Seriously Civil
Professional Development Guide
(For Municipal Engineering Consultants)

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wallis engineering

Seriously Civil Professional Development Guide

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Introduction

Purpose

This guide is about helping municipal consulting engineers become excellent. That is a three-step process with the first two steps being aligning your aptitudes, values, and life-style choices with the best available career paths. The third step is to manage your professional development to achieve not only excellence, and also (as consultants) to ensure you will be capable of working and obtaining equitable compensation.

Our Seriously Civil Program is based upon three facts and one opinion. The three facts are:

- There are a limited number of career paths available to the vast majority of civil engineers. These lie in three basic categories of work: 1) government, 2) consultancy, and 3) construction.
- Most engineers spend the majority of their careers in only one of these paths.
- Their job satisfaction is largely a function of how well their aptitudes, values, and life-style choices fit their career path. It is important to understand that many engineers have a successful career regardless of fit. In general, the better the fit, the more enjoyable and fulfilling is that success.

The one opinion is:

- The business of municipal engineering consulting should be as much about helping engineers find their "professional fit" as it is about business.

Simplistically, the program works as follows:

- Aptitude testing is completed to help you understand your aptitudes (though test results are not all that can be discovered about aptitudes).
- Through informal discussions and a formal annual "personal branding" session, we attempt to help you understand the common civil engineering career paths and how they relate to one's aptitudes, values, and life-style choices – your "professional fit".
- For those who clearly fit our firm's career path, we establish specific professional development goals through our Core24 Program.
- For those who believe municipal consulting may be their best professional fit, but are uncertain, we help them explore those other career paths that interest them. This relates to our "going thru philosophy". summarized as follows:

  "Our firm is one "municipal engineering" place where an engineer can spend all or part of a 40 year journey called a career. For those who are not municipal engineers, we attempt to use that time with our firm to make the most of that journey".

Civil Engineering and Sports

Civil engineers are like athletes in two ways:

- There are many types of civil engineering professionals and there are many types of athletes. Saying you practice civil engineering means as much as saying you play sports.
- Athletes who succeed do so because they found the right fit and worked at getting better over time with training. The same holds true with engineers.

This guide is divided into the following three sections, which explain the program in more detail:

Step 1: Understanding Who You Are (your aptitudes, values, and life-style choices).

Step 2: Finding Your Career Fit (Getting on the right career path).

Step 3: Becoming an Excellent Municipal Engineering Consultant (making the most of your career path).

STEP 1: Understanding Who You Are

Benjamin Franklin once said:

> *"There are three things extremely hard: steel, a diamond, and to know one's self."*

From a perspective of professional self-actualization, knowing one's self is understanding your inborn aptitudes, your values, and your lifestyle preferences. It is in fact, hard.

- Aptitudes are those talents or abilities you have that are not the products of study or experience, but are naturally occurring. *They are not skills*, which are learned. Aptitudes give a person the ability to learn or do certain kinds of things, such as being able to visualize spatially, have a memory for numbers or words, or have musical ability. By identifying where your aptitudes fall in a continuum, you'll be able to understand the career choice that is the best fit for you. You will also be better able to manage the learning that is so essential to success and satisfaction in any career choice.

  It should be noted that it is difficult to find a one hundred percent fit with your aptitudes and your career – the goal is to make the fit the closest possible. It is entirely possible to succeed where that fit is not the closest; to make your career the most fulfilling and enjoyable, however, the attempt should be made.
- Values are different than aptitudes in that they are more malleable. Generally speaking, values are the result of lifelong experiences and culture. Unique events in life can, however, change an individual's values drastically in a relatively short period of time. Values are important, but unless one has very strong public service values, which means public agency work is their best option, aptitudes combined with lifestyle choices should drive your choice of career paths.
- Lifestyle Choices. Regardless of your aptitudes or values, career choices may not fit your lifestyle choice. As an example, some career choices do not enable an individual to live in locations of choice. Nor do some enable an individual to work reduced hours.

Professional Interests

Although one should do work that interests them, interests seldom drive career choice. This is simply due to the fact that sustainable professional interest in any "work" requires three things:

- A fit with aptitudes
- Personal gain (an engineer has to benefit)
- Experience with that work

Aptitudes

Our History of Aptitude Testing

When we began aptitude testing in 1999, we found that there were a variety of aptitude tests as well as testing organizations and objectives of those organizations. After five years of trying various aptitude tests, we concluded that the most relevant to professional development and career choice was Johnson O'Connor (JO), a foundation who has been testing aptitudes since 1922. JO has identified over a dozen independent variables, which can be tested for with a high degree of accuracy. For almost 100 years, they have been engaged in a program of testing, with follow-up interviews for decades following the tests to determine job satisfaction. They have established a database of results, and utilized statistical analysis to correlate test results with job satisfaction. Information on JO can be found on their web site at www.jocrf.org.

Although we relied upon JO for several years, it became apparent that JO was a challenge because the tests require two days of one-on-one testing, with the nearest test centers in Seattle. About six years ago, we started using a more convenient online testing service by a company called The Highlands Company, who acquired rights to the JO test and adapted and added to it. Although we do not believe that program is as effective as JO, it is nonetheless of great value. Aptitudes are tested under time constraints, and results shown as a

percentile compared with a database of thousands of other test takers. In the past few years, we have supplemented Highlands with additional tests.

