

PROFESSIONAL ENGINEER DEVELOPMENT PROGRAM AT THE COUNTY LEVEL: SETTING HIGHER STANDARDS FOR ENGINEERING PRACTICE

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ABSTRACT

One of the most important decisions a young engineer can make early in his/her engineering career is to place oneself on a professional course and become licensed as a professional engineer (P.E.). The profession regulates itself by setting high standards for professional engineers, and by law, many jurisdictions require engineers to be licensed in order to practice. These requirements and high standards help protect the public's safety and welfare. This paper will discuss the success of a professional engineering development program (PEDP) developed at the Sarasota County, Florida and subsequent steps it took to reach its current repute. It will evaluate how compared to PE programs at the state and federal level, PEDP at the Sarasota County is different, and what are some of the program benefits and challenges associated with it. This program began in 1995 and offers employment for civil engineers in all disciplines. It encompasses engineering positions in Sarasota County's Public Works, Development Services and Environmental Services Business Centers. The purpose of Sarasota County Government PEDP is to provide the opportunity for the requirements to be satisfied for licensure as a Professional Engineer. This is accomplished through technical training, mentoring, career guidance and growth opportunities while providing support for the community through dedicated customer service, technical competency and personal integrity. It provides an individual the opportunity to rotate through various disciplines based on organization needs, individual preferences, backgrounds and specialized traits. The requirements for successful completion of the program are a combination of practical on the job activities, formal training and a time component. Initiation of such engineering development program at the County level shows great enthusiasm, and higher standards of motivation and work ethics to serve the community better. Licensure is the mark of a professional. It demonstrates accomplishment of the high standards of professionalism to which the engineering profession subscribes. The

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Sarasota County has given this practice a unique definition called “employee capital.”

1. INTRODUCTION

The purpose of this paper is to emphasize the importance of becoming licensed as a professional engineer through education, experience, and mentoring. This has been successfully implemented in Sarasota County, Florida since 1994. Sarasota County Professional Engineering Development Program (PEDP) provides the opportunity for the requirements to be satisfied for licensure as a Professional Engineer. The requirements for successful completion of the program are a combination of practical on the job activities, formal training and a time component. It provides an individual the opportunity to rotate through various disciplines based on organization needs, individual preferences, backgrounds and specialized traits. This paper will touch on the concepts, background, operation, results, and success of Sarasota County PEDP.

1.1 Professional Licensure and its Importance

One of the most important decisions a young engineer can make early in his engineering career is to place himself on a course to become licensed as a professional engineer (P.E.). The licensing of Civil Engineers is important because of the significant role it plays in society, affecting every human being in terms of safe buildings and roads, clean water, communication, and infrastructure management. The profession is regulated by licensing boards - composed of P.E.'s and members of the public - in each U.S. state and territory. The licensing boards set high standards for professional engineers, and these high standards help protect the public health, safety, and welfare. As a result, engineers must be licensed to offer their services to the public. This constitutes the legislative intent of the Engineering Practice Act.

Licensure is the mark of a professional. It demonstrates accomplishment of the high standards of professionalism to which the engineering profession subscribes. Summarizing the importance of Licensure, it

- i) demonstrates that one has accomplished a recognized standard,
- ii) sets one apart from others in your profession,
- iii) provides career options and opportunities that might not have been available otherwise, and
- iv) serves as a protection of public health, safety, and welfare.

1.2 Engineering Practice in the State of Florida

In an effort to implement the Engineering Practice Act at the State level, the Florida Legislature found that it was necessary in the interest of public health and

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safety to regulate the practice of engineering in the State of Florida and thus created Chapter 471, Florida Statutes, the Engineering Registration Law. Under this law the Florida Board of Professional Engineers is responsible for reviewing applications, administering examinations, licensing qualified applicants, and regulating the practice of engineering throughout the state.

1.3 Sarasota County’s Professional Engineer Development Program (PEDP)

Based on the Florida’s Legislature Sarasota County recognized the importance of promulgating Engineering Practice Act at the County level. This was a smart approach to advance the continuing efforts of introducing the importance of licensure at the community level. Sarasota County’s Professional Engineering Development Program (PEDP) began recruiting graduate engineers in 1994. The purpose of this program was to provide the training and background for participants as they develop into licensed professional engineers. They are expected to fulfill the future needs of Sarasota County Government and include positions in Public Works and Development Services.

