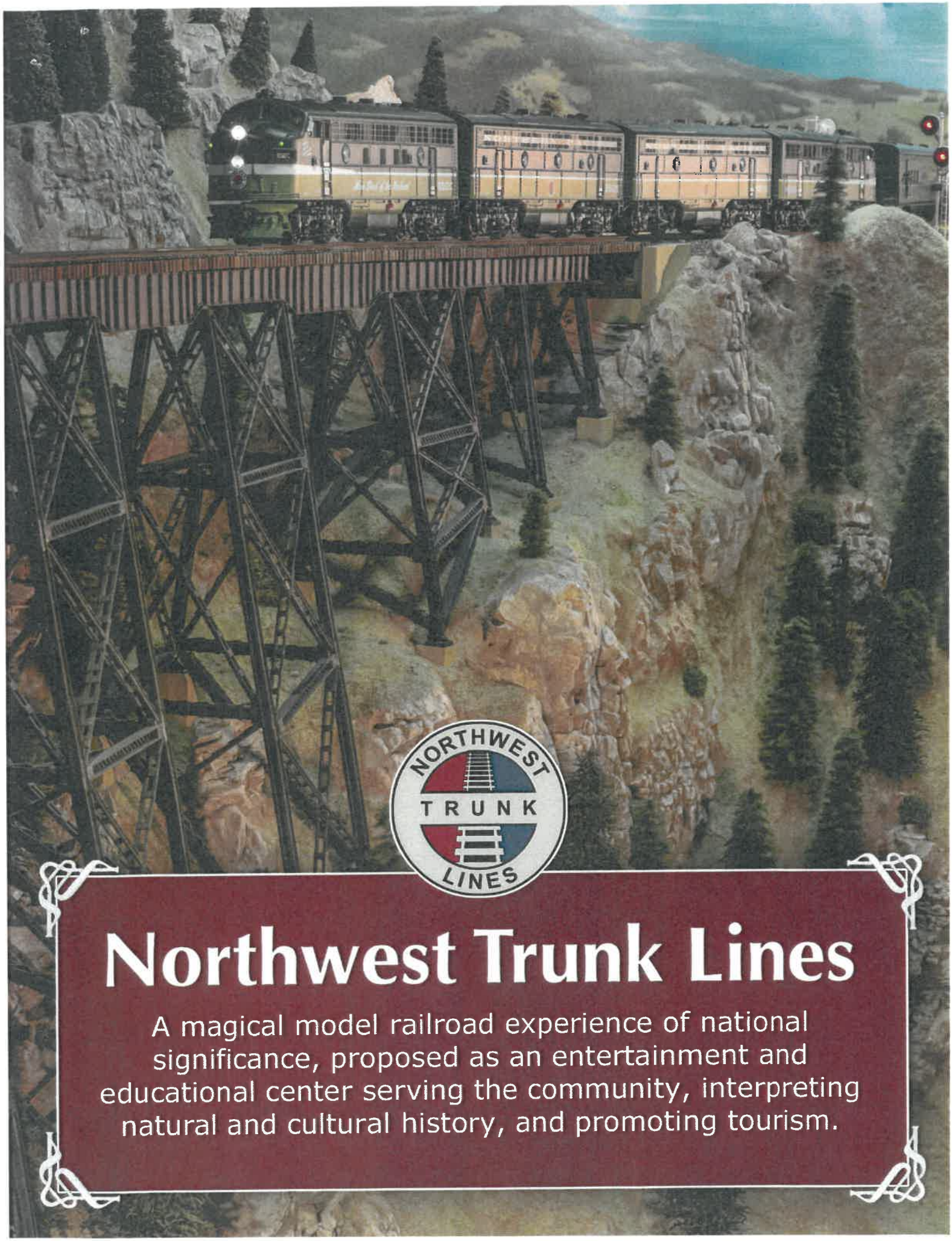
