

# HISTORY COLORADO

## COLORADO STATE REGISTER OF HISTORIC PROPERTIES NOMINATION FORM

### SECTION I

#### Name of Property

Historic Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

Other Names N/A

#### Address of Property

[ ] address not for publication

Street Address Colorado Railroad Museum, 17155 W. 44<sup>th</sup> Ave.

City Golden County Jefferson Zip 80402

#### Present Owner of Property

(for multiple ownership, list the names and addresses of each owner on one or more continuation sheets)

Name Colorado Railroad Museum, Attn: Donald Tallman

Address 17155 W. 44<sup>th</sup> Ave. Phone 720-274-5141

City Golden State CO Zip 80402

#### Owner Consent for Nomination

(attach signed consent from each owner of property - see attached form)

#### Preparer of Nomination

Name Michael P. Spera & Kathy McCardwell Date 08-13-13

Organization Colorado Railroad Museum

Address 17155 W. 44<sup>th</sup> Ave. Phone 303-279-4591

City Golden State CO Zip 80402

#### FOR OFFICIAL USE:

Site Number 5JF.5177

10-4-2013 Nomination Received

1-17-2014 Review Board Recommendation

Approval  Denial

1-23-2104 HC Board State Register Listing

Approved  Denied

Listing Criteria  A  B  C  D  E

Certification of Listing: Vice-President, HISTORY COLORADO

Date

**COLORADO STATE REGISTER OF HISTORIC PROPERTIES**

Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

**SECTION II**

---

---

**Local Historic Designation**

Has the property received local historic designation?

no

yes ---  individually designated  designated as part of a historic district

Date designated \_\_\_\_\_

Designated by \_\_\_\_\_ (Name of municipality or county)

**Use of Property**

Historic Transportation, Rail related

Current Not in use

**Original Owner** Denver & Rio Grande Western Railroad

Source of Information Locomotive Folio Sheet

---

**Year of Construction** June 1928

Source of Information Locomotive Folio Sheet

---

**Architect, Builder, Engineer, Artist or Designer** D&RGWRR Denver Burnham Shops, Denver, CO

Source of Information Locomotive Folio Sheet

---

**Locational Status**

Original location of structure(s)

Structure(s) moved to current location

Date of move Last movement June 21, 1985

---

**SECTION III**

---

---

**Description and Alterations**

(describe the current and original appearance of the property and any alterations on one or more continuation sheets)

**COLORADO STATE REGISTER OF HISTORIC PROPERTIES**

Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

**SECTION IV**

---

---

**Significance of Property**

**Nomination Criteria**

- A** - property is associated with events that have made a significant contribution to history
- B** - property is connected with persons significant in history
- C** - property has distinctive characteristics of a type, period, method of construction or artisan
- D** - property is of geographic importance
- E** - property contains the possibility of important discoveries related to prehistory or history

**Areas of Significance**

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Agriculture                        | <input type="checkbox"/> Economics                     | <input type="checkbox"/> Landscape                 |
| <input type="checkbox"/> Architecture                       | <input type="checkbox"/> Education                     | <input type="checkbox"/> Architecture              |
| <input type="checkbox"/> Archaeology – prehistoric          | <input checked="" type="checkbox"/> Engineering        | <input type="checkbox"/> Law                       |
| <input type="checkbox"/> Archaeology – historic             | <input type="checkbox"/> Entertainment/ Recreation     | <input type="checkbox"/> Literature                |
| <input type="checkbox"/> Art                                | <input type="checkbox"/> Ethnic Heritage               | <input type="checkbox"/> Military                  |
| <input type="checkbox"/> Commerce                           | <input type="checkbox"/> Exploration/ Settlement       | <input type="checkbox"/> Performing Arts           |
| <input type="checkbox"/> Communications                     | <input type="checkbox"/> Geography/ Community Identity | <input type="checkbox"/> Politics/ Government      |
| <input type="checkbox"/> Community Planning and Development | <input type="checkbox"/> Health/Medicine               | <input type="checkbox"/> Religion                  |
| <input type="checkbox"/> Conservation                       | <input type="checkbox"/> Industry                      | <input type="checkbox"/> Science                   |
|   | <input type="checkbox"/> Invention                     | <input checked="" type="checkbox"/> Social History |
|   |  | <input checked="" type="checkbox"/> Transportation |