We have adapted and tailored Highlands and our other testing to the field of consulting civil engineering. The following gives an overview of aptitudes. A more detailed discussion of how aptitudes align with work as civil engineer is included in Appendix A.

Aptitude Overview

The following are brief summaries of each of the tested aptitudes.

Personal Styles

Although these are not strictly "aptitudes", they are important because they can help you determine your comfort level in a given working environment, no matter what field you work in.

Extrovert/Introvert. In essence, an extrovert gets energy from being around people, and an introvert gets energy from being alone.

Generalist/Specialist. Generalists like variety in their work, and specialists like to master a body of knowledge or develop a skill of their own. Generalists also think more in terms of the goals of the team or organization, while specialists prefer to pursue goals and problems on their own.

Time Frame. This measures your most natural frame of reference when thinking about the future or considering the impact of present actions on future plans. A low time frame is up to one year; an intermediate time frame is from one to five years; and a long-range rime frame is five to twenty years.

Driving Abilities

In general, Driving Abilities measure your ability to process or use information. If they are high, they demand to be used. In other words, if you are high in any one and don't use it, you will be frustrated and may not realize why. If you are low in any and your job demands its use, you will also be frustrated.

Inductive (Classification) Reasoning. The ability to make decisions or draw conclusions based on seemingly unrelated information, situations, or events. Someone high in this aptitude can move from the specific to the general when solving problems. Sometimes the person may not be able to communicate specifically how the conclusion was drawn.

Analytical (Concept Organization) Reasoning. The ability to arrange ideas, information or things in a logical order. A person high in this can move from the general to the specific to solve problems and communicate logically how it was done.

Idea Productivity. The ability to generate ideas quickly and easily. This doesn't have anything to do with the quality of the ideas. Those high in this often have a hard time stopping the flow of ideas, and sometimes have a hard time focusing.

Spatial Relations Theory. This is the ability to understand how 'systems' work, applying both to mechanical systems and interpersonal systems. Examples would be understanding how the solar system or how a corporation or family system works.

Spatial Relations Visual. This is the ability to manipulate a three dimensional object in your head, visualizing the impacts of changes in all dimensions.

Specialized Abilities

In general, Specialized Abilities measure your ability to remember or absorb information. Those labelled "learning channel" indicate your best method to learn or retain information if you are medium to high in them.

Design Memory (Learning channel). Being able to recall an overall pattern or picture shown in two dimensions, such as charts, diagrams, sketches or patterns.

Observation. Being able to pay close attention to visual detail and recall detail.

Verbal Memory (Learning channel). Ability to recall written materials and learn new words easily.

Tonal Memory (Learning channel). Ability to recall tonal sequences and melodies. It also indicates the ability to remember what people have said.

Rhythm Memory (Learning channel). Ability to remember rhythm patterns, related to the need for physical activity, and helps with listening.

Pitch Discrimination. Ability to distinguish fine differences in pitch, and general sensory discrimination. Helpful in remembering the spoken word.

Number Memory. Ability to recall numbers and miscellaneous facts. This is a rote memory aptitude, and not necessarily the ability to perform other mathematical calculations quickly.

Visual Speed. Ability to read written numbers and letters quickly.

Visual Accuracy. Ability to read written numbers and letters accurately.

Vocabulary. This isn't an aptitude, but a measure of achievement, because it can be raised with time and effort. It measures your word knowledge, and can be comparable to Verbal Memory, though not always, since words can also be learned through other learning channels.

General Considerations in Aligning Your Aptitudes With Your Work

Any single aptitude is impacted by other aptitudes. Driving Abilities (Inductive, Analytical, Idea Productivity, Spatial Relations Theory, and Spatial Relations Visual) and Specialized Abilities (all others) work together. In general:

- Driving Abilities measure your ability to process, or use information. If you're high in any, you will be frustrated if you don't have the chance to use it.
- Specialized Abilities measure your ability to remember or absorb information.

If you have a high Driving Ability and low Specialized Abilities, you may have a harder time putting that high Driving Ability to use, and vice versa. For instance, if you have high reasoning aptitude and you have low Word Memory, you could have a harder time reasoning well with word-based information, and vice-versa. It's well to be aware of these patterns, so you can compensate for it where possible.

If you have a very high aptitude (especially a high driving ability) or set of aptitudes, it may lead to frustration with others, because you tend to judge people from your own strengths, while ignoring your weaknesses. You may not realize that someone else doesn't see things from your perspective because they are low in an aptitude you are high in.

Values

The most relevant value in regards to the civil engineering profession is valuing public service; i.e., serving the public. For those with public services values, a career in government or closely allied with government may be the most advantageous.

Lifestyle Choices

Some of the lifestyle choices to consider when choosing a business type are:

- Desire to live outside a metropolitan area.
- Desire to work long hours for good pay.
- Desire to work minimum hours to devote time to family or personal interests.

STEP 2: Finding Your Career Fit

This section provides information to help align who you are with your best career path fit, discussing the three distinct "businesses" where an engineer can spend their career, and how to choose the best fit. These "businesses" are:

- Government
- Consulting
- Construction

> **Are There Only Three "Businesses"?**
>
> The answer is "no". In fact, there are many more. Three "businesses", however, comprise the vast majority of places where civil engineers work. Others include non-profit organizations, facilities engineering for industry, research, manufacturing, and equipment sales.

