

The seven habits of highly effective small cells



4site identify seven steps to simplify and streamline small cell rollout

IoT and remote keyhole surgery might be looming on the horizon, but right now what's needed is densification, and in urban areas in particular this often means small cells. And while you don't need a degree in particle physics to get it right, there are a few simple steps which are often overlooked or rushed when it comes to deploying small cells – with costly consequences. We spoke to Ian Duggan, CEO of innovative managed services provider 4site, to find out what preparation is needed to underpin a successful build.

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Read this article to learn:

- Which stakeholders have to be engaged for small cell deployment
- Considerations for site planning and design
- Accessing power and services for your small cell network
- Understanding and meeting MNO demands
- Effective KPIs for your build



With wrap-around tri-sector stealth antenna



Shrouded antenna complete with GPS & WiFi access point



Pre-cast concrete cabinet plinth



Street light before installation



1: Multiple stakeholders

So, you want to deliver targeted extra bandwidth for mobile voice and data – maybe even deliver free public Wi-Fi while you're at it – and you're thinking of small cell? Well, get ready to negotiate.

Buy-in is needed from local government and planning authorities, equipment vendors who make the base stations, mobile operators, infrastructure owners and landowners to name just a few. Buy a big packet of biscuits [KO1] because it's going to be a long meeting with lots of chat and lots of competing agendas!

In reality, of course, it's going to take more than one meeting and real patience: combining all parties' perspectives and working to come up with a solution that delivers the coverage where it's needed while also making commercial sense for all concerned, with a design acceptable to all. For what it's worth, 4site's view is that the most feasible solutions are multivendor hubs which establish small cell infrastructure that competing mobile operators can use as a shared resource to deliver services to their own end customers.

Consultation, early engagement and multilateral buy-in are needed to realise the vision of a highly connected, high bandwidth area.



2: Site selection and design

It's important to recognise that putting together a small cell network isn't as easy as putting up some equipment and hoping for the best. Our experience in designing these networks has shown that site selection, which is critically important, is all too easy to overlook if the parties involved don't have an appreciation of the real needs of a radio network. Concrete structures stop a wireless signal dead – that's why it's so difficult to get indoor coverage in large buildings – while metal and glass bounce around a radio signal, posing challenges for the receiving device.

Specific, in-depth knowledge is needed to design the network because complex technical solutions are required to deliver results – these are complex projects with (for example) building constraints, property issues and budget constraints. Experience and know-how will save a lot of time and reduce the risk. Design-led thinking is critical to getting the right results. Passive and active design need to be combined in order to get the optimal solution. Good design will not only ensure the best operational network is built but also can minimise potential for planning issues. For example, outdoor equipment is needed so how is that going to look? Make it as stealthy as possible to ensure it doesn't impinge on the local environment will reassure local citizens and businesses.

Be creative – one cabinet does not fit all – equipment can be custom designed to suit the purpose.



3: Planning

Network planning is critical to the process of designing and building the small cell network. A wireless site survey has to be conducted to provide the foundation for the small cell network design. Don't underestimate the elements needed for this survey, and don't rely on existing plans and information available – our experience is that they are most likely out of date or inaccurate.

The technical tools to assist in these surveys have developed so much in recent years that its not surprising that we can deliver much more accurate survey data today. For example we use GPR (Ground Penetrating Radar) to precisely map utilities and reduce risks that might occur in the build phase of these projects.

Don't assume planning requirements – plan early in relation to any interaction with local planning

authorities – early engagement is key and will definitely lead to better delivery times.

The planning phase allows us to design around the constraints that are identified – constrains such as space, power, structural (buildings), and cost for example. Having all our ducks lined up at the start allows us to be innovative, accurate and optimal in the design stage.

4: Power and services

When it comes to designing small cell networks, specifically when it comes to site selection, services to the potential site must be considered. Each mini radio base station is going to need electrical power, as well as fibre connectivity into a common backhaul provider, like BT or Liberty Global.

A critical component of getting the solution right is understanding the urban area; what utility services exist, underground as well as overground, and designing for that. Providing power to the small cell base stations in a cost-effective way is important to the overall commercial viability of the project. Looking at innovative ways to exploit off-grid – green energy sources come into play in the design and planning process.

The ultimate aim of these projects is to increase service availability and improve the end-user experience cost-effectively.

5: Delivering on MNO demands

The mobile operators are looking to these projects to solve the ever-increasing demand for capacity and service. But in an industry where margin is everything, they need to deliver at an acceptable cost. Matching the operators' expectations on cost is challenging. Small cell networks allow IoT to be enabled and new applications to be delivered by and for all stakeholders. So who should foot the bill?

The financial model is as yet undecided with several approaches being taken. In one such project we're working with the MNO directly – they have taken the initiative to work with the local authority and develop the network – they're doing it themselves in order to achieve the cost base they need. In another project we're working with the infrastructure owner as the project owner, and developing a shared service model where several MNO's can sign up for service on the new network, paying a 'rental fee' for the service.

We're working toward a 'plug and play' model – cheap and self-configuring. With effective design, planning and developments in new technology this approach should be achievable.

6: Backhaul

Backhaul is vital for small cells – small cells mean we can off-load traffic like voice, data and video, from the macro network and deliver high capacity bandwidth locally. But a dedicated transport network is needed to support the small cell base stations. In dense urban areas a combination of wireless (for the last few hundred metres) and fibre (where available) is ideal.

It's important to determine what is available in the area where the network is to be deployed. Part of the planning process will be to look at site selection in relation to access to backhaul – if you have to put in additional access links (e.g. lay fibre) to get the capacity needed then from a cost perspective the deployment might not make commercial sense. Therefore, designing around the backhaul available is necessary.

7: The build process

The build is the simplest part of the process if the other six points done correctly!

Some key things to consider when building these networks are: Minimise your time on the ground – if you do this you will minimise the cost. If the project is set up correctly then getting a site done (i.e. a hot swap) in a day is the target. Technology is moving apace and self-configuring radio is on the way. New technologies will help with the efficiencies of these projects.

Minimising the risk and making sure there are no surprises is key to keeping everyone happy – minimal disruption to streets and businesses will keep the local authorities, local business and citizens happy and will ensure better cost management and budget control.

With good planning, excellent design and good project management small cells can be relatively easy to install and will deliver a highly scalable, flexible and high capacity network that is life changing for the locality.