**Significance Statement**

(explain the significance of the property on one or more continuation sheets)

**Bibliography**

(cite the books, articles, and other sources used in preparing this form on one or more continuation sheets)

**SECTION V**

---

---

**Locational Information**

Lot(s) N/A Block N/A Addition N/A

USGS Topographic Quad Map Golden, CO

**Verbal Boundary Description of Nominated Property**

(describe the boundaries of the nominated property on a continuation sheet)

**COLORADO STATE REGISTER OF HISTORIC PROPERTIES**

Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

**SECTION VI**

**Photograph Log for Black and White Photographs**

(prepare a photograph log on one or more continuation sheets)

**SECTION VII**

**ADDITIONAL MATERIALS TO ACCOMPANY NOMINATION**

**Owner Consent Form**

**Black and White Photographs**

**Color Prints or Digital Images**

**Sketch Map(s)**

**Photocopy of USGS Map Section**

**Optional Materials**

**Use of Nomination Materials**

Upon submission to the Office of Archaeology and Historic Preservation, all nomination forms and supporting materials become public records pursuant to CRS Title 24, and may be accessed, copied, and used for personal or commercial purposes in accordance with state law unless otherwise specifically exempted. History Colorado may reproduce, publish, display, perform, prepare derivative works or otherwise use the nomination materials for History Colorado and/or State Register purposes.

**For Office Use Only**

Property Type:  building(s)  district  site  structure  object  area

Architectural Style/Engineering Type: locomotive

Period of Significance: 1928-1963

Level of Significance:  Local  State  National

Multiple Property Submission: n/a

Acreage n/a

P.M. 6th Township 3S Range 70W Section 23 Quarter Sections NE NW SW SE

UTM Reference: Zone 13 Easting 483532mE Northing 4402492mN NAD83

Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

## DESCRIPTION and ALTERATIONS

### Setting

Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado") is located at the Colorado Railroad Museum, 17155 W.44<sup>th</sup> Ave., Golden, CO, near the intersection of McIntyre St. and State Highway 58. Since 1959 the Colorado Railroad Museum has become the premier center for preserving Colorado's railroad heritage. The Museum houses the oldest inoperable and operable locomotives in Colorado: Denver, Leadville & Gunnison/Denver, South Park & Pacific Locomotive No. 191(built 1880), and Denver & Rio Grande Western Locomotive No. 346 (built 1881), respectively. Both of these locomotives were added to the State Historic Register in 1996.

### Description

#### **Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado") (1928-1963)<sup>1</sup>**

Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado") is a narrow gauge locomotive of the "Mikado" type, indicating a 2-8-2 wheel arrangement with outside frame design. The 2-8-2 wheel arrangement consists of two lead truck wheels, eight driving wheels, and two trailing truck wheels under the firebox, or rearmost portion of the locomotive. D&RGW Locomotive No. 491 was built by the Denver & Rio Grande Western Railroad's Denver Burnham Shops in June of 1928. This locomotive is a model of efficiency: it was constructed using a boiler, tender, and other related equipment from the 1902 Baldwin Locomotive Works-built standard gauge locomotive No. 1026. (This locomotive was also known as D&RGW Locomotive No. 1126 prior to 1924, when it was renumbered to No. 1026.) The current locomotive unit has two major components: the locomotive itself, which provides power and is discussed in greater detail below, and a tender, which carries the water and fuel for the locomotive's boiler. The two are semi-permanently attached by the means of a drawbar and pins along with large safety chains. The entire locomotive is 65'3" long, 10'5" wide, and 13'4" tall. The operating weight of the locomotive is 187,250 pounds, while the fully-loaded tender weighs 120,000 pounds, yielding a total weight of 307,250 pounds.

