

Planning Basics

The first step in model railway construction is the planning. And in planning a model railway, it seems to me, you have to decide what is important to you. Some like shunting, some can't stand it. Some want lots of scenery and almost no track, some the opposite. And so on. To begin, I believe, you should make a list of must haves, nice to haves and also must nots. This is my list -

Must

- British Steam era. I just like steam engines in all their variety. Don't hate diesel, the transition period in the UK up until roughly 1965 is interesting.
- Lots of shunting that is realistic/prototypical. Operations trumps scenery.
- A least one major terminus with a turntable and large MPD because it adds operational interest, especially in the steam era, and allows for a larger total number of engines.
- A junction station because it provides that idea of slow and fast trains, connecting services, marshalling of freight.
- Two smaller stations that can be manned by smaller folks or those with limited experience but still give them interesting tasks
- The capability of through running so that trains can be left to run and not require attention when we are "short-staffed"
- Several stations that are connected so that complex freight and passenger operations can be modelled
- A *sense* of realism without slavish devotion to it
- Real Signalling and Block Bells.

Nice to have

- The ability to run as many different trains from as many different regions/companies as possible without needing to explain myself too much
- Banking/Double-Heading
- A plausible reason for lots of freight and passenger traffic
- Upper and Lower Quadrant signals

Must Not

- Obvious circles,
- sharp radii
- non-prototypical arrangements,
- slavish modelling of a real prototype so that it can be nitpicked by "rivet counters"

