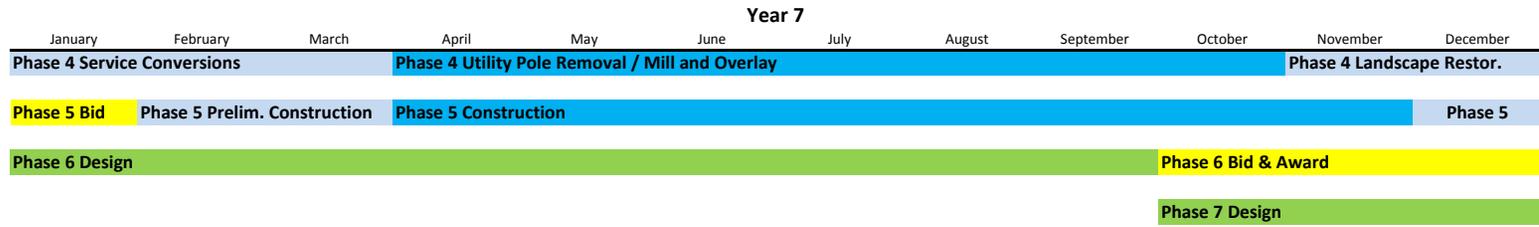
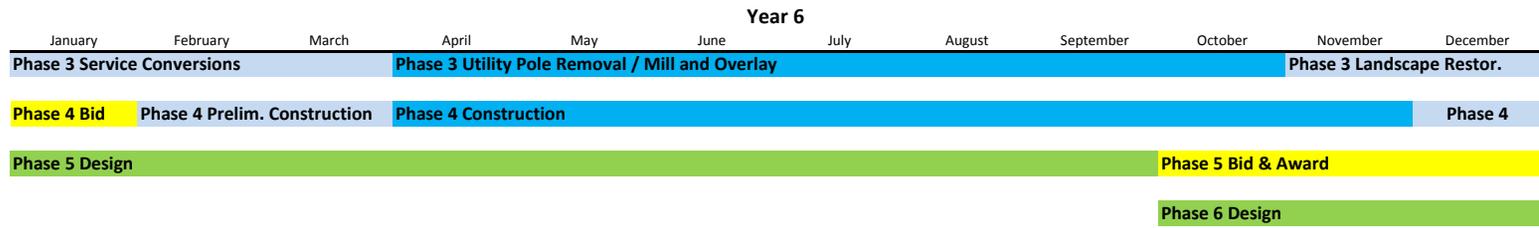
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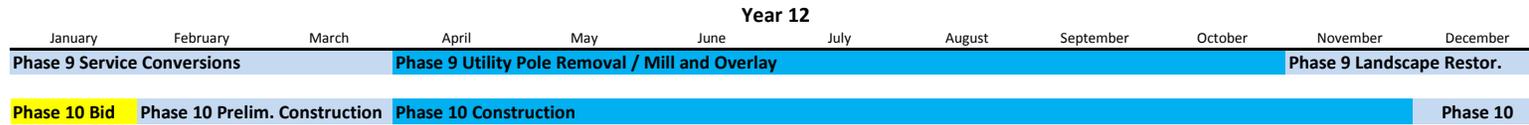
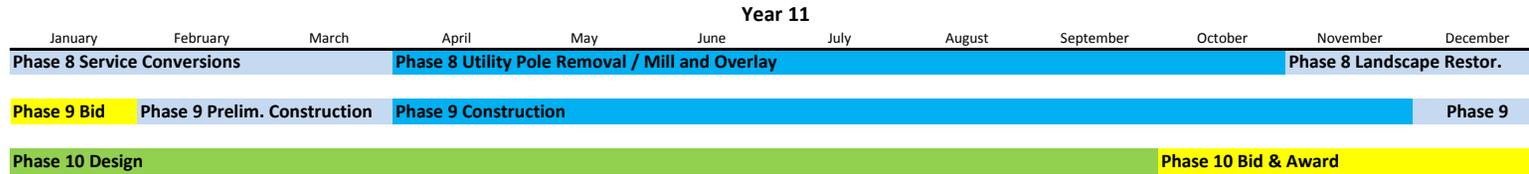
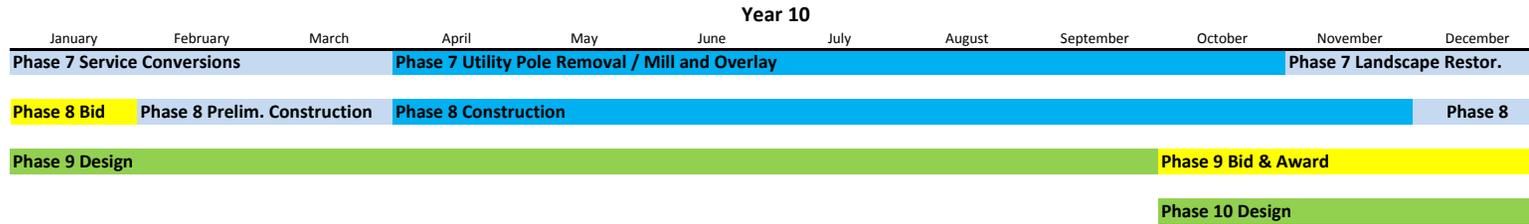
**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. A3,B3&C3, EXHIBIT 9**





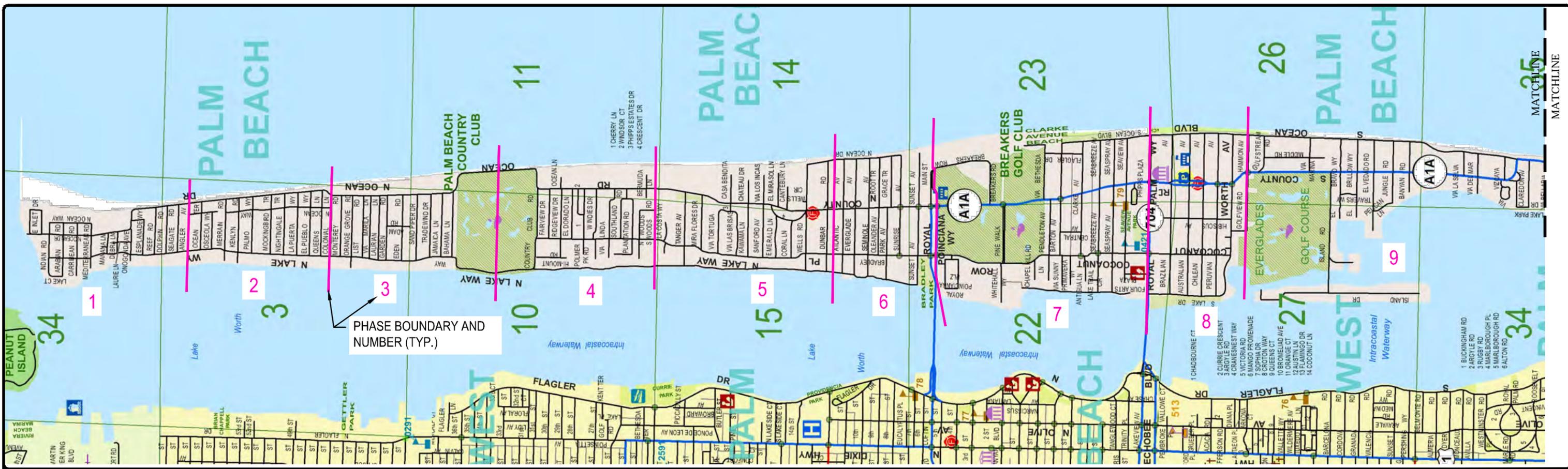
**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. A3,B3&C3, EXHIBIT 9**





**Town of Palm Beach
TOWN-WIDE UNDERGROUNDING
YEARLY SEQUENCE ALT. A3,B3&C3, EXHIBIT 9**





TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION A3 SEQUENCING MAP

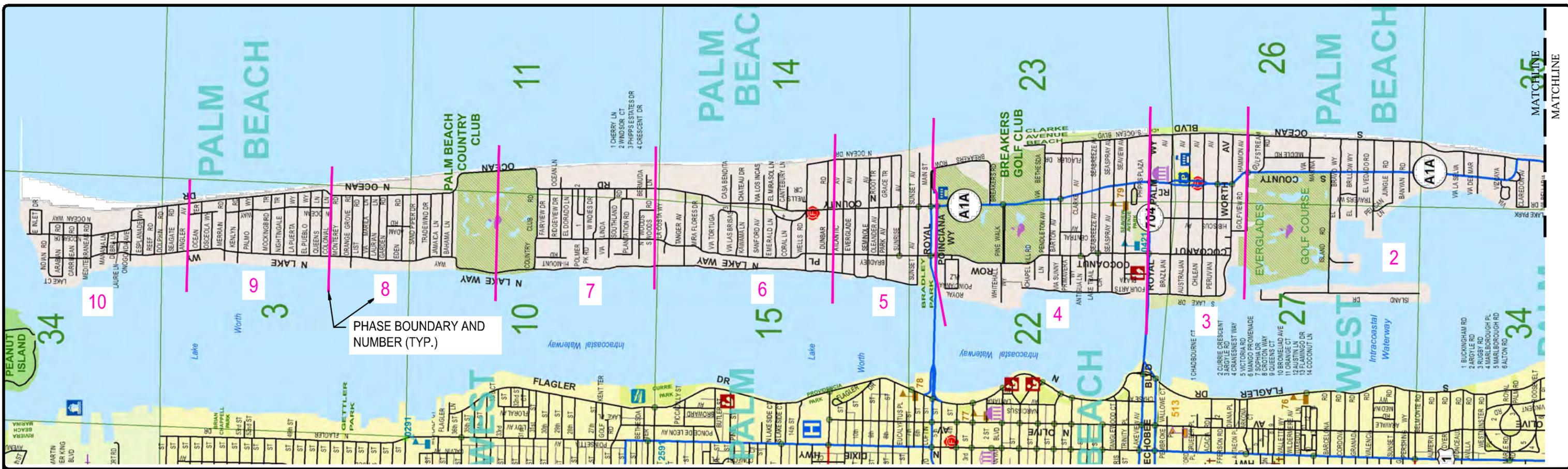
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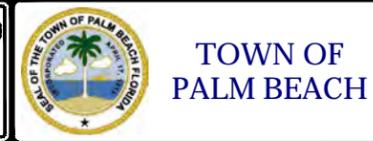
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EX. 10



TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION B3 SEQUENCING MAP

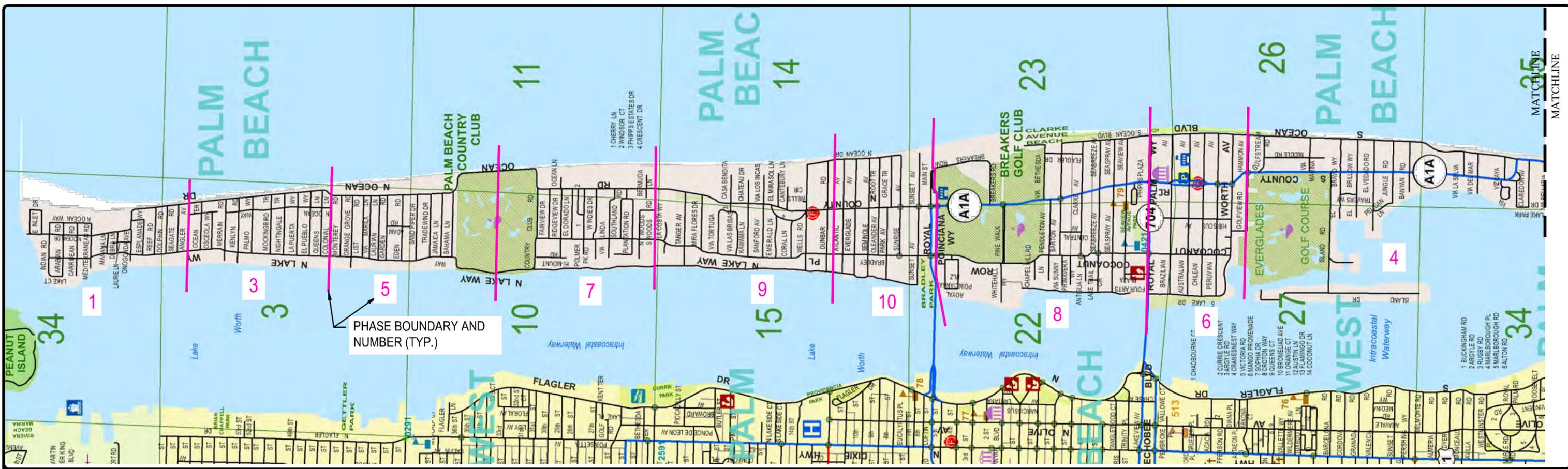
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TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
OPTION C3 SEQUENCING MAP

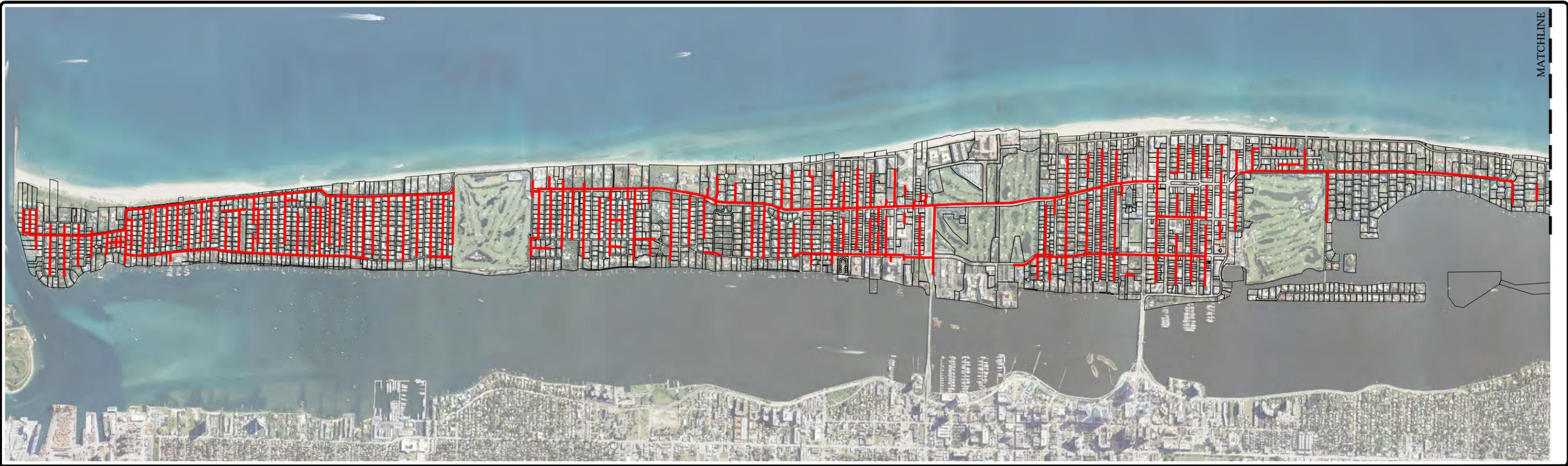
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EX. 12



**TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
ESTIMATED LOCATIONS OF EXISTING OVERHEAD FEEDER AND PRIMARY LINES**