The locomotive portion has two major components: the running gear and the boiler. The running gear consists of all the parts needed to propel the locomotive, via an elaborate system of valves, cylinders, and rods. The two 20" diameter bore by 24" long stroke steam cylinders convert the steam pressure produced by the boiler into reciprocating motion. This drives the main rods that convert the reciprocating motion into rotary motion, which in turn rotates the 44" diameter main drivers. Because the engine was built using outside frame construction, the wheels are placed on the inside of the frame, so that the driver bearing boxes are set on a wider base for more stability. Motion is transferred by way of a counterbalance and crank pin pressed on the common axle of

---

<sup>1</sup> The lexicon of locomotive classification initially appears rather opaque. The term "Mikado" is a popular nickname and trade name for the 2-8-2 wheel arrangement, and refers to the fact the first locomotives of this wheel arrangement, constructed by Baldwin Locomotive Works (Philadelphia, PA) were ordered by the Imperial Railways of Japan. The "K" in the "K-37" class designation references the "K" in "Mikado," as the D&RGW already had an "M" class ("Mountain" class, or 2-8-4 wheel arrangement).

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

the drive wheels. From here the motion is transferred to the other three sets of drive wheels by way of side rods. The steam admission and exhaust of each end of each cylinder is accomplished by the use of an 11" diameter piston or spool valve actuated by Walschaerts valve gear mounted outside of the counterbalances, side, and main rods. The frame has springs and equalizing levers to compensate for deviations in the level of the track. The frame supports the boiler, lead and trailing trucks, and the rear buffer and pocket for the tender drawbar.

The boiler is a large, horizontally-oriented, cylindrical tank of riveted construction mounted on top of the frame, with the running gear running the total length of the boiler. It is designed to generate the steam necessary to power the locomotive. The boiler is designed to operate at 200 pounds per square inch (psi). In operation, it contains approximately 3,000 gallons of water plus adequate space for steam accumulation above the water line. In a fire tube type boiler, such as this one, the hot gases of combustion produced in the firebox travel through 173 2"-diameter tubes and 30 5.5"-diameter flues before being exhausted into the smoke box. Both the firebox and the flues are surrounded by water to prevent overheating. The smoke box area is in front of the boiler above the cylinders and under the smoke stack. When the steam cylinders exhaust, they do so via a nozzle centered directly under the smoke stack in the smoke box. Because of the exhaust action, a negative pressure is created in the smoke box and more post-combustion gases are drawn through the tubes and flues, thereby heating the water and producing more steam. Also present in the smoke box are baffles to break up and cool any still-burning cinders prior to their release through the stack, thereby minimizing the risk of starting grass fires along the railroad tracks.

Affixed to the top of the boiler, from front to back, are: (a) the electric headlight; (b) the smoke stack; (c) the sand dome, which is filled with sand used to promote adhesion to the rail; (d) the bell; (e) the steam dome, which is the highest point on the boiler where the driest steam is taken via the throttle valve and dry pipe for the cylinders; (f) the auxiliary, which has the whistle and safety valves mounted to it; and finally, (g) the turbo-generator, which produces the electricity needed to power the lights. The cab at the rear and sides of the boiler provides a protected area that houses all the related appliances needed to safely operate the locomotive. The cab also provides protection from the elements for the engine crew. A Westinghouse 8 1/2" cross-compound air compressor, which supplies the air for the air brakes, is located outside the cab on the left side of the boiler.

Like all locomotives during their working lives, Denver & Rio Grande Western Locomotive No. 491 had periodic alterations applied in order to maximize its utility and lengthen its working life. The alterations noted in the AFEs<sup>2</sup> are all minimal: most represented upgrades as new and better safety and mechanical technologies became available. AFE 3883 represents the beginning of the construction of this locomotive. Storm windows were rebuilt for this locomotive within a year of its construction. A safety upgrade, in the form of an automatic firedoor, was added shortly thereafter, along with a mysterious and unspecified "additional charge." The brakeman's cupola, or

---

<sup>2</sup> Railroad companies tracked alterations to their physical infrastructure, rolling stock, and other equipment through "AFEs" (Authorities for Expenditure). AFEs were analogous to today's purchase orders, in that they allowed the railroad companies to ensure funds were spent on needed upkeep and alterations. Looking back, they allow us to trace the dates and costs of original construction of and alterations to a piece of rolling stock or other equipment.

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

"doghouse," would have been a standard feature to the original locomotive: it was rebuilt in 1934. In the early 1940s, a string of upgrades were applied to the locomotive: a heater was added to the cab, for employee health and comfort; the original chilled iron wheels were replaced with steel wheels, which could be re-contoured rather than replaced, thus reducing maintenance costs; a new Anderson Cyclone spark arrester, to prevent fires started from sparks from the boiler, was added; and the improved Detroit lubricator was added to improve lubrication of cylinders, valves, and flange oilers.

