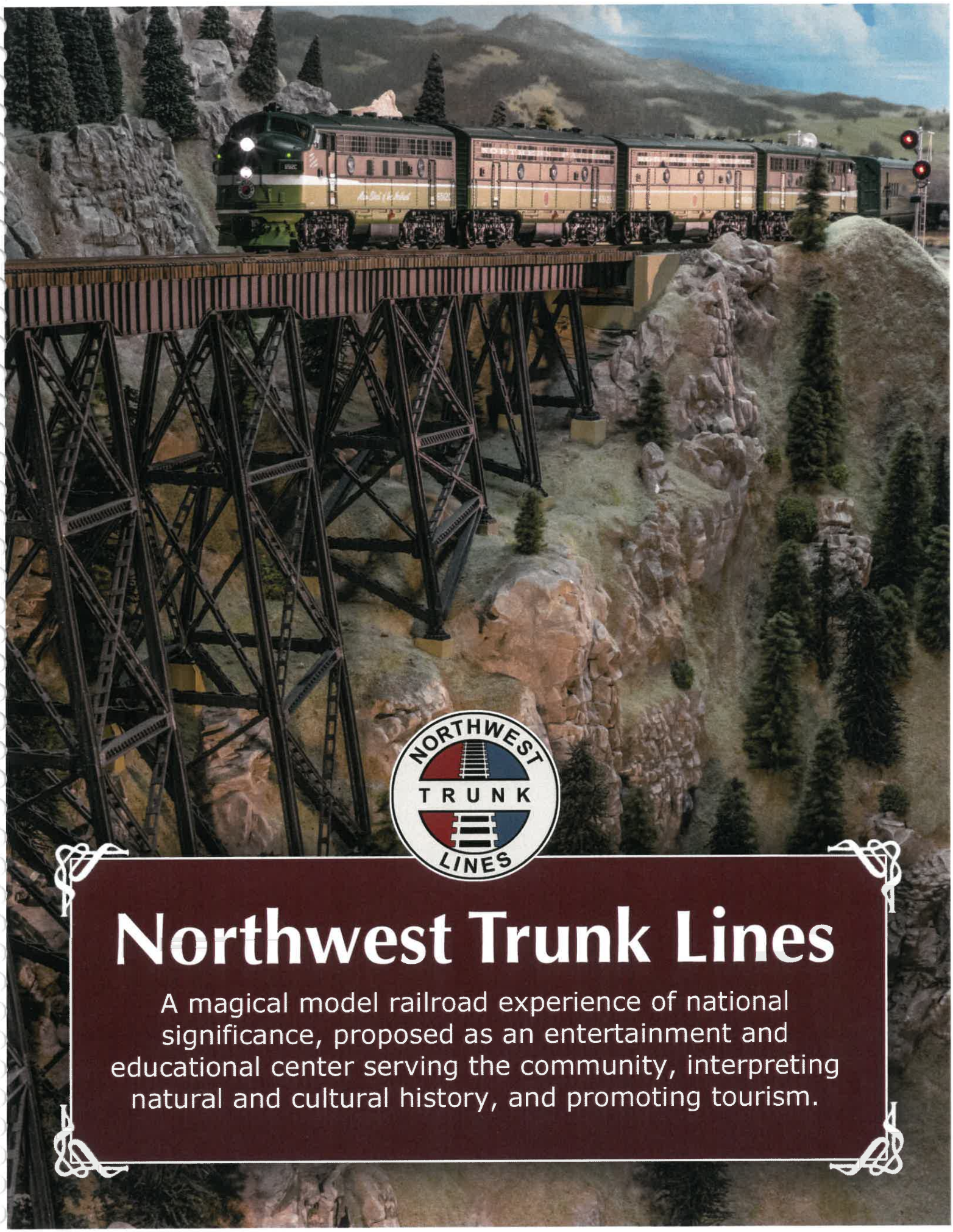
