

Engineering and Infrastructure

Planners have a great opportunity to guide future growth and development within their community.

With this opportunity comes the responsibility for the planner to have a broad understanding of the myriad of elements that contribute to a successful community, from the natural environment to social welfare, from building design to recreation. One important element that planners need to know about, but may not fully understand, is infrastructure – the networks of transportation, communication, sewage, water, energy and similar facilities and services that are fundamental to a well-functioning community.

Whether working on a master plan update or reviewing a site plan for new development, planners are asked to consider whether the plan or development would be “adequately served by public infrastructure.” Do planners know enough about infrastructure to answer this question?

Below are a series of questions posed by a planner and answered by an engineer:

1. What should planners be thinking about when they write plans?

Long-range master plans should be coordinated with a community’s ability to serve the ultimate population. They need to consider existing and planned infrastructure capacities for the various utility systems such as water and wastewater. Some master plans document existing available infrastructure facilities and networks, but little more. Future visions and concepts for growth and development are outlined in the plan, but little thought is given to the resulting impact to infrastructure systems. Does the community’s wastewater treatment plant have adequate capacity, now or planned in the future, to serve a new high-density residential district or light-industrial district? A community’s leaders must consider all



of this during the planning process, which means that the community’s infrastructure experts – DPW directors, municipal engineers – need to be engaged.

Ideally, the community has prepared and actively updates a long-range infrastructure master plan, which will outline current capacities and limitations as well as plans for utility line extensions and system upgrades. The community’s land use master plan and infrastructure master plan need to be closely coordinated.

The master planning process is also an opportunity for leaders to engage and educate the public on best practices and establish policies that reduce demand on

infrastructure systems, such as green infrastructure and low-impact development techniques.

2. How does infrastructure influence implementation of the plan over time?

Planners must ensure that the timing of new development and redevelopment corresponds to available infrastructure capacities. For example, even if the master plan supports a proposed rezoning, planners should consult with the DPW director or the municipal engineer to confirm that adequate infrastructure is also available to support the proposed rezoning.

3. What are the primary objectives of the engineer as it relates to the design of infrastructure systems?

Key objectives include operation, maintenance and cost. From an operational standpoint, an engineer ensures that systems are designed efficiently and in such a manner to be reasonably extended. With regard to maintenance, engineers ensure that those systems can be maintained efficiently over time. A properly designed site will offer convenient access to key utility facilities for the purpose of long-term maintenance. Finally, the engineer's choice of design is greatly impacted by cost – not only short-term construction costs, but also long-term maintenance costs. As planners formulate master plans, craft land development codes, and review site plans, make sure to consider how your decisions may impact these key objectives.

4. What should planners be thinking about when they review site plans?

- Stormwater management is a key driver of site design. Hewing to natural characteristics of the site (i.e., topography, existing drainage patterns), ensures that the site is efficiently laid out for stormwater management. Additionally, a well-designed site can turn stormwater facilities from eyesores and safety hazards into site amenities.
- Design for the right size and scale of certain infrastructure requirements. For example, understanding traffic flow and the space necessary for vehicle turning movements can be the difference between a tight site and a well-functioning site. It's easier to plan ahead than to retrofit after the fact.
- Look for conflicts between site improvements and utilities to ensure access for regular maintenance and future replacement. Avoid constructing buildings within a utility easement. Other site improvements, such as pavement, fences and trees can be located within utility

easements, but be aware that utility maintenance or replacement may require moving or replacing the site improvements.

- Check if the utility systems are designed to be easily extended in the future. Require drives and stub utility lines to extend to the adjacent property lines. Additionally, utility lines may need to be “upsized” to accommodate anticipated use by adjacent future development.
- Engage your engineering friends early on in the process. This will help identify red flags and unnecessary delays in the development review process.

5. What do planners miss or are they generally not aware of?

Planners should be aware of the agencies having jurisdiction over various aspects of site development. This awareness puts planners in a position to facilitate a coordinated and efficient review process. Too often, local review and approval is finalized without any input from outside agencies. This can lead to unnecessary delays, confusion, frustration and finger-pointing. A first step is figuring out which outside agencies may have jurisdiction. These may include state agencies (MDOT, EGLE), regional authorities (water/sewer), counties (road/drain commissions/health department) and others, such as gas, electric and communication providers. Even if these agencies are not able to be involved early on, planners' familiarity with goals and standards will be beneficial to the review process. Establishing relationships with these agencies is important – reach out and meet with them, or invite them to attend a planning commission meeting.

MAP's Board has adopted a series of policies, many are related to infrastructure including Solid and Hazardous Waste Management Policy, Surface Transportation Policy, and Infrastructure Policy. These policies are available at MAP's website and we'll provide links in the

January 2020 E-Dition. Also, MAP is developing its newest workshop series, which includes topics such as Utilities, Parking, and Asset Management. Contact MAP staff if you are interested in scheduling a workshop.

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