



Planning & Building a Prototype Layout in the 21st Century

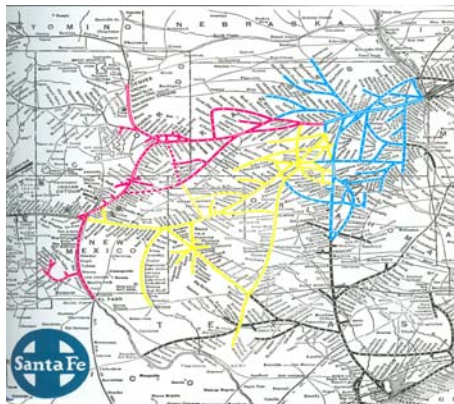
In this clinic I will discuss the process that I am using to build my new layout. A number of ideas were learnt in the demolition of the last layout and others have come from learned colleagues both here and in the USA notably, our good friend Tony Koester, his friend Bill Darnaby, Joe Fugate, Bob Foltz, John Moore and many others in the States with whom I communicate regularly.

Once the area for the railroad is known, length, width & height of available space, then the real planning begins. Following several operating sessions on well known layouts in the states I decided that my new layout would be built to follow Santa Fe operating rules and practices in all instances and be truly an operations focussed railroad. Now with DCC forever changing, operational aspects are continually being enhanced.



While we all have our favourite railroad, we need to focus on a geographical area to model so we can incorporate Layout Design Elements (LDEs) of the area that will help set the region we are trying to model.

I have chosen New Mexico over Raton & Glorieta passes, circa 1950. These were heavy mountain grades that required helpers to assist long trains over the passes. The red route at the top of the map is the Northern District, my operating area.



Due to the limited width of my layout room I have had to selectively compress the area and delete many towns accordingly, and only include those that have operational interest and key LDEs

These are Abajo, Albuquerque, Hahn, Bernallilo, Lamy, Spiess, Apache Canyon, Glorieta, La Junta with Los Angeles, Kansas City & El Paso staging.