2. HISTORY

Located on the gulf coast of Florida, bordering the south side of Manatee County, Sarasota County is one of the fastest growing mid-sized county in the State of Florida. It encompasses both urban and rural landscapes with total area of approximately 573 square miles. Based on the demographic and social factors Sarasota County Government established Public Works/Infrastructure Business Centers to serve the needs of the community.

Population and development issues from 1987 – 1993, along with the flooding problems forced the County to shift its focus towards infrastructure management. This was the time when the old school of running Public Works business was overshadowed by the concept of PEDP (See Table 1). It was recognized that the County needed additional staffing and professionalism to provide service to citizens. Sarasota County had to make marked changes in its organizational layout to put it back on the path to growth and development, and this gave birth to the vision for an “action plan”.

Table 1 Historical Trend in Public Works Staffing

YEAR	POPULATION	ENGINEERS	PE’S	STAFF
1978	178,694	6	3	N/A
1990	277,776	11	7	245
1995	295,942	35	18	349
2002	325,927	48	33	523

In 1991 Sarasota County with the help of Dr. Goodnight, PE who was Deputy Secretary of Transportation, Florida Department of Transportation (FDOT) at the

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time developed a Professional Engineering Development Program (PEDP). It was promoted with emphasis on developing organizational growth and development.

3. PEDP AND ITS IMPLEMENTATION IN SARASOTA COUNTY

The goal for the PEDP was “to create an organization where the leadership and talent necessary for sustainability would be from internal staff rather than relying on external factors, focusing on licensure through education, experience and mentoring.” During the course of developing an action plan for the PEDP, numerous hurdles were faced which were resolved on the principle of “Making it work.” Following are some of the obstacles that were successfully handled at the time,

Obstacles	Solutions
1) Positions for additional engineering staff	1) Reclassification of open positions for Engineers
2) Human Resources, Administration	2) Strong emphasis as part of a vision to better diversity
3) Recruiting staff	3) Recruitment from state universities
4) Will they come?...How long will they stay?...What will they do?	4) Recruitment, responsibility and real work assignments
5) Selling the concept to existing staff; “Field people vs. Carpet people”	5) Allow staff the opportunity to adjust the attitude. Matching assignments with personalities

To create the sense of achievement and development a slogan to success was put together by the pioneers of the program, “Excitement + Enthusiasm = Excellence.” This was used to symbolize the

- i) skills that create a dynamic program comprising of supervisory committees and upper management, governed by principles of self government, and follows the open doors policy,
- ii) developing a professional relationship based on respect, reliability, and responsibility,
- iii) spirited motivation by assigning tasks in increasing difficulty.

Success of this program can be determined from the fact that 13 out of 14 successful graduates are still employed with Sarasota County. Nobody at the time of developing it knew that it would be highly successful, and one day will be recognized at the State and National level. Sarasota County PEDP received the Best Engineering Development Program Award from the Florida Engineering Society (FES) for years 2000 and 2003. Furthermore last year a team from Sarasota County went to 2003 Annual APWA Congress hosted in San Diego, CA

to present their program in front of the national audience. It was a high honor to be nationally recognized, and adds to the credibility of Sarasota County's PEDP.

3.1 Breakdown Structure of PEDP

The program offers employment in all fields of civil engineering and hands-on experience in different disciplines by allowing rotations into different assignments. Participants have the opportunity in the following divisions: Stormwater Environmental Utility, Transportation Planning, Drainage Operations, Traffic Operations, Road and Bridge, Road Program Management and Development Services. Most rotations are one year and are based on the participant's choice as well as the county's need.

After completing two years of engineering experience and fulfilling other requirements, the engineer trainee is eligible for promotion to senior engineer. Senior engineers continue in the program until they are eligible and obtain their professional engineer (PE) license. At this point, they are expected to choose a permanent position. See Figure 1 for the organizational layout.