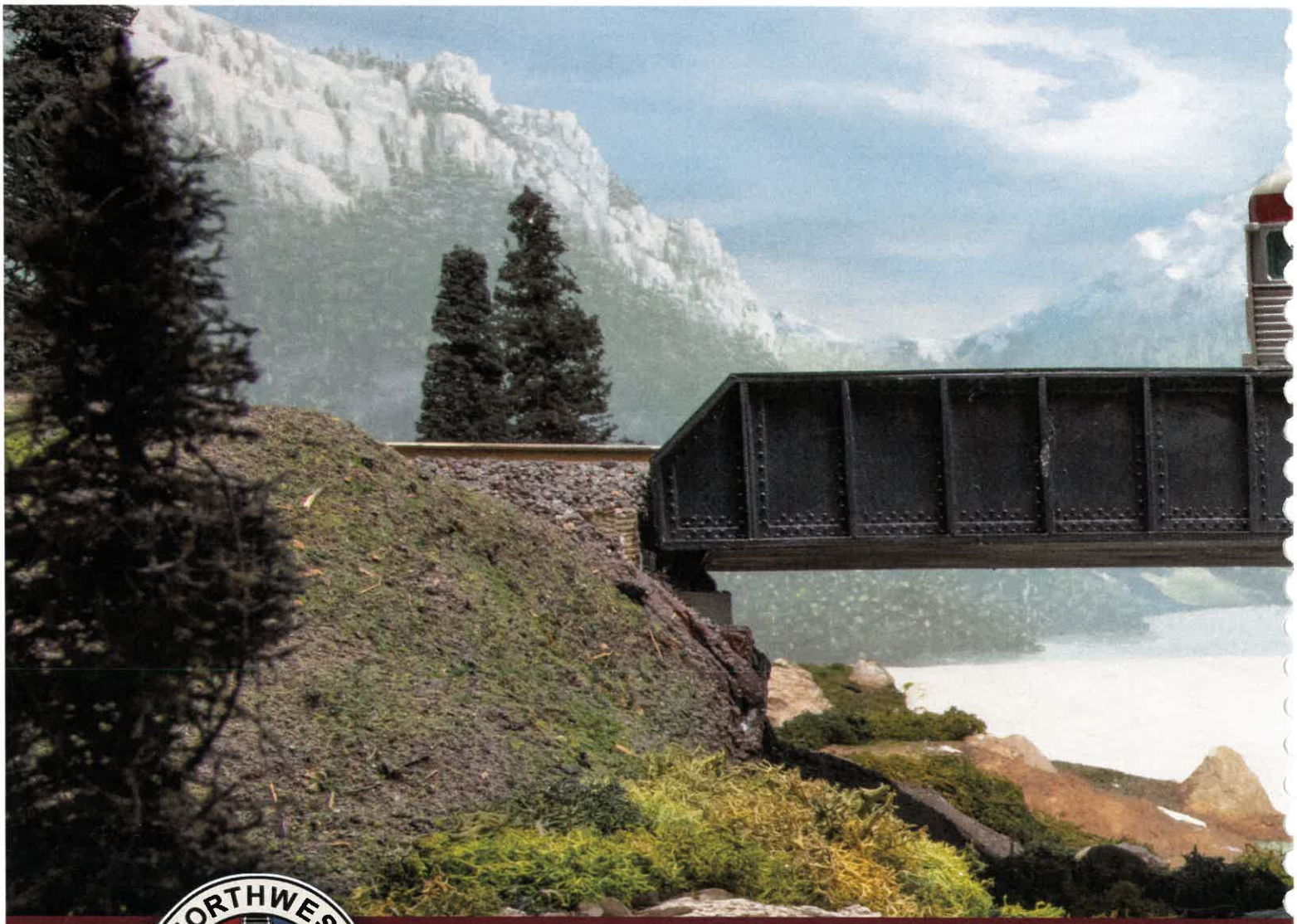



