NPS Form 10-900

OMB No. 10024-0018

1003 Resub

United States Department of the Interior
National Park Service

National Register of Historic Places Registration Form

This form is for use in nominating or requesting determination for individual properties and districts. See instruction in *How to Complete the National Register of Historic Places Registration Form* (National Register Bulletin 16A). Complete each item by marking "x" in the appropriate box or by entering the information requested. If an item does not apply to the property being documented, enter "N/A" for "not applicable." For functions, architectural classification, materials and areas of significance, enter only categories and subcategories from the instructions. Place additional entries and narrative items on continuation sheets (NPS Form 10-900a). Use a typewriter, word processor, or computer, to complete all items.

1. Name of Property

historic name Rio Grande Southern Railroad Engine No. 20

other names/site number Florence & Cripple Creek Railroad Engine No. 20; "Portland"; 5JF2223

2. Location

street & number 17155 West 44th Ave. [N/A] not for publication

city or town Golden [X] vicinity

state Colorado code CO county Jefferson code 059 zip code 80403

3. State/Federal Agency Certification

As the designated authority under the National Historic Preservation Act, as amended, I hereby certify that this [X] nomination [ ] request for determination of eligibility meets the documentation standards for registering properties in the National Register of Historic Places and meets the procedural and professional requirements set forth in 36 CFR Part 60. In my opinion, the property [X] meets [ ] does not meet the National Register criteria. I recommend that this property be considered significant [ ] nationally [X] statewide [ ] locally. ([ ] See continuation sheet for additional comments.)

Georgianna Contiguglia, State Historic Preservation Officer — Nov. 14, 2000
Signature of certifying official/Title — Date

State Historic Preservation Office, Colorado Historical Society
State or Federal agency and bureau

In my opinion, the property [ ] meets [ ] does not meet the National Register criteria.
([ ] See continuation sheet for additional comments.)

Signature of certifying official/Title — Date

State or Federal agency and bureau

4. National Park Service Certification

I hereby certify that the property is:

[✓] entered in the National Register
[ ] See continuation sheet.
[ ] determined eligible for the National Register
[ ] See continuation sheet.
[ ] determined not eligible for the National Register.
[ ] removed from the National Register
[ ] other, explain
[ ] See continuation sheet.

Signature of the Keeper — Date of Action

Beth Boland — 12/14/00

5. Classification

Ownership of Property
(Check as many boxes as apply)

[X] private
[ ] public-local
[ ] public-State
[ ] public-Federal

Category of Property
(Check only one box)

[ ] building(s)
[ ] district
[ ] site
[X] structure
[ ] object

Number of Resources within Property
(Do not count previously listed resources.)

Contributing	Noncontributing	
0	0	buildings
0	0	sites
1	0	structures
0	0	objects
1	0	Total

Name of related multiple property listing.
(Enter "N/A" if property is not part of a multiple property listing.)

N/A

Number of contributing resources previously listed in the National Register.

0

6. Function or Use

Historic Function
(Enter categories from instructions)

Transportation: rail-related

Current Functions
(Enter categories from instructions)

Recreation and Culture

7. Description

Architectural Classification
(Enter categories from instructions)

Other: Narrow gauge, Ten-wheeler steam locomotive

Materials
(Enter categories from instructions)

foundation
walls
roof
other Metal

Narrative Description
(Describe the historic and current condition of the property on one or more continuation sheets.)

DESCRIPTION

The narrow gauge Rio Grande Southern Railroad Engine No. 20 (originally Florence & Cripple Creek Railroad No. 20) was built by the Schenectady Locomotive Works of Schenectady, New York, in April 1899. The Whyte system of locomotive classification by lead-driver-trailer wheel configuration denotes this as a 4-6-0, also known as a Ten-wheeler. The steam locomotive and its associated tender are on static display in the outdoor railyard of the Colorado Railroad Museum in Golden, Colorado. The railyard exhibits an extensive collection of both narrow and standard gauge rolling stock which formerly operated in Colorado. The collection includes eleven locomotives of which five are narrow gauge steam locomotives all dating to 1902 or earlier. The railyard displays rolling stock on a series of track segments designed to allow the movement and rearrangement of the equipment to facilitate interpretation, maintenance, and occasional live operations.

Rio Grande Southern Railroad Engine No. 20 Specifications

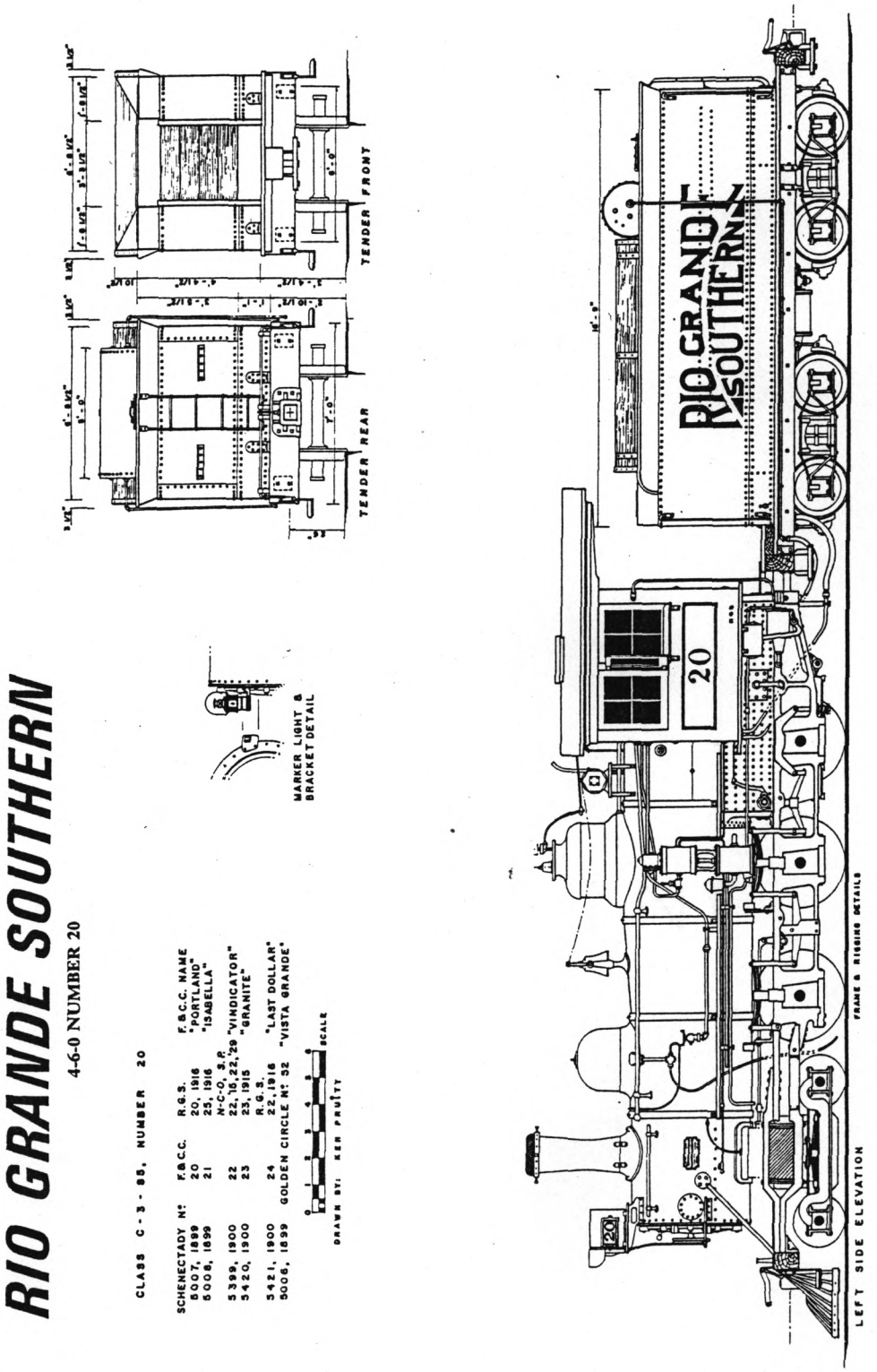
Engine and tender length	49 ft. 1 in.
Engine height	12 ft. 2 in.
Engine width at extreme point	9 ft. 1 in.
Driver wheel size	42 in.
Pilot wheel size	24 in.
Tender wheel size	26 in.
Cylinders	16 x 20 in.
Weight on engine	85,000 lbs.
Tractive effort	18,650 lbs.
Boiler pressure	180 psi.

The description of Rio Grande Southern Railroad (RGS) Engine No. 20 which follows proceeds from the front of the engine to the rear of the associated tender.