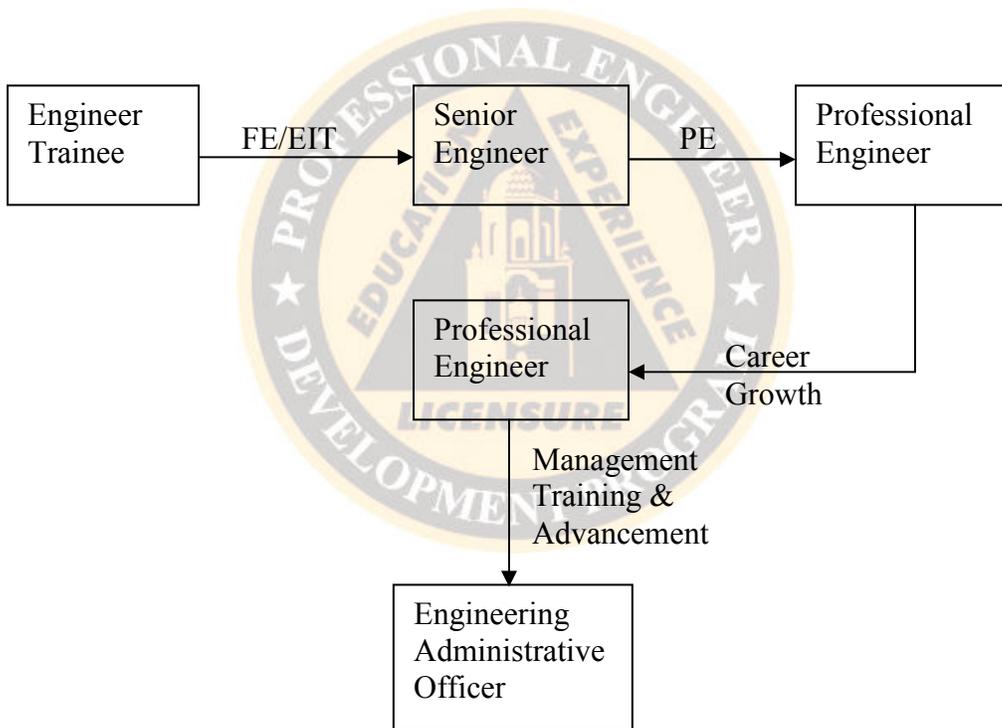


Figure 1 Organizational Layout of PEDP

3.2 Professional Engineer Development Training Requirements

The required training in the PEDP is intended to ensure the participant is capable of providing future leadership for Sarasota County as a professional engineer (See Figure 2). The two types of training included in this program are formal (classroom and technical) and practical (on the job activities). A brief description and guidelines are discussed in this section.

3.2.1 Formal Training

All participants in the PEDP are required to complete a total of six (6) activities classified as formal training, which includes writing, presentation, customer service and team participation skills. These are essential for the success of the individual and Sarasota County Government. Therefore, unless the training has been completed while employed with the organization it will not be applicable in fulfilling the requirements necessary for promotion.

The time restraints for completion of the required formal training for an Engineer Trainee are shown below (see Table 2).

Table 2 Time Restraints for Formal Training Tasks (Engineer Trainee)

Classification	6 Months	12 Months	18 Months	24 Months	Total	Notes:
Engineer Trainee (24 month)	0	1	1	1	3	Required for promotion to senior engineer
Advanced Engineer Trainee (12 Month)	1	2	N/A	N/A	3	Required for promotion to Senior Engineer

Note: An Advanced Engineer Trainee is a participant with prior professional experience or post baccalaureate degree. This determination will be prior to employment. Failure to complete the required formal training will hinder the promotion to Senior Engineer.

The time restraints for completion of the required formal training for a Senior Engineer are shown below (see Table 3).

Table 3 Time Restraints for Formal Training Tasks (Senior Engineer)

Classification	Prior Training	6 Months	12 Months	24 Months	48 Months	Total	Notes:
Senior Engineer (24 -48 month)	3	0	1	1	1	6	Required for promotion to Professional Engineer
Advanced Senior Engineer (24-48 Month)	0	1	1	2	2	6	Required for promotion to Professional Engineer

Note: An individual may qualify for initial status as a senior engineer based on criteria including experience and education. However, since only the formal training obtained while with Sarasota County is applicable, the requirement will be to complete all six (6) of the tasks prior to promotion to Professional Engineer. Program participants who are promoted from the Engineer Trainee Class must complete the remaining three tasks prior to promotion to Professional Engineer.