# Northwest Trunk Lines

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.

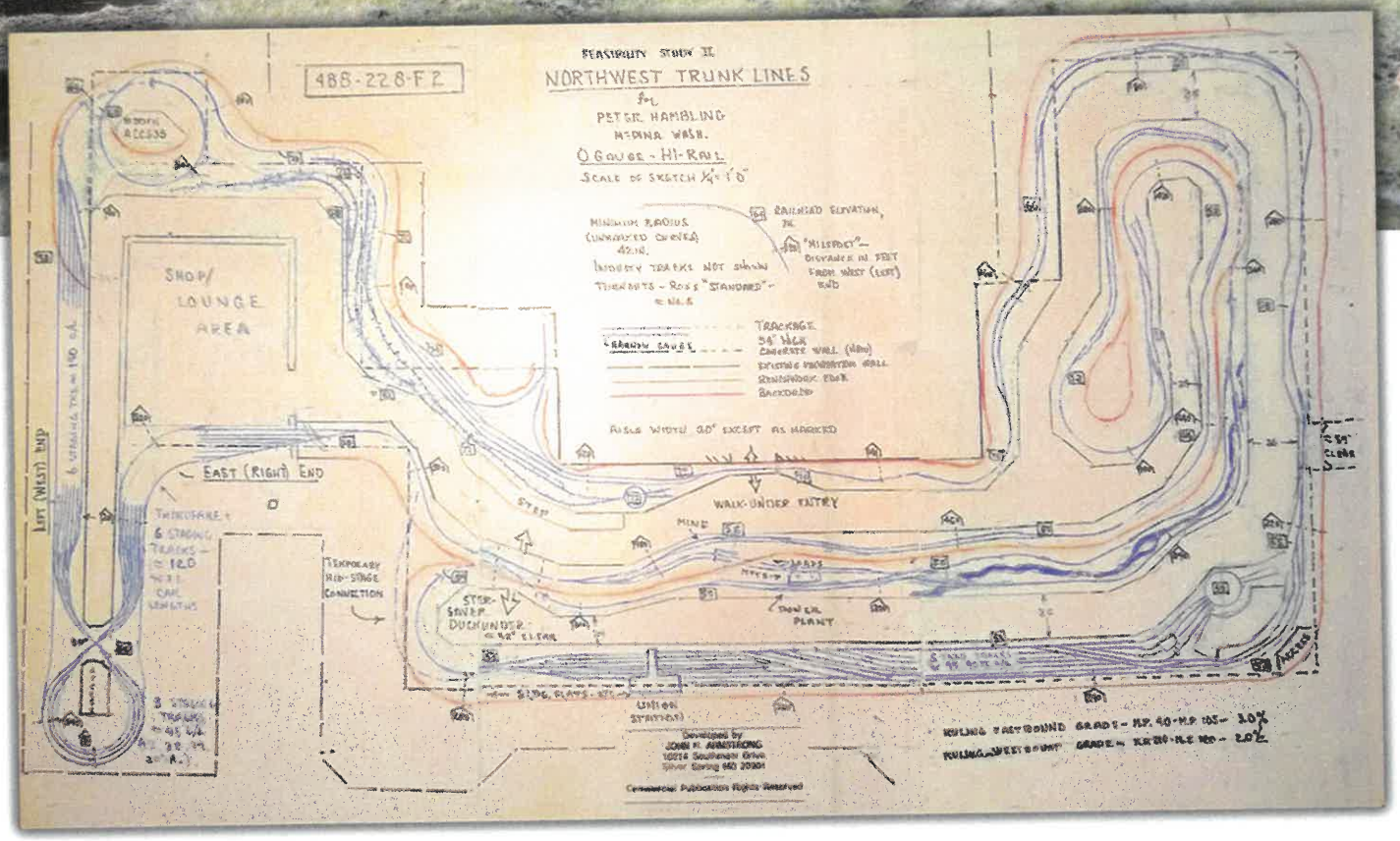


# BACKGROUND

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.