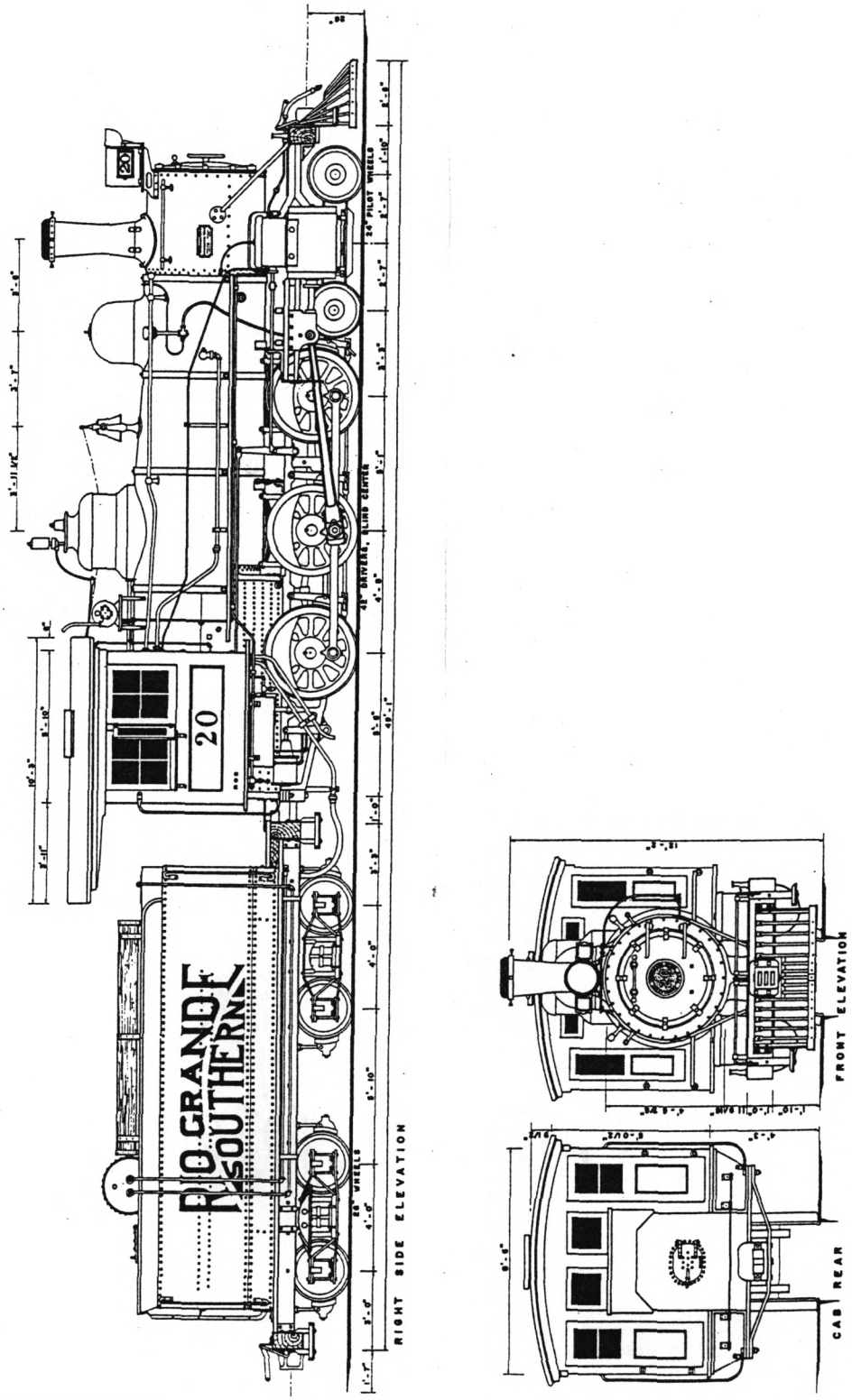
The "cow catcher" or pilot is made of boiler tubes in a manner to allow clearance for the coupler to attach to another car without fouling. The coupler is a standard gauge size Janey-type coupler. The original pilot had been of built up wood construction pointing in front of the link and pin coupler. There are steps on either side of the pilot. A coupler lift pin handle spans the entire width of the oak pilot beam. Bolts and rod boiler braces secure the pilot beam to the two sides of the bar frame. The pilot beam also supports flag holders on the top outside ends. Under the pilot and smokebox is a RGS-made flanger operated by an air cylinder that raises and lowers the flanger. Behind the pilot beam and in front of the steam chests on each side are metal platforms allowing personnel access to the running boards.

The boiler is a five course, modified wagon top variety of riveted steel construction. Courses are horizontal cylindrical sections of the boiler defined by vertical metal bands on the boiler jacket. The smokebox is an exposed steel course without the insulating asbestos-magnesia lagging (insulation) present under the boiler jacket from the second course rearward. The firebox is long and narrow so it may rest on the bar frame between the last two pair of drivers. The bar frame is steel about four inches square, is of bolted construction, and consists of two parallel frames with stretchers, buckle plates to hold up the boiler, slide pads for the firebox, and pedestal braces, the later holding the bottom of the frame together under each driver. The boiler and frame are firmly fastened with bolts, wedges and keys at the steam chest. The steam chest consists of a pair of mirror image iron castings with passages allowing steam to pass from the valves to the cylinders. The engine operates on saturated steam. The use and benefits of superheated steam had yet to be developed.

Rio Grande Southern RR Engine No. 20
Elevation Plans
Figure 1



Rio Grande Southern RR Engine No. 20
Elevation Plans
Figure 2



The engine frame utilizes suspension rigging of rockers, pivots, and driver springs. These are arranged to form a three point suspension of right frame, left frame, and engine truck. This design provides good stability on the typically rough track Engine No. 20 operated on during its entire working life. The crossheads are bolted to the rear of the steam chests and to the rear crosshead member cantilevered out in the middle of the first driver, but attached to the space between the last wheel of the engine truck and the first driver. The engine brake cylinders are bolted to the frame under the cab. The brake rigging is suspended under the frame and operates brake shoes on all six drivers. The Stephenson link valve motion is suspended in a very cramped position between the bar frames and the first and second set of drivers.

Atop the boiler starting in front is an electric headlight of a design from about 1916-1918. Formerly the engine was equipped with an electric light inside an old style kerosene light case. (See photo No. 24). The generator was originally between the headlight and stack (now located in front of the cab). Below the headlight is a short handrail. Below that is a cast brass round engine number plate with the number "20" in the center and "Schenectady Locomotive Works 1899" cast in the outside circle. On either side of the smokebox is a cast brass builders plate in the characteristic rectangular shape used by Schenectady and later the American Locomotive Company (Alco) with which it merged in 1901. Cast on the builders plate is "No. 5007 1899; Schenectady Locomotive Works; Wm. D. Ellis, Prest. A.J.Pitkin, Gen Mgr.". The shotgun-type smokestack rises to about 5 foot 6 inches above the top of the boiler. There are two short handrails on the sides of the smokebox.

The next course holds a domed sand box of generous height. It contains air operated sander valves to release sand to the rails in front of the first pair of driver wheels. The sand aids adhesion on wet or frosty rail. The sand box is in the "as delivered" configuration. A round hatch on top allows the sand box to be filled with clean, dry sand. The running boards and handrails start below the sand box on both sides of the boiler and run back to the cab. On the fireman's (left) side an electrical conduit contains wires running to the headlight, engine number boards on the headlight casing and class lights on the upper front smokebox. In earlier years a similar conduit also ran on the engineer's (right) side. There is a step on the boiler on the fireman's side to give access to the sand dome hatch. The check valves on this course supply cold water into the coolest place in the boiler to alleviate thermal stress. These first two courses are straight.

The manually rung bell rests atop the third boiler course. The course is straight on the bottom but grows larger in diameter on top toward the rear. This is called a "modified wagon top." An ordinary wagon top expands symmetrically. The modified version was found primarily on 4-4-0 American-type locomotives built about 1860 to 1870. The advantage of the wagon top boiler is the larger steam space.

The fourth course supports the steam dome. A photo of May 1904 shows a rounded steam dome rather than the ringed type currently in place. The dry pipe runs just under the third course and makes a right angle up into the steam dome to the throttle. On top of the steam dome are the whistle and two safety valves – one set at boiler pressure (180 lbs.) and one at an additional 5 pounds pressure. Theses valves snap open and shut quickly in operation. The single stage 9½-inch air compressor rises through the running board on the fireman's side and includes air filter, governor, and air and steam lines.

A Pyle National steam turbine electric generator sits atop the fifth course. This was applied about 1913. The cab extends over the rear 3/5ths of this course. The boiler runs through the full length of the cab. The engineer operated the locomotive from the right side. The reverse lever, throttle, independent and train air brake levers are on the engineer's brake stand there. Gauges showing air pressure in the train line and independent or engine brakes kept the engineer informed of braking operations. The illuminated, boiler pressure gauge was mounted high in the center of the cab where both enginemen could see it. A sight glass shows boiler water level. The glass appears the same for full or empty status. Only a partially filled boiler registers in the glass. There are also three try cocks to manually determine water level. The bottom try cock is below the crown sheet, the center try cock level with the crown sheet, and the top try cock is above the crown sheet. The cocks could be opened to show water level as either

steam or water. The most violent steam generation takes place where the boiler meets the crown sheet at the top of the firebox. If the crown sheet becomes exposed, steam pressure inside forces the softened steel off the staybolts and into the firebox resulting in an explosion. Towards the front of the cab a pull lever operated the cylinder cocks draining water accumulated in the cylinders from condensation when the engine was idle. The sander control valve was near the brake stand. Locomotives always had two independent water supply systems to keep the boiler full in case one system failed. Each engineman had valves to control the two lifting injectors. Venturiis in the injectors utilized speed and pressure drops to force water into the pressurized boiler. The injectors are inside the cab.