Design Evolution

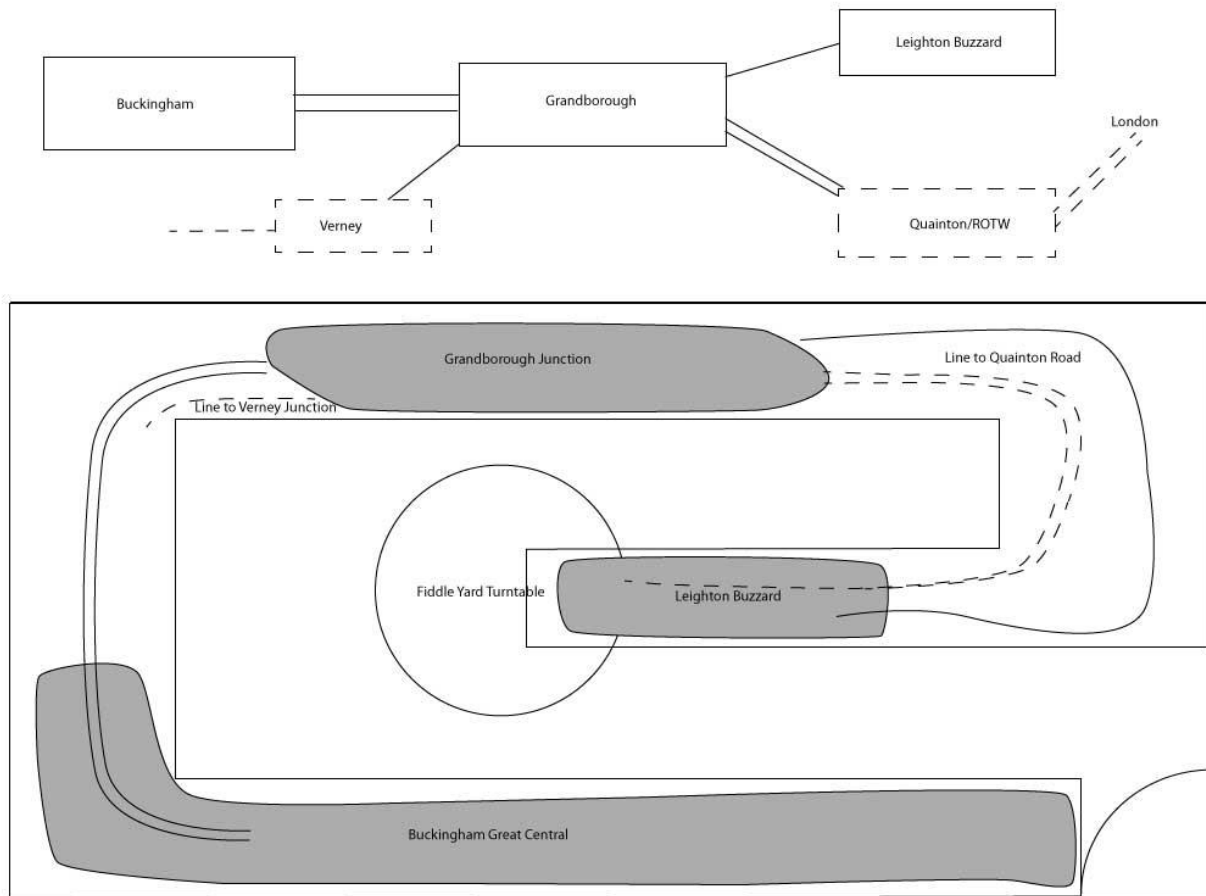
Standing on the shoulders of giants

There is no doubt my own approach to modelling is most directly influenced by Rev. Peter Denny. Of all the layouts in RM, the one that as a youngster captured exactly what I would like to have is Buckingham Great Central. The fascination was for me his self-contained world of several related stations (one large terminus, Buckingham, one junction, Grandborough, one small terminus, Leighton Buzzard). I still remember the thrill of getting his book at the model store in Loughborough. I had to order it and wait 3 weeks (remember those pre-Amazon days?) and it arrived in brown paper - to be ripped open and devoured whole. Peter's design of a large terminus connected via a mainline to a two-way junction which has a branch-line to a smaller terminus, as well as the mainline to hidden fiddle yard has a lot of subtle depths operationally honed over years of experience and several versions. And he had working signalling, block bells and an almost Jules Verne-esque automated signalman built with Meccano - the Automatic Crispin.

A later influence is from an even earlier age - The Rev. Edward Beal. Not so known now, and working in a largely antediluvian pre-RM era, Edward was a true pioneer from 1925 onward, what I know of his efforts comes from a copy of his work "West Midland" published in 1952 that I found on eBay. He was working with a much larger space - 40'x15' - and in it produced a layout with two termini, two through stations, one high-level/low-level junction, a set of docks and a hump shunting yard! With overhead electric sections! All from scratch! The *raison-d'être* was a fictional railway company in a fictional place but operating to real-life operational principles. Clearly this type of fictional "railway empire" has fallen out of favour today. But what is compelling about it is that it was designed to be operationally life-like by following prototype practice. A backstory was created to give it life. Peter Denny himself was influenced by Rev. Beal and produced a fictional story for Buckingham but instead based it in the real world Great Central and its fictional designs on a real county town, and so I resolved to follow suit.

Initially I had thought of something like a later-period Buckingham copy (these days we say "*homage*", don't we? 😊). But then I thought, might it be improved upon operationally instead? In thinking about this, I have two critical advantages over the spare bedroom of a vicarage that initially housed his layout - some extra usable space and the fact that one side of my "room" is open and therefore available to human operators, and doesn't have a door opening into it - so how might I use it to attempt to improve on the master's chef d'oeuvre?

Buckingham schematic and floor plan



Ideas on improving on Buckingham as a plan

In his books, Peter noted a problem with Buckingham as a layout was that the second line from Grandborough Junction (GJ) to offstage Verney Junction led “nowhere” - this only allowed him to use a steam railcar on that line - since a push-pull operation was required. He had even thought about extending a third line to Buckingham to give a “longer run”, but that would have reduced the operational interest at GJ. Additional complex movements of freight or through trains that bypassed Buckingham were thus precluded. He couldn't pull that line into the fiddle yard easily because it would have made for an awkward bridge dividing the room into two.