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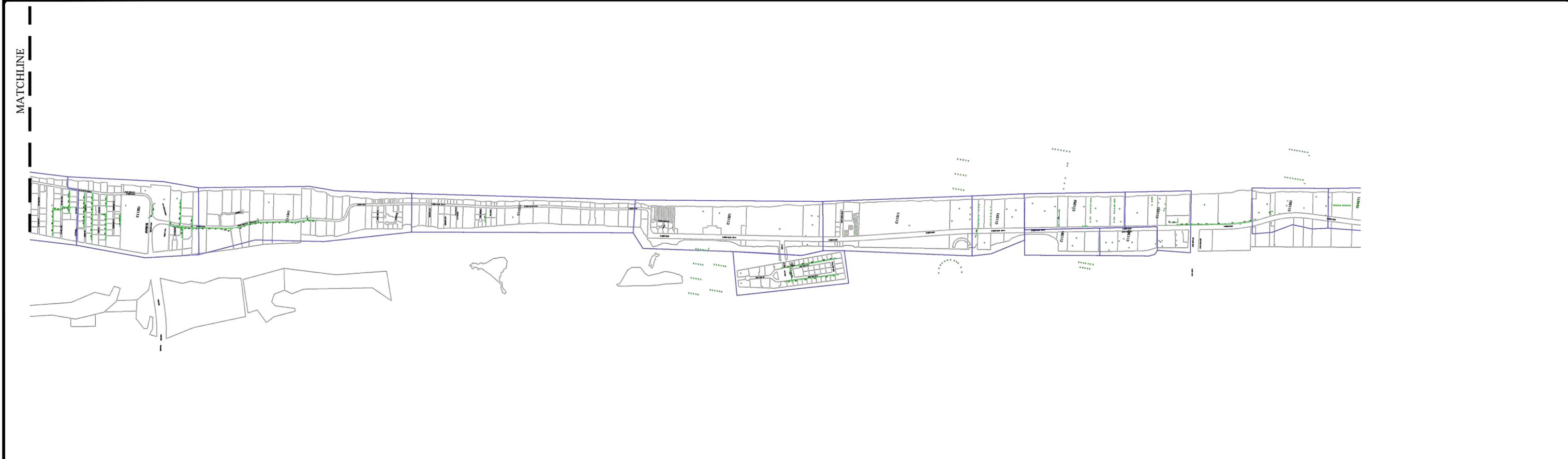
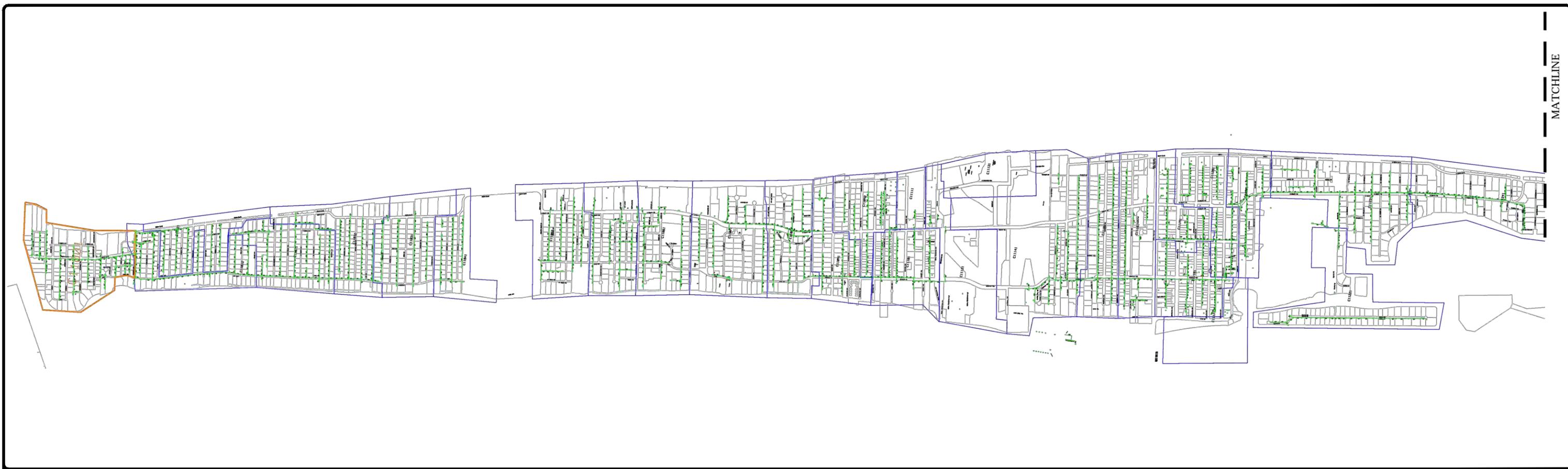
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Apr 06, 2015

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EX. 13



TOWN OF PALM BEACH TOWN-WIDE UNDERGROUNDING
COMCAST SUGGESTED PHASE BOUNDARIES

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Allen T. Green III
P.E. 67401
Apr 06, 2015

PROJECT No.
13-1030
SHEET No.
EX. 14



KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held at the Town of Palm Beach Public Works with FPL on Tuesday, December 16th, 2014 at 1:00pm to discuss utility undergrounding for the entire island. Please see the attached “Sign In Sheet” for attendees.

The following was discussed:

- The Town is in the process of developing a preliminary sequencing plan to present to the Town Council; the Town has hired Keshavarz & Associates (K&A) to assist with this effort, a Town referendum will be conducted regarding the undergrounding in March 2015.
- The Town would like to divide the undergrounding into several projects. K&A has selected a “model project area” as the basis of discussion on creating a model schedule and construction process for the purposes of estimating project durations and sequencing for the overall project. The model area includes single family, multi-family residential and some commercial properties. A copy of this “model project area” together with the associated schedule was provided to the attendees.
- Additional meetings will be held with AT&T, Comcast, City of West Palm Beach, Florida Public Utilities and FDOT to acquire additional information to consider in determination of the sequencing plan.
- Based upon language from the FPL tariff, the Town has preliminarily identified 10 areas that could be individual undergrounding projects with a minimum length of 3-pole miles.
- The Town-wide is requesting flexibility on the 3-pole mile minimum criteria, as established in the tariff for a 25% incentive applied towards FPL undergrounding costs.
- The Town would like to explore the possibilities and logistics of adhering to the Town’s construction season to the extent possible.
- The Town construction season is from May to November. Any deviation of the construction season will require approval from the Town Council.
- The Town would like to see at least 6 pole miles completed in a year.



- FPL will try to accommodate the Town's needs where possible. A 3-pole mile project can be constructed in phases. Maximum of 1 year between phases.
- FPL's biggest concern is the north/south roads because that is where their feeder trunk is. The most economical is to minimize transition poles on the north/south routes.
- To begin their design, FPL will need a deposit of \$1.20 per LF of overhead removal for each individual project.
- It is critical for FPL to receive existing underground utility drawings and topographic information of property lines, driveways etc. prior to their design. Duration of design is a 10 to 16 week time frame. Some effort will be made to reduce that duration.
- Upon completion of design, FPL will provide the Town with a binding cost estimate, valid for 180 days. To initiate construction, the Town must pay the remaining portions of the Cost in Aid of Construction (CIAC). The \$1.20/LF design fee will be credited to the project.
- Upon activation/energization of the underground utilities, the Town will have 180 days to transfer all aerial services to the underground feeders or else the Town forfeits the 25% credit.
- FPL lay out is based on transformers and switch cabinets. The new transformers will be front lot; currently rear lot; they do not like to straddle properties. FPL suggests the Vista switch cabinet as it is smaller (waist high) even though more expensive.
- The tariff will allow the Town to install the FPL facilities or for the Town to contract with FPL to install the facilities. FPL does not install Comcast or AT&T conduit or facilities.
- FPL is in the process of generating a transformer map for the Town to assist in conceptual planning.
- FPL suggests the Town locate equipment and switch cabinets on Town owned property to the extent possible.
- All easements must be acquired prior to construction. FPL believes that easement acquisition will be the most time consuming part of the process.
- The Town will more than likely install the conduits, pull boxes and slabs for the project and will incorporate their decorative street lighting to replace existing overhead light poles or the existing FPL poles.
- FPL prefers to own the services up to the meter location.



- FPL prefers a 20' x 20 easement for capacitor banks; 10' x 10' easements for switch cabinets or transformers.
- FPL has agreed to review and comment on our model project schedule; comments have been received (Thank you).

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees

SIGN IN SHEET

(Please print)

Townwide Utility Undergrounding FPL Meeting

December 16, 2014 - 1:00 PM

Name	Company	Telephone #/Email Address
RANDY WERTEFNY	KESHAVARZ & ASSOC.	561-689-8600 randy@keshavarz.com
Allen T. Green III	"	" agreeniii@keshavarz.com
PAUL BRAZZI	Town of Palm Beach	838-5440 pbrazzi@townofpalmbeach.com
Chuck Langley	"	" clangley@townofpalmbeach.com
BILL FRANCIS	TOWN OF PALM BEACH	561-838-5440 wfrancis@townofpalmbeach.com
Robert Weese	FPL	561-640-2209 robert.weese@fpl.com
JOHN LEHN	FPL	561-845-4624 JOHN.LEHN@FPL.COM
Mirta Signo-Dieg	FPL	561-373-2092



KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held at Florida Department of Transportation (FDOT) on Thursday, December 18th, 2014 at 9:30am to discuss utility undergrounding for the entire island. The following were in attendance:

Brett Drouin	FDOT
Chuck Langley, P.E.	Town of Palm Beach
Allen T. Green III, P.E.	Keshavarz & Associates, Inc.
Joan Sopczak	Keshavarz & Associates, Inc.

The following was discussed:

- The Town is in the process of developing a preliminary sequencing plan to present to the Town Council; the Town has hired Keshavarz & Associates (K&A) to assist with this effort.
- Additional meetings will be held with AT&T, Comcast, City of West Palm Beach and Florida Public Utilities for additional information to consider in determination of the preliminary sequencing plan.
- The Town would like to divide the undergrounding into several projects.
- The Town will more than likely install the conduits, pull boxes and slabs for the project and will incorporate their decorative street lighting to replace existing overhead light poles or the existing FPL poles.
- FDOT has no issue with undergrounding work in FDOT R/W as long as restoration is completed.
- FDOT will allow switch cabinets and other above ground equipment in their R/W as long as it meets clear zone criteria.
- FDOT will allow underground structures within the R/W; however any structure larger than 80 CF will be subject to additional regulations.
- If directional boring affects FDOT roadway, mill and overlay must be completed per FDOT Standards (millings belong to the State).



- Existing street lighting that is attached to power poles will be replaced with Town approved decorative street lights.
- The Town would like to explore the possibilities and logistics of adhering to the Town's construction season to the extent possible.
- Brett will forward FDOT's 5 year plan for work in the Town of Palm Beach to K&A.
- K&A will contact Tim Brock of FDOT for their 10 year plan for work in the Town of Palm Beach.
- No R/W agreement is needed for FDOT; however Utility Permits must be obtained by the utility providers prior to starting any work.

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees
Mr. Tom Bradford
Mr. Paul Brazil, P.E.
Mr. William Francis, P.E.
Mr. Chuck Langley, P.E.

P:\11-982 ToPB Underground GEN\Doc's\Meeting Minutes\Meeting Minutes_FDOT_20141218.doc
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KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held at the Town of Palm Beach Public Works with AT&T and Comcast on Monday, December 22nd, 2014 at 3:00pm to discuss utility undergrounding for the entire island. The following were in attendance:

Bill Francis	Town of Palm Beach
Chuck Langley	Town of Palm Beach
Thomas Bradford	Town of Palm Beach
Robert Lowen	AT&T
Darrell Davis	AT&T
Vic Beninate	AT&T
Jeannine McEnroe	Comcast
Derek Cooper	Comcast
Randy Wertepny	Keshavarz & Associates, Inc.
Allen T. Green III	Keshavarz & Associates, Inc.
Joan P. Sopczak	Keshavarz & Associates, Inc.

The following was discussed:

- The Town is in the process of developing a preliminary sequencing plan to present to the Town Council; the Town has hired Keshavarz & Associates (K&A) to assist with this effort.
- The Town would like to divide the undergrounding into several projects. K&A has selected a “model project area” as the basis of discussion on creating a model schedule and construction process for the purposes of estimating project durations and sequencing for the overall project. The model area includes single family, multi-family residential and some commercial properties. A copy of this “model project area” together with the associated schedule was provided to the attendees.
- Additional meetings will be held with City of West Palm Beach, Florida Department of Transportation and Florida Public Utilities to acquire additional information to consider in determination of the sequencing plan.
- Based upon language from the FPL tariff and discount offered, the K&A has preliminarily identified 10 areas that could be individual undergrounding projects with a minimum length of 3-pole miles.



- FPL allows flexibility on the 3-pole mile minimum criteria, as established in the tariff for a 25% incentive applied towards FPL undergrounding costs if the project is phased.
- The Town would like to explore the possibilities and logistics of adhering to the Town's construction season to the extent possible.
- The Town construction season is from May to November. Any deviation of the construction season will require approval from the Town Council.
- The Town will more than likely install the conduits, pull boxes for the project and will incorporate their decorative street lighting to replace existing overhead light poles or the existing FPL poles.
- The Town will incorporate other improvements (drainage etc.), where possible, with the undergrounding projects.
- Both AT&T and Comcast would prefer starting at the north end of the island and construct in progression to the south end and/or from the south to the north as this would be the most cost effective and efficient which will minimize service interruptions and would be less impact to residents.
- Comcast has two feeds into the Town; one on the northern end and one from Lantana.
- AT&T and Comcast strongly recommend to relocate any existing utility services is in the rear as it is beneficial to move the service to the front. There would be less disruption to the residents if all utility services are in the front.
- AT&T and Comcast are concerned with powering their services; may require overlap into next phase of project area due to powering.
- AT&T & Comcast recommend the Town upgrade the facilities during this process.
- Other providers share use of AT&T facilities, therefore AT&T will need to keep analog facilities in additional to digital/fiber facilities if the Town upgrades the service.
- Comcast will provide estimate of cost increase to upgrade system for the Town to consider.
- AT&T and Comcast were asked to identify their node boundaries for determining optimal project boundaries.
- AT&T and Comcast will require 5' x 5' easements and can share conduit trench and easements; separate hand holes away from roadway would be required. AT&T has pedestals that serve 8 to 12 houses. **Added note:** *If there is unpaved right-of-way and a pedestal or hand hole is needed and there is room to sufficiently set back the pedestal or hand hole from the edge of pavement and remain within the right-of-way, an easement may not be needed at such a location.*



- AT&T and Comcast ground their services off of FPL; AT&T suggests all utilities feed to house on the same side of resident's property.
- AT&T cut over work, preparation and/or clean up could be done off season.
- Tom Bradford stated that it may be best if resident is present for cut over to confirm service quality.
- The Town may want to consider AT&T small cell antennas in the decorative street light to enhance cell reception within the Town; Victor Beninate with AT&T will facilitate this option with Tom Bradford.
- AT&T may take up to 18 months (worst case) for service switch over s they are contractually required to notify certain customers 18 months in advance prior to service conversion.
- AT&T owns some of the utility poles on the island and are recommending for the Town to contract with FPL for the removal of all utility poles, inclusive of AT&T poles, to avoid confusion and limit the pole removal to one entity.
- AT&T currently has 80% of main lines underground in the Town; Comcast main lines are currently 50% underground.
- Time estimate of design for both AT&T and Comcast is 60 to 90 days.
- AT&T and Comcast to review and comment on our model project schedule.
- K&A will prepare a draft "Schedule & Sequencing Plan" and will meet with the stakeholders to discuss prior to finalizing before submitting for the Town Council.

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees

SIGN IN SHEET

(Please print)

Townwide Utility Undergrounding

December 22, 2014 - 3:00 PM

Name	Company	Telephone #/Email Address
Bill Francis	Town of Palm Beach	(561) 838-5440 wfrancis@townofpalmbeach.com
Chuck Langley	Town of Palm Beach	(561) 838-5440 clangley@townofpalmbeach.com
Robert Lowen	ATT	(561) 357-6615 rl4510@att.com
Darrell Davis	ATT	(561) 357-6450 dd8715@att.com
Vic Beninate	ATT	(954) 801-4623 vb2674@att.com
Thomas G. Bradford	Town of Palm Beach	(561) 838-5410 tbradford@townofpalmbeach.com
Jeannine McEnroe	Comcast	(561) 436-9033 jeannine_mcenroe@cable.comcast.com
Derek Cooper	Comcast	(561) 436-9033 derek_cooper@cable.comast.com
Randy Wertepny	Keshavarz & Associates	(561) 689-8600 randy@keshavarz.com
Allen T. Green III	Keshavarz & Associates	(561) 689-8600 atgreen3@keshavarz.com
Joan Sopczak	Keshavarz & Associates	(561) 689-8600 joan@keshavarz.com



KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held with the Town of Palm Beach Public Works Department on December 23, 2014 at 3:30pm regarding the Town-wide Utility Undergrounding project. The following were in attendance:

Paul Brazil, P.E.	Town of Palm Beach
Bill Thomas, P.E.	Town of Palm Beach
Chuck Langley, P.E.	Town of Palm Beach
Randy Wertepny, P.E.	Keshavarz & Associates, Inc.
Allen T. Green III, P.E.	Keshavarz & Associates, Inc.

The follow items were discussed at this meeting:

- Town is concerned that this project will involve work on private property in the Town and the magnitude of the costs to restore the private properties is non-quantifiable.
- They recognize that construction will have to occur year round and are recommending that only low impact work occur during the offseason.
- Work within the offseason shall be light duty only (pick-up truck).
- The Town requested that we request letters from FPL, Comcast and AT&T that state each of the utility provider's preferences for undergrounding.
- Town is urging that we construct 2 projects at a time, one from the north end working south and the other from the south end working north for several reasons, including potential political issues.
- Town would like the most realistic schedule to present to the Town Council, no matter the actual duration. One construction season should be used to determine the project magnitude (number of pole miles) and to determine the number of crews required by the utility providers to keep up with the schedule.
- Confirm with Comcast who can install the Comcast wiring and install their facilities.
- Do not include staggering of the service conversions on the schedule but include in the narrative.



- The Town feels that we should have one FPL approved contractor per each 2-3 regular undergrounding contractors.
- The Town would like FPL to determine transformer locations.
- The Town wishes us to determine milestones on our schedule for cash flow purposes; i.e. payment for FPL design due, FPL construction, etc.
- The Town wishes the overall schedule to depict the number of years for the project, start to finish and the number of years for heavy construction/disruption to be presented to the Town Council.