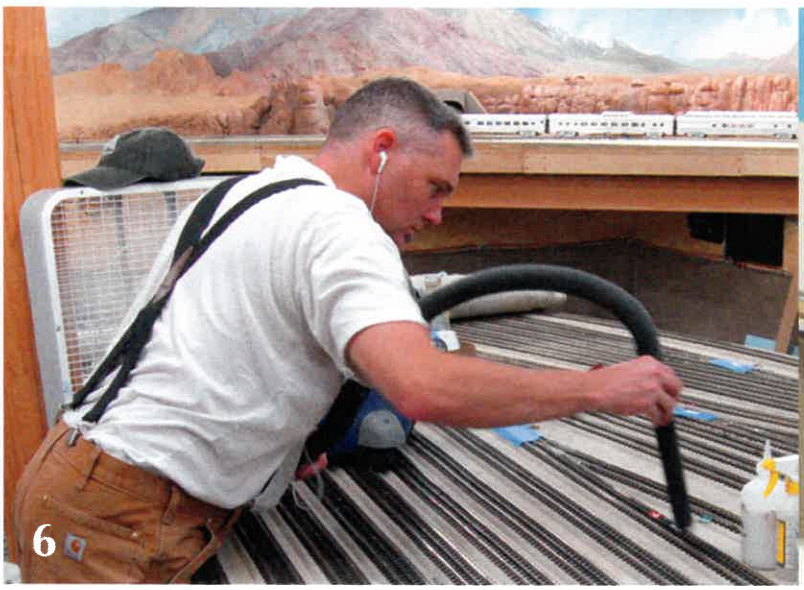




Layout Design
by John H Armstrong


**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.

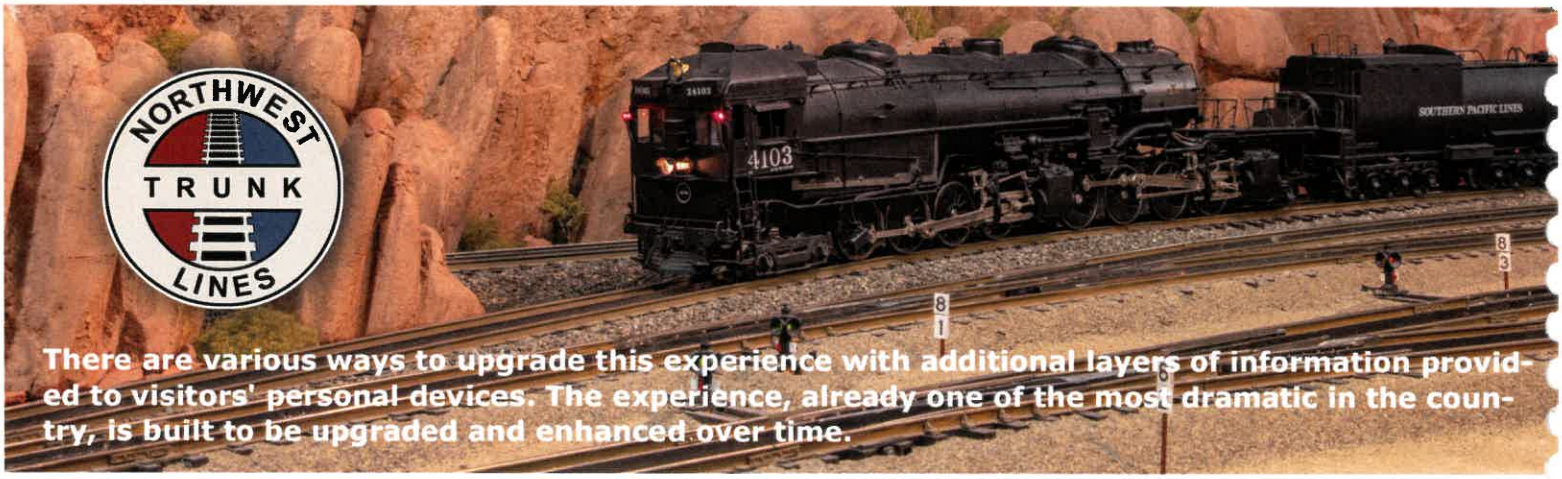
**Rocks**
Rock castings help bring the scenery to life in the various natural environments, and NWTL used a wide selection to create mountains and cliffs that correctly match the geology of each segment. The artists created forms from latex rock molds, fracturing, shaving, and sculpting these pieces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




There are various ways to upgrade this experience with additional layers of information provided to visitors' personal devices. The experience, already one of the most dramatic in the country, is built to be upgraded and enhanced over time.

