Archaeological assessment of the Otago Central rail trail : the line today

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Introduction

In the first part of this assessment (Hamel 1994), a brief history of the Otago Central railway line and the available documentation was used as a background to an assessment of the physical evidence still on the ground for the section to be used as a rail trail. A short section of the line (Middlemarch to Hyde) was surveyed to indicate the value of the exercise, and in December 1994 the rest of the line (Hyde to Clyde) was covered.The work has been funded by a grant from Science and Research Division of the Department of Conservation.

The interim policy and development plan (1994) for the rail trail has been incorporated into the draft Conservation Management Strategy (CMS) for the Otago Conservancy. The rail trail becomes one of forty special places within the CMS. Objective 3 (draft CMS, Chapter 10: 349) is *to preserve and enhance where possible the historic and heritage attributes of the rail trail,* and *historic site appreciation* is listed as a potential use. The latter will require interpretation, which should focus on the physical evidence that the public can actually see.This inventory and comments based on it provide a basis for these objectives.

Though the railway should be viewed as a whole system and as part of the social landscape, people do classify the things they see as they travel along it, into such groupings as stations, bridges, culverts, tunnels, huts and houses, loading platforms, sections of rails and sleepers, borrow pits, retaining walls and marker posts. Some of these groupings have suffered more than others from demolition, especially buildings and the rails. The bridges have been affected by removal of decking and rails, but are otherwise intact.

In considering the survey evidence, as well as assessing the status of stations, bridges and masonry culverts, I have sorted out some of the less common items and listed them where they occur. I have also assessed management problems such as broken copings of masonry bridge abutments, missing chimneys on huts and more obvious safety problems on bridges. Bridge decking is described as it was at the time of surveys (May and December 1994), but thefts of sleepers have affected some bridges in recent months. The existence of nearly all the masonry culverts as listed on the mileage sheets was checked, and many were photographed. The annotated mileage sheets contain more information than has been extracted for this report, and copies are lodged with the Department of Conservation.

Mileage is given for most items, in the form 50.34, indicating 50 miles and 34 chains from the Wingatui start of the line. The mileages are shown for the whole line on cadastral maps (Fig. 1). Culverts and bridges were built by imperial feet, and their sizes are given here in feet where relevant.
One mile = 80 chains = 1.6 km One chain = 22 yards = about 20 metres
One foot = 30 cm

Stations, sidings, and their remnants

Only Hyde and Ranfurly retain enough buildings to show how the stations functioned. Others are skeletal, having only some concrete foundations or a loading platform, and others are mere ghosts - a flat place by the line.

Middlemarch Station is an intact functional station and though not legally part of the rail trail the public could be directed to it as typical of the line. Rail runs north from it to 500 m north of Dewar Stream.

Tisdalls Ballast pit was a siding into a gravel pit on the west side of the line which is now full of water and gorse (42.19). It was not used after 1934.

Ngapuna Station (originally called Springs) is represented by a wooden-edged loading bay (about 44.60).

Rock and Pillar Station is only a wide flat space by the line (47.66).To the north of where the platform was, there is still a gate post and pedestrian turnstile.

Hyde Station has been bought and developed privately (55.57). It not only has its station building, but also about 300 metres of rail with some railway trucks parked on it and on a siding. There is also a loading ramp, two signals and a tablet arm. The station was built 1.5 k south of Hyde because this was the only suitable piece of land for a siding and loading ramp. It is important as the only intact small station on the trail.

Hyde Township station was only a passenger halt near the hotel and post office, because the station was so far away (56.51). It has been removed.

Hyde ballast pit (56.69) had its siding removed long ago, and it was not noted during the survey.

Prices Creek (59.41) on the north side of the old bridge seems to have been only a water tank. Capburn Station or Tiroiti (60.73) had only a siding shed, urinals and a cottage. Nothing remains. Kokonga is only a skeleton. Coming from the south, there are three sets of points with short sections of rail, two of which include a lever, then a loading ramp and sleepers outlining the platform, followed by a set of points at the north end of the station. Beyond these again there are fence posts outlining some house sites and the remains of a concrete path. There was a labour camp nearby when this part of the line was being built (Dangerfield and Emerson 1967).