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees



KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held at the Town of Palm Beach Public Works with the City of West Palm Beach and Florida Public Utilities (FPU) on Monday, December 29th, 2014 at 1:00pm to discuss utility undergrounding for the entire island. Please see the attached “Sign In Sheet” for attendees.

The following was discussed:

- The Town is in the process of developing a preliminary sequencing plan to present to the Town Council; the Town has hired Keshavarz & Associates (K&A) to assist with this effort.
- Minimization of disruption to the Town residents is a priority during the undergrounding process.
- The intent of the meetings with the stakeholders is to acquire additional information to consider in determination of the sequencing plan.
- The Town construction season is from May *through* November. The Town would like to explore the possibilities and logistics of adhering to the Town’s construction season to the extent possible. Any deviation of the construction season will require approval from the Town Council.
- The Town will incorporate other improvements (drainage, sanitary sewer etc.), where possible, with the undergrounding projects.
- FPU began the 10-year federal program “Bare Steel Replacement Project” and has completed a large area of pipe replacement at the north end of the island. FPU has approximately 7.5 years remaining under this federal program.
- FPU is willing to work together to avoid any conflicts where possible and is willing to have their engineers, Magnolia River, meet with the Town and Keshavarz & Associates to go over their plans.
- FPU and the Town can potentially share in restoration costs when possible.
- FPU completed a risk analysis prior to start of pipe replacement.
- FPU is willing to mark up Keshavarz plans with their existing utilities.
- Magnolia River will be mapping FPU utilities and providing as-builts at the end of the project.



- The City of West Palm Beach is willing to work with the Town on civil improvements. Necessary water main replacements can be performed in an opportunistic manner following the undergrounding sequence.
- The City has completed an assessment on age of pipe and maintenance records for prioritizing pipe replacement.
- After preparation of the draft Sequencing Plan, K&A will hold additional meetings with stakeholders to discuss.
- The Town requires removal of any abandoned pipe encountered during construction.
- All entities can work together for the benefit of all, including Town residents.

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees

SIGN IN SHEET

(Please print)

Townwide Utility Undergrounding

December 29, 2014 - 3:30 PM

Name	Company	Telephone #/Email Address
Suzanne Halverson	City of West Palm Beach	(561) 494-1075 shalverson@wpb.org
Jackson Loebig	City of West Palm Beach	(561) 951-7656 jloebig@wpb.org
Thomas G. Bradford	Town of Palm Beach	
Allen T. Green III	Keshavarz & Associates	(561) 689-8600 agreeniii@keshavarz.com
Dale Butcher	Florida Public Utilities Co. (F.P.U.C.)	(561) 602-3702 dbutcher@fpuc.com
Maziar Keshavarz	Keshavarz & Associates	(561) 689-8600 maziar@keshavarz.com
Randy Wertepny	Keshavarz & Associates	(561) 689-8600 randy@keshavarz.com
Doug Moreland	Florida Public Utilities Co. (F.P.U.C.)	dmoreland@fpuc.com
Danielle Manuel	Florida Public Utilities Co. (F.P.U.C.)	dmanuel@fpuc.com
Matt Ryan	Florida Public Utilities Co. (F.P.U.C.)	mryan@fpuc.com
Paul Brazil, P.E.	Town of Palm Beach	(561) 838-5440 pbrazil@townofpalmbeach.com
Chuck Langley, P.E.	Town of Palm Beach	(561) 838-5440 clangley@townofpalmbeach.com
Joan Sopczak	Keshavarz & Associates	(561) 689-8600 joan@keshavarz.com



KESHAVARZ & ASSOCIATES
Civil Engineers – Land Surveyors

Revised Meeting Minutes
for
Town-Wide Utility Undergrounding
K&A Project No. 11-982

A meeting was held at the Town of Palm Beach Public Works with all stakeholders on Wednesday, March 25th, 2015 at 2:00pm to share thoughts, concerns and suggestions regarding the Draft Phasing and Sequencing Report (DPSR) for town-wide undergrounding. Please see the attached “Sign In Sheet” for attendees.

The following was discussed:

Keshavarz & Associates (K&A)

- For the undergrounding effort it was determined that the Town needed to be divided into zones/phases and the goal is to disrupt as little life/routine on the island as possible.
- The Town wishes to take full advantage of a 25% savings through the conditions outlined in the FPL tariff.
- K&A selected up to 16 phases within the Town and a series of 7 undergrounding sequencing options with total durations of 10, 12 and 18 years; the 10 year option proposes two projects to be constructed simultaneously and for the individual project sizes to be approximately 2 pole miles; each of the other options propose only one project to be constructed at a time with individual project sizes of approximately 2 or 3 pole miles or more.
- The most aggressive option proposes 16 phases at 2 pole miles or more with 2 phases constructed simultaneously within a total duration of 10 years; starting from either end of the Town working inward; sharing restoration costs with Florida Public Utilities.
- Next less aggressive option proposes 12 years, 10 phases of at least 3 pole miles per year with 1 individual phase constructed at a time; working from one end to the other.
- The least aggressive option is 16 zones of 2 pole miles per year with 1 individual phase constructed at a time for a total duration of 18 years.
- Comments were received from the Town of Palm Beach, the City of West Palm Beach and FPL, after their review of the DPSR.
- The final report will be issued in 3 weeks. The purpose is to present it to the Town Council in May.

- The Town has not decided whether it will begin undergrounding from the north or south end; they may choose to begin at both ends concurrently.
- K&A will send the City of WPB a list of the streets already undergrounded within the Town.
- K&A requested the deadline for incoming comments on DPSR to be Friday afternoon, March 27, 2015.

Town of Palm Beach (ToPB)

- The Town stated that engineering needs take precedence in all decisions.
- The Town concedes that some work will have to happen in the winter season but will not permit heavy construction during this season. Utility service conversions are not considered heavy construction.
- If the Town uses their own contractor for dry utility conduit installation and/or cable pulling & equipment installation, no permit from the utility provider will be required; however an inspection will be required.
- The majority of the undergrounding infrastructure will be built within the limits of the road rights-of-way.
- One of the Town's main concerns is the work on private property to serve each individual residence and associated hardscape and landscaping.
- The Town will have a separate effort/team to secure the easements which must happen prior to the start of construction for the first phase.
- The Town offered to design and administer construction of the proposed potable water infrastructure improvements on behalf of the City of West Palm Beach. Work associated with this would be invoiced to the City. City to finalize a list of projects shortly.
- ToPB has no streetlighting plan; they have no current plan to switch to LED lighting. IF the Town has to install all new streetlights on a street they may utilize LED. If existing streetlights are on FPL poles the Town will install decorative streetlight poles to replace the existing lighting. The streetlight program is currently on hold pending the undergrounding effort.
- Nightingale and Lake Towers undergrounding projects will continue; El Bravo is pending, awaiting a decision from the residents.
- The Town will have a Citizen Task Force making recommendations on policy and project related issues. All requests for Task Force must be submitted by residents by April 3, 2015 at 5:00pm.

Florida Power & Light (FPL)

- FPL will design to sustain the service to the Town; their main concern is limitation of the construction season.

- FPL's concern is switching large circuits in the summer. Summer is FPL's greatest load and FPL feels it is best to switch circuits in December – January. At each subaqueous crossing to the mainland they would need a day to make the splice. They would prefer construction in the summer and transition in the winter.
 - The Town is concerned if and how this will impact the individual project schedules which now include 2 seasons of heavy construction and do not want to add a third season.
- Approximately 80% of homes have service currently in the rear. FPL can provide cable and conduit to reconnect service from the front lot ground transformer to the meter can; the cost would be included in FPL's cost estimate to the Town.
- FPL will remove as much as possible out of the rear lots; their intent is to pull both AT&T and FPL poles and as many rear hand holes that they can find; however due to the lush landscaping some hand holes may not be found.
- FPL stated less than 3 pole mile phases are acceptable under the Tariff as long as there is no more than one year between each phase.
- The majority of FPL services can be directional bored.
- If the report goes to the Town Council in May is there another vote by residents following and if so, when?
Town: The Town's vote by the residents may not be required. It will depend on the funding mechanism, which is not yet determined.
- FPL will design a system that emulates the existing overhead system.
- FPL will allow 2 pads on top of each other to elevate equipment over low level roadways or (as in Sanford Avenue) maximum 24" pad.

AT&T

- AT&T will let FPL take the lead.
- Most utilities are on the same side of the home with some exceptions.
- AT&T suggests getting a copy of the Utility Agreements utilized during the Jupiter Inlet Colony effort as a template and letting the utilities design the street by engineering/utility needs.
- AT&T would like to see the utility agreement previously made with the Town *by Robert Scheffel Wright* so as to understand their obligation and not have to redraft an agreement entirely.
- AT&T will install modern equipment with the potential of newer systems that could be installed in the future.

Comcast

- Comcast prefers off season for service cutover after infrastructure is in place. Comcast has moratoriums during the season (holidays & Superbowl).
- Comcast is concerned with the process of securing accessible easements; a place where the technicians can get to easily.
- Comcast will be upgrading to fiber optic during undergrounding.

Florida Public Utilities (FPU)

- FPU questioned if FPL will direct bury or use directional bore.
 - FPL/Town: Both, the Town will decide during the design process.
- FPU already has completed some infrastructure; by 2017 will be completed up to the north bridge.
- FPU agrees to cost share in the restoration work where possible.
- FPU would prefer TOPB to begin undergrounding work from south to north to avoid conflicts with their construction.
- FPU is concerned with the aggressive schedule as the **PSC** mandates FPU have all pipe replaced within 10 years for pre 1970 pipe (are currently 4 years into the program). FPU must meet the PFC deadline or will be fined.

City of West Palm Beach (WPB)

- WPB would prefer to install their new water mains first as it would not be as crowded in the corridor; there would be more space to relocate it.
- Amount of funding is limited for water main replacement; WPB has not yet identified the priorities for replacement.
- WPB would like to know which streets have already had the undergrounding completed as they are in the process of prioritizing which water mains need to be replaced. WPB would like a list of the undergrounding completed streets.
- WPB would like to concentrate on the streets that are within the undergrounding effort.
- WPB would like to see where the water main replacement fits into the schedule on the final report.
- The City may amend their Interlocal Agreement with the Town.

Should your recollection and understanding of the items discussed during this meeting differ from the notes contained herein, please contact us immediately.

CC: All Attendees

Town-Wide Utility Undergrounding Draft Phasing & Sequencing Report

March 25, 2015 - 2:00 PM

Name	Company	Telephone #/Email Address
Suzanne Halverson	City of West Palm Beach	(561) 494-1075, shalverson@wpb.org
Jackson Loebig	City of West Palm Beach	(561) 494-1067, jloebig@wpb.org
Robert Lowen	AT&T	(561) 357-6615, rl4510@att.com
Maziar Keshavarz	Keshavarz & Associates, Inc.	(561) 689-8600
Allen T. Green III	Keshavarz & Associates, Inc.	(561) 689-8600
Randy Wertepny	Keshavarz & Associates, Inc.	(561) 689-8600
Jeannine McEnroe	Comcast	(561) 436-9033, jeannine_McEnroe@cable.comcast.com
Paul Brazil	Town of Palm Beach	pbrazil@townofpalmbeach.com
Jay Boodheshwar	Town of Palm Beach	jboodheshwar@townofpalmbeach.com
Chuck Langley	Town of Palm Beach	clangley@townofpalmbeach.com
Matt Ryan	Florida Public Utilities	(561) 602-3702, mryan@fpuc.com
Dale Butcher	Florida Public Utilities	(561) 602-3702, dbutcher@fpuc.com
Garth Bedward	AT&T	(561) 357-6593, gb7410@att.com

TOWN OF PALM BEACH

Information for Town Council Meeting on: October 14, 2014

To: Mayor and Town Council

Via: Peter B. Elwell, Town Manager

From: Thomas G. Bradford, Deputy Town Manager

Re: FPL Hardening Plans and Neighborhood Underground (UG) Plans Relative to FPL Hardening Plans

Date: October 9, 2014

STAFF RECOMMENDATION

Staff recommends the Town Council hear the presentations on this subject matter and provide staff with direction on how to proceed. Policy questions to be considered are:

- 1) Shall FPL be allowed to improve system reliability on the island via their hardening plans?
- 2) Shall the Town pursue undergrounding in lieu of hardening? If so, shall undergrounding be done only in those areas impacted by FPL hardening plans or according to some other plan?

GENERAL INFORMATION

FPL Hardening Plans

FPL officials will be present to provide you with an overview of their hardening plans for the Palm Beach service area. Please see the attached exhibit marked as Attachment A to see the locations of FPL proposed hardening projects. Originally, hardening was a function of FPL's Storm Secure plan that was developed in response to the outages their electrical system incurred from the wrath of hurricanes experienced in the last decade. Hardening entails system upgrades to enable the electrical distribution system to withstand the effects of winds up to 150 miles per hour. Although hardening entails more than just different utility poles, what the average consumer sees is a taller, more substantial concrete pole.

Hardening originally applied to feeder lines as they are considered to be the backbone of the distribution system. Subsequently, the Florida Public Service Commission allowed FPL to expand the use of hardening to circuits that are in need of reliability upgrades. Most FPL proposed hardening in Town applies to feeder lines, but some hardening is being done to improve system reliability. It is important to note that when FPL hardens a feeder line in Town that feeder line is hardened on the mainland as well all the way back to the substation. This

means that whether the Town chooses to let FPL go forward with hardening in Palm Beach or to address increased reliability and infrastructure survivability via undergrounding, once completed Town residents will have the most secure electric service possible.

Many residents have expressed concern about the appearance of so called hardened facilities saying they look more commercial and detract from a residential neighborhood. One can gauge a general idea of what hardened utility poles will look like in comparison to what is most common in Town today. See the three pictures that appear below. The photo on the left is the most common sight in Town today being a wooden utility pole and the pictures on the right are akin to what will be installed for hardening standards using concrete poles.



Existing Pole Hardened Pole Hardened Pole

We should be appreciative of the fact that FPL is taking steps to make their electrical system serving Palm Beach more storm secure and reliable. FPL is under a tight timeline to get this work completed per the requirements of the Florida Public Service Commission (PSC). However, it is up to the Mayor and Town Council to decide whether or not hardening is the preferred method of improving reliability. Undergrounding can accomplish the same results, but comes with a cost which we will review below. Once a decision is made it should be considered to be final and irrevocable so that FPL can report to the PSC that reliability was improved one way or the other.

Proposed Neighborhood Underground Projects

Attachment A also shows where existing neighborhood underground conversion projects are located relative to FPL proposed hardening projects. Virtually every neighborhood project is impacted by FPL hardening plans. The impact has to do with the formula used to calculate FPL's charges for converting to UG. Today, the neighborhood projects mostly entail conversion of depreciated FPL assets, in some cases fully depreciated assets, to UG. If FPL hardening plans go forward and neighborhood UG projects follow, the existing assets will be replaced with new overhead facilities that will have no depreciation attached thereto and result in the cost of undergrounding being higher than it would have been if the other facilities were left in place until underground conversion commenced.

Accordingly, if hardening is not the preferred way to improve reliability the question that must be answered is how much undergrounding shall the Town attempt to do? At a minimum, if the Town says no to hardening then we must pursue undergrounding every line proposed to be hardened. However, it is not really feasible to underground only those lines proposed to be

hardened. For starters, one has to ask who would pay the cost if only the hardened lines were to be buried. It does not seem fair for only those property owners adjacent to the lines scheduled for hardening to bear the cost of undergrounding those lines. Many lines proposed to be hardened are along arterial roadways in Town. It makes little sense to only bury those facilities along the arterial roadway when they are usually connected to distribution facilities running both east and west. It would make more sense to include the areas adjacent to the arterial roadways where hardening is proposed and the areas east and west from that point because they are all part of the same integral distribution system.

How much will pursuit of various options likely cost? This and other questions have at least been answered in part by the information Town staff requested of FPL this past spring when it became known that FPL desired to pursue hardening in Town. In this regard, please see the exhibit marked as Attachment B, which is a letter to the Town dated June 27, 2014, from FPL’s Project Manager for Distribution Underground, John Lehr, wherein Mr. Lehr provides ballpark cost estimates for various scenarios as requested by staff. These scenarios cover undergrounding options that include the entire spectrum from the entire Town to just the lines proposed by FPL for hardening. The Project Segment table appearing in John Lehr’s letter is reproduced here:

Town of Palm Beach

Project Segment	Ballpark Estimate*	Non-Refundable Engineering Deposit
Entire Town	\$35,000,000	\$258,522
Wells Rd. North to the Inlet-Beach to Intracoastal	\$10,600,000	\$81,860
N. County (ROW) – Wells Rd. to Tangier Avenue	\$460,000	\$3,340
Well Rd. South to Royal Poinciana Way – Beach to Intracoastal	\$3,400,000	\$24,443
Royal Poinciana Way South to Barton Avenue - Beach to Intracoastal	\$1,400,000	\$11,724
Sloan’s Curve to Southern Town Limits - Beach to Intracoastal	\$4,300,000	\$31,044
Sloan’s Curve to Lake Avenue - Beach to Intracoastal	\$2,500,000	\$17,549
Lake Avenue to Southern Town Limits - Beach to Intracoastal	\$1,900,000	\$13,495
Northwood – 40332 -2015 (Green, Exhibit “B”)	\$2,800,000	\$19,895
Terminal – 40213 – 2014 (Pink, Exhibit “B”)	\$1,800,000	\$14,867
Evernia – 4011862 – 2015 (Yellow, Exhibit “B”)	\$739,000	\$6,524
Belvedere – 402533 – 2015 (Orange, Exhibit “B”)	\$1,030,000	\$6,740
Skypass Improvements – 2015 – (Blue, Exhibit “B”)	\$1,800,000	Not Provided by FPL, but estimated to be \$14,867

**Ballpark cost is for FPL facilities only. AT&T and Comcast facilities are extra, as are restoration costs and other project related expenses.*

The reference to the non-refundable deposit is the cost charged by FPL to provide a binding cost estimate. A binding cost estimate is based on an engineered design and, once provided, must be accepted within 180 days. If accepted, the cost of the work cannot be exceeded by 10%. In all neighborhood projects pursued to date, the lowest cost scenario is where the Town, via its selected contractor, does the work of installing the conduit, transformers and other facilities, including running the necessary wires. It is this scenario that should be requested when seeking a binding cost estimate.