**Alterations**

<i>Date</i>	<i>AFE</i>	<i>Description of Work</i>	<i>Book Value</i>
8-1-1928	3883	D. & R.G.W.	\$20,774.20
1-1-1929	3950	Cab Curtain: Storm Windows	41.69
6-1-1930	3882	Additional Charge	61.71
6-1-1930	4617	Automatic Firedoor	87.54
7-1-1934	5183	Brakeman's Cupola	119.90
1-1-1940	T-7248	Cab Heater	43.08
1-1-1942	T-8655	Multiple Wear Tender Wheels	216.89
7-1-1942	T-9150	Anderson Cyclone Front End	412.73
8-1-1943	T-9242	Detroit Lubricator	283.89

It bears noting that the locomotive itself provides evidence of a few additional alterations, including the addition of a flanger blade, to cut out ice and packed snow, and signal air and steam heat, which enabled the repurposing of the engine from primarily freight service to passenger service. Because these elements are extant on the locomotive, they were most likely added between 1949 and 1951, following the locomotive's final historic major mechanical "shopping," or repairs.

**INTEGRITY**

D&RGW Locomotive No. 491 demonstrates the evolving use of locomotives in the mid-twentieth century, with historic modifications apparent on the structure. Because these modifications were part of the engine's original work, the locomotive retains a high level of integrity of design, materials, and workmanship. When the railroad constructed the locomotive in 1928 using parts from a standard gauge locomotive, many of the original features remained intact and the historic changes are readily apparent. Since the locomotive was removed from service in 1963, it has remained unchanged other than standard cosmetic maintenance. It remains in a railroad setting at the Colorado Railroad Museum. While the locomotive is not currently operational, preliminary assessments suggest it would be a prime candidate for return to service. As such, it retains a high degree of integrity to its setting, association, and feeling.

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

### **SIGNIFICANCE STATEMENT**

D&RGW Locomotive No. 491 is locally significant under Criterion A for Transportation from 1928 until 1963 for its rail service and association with the Denver & Rio Grande Western Railroad. Additionally, it is significant under Criterion C in the area of Engineering, for 1928 and 1947, because it demonstrates innovation by the railroad for repurposing an existing boiler in 1928; for a cooperative effort of three Colorado companies to reverse engineer an existing class of locomotives for which the D&RGW already carried a quantity of replacement parts; and, in 1947, for adding thermic siphons to boost steaming efficiency and increase heating surface within the firebox, a practice not previously applied to narrow gauge locomotives. In effect, D&RGW Locomotive No. 491 is the "test case" of applying these boiler improvements, common on standard-gauge locomotives, to a narrow-gauge locomotive.

### **TRANSPORTATION**

The Denver & Rio Grande Western Railroad was a key component of the Colorado transportation network in the days when most freight and passengers traveled by rail. The Denver and Rio Grande Western was, in effect, a post-bankruptcy reorganization of the Denver & Rio Grande Railroad, which made its first inroads in Colorado in 1870. D&RG and, later, D&RGW, were notable for their substantial narrow gauge network, which allowed them access to many smaller mining communities. As such, they were a key player in the development of the mining industry in Colorado and Utah, with smaller inroads into New Mexico. D&RGW subsidiary Rio Grande Southern was particularly instrumental in transporting uranium during the WWII and Cold War eras. D&RGW railroads were also heavily involved in food transportation, especially after the advent of refrigeration. D&RGW Railroad Company provided the transportation infrastructure necessary to support the growth of the cattle, sugar beet, coal, oil, and potato industries in Colorado.