Taieri Lake (68.40) is just a flat area of ground marked on the mileage sheets as an abandoned station site. It was established for the loading of basalt from the Kokonga quarry, which was opened to provide stone for the Dunedin Railway Station. The quarry is above the line.

Waipiata is partly visible (72.1). The goods shed has been shifted but stands close to the line with the name painted on it. There is still a railway house at the south end and a wooden tank stand without a tank at the north end. The platform has vanished but a loading ramp is still in place.

Ranfurly Station is relatively intact and a private museum has been established in the station building with a diesel engine parked beside it (minus motor). There is a local story that the engine was acquired by concealing it in a shed until too much of the line had been taken up for it to be retrieved. Other buildings, of a wide range of ages, have been converted for back-packers' accommodation and for a shop. There is a long length of intact rail with three point levers, a turntable which still turns, a loading bank, a pedestrian overbridge stored to one side on drums, and piles of bolts, nuts and plates neatly stacked beside a goods shed. This station has to represent stations between Middlemarch and Clyde, the rest being more or less skeletal. Even at Clyde there is relatively little left.

Wedderburn has lost virtually all its buildings (85.18), though the small station building is intact with its signs behind the Wedderburn hotel. The goods shed made famous by Graham Sydney's painting has gone to a local coal pit, and only the concrete edged platform marks the site of the station. Between Wedderburn and Oturehua the line reaches its highest point at 612 m (88.40).

Oturehua was once called Rough Ridge. The formation has been obscured in part by rubble heaps of concrete but there are still railway houses at both ends of the station area (92.62). In between there is a concrete-edged loading ramp, but everything else has gone.

Ida Valley Station, once known as Blackstone Hill Station according to the mileage sheet, has a skeleton left (97.53). The railway hotel on private land is an attractive, sprawling, wooden villa, with side as well as front gables. Though the goods sheds, platelayers' houses and station building are gone, there is a short section of rail to the shunting yard, the pit for the turntable, the remains of at least one of the cart bridges into the yard, various concrete foundations, and at the west end of the station a magnificent arched culvert which may be one of the largest on the line. This was once a large station, complete with engine sheds. There was a large labour camp either here or at Auripo when the Poolburn viaduct and this section of the line were being built.

Auripo (once known as Poolburn Station) is a ghost with no trace of the station left (100.14).

Lauder Station has been wholly demolished and the formation much disturbed (106.60). There is virtually no trace of the station left.

Omakau Station (once called Ophir) still has its goods shed and platform, as well as various concrete slabs (111.0).

Chatto Creek ballast pit remained in use until 1960 but is now quite a large wetland (118.21). It had a siding and bridge 76a in it.

Chatto Creek Station is one of the more interesting skeletal stations in that it has two railway houses and a shed of a third still in place, as well as a concrete-edged loading platform and a long iron water trough (118.28). The houses are in nice condition and still painted white with the correct double hung windows of the period. Though unrelated to the railway, there is quite a large collection of big irrigation pipes lying north of the loading bank.

Galloway Station is a ghost, with no trace of the buildings or siding (124.45).

Alexandra Railway Station is skeletal with numerous concrete foundations, a loading platform, the main platform, and some houses built in the distinctive railway style but camouflaged among the Alexandra suburban houses. Half way between Alexandra and Clyde railway stations is a treasure, which should be carefully marked-the only signal light recorded on the rail trail. It is at 132.32, 200 m west of the Muttontown Viaduct. It has a white metal standard with a square black box containing the lights. There is a ladder up the back of it, and the lens of the top light has been broken. Otherwise it is intact.

Clyde station is very difficult to interpret as the mileage sheets do not provide details of the new yard built when the terminus of the line was shifted there from Cromwell.There are many concrete foundations and a relatively new shed. The most interesting things are the station building and platform and the turntable, both of which are relatively intact. The numerous cottages are gone.

The status of bridges and tunnels in 1994

The following descriptions are taken from the May and December surveys and focus on the relative importance of the structure, any obvious damage seen, and the need for interpretation and safety railings. The term "brought to course" is used to describe the masonry, and means that all the stones along one line of masonry have been trimmed to the same height (Fig. 2).