Since this ballpark cost estimate data applies to FPL only we must add AT&T and Comcast costs and project management, engineering, legal, surveying, site restoration and milling and resurfacing costs to come up with a complete accurate cost estimate. Town staff recommends that any large scale undergrounding effort be pursued using the Construction Manager at Risk (CM@Risk) construction format. Underground conversion projects will also incorporate any Town or public utility infrastructure work for which there is funding that needs to be done for convenience while construction is underway. The CM@Risk contractor will oversee and coordinate all of this in conjunction with Town project managers and provide a guaranteed maximum price. This will provide the lowest possible milling and resurfacing price to residents as the cost of paving will be equitably shared by all Town and public utility entities engaged in working within any given project area. The end result will also provide for state of the art utilities and public infrastructure for many years into the future for the benefit of Palm Beach citizens.

The table below is an order of magnitude estimate based on costs incurred for similar work in South Florida adjusted for inflation. It assumes FPL ballpark numbers are accurate. Contingency must be added and has been at 20 %. Costs in the table are based on the assumption that any UG project pursued by the Town will use FPL Vista type feeder switches which are sealed against water intrusion and are smaller in size and more easily screened with landscaping. This type switch has been used in other large scale UG projects on barrier island communities in South Florida.

Townwide Underground Order of Magnitude Cost Estimate, All Utilities

Project Engineering	\$5,400,000
CM@Risk Project Management	\$3,415,000
Legal Costs	\$725,500
Survey Costs	\$1,232,000
Utility Conversion Costs (FPL)	\$35,000,000
FPL GAF Discount @ 25%	(\$7,947,169)
Utility Conversion Costs (AT&T & Comcast)	\$8,900,000
Conversion of FPL Service Connections	\$10,075,000
Site Landscape/ Hardscape Restoration Costs (Excluding Asphalt)	\$1,500,000
Asphalt Milling and Resurfacing Costs (1)	\$12,840,000
Sub-Total Project Costs	\$71,140,331
Contingency @ 20%	\$14,228,066
Total Project Costs	\$85,368,397

(1) \$17,120,000 if every road in Town is milled and resurfaced with the following exceptions. This figure does not include Ocean Blvd. as we are underground on much of it and are typically on one side of

the street with overhead. South of Sloan's Curve is excluded as there is plenty of grass area and no paving should be needed. Roadway and milling costs are based on adopted Town standards and will decrease where costs are shared with other Town or public utility underground or roadway improvements. Pricing assumes \$30 per square yard and assumes smaller segments will be paved. If larger segments are paved at a time pricing could drop below \$30 per square yard. Assumes the entire street would be milled and resurfaced which may not be true in all cases. Assumes 214,000 linear feet of streets with an assumed width of 24 feet of pavement, which also is not true in all cases. (214,000ft X 24ft X 1yd/9sq ft X \$30 = \$17,120,000). Additional analysis may reveal a lower cost. For now, assumes about 75% of paving cost will be borne by underground projects.

If large projects are pursued by the Town, the goal should be to convert 3 pole miles of lines per project. If that is done the Town receives a 25% GAF discount passed on to property owners. For example, using the 3 pole mile size as a minimum project area target and focusing from north to south, from the Palm Beach Inlet to the north side of Ocean Terrace would constitute one such area and from the south side of Ocean Terrace to List Road would constitute another and so on.

If special assessments are to be used for funding and the Town Council wishes to use the petition process similar to what is currently done for small scale UG projects, we need to segue to a more efficient mailed petition process. The land areas involved in the 3 pole mile target project size are too great to rely on neighborhood UG champions going door-to-door to secure affirmative petition signatures of 67% of the project area property owners. In this scenario, we recommend that the Town employ a mailed petition that must be mailed back to the Town by a time certain and only those mailed petitions received by the Town will be counted. 67% of those petitions received must affirmatively approve the proposed underground assessment project. It is envisioned that the Town would provide a cover letter of explanation, the petition and a return envelope. The petition ballot and envelopes will be marked with the property's property control number. Both the cover letter and petition can make reference to, and provide the link to, the Town's website where detailed project information will appear. LLC's would receive an affidavit to execute and return with the signed petition. A Canvassing Board would be established to count ballots.

Please see Attachment C to review the Town Clerk's memorandum to me on this subject offering her opinions on how this process should be set up along with a draft of the proposed cover letter and petition ballot.

Large UG projects will require financing. If we use the assessment process to pay for undergrounding we can use special assessment bonds. Pursuing large scale UG projects over a number of years interjects complexity to financing. The complexity stems from the cost, the timing of the projects, the size and number of project areas and the use of the assessment methodology. This is not insurmountable, it just requires good planning. The Town may need to use short term debt, such as bank loans or lines of credit to fund the initial projects. Once the projects are completed, the Town could refinance the bank debt with special assessment bonds payable with the proceeds from the assessments charged to the property owners that benefit from the project. One benefit of larger projects is the financing allows for longer repayment terms than the Town can provide with its internal financing plan. Indeed, use of special assessment bonds can allow repayment over 30 years resulting in much lower annual assessments and spreading the cost over potentially several generations of property owners. The downside to

longer term bank and bond financing is that it comes with closing costs and requires arbitrage avoidance planning. Interest rates remain relatively low, but will not stay that way forever.

Current rates available for bank loans and special assessment bonds are shown in the following table:

Scenario	Term	Debt Type	Base Interest Rate ¹	Costs of Issuance ²	All-In Interest Rate
1	10 - Year	Bank Loan	3.25%	0.25%	3.50%
2	15 - Year	Bank Loan	3.95%	0.25%	4.20%
3	20 - Year	Bank Loan	4.45%	0.25%	4.70%
4	10 - Year	Bonds	3.10%	0.35%	3.45%
5	15 - Year	Bonds	3.80%	0.35%	4.15%
6	20 - Year	Bonds	4.30%	0.35%	4.65%
7	25 - Year	Bonds	4.50%	0.35%	4.85%
8	30 - Year	Bonds	4.70%	0.35%	5.05%

1. Estimated rate (net of cost of issuance)
2. Cost of issuance shown as a %, based on a \$10 million financing

Staff is prepared to work with our Financial Advisors at PFM to prepare a financing plan for these projects once the Town Council decides on the scope to be accomplished.

If the order of magnitude estimate of \$85,368,397 were to hold true and the Town Council wished to pursue general obligation bonds (GO) in lieu of the special assessment bonds referenced above, which would require a townwide referendum, to give you some idea of the cost to a property owner in Town in the GO scenario it is estimated to cost \$371 per \$1 million of taxable value. See the table below. The all in rate used was 3.69%, which included closing costs and assumes a 30 year term.

General Obligation Bond Scenario

	Current Millage	Millage Impact
Cost of Program		85,368,397
Property Tax Revenue Needed		4,729,165
Millage Rate	3.4058	0.3709
Taxable Value	13,421,075,355	13,421,075,355
Taxes Generated		4,729,165
Taxes Per \$1 million		371
Percentage Increase		10.9%

The down side to using GO is that it changes the cost allocation to one's property value instead of being based upon the direct benefits each property receives from the improvement as is the case when using the Town Council adopted UG assessment methodology.

Streetlights

We should take this opportunity to let you know that the subject of streetlights will come into play sooner or later. Some property owners will likely wish to add decorative streetlights while a UG project is underway. Project designers must know this as soon as possible. These costs will be extra as the Town's current policy in the Code of Ordinances is that the majority of property owners must approve of the same by petition to dovetail UG petition requirements. We were in the process of changing that to 67% of the property owners approving decorative streetlights by petition. An ordinance effectuating this change was deferred from a previous Town Council meeting and will appear for first reading on October 14.

Streetlights can be handled separately from the underground petition process. We can notify people within any approved project area early on in the process that, if they wish to have decorative streetlights installed, the Town requires a majority or 67% of the owners to affirmatively sign a Town prepared petition and that we must receive same by a time certain or it will not be done in conjunction with the current UG project. Alternatively, to keep things simple and move along with UG projects as fast as possible, the Town Council could place a moratorium on any new streetlight requests until all UG projects authorized are completed.

We have two pending streetlight projects funded with 2013 ACIP bond funds that are being held in abeyance pending Town Council direction relative to the FPL Hardening plans and any undergrounding decisions that you may make. Paul Brazil has two agenda items following this hardening/UG presentation that he wishes for the Town Council to consider. The first pertains to continued replacement of existing decorative streetlights that require full replacement due to age and condition. The second streetlight project is for placement of decorative streetlights from Sloan's Curve to Lake Worth Road which is also funded by the 2013 ACIP bond proceeds.

Conclusion

To summarize,

- 1) Increased reliability is highly desirable, but hardening provides desired reliability with an aesthetic impact in the opinion of many.
- 2) Hardening negatively impacts proposed neighborhood UG projects already on the books by making the cost to underground go up.
- 3) Undergrounding is a preferred alternative to hardening for increased reliability for many, but it is expensive.
- 4) Shall FPL be allowed to improve system reliability on the island via their hardening plans?
- 5) Shall the Town pursue undergrounding in lieu of hardening?

- 6) If the Town shall pursue undergrounding in lieu of hardening, shall undergrounding be done only in those areas impacted by FPL hardening plans or according to some other plan?
- 7) Shall the Town use the CM@Risk construction process to make the general contractor our design and construction partner in the process, with competitive price selection of subcontractors and a guaranteed maximum price?
- 8) Establishing UG project areas of 3 pole miles provides the 25% FPL GAF discount and the lowest possible price to residents. Shall this be a parameter for Town staff to pursue?
- 9) How shall the cost of UG be financed? General obligation bonds, bank loans or special assessment bonds?
- 10) If UG projects are to be paid by assessments shall 67% of the property owners within proposed project areas affirmatively approve the proposal as is done with neighborhood UG projects? The Town's process is not required by state law.
- 11) If a petition process is to be used, shall we shift to the mailed petition process to allow for it to be more efficient and require 67% of the respondents to affirmatively approve?
- 12) How shall the Town deal with streetlighting requests?

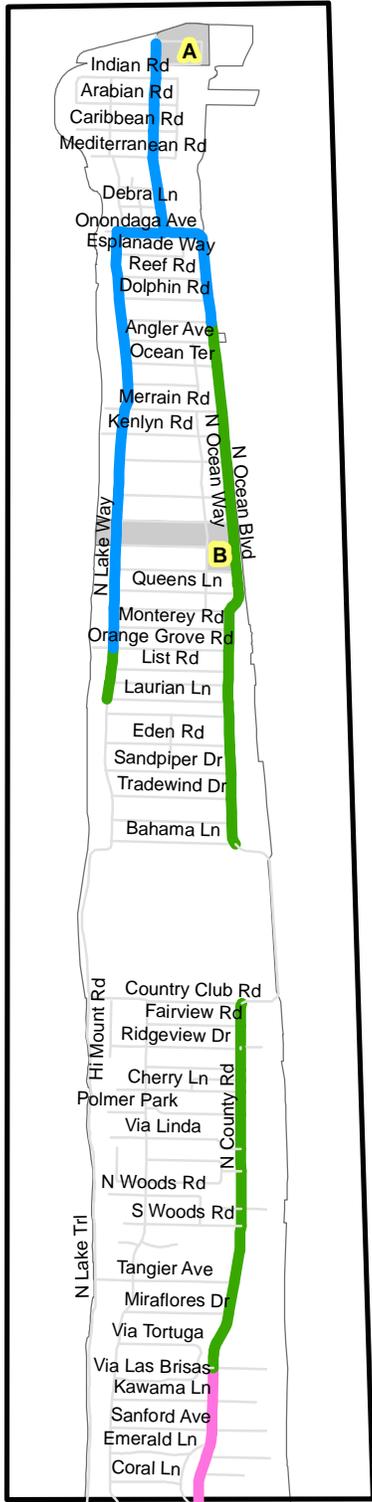
No final decisions need be made relative to hardening and undergrounding on October 14. You can consider this to be the first step in a thoughtful decision process. Staff stands ready to assist you in this decision making process in every way possible.

Numerous people helped me prepare different aspects of this report or provided information helpful to the process and I wish to acknowledge their help and publicly thank them for their time and efforts, as follows.

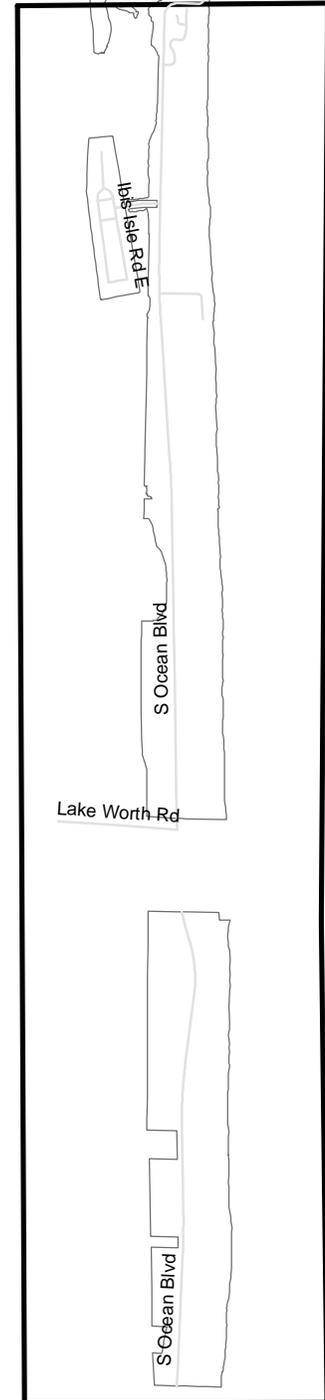
- H. Paul Brazil, Director of Public Works
- Jane Struder, Director of Finance
- Chuck Langley, Senior Projects Engineer
- Cory Cordero, GIS Specialist
- Susan Owens, Town Clerk
- Danny Brannon, P.E., Brannon and Gillespie
- Maziar Keshavarz, P.E., Keshavarz and Associates
- John Lehr, Project Manager for Distribution Underground, FPL

cc: H. Paul Brazil, Director of Public Works
Jane Struder, Director of Finance
William Francis, Town Engineer
Chuck Langley, Senior Projects Engineer
Susan Owens, Town Clerk
John C. Randolph, Town Attorney
Ethel Isaacs Williams, Regional Manager, External Affairs, FPL
John Lehr, Project Manager for Distribution Underground, FPL
Danny Brannon, P.E., Brannon and Gillespie
Maziar Keshavarz, P.E., Keshavarz and Associates

1



ATTACHMENT A



2

Town of Palm Beach



Legend

FPL HARDENING PROJECTS

- █ 2015 Skypass Improvements
- █ 2015 Northwood 332
- █ 2014 Terminal 2131
- █ 2015 Evernia 11862
- █ 2015 Belvedere 2533

UNDERGROUND PROJECTS

- A - East Inlet Drive
- B - Nightingale Trail / La Puerta Way
- C - Lake Towers
- D - Bradley Place
- E - Root Trail
- F - El Bravo Way

STAFF RECOMENDATION FOR UNDERGROUND

- 1 - North Inlet to Wells Rd
- 2 - Sloan's Curve to South Town Limits

Prepared for: October 1, 2014
 Tom Bradford, Deputy Town Manager
 Town of Palm Beach
 Office: 561.227.5410
 Email: tbradford@townofpalmbeach.com



TOWN OF PALM BEACH

JUN 27 2014

Town Manager's Office

June 27, 2014

Mr. Thomas G. Bradford
Deputy Town Manager
Town of Palm Beach
360 South County Road
P.O. Box 2029
Palm Beach, FL 33480

**Re: Town of Palm Beach
Electric Facilities Conversion – Ballpark Estimate
Ballpark Cost Estimate – Various Locations throughout the Town
WR # 5580839**

Dear Mr. Bradford:

FPL welcomes the opportunity to assist you in examining the feasibility of converting from overhead electric distribution facilities to an underground system at the following location:

Various Locations throughout the Town in Palm Beach, Florida.