In the long-term, most engineers are happy in only one of these "businesses", with that happiness primarily a function of their aptitudes and values (A&Vs), but also lifestyle choices. As early as possible, an engineer should select the "business" in which to spend his or her career.

- Government. The business of government is public service. Engineers who really value public service should work for government. In considering a career in government, the following factors are relevant:
  - For those who value public service, and who see clearly the relationship between civil engineering and people's lives, government is the best career choice.
  - Particularly for large agencies, an engineer is not pressured into taking technical shortcuts to meet profit goals, and thus can develop exceptional technical skills. Because of that, government has traditionally been the best place for those engineers who are truly technically exceptional.
  - For some engineers, management and people are more important than engineering. The fact that most governments are about the "process" of delivering projects, as opposed to the "engineering" of delivering projects, means that those whose strength lies in management and people often find government to be their best choice. This is particularly true for those in smaller public agencies. This essentially means that, as compared to consulting, government is much more about people. That makes government the preferred option for many engineers, even those without a strong public service value.
- Consulting. In considering a career in consulting, the following factors are relevant:
  - There is a false impression that consulting is about "expertise". It is that for sure, but it is increasingly more about selling and production. The better at sales, the less important is production.
  - For those whose strengths are in sales, consulting offers tremendous advantages. This is particularly true for those who do not value public service, or value it slightly. In general, the larger the engineering firm, the more important is sales.
  - For those with production aptitudes, and who do not have public service values, some consulting business paths offer

> **Avoiding the Two Big Mistakes**
>
> There are two mistakes made by many engineers which can be avoided by understanding "fit":
>
> Not finding a fit early enough in your career. For consultants, this is a common mistake, particularly for those engineers whose technical or marketing aptitudes are not sufficient to sustain them through the downturns in the market which the business of consulting is prone to.
>
> Not understanding that the pain caused when you have to change agencies or firms is due to anything but fit. If you don't understand "fit", it's difficult to accept lack of job satisfaction. This lack of understanding often causes stress. It often causes people to "jump from the frying pan into the fire" – switching jobs suddenly and winding up with a less satisfying job.

significant advantages (development firms in particular).

- Construction. In considering a career in construction, the following factors are relevant:
  - Construction engineering involves less design than does consulting, but also involves more freedom to enjoy what many find enjoyable about engineering – being part of construction.
  - The downside of most construction engineering positions is that they often demand considerable travel.

Wallis Engineering's Going Thru Philosophy

At Wallis Engineering, we understand that most civil engineers will spend 40 years on a professional journey called a career. Those who manage their professional development on that journey will be much more likely to find that journey enjoyable and rewarding. For all engineers, we encourage exploring alternative career paths. We strive to help every engineer find that career path which best fits their aptitudes, values, and lifestyle choices, whether that be the municipal consulting career path or another. Some, if not many, may over time find other types of firms, or even other "business" models, to be a better fit. For this reason, we view all of our engineers, particularly those with less than 10 years of experience, to be "going thru", which means they may or may not find municipal consulting to be their best fit. It must be emphasized that many of these who end up in another business model may still be exceptionally valuable in a municipal firm such as ours. For those that transition to that other model, it just happens that municipal engineering is not the best choice for them in the long run given their aptitudes, values, and lifestyle choices. Accepting that fact, we help engineers gain experience with other types of career paths which they believe to possibly be, but are not sure, a better fit than municipal consulting.

Process Delivery vs Project Delivery

The work of most engineers falls into one of two activity categories – process delivery or project delivery. These categories are also considerations in choosing a "business" model. For many engineers, these categories separate public from private. In general:

- Process delivery is typically never-ending. Project delivery ends with the project.
- Small and medium sized public engineer's work is primarily "process delivery" – keeping public works running according to a relatively routine but very demanding "process". Large public agencies have engineering staff who function to deliver projects.
- Consultants involved in management or marketing are more process delivery focused than those involved in project engineering (project delivery).
- Most consultant's work is involved in delivering a specific project, with each project having a discrete beginning and end – project delivery.

Experience

It is important to note that one often cannot fully comprehend the true nature of a career path without working in that career. Engineers whose aptitudes and values ideally fit a given career path may not get on that path simply because they have never had the opportunity to experience the work associated with that path. For those who happen to find their right fit by chance or by design, or who happen to be geographically constrained (another life-style choice), experiencing other career paths may not be an option. For others, however, it is.

Finding Where You Belong

See the table below for a general guide to finding where you belong, based on aptitudes, values, interests and lifestyle choices.

Legend
- ● Typical for this "business"
- ●● Atypical for this "business"

General Guide to Finding Where You Belong			
About you	**Government Agency**	**Consulting**	**Construction**
Prefers process delivery	●●	●	
Prefers project delivery	●	●●	●●
Prefers the challenge of project delivery with tight budgets		●	●●
Enjoys project engineering AND working with contractors AND can tolerate the stress of dealing with the world of "low bid" contracting	●	●	●●
Enjoys the concept phase of project delivery, but not the detail phase.	●●	●	●
Does not enjoy design engineering but enjoys working with contractors	●	●	●●
Enjoys contract law	●	●●	●●
Enjoys teamwork with public works crews	●●	●	
Has exceptional leadership ability	●●	●	●●
Has exceptional project management ability	●	●●	●●
Prefers working long hours at engineering and being financially rewarded for it		●	●●
Enjoys continuous specialized technical learning (deep learning)	●	●●	
Enjoys continuous general learning (broad learning)	●●	●	●
Values public service	●●	●	
Is a perfectionist	●	●	
Enjoys selling		●●	
Prefers rigid work rules	●	●	
Enjoys mechanical design		●	
Prefers living outside a metropolitan area	●●	●	

Finding the Right Type of Government Agency

Public service is not a popular term today, but is as real as it has ever been. All engineers care about people. It is only a matter of degree. Somewhere there is a line separating those who care enough to be called public servants. For those with strong public service values, working for a government agency is the only real option.