3.2.1.1 Customer Service Skills

Customer service skills are probably the most important of all, because the business of government is people and serving their needs as part of the County Government. Government employees are held to a higher standard and require all citizens to be treated with dignity and respect. Therefore a minimum of eight hours are required for satisfaction of the customer service skill requirement. This can be accomplished by registering and completing Customer Service level 1 classes offered through the Organizational and Employee Development branch of Sarasota County Human Resources. It is considered to be an alternative to the in house training.

3.2.2 Job Training

The important aspect of job training is that it gives the participants a chance to be involved in PEDP rotation assignments, and provides an opportunity to learn and develop people skills, networking, interagency communication and technical expertise. Overall aim is to encourage development of skills in project management, design, permitting and construction inspection. Figures 3 and 4 show the task lists used for the practical/on-job training.

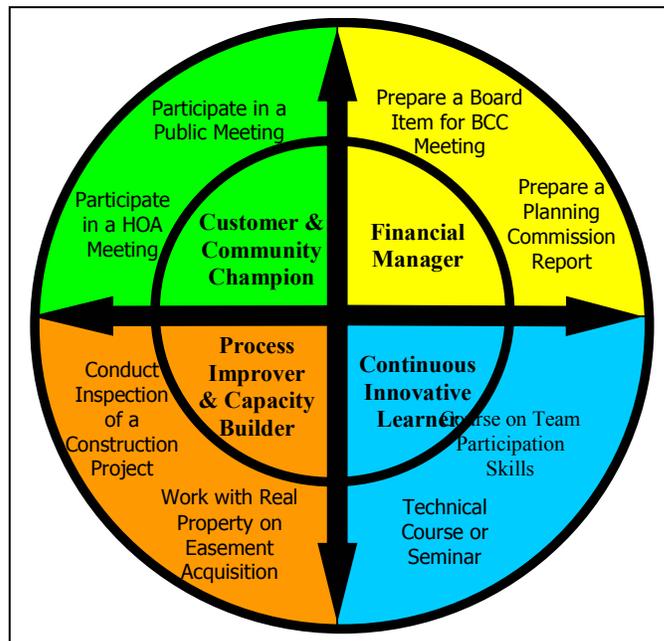


Figure 2 Checklist Reflecting Sarasota County’s Core Competencies

**Sarasota County PEDP
Participant Requirement Checklist
4-YR Program**

Name: _____ Date Hired into Program: 1/1/2004

Time (months)	Entry Engineer Phase - 24 Months Maximum				Senior Engineer Phase - 42 Months Maximum		
	0-6	6-12	12-18	18-24	24-30	30-36	36-42
Level of Period	7/1/2004	12/31/2004	7/1/2005	12/31/2005	7/1/2006		7/1/07
Required Formal Training	R-1 Date: _____ Initial: _____	R-2 Date: _____ Initial: _____	R-3 Date: _____ Initial: _____	R-4 Date: _____ Initial: _____	R-5 Date: _____ Initial: _____	R-6 Date: _____ Initial: _____	R-7 Date: _____ Initial: _____
	On-the-Job Training				On-the-Job Training		
On-the-Job Training	T-1 Date: _____ Initial: _____	T-2 Date: _____ Initial: _____	T-3 Date: _____ Initial: _____	T-4 Date: _____ Initial: _____	T-5 Date: _____ Initial: _____	T-6 Date: _____ Initial: _____	T-7 Date: _____ Initial: _____
	EIT License: _____ Date: _____ Initial: _____				Promoted to Senior: _____ Date: _____ Initial: _____		
EIT License: _____ Date: _____ Initial: _____				Promoted to PE: _____ Date: _____ Initial: _____			Continued on the job training while working for Sarasota County as an Engineer Licensee.