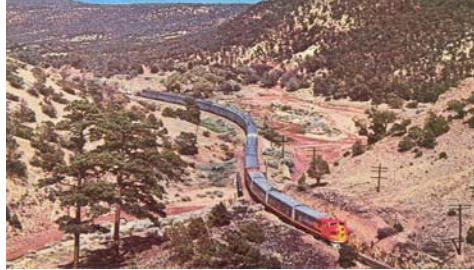
Albuquerque Depot area



Bernalillo Depot & Spur



Lamy Depot



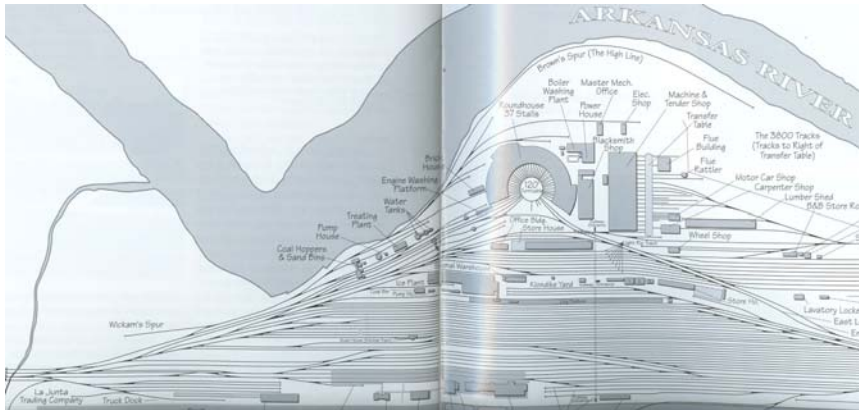
Apache Canyon



Lamy Cooling Tower over Mainlines



Glorieta

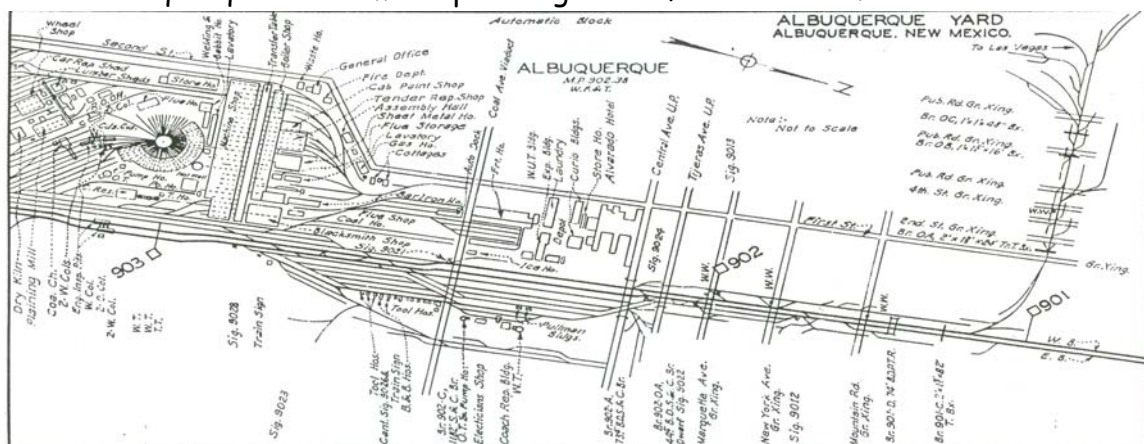


La Junta Yards Colorado



La Junta Depot

Albuquerque is the main operating area of the railroad.



Specifications of what was desired:

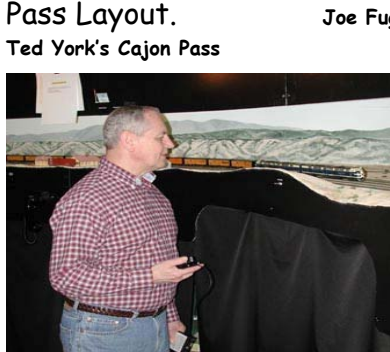
- Linear walk around style of layout
- Main layout Height of 52" (at Albuquerque)
- Bench work: 70mm x 35mm Pine with 70mm x 19mm risers
- Track Support: 18mm sealed MDF with 90mm x 19mm finger jointed pine, biscuit jointed to each joint.
- Road Bed: Davco Polypropylene Zipped Expansion Jointing, fastened with Bear double-sided tape.
- Track: Micro Engineering Flex Track, Code 70 mainline, Code 55 yards & industries. Held in place with Bear double-sided tape.
- Scenery Construction: Poly Styrene with PVA Wash, Rock moulds & casting plaster over cardboard strip supports.
- Backdrop Construction: 3mm MDF layer painted dark to sky blue to blend in with the backdrops from The Backdrop Warehouse. Print printed to length of scene. All backdrops are cove cornered.
- Lighting: 15 & 25watt incandescent spaced 2' apart & dimmable.
- Fascias & Lighting Valances: 4.5mm MDF painted Gentian Violet.
- Control System: NCE or System 2, tethered & radio throttles.
- Dispatcher: Dispatcher Pro Software from Kam Industries
- Signal System: NCE full NMRA approved system
- Signals: Searchlight & Semaphore with Train Order boards at Bernallilo & Glorieta
- Turnout Control: Mainline: Hankscraft/Tortoise, all others manual slide switches.
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- To use the full effects of DCC sound & animation such as Water Crane & Coal loading sound modules & DCC caboose.
- Recessed pockets in fascias for all switches, waybill & car card holders, etc as well as the LEANERS! Many of us are guilty of this.