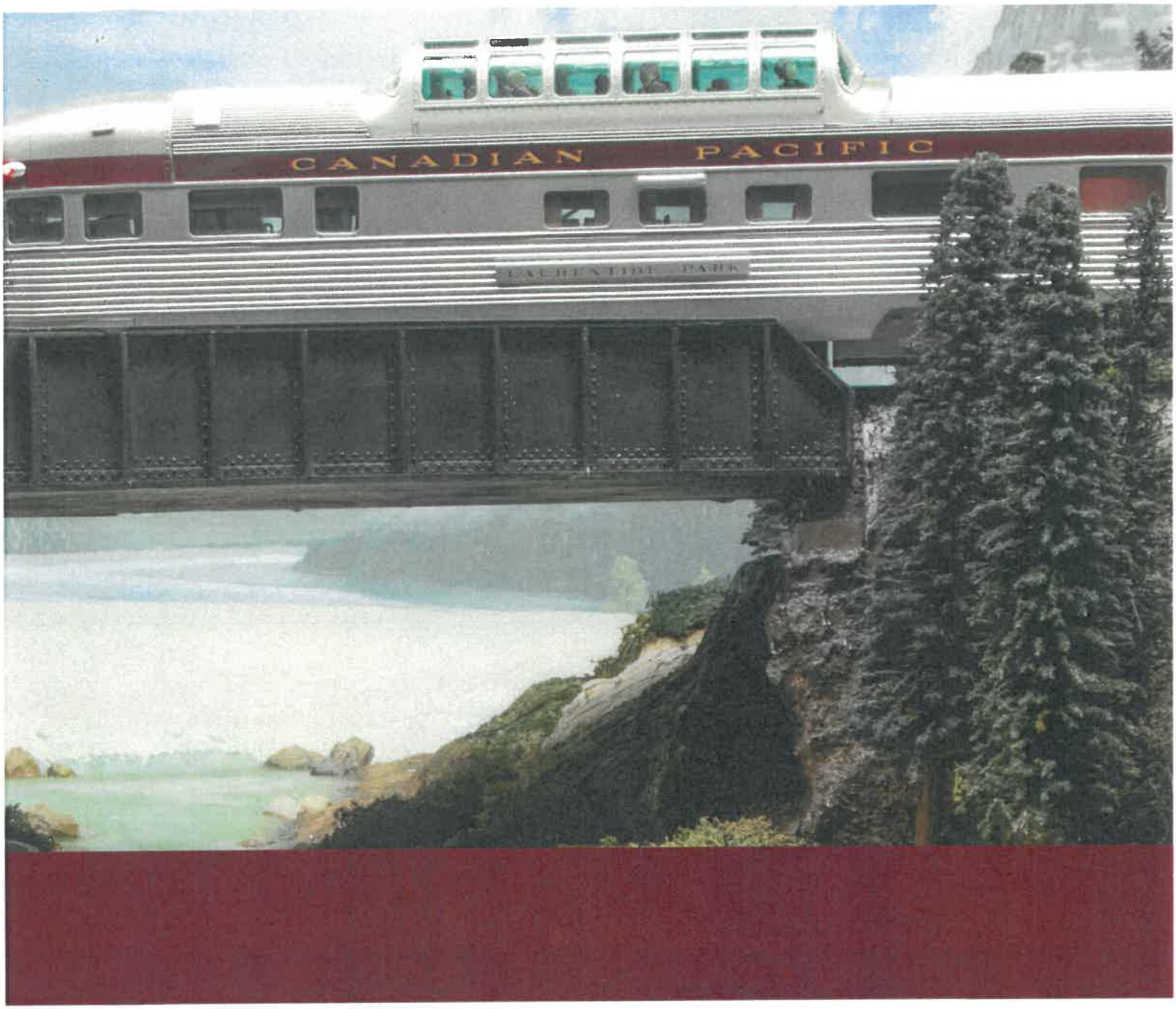