The cab roof overhangs the gangway where the fireman shovels coal into the firebox. Under the cab roof are the slides for the canvas cab curtains that provide bad weather protection. A door on each side of the cab rear provides access to the fireman's and engineer's operating stations. The engine has a hinged, steel deck plate that folds down onto the gangway of the tender.

Connections between the locomotive and tender are primarily two steel draw bars pinned to the frames. The engine and tender are held in tension by a spring buffer to prevent pounding between the two units. The tension is so great that another engine is needed to compress the springs. The water lines are in armored rubber hoses with threaded connections. The air lines are flexible rubber hoses connected with glad hands – connections that look like two people clasping and shaking hands.

The tender has two end sills connected with steel stringers covered with oak planking to form a platform. On the platform sits the steel water tank that forms a U-shape when viewed from above. The open area surrounded by the tank functions as a coal bunker. Water shut off valves sit on top of each end of the U-shaped tank. The tender is supported by a pair of four-wheel arch bar trucks. At the rear of the tender is a short space about two feet wide that currently is bare but that at various times held two air reservoirs or a tool box. Sometime between 1916 and 1920 the RGS added one additional foot of steel riveted onto the bottom of the tender tank to increase water capacity from 2,500 gallons to 3,200 gallons. Coal capacity was increased from 5 tons to 5¾ tons. The railroad later extended the coal bunker by adding brackets and 2"x12" pine coal boards to further increase coal capacity to around 7 tons. Steel plate lines the bottom of the coal bunker so coal can be shoveled easily. Just behind the coal bunker on the tender fill deck is a large air reservoir. Behind the reservoir is the water fill hatch. The hatch also provides access to the inside of the tender for inspection. A steel ladder on the rear of the tender lets the fireman up to fill the tender with water. There are marker light brackets on the ladder and also on the top rear corners of the tank. The front and rear corners of the tank contain hand rails and steps. There is also a footboard across the buffer beam just below. The rear buffer beam supports a coupler lift handle that operates the tender's standard gauge Janey-type coupler.

ALTERATIONS

Several alterations occurred circa 1916 when the RGS obtained the engine from the F&CC and reconditioned it prior to its return to service. Additional changes occurred during the remainder of the locomotive's operational life. The following are the significant changes since 1899.

1. Headlight changed from original kerosene case type to electric can type circa 1916-1918.
2. Electrical generator moved from behind the headlight to in front of the cab. Generator changed to Pyle National type 12; 32 volts, 18 amps; circa 1916-1918.
3. Steam dome outer cover changed from smooth to current configuration circa 1916-1923, the result of a probable roll-over accident.
4. Tender tank raised one foot to increase capacity circa 1916 to 1920. Water capacity increased from 2,500 gallons to 3,200 gallons. Coal capacity increased from 5 tons to 5¾ tons.
5. Link and pin coupler changed to Janey type to conform to Safety Appliances Act.
6. Pilot changed from wood to boiler tube after 1923.
7. Flanger behind pilot installed by RGS shops circa 1920s.
8. Pine coal boards (2"x12") added circa 1920s. Coal capacity increased to about 7 tons.
9. Tender switch occurred in the early 1920s. Apparently the original tender operated with another engine for a period of time before being returned to the No. 20. (See photo No. 4.)
10. No. 20 may have received No. 25's tender when the latter engine was scrapped in 1940 at Ridgway. The tender replacement was reported in Mallory Hope Ferrell's, *Silver San Juan-The Rio Grande Southern*. A physical investigation of the tender and an examination of numerous documentary sources did not yield any supporting evidence to indicate a change in No. 20's tender.
11. Original asbestos-magnesia lagging (insulation) removed by the Rocky Mountain Railroad Club circa 1983. This was disposed of by a firm specializing in hazardous waste disposal. New boiler jacket held up by wooden blocking then applied and painted.

Paint Schemes

1. F&CC "as delivered". The closest approximation of this is shown in photo Nos. 2 & 3.
   It is believed that this scheme only lasted to the locomotive's first shopping. The only builder's photo of the first three 4-6-0s is of No. 52. (See photo No.24).
2. F&CC "run-of-mill". Most railroads used a variation of this scheme. The large engine numbers on the side of the tenders enabled railroad personnel to confirm engines against train orders. "F&CC" was lettered on the tender coaming. Large "No. 20" on tender sides, small "No. 20" on cab sides and sand box sides. Lettering probably gold and engine and tender black.
3. RGS "run-of-mill". Same as above. This scheme used from 1916-1940. (See photo No. 4.)
4. RGS "Rio Grande Southern-straight". This had the "Rio Grande Southern" in a straight line on the tender. The cab had "20" centered with "R.G.S." on bottom rear corner and "T-19" on bottom front corner of the cab. This scheme only lasted a short time from 1940 to 1942. (See photo Nos. 5 & 6.)
5. RGS "Sunrise thin". The Galloping Geese fleet first displayed this scheme. It was well liked by the shop men so it was put on the locomotives. The sunrise lettering was first done in a thin style lettering on the tender. The cab had "20" centered on it as did the sand dome. The lettering was probably white or gold. This was applied from 1942 to about 1947. (See photo No. 23.)

6. RGS "Sunrise thick". The lettering was painted thicker than before. The reason for this change is unknown. Perhaps, while preparing for a fan trip some of the letters were sloppy and the widths were made thicker to fix the job. The sunrise lettering was applied to the tender. The cab had "20" centered, but only "R.G.S." was left on the rear bottom corner of the cab. This scheme was applied 1945(?) to 1949. There were variations at this time related to what was highlighted with either white or silver paint. At various times these items were painted; the letters on the number plate, ends and posts on the front smoke box hand rail, ends and posts on main engine hand rails edges of the running boards, board on bottom of cab sides, board on ends of planking on bottom sides of tender, engine axle ends, engine wheel tires, engine main and side rod ends, and tender journal box covers. The shop forces usually would repaint the engine for an excursion and "doll it up." (See photo Nos. 7, 8, 9, 10, and 11.)
7. RGS "Movie". The movie *Ticket to Tomahawk* was filmed on the Silverton branch of the D&RGW during August 1949. The engine was considerably altered in appearance and paint just for the movie. (See photo No. 25.)
8. RGS "Final days". The shop forces liked the clipper ship on the tender so they left it intact. "Rio Grande" was the top lettering with "Rio" jammed in and "Southern" below. "20" was again centered on the cab. The engine and tender were black. This scheme lasted from 1949 to 1951.
9. F&CC "Repaint as-delivered". The Rocky Mountain Railroad Club (RMRC) purchased the engine in 1952. Some of the members did research on the F&CC. They repainted the engine and tender on one week end. Irv August furnished photo No.3 as he was one of those who worked on this project on May 12, 1957. No. 20 was moved from Alamosa to Golden to the Colorado Railroad Museum in 1958.
10. RGS "Repaint Sunrise thick". The F&CC repaint faded. The RMRRC put the RGS "Sunrise" scheme back on circa 1965. The asbestos-magnesia was removed correctly from the boiler circa 1984. The boiler jacket had badly rusted out so a new one was fabricated of the same materials and repainted. As more maintenance was done through the years silver paint was applied to the main handrails, water supply lines to the check valves, main and side rods, front steps, flag holders on the pilot beam, rerailing frogs on the tender, and the front and back coupler lift handles. (See photo No. 15.) Many of these items were repainted back to black in 1999. (See photo Nos. 16, 17, 18, and 19.)