Beginning in 1928, D&RGW Locomotive No. 491 operated along the entire D&RGW system, from the tortuous four percent grade of Marshall Pass, to the gun barrel of the Valley Line, up and over Cumbres Pass, and on to Farmington, New Mexico. The records of the exact "consists," or loads, pulled by the D&RGW Locomotive No. 491 have not been preserved, but given the size, power, and known locations of this locomotive, it would have been primarily assigned to freight transport. By 1947, D&RGW Locomotive No. 491 would have seen all the "Scenic Line of the World" had to offer and begun to show significant wear. In 1947, the locomotive, having logged more than 178,000 miles, was brought back to Alamosa for repairs to its aging boiler. Post-repair, it was transferred to a passenger assignment, as the "passenger protection locomotive" for the San Juan train during its last two years of operation, ending in 1951. As a passenger protection locomotive, the D&RGW Locomotive No. 491 was employed as a "substitute" locomotive role for passenger service: if a regularly-assigned locomotive broke down or otherwise was unable to complete its assigned routes, it would retrieve the cars the regular engine had been unable to deliver as intended. After 1951, when the San Juan ceased operation, D&RGW Locomotive No. 491 served on various trains as a helper engine, providing additional power to a primary road locomotive. In 1963, it was formally removed from service and set aside to be offered to the Oriental Refinery in Alamosa, Colorado; however, this proposed lease never came to fruition. D&RGW Locomotive



**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

No. 491 sat on the dead line in Alamosa until 1970, when the D&RGW donated the locomotive to the Colorado Historical Society, now History Colorado. In 1985, it was moved to the Colorado Railroad Museum for long-term loan and display. In June 2013, D&RGW Locomotive No. 491 was de-accessioned from the collection of History Colorado and formally donated to the Colorado Railroad Museum.

The D&RG and D&RGW lasted nearly a century, and during that time period operated thousands of both standard gauge and narrow gauge locomotives. While a number of these have been preserved, D&RGW Locomotive No. 491 is representative of the work experience of the entire K-37 class. However, it is also unique in the ways it illustrates the history of technological innovation within a major railroad in Colorado (discussed below).

## **ENGINEERING**

The C-41 class of locomotives, 1100 series, built in 1902 by the Baldwin Locomotive Works of Philadelphia, Pennsylvania, was one of the most widely used groups of locomotives on the Denver & Rio Grande Railroad system. Out of the C-41 class came Locomotive No. 1126, a homely little standard gauge engine built with all the mechanical refinements typical of the turn of the century. The locomotive was renumbered in 1924 to No.1026. In 1927, an AFE was drafted for the larger shops to begin conducting mechanical evaluations on the C-41 class. This AFE brought with it the possibility of "mining" the engines for parts to be used for the construction of new narrow gauge locomotives, as there was a great need to cater to passenger and freight traffic on the D&RGW's steeply graded narrow gauge southwestern divisions. This cobbling-together of new pieces of rolling stock to better suit new market needs is fairly representative of the railroads' business practices in the late nineteenth and early to mid-twentieth centuries, and is a testament to the ingenuity of the mechanical engineers who designed these machines.

P.C. Withrowe, chief mechanical engineer at the D&RGW Denver Burnham Shops, and George R. Ballard, president of General Iron-Stearns Roger, believed that if the railroads of the east could build their own power, then surely the D&RGW could do the same. This seemingly-radical proposal was meant to preemptively address two issues: material shortages and personnel issues. There was a huge demand for locomotives at this point in history, so a company building its own motive power would have a competitive advantage in that it would not have to wait for outside orders to be completed, potentially for competing railroads. Additionally, in the face of shortages of raw materials, such as steel, a company making its own locomotives would have a competitive advantage over other railroads waiting not just on raw materials, but also on the construction time of an off-site provider. While this flies in the face of traditional ideas of the efficiency of specialization, railroads faced a nearly-constant shortage of materials, including both raw materials and finished goods, so being able to ensure the completion of a new stable of locomotives, on the company's own schedule, was essentially a way to avoid being bogged down by delays from production in external shops.

Constructing its own engines could also allow a railroad to circumvent personnel issues: labor unrest had been a significant problem for many industries during the first quarter of the twentieth century, and while it would be naïve to suggest that railroads would not experience these issues in

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

their own shops, it would, at the very least, bring these issues under the railroad's own control. Additionally, constructing its own locomotives would provide the opportunity to retain a larger number of skilled men on the payroll. More skilled men on the payroll would allow for a higher-quality of in-house work, both in construction and in maintenance and upkeep. It was also widely assumed that "unskilled" laborers would be less desirable employees, with more disciplinary problems and higher turnover. Thus, making a company's locomotives in-house offered the opportunity to exercise greater control over what was assumed to be a more desirable workforce.