Of the non-government career choices for those who have public service values, municipal consulting is the best option. This relates to the fact that municipal consultants often function as an extension of staff for small cities and districts.

If choosing Government as your "business" of choice, the following discusses the three categories of government agencies available for most civil engineers. It is important to note that government agencies within these categories vary considerably. These are very general categorizations.

Federal and State Governments

Federal and state governments are distinguished by the fact that most, but not all, are highly bureaucratic. Their engineering tends to be highly codified. For many, the word "bureaucracy" has a negative connotation. This is based upon cultural influences, not fact. A bureaucracy is nothing more than an organization whose function is largely dictated by rigid rules and procedures. Such rigidity is essential for many organizations for many reasons. For such agencies as the US Corps of Engineers and most state highway departments, the bureaucratic structure offers the opportunity to do exceptional technical engineering.

For the right set of aptitudes, values, and lifestyle choices large federal and state bureaucracies offer a rewarding career and the opportunity to become professionally self-actuated. The key, however, is tolerance for rigid rules and procedures, as well as the many perspectives that those rules and procedures serve to keep the peace.

County and Municipal Local Government

As compared to other governments, what distinguishes local government is the connection they have to community. This of course, varies inversely by size. In fact, large local governments are as bureaucratic as are many federal and state governments, and thus not closely tied to community. On the other hand, large government agencies tend to be like consulting firms in that they offer an opportunity to focus upon project delivery as opposed to process delivery which is largely the only opportunity engineers with small government agencies have.

The smaller the local government, the more vulnerable an engineer is to drastic changes in political views and resulting policies which impact engineering. For the smallest of these governments, job security can become a challenge due to the potential for these political changes.

Special Service Districts

Like all governments, these are difficult to categorize. They may or may not be closely connected to community. What distinguishes districts is that they offer specialized engineering opportunities, particularly for the very large districts. Special service districts tend to be less politically volatile than other local governments, and thus more stable.

Finding Where You Belong in Government

The following is a general guide to finding where you belong if Government is your choice.

Finding Where You Belong – Government			
About you	**Fed/State**	**County or City Local Govt**	**Districts**
Prefers process delivery	●	●	●
Prefers project delivery	●	●	●
Enjoys project engineering AND working with contractors AND can tolerate the stress of dealing with the world of "low bid" contracting	●	●	●
Enjoys the concept phase of project delivery, but not the detail phase.	●	●	●
Does not enjoy design engineering but enjoys working with contractors.	● (Construction department)	● (Construction department)	
Enjoys contract law	●		

Finding Where You Belong – Government			
About you	**Fed/State**	**County or City Local Govt**	**Districts**
Enjoys teamwork with public works crews		●	●
Has exceptional leadership ability	●	●	●
Has exceptional project management ability	●	● (if large)	● (if large)
Enjoys continuous specialized technical learning (deep learning)	●	● (if large)	● (if large)
Enjoys continuous general learning (broad learning)	●	●	●
Values public service	●	●	●
Is a perfectionist	●	● (if large)	● (if large)
Prefers rigid work rules	●	● (if large)	● (if large)
Prefers living outside a metropolitan area		● (if small)	● (if small)

Finding the Right Type of Consulting Firm

If choosing Consulting, the following discusses the five different types of firms that comprise most civil engineering jobs for consulting firms. A summary is below, with more details following:

- Corporate. Differentiated from other firm types by exceptional sales and time management.
- Support. Differentiated from other types by the fact that civil engineers support other disciplines.
- Municipal. Differentiated from other types of firms by their focus upon small to medium local government, and the close working relationship they have with their staff (facilitated by the fact that their smaller average project size result in more frequent contact).
- Development. Differentiated from other firms by their focus upon land development.
- Specialty. Differentiated from other firms by a specialized highly technical focus.

The differences between these types of consulting firms are often difficult to understand, for several reasons. The primary one is that they frequently overlap in their clients and projects. Despite this challenge, there are real differences in these firms and they equate to differences in the people who thrive with them. Consider the following:

- For most engineers, there is more than one type of

Water/Wastewater vs. Transportation

Consider the following when thinking of firm types that you are generally interested in:

- Large corporate firms often provide both water/wastewater engineering and transportation engineering. Small corporate firms typically focus upon one or the other of these categories of work.
- Water/wastewater work is more stable in the long term.
- Transportation work, like development work, is subject to significant fluctuations in workload, with high profits during the upswings, and unemployment during the downswings.

consulting firm that affords them an opportunity for a satisfying career, but generally speaking, only one that is a more or less perfect fit.

- That "fit" is mostly a matter aptitudes and lifestyle choices, with values being somewhat of a factor in municipal and development consulting.