Northwest Trunk Lines

A magical model railroad experience of national significance, proposed as an entertainment and educational center serving the community, interpreting natural and cultural history, and promoting tourism.

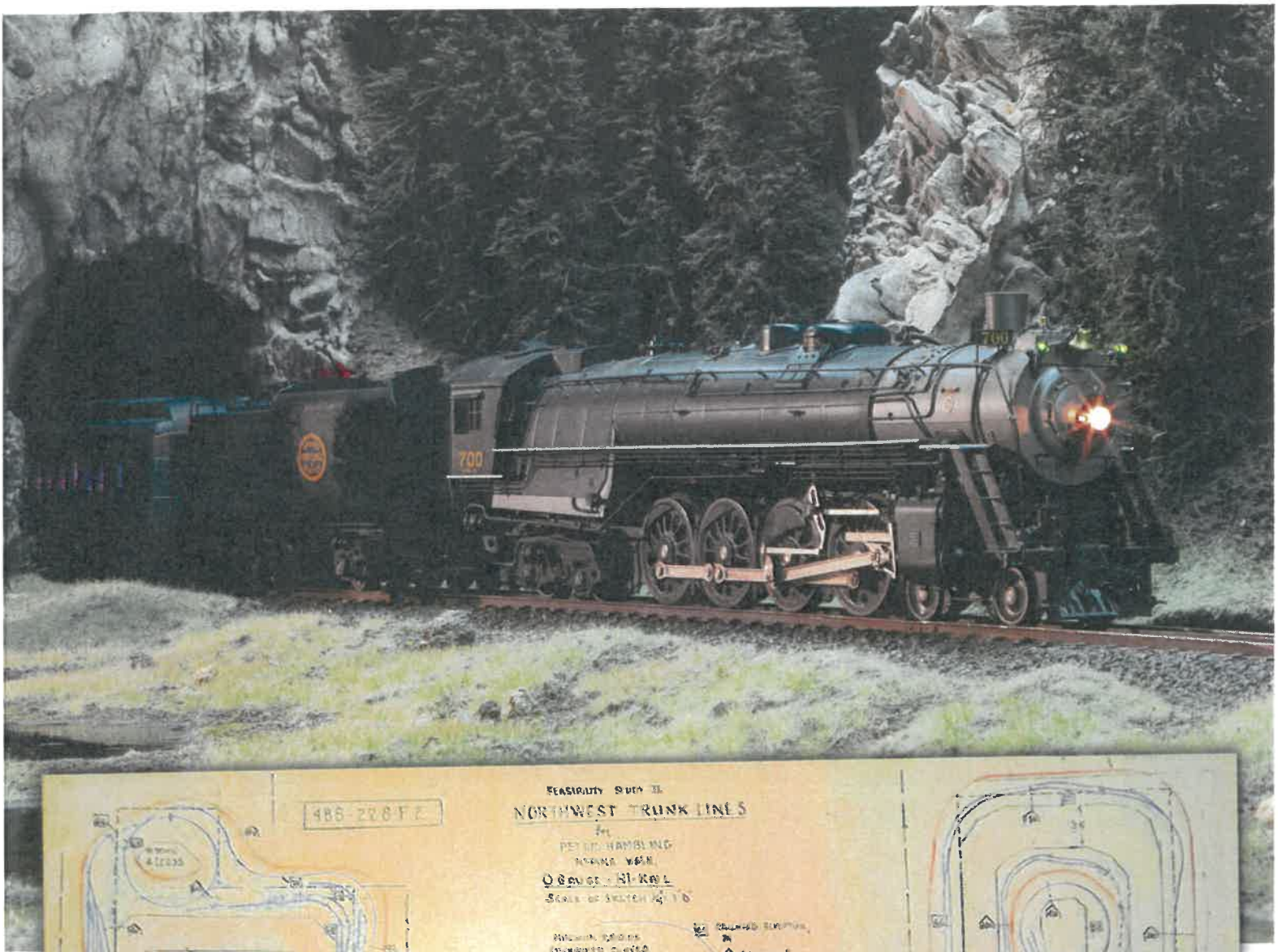
BACKGROUND

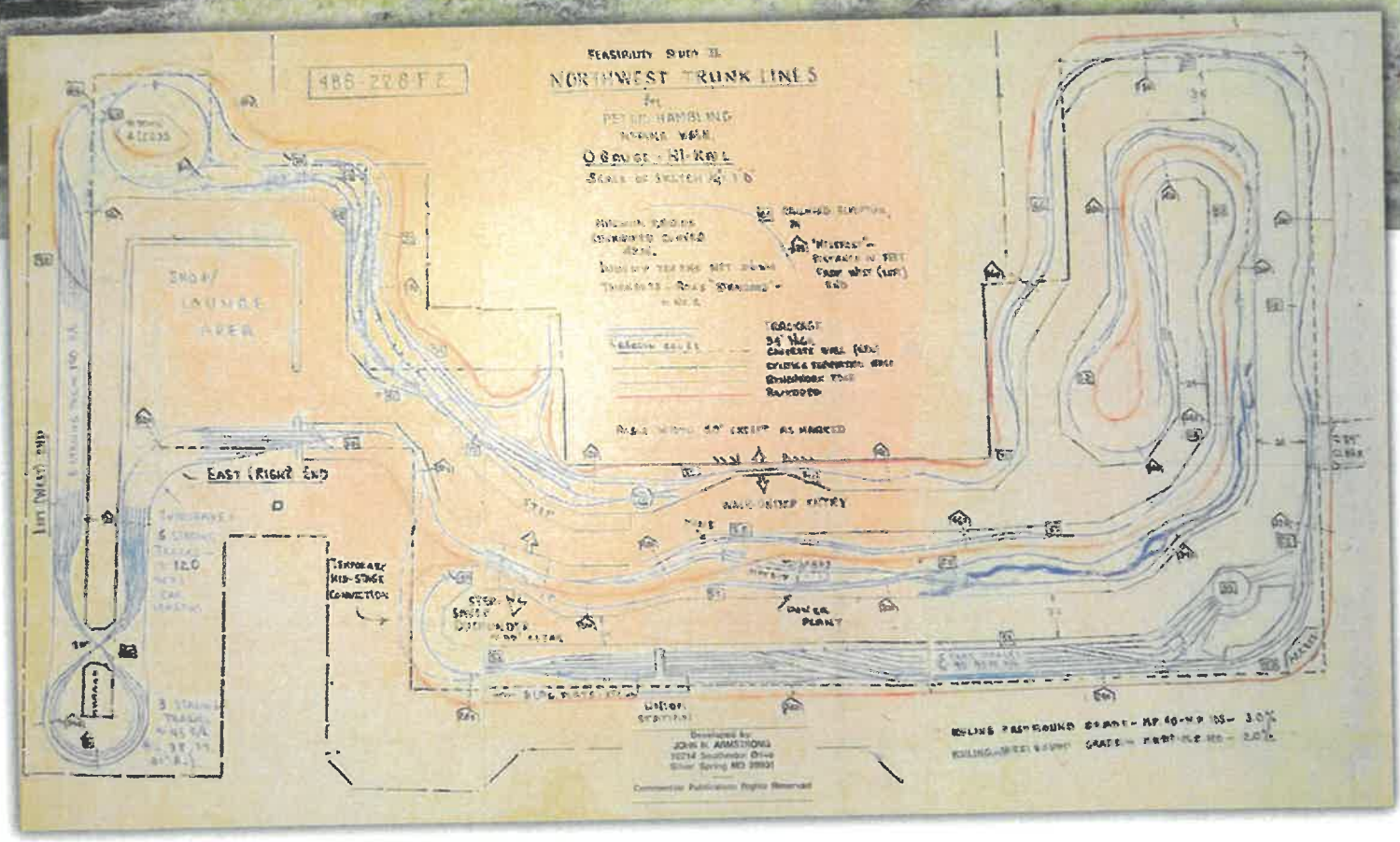
Northwest Trunk Lines (NWTL) is an interpretive rail creation of Peter Hambling, who envisioned an authentic story using model crafts and technology, an interest he fostered from his youth. Peter organized a skilled team with expertise in model rail planning, historic structure replication, set design, and special effects who worked in the basement of the Hambling residence in Medina, Washington, for more than a decade.