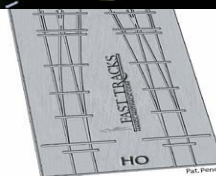
- Slide-out illuminated trays for Yard Operators, Hostler & Conductor in fascias.
- Hidden Staging yards viewed on monitors under fascias with infra red cameras.
- Full 24 hour operation capabilities with fast time clock & 4:1 controlled dimmable lighting.
- 7 Lighting circuits with computer controlled dimmers for varied degree of light at different geographic areas, eg; Raton/La junta light snow/rain, with a bright sunny day at Albuquerque.
- Room painted Gentian Violet to match fascias, carpeted and air- conditioned.
- Shadow box effect per Joe Fugate's SP Siskyou Line & Ted York's Cajon Pass Layout.



Joe Fugate's Layout



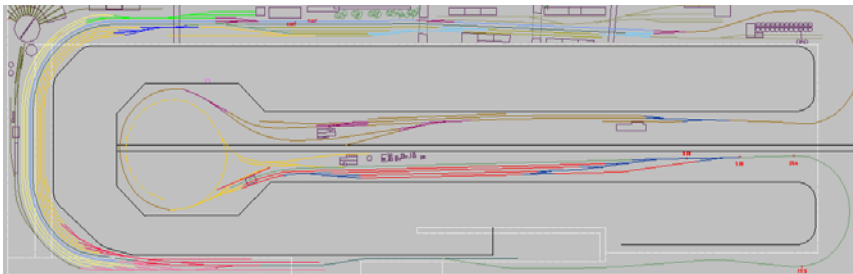
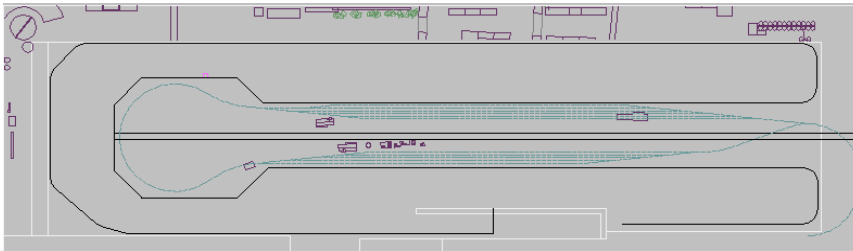
- Turnouts: Mainline NO; 10, Yard and built using FastTTracks DCC friendly turnouts



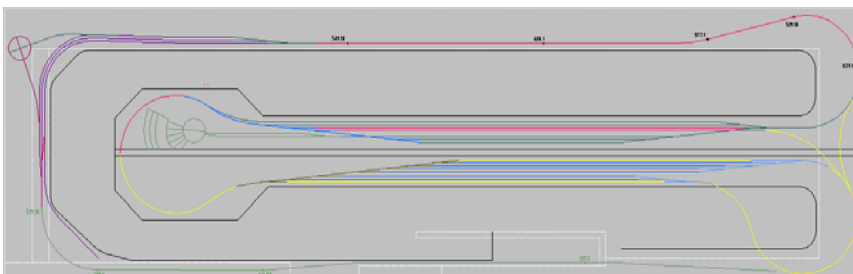
- Minimum Radius: 42" with easements & super elevated.
- Maximum Grade: 2% LA Staging to Abajo & 3% Spiess to Glorieta.

After many hours of scale drawing and many, many hours with Gary Spencer-Salt & his Auto Cad 3D computer program, we finally came up with a workable operational plan. This now involved becoming a double deck layout. It did give me 480' of mainline.

LA staging



Main Level



Top Level

Layout at the highest level is 73" at La Junta. La Junta is operated from a raised walkway. This is also used by engineers to watch their trains descending Glorieta to La Junta. Division to Division operation is now practical with operators being able to sign on at Albuquerque or La Junta and take their train to the end of the division. Helpers are now required to assist trains up the 3% grade from Lamy to Glorieta and are used for braking from Glorieta down to Lamy.

Atlas re-railers will be fitted every 6' in LA staging to prevent de railments.

Construction Begins, Peninsular & Albuquerque area with 2nd level brackets & fascia supports attached.