Corporate

Corporate firms range widely in size and services provided. What they have in common is that they compete on the basis of their marketing, with that marketing typically directed at being viewed to have "high value" expertise so as to cover the "high cost" of marketing. All of these firms have multiple offices, which offers them considerable opportunity to leverage their expertise. For the larger firms, that effort is supplemented by the effective use of political influence through lobbying and "revolving door" hiring. For the smaller of these firms, which tend to focus on water and/or wastewater, the "high value" strategy is supplemented (and reinforced) by close involvement in professional technical organizations such as AWWA and WEF. Small corporate firms tend to compete on the low technical end of "high value" projects, while large corporate firms tend to focus upon the high technical end. Significant features of corporate firm career choices are:

- Because engineers with the larger of these firms have the opportunity to focus on large complex projects, this affords opportunities for engineers with strong technical and management aptitudes. For all corporate firms, there are opportunities for those who are very strong in sales, or exceptionally strong technically.
- For engineers who are strong technically, but weak in production, these firms are an excellent choice because the strength that corporate firms have in marketing allows higher fees and less demands upon production.
- Corporate firms often frustrate engineers with strong technical aptitudes who do not have high sales/management aptitudes. This is due to the high value corporate firms place upon sales/management. For such individuals, Specialty Firms often provide a more satisfying career.
- Corporate firms tend to staff up to do large projects and then cut back when they are finished. In cutting back, they keep the engineers whose aptitudes best fit their business and cut the rest or offer a transfer to another "big project" location.

Support Firms

Support firms are very diverse. What they have in common is the fact that civil engineering is not their key discipline. They are similar to corporate firms in many ways, but are different in that they offer one or more specialties (architectural, structural, environmental, or landscape architectural) which they rely upon to compete more than their marketing.

Significant features of support firm career choices are:

- Although many of these firms offer stable employment for civil engineers, they have tended to be less stable than corporate firms.
- These firms have grown considerably in the past ten years for a variety of reasons, including the growth of federal and state work, as well as the growth of environmental regulations. In many cases, the civil engineers with these firms have not shared in the benefits of that growth because they were not its significant driver.
- If your technical and production strengths are moderate, civil support firms may be a good fit.

Municipal

Municipal firms are differentiated from other firms in that they focus upon less bureaucratic local government and tend to function as an extension of staff. As such, they are the one type of consulting firm where an engineer can find an outlet for public service. These firms are an excellent place for engineers with moderate technical strength and high production capability. Their projects tend to be relatively small, and thus less profitable, which requires strong production ability. Significant features of municipal firm career choices are:

- These firms have not thrived over the past decade or two, due to a variety factors, most notably the ever-growing financial challenges faced by local government.
- Basically these firms depend upon relationships built through successful projects as opposed to marketing for their workload.
- For a new or less experienced engineer, these firms offer a great opportunity to explore career options.
- For a more experienced engineer, municipal consulting may not offer as much as other career choices unless that engineer values what is unique about municipal consulting: being more closely involved in a community, working on a broad variety of projects, less need to market, and being involved closely with public works contractors.

Development

Development firms are challenged by the highs and lows that come with development. Many of these firms have a heavy hand in public road work. Significant features of development firm career choices are:

- They are a great fit for those "project delivery focused" (as opposed to "process delivery focused") engineers who want to work a lot and get paid for their effort and are willing to tolerate the market fluctuations.
- They are a great fit for those whose who are less technically focused and do not want to work in the public sector.
- They are a great fit for those who want to own their own business, and/or engage in land development.
- Some of these firms do exceptionally interesting projects and work with equally exceptional developers.

Specialty

Specialty firms are very focused firms with engineers having high technical aptitudes and interests. Those who tend to choose this path often have a low tolerance for bureaucracy and/or being managed by those who are more process oriented than technical. They are a great fit for those who are very strong technically.

Finding Where You Belong in Consulting

The following is a general guide to finding where you belong if Consulting is your choice.

Legend
- ● Typical for this "business"
- ●● Atypical for this "business"

Finding Where You Belong – Consulting					
About you	**Corporate**	**Support**	**Municipal**	**Development**	**Specialty**
Prefers process delivery	●●	●			
Prefers project delivery	●	●	●●	●●	●
Prefers the challenge of project delivery with tight budgets			●	●	
Enjoys project engineering AND working with contractors AND can tolerate the stress of dealing with the world of "low bid" contracting		●	●●		

Finding Where You Belong – Consulting					
About you	**Corporate**	**Support**	**Municipal**	**Development**	**Specialty**
Enjoys the concept phase of project delivery, but not the detail phase.	●● (if sales skills are high)	●			
Does not enjoy design engineering but enjoys working with contractors.	●● (cm)	●● (cm)	●		
Enjoys contract law	●	●	●●		●
Enjoys teamwork with public works crews		●	●●		
Has exceptional leadership ability	●				
Has exceptional project management ability	●●	●		●	
Prefers working long hours at engineering and being financially rewarded for it			●	●●	●
Enjoys continuous specialized technical learning (deep learning)	●●	●			●●
Enjoys continuous general learning (broad learning)		●●	●●		●
Values public service			●		
Is a perfectionist	●				●●
Enjoys selling	●●	●		●	
Prefers rigid work rules	●●	●		●	
Enjoys mechanical design	●●	●	●		●
Prefers living outside a metropolitan area			●●	●	●●