R-1 Writing Skills
R-2 Presentation Skills
R-3 Customer Service Skills
R-4 Team Participation Skills
R-5 Technical Seminar
R-6 Ethics

T-1 Work with Survey/Mapping on a GIS Map
T-2 Conduct an Inspection of a Construction Project
T-3 Conduct an Inspection of a Operation/Maintenance Project
T-4 Prepare a Board Demand and Attend a BCC Meeting
T-5 Prepare a Planning Commission Report and attend a Planning Commission Mtg
T-6 Participate in an Advisory Committee

T-7 Participate in a Development Review Committee Meeting
T-8 Participate in a Public Meeting
T-9 Conduct an Inspection of a Development Project
T-10 Participate in a Home Owners Association Meeting
T-11 Attend a Metropolitan Planning Organization Meeting
T-12 Review a project and present results at a PSRC Meeting
T-13 Permit a Project through SWFWMD or FDOT
T-14 Work with Real Property on an easement/acquisition
T-15
T-16
T-17
T-18 Other acceptable item

Figure 3 Checklist for Undergraduate Students as a PEDP participant

**Sarasota County PEDP
Participant Requirement Checklist
3-YR Program**

Name: _____ Date Hired into Program: 1/1/2003

Time (months)	Engineer Trainee Phase - 12 Months Maximum			Senior Engineer Phase - 12 Months Maximum		
	0-6	6-12	12-18	12-36	36-42	42-64
Level of Period	7/1/2003	1/1/2004		12/31/2005		7/1/2007
Required Formal Training	R-1 Date: _____ Initial: _____	R-2 Date: _____ Initial: _____	R-3 Date: _____ Initial: _____	R-4 Date: _____ Initial: _____	R-5 Date: _____ Initial: _____	R-6 Date: _____ Initial: _____
	On-the-Job Training			On-the-Job Training		
On-the-Job Training	T-1 Date: _____ Initial: _____	T-2 Date: _____ Initial: _____	T-3 Date: _____ Initial: _____	T-4 Date: _____ Initial: _____	T-5 Date: _____ Initial: _____	T-6 Date: _____ Initial: _____
	EIT License: _____ Date: _____ Initial: _____			Promoted to Senior: _____ Date: _____ Initial: _____		
EIT License: _____ Date: _____ Initial: _____			Promoted to PE: _____ Date: _____ Initial: _____			Continued on the job training while working for Sarasota County as an Engineer Licensee.

R-1 Writing Skills
R-2 Presentation Skills
R-3 Customer Service Skills
R-4 Team Participation Skills
R-5 Technical Seminar
R-6 Ethics

T-1 Work with Survey/Mapping on a GIS Map
T-2 Conduct an Inspection of a Construction Project
T-3 Conduct an Inspection of a Operation/Maintenance Project
T-4 Prepare a Board Demand and Attend a BCC Meeting
T-5 Prepare a Planning Commission Report and attend a Planning Commission Mtg
T-6 Participate in an Advisory Committee

T-7 Participate in a Development Review Committee Meeting
T-8 Participate in a Public Meeting
T-9 Conduct an Inspection of a Development Project
T-10 Participate in a Home Owners Association Meeting
T-11 Attend a Metropolitan Planning Organization Meeting
T-12 Review a project and present results at a PSRC Meeting
T-13 Permit a Project through SWFWMD or FDOT
T-14 Work with Real Property on an easement/acquisition
T-15
T-16
T-17
T-18 Other acceptable item

Figure 4 Checklist for Graduate Students as a PEDP participant

3.3 Checklist Implementation

It is made sure that the PEDP checklist is implemented properly, so as a part of process

- i) employees receive checklist from PEDP Committee when hired,
- ii) merit increases are based on checklist milestones at 6, 12, 18, 24, 36 & 48 months, and
- iii) program director must approve each completed task.

3.4 PEDP Committee

PEDP committee is made up of four volunteer participants who have been in the program for a minimum of 1 year. It creates a liaison between upper management and program participants. Such kind of contact provides the participants with opportunity to get mentoring in their professional development curve, and could be very useful for their future. Some of the tasks handled by the committee include

- i) setting up and conducting the quarterly meeting for all program participants and supervisors, and
- ii) organize recruiting and hiring for engineers and interns.

4. BENEFITS OF THE PROGRAM

Following section concludes program as a whole, and helps in giving an overview of the positive items associated with the PEDP.