Idea 1 - The ability to have trains that run through the junction and back to storage would be helpful and increase the types of movements available.

Additionally, there is no through track that bypasses the storage for continuous running at Buckingham - this is not often a problem from the perspective of realistic operations, of course, but it means that all operations have to be attended - and such things as running in locomotives are more complex.

Idea 2 - move the main terminus to the middle of the room, so the outside becomes a complete oval.

What Peter himself diffidently described as his “modest” contribution to the hobby - the train-turntable “Denny Fiddle Yard” - while clearly a technical triumph - is a design problem because the turning of trains requires a large swath of space be kept clear to allow for rotation - cramping the space for operators. It also limits the length of the trains that can be used, as the diameter of the train turntable has to fit into the clear space available. This is less of a problem with Edwardian trains (one of the reasons, indeed, that Peter picked the GCR).

*Idea 3 - I found that by fully using my slightly larger space, I could adopt the common American practice of having a **staging yard complete with a turning circle** and hence dispense with the need for a turntable staging/fiddle-yard.*

Rather than the diameter of the longest train it only has to have a turning circle that is the smallest track circle diameter we can utilise - in my case 48” - whereas the trains to be turned on PDL need to be up to 7 or 8 feet long. The trains do need to be stored at full length but by hiding this loop and storage on a second level directly beneath the main terminus which has to accommodate the same length trains, of course, more operational space can be achieved.

Looking at Peter’s books, I believe a problem with his backstory is that Buckingham is a very large terminus for such a small town. The town does not have the intrinsic need for passenger and freight traffic which would really justify a very frequent timetable. He started imagining it as becoming a cathedral city as a result of its better rail connection! In earlier versions of Buckingham (which some readers preferred) the branch line came into a smaller mainline terminus itself. This added traffic at the terminus as a consequence of that junction independent of the town/city.

*Idea 4 - So a “**through terminus**” looks like a good idea operationally.*

Buckingham is a single company Edwardian model - the Great Central. It’s superb modelling in EM gauge with nothing Ready-To-Run - resulting in the need to scratch-build everything - which is a monumental labour of love I do not have a similar 25+ years to achieve.

*Idea 5 - Today the vast majority of steam locomotives that are ready-to-run are either post-grouping or BR - **so BR it is**, especially as that adds to the chances of visiting engines from other regions. I have always felt the early sixties offers the most scope - there was a lot of older pre-BR equipment about and the BR Standards and also early diesels. But even if something like Buckingham was updated to a later BR period it would be a single region layout (ER or LMR). This restricts the variety of engines and stock one could use.*

Idea 6 - find a reason to have multiple BR regions at work - 2 (or even better 3) of them.

Ideas from the prototype

Border-and-Joint Advantage

Many of the most famous British railways in the steam era were “oddballs” which had either joint running or were stations on the border between companies. Perhaps the best known terminus like this is Bath Green Park (BGP) which hosted two companies (S&DJR and MR) and then two regions (LMR with SR subsequently replaced by WR). There were through trains and also exchange trains, and lots of engine switching. The S&D was single line and steep in places - so banking engines were needed. You can get an idea of this complexity in practice from the excellent signalling simulation program PCRAIL² which has a BGP simulation. BGP was not unique, but it had many useful characteristics - it was on a inter-company/region border, so it was **a large terminus between two regions and all through trains had to reverse and change locos.**

Banking waypoint

Operationally, with DCC, we can now sensibly attempt another reason for lots of locomotives - banking engines and/or double heading. A well-loved station on the former S&DJR was Evercreech Junction³. My theory on why it was so loved is this - it is a **through station with a level crossing where double heading and banking engines** were frequently seen. Lots of engines, lots of movement. But simple in track layout, so a newbie won't feel overwhelmed, Bingo!