Bridge 37 for Dewar Stream is the size of an open culvert, and has not only its sleepers but also a continuous line of rails running south to Middlemarch Station (40.63). It is a standard masonry culvert, fully brought to course, with intact coping stones and wooden beams resting on wooden lintels. It does not need safety railings and should be left exactly as it is.Though it is the first of the masonry bridges and culverts north of Middlemarch Station and the first that many people will see, it is relatively insignificant for interpretation.

Bridge 38 over Camlet Creek is another small masonry bridge like No 37 (41.77). It has lost its sleepers and being very short requires only decking and no railing. It has had some unsympathetic pointing with cement mortar.

Bridge 39 at Five Mile Creek is an example of wrought iron girders over a single span, set on timber sills with well-made schist abutments which will

be typical of the line north to the last small bridge before Alexandra (Bridge 84). Wrought iron was probably old-fashioned even at this stage. There is a very similar open culvert only 250 m to the south. The culvert has lost its decking, which is still present on the bridge. Neither need railings. Only 500 metres further north is the very handsome arched masonry culvert near some Lombardy poplars used as an illustration on the previous report (Hamel 1994).

Bridges 40 and 41 are twins only 150 m apart (44.42 and 44.49). Except for a small concrete slab at each end, some cement mortar work and the loss of their main rails, they appear to be in the same state as when they were built. The schist masonry is all brought to course and the courses are much the same height. The capping stones are intact. These two bridges are well worth some interpretation, possibly on a panel at Hyde, with only a clear number at the bridges themselves (Fig. 3). The decking may need to be filled in between the sleepers, but it would be desirable if railing could be dispensed with, or else made up in a replica of the metal railings on the Six Mile Creek bridge No. 50.

Bridge 42 over the Wandle Creek is a single span masonry bridge, similar to Bridges 40 and 41, except that it has massive wooden beams instead of metal girders (45.70).

Bridges 43 and 44 are twins and similar to bridges 40 and 41 (46.72 and 47.11). The masonry work on each bridge supporting a single span metal girder is impeccable. About 100 m south of bridge 43 there is a rectangular concrete container which may have been a supplementary water trough.

OTAGO CENTRAL RAIL TRAIL

Bridge 45 over Last Creek is the same as bridges 40,41,43 and 44, with the same neat masonry and metal girder (48.6). It is suffering from mud and gravel falling down over a southern wing wall, and there is some threat from the creek scouring its bed on the downstream side of the bridge.

Bridge 46 is built to the same pattern but one wing wall may have collapsed long ago and been replaced with timber and stakes (48.58). It is otherwise intact.

Bridge 47 at Heeney Creek breaks with the English masonry tradition and introduces the American wooden trestle, which was to be used extensively along the rest of the line (49.50). The whole bridge is wooden with slabs to hold back the embankments at either end, wooden piers, caps and beams. Though some piles have been replaced, some of the original silver pine piles from the West Coast are still in place. The bridge still has its decking and centre rails, and it would be desirable to leave it as it is. For safety a bypass ford may be needed. Though modest, it would be an interesting bridge to interpret (Fig. 4).

Bridge 48 over Gills Creek returns to traditional masonry and metal girder (50.58). It is intact but sullied by a rough gate across the line at one end.

Bridge 49 is a twin of 48 (51.26). Neither should be modified by the addition of railings.

Bridge 50 over Six Mile Creek is a classic of Victorian engineering-masonry piers about 15 m high, two end spans of wrought iron plate girders and a 31 m central fancy lattice girder (52.46). The big central girder rests on massive timber sills and has had a lot of welding repairs from 1937 onwards. The masonry is schist blocks, all brought to course. There is a cantilevered walk-way and metal railing on the eastern side, and the sleepers and central rail are still intact. It would be desirable to avoid placing a railing on the other side, or if safety requires one it should be similar to the metal one. There is an old track down to the creek bed on the north side, which should be maintained as a way of seeing the bridge side on (Fig. 4).