As per your request, the non-binding "ballpark" estimate to complete this conversion for the entire Town is \$35,000,000 (See Exhibit "A" & "B" for a Project/Cost breakdown). This estimate is provided strictly to assist you in preliminary decision making and it does not include the conversion of the existing streetlight system. It is not an offer from FPL to perform the requested conversion and should not be construed or used as such for detailed planning purposes. This represents an "order of magnitude" figure based on previous FPL experience and reflects the CIAC payment that the Town would ultimately need to make to FPL if the conversion were performed at this point in time. It is our experience that conversions in developed areas are the most complex and challenging types of construction. As such, this estimate likely will not precisely represent the Town's ultimate actual cost to convert, but can assist the Town in preliminary decision-making.

FPL estimates include only estimated charges to be paid by the Town to FPL. The costs of the following items are not included with the estimate and are the responsibility of the Town / residents. These potential costs should be included in future planning of the project:

- Site restoration (sod, landscaping, pavement, sidewalks, etc.)
- Rearrangement of customer electric service entrances (requires electrician) from overhead to underground. Also, additional customer expense if local inspecting authorities require customer wiring to be brought to current codes.
- Trenching/backfilling for service laterals.
- Removal and undergrounding of other utilities (e.g. telecom, CATV, etc.)
- Acquiring, describing, securing and recording of easements for underground facilities. In underground systems, major components formerly attached to poles must now occupy "at grade" appurtenances, e.g., ground level pad mounted transformers and switch cabinets.

Facilities of an underground distribution system will not be placed in road right-of-way, with the exception of cables required for crossings. (See special note below)

Note: Obtaining easements is typically the most difficult aspect of the conversion process; the time required to secure the easements may even exceed the 180 day binding estimate timeframe. FPL strongly suggests that all easements required for the conversion be described and secured prior to requesting the detailed cost estimate. Further, in some instances, the underground distribution system may be placed within the road right-of-way with the proper agreement.

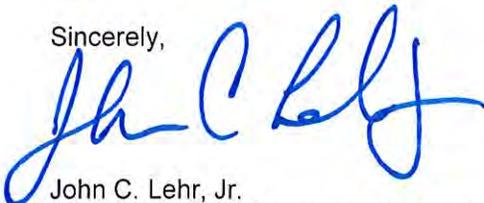
In 2007, the Public Service Commission approved FPL's 25% Governmental Adjustment Factor (G.A.F.) waiver for local government sponsored projects. In order to be eligible for the G.A.F. waiver a project must meet a series of criteria (see Attachment). Based on the preliminary information you provided for the proposed conversion area, this request, i.e. the entire Town, would qualify for the G.A.F. waiver.

After reviewing the "ballpark" estimate, if you decide to move forward with the conversion project, you may request a detailed and "binding" estimate. Due to the complexity and time required to estimate such a conversion, a non-refundable engineering deposit is required prior to beginning the estimating process, as set forth in the Florida Administrative Code 25-6.115. For this conversion project the amount of the required engineering deposit is \$258,522.00. If you decide to proceed with the work contained in the estimate, the amount of this deposit would be applied toward the estimated amount owed to FPL for the conversion. The work must commence within 180 days of the date the binding estimate is provided.

The request for the binding estimate must be in writing, and must describe in detail the facilities to be converted. Binding estimates are valid for 180 days, and would be subject to change in the event of a work scope change. Should actual FPL costs exceed the binding estimate amount, the customer may be responsible for those additional costs up to a maximum of 10% of the binding estimate amount. Payment of customer costs, easements (with opinion of title and recorded), agreements from other utilities/pole licensees, and execution of a Conversion Agreement would be required before commencement of construction.

If you have any questions or wish to consider a binding cost estimate, please call me at (561) 845-4624.

Sincerely,



John C. Lehr, Jr.
Project Manager, Dist. Underground
FPL

Attachments

cc: Mr. Peter Ewell – Town of Palm Beach
Mr. Bret Beck – FPL
Ms. Ethel Isaacs Williams – FPL
Mr. Erik Dillenkofer - FPL
Mr. John Lehr – FPL
Mr. Tom Allain – FPL



FPL

Exhibit "A"

Town of Palm Beach

Project Segment	Ballpark Estimate	Non-refundable Engineering Deposit
Entire Town	\$ 35,000,000	\$ 258,522
Wells Rd. North to the Inlet - Beach to Intra	\$ 10,600,000	\$ 81,860
N. County (ROW) - Wells Rd. to Tangier Ave.	\$ 460,000	\$ 3,340
Wells Rd. South to Royal Poinciana Way - Beach to Intra	\$ 3,400,000	\$ 24,443
Royal Poinciana Way South to Barton Ave. - Beach to Intra	\$ 1,400,000	\$ 11,724
Sloan's Curve to Southern Town limits - Beach to Intra	\$ 4,300,000	\$ 31,044
Sloan's Curve to Lake Ave. - Beach to Intra	\$ 2,500,000	\$ 17,549
Lake Ave. To Southern Town Limits - Beach to Intra	\$ 1,900,000	\$ 13,495
Northwood - 40332 - 2015 (Green, Exhibit "B")	\$ 2,800,000	\$ 19,895
Terminal - 40213 - 2014 (Pink, Exhibit "B")	\$ 1,800,000	\$ 14,867
Evernia - 4011862 - 2015 (Yellow, Exhibit "B")	\$ 739,000	\$ 6,524
Belvedere - 402533 - 2015 (Orange, Exhibit "B")	\$ 1,030,000	\$ 6,740



2015
Northwood
332

2014
Terminal
2131

2015,
Evernia
11862

2015
Belvedere
2533

480



TOWN OF PALM BEACH

Office of the Town Clerk

MEMORANDUM

To: Thomas G. Bradford, Deputy Town Manager
From: Susan A. Owens, MPA, MMC, Town Clerk *SAO*
Date: June 27, 2014
Re: Undergrounding Balloting Options

In furtherance of our conversation regarding procedures for conducting a Town-wide ballot on utilities undergrounding, I am proposing the following:

- Each ballot, mailing envelope, and return envelope shall contain the property identification number of the property. When the ballots are returned, the number on the ballot and the return envelope must match in order to be counted. This will help to ensure that only one ballot per parcel is counted.
- Each ballot will be embossed with the Town Seal to ensure the integrity of the ballot.
- The Town shall determine beforehand if postmarks will be allowed. As a point of reference, Florida Election Law generally does not accept postmarks for absentee ballots.
- For those properties that are owned by corporations, trusts, etc., the Town Attorney shall prepare an appropriate affidavit stating that the signatory is an authorized individual to vote on behalf of the property owner. Said affidavit must be included with the ballot, or the ballot will not be counted.
- The Town shall establish a three-person Canvassing Board to open and tabulate the ballots, determine voter intent, and review questionable ballots.

If you would like to discuss any of these options in further detail, please do not hesitate to contact me.



TOWN OF PALM BEACH

Town Manager's Office

November 1, 2014

John and Jane Doe
123 Mail Street
Palm Beach, FL 33480

Re: Underground Utilities Special Non-Ad Valorem Assessment Project; Petition

Dear Mr. and Mrs. Doe:

The Town Council of the Town of Palm Beach, working in conjunction with the local public utilities serving Palm Beach, has concluded that it would be beneficial for the Town and its residents, if the Town were to take the necessary steps to convert all overhead utility lines and facilities to underground service. The benefits are primarily related to aesthetics, safety and reliability of the primary public utility facilities serving properties in Palm Beach. In addition, by attempting to convert large areas of Town economies of scale are realized and FPL provides a 25% discount if the work is undertaken by local governments and three miles of lines are converted. Therefore, savings are possible if we work together to systematically convert the entire Town to underground service. Another factor considered is FPL's desire to "harden" some facilities as part of their on-going Storm Secure plan to improve their system's ability to withstand wind storms. This entails installing taller more substantive concrete poles over large areas of Town that many believe will further exacerbate aesthetic concerns with overhead facilities. In addition, hardened facilities will increase the cost of converting to underground service as they will not be fully depreciated assets as is much of the existing utility grid in Palm Beach.

Now is the time to act if property owners wish to do so. Underground utility projects are paid for by using special non-ad valorem assessments that are placed on one's property tax bill. Town policy requires that 67% of the property owners to be assessed approve of the proposed assessment program. Due to the large area being assessed 67% of the returned petitions will need to affirmatively approve of the assessment for a project to go forward.

Please go to the following link to learn more about the underground conversion process:

<https://townofpalmbeach.com/index.aspx?clientId=11397>

A petition specific to your property is attached. Please review it and return it to the Town at your earliest convenience, but by no later than Friday, November 28, 2014. Petitions received after this date will not be counted.

Sincerely,

Mayor and Town Council
Town of Palm Beach



TOWN OF PALM BEACH
Petition for Underground Utility Service

November 1, 2014

PCN: 50-43-44-11-02-000-0080

Description of Location of Proposed Underground Utility Conversion Project _____

For additional information on the processes involved in Town underground utility conversion projects, the associated special non-ad valorem assessment process and financing go to the following link on the internet:

<https://townofpalmbeach.com/index.aspx?clientId=11397>

Property Proposed for Inclusion in the above described Underground Utility Conversion Project

Street Address	PCN	Owner ID	Print Owner Name	Owner Signature	Check Below to Approve	Check Below to Disapprove
123 Main Street	50434411020000080	Doe	John Doe	<i>John Doe</i>	X	X

CONDITIONS & PROCEDURES:

- Not less than 67% of all responding property owners must approve the utility conversion project as evidenced by signing and indicating approval on this mail-in petition. Town staff or utility personnel shall be the initial determiner of those properties affected and/or benefitting, subject to final approval by the Town Council.
- Underground utility lines and facilities will only be installed pursuant to industry and/or Town standards.
- Only one signature of applicable property owners of record at the listed address is required. Only one preference per property will be counted. Any indication of a split preference will be counted as an approval.
- *State signature requirements for Trust and LLC owners here.*
- Return to: Town of Palm Beach
 Petition Processing
 Town Clerk's Office
 P.O. Box 2029
 Palm Beach, FL 33480
- Return by: November 28, 2014

Place embossed
 Town Seal here for
 petition authenticity.

Final Report

CONVERSION OF AERIAL to UNDERGROUND UTILITIES ANALYSIS

Town of Palm Beach
Palm Beach, FL



November 2006



Town of Palm Beach
Palm Beach, Florida

CONVERSION OF AERIAL TO UNDERGROUND UTILITIES ANALYSIS

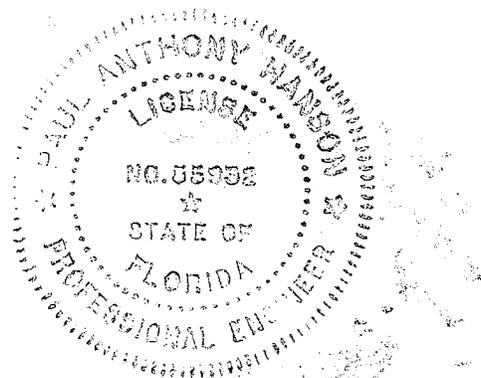
I hereby certify that this Conversion of Aerial to Underground Utilities Analysis was prepared by me or under my direct supervision and that we are duly registered professional engineers under the laws of the State of Florida.

Paul Anthony Hanson

Paul Anthony Hanson, P.E.
Project Manager
R.W. Beck, Inc.
400 Professional Park Drive - Suite 100
Goodlettsville, Tennessee 37072
Professional Engineer NO. 55932

Date: 11-01-06

R.W. Beck, Inc.
1001 Fourth Ave. - Suite 2500
Seattle, Washington 98151-1004
Certificate of Authorization NO. 7525



R. W. BECK, INC.
CONVERSION OF AERIAL to UNDERGROUND
UTILITIES ANALYSIS
Town of Palm Beach

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- Appendix A –Detailed Cost Spreadsheet - Electric
- Appendix B – Detailed Cost Spreadsheet - Comcast
- Appendix C – Detailed Cost Spreadsheet BellSouth

This report has been prepared for the use of the client for the specific purposes identified in the report. The conclusions, observations and recommendations contained herein attributed to R. W. Beck, Inc. (R. W. Beck) constitute the opinions of R. W. Beck. To the extent that statements, information and opinions provided by the client or others have been used in the preparation of this report, R. W. Beck has relied upon the same to be accurate, and for which no assurances are intended and no representations or warranties are made. R. W. Beck makes no certification and gives no assurances except as explicitly set forth in this report.

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Table ES-1
Underground Conversion Cost Summary

	Total Cost (w/o Joint Trenching)	Total Cost (with Joint Trenching)
FPL (CIAC)	\$49,878,300	\$51,336,400
BellSouth	\$6,001,000	\$5,400,000
Comcast	\$3,970,800	\$3,578,400
Total	\$59,850,100	\$60,314,800

The results of the options appear to be counter intuitive, since the joint use trench cost is higher than the separate trench option. However the justification or explanation of the relationship is:

- The joint trench option assumes a pathway will be provided on all backbone and tap circuit routes for ultimate use and conversion. The actual footage of the existing underground telephone plan is about 60% of the proposed route. Therefore there is excess conduit included in the joint trenching option.
- The installation method of the joint trench would utilize a different installed depth than the separated routes.
- The joint trench allowance stated by the cable company seems to understate the benefit.
- The completed system would provide a more efficient use of the space or “right-of-way”.
- The public should be exposed to less construction time with the joint trench approach.

The cost estimate also includes expenses which are the responsibility of the Town, but would not be direct payments to the Utilities. Project Management and owner’s expenses have been included and are approximately \$5.9 million of the total estimate for the joint trenching option. As discussed in the report, these items are necessary to coordinate a complex project and protect the Towns interest.

Details of the cost estimate are shown in Section 3.

EXECUTIVE SUMMARY

Introduction

The Town of Palm Beach Florida (Town) has been evaluating the potential benefits of a conversion of all overhead electrical and communications facilities within the city limits to underground, due to aesthetics and issues concerning reliability. The affected utilities would be Florida Power and Light (FPL), BellSouth and Comcast (collectively as the Utilities). Several studies have evaluated the related impacts and cost of such projects. These studies have been performed by internal as well as external entities. The recent hurricanes in Florida have further motivated such analyses, which are now a state-wide subject with discussions by the local utilities as well as the Public Service Commission. The Town is currently slated to have a referendum vote to determine citizens' interest and desire to initiate a requirement to underground all utilities within the city limits.

The Town has requested R. W. Beck, Inc. (R. W. Beck) to perform a high level review of the current cost estimates the Town is utilizing in its analysis (Project). This review evaluates the electric, telecommunications and cable television utilities (Utilities) in the area.

Findings

The analysis contained in this report finds that the costs of converting the existing overhead networks to underground of the Utilities in Palm Beach to be roughly \$60.3 million. These costs may be reduced by carefully coordinating the FPL conversion and replacement of existing telephone and Comcast overhead cable facilities. The cost was developed with two construction scenarios; the first was based on each utility performing individual trenching or boring functions and the second option is based on one entity performing the trenching or boring and conduit installation for the main line facilities. These costs are summarized in the following table for each Utility, with and without joint trenching:

This is not Palm Beach's first attempt to obtain an estimate of the cost of converting its overhead Utilities to underground. Prior attempts have produced different results, which are likely based on different assumptions. The following table summarizes cost estimates to date:

Table ES-2
Cost Comparison

	Cost	Notes
Palm Beach	\$62,000,000	Based on extrapolation from pilot project cost
JLSD	\$53,000,000	2004 Estimate- does not include FPL CIAC formula
R. W. Beck	\$60,314,800	Includes CIAC formula, Telecomm, Project Management and owner's expenses
FPL (Electric Only)	\$32,000,000	Does not include Telecomm

Additionally, the decision and ultimate negotiations with the Utilities should reflect the current regulation amendments under consideration. Current potential impact issues include:

- FPL's 25% allowance for conversion projects to municipals. This allowance is a product of the state-wide initiative to improve reliability to the Florida electric Grid. FPL is proposing this credit to foster a joint effort of the municipals and utility to improve the service to the area. Based on the estimate enclosed this could amount to approximately \$12 Million reduction in the overall cost of the project.
- FPL's current decision to change the design standards for distribution facilities. FPL is proposing designing its new distribution facilities to meet the NESC extreme wind criteria. If applied to the overhead credit or the conversion formula, the total cost to the Town should be reduced. Based on the enclosed estimate this could reduce the overall cost of the project by \$950,650.

Evaluation Material

The analysis conducted in this Project included the following data sources:

- Site visit to observe the condition, location and type of overhead facilities
- Local interview with the Town of Palm Beach's Deputy Town Manager
- Previous studies performed by JLSD Consulting Engineers
- FPL system maps provided August 2004
- FPL cost estimate for conversion dated December 2005
- Site interviews with the Bellsouth representatives
- Site interviews with Comcast representatives

- Census data from the Town records
- Additional detail of plant quantities from FPL
- Current PSC regulations
- FPL tariffs for underground conversion

General Assumptions

Due to the high-level nature of this assessment, a number of important assumptions are required. These assumptions are noted below.