More traffic

One other thing that will help with plausibility is a reason for trains to travel to the terminus itself, rather than just pass through to the branch. BGP was essentially a through terminus with only local traffic going to the city Bath itself. What could we do to the terminus to make it a destination in its own right? At this point my mind went back to my youthful, always wet in memory, summer holidays spent in North Wales and a remote terminus at a small country town with lots of traffic - Holyhead! Holyhead itself is a small town, but Holyhead Station was a giant busy terminus, driven by the port which gave direct access to Dublin via ferry. So if **the terminus is a port station**, that will increase the need for traffic.

² "PC-Rail Simulations." <http://pcrail.co.uk/>.

³ [Evercreech Junction](#)

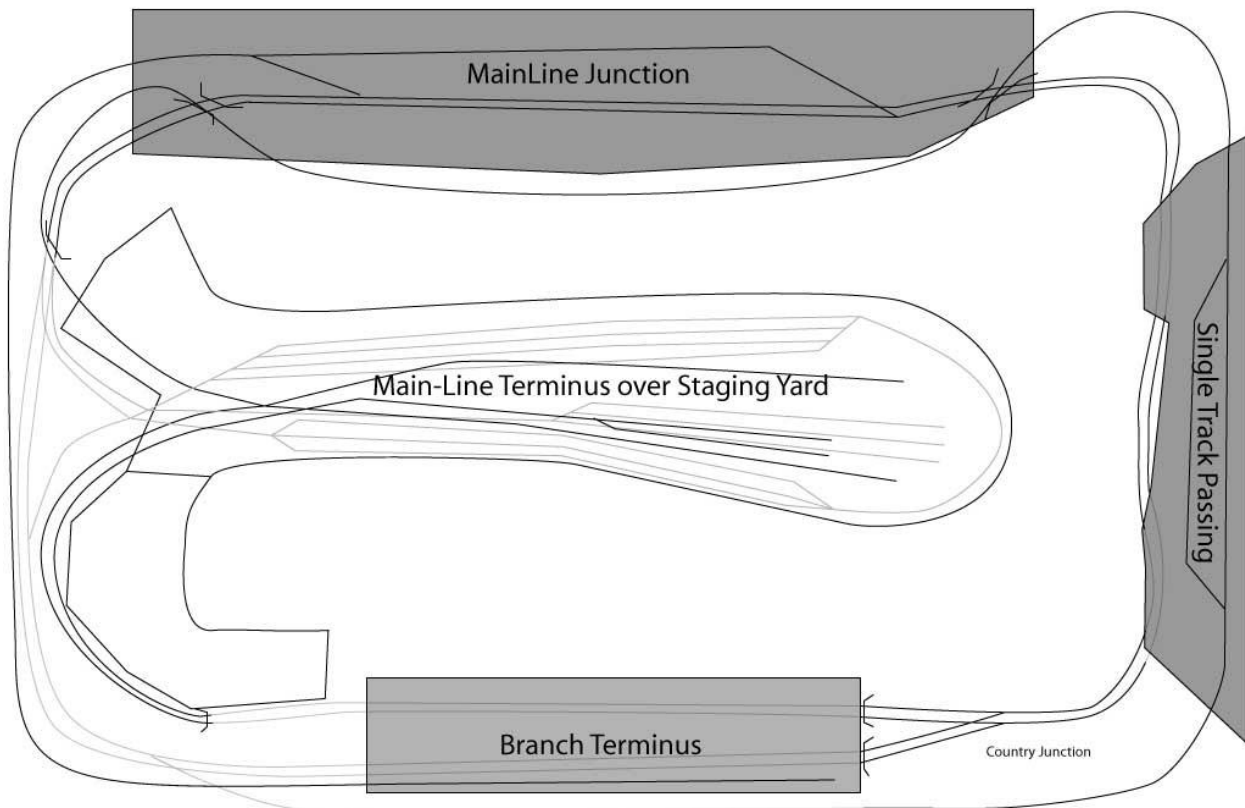
Resulting Layout Requirements

That's it really, a layout with -

- through running ability
- a large/long terminus on a peninsula
- the terminus being above a staging yard with a reversing loop
- that terminus having a "through" secondary route through it
- The period being modelled being later days of steam on BR - 1962 is handily the year i was born!
- the terminus being a port, which has two BR regions joining at it, and possibly a third having running powers.
- a double track junction station which has a branches at each end and exchange sidings
- an ability to do through running for when we are short-handed
- a small branch terminus
- a through station single-track passing place with stabling for banking engines and a level crossing