Bracket Assembly

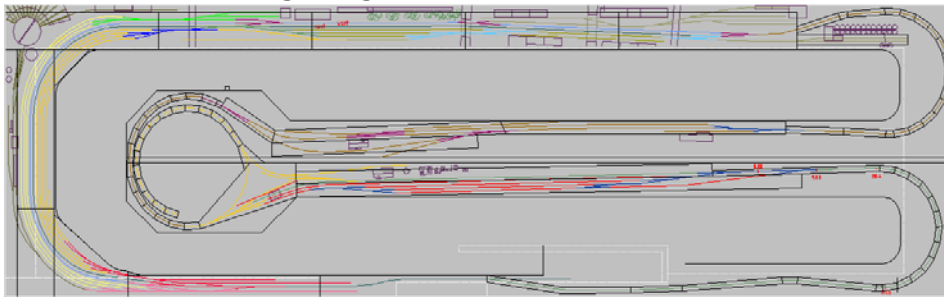


With MDF cove trial



Bench work complete on peninsula

Road bed Planning using Autocad 3D, coloured track is for Bus Bars

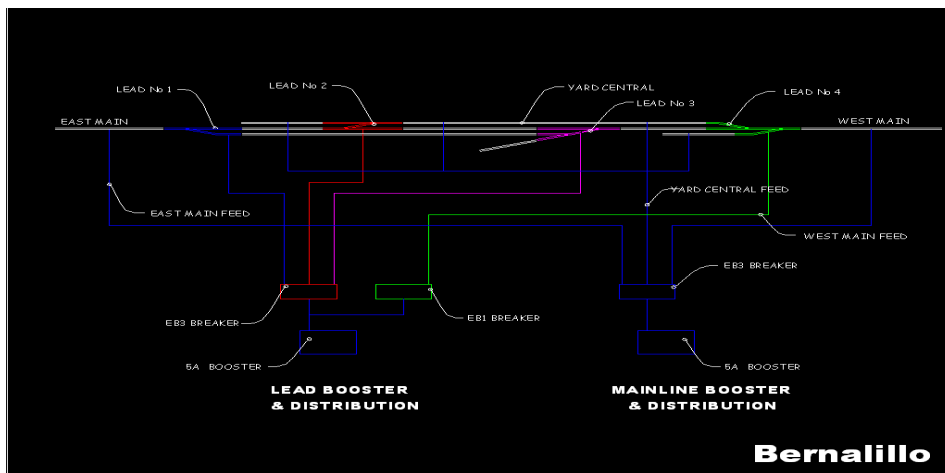


Curves are cut on 90mm x 19mm finger jointed pine at 15 degrees to form radius. All others are flat panel MDF sealed with paint or floor sealer. Flat panels are braced underneath where necessary.

Bus Bars:

Bus bar wire will be 4.5mil squared tinned uninsulated copper wire. The bus bars are all independent of each other, colour coded with a wiring schematic plan at each separate area. The wires will be twisted and sprung to keep a firm tension on the wire. Each bus bar feeds through the appropriate NEC circuit breaker

and the Star Delta transformer, which is circuit breaker protected also. All turnouts are protected through an NEC circuit breaker as the schematic below shows.



Booster & Distribution Schematic showing bus bars.

The following is a description of my operating area and a more detailed description of the layout.

The Atchison, Topeka & Santa Fe Railway Co.



Western Lines New Mexico Division

NMRA members may recall my Santa Fe Cajon Pass layout was dismantled in 1995 when we re-located our home to the Central Coast of NSW. The following article is an overview of my new "Santa Fe" now under construction. I have chosen lower **Colorado & New Mexico** as my operating areas to focus on the unique operating area of this region.

The new layout will represent districts of the northern Santa Fe mainline in New Mexico & a portion of lower Colorado circa 1950s. The following is an overview of the areas and the layout.