- Overhead to underground conversion costs are limited to the primary providers of electric power and telecommunications services (e.g. FPL, BellSouth and Comcast). Wireless service providers, such as cellular telephony, are not included.
- While the system characteristics of future networks might be significantly different from the status quo, cost estimates strictly focus on replacing existing networks with their identical underground counterparts. Any incremental costs related to improvements in system characteristics (e.g. replacing overhead copper wire with underground fiber optic cable) would be the responsibility of that utility.
- This report is founded on high level cost analyses and is not intended to be used for budgetary purposes.
- This report does not include any in-depth system design considerations.
- The information contained in this report is based on two brief field inspections of the Town of Palm Beach, Florida, conversations with staff at FPL, Comcast and BellSouth and R. W. Beck's prior experience in related matters.
- Facilities would be installed inside the existing Right-of-Way to prevent private easements. Where this concept is not possible, private easement must be obtained; cost for easement acquisition is not included. This would require the Town to agree to "keep FPL whole" for future road work.
- Cost estimates are prepared based on typical industry standard practices and costs. Individual company overhead allocation will vary greatly and could significantly impact the cost. Cost savings may exist if the Town installs all equipment and donates installed facilities to FPL.
- Service entrances for a majority of the homes are already underground due to the existing town ordinance; therefore, no cost has been included for these private facility modifications. Cost has been included for the replacement of the underground FPL conductors to reflect the new location of the electric facilities.
- Electronic or node equipment for telephone and cable facilities are usually located at grade level in pad mounted cabinets, therefore the telephone and cable conversion cost assumes these will be re-used.

- Underground electric equipment type and installation practices were based on FPL standard design practices. Once design begins, other practices should be considered to increase reliability and storm responses. Items to consider would be subsurface style switchgear, concrete encased duct bank, and vacuum or SF₆ insulated switchgear. These items would impact overall cost and may improve reliability to the Town.
- The basic methodology of installation was assumed to be utilizing open trenching methods. Directional boring could be utilized to minimize the disturbances to the public. The cost impact would be negligible if a reduction in the number of spares was implemented. The Utilities have expressed a desire to utilize directional boring where practical.

Section 1

EXISTING PLANT SUMMARY

Section 1

EXISTING PLANT SUMMARY

1.1 Customer Base for Utility Services

One attribute that directly impacts the cost of underground services is Palm Beach's total customer base for utility services and the segment which is currently served by overhead systems. The overhead systems located in the Town of Palm Beach are primarily owned by FPL, Comcast and BellSouth. Adelphia previously owned some local assets, but these were acquired by Comcast during 2006. Wireless telephony facilities, such as cellular towers, are also expected to be located within Palm Beach, but are assumed to be outside of the scope of this analysis due to their limited visual impacts. The Palm Beach market is summarized in the following table.

Table 1-1
Customer Base

Market Segment	Number of Units
Single Family Housing	2,455
Condominium Buildings	116
Apartment Buildings	66
Business/Commercial	214
Total	2,851

1.2 Existing Overhead Plant - Comcast

Comcast's overhead plant in the Town is comprised of backbone fiber optic and coaxial lines (hard line plant) and service drops which connect the backbone system to customers (soft line plant). In addition, Comcast owns considerable head-end facilities, but these are not located in the Town. Verbal information provided by Comcast indicates that there is 37.21 miles of overhead hard line.

In contrast, Comcast does not have an estimate for the length of its soft line plant, but did indicate that individual service drops typically range from 100 to 150 feet (125 feet is average). This figure can easily be translated into an estimate for total soft line plant, if the number of Comcast customers were known. Unfortunately, Comcast was not able to provide any customer data; however, Comcast did provide some verbal estimates for its percentage of overhead customers by class, as shown in the following table. In the absence of actual customer counts, R. W. Beck applied its experience in such matters and finds that typical penetration rates for household cable television in Palm Beach could be 85%. Similarly, penetration rates for businesses range between

EXISTING PLANT SUMMARY

10% and 35%. Collectively, these data lay the foundation for estimating overhead customers, which are summarized below.

Table 1-2
Comcast's Customer Base

Market	Total Number	Overhead Customers	Penetration Rate (Average)	Overhead Customers
Residential	2,455	95%	85%	1,749
Apartments	66	10%	85%	5
Condominiums	116	10%	85%	9
Businesses	214	90%	22.5%	43
Total	2,851			1,806

Differences between the forecasted and actual number of overhead customers will directly affect the estimated number of required overhead conversions and resultant costs.

1.3 Existing Overhead Plant - BellSouth

Verbal communications with BellSouth indicated that it did not readily know its number of customers or length of its overhead networks. Consequently, this report includes several high-level assumptions in estimating the cost of system conversions.

The total number of accounts appears to be greatly different from the statistics provided by the Town. This has been attributed to the number of apartment and condo units per parcel and the number of individual accounts located on a single residential parcel.

Table 1-3
BellSouth's Customer Base

Market	Total Number	Overhead Customers	Penetration Rate (Average)	Overhead Customers
Residential	2,455	95%	100%	2,332
Apartments	66	10%	100%	7
Condominiums	116	10%	100%	12
Businesses	214	90%	100%	193
Total	2,851			2,544

1.4 Existing Overhead Plant - FPL

The existing electrical plant consists of mainly overhead 13kV construction. The Town is served by 12 inter-coastal crossings, which rise to an overhead configuration

at the first available location on the island. The majority of the backbone system is located along the roadside. The exact location in relation to private versus public property is unknown. The majority of the radial primary taps serving the residences in the town are located in a rear lot configuration. The service drops to a majority of the homes are currently underground due to the current Town regulation requiring new services be located underground.

FPL provided a summary of the existing electrical facilities serving the Town. These numbers will be utilized to develop an underground cost as well as an overhead replacement cost. Quantities provided by FPL are as follows:

Table 1-4
FPL Electrical System Characteristics

	Total
Number of existing electric meters	9,400 <i>(Residential – 8,000)</i> <i>(Non-Residential – 1,400)</i>
Number of Poles	1,970
Number of miles of OVH backbone lines	26
Number of miles of OVH tap lines	13
Number of miles of UG backbone lines	9
Number of miles of UG tap lines	24
Number of overhead transformers	800
Number of underground transformers	220

Section 2

COST DRIVERS AND ASSUMPTIONS

Section 2

COST DRIVERS AND ASSUMPTIONS

2.1 Introduction

There are a number of drivers that could have a significant impact on forecasting the cost of converting overhead utility systems to underground. Unfortunately, some of these drivers are relatively uncertain and cannot be fully explored until the design or detailed cost estimating process begins. In light of such issues, this section addresses the drivers that could significantly affect the high-level underground conversion costs that are presented here.

2.2 Project Management

An undertaking of this magnitude will require a substantial project management effort. A Project Manager would represent the Town, serve as a single point of contact between property owners and the construction effort, and requires a background in electric power and telecommunications systems. The Project Manager would be responsible for ensuring that the Town's concerns are met (e.g. minimize impacts to constituents, permitting and construction regulations). Additional responsibilities would include:

- Coordinating schedules between utilities (especially required for joint trenching) to avoid redundant street digs
- Coordinating effected roads to minimize road closures, delays and impacts to local constituents
- Reviewing and reporting on forecasted and actual budgets
- Conducting construction monitoring
- Coordinating the Town's internal permitting and construction staff

Costs related to project management have been estimated at 8% and are included in this analysis.

2.3 Legal

Construction may result in unfortunate impacts such as damage to property. It is not known whether such costs would be significant. The potential costs can not be forecasted and have not been included in this analysis.

2.4 Easements

Verbal feedback from the Utilities indicates that they are currently assuming that the Town will perfect all existing easements, as required, and obtain all newly required easements to provide necessary access for the Utilities. Consequently, the cost of obtaining easements has not been included in this estimate.

2.5 Conduit

The Utilities have not currently made a final determination whether its cable plant (e.g. coax, copper and fiber optic) should be directly buried or placed in conduit. Preliminary feedback indicates a preference for conduit and the utilities are assuming that such expense would be borne by the Town. In order to minimize the duration and number of construction activities in an area, the current preferred plan is to have one entity install all conduits for the project. The enclosed cost estimate reflects one party installing all conduits and individual installations.

2.6 Number of Conduits

The Town will need to assess the number of conduits to be placed in the backbone system. One option is to install only the minimum number of conduits that would be required to meet FPL's, BellSouth's and Comcast's immediate needs. However, an alternative approach would be to plan for long range growth and alternative competitive service providers to reduce the need for future street digs. This latter approach would likely install additional conduit at a higher cost. The estimate includes a prudent number of spares since the location and number of spares is impossible to forecast and would significantly impact the cost of the project.

2.7 Utilization of City Resources

The project, as currently defined, will require a significant amount of the Town's resources due to the coordination of road crossings, Right-of-Way definition, and underground facility locates.

These efforts would be in addition to the design and project management services defined earlier; therefore the estimate includes a 3% allowance for internal labor expenses.

2.8 Telecommunications Electronics

Since BellSouth and Comcast have not yet performed a detailed design of their underground systems, it is not yet feasible to identify or estimate the cost of required electronic equipment. It is assumed the existing equipment could be re-implemented since a majority of the equipment is already pad mounted at strategic locations

2.9 Cable (Coax, Copper and Fiber Optic)

There have been many significant technological advances in the field of telecommunications since the original Palm Beach networks were installed. One industry-wide change has been the replacement of traditional copper wire with fiber optic cable. Fiber optic cables are capable of carrying a great deal more traffic than their copper based counterparts.

Today, it appears that much of BellSouth's overhead and underground networks are comprised of copper circuits. If ordered to convert its overhead plant, BellSouth might wish to replace copper circuits with fiber optic cables.

Therefore a new underground cable plant is expected to be comprised of coax and fiber optics. Historically, voice based systems have extensively used copper wire for such projects. However, BellSouth has verbally indicated that it may replace much of its existing copper plant with fiber optics. This approach is commonly referred to as fiber to the curb (FTTC). FTTC has the capability to support significantly more and higher quality services than copper. For example, data or Internet transmission over copper wire is commonly limited to 640 Kbps for digital subscriber lines (DSL) and 1.544 Mbps for T1 lines. In contrast, FTTC is potentially suitable to support bandwidths that are 100 times greater. The basic impact is a potential increased level of service to the general population.

Even though this upgrade would provide an upgraded service to the City's population, the cost for the incremental capacity or capability of the new facilities should be the responsibility of the Utility and be deemed a betterment. See discussions below regarding betterment allowances.

2.10 No Betterment

The assessment conducted in this report assumes that the utilities would be permitted to only replace existing overhead assets with like underground ones. This stipulation is predicated on the concern that the Town of Palm Beach should not subsidize system improvements. However, it must be noted that telecommunications technologies and capabilities have improved significantly over time and it is possible that BellSouth and Comcast might wish to install significantly different infrastructure. For example, BellSouth's existing copper backbone lines might be replaced with fiber optic cable. Therefore allowances should be negotiated for perceived betterment.

2.11 Construction Methods

The Utilities face choices between directly burying cable or placing it in conduit, types of conduit, and boring versus trenching. Each choice is accompanied by several advantages and disadvantages. Direct bury is generally less expensive and faster to install while conduit offers more system security at a higher price.

2.12 Phased Implementation

For economic and technical reasons, each utility is likely to build-out its conversion on a different basis. For example, Comcast would be expected to convert its system on a node by node basis while FPL would be expected to do so on a feeder by feeder basis. A coordinated effort will be required to minimize the effects of the Town.

Minimizing construction related impacts and inconveniences to the local community can be accomplished, in part, by carefully coordinating the Utilities needs and scheduling the project in phases.

2.13 Damage to Foliage

The Town's weather encourages the fast, year long growth of numerous different types of foliage. Consequently, the roots of existing plants could become damaged during construction, thereby creating an unforeseen financial liability.

2.14 Joint Trenching

By using a common trench, the total cost of the proposed underground conversion could be reduced. However, Comcast and BellSouth have indicated that they may utilize different routes, especially for entrances to premises.

2.15 Construction Period

Ordinarily, utility related construction within Palm Beach is permitted only during part of the year. In order to expedite the project and meet expected schedules, the Utilities would benefit from being able to conduct construction throughout the year. Our understanding is that the Town has agreed to a year long construction schedule for this project.

2.16 Construction Permits

The Utilities may utilize contract and its own crews for this project. Ordinarily, there are limitations on the number of simultaneous vehicles that can work in the Town. Expeditiously completing this project may require a compromise in the number of allowed vehicles.

Section 3

ELECTRIC SYSTEM COST ESTIMATE

Section 3

ELECTRIC SYSTEM COST ESTIMATE

3.1 Electric System Cost Estimate

Current PSC and FPL tariffs (Section 6.3) include a stipulated formula for entities cost responsibilities for conversion of existing overhead electrical facilities to underground facilities. The tariff stipulates the cost of the electrical underground facilities will be based on the actual cost of installation with a 10% allowance for variation.

Current FPL regulations include a formula for an underground replacement project. The current formula is as follows:

$$CAIC = (UG+NBV+R) - (OH+SV)$$

CAIC = Contribution in Aid Of Construction

UG = Estimated cost to install the underground electric distribution facilities

NBV = net book value (book value less accumulated depreciation)

R = Removal cost of the overhead facilities

OH = Estimated cost of a new overhead electrical distribution facility was being installed

SV = Salvage value of the removed facilities

FPL provided a “Non binding” cost for the conversion of \$32,000,000. This estimate is the result of the above formula and FPL’s estimate of the components above. In order to obtain a detailed design estimate, the Town must pay a fee based on the requested study area. In addition, in order to develop a cost estimate to compare to the FPL estimate, the following assumptions were utilized:

- Main feeder circuits will be designed for 600 Amp Capacity (1000 MCM Aluminum conductor)
- Route will consist of direct embedded duct bank
- Sectionalizing cabinets with junction points will be utilized at tap points
- “PME style” switchgear will be used at potential switching points. Estimated at two switchgear per mile
- Sectionalizing cabinets will be estimated every 500 feet
- Branch circuits will be based on 200 Amp capacity
- Pad-mounted style cabinets will be assumed for switchgear location

ELECTRIC SYSTEM COST ESTIMATE

- Due to the nature of the island environment, the main feeder may require additional reinforcing to satisfy potential storm surge forces. The final design will need to identify the proper reinforcing.
- All single phase transformers were estimated at 50 KVA
- All three phase transformers were estimated at 150 KVA
- Street lighting will not be included in the estimate. This is a separate project being considered by the Town.
- Optional costs include conduits for telecommunication cables, but do not include relocation labor or other equipment needed to underground the cable and telephone facilities.
- Cost estimates do not include Right-of-Way or construction easement, permitting and/or acquisition costs.
- The location of the switchgear is assumed to be within the Right-of-Way of the road easement. FPL has recently agreed to utilize this space for facilities.
- Minor landscaping will be included for restoration; however disturbance of elaborate landscaping which is located within the Right-of-Way will require special attention.
- The conduit system will be installed by the Town of Palm Beach to facilitate one construction period and efficient use of space.
- Estimate assumes existing electrical services are underground and will not require additional service entrance work (i.e. panel and meter base work).
- Removal cost estimated at 15% of estimated construction cost.
- Overhead replacement costs estimated at \$200,000 per mile for three phase backbone system and \$100,000 for overhead three phase tap lines, and \$75,000 for overhead single phase lines.
- Estimates based on standard construction pricing.
- The breakdown provided by FPL did not differentiate between three phase and single phase tap lines. A 50/50 split was assumed.
- Salvage value was assumed to be equal to 50% of the replacement cost of the existing overhead transformers.

The derivation of the overhead replacement is outlined in Table 3-1:

Table 3-1
Estimated Replacement Cost of Overhead Electric Facilities

Unit	Quantity	Unit Cost	Extended Cost
Three Phase backbone	26	\$200,000	\$ 5,200,000
Three Phase Tap	6.5	\$100,000	\$650,000
Single phase Tap	6.5	\$75,000	\$487,500
Transformers	800	\$ 2,000	\$1,600,000
Services	1700	\$1,000	\$1,700,000
Total			\$ 9,637,500

These assumptions along with information provided by FPL and current industry pricing components will allow the derivation of each of the elements in the CIAC formula. The estimated components are as follows:

Table 3-2
Estimated Component

CIAC	With Joint Trenching	Without Joint Trenching
UG	\$52,470,134	\$53,928,311
NBV	\$6,400,000	\$6,400,000
R	\$1,445,625	\$1,445,625
OH	\$9,637,500	\$9,637,500
SV	\$800,000	\$800,000
Total	\$49,878,259	\$51,336,436

3.2 Storm-Hardened Overhead Construction Cost

The CIAC formula includes an overhead replacement cost factor (OH) that could be affected by a joint proposal filed on behalf of the Florida IOUs and currently under consideration by the Florida PSC. The purpose of this proposal is to mitigate the effects of severe storms on utility infrastructure and includes a provision to “storm-harden” overhead distribution facilities over and above those construction standards currently prescribed by National Electrical Safety Code (NESC). If the proposed construction guidelines are adopted, new distribution facilities would be designed to withstand extreme wind loading conditions up to 150 mph along some Florida coastal regions. The added costs associated with “storm-hardened” construction standards will be manifested primarily in the installation of higher ANSI-class poles. Typically, main feeders will require a heavy class concrete pole while overhead laterals will include wood poles with a much greater loading (moment) capacity than those installed under current standards.