Basic Solution Schematic

The basic layout is two spirals from lower staging level to upper model level in opposite directions that meet in two spots (at the terminus and at a junction in the country). As the sides



of the rectangle are 22 and 13 feet this allow gradients of 2.5% or less even with the levels being $9\frac{1}{4}$ " apart. Added to the side of this is a branch line that runs from the junction to a branch terminus 25 feet away. Trains can do a continuous loop of 70' by using the country junction to return to the lower level and bypassing the staging. The run from staging to terminus is 90 ft. Another single line runs from the terminus to the lower level by way of a passing station.

Note that trains that go away from the terminus on the double track and single track will pass each other going in opposite directions. This gives rise to a route that starts at the terminus on the single track bypasses staging and returns to the terminus via the double track and vice versa.

For realistic operation the staging yard is used to act as "the rest of the world" and serve as the source and sink of trains from multiple directions. To help it in this task there are additional tracks in which trains that have exited the scene can wait for access or be staged ready to appear when needed.

Finding a Back Story

All the required elements do not exist (to my knowledge) together in the 1::1 world. So that led me to create a backstory of what might have been. I perused my *Complete British Railways Maps and Gazetteer*, for suitable places to “tweak”, but I still came up blank. The locale I eventually chose was as a result of a random discovery on Google. They had recently indexed the UK parliamentary proceedings from the 1830 and 1840s. While browsing around I found references to a scheme to build a rival port to Holyhead, with the engineer being none other than IK Brunel⁴. One of the



proposed routes would have come from Shrewsbury via the Llangollen pass and the Ogwen valley to Bangor and then to Caernarvon and then proceeded along the coast to the small fishing village of Porthdinllaen, which had the only other sheltered anchorage available that was close enough to Dublin. This route would have been in heated competition with the soon to be LNWR Chester-Holyhead line and so probably would not have connected to it at Bangor, but have waited until the late 1890s for a connection at Caernarvon.



The original promoters tried very hard to disguise the fact that they intended to be competition for the Chester and Holyhead for Irish traffic. But ultimately the success of Stephenson's Menai Bridge and parliamentary manoeuvring scuppered the plan. It is clear, however, that had it been built it would have been a serious rival that potentially would have been sustained into the grouping and thence into nationalisation. For my purposes, I envisage the North Wales Coast Railway and the never built Birmingham and Ireland Railway joining forces to

⁴ [Isambard Kingdom Brunel](#)



actually build the scheme for a line from Birmingham to Port Dinllaen, but going broke and being taken over and operated by the Cheshire Line Committee via an extension from Chester to Shrewsbury as a means to get members coal to Ireland without the LNWR. Then becoming directly controlled by the Great Central with a new high-speed line to London Marylebone - a kind of *HS0*? Finally, in turn, it became an LNER line at grouping with running powers for the LMS on its way from Caernarvon to Afon Wen.

I also knew that the Cambrian Railway had permission by Act of Parliament to extend its line from Pwllheli to Dinllaen that never came to pass. But, I reasoned, had the first scheme been built, the extension would have been almost inevitable! Then there would have been a boundary port terminus between two companies with running powers for a third that were subsequently absorbed into three different BR regions. The new route would have provided both



direct traffic and through traffic. By manipulating the fictional ownership changes along with the real ones, we can bring the LNER (ER), GWR (WR) and LMS (LMR) together in close proximity and so have legitimate access to all those locomotives and rolling stock, not to mention upper and lower quadrant signals, etc. Should we need to, we could stretch a point and have the occasional SR locomotive on port-to-port duties from Dover...