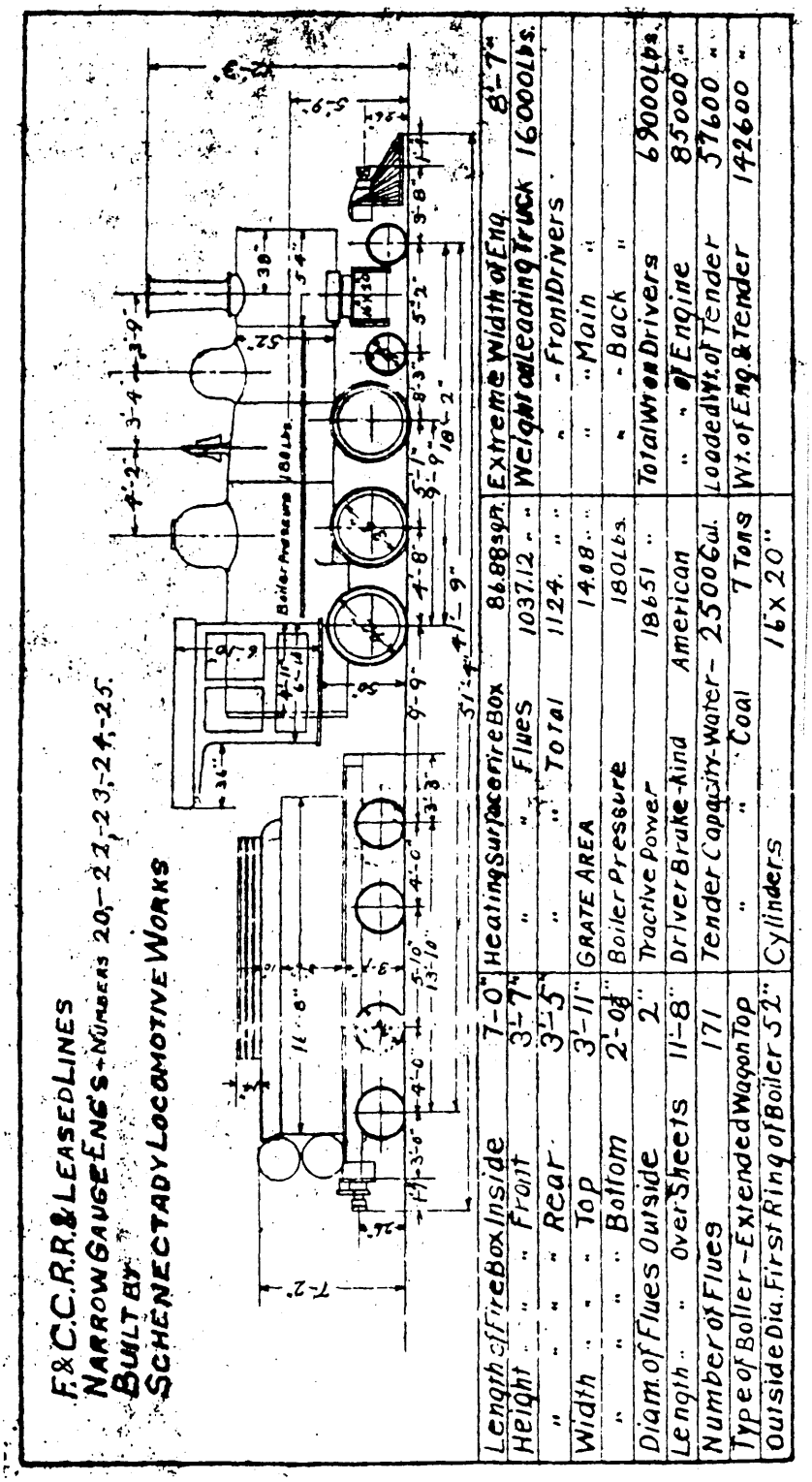
INTEGRITY

Rio Grande Southern Railroad Ten-wheeler Engine No. 20 retains all of its design and character that it had at the end of service on the Rio Grande Southern R.R. It is easily recognizable by anyone who saw it in service on the RGS or who has seen photos of it as Engine No. 20.

All locomotives receive minor alterations during their lifetime due to routine maintenance and repair/replacement of worn or broken parts. With good maintenance, locomotives could last 50 years or more in service. The engine has not undergone any major rebuilds since the Rocky Mountain Railroad Club purchased it from the Rio Grande Southern Railroad. The club has performed general maintenance to keep the engine in good condition. During these activities the club has reconditioned original parts whenever possible, used standard replacement parts if reconditioning was not possible or manufactured new parts based on original designs and materials when necessary.

Currently, the engine is on static display at the Colorado Railroad Museum in Golden. The locomotive can and has been moved to insure that the running gear is kept free from rust and corrosion. The engine was last moved in October 1998. The officers and directors of the Rocky Mountain Railroad Club are investigating the feasibility of restoring RGS Engine No. 20 to operating condition.

Florence & Cripple Creek RR Engine No. 20
Elevation Plans
Figure 3



8. Statement of Significance

Applicable National Register Criteria
(Mark "x" in one or more boxes for the criteria qualifying the property for National Register listing.)

[ ] **A** Property is associated with events that have made a significant contribution to the broad patterns of our history.

[ ] **B** Property is associated with the lives of persons significant in our past.

[X] **C** Property embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master, or possesses high artistic values, or represents a significant and distinguishable entity whose components lack individual distinction.

[ ] **D** Property has yielded, or is likely to yield, information important in prehistory or history.

Criteria Considerations
(Mark "x" in all the boxes that apply.)

Property is:

[ ] **A** owned by a religious institution or used for religious purposes.

[ ] **B** removed from its original location.

[ ] **C** a birthplace or grave.

[ ] **D** a cemetery.

[ ] **E** a reconstructed building, object, or structure.

[ ] **F** a commemorative property.

[ ] **G** less than 50 years of age or achieved significance within the past 50 years.

Areas of Significance
(Enter categories from instructions)

Engineering

Periods of Significance
1899

Significant Dates
1899

Significant Person(s)
(Complete if Criterion B is marked above).

N/A

Cultural Affiliation
N/A

Architect/Builder
Schenectady Locomotive Works

Narrative Statement of Significance
(Explain the significance of the property on one or more continuation sheets.)

9. Major Bibliographical References

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

Previous documentation on file (NPS):

[ ] preliminary determination of individual listing (36 CFR 67) has been requested

[ ] previously listed in the National Register

[ ] previously determined eligible by the National Register

[ ] designated a National Historic Landmark

[ ] recorded by Historic American Buildings Survey

#_____

[ ] recorded by Historic American Engineering Record

#_____

Primary location of additional data:

[X] State Historic Preservation Office

[ ] Other State Agency

[ ] Federal Agency

[ ] Local Government

[ ] University

[X] Other

Name of repository:
Colorado Historical Society
Colorado Railroad Museum

SIGNIFICANCE

Rio Grande Southern Railroad (RGS) Engine No. 20 is eligible for the National Register under Criterion C in the area of Engineering. The engine is a rare surviving example of a Ten-wheeler type narrow gauge steam locomotive. These "third generation" narrow gauge locomotives were particularly well suited for hauling passenger trains on the sustained grades typical of mountain railroading in Colorado. The success of its design is borne out by No. 20's half-century of continuous service. It is one of only three known examples of the Ten-wheeler type narrow gauge locomotive surviving in Colorado. The other two are "second generation" narrow gauge locomotives. For this reason, RGS Engine No. 20 is significant at the state level.

ENGINEERING OF THE TEN-WHEELER ENGINE NO.20

In the 1890s most passenger travel was by rail as other competing modes of travel were very slow and uncertain. The western U.S. railroads ran passenger trains much like the eastern lines. Consists were baggage, mail and express, with a couple of day coaches tacked on. Deluxe trains complete with Pullman sleepers, diners, lounge cars, and a club-observation were still to come.

The challenge of railroad engineering in the Rockies was not so much a matter of grade steepness but of the great length of grades. Colorado mountain railroading consisted of a succession of long climbs and descents. Although mountain railroaders were not strangers to multiple engine trains, they preferred to get their trains over the road with a single large engine. The design advances from the 4-4-0 American-type to 4-6-0 Ten-wheelers for additional power was a natural evolution of steam power. At the beginning of the twentieth century the Ten-wheeler was the largest locomotive in service and the four-wheel lead truck certainly was desirable for negotiating the twisting railbed that paralleled mountain streams through deep canyons.

The western Ten-wheelers started life as passenger engines and never seriously competed with eight-drive wheel powered locomotives for jobs as freight haulers. Compared to eastern locomotives of this type, a western Ten-wheeler boiler was unusually large. This allowed the engine to be worked hard uphill for long periods of time in full forward valve gear. The long grades kept train speeds low. Long descents also required crews to proceed slowly to keep their trains under control. The western Ten-wheelers were designed with small diameter drive wheels to afford maximum adhesion to the rail, although at the cost of speed on flat sections of track. Though low drivers have a smaller wheelprint than higher drivers at the point of contact with the rail, the wheelprint is deeper. Low drivered engines tend to slip less for this reason. Western 4-6-0s with their small drive wheels looked like freighters compared to mid-western and eastern counterparts. In fact, in the Rockies, travel times for freight and passenger train operation differed little.

Steam engines are rated primarily by tractive effort (pull) and horsepower (pull at speed). It is useful to compare the F&CC 4-6-0s to the D&RG engines of that era. The D&RG started briefly with some 2-4-0s but quickly went with heavier 4-4-0s to handle the rapid expansion of business. After the deep depression of the 1870s was over, D&RG president General William J. Palmer moved to rapidly expand his narrow gauge railroad line. The D&RG ordered mostly 2-8-0 Consolidations. These were the famed C-16 class of the later Denver and Rio Grande Western (D&RGW and successor to the D&RG) classification system. The D&RGW system used "C" for Consolidation, "T" for Ten-wheeler, and "K" for Mikado (2-8-2). The number following the letter designation represents approximate tractive effort in thousands of pounds. A C-16 is a Consolidation-type generating 16,000 pounds of tractive effort. The D&RG engines leased by the F&CC were C-16s. The F&CC Ten-wheelers generated over 15% more tractive effort than the older C-16s.