**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.

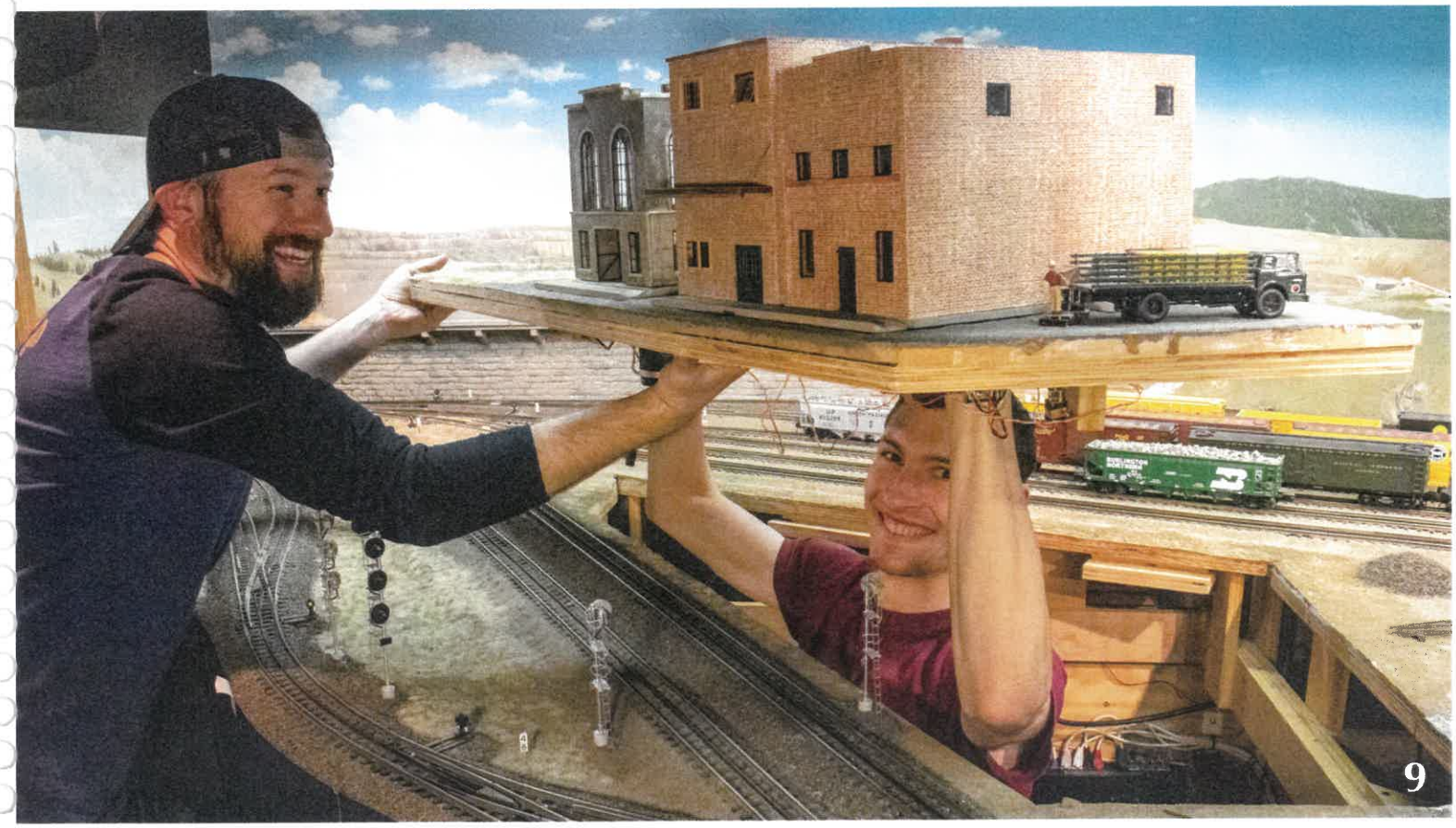
## Computer, Controls, and Operations

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.



# MODEL RAILROAD ATTRACTIONS IN THE UNITED STATES

The study of various examples has allowed the NWTL team to find the best opportunities and practices:

- Model rail attractions are popular with families.
- Rail enthusiasts offer support.
- Many are private and not accessible.
- The public exhibits can be in existing rail or history museums, a few stand-alone.
- They are limited in authenticity, expandability, and related programming for full service.
- The attraction can enrich the local natural and cultural history by expanding interpretive content.