Step 3: Becoming an Excellent Municipal Engineering Consultant

If you advanced to Step 3, you have decided to either become a municipal engineering consultant or are considering that career path in conjunction with another. To achieve success on the Municipal Engineering Consultant career path, you must:

1. Have public service values. They may not be as strong as those engineers who work for public agencies, but they have to be present to some extent. The reason is simple – it helps deal with the challenges of letting "public" decisions influence your engineering.
2. Be "project delivery" focused as opposed to "process delivery" focused. Municipal engineering consultants exist to deliver projects.
3. Be highly productive. Municipal consultants work for local government, which is the one government with the most financially challenged of all governments. Your work will always be "fee" challenged.
4. Have project management capability. This relates a little to #3 above (good project management helps with the "fee" challenge). In the long-term, Municipal Engineering Consultants must become project managers to achieve a decent salary. Unfortunately, unlike Support and Corporate career paths, there is no "back seat" for a municipal engineer on the Municipal Engineering Consultant career path.
5. Enjoy more "flexible" project delivery as opposed to "rigid" project delivery. In short, what distinguishes municipal engineering from other engineering is the opportunity to tailor design and specifications to the unique needs of a project as opposed to a more rigid approach where you can rely upon procedures and guidelines.
6. Enjoy collaborative decision making. For the same reason that municipal engineering involves "flexible" project delivery, a municipal consultant must be adept at collaborative decision making with those having perspectives that are different from yours. Those who have different perspectives which need to be considered in your decision making include:
   - Client engineering staff who see the political implications of their work differently than you.
   - Client operations staff who see maintenance implications of your work differently than you.
   - Environmental regulators who see regulations differently than you.
   - Contractors who see public works construction differently than you.

   If you are an extreme specialist, as opposed to a generalist, collaborative decision making will be a challenge. If a specialist, you can be a municipal consultant, but will have to work upon understanding differing perspectives, be more selective in your projects.
7. Be capable of expanding relationships. This is a challenge for "non-salesmen" (extreme introverts, for example). Such individuals may be superb municipal engineers, but in the long term take a back seat to salesmen. Municipal consulting has no "back seat". Our Core24 Program was developed to help such "non-salesmen" become successful municipal engineering consultants.

Core24 Program

Those whose aptitudes and values fit the municipal engineering consultant career path perfectly will become "seriously civil" without training. Core24 provides such training. That program involves the following six efforts:

1. From day 1, start working on building PM skills.
2. From day 1 start building your teamworking skills.

3. As soon as possible (it takes a few years) gain experience in the Core4 Systems (water, wastewater, street, and drainage systems).
4. As soon as possible (hopefully within a decade) select one of the six potential "PM Lanes" in your municipal consulting career path.
5. Focus your learning, experience, and networks upon those Core24 projects within your preferred "PM Lane".
6. If you are not inclined to sell, and/or not inclined to network, become a Core24 Counselor. That will help mitigate what is in fact a serious handicap unless acknowledged and managed. View yourself in a battle with salesmen who add nothing to the value of consultancy. Core24 can help you win that battle.

Building Core24 Technical Skillsets

To succeed in municipal consulting, an engineer must master a handful of project specific technical skillsets. Our professional development program focuses upon building these skillsets in a handful of Core24 projects (see list below). Although there are exceptions, most successful municipal consultants must master several Core24 project technical skillsets. This relates to the fact that municipal consultants generally work in a relatively small geographic area. To keep busy in the long term, a successful municipal consultant must be capable of managing several Core24 projects.

In general, EIT's lack the experience to know which Core24 projects interest them. They are given the opportunity to obtain broad technical experience (water, sewer, street, and drainage projects) to help discover those interests. As they gain more experience, they gain a clearer understanding of what their best fit is.

In addition, because municipal engineering is about construction as much as design, we strive to ensure that engineers obtain field experience as inspectors and/or construction managers closely involved in several major construction projects, particularly those in which they had active design involvement.

The table below lists Core24 projects.

Core24 Project Types			
Water	**Wastewater**	**Street and Sitework**	**Drainage**
Water plan	Sewer plan	Corridor plan	Drainage plan
Distribution (special site, control of work, or design challenges)	Submersible pump station with force main	Residential street	FEMA studies
Booster pump station	Gravity sewer	Main street	Conveyance
Pressure evaluation and control	Gravity sewer rehabilitation	Arterial street	LID
Metering and leak detection	I/I evaluation and management	General sitework	Detention/water quality
Steel reservoir	Odor control	Bike and pedestrian paths	
Concrete reservoir			

Project Delivery Guides

An important part of our professional development program is its integration with our ongoing effort to improve the efficiency and quality of our project work. Each engineer is assigned responsibility for maintaining a Core24 Project Delivery Guide for one of the Core24 projects. An attempt is made to assign an engineer that Guide that best fits their career goals.

Building Teamwork Skillsets

Teamwork is essential to delivering quality engineering efficiently. This includes teamwork with coworkers and subconsultants as well as the client. One part of developing teamwork skills is to start with understanding yourself, and how you best work with others. This helps lead to an understanding of the wide variety of perspectives of those with whom you work.

Communication is also a key part of developing teamwork skills, and communication training is applied uniformly to all engineers.

Building Project Management Skillsets

Becoming an effective project manager is key to a successful career in municipal engineering. Because learning project management is largely a function of one's experience, our goal is to push project management responsibilities down to the lowest level possible.