ELECTRIC SYSTEM COST ESTIMATE

To estimate the impact of the proposed “storm-hardening” standards on future distribution construction costs, an NESC extreme-wind weather case of 56.7 psf (150 mph) was applied to a typical main feeder structure meeting NESC Light Loading District Grade C construction standards. The analysis used a typical wind span of 175 feet, .556kcmil ACSR conductor, #4/0 AWG ACSR neutral, and two communications cables on a 45 foot Class 2 wood pole. Under the extreme wind conditions specified, a Class H3 wood-equivalent concrete pole was required to meet proposed “storm-hardened” design standards. Similar analysis was applied to typical three-phase and single-phase overhead laterals.

To arrive at an estimate for the added cost impact of “storm-hardened” construction standards, material and labor cost differentials for the heavier class poles were used, in addition to an allowance for the utilization of higher capacity guying and higher strength insulators on main feeders. As a result, the total estimated impact of these proposed construction standards on the CIAC overhead replacement cost component is an increase of 10-15 percent.

Section 4

BELLSOUTH COST ESTIMATE



Section 4

BELLSOUTH COST ESTIMATE

4.1 Introduction

Estimating the cost of converting BellSouth's overhead telecommunications systems to underground has been pursued by verbally interviewing selected staff at BellSouth and utilizing R. W. Beck's existing data in similar matters. BellSouth's overhead system in the Town of Palm Beach is primarily comprised of main lines, laterals and service drops. At this point in time, BellSouth has not estimated the cost of converting its overhead facilities. The costs associated with converting each component are examined below.

The current Bellsouth Service tariff dated August 1 2006, addresses the requirements for requesting and executing a formal conversion study by Bellsouth.

It must be noted that these costs are planning level estimates only and require further refinement before using for budgetary purposes.

4.2 BellSouth Cost Estimate – Main Lines

BellSouth verbally reported that its typical cost for converting overhead primary lines to underground is between \$121.21 per foot and \$132.66 per foot. It is R. W. Beck's opinion that while these unit costs appear to be high, they are suitable for the purposes of this study.

BellSouth does not currently have an estimate of the length of its total main line plant. However, an estimate can be derived by taking the total length of Ocean County or Lake Roads, since BellSouth's backbone system generally follows these roads. The length of these roads was measured from scaled maps that were provided by the Town of Palm Beach.

Based on these assumptions, the cost of converting BellSouth's main lines would be approximately \$2,395,000.

4.3 BellSouth Cost Estimate – Laterals

BellSouth verbally reported that its typical cost for converting overhead laterals to underground is between \$19.53 per foot and \$26.04 per foot (average cost is \$22.79 per foot). It is R. W. Beck's opinion that these costs are probably conservatively high, especially when accounting for the economies of scale that are available in converting a significant amount of the system at one time, but serve the objectives of this report.

Once again, BellSouth does not currently have an estimate of its total lateral overhead plant. Consequently, an estimate was derived by assessing the total length of all streets within Palm Beach that are served by overhead telephone systems. Based on these data, the total cost of laterals would be \$2,217,000.

4.4 BellSouth Cost Estimate – Service Drops

BellSouth verbally reported that its typical cost for converting overhead service drops to underground varies by type of customer. Reported cost estimates were \$250 for each residence and \$1,000 for each business, condominium and apartment building.

While BellSouth does not have an estimate of its total service drop plant or number of customers by class, an estimate was derived from the Town of Palm Beach's data bases. This source of information resulted in the following customer estimated class allocations:

- Residences: 2,455 (95% overhead)
- Apartment Buildings: 66 (10% overhead)
- Condominium Buildings: 116 (10% overhead)
- Businesses: 214 (90% overhead)

Based on the above assumed data and the previously derived underground service quantities, the total cost to convert all overhead service drops to underground would be roughly \$794,000.

4.5 BellSouth Cost Estimate – Summary

The above cost estimates assume that BellSouth would be pursuing its underground conversion alone, without any coordination with other utilities. However, earlier in this report it was pointed out that significant cost savings could be captured by joint trenching. The following table summarizes BellSouth's conversion costs with and without joint trenching.

Table 4-1
BellSouth Conversion Cost Estimate Summary

Conversion Cost		
	Without Joint Trenching	With Joint Trenching
Main Line Plant	\$2,395,000	\$2,395,000
Credit Joint Trenching	\$0	\$(540,635)
Lateral Plant	\$2,217,000	\$2,217,000
Service Drops	\$794,000	\$794,000
Palm Beach Expenses	\$162,000	\$146,000
Palm Beach PM	\$433,000	\$389,000
Subtotal	\$6,001,000	\$5,400,000

Section 5

COMCAST COST ESTIMATE

5.1 Introduction

Estimating the cost of converting Comcast's overhead cable television (CATV) networks to underground has been pursued by verbally interviewing selected staff at Comcast and utilizing R. W. Beck's existing data in similar matters. Comcast's overhead system in the Town of Palm Beach is primarily comprised of hard and soft line plant. The costs associated with converting each component are examined below.

The Hard line plant for a cable system is analogous to a backbone or main line system. The Soft Line plant for a cable system is analogous to the service laterals for an electric system

It must be noted that these costs are planning level estimates only and require further refinement before using for budgetary purposes.

5.2 Comcast Cost Estimate – Hard Line Plant

Verbal information provided by Comcast indicates that there is 37.21 miles of overhead hard line plant that costs roughly \$80,000 per mile (\$15.15 per foot) to convert to underground. These data assume that some boring would be required. This would result in a total hard line plant cost of \$2,976,800.

5.3 Comcast Cost Estimate – Joint Trenching Credits to Hard Line Plant

The above figure assumes that Comcast would not jointly trench its hard line plant with any other utility. However, if joint trenching were utilized, then conversations with Comcast indicate that a credit of roughly \$2.00 per foot could be realized. However, differences between system routes and requirements for each utility preclude the feasibility to assume that all of Comcast's hard line plant could be jointly trenched. For the purposes of this high-level analysis, it was assumed that 90% of Comcast's hard line plant, or 33.49 miles, could be jointly trenched.

Based on these assumptions, the potential joint trenching credit to the cost of Comcast's hard line plant is roughly \$354,000, causing the total hard line cost to be roughly \$2,623,000.

5.4 Comcast Cost Estimate – Soft Line Plant

The next step is to estimate the cost of converting Comcast's soft line plant by using its customer data noted in the preceding section and R. W. Beck's experience in related matters. Comcast indicated that the cost of converting a single residence, apartment building, condominium building or businesses would be roughly \$100 each. In addition, boring costs would be required to gain access beneath driveways and roads at a cost of \$7.00 per foot. Based on these assumptions, the cost of soft line plant conversion is summarized in the following table.

Table 5-1
Conversion Costs for Comcast's Soft Line Plant

Market	Number	Total Cost
Residential	2,455	\$456,000
Apartments	66	\$24,000
Condominiums	116	\$42,000
Businesses	214	\$79,000
Total	2,851	\$601,000

The above table indicates that the cost of converting Comcast's overhead soft line plant to underground would be roughly \$601,000. This figure assumes that there no credits available from joint trenching since each utility might enter the customer's premise from the either the front or back lot line.

5.5 Comcast Cost Estimate – Summary

In summary, the cost to convert Comcast's existing overhead system to underground would be roughly \$3.9 million without joint trenching and \$3.5 million with a credit for joint trenching, as shown in the following table.

Table 5-2
Comcast's Conversion Cost Estimate Summary

Conversion Cost		
	Without Joint Trenching	With Joint Trenching
Hard Line Plant	\$2,976,800	\$2,976,800
Soft Line Plant	\$601,000	\$601,000
Joint Trench Credit	N/A	\$ (354,000)
Subtotal	\$3,577,800	\$3,223,800
Palm Beach Expenses	\$107,000	\$96,700
Project Management	\$286,000	\$257,900
Total	\$3,970,800	\$3,578,400

Appendix A
ELECTRIC COST ESTIMATE

Palm Beach

With Joint Trenching

ASSUMPTIONS FOR UNDERGROUND CONSTRUCTION:							
171600	3 PHASE - FEEDER LENGTH						1. Cable is in non concrete encased conduit
34320	1 PHASE - FEEDER LENGTH						2. Restoration Costs are part of trenching or boring unit.
	SECONDARY CABLE						3. No Cost has been included for ROW clearing (This should be minimal).
	TRANSFORMERS						
BID UNIT DESCRIPTION	# OF UNITS	UNIT	LABOR	MATL	UNIT PRICE	EXT. PRICE	COST PER FT
MAIN FEEDER - 3 PHASE PRIMARY							
3 PH RISER ASSEMBLY		EA	\$ 2,500.00	\$ 4,000.00	\$ 6,500.00	\$ -	
CABLE, 1-1000 AL, AL, CXN	137280	FEET	\$ 10.00	\$ 35.00	\$ 45.00	\$ 6,177,600.00	
DIRECTIONAL BORING (POWER) 10% Avg.		FEET			\$ 49.50	\$ -	
DUCTBANK- 16-4" Concrete Encased		FEET	\$ 45.00	\$ 75.00	\$ 120.00	\$ -	
DUCTBANK- 12-4" Concrete Encased		FEET	\$ 40.00	\$ 65.00	\$ 105.00	\$ -	
DUCTBANK- 4-6" +2-2" Non Concrete Encased	137280	FEET	\$ 35.00	\$ 45.00	\$ 80.00	\$ 10,982,400.00	
TRENCHING (Includes Backfill, & Restoration)	137280	FEET	\$ 15.00	\$ 15.00	\$ 30.00	\$ 4,118,400.00	
PILINGS(One per 100 feet)	0	FEET	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ -	
SPICES							
MISCELLANEOUS (Traffic, Vault Racks, Splices)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
TOTAL PRIMARY COST (Three Phase):						\$ 21,278,400.00	
PRIMARY - THREE PHASE 200 Amp							
CABLE, 4/0, AL URD, EPR or XLP	34320	FEET	\$ 3.00	\$ 10.00	\$ 13.00	\$ 446,160.00	
DIRECTIONAL BORING (POWER)	0	FEET			\$ -	\$ -	
DUCTBANK- 2-4" + 2-2" concrete Encased	34320	FEET	\$ 25.00	\$ 30.00	\$ 55.00	\$ 1,887,600.00	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 15.00	\$ 15.00	\$ 30.00	\$ -	
MISCELLANEOUS (Traffic, Elbows, Vault Racks, Splices)	0	FEET	\$ 2.50	\$ 2.50	\$ 5.00	\$ -	
TOTAL PRIMARY COST (Single Phase):						\$ 2,333,760.00	
PRIMARY - SINGLE PHASE-200 Amp-							
CABLE, 1/0, AL URD, EPR or XLP	34320	FEET	\$ 3.00	\$ 3.00	\$ 6.00	\$ 205,920.00	
DIRECTIONAL BORING (POWER)	0	FEET			\$ -	\$ -	
DUCTBANK- 2-4" + 2-2" concrete Encased	34320	FEET	\$ 25.00	\$ 30.00	\$ 55.00	\$ 1,887,600.00	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
MISCELLANEOUS (Traffic, Elbows, Vault Racks, Splices)	0	FEET	\$ 2.50	\$ 2.50	\$ 5.00	\$ -	
TOTAL PRIMARY COST (Single Phase):						\$ 2,093,520.00	
SECONDARY							
600V SECONDARY CABLE (4/0 AL)		FEET	\$ 4.00	\$ 2.00	\$ 6.00	\$ -	
DIRECTIONAL BORING (POWER)	0	FEET			\$ -	\$ -	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
TOTAL SECONDARY COST:						\$ -	
TRANSFORMERS							
150 KVA, 3 PH, LF, 120/208	100	EA	\$ 500.00	\$ 4,850.00	\$ 5,350.00	\$ 535,000.00	
300 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 8,400.00	\$ 8,900.00	\$ -	
500 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 14,000.00	\$ 14,500.00	\$ -	
750 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 21,000.00	\$ 21,500.00	\$ -	
1000 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 23,000.00	\$ 23,500.00	\$ -	
50 KVA, 1 PH, LF, 120/240	500	EA	\$ 500.00	\$ 1,500.00	\$ 2,000.00	\$ 1,000,000.00	
100 KVA, 1 PH, LF, 120/240		EA	\$ 500.00	\$ 2,200.00	\$ 2,700.00	\$ -	
CONCRETE PAD, 3PH TRANSFORMER	600	EA	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ 600,000.00	
CABLE WELL UNDER PADS		EA	\$ 500.00	\$ 1,000.00	\$ 1,500.00	\$ -	
GROUNDING, RODS & CABLE, 3 PH	600	EA	\$ 85.00	\$ 30.00	\$ 115.00	\$ 69,000.00	
LOAD BREAK 200A ELBOWS	1600	EA	\$ 100.00	\$ 50.00	\$ 150.00	\$ 240,000.00	
TOTAL TRANSFORMER COST:						\$ 1,909,000.00	
JUNCTIONS & SWITCHES							
SECTIONALIZING JUNCTION (Three phase 600 A)	274.56	EA	\$ 1,500.00	\$ 3,000.00	\$ 4,500.00	\$ 1,235,520.00	
SECTIONALIZING JUNCTION (three phase 200A)	68.64	EA	\$ 500.00	\$ 2,000.00	\$ 2,500.00	\$ 171,600.00	
PME-6 with SMU 20 style fuses		EA	\$ 2,000.00	\$ 14,000.00	\$ 16,000.00	\$ -	
PME-9 with SMU 20 style fuses	52	EA	\$ 2,000.00	\$ 16,000.00	\$ 18,000.00	\$ 936,000.00	
PME-11 with SMU 20 style fuses		EA	\$ 2,000.00	\$ 18,000.00	\$ 20,000.00	\$ -	
PADS FOR ABOVE EQUIPMENT		EA	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ -	
Large MANHOLES (Includes Excav., Backfill)	275	EA	\$ 3,000.00	\$ 3,000.00	\$ 6,000.00	\$ 1,650,000.00	
Small MANHOLES (Includes Excav., Backfill)	69	EA	\$ 2,000.00	\$ 2,000.00	\$ 4,000.00	\$ 274,560.00	
DEAD FRONT 200A ELBOWS	1233	EA	\$ 100.00	\$ 50.00	\$ 150.00	\$ 184,950.00	
DEAD FRONT 600A ELBOWS	2943	EA	\$ 150.00	\$ 200.00	\$ 350.00	\$ 1,030,050.00	
Splices 600 Amp		EA	\$ 235.00	\$ 160.00	\$ 395.00	\$ -	
	0	EA	\$ 235.00	\$ 160.00	\$ 395.00	\$ -	
TOTAL JUNCTION & SWITCH COST:						\$ 5,482,680.00	
						SUBTOTAL: EQUIPMENT	\$ 33,097,360.00
MISC COST							
Telecomm communication Boxes		EA	\$ 250.00	\$ 250.00	\$ 500.00	\$ -	
	0	FEET				\$ -	
Total misc Cost						\$ -	
SERVICE ENTRANCE COSTS:							
TYPE 1 (Single Phase)	1500	EA	\$ 1,000.00	\$ 2,500.00	\$ 3,500.00	\$ 5,250,000.00	
TYPE 2 (Three Phase)	200	EA	\$ 1,000.00	\$ 4,000.00	\$ 5,000.00	\$ 1,000,000.00	
TOTAL SERVICE ENTRANCE COSTS						\$ 6,250,000.00	
						SUBTOTAL:	\$ 39,347,360.00
CONTRACTOR MOBILIZATION						1%	\$ 393,473.60
SUBTOTAL							\$ 39,740,833.60
CONTINGENCY						15%	\$ 5,961,125.04
SUBTOTAL							\$ 45,701,958.64
ENGINEERING & DESIGN						7%	\$ 3,199,137.10
PROJECT MANAGEMENT						8%	\$ 3,656,156.69
OWNER'S OVERHEAD EXPENSE						3%	\$ 1,371,058.76
SUBTOTAL							\$ 53,928,311.20
ENVIRONMENTAL						0%	\$ -
SUBTOTAL							\$ 53,928,311.20
TOTAL FOR UNDERGROUND				171600	Footage	\$ 53,928,311.20	
TOTAL / FT							\$ 314.27