When the Rio Grande Southern was built in 1899-1891 it was first stocked with the ubiquitous C-16 2-8-0s. These were the same engines built for the large narrow gauge expansion of the D&RG in the 1881-1882 era. As

time went on these light engines not only wore out but their limited pulling capacity caused operational problems. The route over Lizard Head Pass subjected engines to about fourteen miles of 3% grade on both slopes. The C-16s could handle four cars unassisted on the steep grade while the T-19 4-6-0s purchased in 1916 could handle five loads. Two C-19 2-8-0s and one C-17 2-8-0 purchased in 1916 from the D&RG could handle five loads each.

By 1900 the quest for ever larger motive power resulted in the western Ten-wheelers being unseated by larger locomotives from their place as preeminent passenger locomotives. Some 4-6-0s found duty on secondary lines as passenger and, in later years, light freight power. This, in fact, was what happened to Engine No. 20 and was the reason the engine lasted until the 1950s. Technically, it was big enough as a "third generation" narrow gauge locomotive to be cutting edge when built but not so big that it was scrapped early like heavier more complex brethren. For instance, the RGS had a chance to purchase Uintah Railway 2-6-6-2T engines Nos. 50 and 51. These articulated locomotives, built in 1926 and 1928, were being offered as a pair for the bargain price of $30,000. However, the weight and complexity of the engines mitigated against the purchase. Had Engine No. 20 been on the relatively more prosperous D&RGW, it would have been scrapped earlier when the railroad went to the "fourth generation" 2-8-2 Mikados K-27, K-28, K-36 and K-37s. The RGS did lease some K-27s from the D&RGW starting in 1925. Still, the lighter Ten-wheeler T-19s still filled a useful role in freight operations.

Three narrow gauge Ten-wheelers exist in Colorado. The other two are D&RGW No. 168, on display in Colorado Springs, and D&RGW No. 169, on display in Alamosa. RGS Engine No. 20 is the largest and most powerful of the surviving Ten-wheelers.

Schenctady Locomotive Works

Few Colorado railroads purchased steam locomotives from the Schenctady Locomotive Works. The vast majority of locomotives arriving in Colorado prior to 1900 were from the Baldwin Locomotive Works. Baldwin's president, Samuel Vauclain, was an aggressive salesman with quality products who captured much of the market for new railroad locomotives.

The Schenectady Works was organized in its namesake city in New York state by the Norris brothers, locomotive builders from Philadelphia. The undercapitalized firm struggled for a year to get under way. After producing a few engines the Norris brothers abandoned the New York plant and returned to Philadelphia. The plant lay vacant for a year until another group of investors headed by a hard driving Scot named John Ellis bought the establishment for half its original cost. Schenectady Locomotive Works was reorganized 14 June 1851 with $60,000 capital. Ellis soon hired mechanical designer Walter McQueen who quickly established a reputation for excellent, straight forward designs. The firm prospered and within a few years employed six hundred men producing about fifty engines a year.

The company's fortunes rose and fell with national economic conditions and it survived through a serious fire and flood. After 1875 Schenectady became a more serious competitor of the several other mid-sized rivals, such as Taunton and Manchester, although Baldwin remained the major producer. By 1880, 1,400 men were employed, 1,200 locomotives had been built during its 29 years in business, and it ranked third in total locomotives built. Schenectady established a reputation for quality locomotives. The Ellis family continued to invest in new buildings and tools, and they were quick to retire mechanical supervisors, such as McQueen, who would not follow the latest design trends. During the early 1890s plant capacity greatly expanded until production reached 450 units per year. By the late 1890s all of the Ellis brothers had died except for William D. He proved willing to retire in favor of the newly formed American Locomotive Company (Alco) which took over Schenectady in June, 1901. Several Alco-built steam locomotives survive in Colorado, including three D&RGW K-28s in Durango. However, of the older Schenectady Locomotive Works engines, only Engine No. 20 remains. (See Figure 4).

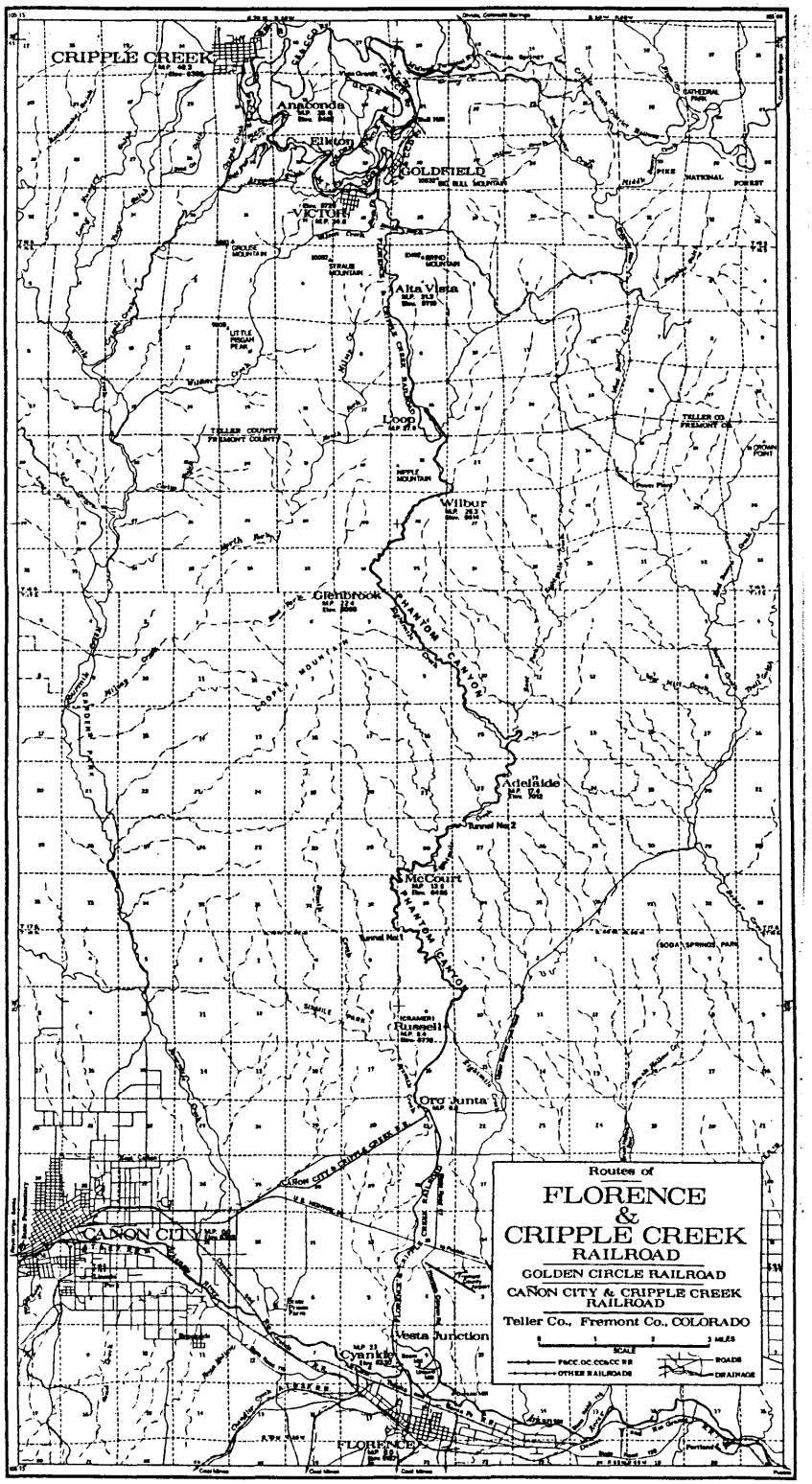
Figure 4 – **Locomotives Produced for the F&CC by the Schenectady Locomotive Works**

Road No.	Name	Date Built	Builder's Number	Cost	Remarks
20	Portland	April 1899	5007	$26,000	Cost for 20, 21, and 52. Sold to Rio Grande Southern RR 1/1916; became their No. 20; Sold to Rocky Mountain RR Club 1952. On display at Colorado Railroad Museum, Golden, CO.
21	Isabella	April 1899	5008	26,000	Renumbered 25 in 1905; Sold to RGS 1/1916; became their No. 25. Dismantled 1940.
22	Vindicator	Jan. 1900	5399	11,250	Sold to Nevada-California-Oregon Ry. 1915; became their No. 22. Resold to Southern Pacific RR 1922; became their No. 22. Dismantled in 1949.
23	Granite	Jan. 1900	5420	11,624	Sold to N-C-O in 1915; became their No. 23. Dismantled 1927.
24	Last Dollar	Jan. 1900	5421	11,824	Sold to RGS 1/1916; became their No. 22. Dismantled 1946.
51	Golden Circle	May 1898	4740		0-4-4T tank engine. Converted by F&CC to 2-4-4T. Lettered "Golden Circle" when built; relettered F&CC about 1901. Sold to Pajaro Valley Consolidated Railroad in 1914 where it became No. 10. Scrapped in 1935.
52	Vista Grande	April 1899	5006	26,000	Lettered "Golden Circle" when built; relettered F&CC about 1901. To Cripple Creek & Colorado Springs Short Line 1915 and renumbered 28. Sold to Kentwood, Greesburg & Southwestern Ry., Kentwood, LA. 1920; became their No. ? May have been lettered Cripple Creek Central Co. at time of disposition.