The northern mainline over Raton Pass with its grades of 3 & 3.5% became the secondary freight route of the Santa Fe after the Belen cut-off through Abo Canyon was completed in 1908. Mostly mainline freights to and from Colorado and Northern New Mexico used Raton Pass after the cut-off was completed with transcontinental freights using the Belen cut-off.

At times the Belen cut-off was out of action due to rockslides in Abo Canyon & all freights travelled via La Junta & Raton Pass where they required helpers. Transcontinental passenger trains travelled via Raton & Glorieta Passes so that Denver connections could be maintained at La Junta Colorado, as well as service to south eastern Colorado, Santa Fe, & Albuquerque. Passenger trains were less affected on grades. The exception to this was the southern section of The Grand Canyon, which went via Amarillo.

With Division headquarters at Las Vegas, the **New Mexico Division** operated the La-Junta-Albuquerque-Belen mainline with its heavy grades. Automatic block signals were in service with CTC installed in 1952 between Raton-Trinidad, the only double track portion on the division. Only minimal local service was operated, once a week in each direction between Raton-Las Vegas and tri-weekly Las Vegas-Albuquerque. A daily except Sunday, mixed train ran between Lamy and Santa Fe on the 18-mile branch along with the daily local from Albuquerque to El Paso NM. Re-built locomotives from the shops at Albuquerque up to 3800 class 2-10-2s use the **Santa Fe** branch as a testing ground prior to heading back to their operating districts.

Las Vegas was a freight train crew terminal where passenger engine crews also changed. Passenger train crews (conductor, brakeman & baggage man) worked through between La Junta and Albuquerque. Engine & Caboose were changed at La Junta.

Six daily transcontinental passenger trains pass through the division travelling to Chicago & Los Angeles. These were **The Super Chief**, NOs 17 & 18, **The Chief**, NOs 19 & 20, **The Grand Canyon Northern Section** NOs 123 & 124, **The EL Capitan** NOs 21 & 22, the heavyweight **California Ltd** NOs 3 & 4 & **The Fast Mail Express** NOs 7 & 8. All stop at Albuquerque for fuel & water, while the **California Limited** stops for passenger meals in the Harvey House. El Paso also has a daily passenger service from Albuquerque.

Mainline freight trains would set out cars at Albuquerque freight yard (**Abajo**) destined for industries served by the local on the mainline and the branch to Santa Fe. The **Fast Mail Express** would set out cars for the Railroad Express Agency and the Pullman Company at the passenger yard.

The New Mexico region was a region of irrigated & dry farming, stock raising, fruit growing and dairying along with sheep, wool & timber; small grain & corn.

Albuquerque was the site of an important locomotive repair shop. Passenger trains were always serviced and both steam and diesel locomotives took fuel and water en route. The freight yard is at Abajo south of the passenger depot. Abajo switched train NOs 31-46, the La-Junta-Belen Red Ball trains; train NOs 51-52 which ran between Albuquerque and El Paso; and a tri-weekly local freight to and from Las Vegas, NM. Most switching was for inbound cars that arrived for various wholesalers and the local freight house. The yard was much more important before the 1909 Belen cut-off via Amarillo was completed. Albuquerque was the only shop that could handle 2-10-4 power, and most 4-8-4s were also shopped there. As dieselisation advanced, all steam repair work was consolidated at Albuquerque beginning in 1950 until the shop was closed in 1954.

Due to the space that I have available I can only model portions of the divisions with some deletion of towns to model only those that have operational characteristics.

I will be focussing on **Albuquerque** with its unique operating & switching characteristics, **Bernalillo** where a spur heads off behind a hill to a sawmill, **Lamy** where the branch to Santa Fe departs to staging, **Apache Canyon** with its steep canyon walls & many bridges as the line crosses Apache creek while traversing the canyon, **Glorieta** with its Wye for turning helpers from Lamy, **La Junta**, the branch to Denver & West of Albuquerque the mainline to Belen & the branch to El Paso & Los Angeles, (both in staging).