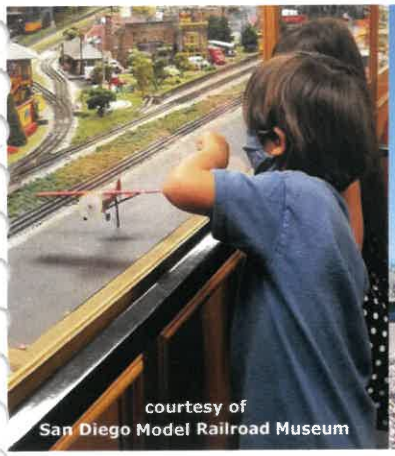
The NWTL team has studied examples of model rail attractions for public service opportunities, challenges, and best practices.

The global best is Miniatur Wunderland in Hamburg, Germany. Located in a waterfront tourist area, this exhibition has hundreds of thousands of international visitors each year. Its quality of layout and visitor service are good references. The United States has numerous model rail displays. Many are club-operated for enthusiasts that feature popular public events each year. However, some of the best examples are in private ownership and are not accessible to the public.

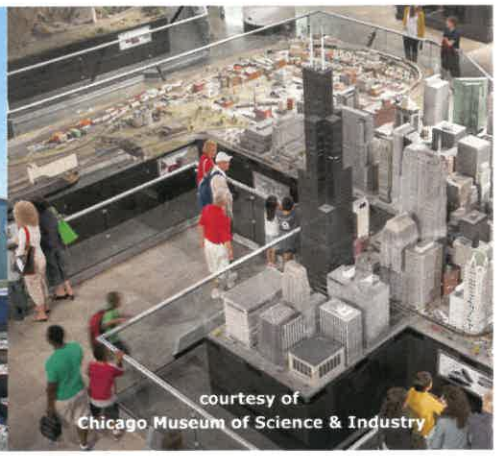
The Great Train Story at the Chicago Museum of Science & Industry is well done and popular, featuring a model replication of the Northern Pacific route from Chicago to Seattle. It is in one of the largest museums in the world and only one of many exhibits. The layout is smaller than NWTL and not easily expandable.

San Diego Model Railroad Museum in Balboa Park is also highly ranked, and it posts good attendance figures. This institution is well maintained, with limited public programming. It shares space in a historic structure, with park foundation and municipality support.

Considered by many the best free-standing attraction is the Colorado Model Railroad Museum in Greeley, a town of 100,000 in the high plains of Colorado. It features what was a private set modeling logging and railroading in the west, and then gifted to the new non-profit for public enjoyment. It started with limited operations run by volunteers and has grown and is poised to expand with success. Their challenge is a drab site and modest structure that will impede expansion.


courtesy of
San Diego Model Railroad Museum

courtesy of Colorado
Model Railroad Museum


courtesy of
Chicago Museum of Science & Industry

**PLANNING**
From the research of other institutions, the NWTL team has envisioned an attraction that can be the best of its kind in the country.

**STATEMENT OF PURPOSE**
Its purpose is to provide a popular cultural attraction and educational institution that serves the community and enhances tourism with a sustainable operation.

**MISSION**
The mission is to entertain, stimulate, and educate visitors on history, technology and railroads through the magic of the model railway storytelling experience within the context of natural and cultural history.