SERVICE ON THE FLORENCE AND CRIPPLE CREEK

The Florence and Cripple Creek Railroad (F&CC) began running into Cripple Creek-Victor starting 23 May 1894. Initially, the road leased engines from the Denver and Rio Grande Railroad (D&RG) to operate its trains. As the Florence and Cripple Creek was the first railroad into the district, it gathered most of the traffic. Fuel, mining supplies, building materials, and merchandise became available in larger quantities and at lower prices following the arrival of the railroad. The reduced transportation costs made it profitable for the mines to ship ores of lesser value to the smelters in Florence, Pueblo, and Colorado City. The Midland Terminal Railway's arrival in Cripple Creek from Divide in December 1895 strengthened this trend. Consequently, the Cripple Creek district rapidly expanded its mineral output.

Figure 5


CRIPPLE CREEK
Anaconda
Elkton
GOLDFIELD
VICTOR
Alta Vista
Loop
Wilbur
Glenbrook
CANYON
Adelaide
Tunnel No. 2
McCourt
Tunnel No. 1
CANON CITY
Vesta Junction
Cyanide
FLORENCE
Routes of
FLORENCE
&
CRIPPLE CREEK
RAILROAD
GOLDEN CIRCLE RAILROAD
CAÑON CITY & CRIPPLE CREEK
RAILROAD
Teller Co., Fremont Co., COLORADO
SCALE
ROADS
DRAINAGE

Competitive pressure on freight rates drove the Cripple Creek railroads to seek ways to lower their operating costs. The F&CC management believed that costs could be reduced by purchasing its own rolling stock and terminating its lease agreements with the D&RG. By 1 January 1896 the Florence and Cripple Creek had purchased six identical Baldwin-built 2-8-0 Consolidation-type engines. These engines each weighed 72,000 pounds, had 16 x 20 inch cylinders and 38-inch drivers, and developed a tractive effort of 18,820 pounds. Baldwin delivered four more 2-8-0 Consolidations in April 1896 and two final units in April 1897, all matching the first order in design.

Though the F&CC had their own locomotives and equipment, business was increasing so rapidly that they continued to lease from the D&RG. The year 1899 brought additional purchases to eliminate the remaining leased equipment. Schenectady Locomotive Works delivered 4-6-0 Ten-wheeler Engine Nos. 20, 21, and 52 during April 1899. January 1900 brought Nos. 22, 23 and 24. The six engines each weighed 85,000 pounds, had 16 x 20 inch cylinders and 42 inch drivers, and generated tractive effort of 18,650 pounds.

Although the 2-8-0s were state of the art in 1896, by 1899 the heavier 4-6-0s provided greater hauling capacity by developing more tractive effort. Railroad motive power engineering has always emphasized the development of engines capable of more work.

The extra horsepower of the new Ten-wheelers proved very useful on the Florence and Cripple Creek. The 40-mile long railroad main line rose in altitude from 5,197 feet at Florence to 9,396 feet at the depot in Cripple Creek. Though the grade averaged 2%, there was considerable variation over the route. Some sections were nearly level, but from the mouth of Eight Mile Canyon (Phantom Canyon) to Alta Vista station at mile post 31.3, trains rose at a steep 4% grade, about the maximum possible for an adhesion railroad. Ten-wheelers like Engine No. 20 were designed to pull passenger trains on the long sustained mountain grades with sharp curves (30 degrees) like those found in Eight Mile Canyon.

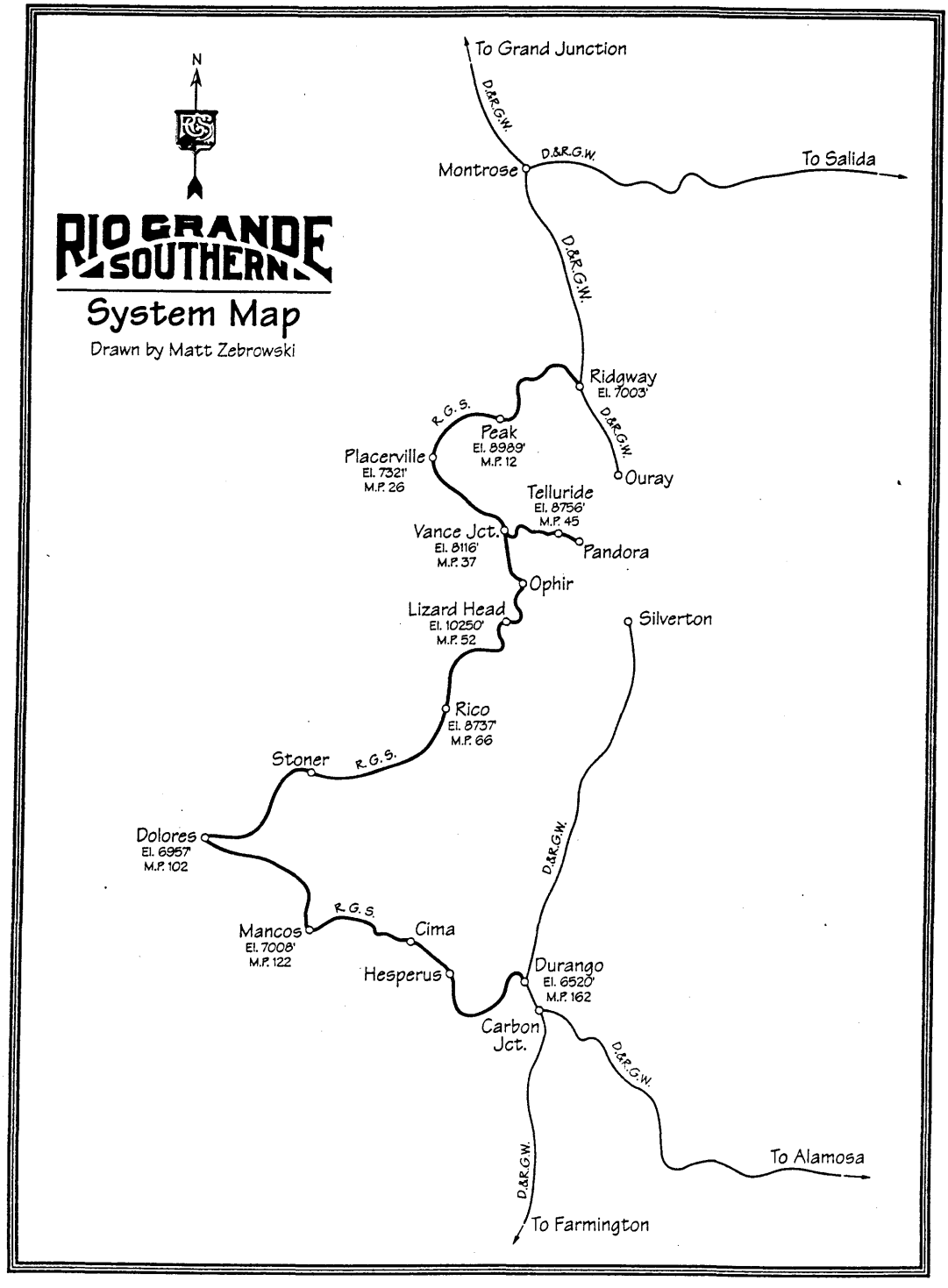
By the end of 1904 it was clear that traffic to and from the Cripple Creek District could not support three railroads. The F&CC's vulnerability originated in its construction through Phantom Canyon. The railbed had not been located far enough off from the normally placid banks of Eight Mile Creek. A flood in 1895 washed away considerable amounts of track and provided a foretaste of troubles to come. Nature decided the issue when on 21 July 1912 a flash flood sent a 30-foot wall of water roaring down Phantom Canyon. The flood washed away most of the trackbed, but mercifully, no lives were lost. The Florence and Cripple Creek was abandoned and its equipment dispersed.

Of the 19 locomotives which are known to have operated on the F&CC only Engine No. 20 and two others survive. The No. 3, renumbered as D&RG 425 in 1917 and renumbered again as D&RGW 315 in 1924, is on display in Durango. The No. 8, renumbered as D&RG 428 in 1917 and renumbered again as D&RGW 218 in 1924, is on display at the Colorado Railroad Museum.