The division is operated on an Automatic Block System with both semaphore and searchlight signals used.

As the Belen cut-off is cut off by rockslides on the day that I am modelling there is much mainline freight that pass through the district including **hot** eastbound **GFX** perishable trains, The time frame is circa 1950s, nearing the last days of steam in this area with Northern 4-8-4, Mountain 2-10-4, Pacific 2-6-2, & 3800 2-10-2s. **Glorieta** helpers working from Lamy were 1600 class 2-10-2s. The diesel is rapidly taking over on the Santa Fe with the following locomotives working the division: - FT freight, F3 & F7 freight and passenger, E8 passenger, Alco PA passenger, M180 Doodlebug, GP7 & RSD 5 freight locomotives.

High-powered electro magnetic uncoupling ramps will be installed in all locations for switching of industries & mainline helpers where applicable. Minimum

mainline radius is 42" with easements, though at one location this has had to be trimmed to 38" but will be hidden from full view.

Staging tracks will be monitored by video cameras for the Train Order Operator and engineers.

The layout will be fully signalled using NCE. Signals will be by Tomar. Santa Fe cantilever signal bridges will be from N & J.

Wiring of the layout will be heavy duty, designed especially for DCC operation & will be colour coded for ease of maintenance & troubleshooting. The mainline will have its own bus bars broken into sections to ensure continuous operation on the main should a short circuit occur in other locations. Heavy gauge 4.5 ml squared bus bars will run the length of the layout for the attachment of short 12 gauge track feeders. All track feeders will be attached under the rails prior to fixing the track to the roadbed to allow prototype appearance of the track.

Track feeders will be screwed to terminal strips with a heavy gauge feeder soldered to the bus bar to allow easy disconnection if fault finding is necessary.

Power for the DCC system is from a Star Delta 20Amp transformer. Also from Star Delta is a 10 amp filtered AC transformer for all other functions.

Recessed LEDs in the fascia of each block will illuminate should a fault occur. Mainline turnout switches will be controlled by the Train Order Operator with local use of these by train crews to be Train Order authorised.

Fluorescent lights will be located under the layout for ease of maintenance to the wiring & turnout motors etc. Power points & airlines have been located around the layout for ease of construction & maintenance.

Control system will be **NCE** DCC Command control, with **SoundTraxx** decoders for locomotives, with decoders from various suppliers for caboose marker light activation, passenger car effect control & building lighting/ sound effects etc. Stationary decoders will also be used for switch machine control & signal detection. All locomotives where possible will have functional classification lights & sound.

Though there was no CTC control in this era, the Train Order Operator will work from a computer showing track schematic layout & signal positions etc using Ramtraxx software.

The layout is being built to achieve the maximum effects of sound, animation & lighting over a 24hr-operating period with industries, buildings & rolling stock.

Lighting in walkways is fluorescent separate to the layout. Layout operating lighting will be dimmable 25watt & 15watt incandescent bulbs spaced 2' apart as per Joe Fugate's Siskiyou SP Line. These will be controlled from the DCC system & the fast time clock.

Layout dust covers will attach to the lighting valance when the layout is not operational.

To view the second level, a raised platform is in the corner of the Albuquerque yard below Glorieta. Another is located in the reverse loop of Kansas City staging near Spiess and the floor is raised the full length of the Bernallilo peninsular for operators to operate the La Junta yard.

Where possible layout buildings including town areas are being built up on baseboards in the workshop & fully detailed in readiness for installation on the layout.

My aim has been to completely plan the layout, its construction & the location of all buildings with Gary Spencer-Salt & his Engineering Auto-cad program. This has been a lesson learned from my last layout. Valuable input on operational issues & design elements has come from Tony Koester, John Moore, [a resident of Albuquerque] Keith Jordan, Bob Foltz, Chuck Hitchcock, Russell Crump & the late Ross Allen of Rail Serve.

For any further information please feel free to contact me either by email at mooreph@bigpond.com or call me on 43-89-8933.