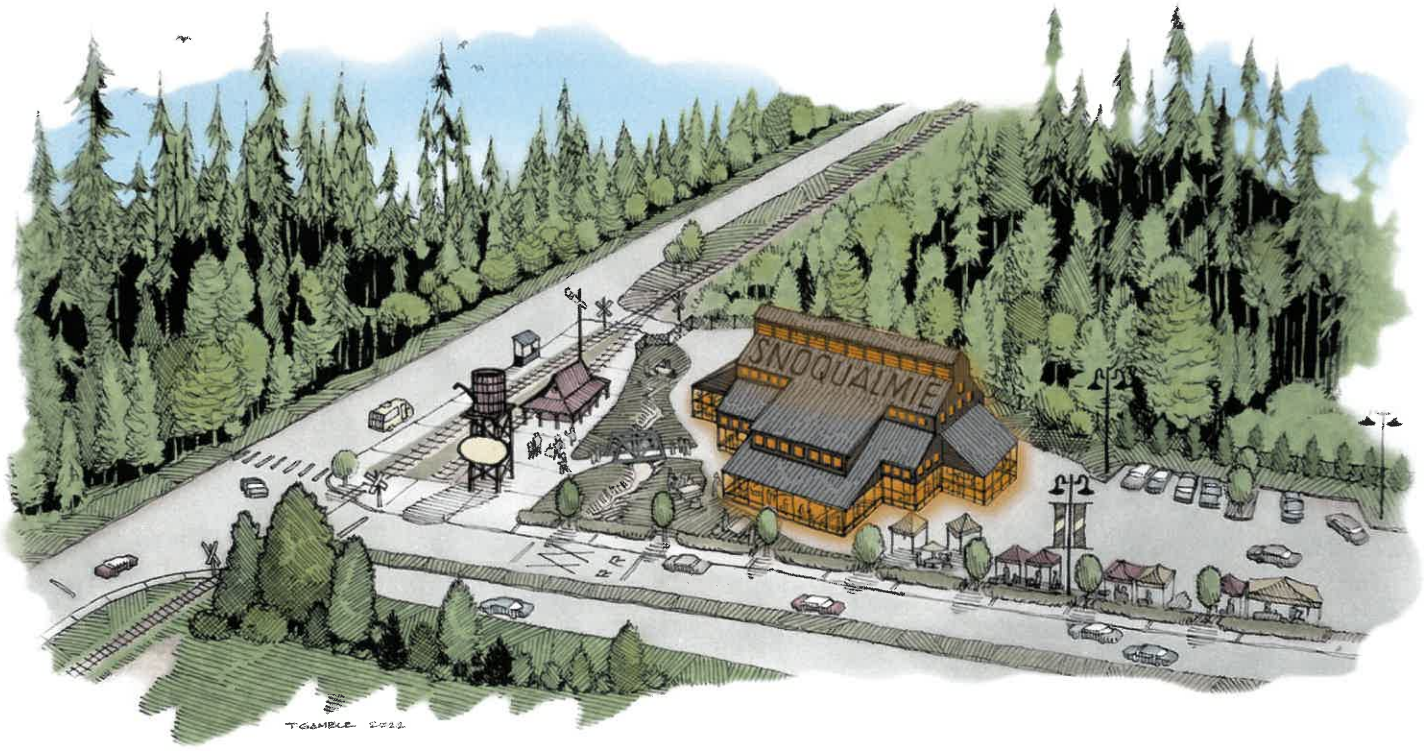
**ORGANIZATION**
For accessibility, partnering, and sustainability, an optimum structure is a public, non-profit organization, NWTL Foundation, chartered for the specific purpose of building and operating this new attraction.

**STRUCTURE**
A free-standing structure designed to the specifications of the new model. A larger space will allow the opportunity to make upgrades and add to the experience.

**LOCATION**
A suitable site of size and visibility to accommodate the proposed new model. This location should have rail history and the support of community partners to tell stories of the natural and cultural history of the region.

**USES**
This attraction will not only feature a magical model railroad experience but a host of support functions of full service to visitors and the community. These will include a large and authentic rail display in an attractive, themed structure, with an entry plaza and reception, maker space and classroom for educational and craft presentation, a changing exhibit gallery, a specialty gift shop, and event spaces for cultural and social gatherings. In addition, a mezzanine balcony would allow dramatic views into the layout.

# Northwest Trunk Lines




## CONCEPT DEVELOPMENT

The development program is devised to provide an extensive model rail experience in entertainment and educational programming. The team is exploring a variety of concepts to provide for expansion of the rail layout and adding associated uses for a full-service attraction.

Architecture and engineering design will begin when a specific building site is identified.

A professional staff, augmented by trained volunteers, will operate the themed attraction within a sustainable budget.

## VALUE

NWTL has been appraised at $5M; replicating it today would double the cost.

NWTL will deliver the model rail experience ready to install in the new location.

NWTL comes with experienced staff to ensure the quality of maintenance and operations.