Palm Beach

Without Joint Trenching

ASSUMPTIONS FOR UNDERGROUND CONSTRUCTION:							
7829	3 PHASE - FEEDER LENGTH					1. Cable is in non concrete encased conduit	
0	1 PHASE - FEEDER LENGTH					2. Restoration Costs are part of trenching or boring unit.	
	SECONDARY CABLE					3. No Cost has been included for ROW clearing (This should be minimal).	
	TRANSFORMERS						
BID UNIT DESCRIPTION	# OF UNITS	UNIT	LABOR	MATL	UNIT PRICE	EXT. PRICE	COST PER FT
MAIN FEEDER - 3 PHASE PRIMARY							
3 PH RISER ASSEMBLY	0	EA	\$ 2,500.00	\$ 4,000.00	\$ 6,500.00	\$ -	
CABLE, 1-1000 AL, AL, CXN	137280	FEET	\$ 10.00	\$ 35.00	\$ 45.00	\$ 6,177,600.00	
DIRECTIONAL BORING (POWER) 10% Avg.		FEET	\$ 100.00	\$ 20.00	\$ 120.00	\$ -	
DUCTBANK- 8-6" Concrete Encased		FEET	\$ 45.00	\$ 75.00	\$ 120.00	\$ -	
DUCTBANK- 12-4" Concrete Encased		FEET	\$ 40.00	\$ 65.00	\$ 105.00	\$ -	
DUCTBANK- 4-6" Non Concrete Encased	137280	FEET	\$ 35.00	\$ 40.00	\$ 75.00	\$ 10,296,000.00	
TRENCHING (Includes Backfill, & Restoration)	137280	FEET	\$ 15.00	\$ 15.00	\$ 30.00	\$ 4,118,400.00	
PILING(One per 100 feet)	0	FEET	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ -	
SPICES							
MISCELLANEOUS (Traffic, Vault Racks, Splices)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
TOTAL PRIMARY COST (Three Phase):						\$ 20,592,000.00	
PRIMARY - THREE PHASE 200 Amp							
CABLE, 4/0, AL URD, EPR or XLP	34320	FEET	\$ 3.00	\$ 9.00	\$ 12.00	\$ 411,840.00	
DIRECTIONAL BORING (POWER)	0	FEET	\$ 100.00	\$ 20.00	\$ 120.00	\$ -	
DUCTBANK- 2-4" concrete Encased	34320	FEET	\$ 25.00	\$ 25.00	\$ 50.00	\$ 1,716,000.00	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 15.00	\$ 15.00	\$ 30.00	\$ -	
MISCELLANEOUS (Traffic, Elbows, Vault Racks, Splices)	0	FEET	\$ 2.50	\$ 2.50	\$ 5.00	\$ -	
TOTAL PRIMARY COST (Single Phase):						\$ 2,127,840.00	
PRIMARY - SINGLE PHASE-200 Amp-							
CABLE, 1/0, AL URD, EPR or XLP	34320	FEET	\$ 3.00	\$ 3.00	\$ 6.00	\$ 205,920.00	
DIRECTIONAL BORING (POWER)	0	FEET	\$ 100.00	\$ 20.00	\$ 120.00	\$ -	
DUCTBANK- 2-4" concrete Encased	34320	FEET	\$ 25.00	\$ 25.00	\$ 50.00	\$ 1,716,000.00	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
MISCELLANEOUS (Traffic, Elbows, Vault Racks, Splices)	0	FEET	\$ 2.50	\$ 2.50	\$ 5.00	\$ -	
TOTAL PRIMARY COST (Single Phase):						\$ 1,921,920.00	
SECONDARY							
600V SECONDARY CABLE (4/0 AL)		FEET	\$ 4.00	\$ 2.00	\$ 6.00	\$ -	
DIRECTIONAL BORING (POWER)	0	FEET			\$ -	\$ -	
TRENCHING (Includes Conduits and Restoration)	0	FEET	\$ 5.00	\$ 5.00	\$ 10.00	\$ -	
TOTAL SECONDARY COST:						\$ -	
TRANSFORMERS							
150 KVA, 3 PH, LF, 120/208	100	EA	\$ 500.00	\$ 4,850.00	\$ 5,350.00	\$ 535,000.00	
300 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 8,400.00	\$ 8,900.00	\$ -	
500 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 14,000.00	\$ 14,500.00	\$ -	
750 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 21,000.00	\$ 21,500.00	\$ -	
1000 KVA, 3 PH, LF, 120/208		EA	\$ 500.00	\$ 23,000.00	\$ 23,500.00	\$ -	
50 KVA, 1 PH, LF, 120/240	500	EA	\$ 500.00	\$ 1,500.00	\$ 2,000.00	\$ 1,000,000.00	
100 KVA, 1 PH, LF, 120/240		EA	\$ 500.00	\$ 2,200.00	\$ 2,700.00	\$ -	
CONCRETE PAD, 3PH TRANSFORMER	600	EA	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ 600,000.00	
CABLE WELL UNDER PADS		EA	\$ 500.00	\$ 1,000.00	\$ 1,500.00	\$ -	
GROUNDING, RODS & CABLE, 3 PH	600	EA	\$ 85.00	\$ 30.00	\$ 115.00	\$ 69,000.00	
LOAD BREAK 200A ELBOWS	1600	EA	\$ 100.00	\$ 50.00	\$ 150.00	\$ 240,000.00	
TOTAL TRANSFORMER COST:						\$ 1,909,000.00	
JUNCTIONS & SWITCHES							
SECTIONALIZING JUNCTION (Three phase 600 A)	274.56	EA	\$ 1,500.00	\$ 3,000.00	\$ 4,500.00	\$ 1,235,520.00	
SECTIONALIZING JUNCTION (three phase 200A)	68.64	EA	\$ 500.00	\$ 2,000.00	\$ 2,500.00	\$ 171,600.00	
PME-6 with SMU 20 style fuses		EA	\$ 2,000.00	\$ 14,000.00	\$ 16,000.00	\$ -	
PME-9 with SMU 20 style fuses	52	EA	\$ 2,000.00	\$ 16,000.00	\$ 18,000.00	\$ 936,000.00	
PME-11 with SMU 20 style fuses		EA	\$ 2,000.00	\$ 18,000.00	\$ 20,000.00	\$ -	
PADS FOR ABOVE EQUIPMENT		EA	\$ 500.00	\$ 500.00	\$ 1,000.00	\$ -	
Large MANHOLES (Includes Excav., Backfill)	275	EA	\$ 3,000.00	\$ 3,000.00	\$ 6,000.00	\$ 1,650,000.00	
Small MANHOLES (Includes Excav., Backfill)	69	EA	\$ 2,000.00	\$ 2,000.00	\$ 4,000.00	\$ 274,560.00	
DEAD FRONT 200A ELBOWS	1233	EA	\$ 100.00	\$ 50.00	\$ 150.00	\$ 184,950.00	
DEAD FRONT 600A ELBOWS	2943	EA	\$ 150.00	\$ 200.00	\$ 350.00	\$ 1,030,050.00	
Splices 600 Amp		EA	\$ 235.00	\$ 160.00	\$ 395.00	\$ -	
	0	EA	\$ 235.00	\$ 160.00	\$ 395.00	\$ -	
TOTAL JUNCTION & SWITCH COST:						\$ 5,482,680.00	
						SUBTOTAL: EQUIPMENT	\$ 32,033,440.00
MISC COST							
Telecomm communication Boxes		EA	\$ 250.00	\$ 250.00	\$ 500.00	\$ -	
	0	FEET			\$ -	\$ -	
		EA			\$ -	\$ -	
Total misc Cost							
SERVICE ENTRANCE COSTS:							
TYPE 1 (Single Phase)	1500	EA	\$ 1,000.00	\$ 2,500.00	\$ 3,500.00	\$ 5,250,000.00	
TYPE 2 (Three Phase)	200	EA	\$ 1,000.00	\$ 4,000.00	\$ 5,000.00	\$ 1,000,000.00	
TOTAL SERVICE ENTRANCE COSTS						\$ 6,250,000.00	
						SUBTOTAL:	\$ 38,283,440.00
CONTRACTOR MOBILIZATION							
					1%	\$ 382,834.40	
						\$ 38,666,274.40	
CONTINGENCY							
					15%	\$ 5,799,941.16	
						\$ 44,466,215.56	
ENGINEERING & DESIGN							
					7%	\$ 3,112,635.09	
					8%	\$ 3,557,297.24	
					3%	\$ 1,333,986.47	
						\$ 52,470,134.36	\$ 5,679.68
ENVIRONMENTAL							
					0%	\$ -	
						\$ 52,470,134.36	
TOTAL FOR UNDERGROUND							
				7829	Footage	\$ 52,470,134.36	
TOTAL / FT							
							\$ 6,702.02

Appendix B
COMCAST COST ESTIMATE

Underground Conversion Cost Estimate: Comcast

Hard Line Plant: Comcast Sole Trench

Length		37.21 Miles
Cost per Foot	\$	15.15 Per Foot
Cost per Mile	\$	80,000 Per Mile
Subtotal Cost (Includes Boring and Conduit)	\$	<u>2,976,800</u>

Hard Line Plant: Comcast and FPL Joint Trench

Length		37.21 Miles
Percent Feasible for Joint Trenching		90%
Trenching Cost	\$	2.00 Per Foot
Trenching Cost per Mile	\$	<u>10,560 Per Mile</u>
Trenching Cost	\$	353,644
Cost without Joint Trenching	\$	2,976,800
Joint Trenching Credit	\$	<u>(353,644)</u>
Total Hard Line Plant Cost	\$	2,623,156

Soft Line Plant: Households

Total Households		2,455 Units
Overhead Service		95%
CATV Penetration Rate		85% Low Estimate
CATV Penetration Rate		85% High Estimate
Cost per Household	\$	<u>100.00 Each</u>
Subtotal Cost - Low	\$	198,241
Subtotal Cost - High	\$	<u>198,241</u>
Subtotal Cost - Average	\$	198,241
Total Households		2,455 Units
Boring Cost	\$	7.00 Per Foot
Household Boring Length (Average Driveway)		30.00 Feet
Households Requiring Boring (Front Access)		<u>50%</u>
Boring Cost for Households	\$	257,775
Household Cost - Low	\$	456,016
Household Cost - High	\$	456,016
Household Cost - Average	\$	456,016

Soft Line Plant: Apartment Buildings

Total Apartment Buildings		66 Buildings
Overhead Service		10%
CATV Penetration Rate		85% Low Estimate
CATV Penetration Rate		85% High Estimate
Cost per Apartment	\$	<u>100.00 Each</u>
Subtotal Cost - Low	\$	561
Subtotal Cost - High	\$	<u>561</u>
Subtotal Cost - Average	\$	561
Total Apartment Buildings		66 Units
Boring Cost	\$	7.00 Per Foot
Apartment Boring Length (Average Driveway)		50.00 Feet
Apartments Requiring Boring (Front Access)		<u>100%</u>
Boring Cost for Apartments	\$	23,100
Apartment Cost - Low	\$	23,661
Apartment Cost - High	\$	23,661
Apartment Cost - Average	\$	23,661

Underground Conversion Cost Estimate: Comcast

Soft Line Plant: Condominiums

Total Condominium Buildings	116 Buildings
Overhead Service	10%
CATV Penetration Rate	85% Low Estimate
CATV Penetration Rate	85% High Estimate
Cost per Apartment	\$ 100.00 Each
Subtotal Cost - Low	<u>\$ 986</u>
Subtotal Cost - High	<u>\$ 986</u>
Subtotal Cost - Average	\$ 986
Total Condominium Buildings	116 Units
Boring Cost	\$ 7.00 Per Foot
Condominium Boring Length (Average Driveway)	50.00 Feet
Condominiums Requiring Boring (Front Access)	<u>100%</u>
Boring Cost for Condominiums	\$ 40,600
Condominium Cost - Low	\$ 41,586
Condominium Cost - High	\$ 41,586
Condominium Cost - Average	\$ 41,586

Soft Line Plant: Businesses

Total Businesses	214 Businesses
Overhead Service	90%
CATV Penetration Rate	10% Low Estimate
CATV Penetration Rate	35% High Estimate
Cost per Apartment	\$ 100.00 Each
Subtotal Cost - Low	<u>\$ 1,926</u>
Subtotal Cost - High	<u>\$ 6,741</u>
Subtotal Cost - Average	\$ 4,334
Total Businesses	214 Units
Boring Cost	\$ 7.00 Per Foot
Business Boring Length (Average Driveway)	50.00 Feet
Businesses Requiring Boring (Front Access)	<u>100%</u>
Boring Cost for Businesses	\$ 74,900
Business Cost - Low	\$ 76,826
Business Cost - High	\$ 81,641
Business Cost - Average	\$ 79,234

Total Comcast

	<u>Without Joint Trenching</u>	<u>With Joint Trenching</u>
Hard Line Plant	\$ 2,976,800	\$ 2,976,800
Credit for Joint Trenching	\$ -	\$ (353,644)
Soft Line Plant (Residences)	\$ 456,016	\$ 456,016
Soft Line Plant (Apartments)	\$ 23,661	\$ 23,661
Soft Line Plant (Condominiums)	\$ 41,586	\$ 41,586
Soft Line Plant (Businesses)	\$ 79,234	\$ 79,234
Subtotal Comcast Conversion Cost	<u>\$ 3,577,297</u>	<u>\$ 3,223,653</u>
Town of Palm Beach Labor	107,318.90	96,709.59
Project Management	286,183.74	257,892.23
Total Comcast Conversion Cost	<u>\$ 3,970,799</u>	<u>\$ 3,578,255</u>

Appendix C

BELLSOUTH COST ESTIMATE



Underground Conversion Cost Estimate: BellSouth

Sample Conversion Project: Lateral Underground

Lateral Length	220	Feet
Total Lateral Cost	\$ 5,729.00	
Cost per Foot (Lateral - High)	\$ 26.04	Per Foot
Potential Savings Due to Scale	25%	
Cost per Foot (Lateral - Low)	\$ 19.53	Per Foot

Sample Conversion Project: Main Underground

Lateral Length	440	Feet, Each
Number of Laterals	4	
Unit Cost (Low)	\$ 19.53	
Unit Cost (High)	\$ 26.04	
Lateral Cost (Low)	\$ 34,374.00	Total
Lateral Cost (High)	\$ 45,832.00	Total
Lateral Cost (Average)	\$ 40,103.00	Total
Total Project Cost	\$ 167,037.00	
Less Lateral Cost (Low)	\$ (34,374.00)	
Cost of Main (High)	\$ 132,663.00	
Length of Main	1,000.00	Feet
Main Line Unit Cost (High)	\$ 132.66	Per Foot
Total Project Cost	\$ 167,037.00	
Less Lateral Cost (High)	\$ (45,832.00)	
Cost of Main (Low)	\$ 121,205.00	
Length of Main	1,000.00	Feet
Main Line Unit Cost (Low)	\$ 121.21	Per Foot
Cost of Main (Average)	\$ 126.93	Per Foot

Main Line Analysis

Total Length	94,358.97	Feet
Percent Overhead	20%	
Cost of Main (Average)	\$ 126.93	Per Foot
Total Main Line Cost	<u>\$ 2,395,472.21</u>	

Lateral Analysis

Total Length	216,217.95	Feet
Half of Total Length	108,108.98	Feet
Percent Overhead	90%	
Lateral Cost Per Unit (Low)	\$ 19.53	Per Foot
Total Cost of Laterals (Low)	\$ 1,900,298	
Total Length	216,217.95	Feet
Half of Total Length	108,108.98	Feet
Percent Overhead	90%	
Lateral Cost Per Unit (High)	\$ 26.04	Per Foot
Total Cost of Laterals (High)	\$ 2,533,730	
Total Cost of Laterals (Average)	<u>\$ 2,217,014</u>	

Service Drops

Number of Residences	2,455	
Residences Receiving Overhead Service	95%	
Cost to Convert Each Residence	\$ 250.00	Each
Total Cost to Convert Residences	\$ 583,062.50	
Number of Businesses	214	
Businesses Receiving Overhead Service	90%	
Cost to Convert Each Business	\$ 1,000.00	Each
Total Cost to Convert Businesses	\$ 192,600.00	
Number of Condominiums	116	
Condominiums Receiving Overhead Service	10%	
Cost to Convert Each Condominium	\$ 1,000.00	Each
Total Cost to Convert Condominiums	\$ 11,600.00	
Number of Apartment Buildings	66	
Apartment Buildings Receiving Overhead Service	10%	
Cost to Convert Each Apartment Building	\$ 1,000.00	Each
Total Cost to Convert Apartment Building	\$ 6,600.00	
Total Cost of Service Drops	<u>\$ 793,862.50</u>	

Total BellSouth

	Without Joint Trenching	With Joint Trenching
Main Lines	\$ 2,395,472.21	\$ 2,395,472.21
Credit for Joint Trenching	\$ -	\$ (540,634.88)
Laterals	\$ 2,217,014	\$ 2,217,014.13
Service Drops	\$ 793,863	\$ 793,862.50
Subtotal BellSouth Conversion Cost	<u>\$ 5,406,348.84</u>	<u>\$ 4,865,713.96</u>
Town of Palm Beach Labor	\$ 162,190	\$ 145,971
Project Management	\$ 432,508	\$ 389,257
Total BellSouth Conversion Cost	<u>\$ 6,001,047</u>	<u>\$ 5,400,942</u>