4.1 Advantages of PEDP

- 1) There is no “Pigeon-Holing”.
- 2) The rotating engineer is a beneficial, productive employee.
- 3) New job training, and ultimately the trainee becomes the trainer.
- 4) Provides mean to connect with people and produces most efficient interoffice/agency networking.
- 5) Promotes Continuing education, with incentives for tuition reimbursement and promotion.
- 6) Helps in developing training and conference attendance, and presentation experience.
- 7) Conducts PE/EI review courses periodically.
- 8) PEDP meetings hosted quarterly.
- 9) Creates an extremely well rounded, diverse engineer that knows public works.
- 10) Formal and job training helps in promotions.
- 11) Timely completions of tasks including engineering certification results in pay increases.

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- i) For Engineer Trainee: 6-month merit increases (3-8%) for first 18 months.
 - ii) For Senior Engineer: 10–12% merit increase after 2 years if all program requirements are met, and annual merit increases (3-8%) afterward.
 - iii) For Professional Engineer: 10-12% merit increase upon certification if program requirements are met.
- 12) Direct benefits from being a County employee and participating in the PEDP.

4.2 Program Challenges

List of challenges, which makes the training program more exciting and affective, and puts life long learning technical and social impressions consists of

- 1) the cost of the program: an immediate supervisor trains the participants, and use and polishes his/her skills and abilities;
- 2) keeping rotational spots when the engineer gets their PE;
- 3) making sure everyone rotates, this helps people get comfortable with others;
- 4) getting “Buy-In” from other employees and departments;
- 5) Standardizing training.

4.3 Steps taken to Continue to grow

An ability to continue to grow is what marks the ultimate success of any developing and technical training program. Following steps have been taken by the Sarasota County to ensure the continuing growth of PEDP.

- 1) periodic recruitment, involving on campus and electronic recruiting via internet.
- 2) exposing currently enrolled graduates to the PEDP by hiring Co-Ops and interns.
- 3) promotes community involvement through outreach programs, active participation in professional associations and charity events.
- 4) program comparison with other State and National level professional engineering training programs to make sure that the program competes well with them (See Table 4.)

Table 4 Program Comparison

AGENCY ITEM	Sarasota County	Florida DOT	CAL Trans	FHWA
Rotation Period	1 yr for 4yr	6 mo for 4yr	6 mo for 2yr	1 yr for 2yr
Location	1	> 1	> 1	> 1
E.I.T	Condition of Employment	Condition of Program	Prefer	Prefer
Mentor	Committee	One Person	One Person	One Person
Promotion for P.E.	Automatic	Apply for	Apply for	Apply for

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5. CONCLUSION

The purpose of the Sarasota County Government Professional Engineer Development Program (PEDP) is to provide the opportunity for the requirements to be satisfied for licensure as a Professional Engineer. This is accomplished through technical training, mentoring, career guidance and growth opportunities while providing support for the community through dedicated customer service, technical competency and personal integrity.

Several key factors about the program are as follows:

- 1) The program includes three separate employee classifications, Engineer Trainee, Senior Engineer and Professional Engineer. The County broad banded the positions assigned to the program. After successfully completing the program and obtaining licensure, participants are assigned to a permanent position.
- 2) The program offers the opportunity for non-competitive promotions from Engineer Trainee to Senior Engineer and Senior Engineer to Professional Engineer. With completion of the required criteria and satisfactory evaluations, promotions are awarded as they are earned.
- 3) The opportunity to rotate while in the program helps enhance open communication within business centers. Duration of the assignment is based upon the needs of the organization and may vary. Additional consideration is given based on individual preferences, backgrounds, and specialized traits.
- 4) The requirements for successful completion of the program are a combination of practical on the job activities, formal training, and a time component. Failure to complete the required amount of tasks will result in promotional delays, removal from the program and termination of employment.
- 5) The maximum period of time for any individual to complete the program from engineer trainee to professional engineer is sixty-six (66) months. This includes a maximum of twenty-four (24) months as an Engineer Trainee, and 42 months as a Senior Engineer.

Currently analyzing and comparing PEDP with the other available professional development programs in the country it is justified to say that the “Initiation of such an engineering development program at the County level shows great enthusiasm, and higher standards of motivation and work ethics to serve the community better.” This is why Sarasota County truly defines its conduct and practice as an “employee capital”, for it is for the betterment of the people by the people.

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