How to achieve a connection to the actually built railways needed to be addressed. I decided that the offstage location of Caernarvon was the key - if the junction to the mainline track to London was moved to Bangor, it would reduce the necessary rivalry too much, because passengers would be able to easily change from the line to Holyhead. But I need a connection so that trains through PD can go to and from Liverpool and Manchester. To do this I utilised another piece of modeller's licence and diverted the real line from Caernarvon to Afon Wen to meet the new line at a country junction about 10 miles from PD. With that in place my junction at Pont Llyfni became more important as a station because it was serving both trains to and from Afon Wen and Nantlle branch trains. This allowed freight trains to be marshalled there because they would go via Afon Wen rather than over the steep line from PD to Pwllheli. And that is important because I didn't have room for a marshalling yard at PD as one would normally expect from such a border station.

The real history of the railways at Caernarvon⁵ is very interesting - originally there were three stations, none of them joined to the others! There was *Carnarvon* (note spelling) for the line to Bangor, *Carnarvon Pant* for Afon Wen, and *Carnarvon Morfa* for Llanberis. These were unified in 1870 when the Carnarvon Town Railway was built. To reimagine this, I merely make Carnarvon Pant into through station on the line to Shrewsbury via the Birmingham and Ireland that changed into a Carnarvon Junction in 1870 when it was joined to the other two stations and renamed as Carnarvon Central (although it was most remote from the centre of town!) in 1911 to commemorate the Investiture of the Prince of Wales - the future King Edward VIII.



⁵ [Carnarvon Town Line](#)

Fictional Stations

[Port Dinllaen](#) (PD) as modelled is an analog for Holyhead with its interesting central dock and complex station throat. Trains from Marylebone in London will come to PD for the boats to Ireland. Because it is a boundary station between the ER and the WR, it has the operational characteristics of a BGP as well because through trains from South Wales to Liverpool/Manchester (The Welsh Dragon?) will change locos and also meet the boats.



By positioning the other stations I want into this fiction, I can get all the desired elements in close enough proximity to PD to make sense.



The junction station is at [Pont Llyfni Junction](#) (PLJ) is north of PD on the coast. It handles both the Nantlle branch and local traffic on the line from Caernarvon to Afon Wen which diverges at Trefor Junction, allowing through freight trains to bypass PD. PLJ has the marshalling yard for the major freight movements, rather than the cramped quarters at PD, just as Menai Bridge did in the real world for Holyhead and Caernarvon. The PLJ track plan is really an amalgam of Peter Denny's Grandborough Junction with a bit of Barnstable thrown in.

The "Pont" at Pont Llyfni.

[Nantlle](#), in real life, had an interchange with the narrow-gauge tramway (last horse-drawn railway in the UK). In our fiction the standard gauge line overlaid its original course down to the sea at PLJ rather than the route to Caernarvon. We suppose that the tramway still exists to Dinas Junction providing competition between the narrow and standard gauges for slate traffic, much as there was between the Port Penhryn to Bethesda narrow gauge and the Bangor to Bethesda standard gauge. The track plan is wholesale lifted from Bethesda with an additional narrow-gauge slate exchange siding and passenger platform added.



The last station is [Tan-Y-Graig](#) (TYG) which is a passing place and token exchange on the line between PD and Pwhelli. It is a halfway point on this very steep, single line, and as such is a perfect point to position banking locomotives that help trains up the banks between PD and TYG (uphill both ways!). The basic track plan inspiration for TYG is Evercreech of the SD&JR. The station has a central road for banking engines, a level crossing and possesses a small yard, two industries (dairy and gunpowder!).



If we take all this fiction together we get the map on the next page. A fast ex-GCR line gave the ER a route from Dublin to London, Marylebone via Shrewsbury. The WR has a route from Cardiff and South Wales to North Wales, the Irish boats, and then onto Liverpool and Manchester on the LMR at Caernarvon. A junction at Trefor to an LMR route to Afon Wen handles most through through freight trains and some stopping passenger trains from Bangor as well bypassing PD.