SERVICE ON THE RIO GRANDE SOUTHERN

In 1916, the Rio Grande Southern Railroad, by then a Denver and Rio Grande subsidiary, purchased the former F&CC Engine Nos. 20, 22, and 25. The Ten-wheelers were overhauled at the D&RG shops at Alamosa. They then ran over the San Juan Extension via Chama to Durango where they were delivered to the Rio Grande Southern. Engine No. 20 was delivered in Durango 9 March 1916. The locomotive went into service that very day by powering the mixed train to Telluride double headed with RGS Engine No. 3. C.D. Wolfinger, RGS Superintendent, issued a directive 24 February 1916 that the newly acquired engines were to be used between Telluride and Durango. Enginemen were not to exceed 12 mph over the 30 pounds rail in several places between Rico and Stoner Creek and also in the north end of Telluride yard.

Figure 6


N
RIO GRANDE SOUTHERN
System Map
Drawn by Matt Zebrowski
To Grand Junction
D.&R.G.W.
Montrose
D.&R.G.W.
To Salida
D.&R.G.W.
Ridgway
El. 7003'
R.G.S.
Peak
El. 8989'
M.P. 12
Placerville
El. 7321'
M.P. 26
D.&R.G.W.
Ouray
Telluride
El. 8756'
M.P. 45
Vance Jct.
El. 8116'
M.P. 37
Pandora
Ophir
Lizard Head
El. 10250'
M.P. 52
Silverton
Rico
El. 8737'
M.P. 66
Stoner
R.G.S.
Dolores
El. 6957'
M.P. 102
D.&R.G.W.
R.G.S.
Mancos
El. 7008'
M.P. 122
Cima
Hesperus
Durango
El. 6520'
M.P. 162
Carbon Jct.
D.&R.G.W.
To Alamosa
D.&R.G.W.
To Farmington

Soon the RGS track people wanted to send the engines back to the D&RG. The heavy locomotives were tearing up the light 30-pound rail. Engine Nos. 20, 23 and 25 were temporarily reassigned to the D&RG and based out of Salida. Meanwhile, the RGS upgraded by replacing its 30-pound rail with 57-pound rail. The high line between Ophir Loop and Trout Lake also operated over several wooden Howe deck truss bridges. The RGS installed trestle bents under the bridges to carry the extra weight of the Ten-wheelers. With the completion of the track upgrades the Ten-wheelers returned to the RGS mainline.

The Rio Grande Southern ran from Ridgway over Dallas Divide, down to Placerville, then up the San Miguel River (with a branch to Telluride), over Lizard Head Pass, down to Dolores, and finally over a divide into Durango. Otto Mears built this railroad from 1889 to 1891 to connect Silverton and Ouray while avoiding the 19% grades in the Uncompahgre River Canyon. The Silver Purchase Act of 1890 raised the demand for silver and thus its price. The mines around Telluride, Ophir, and Rico could be worked profitably provided cheap and reliable transportation was available. The Rio Grande Southern cashed in on the high silver prices that continued until the repeal of the Act in 1893. With the decreased demand for silver, prices fell, mines shut down, and the railroad promptly filed for bankruptcy. The Denver and Rio Grande took over RGS operations. Despite the allusive nature of measurable profits, the next sixty years saw the Rio Grande Southern carry much of the economy of the San Juans.

With the passing years and declining business, the Consolidation-type engines were gradually retired when they needed heavy repairs and by 1926 they were off the roster. The larger Ten-wheeler engines helped the RGS ran heavier tonnage trains over Lizard Head Pass. Usually, trains were double headed and a third engine was put on the end if available.

The year 1929 found the D&RGW with financial problems of its own. The parent firm cast the RGS loose which quickly resulted in receivership (bankruptcy) for the junior line. Victor Miller, the RGS receiver, cast about for solutions to the high cost operating trains pulled by locomotives with full crews. The answer came with the development of the fleet of gasoline powered railcars known both with affection and frustration as Galloping Geese. The self-powered railcars utilized a car/bus body on flanged wheels and a crew of one. For heavier freight service the Rio Grande Southern rented 2-8-2 Mikado-type engines, bought Mikado Engine No. 464 and soldiered on with 2-8-0 Engine Nos. 40, 41, and 42 along with ex-F&CC Ten-wheeler Nos. 20, 22, and 25.

World War II brought increased business in part by transporting locally mined fissionable ore for use in the Manhattan Project. After the war, the public's preference for autos, the construction of improved highways, and increasing competition for freight by trucking firms spelled the end for the Rio Grande Southern. One bright spot came in August 1949 when Engine No. 20 was used in the movie *Ticket to Tomahawk* filmed on the D&RGW Silverton branch. Efforts to promote the RGS as a tourist destination generated additional revenue but ultimately not enough to sustain operations. The last runs on the RGS were made in 1951. Track was pulled up in 1951-1952 and the remaining equipment sold or scraped.

Engine No 20 continued to operate until the end of revenue service. Engine No. 20 is one of four surviving RGS engines, the others being: No. 74, now Chicago and Northwestern Railroad No. 30 on display in Boulder; No. 41, now Ghost Town & Calico Railroad No. 41 in serviceable condition at Knott's Berry Farm, Buena Park. California; and No. 42, now Durango & Silverton Narrow Gauge Railroad No. 42, on display in Durango.

ENGINE NO. 20 AFTER RETIREMENT

The Rocky Mountain Railroad Club publicly displays RGS Engine No. 20 at the Colorado Railroad Museum. Engine No. 20's display makes this historic structure available for the education of current and future generations. The Club has maintained this engine since its purchase in 1952 from the RGS. Initially, the engine was displayed at the Narrow Gauge Motel in Alamosa. In 1958, with the founding of the Colorado Railroad Museum, the engine was

brought to Golden. The engine is in excellent condition. During April 1999, the club staged a 100th anniversary party for RGS Engine No. 20. This important example of nineteenth century engineering and ingenuity that provided transportation for Colorado citizens will benefit from listing in the National Register.

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GEOGRAPHICAL DATA

VERBAL BOUNDARY DESCRIPTION

The nominated property includes the structure of the Rio Grande Southern Railroad Engine No. 20 and its tender plus the rails, ties and land directly beneath it within the boundaries of the outdoor railyard at the Colorado Railroad Museum, 17155 W. 44th Ave., near Golden, Colorado.

BOUNDARY JUSTIFICATION

Rio Grande Southern Railroad Engine No. 20 is owned by the Rocky Mountain Railroad Club. The structure is currently a static display at the Colorado Railroad Museum. The engine is displayed within the confines of the outdoor railyard. Although the engine is not currently operational, its display location may shift within the railyard exhibit area.

Rio Grande Southern Railroad Engine No. 20 | Jefferson County, Colorado
Name of Property | County/State

10. Geographical Data

Acreage of Property less than one

UTM References
(Place additional UTM references on a continuation sheet.)

	Zone	Easting	Northing
1.	13	483450	4402280
2.			
3.			
4.			

[ ] See continuation sheet

Verbal Boundary Description
(Describe the boundaries of the property on a continuation sheet.)

Boundary Justification
(Explain why the boundaries were selected on a continuation sheet.)

11. Form Prepared By

name/title Steve Mason / Vice President
organization Rocky Mountain Railroad Club date November 26, 1999
street & number PO Box 2391 telephone 303-979-2806
city or town Denver state CO zip code 80201-2391

Additional Documentation

Submit the following items with the completed form:

Continuation Sheets

Maps
A **USGS map** (7.5 or 15 minute series) indicating the property's location.
A **Sketch map** for historic districts and properties having large acreage or numerous resources.

Photographs
Representative **black and white photographs** of the property.

Additional Items
(Check with the SHPO or FPO for any additional items)

Property Owner

(Complete this item at the request of SHPO or FPO.)

name see continuation sheet
street & number _____ telephone _____
city or town _____ state _____ zip code _____

PROPERTY OWNERS

Locomotive:

Rocky Mountain Railroad Club
PO Box 2391
Denver, CO 80201-2391

Land:

Colorado Railroad Historical Foundation, Inc.
PO Box 10
Golden, CO 80402-0010

PHOTOGRAPH LOG

The following information pertains to photograph numbers 1-26 except as noted:

Name of Property: Rio Grande Southern Railroad Engine No. 20
Location: Colorado Railroad museum, Jefferson County, Colorado
Negatives: Robert W. Richardson library, Colorado Railroad Museum
17155 W. 44th Ave., Golden, CO

Photo No. Photographic Information

1 This is the only known photo of Florence and Cripple Creek Engine No. 20 in service. The photographer is unknown; probably a newspaper photographer or a private individual. This is a significant photo taken in Victor, Colorado, that shows the loading of the sticker-miners. After Harry Orchard bombed the Independence depot killing thirteen people instantly on 5 June 1904 at 2 am., Adjutant General Bell of the Colorado militia arrived on 7 June. He conferred with A.E.Carlton and Clarence Hamlin of the Mine Owner's Association. General Bell said that deportation was permitted under a law for dispersal of a mob. Twenty-five Western Federation Miners said good-by to their families the same afternoon. They were put on this train going south to connect with the Santa Fe RR. The Santa Fe took them east to the Colorado-Kansas state line then marched over that into desolate country. More miners were deported soon after this, but this train is the first.
Photographer: unknown
Date: 7 June 1904 pm.

2 This photo was taken at the Colorado Railroad Museum shortly after the museum was relocated to Golden in 1958. View looking north.
Photographer: unknown
Date: 1960.