Communication skills, discussed above, are an important component of a successful project manager. Managing relationships is also important. Although relationships are as largely dependent upon communication skills and values as much as anything, they can be managed. We help foster relationships by aligning Core24 goals with professional organizational objectives as much as possible.

Municipal Consultant Project Categories

Due primarily to the synergistic effects of learning, the vast majority of municipal consultants eventually fall into only six categories of project expertise, which are listed in the table below. The vast majority of their project expertise is either entirely in water, wastewater, street, or drainage engineering (four categories) or is a combination of water and wastewater projects or street and drainage projects (two categories). The relationship between these is shown in the table below.

It is important to note that the previous statement regarding the importance of having skills in a "handful" of Core24 projects does not mean that expertise in an individual project type cannot support a successful career as a municipal consultant. This can be the case if, in fact, an individual is very strong in one of those project types, and manages their career properly. For instance, there are successful municipal consultants whose only project skill is water or sewer planning. They compensate for their narrow focus by offering services over a broader geographical area.

Long-term Skillset Categories			
Project Manager	**Essential Core24 Project Expertise**	**Valuable Supplemental Expertise (one or more desired)**	**Professional Organization**
Water Specialist	Water plan Distribution Booster pump station Pressure evaluation and control Metering and leak detection Steel reservoir Concrete reservoir	* Basic disinfection and source protection * pH control facilities * Basic iron & manganese treatment * Ground and surface water supply	Active involvement in AWWA is essential
Wastewater Specialist	Sewer plan Submersible pump station with force main Gravity sewer Gravity sewer rehabilitation I/I evaluation and management Odor control	* Simple treatment * Outfalls * Sludge management * Pressure sewers	Active involvement in WEF is essential

Long-term Skillset Categories			
Project Manager	**Essential Core24 Project Expertise**	**Valuable Supplemental Expertise (one or more desired)**	**Professional Organization**
Water/Wastewater Generalist (you can have less specialized expertise in water or wastewater if you have general strength in both)	Water plan Water distribution Booster PS Sewer plan Submersible pump station Gravity sewer	Pressure evaluation and control Metering and leak detection Steel Reservoir Concrete reservoir Gravity sewer rehabilitation I/I evaluation and management Odor control	Some involvement in either AWWA, WEF, or both is essential
Street Specialist	Corridor plan Residential street Main street Arterial street General sitework Bike and pedestrian paths	Stormwater conveyance Water distribution Sewer collection Detention/ water quality	Active involvement in APWA is essential
Drainage Specialist	Drainage plan FEMA studies Conveyance LID Detention/water quality	* Stream restoration/fish passage. * Drainage pump station	Active involvement in APWA or ASCE is desirable but not essential
Street/Drainage Generalist (you can have less specialized expertise in street and drainage if you have general expertise in both)	Residential street Arterial street General sitework Bike and pedestrian paths Stormwater conveyance Drainage plan Detention/water quality	Corridor plan Main street FEMA studies LID Water distribution Sewer collection * Stream restoration/fish passage. * Drainage pump station	Modest involvement in APWA or ASCE is desirable

** Common project type, but not Core24*

APPENDIX A: Aptitudes and Engineering

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The following discusses aptitude and patterns and how they impact an engineer's work.

Driving Abilities

Inductive and Analytical Reasoning

Reasoning is one of the more important aptitudes for municipal consulting. Combined reasoning aptitudes are of value in assessing your fit as a municipal consultant, but must be evaluated within the context of having a minimum amount of inductive reasoning (as discussed later) and having ample "memory" abilities so as to be able to draw upon the information that is needed to reason (discussed later). Also, for design, strong reasoning is of limited value if you have low spatial relations abilities and low design memory.

The following are several patterns and their impact:

Low Inductive and Low Analytical Reasoning

If these are both are very low:

- The engineer will have difficulty reasoning based entirely on facts. They must rely upon experience, or engineering standards or other codified information to make decisions.
- The engineer should focus his/her career on work that is not varied, which does not rely upon creating "new design", and which has decision making highly codified.

Another very important trait, especially for those who rely upon experience, is the ability to accept mistakes. This is as important as any reasoning ability over time. Regardless of how well you can reason, experience is always important. Many people cannot accept their mistakes, however, and thus do not gain valuable experience over time. Those who can accept their mistakes, and who are willing to make mistakes, can offset their low reasoning skills over time.

Low Inductive and High Analytical Reasoning

With this pattern:

- The engineer should avoid work which involves conceptual evaluations of options. He/she will have difficulty performing well during the conceptual phase of a project, where they are developing and/or filtering options which are not fully developed. They tend to over-engineer options that are ultimately rejected. They want "detail" to support their decision making, where such detail either doesn't exist, or is not efficient to gather at this stage.
- They should focus on work where design is codified (design standards).
- High Analytical engineers sometimes have a problem in completing a project when one or two steps are missing; i.e., they can get bogged down in detail that may not be essential to project completion. The people that are medium to high in the Inductive reasoning can get a better idea of the 'big picture', thus avoiding too much attention to completing every 'step' of a project perfectly.
- Analytical reasoning is most important in the later phases of the project, where decisions have been made regarding the basis of design, and being able to organize production is the major task to be completed.
- In choosing between water/wastewater or street/drainage Core24 projects, street/drainage offers more opportunity.