The fictional Port Dinllaen Lines - early 1960s

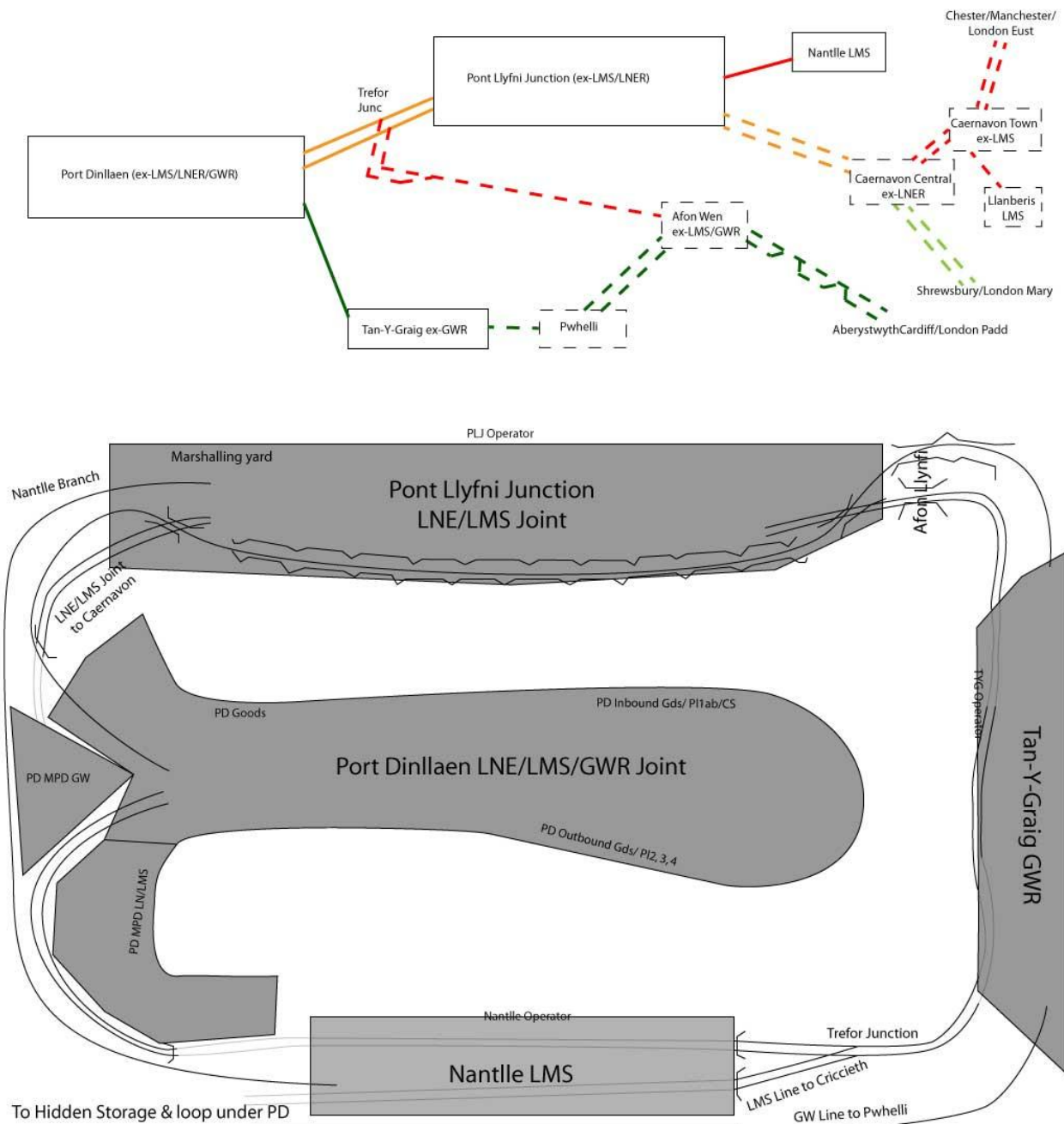
The map shows the overall scheme. A complete faux “history” or “faction” has been [created](#). The coloured-in circles are the stations to be modelled. Note that in 1958 BR was reorganised and many former GCR lines were transferred to the LMR. The new owners started a process of “Midlandification”. This involved both a movement towards the LMR rolling stock and engines and a run-down of the acquired lines that competed with former LMS lines.