3 Photograph number not used.

4 The engineer is oiling around at a meet at Rico in the summer of 1923. This is the earliest photograph known to exist of Rio Grande Southern Engine No. 20. Engine No. 20 had only been on the Rio Grande Southern since 1916. Otto Perry, a charter member of the Rocky Mountain Railroad Club, took this photo on trip over primitive roads to southwest Colorado View is east.
Photographer: Otto Perry
Date: Summer 1923
Negatives: Otto Perry Collection, Western History Department, Denver Public Library

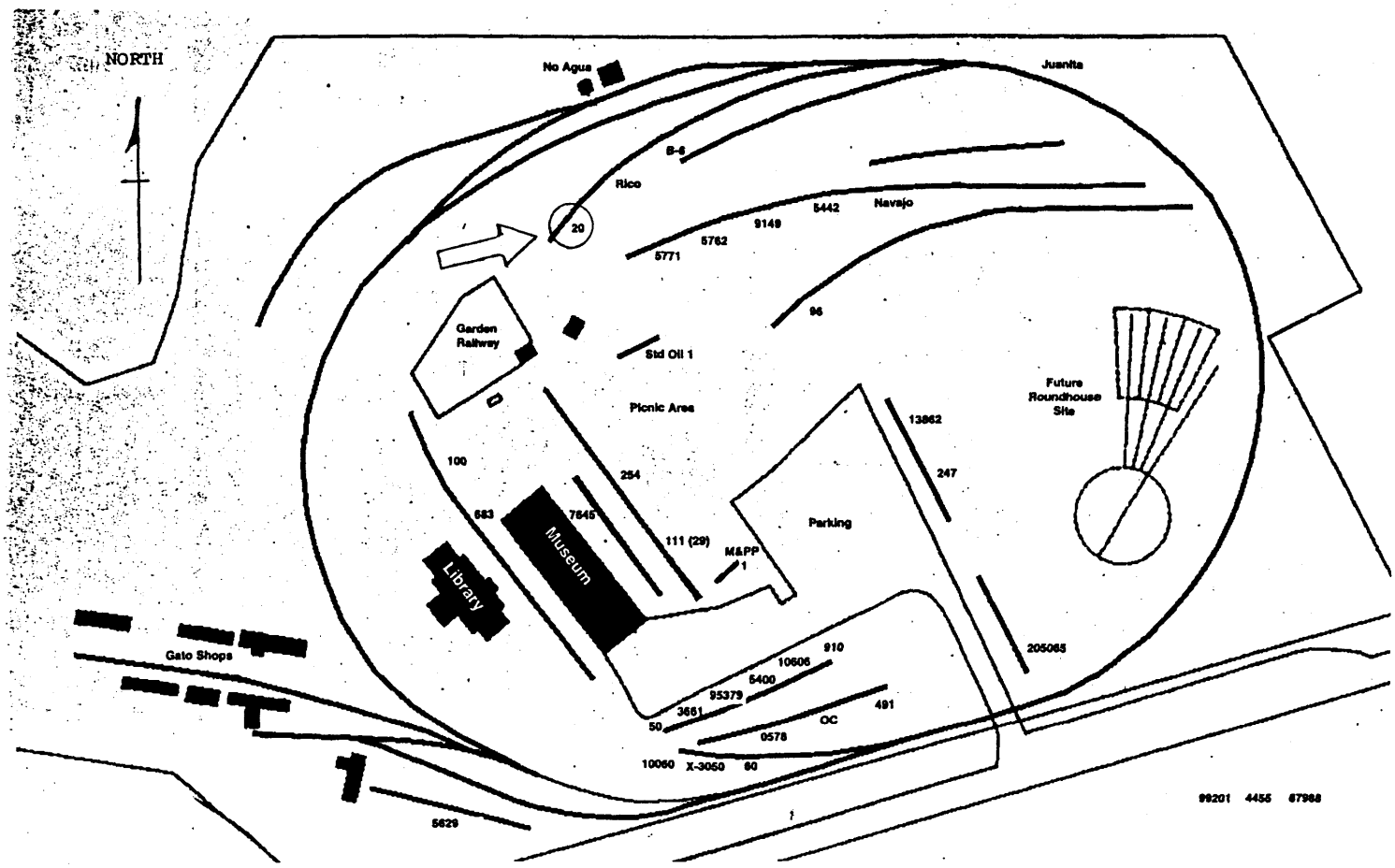
5 RGS Engine No. 20. is waiting to leave Ridgway, Colorado, in 1940. View is southwest.
Photographer: William Monypenny
Date: 22 September 1940
Negatives: Tom Klinger Collection

Photo No.	Photographic Information
6	RGS Engine No. 20 at Coke Ovens between Lizard Head Pass and Rico. This view clearly shows details of the rear of the cab and tender, particularly the lettering. View is southwest. Photographer: Otto Perry Date: unknown Negatives: Otto Perry Collection, Western History Department, Denver Public Library
7	RGS Engine No. 20 at Ridgway in 1947 just prior to departure. The Rocky Mountain Railroad Club ran Memorial Day excursions on the narrow gauge lines in the early 1950s. This Rio Grande Southern excursion was well attended. View is east. Photographer: Otto Perry Date: 30 May 1947 Negatives: Otto Perry Collection, Western History Department, Denver Public Library
8	RGS Engine No. 20 taken at Leopard Creek where there was a meet with a Galloping Goose. This same excursion was taken on 30 May 1947. View is northwest. Photographer: unknown Date: 30 May 1947 Negatives: Mallory Hope Ferrell collection in possession of Tom Klinger
9	Photo taken at Ridgway during a Rocky Mountain Railroad Club excursion. View is east. Photographer: Richard H. Kindig Date: 30 May 1947 Negatives: James L. Ehernberger collection
10	Rocky Mountain Railroad Club excursion at Ophir, CO. View is west southwest. Photographer: Richard H. Kindig Date: 30 May 1947 Negatives: James L. Ehernberger collection
11	RGS Engine No. 20 having taken water at the Trout Lake tank is waiting for a meet with a Galloping Goose during the Memorial Day weekend excursion. View is north. Photographer: Richard H. Kindig Date: 30 May 1947 Negatives: James L. Ehernberger collection
12	RGS Engine No. 20 westbound from Durango at the trestle near Franklin Junction with seven cars. View is east. Photographer: Richard H. Kindig Date: 4 June 1951 Negatives: Tom Klinger collection

Photo No.	Photographic Information
13	RGS Engine No. 20 westbound from Durango near Porter, CO. View is northwest. Photographer: Richard H. Kindig Date: 4 June 1951 Negatives: Tom Klinger collection
14	RGS Engine No. 20 leaving Hesperus, CO. View is northeast. Photographer: Richard H. Kindig Date: 4 June 1951 Negatives: Tom Klinger collection
15	Photograph number not used.
16	The Rocky Mountain Railroad Club celebration and ceremony commemorating the 100th anniversary of Engine No. 20 held at the Colorado Railroad Museum. View is northeast. Photographer: Steve Mason Date: 17 April 1999 Negatives: possession of photographer
17	Engineer's side of RGS Engine No. 20. View is south. Photographer: Steve Mason Date: 17 April 1999 Negatives: possession of photographer
18	RGS Engine No. 20 clearly showing the one-foot extension of the tender to gain additional coal and water capacity. Photographer: Steve Mason Date: 8 May 1999 Negatives: possession of photographer
19	This 3/4 view of RGS Engine No. 20 shows placement of air pumps, generator, domes, bell, whistle, headlight, and class lights. View is north. Photographer: Steve Mason Date: 8 May 1999 Negatives: possession of photographer
20	Photograph number not used.
21	Photograph number not used.
22	Photograph number not used.

Photo No.	Photographic Information
23	RGS Engine No. 20 at Durango. View is west. Photographer: R.F.Blackburn Date: 29 September 1946 Negatives: Tom Klinger collection
24	Schenectady Locomotive Works builder's photo of Golden Circle Engine No. 52. This engine was third in the F&CC order delivered April 1899. The other two engines, F&CC Engine Nos. 20 and 21 are like Engine No. 52. Photographer: Schenectady Locomotive Works Date: 1899
25	This is a photo of a post card circulated in the Durango area in the 1950s. The photo shows RGS Engine No. 20 as the "Emma Sweeney" in the movie "Ticket to Tomahawk" filmed on the Silverton branch of the D&RGW during August 1949. View is northwest. Photographer: Sanborn (negative x-1591) Date: 1949
26	RGS Engine No. 20 at Rico with southbound train. Engineer is waiting for the conductor to sign the depot register so train could depart for Dolores. View is north. Photographer: Robert W. Richardson Date: 23 May 1951

COLORADO RAILROAD MUSEUM
Site Plan
Figure 7



Colorado Railroad Museum
17155 West 44th Ave.
Golden, Colorado

Scale: 1 inch = 160 feet

USGS TOPOGRAPHIC MAP
Golden Quadrangle, Colorado
7.5 Minute Series
Revised 1994
Figure 8