# Cultural And Educational Impact

## NWTL's objective is to build the finest model rail experience in the country.

- **NWTL will establish a popular new entertainment and cultural attraction, and its associated rail history and technology exhibits offer educational support.**

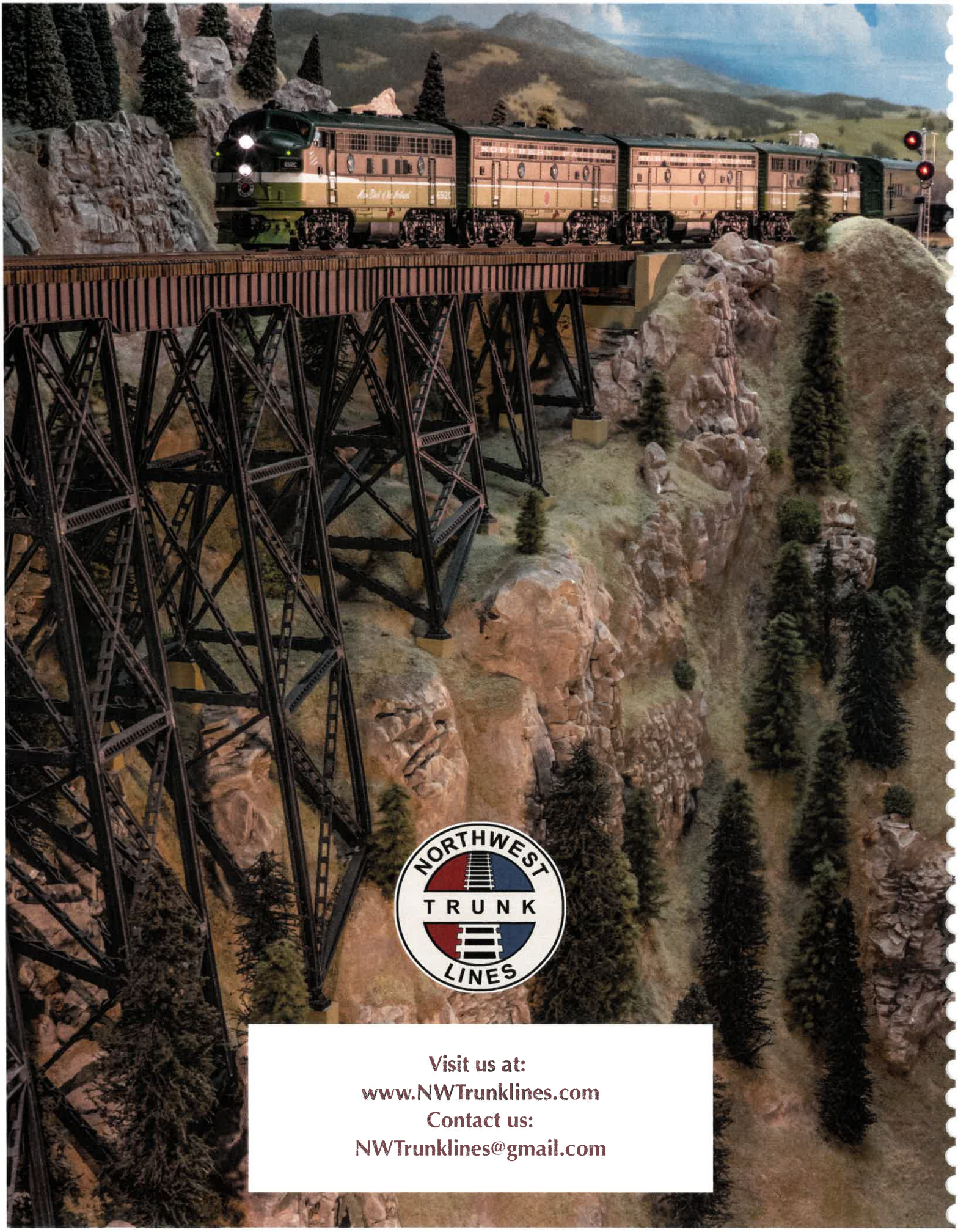
- **The enhancement of tourism visitation complements community service.**

- **Its potential economic impact will be substantial.**

- **The one-time construction of NWTL will induce expenditures, earnings, jobs, and taxes.**

- **On a recurring basis, the attraction introduces a new small business and a stimulation to tourism that adds additional revenues, jobs, earnings, and taxes.**


***Above: Vintage Downtown Snoqualmie***

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