Average to High Inductive and Low Analytical

This pattern indicates:

- An engineer with high inductive reasoning is well suited to conceptual decision making – the preliminary stage of most engineering. In general, complex water and wastewater projects require higher inductive skills than do street and drainage projects. Inductive reasoning is the only way one can reason in the conceptual phase of engineering decision making because it requires drawing conclusions where minimal detailed information is available.
- With this pattern, it will be advantageous for the engineer doing the conceptual engineering to partner with an engineer high in Analytical, who can assist with the more organizational project work.

Idea Productivity

High Idea Productivity

- Civil engineering in general is not about "ideas". High Idea Productivity thus is of no value. In fact, unless controlled it can be curse.
- An engineer with high Idea Productivity should learn to live with that curse, or find an outlet outside of work. In particular, they should recognize that the many ideas they have are probably of no value.
- They should recognize that high Idea Productivity can make communication difficult, because they may have problems focusing.

Spatial Relations

Strong spatial abilities are important to civil engineering. In general, people low to medium in both will be more interested in working with ideas or relationships than with concrete objects.

Combined Spatial Score

High scores in both spatial abilities are ideal, but having at least a medium to high score in each will provide an opportunity to succeed in engineering. In general, being on the upper end of the combined spatial abilities score is most advantageous with complex water and wastewater projects, where design is more three dimensional than transportation projects. The implications of being high in one and low in the other are:

High Spatial Relations Theory and Low Spatial Relations Visual

An engineer with this pattern will be able to understand how the project works as a whole, but can have problems visualizing the whole or individual components in three dimensions in his/her mind.

Low Spatial Relations Theory and High Spatial Relations Visual

An engineer with this pattern will be able to easily visualize components in three dimensions, but can have problems seeing the project as a whole, and how each component impacts others.

Specialized Abilities

Design Memory

High Design Memory

Having a high design memory is important in design, more specifically for complex water and wastewater projects. It enables the engineer to recall other designs that may be relevant to the project being worked on.

Low Design Memory and Low Spatial Relations

Engineers that are low in both of these will in general have less ability with design, particularly for more complex projects with mechanical elements, and should keep it in mind when choosing a Core24 goal.

Observation

Being high in this ability is the most important in construction inspection, where attention to detail and noticing small changes is crucial. It's also useful in noticing consistency in plan sheet layouts, and other items of that nature.

Verbal Memory

High Verbal

Verbal memory is important for contractual issues, report preparation, or other "word" functions.

Low Verbal

An engineer low in Verbal Memory will struggle with tasks requiring it, no matter how high he/she is in reasoning or spatial abilities. In addition, if the Core24 project type you are focusing on requires extensive learning through written material, being low in Verbal Memory can hinder your progress, and should be taken into account when choosing your goals in this regard.

Those low in this ability can figure out other ways to compensate for it. This can mean:

- Taking more time and effort to learn written material.
- Using other learning channels you are high in. For example, if you are medium to high in tonal memory, it can help to read aloud. Or if you are medium to high in design memory, look for information in chart or graphic form, or videos, if any is available. Such alternative methods may or may not be applicable.

Number Memory

The ability to remember numbers and miscellaneous facts is useful in engineering, but not crucial. If you are low in this, make sure you record important numbers and know how to access them easily. This can mean in a spreadsheet, app or handwritten. If you are medium to high in Design Memory, it can be helpful to write these down or put into a graphic chart if applicable, and post on the wall near your desk.

Most people low in this ability can remember the numbers that are most useful to them in their work.

High number memory can be useful in estimating, specification writing (remember spec sections), and other similar work.

High Number Memory and High Verbal Memory

This combination is perfect for the "admin" side of project management – preparing specs, scopes of work, contracts, budget tracking, etc.

Tonal Memory, Rhythm Memory and Pitch Discrimination

Tonal memory is the ability to remember melody, and is basically being able to remember what you hear – whether it be music or conversations. Rhythm memory means being able to remember rhythms, and pitch discrimination is the ability to distinguish between musical pitches.

These abilities all contribute to being able to remember the spoken word. While they are not as important in project production, they are important in communication, contributing to better being able to work with a team and with clients. Being medium to high in all, but especially tonal memory, means you'll be able to remember conversations easily, and will make it easier to understand the other person's point of view.

Understanding Aptitudes and Working With Others

One of the most important aspects of understanding your own aptitudes is gaining an understanding of the aptitudes of those you work with, especially those that are radically different. Even though you may not know another person's level in any one aptitude, some of these often become apparent when working with the

person. Examples to be considered when working with team members in the office, subconsultants, or clients are:

- Those who prefer long emails vs phone calls or face to face meetings (those with high introversion and high verbal memory, vs those with higher extroversion and lower verbal memory).
- Those who prefer graphic rather than written explanation (those with higher design memory then verbal memory).
- Those who prefer to work on their own on an issue rather than collaborate with others (higher specialist rather than generalist; also to some extent, those who are more introverted).
- Those who prefer a logical step-by-step process and have a hard time seeing the big picture (high analytical reasoning and low inductive reasoning).
- Those who seem to rapidly make decisions and may find it difficult to explain how conclusions were drawn (high inductive reasoning and low analytical reasoning).
- Those who seem not to remember conversations, either phone or in person (low tonal memory). In those cases, it's advantageous to follow up with a written email.
- Those who never seem to read emails, especially long ones (low verbal memory). Keep emails short and follow up with a phone call or in person visit.