For the purpose of our model we will suppose that the Port Dinllaen MPD, being so remote, is among the last places to acquiesce to Crewe, and that there are important passengers that routinely use the high-speed trains to the Dublin ferry and so are indulged with a more-or-less intact timetable. This does not mean that the Midland is shut out - they also had a presence at PD before the regional rationalisation for trains over ex-LNWR metals to Northern towns. This also gives an excuse for an experimental Midland Pullman service to be running as well as the Bachmann model is so attractive!



Port Dinllaen Lines c1960

Port Dinllaen Lines Schematic



Modelling Compromises

Squashing this “faction” geography into a small space means making some big compromises. A Holyhead-sized station alone at 1::72 scale would be many times larger than the whole space. The main compression I used was to shorten everything. Holyhead had 10 and 12 coach trains - we will have to be content with 5 and 6. Holyhead cattle and freight trains are similarly “distressed”. A partial excuse is that PD is literally the end of the line and express trains would have slipped coaches on the way to it, and would pick up coaches on the way back - like the ACE trains did in the West Country. Also we have imagined some pretty steep gradients into our fiction - the 1 in 24 from TYG to PD and the offstage 5 miles of 1 in 30 just after Bangor on the way to Shrewsbury in the Ogwen Valley. These gradients would require double heading and/or banking and would put a premium on the number of coaches that could be accommodated.

The boats at PD are also going to have to be smaller than Holyhead driven by the size of the model harbour, which implies smaller train loads. This is not too outlandish given that the boats were smaller at Holyhead until the 1930s as well. In fact our *raison d'être* for the retention of the line is the speed from Dublin to London rather than the capacity carried. We suppose that the PD boats are smaller converted WWII corvettes - for passengers only - because the ex-GC line is the fastest way to get to London, shaving off an hour or more door-to-door and so justifying a premium. By making the direct connection between the BWIR and the LMR be at Caernarvon and not Bangor, Holyhead to London trains would still prefer to go via Chester rather than change direction twice to make use of this faster line. All this, then, suggests smaller trains (but possibly more of them).

The asymmetric line connection relationships between lines of former rival companies and the persistence of rivalries into the BR era are very prototypical. There were occasions where the workers and management held onto working practices that dated from the pre-Grouping era well into the 1970s where everyone who was originally present would have long retired!

To achieve the logical layout, the single line from PD to TYG has to leave PD in the opposite direction to the line from PD to PLJ. So the WR line in the model has to go past PLJ on a viaduct - which is completely unrealistic geographically! But this does allow for the possibility of visually breaking up the operator view from PLJ to PD which otherwise would destroy the idea that these are far apart. Likewise, the mainline from PD to PLJ runs on a lower shelf past TYG.

Even with these compromises, I hope to give a pastiche or caricature of the overall scene - not fully realistic, but realistic enough that it feels right. With the stunning geography of the Llyn Peninsula as a backdrop, the sense of the villages as small and compact, the feeling of PD as a literal “end of the pier” place, I hope I can pencil in an outline or backdrop to the main action. Partly I want to do this by restricting the viewer's field of vision - mounting the trains high and providing visual framing “matting” that draws them into the small details and breaks up the big picture. I will also ask people to suspend disbelief long enough to enjoy the view and not worry too much about the incongruities.