Peter selected the segments for the NWTL through research in his collection of more than 400 railroad books. Using these references, he and the designers identified 14 specific locations on routes ranging from New Mexico to Western Canada. Next, the team traveled throughout the western United States and Canada, documenting the actual locations with thousands of photographs.

While visiting each site, the crew collected environmental materials, GPS coordinates, and historical data. In the model-building process, all of these places were oriented in their proper North, East, South, and West directions, allowing scenery artists to simulate the environmental diversity of deserts to temperate rainforests. This dramatic model experience is among the largest and most authentic in the world.





Layout Design
by John H Armstrong

Scenery Construction
NWTL scenery is some of the most detailed of any model railroad. The majority of the base material is EPS (expanded polystyrene) sheet foam. These sheets are stacked and glued to the desired height. The scenery artist then uses a hot wire or knife to carve and sculpt the foam into the desired shape. The layout also uses a hardshell base for stability and ease of maintenance

Soil Collection
Another authentic detail is the soil, which comes from actual locations to match the modeled region. These samples were placed in shaker containers and labeled with the railroad name, date collected, and GPS tag from the collection site for continued use in future modeling or layout expansion.

Grasses and Ground Coverings
On top of the initial layer of earthen materials, model artists used an inventory of photographs to distribute the grasses, shrubs, and trees covering the landscape. The design team employed detailed techniques to simulate the varied terrain, making for beautiful natural environments throughout the display.

Trees
The model railroad has approximately 50,000 trees, with tens of thousands covering Western Canada and the Pacific Northwest. The artists created most trees in-house, each unique, growing at different stages, some with new growth on the tips of branches.

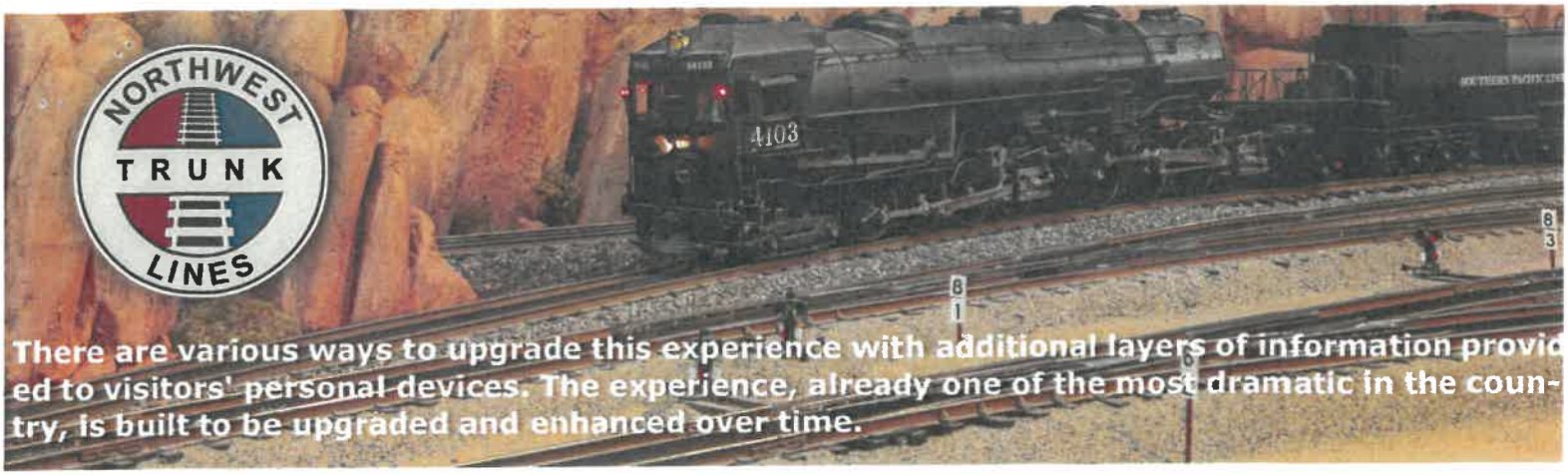
Rocks
Rock castings help bring the scenery to life in the various natural environments, and NWTL used a wide selection to create mountains and cliffs that correctly match the geology of each segment. The artists created forms from latex rock molds, fracturing, shaving, and sculpting these pieces to match specific mountain formations.