Once the decision to fabricate locomotives in-house had been reached, the question of which locomotives to start with arose. Withrowe in particular was familiar with the great popularity of the outside-frame K-36 class 2-8-2 "Mikados." 2-8-2 "Mikados" earned their popularity thanks to their their nearly equal power and flexibility running backwards and forwards, as a function of their balanced wheel and trailing truck arrangement. This trait was particularly useful for navigating an increasingly-heavily-trafficked area, complete with sidings, switchbacks, and the like. The K-36 class was particularly popular within the D&RGW because of its simplistic and robust design, leading to fewer, and more straightforward, repairs. The option of an outside frame provided the added stability on narrow gauge tracks, resulting in greater safety and less loss of time, money, and freight. Given all these considerations, the D&RGW opted to begin their locomotive construction program with their own variation of the outside-frame K-36 class 2-8-2 "Mikados," known as K-37s. Though the naming convention may seem confusing, the K-37 is very similar to the K-36: the only differences are in the K-37s' recycled boilers (from standard gauge C-41s), and minor differences in the frame tailpiece and trailing truck, which for the K-37s is identical to a K-28 trailing truck. Note also that the D&RGW's K-36s were all built by Baldwin; all K-37s were assembled in-house, at Burnham shops in Denver, from parts made by corporations with which the company had exclusivity agreements, or in which they had substantial ownership interests.

The similarity between the K-36 and K-37 was intentional, as it facilitated the sharing of parts between K-36 and K-37 locomotives, which made repairs simpler. This interchangeability had the added benefit of keeping stocking costs down. Through a cooperative agreement with AMSCO Foundries, General Iron-Stearns-Roger, and the Dorr Company, all parts manufacturing would be done in-house, and in-state, under the watchful eye of the Rio Grande. Telegrams were sent to Salida and Alamosa from General Iron Stearns-Roger, instructing those shops to "convey unto Mr. Ballard at Denver in five lots, casting and weldments concerning the Baldwin 189 class chassis [the K-36] as they are brought through the shop for class repairs"(D&RGWRR Co. Telegram Collection: 1927). It is remarkable that this brazen reverse engineering did not result in legal action from Baldwin.

In the fall of 1927, five of the ten chosen C-41s, among them Locomotive No.1026, were summoned by the Office of Master Mechanic to the Denver Burnham Shops to be dismantled with the boilers and related equipment to be utilized in the construction of Withrowe's K-37 locomotives. As 1928 dawned, one by one the new locomotives emerged from Burnham. They were all finished with gleaming "Black Duco" cabs and domes. The black enamel running gear was accented by freshly machined rods; a dark "Moffat Green" boiler jacket finished off the appearance of these massive machines. The tenders were re-used by replacing their standard gauge axles with narrow gauge axles. In June of 1928, D&RGW Locomotive No. 491 rolled out of

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

the Denver Burnham Shops, with an estimated price tag of \$20,774.20. The locomotive was loaded onto a standard gauge flat car and shipped to the D&RGW's Alamosa Shops to begin its working life as the largest narrow gauge locomotive on the Rio Grande line.

At this point, the locomotive was already an example of technological innovation, in that the entire K-37 class was the first to be engineered and constructed in-house by the Denver & Rio Grande Western Railroad. The class as a whole included a number of innovations, such as the recycled C-41 boilers and the application of the K-28 trailing trucks. In 1947, however, D&RGW Locomotive No. 491 as an individual locomotive received additional experimental improvements, in the form of the addition of thermic siphons in the boiler. These additions were common on standard-gauge locomotives, as they provided a desirable improvement in steaming efficiency by increasing the available heating surface within the firebox. While this was an established technology for the standard gauge, it was virtually unheard of for a narrow gauge locomotive. No. 491 was, in effect, the test case of this re-application of a known technology. While this was effective, it was not widely adopted, primarily because diesel locomotives, which were equally powerful and more efficient to run, were bursting on the scene. Even so, this locomotive is a landmark of technological innovation.

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

**BIBLIOGRAPHY**

Denver & Rio Grande Western Railroad Company AFE Card File Collection. Cards 3882, 3883, 3950, 4617, 5183, T-7248, T-8655, T-9150, T-9242. 1928-1943. Colorado Railroad Museum, Richardson Library.