Rivers
The model incorporates rivers that span from forests of northern California through high deserts to canyons of western Montana. Matching the color of rivers is essential to the artists who take great pride in perfectly tinting the 2-part epoxy resin and carefully pouring and manipulating it to remove air bubbles to create the effect of flowing water.

Buildings & Lighting
All structures are scratch-built, allowing NWTL to scale them perfectly. Many are LED-wired with views into detailed interiors. In addition, some buildings are complete with day and night systems that provide light intensity adjustments.

Bridges
For authenticity, bridges throughout the model railroad are scaled-down replicas of actual structures. Nearly every bridge on the NWTL is hand-built, or 3D printed in-house. The models are then painted and weathered to appear like the original.

Lighting
Lighting plays a vital role in the experience. The overhead lighting utilizes a Crestron programmed 24-hour lighting cycle with half-hour time increments. Coupled with an LED rope light that runs along the base of the painted backdrop, this system establishes an immersive experience simulating a beautiful warm sunrise, sunset, and moonlight glow.



Catenary
Not all railroads ran with diesel or steam; some were electrified. The NWTL blue line represents what was once the longest electrified rail line in the world. The overhead wires and pull-offs are all designed in-house and replicate the catenary that ran on the Milwaukee route. These wires have been laser cut, all centered over the middle allowing the pantograph to ride along as it would in a real-world electrified locomotive. In addition, the wired catenary provides occasional bright flashes, simulating the arcing one finds with electrified rail.

Animated Scenes
Many animated scenes throughout the layout bring the experience to life. Smoke units, fiber optic lights, miniature motors, and Arduino boards help turn a static set into unexpected drama. These action scenes include forest fires, workers on a coal platform, cave mine blasting, an operating incline railway, a wild-west shootout, and even a model of Peter Hambling's Douglas A-26 aircraft with spinning props.

The Backdrop
A local artist spent an entire year on a four-foot-high concrete retaining wall shelf while painting the backdrop on the perimeter of the basement, using photos of the actual scenes for reference. The painted canvas was affixed to flexible Masonite using a unique adhesive. The canvas backdrop will be peeled away from the Masonite and rolled up, ready to be placed on a new substrate as the layout comes back to life in its future home.

Audio
Enriching the immersive experience, each segment has sound simulating its natural location. For example, standing near Kicking Horse Loop and Emerald Lake in Canada, one hears loons and other native birds, with water flowing in the streams and waterfalls. An Emmy award-winning sound engineer produced animated scenes with specific sound effects, from forest fire crackling to mine explosions to saloon fights. Each set has two audio tracks, switching between day and night with the 24-hour lighting cycle. As the sun sets, frogs, owls, and other nighttime creatures come to life around the layout.

Computer, Controls, and Operations

Many essential parts of a model railroad are not visible to the public. Miles of wires run above, under, and through the model, bringing the layout to life with a computer-controlled autonomous system. Trains run scheduled routes, stop for each other and throw switches to reach their desired destinations. Trains speak to each other through the computer and can tell other trains when to run routes.

A series of commands help bring the miniature world to life. For example, with a push of the "go buttons," one can view 45 minutes of 9 different trains location audio, 24-hour lighting cycles, and animated scenes. This feature allows anyone, regardless of model railroading knowledge, to enjoy the whole experience.

Disassembly & Reassembly

During construction, the team addressed the future challenge of disassembling the model and moving it for reassembly at a new public location while retaining its high quality of craftsmanship. Benchwork sections fit through the basement doorway leading outside. The scenery artists installed seams between benchwork, adding fishing lines that would act as pull cords when separating the areas. Electronics have color-coded connectors on all wires bridging the benchwork to aid reassembly. A manual that details this process will ease the task of relocation.