Denver & Rio Grande Western Railroad Company Folio Sheet Collection. Vol. 11. 1889-1951. Sheet L-60. Colorado Railroad Museum Collection, Richardson Library.

Denver & Rio Grande Western Photo Subject File. Folders 579 and 580. Colorado Railroad Museum, Richardson Library.

Denver & Rio Grande Western Railroad Company Telegram Collection. 1927. SB 2656. Colorado Railroad Museum, Richardson Library.

Gordon Basset Photo Collection. Vol. 157. Colorado Railroad Museum Collection, Richardson Library.

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

**GEOGRAPHICAL DATA**

**VERBAL BOUNDARY DESCRIPTION**

The locomotive is permanently housed on the grounds of the Colorado Railroad Museum, located at 17155 W. 44th Avenue, Golden, CO 80403. The property is bounded by 44<sup>th</sup> Avenue to the south, Easley Road to the north, a ditch running alongside Easley Way to the west, and the cul-de-sac neighborhood on an unpaved Easley Way to the east. No real property is associated with this nomination.

**Property Name** Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

### **PHOTOGRAPH LOG**

Name of Property: Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

Location: Colorado Railroad Museum, Golden

Photographer: Beau Brandstetter

Date of Photographs: January 9, 2013

Negatives: n/a

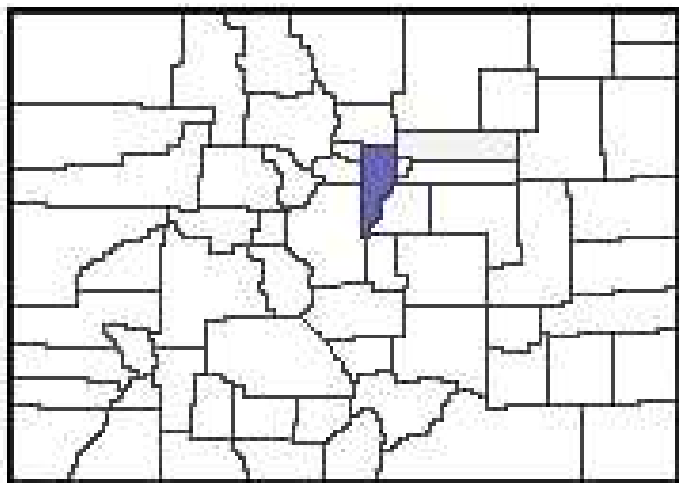
Photo No.                      Photographic Information

- 1.) D&RGW Locomotive No. 491 on turntable, nearly side elevation.
- 2.) D&RGW Locomotive No. 491, three-quarter view left, sepia.
- 3.) D&RGW Locomotive No. 491, head-on.
- 4.) D&RGW Locomotive No. 491, rear view.
- 5.) D&RGW Locomotive No. 491, front portion, right elevation, with counterweight pattern in foreground.

### **HISTORIC PHOTOS**

- 1 Left elevation of D&RGW Locomotive No. 491. Richard Kindig photo, unknown location, 1938. (D&RGW Photo Subject File)
- 2 Right elevation of D&RGW Locomotive No. 491, with "Rio Grande" lettering on tender. Richard Kindig photo, Poncha Pass, CO, 1946. (D&RGW Photo Subject File)
- 3 Three-quarter view, left side visible, of D&RGW Locomotive No. 491 in a railyard in the snow. Robert W. Richardson photo, Chama, NM, 1950. (D&RGW Photo Subject File)
- 4 Left elevation of D&RGW Locomotive No. 491 at Salida by stand-pipe. L.W. Moody photo, Salida, CO, 1938. (Basset Collection)
- 5 Three-quarter view, left side visible, of D&RGW Locomotive No. 491 on wreck train in Salida, CO. Joe Schick photo, Salida, CO, 1947. (Basset Collection)
- 6 Three-quarter view, right side visible, of D&RGW Locomotive No. 491, Chama, NM. S.L. Logue photo, Chama, NM, 1951. (Basset Collection)
- 7 Three-quarter view, right side visible, of D&RGW Locomotive No. 491 in railyard. W.K. Barham photo, Durango, CO, undated (post-1951). (Basset Collection)

Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

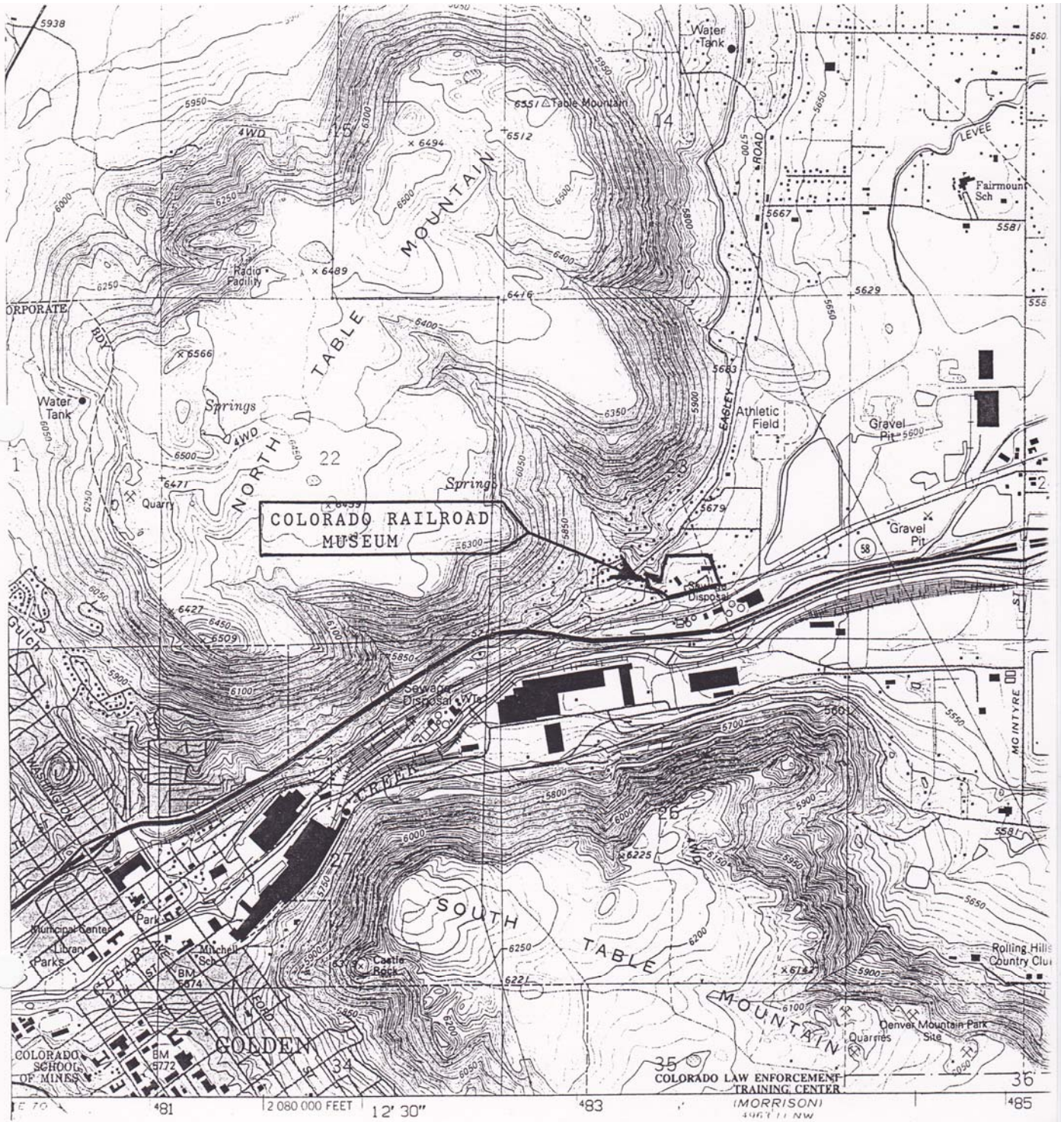


Location: Jefferson County



Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

USGS TOPOGRAPHIC MAP  
Golden Quadrangle, Colorado  
7.5 Minute Series Elevation 5580ft





Property Name Denver & Rio Grande Western Locomotive No. 491 (K-37 2-8-2 "Mikado")

Folio sheet, providing basic physical and technical data on the K-37 class as a whole (below)