Bridge 51 over the Scrub Burn is a pair with Bridge 50 (54.30). Though it is only a single span, it has a deep lattice work girder set on the usual masonry piers with wing walls, made of perfectly brought to course schist blocks, all trimmed to a standard height. The wing walls on the west side appear to have been damaged by flooding as their copings are uneven. Though this bridge is only half the height of the Six Mile it is still about 9.5 m above the river and 15 m long. It either needs railings (which should be metal) or an effective bypass track and ford. At the time of the survey the Scrub Burn was easily forded.

Bridge 52 over Three Mile Creek takes us back to the masonry abutments, wing walls and single solid wrought iron girder of Bridges 43 to 45 (54.71). It has the same impeccable masonry but one wing wall has cracked away from its abutment at an early stage and is stable. The decking and centre rail are intact. It is a short bridge and should not be modified with a railing. It looks quite feasible to put a ford across the river for safety.

Bridge 53 over Coal Creek south of Hyde township is an unusual trestle bridge with two heavy and complex wooden piers (56.8). On each pier, the piles are doubled up with extra bracing legs out to the sides, called raker bracings. The Hyde Township bridge and the old bridge at Prices Creek are similar, but these are the only three on this section of the line. (Manuherikia No. 2 and Muttontown bridges are similar.) They are unlike Bridge 47 at Heeneys Creek which became the standard pattern further along the line, as at Eweburn or Wetherburn (see Discussion). The Coal Creek bridge is intact with sleepers and centre rails, and being 8.7 m high and 37.5 m long it will probably re-quire safety railings. These should duplicate those on the Six Mile if economi-cally possible.

Bridge 54 at Hyde township is a twin to Coal Creek with its doubled-up piers, raker bracings, and wrought iron plate girders (56.62). It runs on a curve from directly in front of the last store at Hyde. It has a cantilevered walkway and white railing on one side. Since it has similar dimensions to Coal Creek (9 m high and 43 m long), it will probably require a railing on both sides. It would be desirable to duplicate the original railings. More work should be done on 'hose two bridges to determine the significance of the double piers (Fig. 4a).

Tunnel 11 south of Prices Creek is about 180 m long (59.00). Its portals are built of basalt, which may have been derived from the bore of the tunnel itself or nearby (Fig. 5).The large eastward loop of the railway south of the tunnel skirts a large basalt dome of Waipiata volcanics. Curiously the masonry here is only partly brought to course with many small infill blocks. The arch and interior is formed of bricks over the curve on a basalt base - "brick lined above springing" as the mileage sheets put it. This is the furthest south that basalt was used on the line.

Beyond tunnel 11 the line has been shifted to carry it over the new Prices Creek bridge, and for the section from 59.13 to 60.20 there are two sets of mileage sheets.

Bridge 55 at Prices Creek was built in 1961-63 to replace the older unstable bridge of iron girders and massive double piers with raker bracings. This is now an interesting ruin up the gully, and though sold in 1967 the buyer was unable to remove the timber because of an access problem. Four piers are intact, two fallen and two removed. These piers are massive objects about 3 m high. The metal girders, some 33 feet long, were removed by Railways for use elsewhere. The new bridge is impressive rather than beautiful on its high concrete piers which have no taper. The decking is intact with a cantilevered walkway and hand railing on one side. The bridge is a standard Railways-designed bridge, typical of the 1960s, fitted to its site but built of standard components. It is a large bridge, and its technological interest should be evaluated further.

Bridge 56 over the Capburn is a large masonry and lattice girder bridge (60.63). The girders are wrought iron, and the only basic modification to the bridge is the replacement of the timber sill and corbels on the southernmost pier with precast concrete blocks in 1937. The masonry work is basalt, some of it quite brown rather than blue-black and nicely brought to course with lightly bolstered faces (Fig. 4). They may be the largest brought-to-course basalt structures in Otago. These are the largest masonry piers on this section of the line, where piers this high were usually made of timber. The presence of basalt at Kokonga may have influenced the decision. Basalt is stronger under shear than schist.

There is a large open culvert between bridges 56 and 57 that is as large as some of the numbered bridges (69.32). It has large masonry abutments (about 1.5 m high) and wing walls of carefully trimmed basalt blocks all about the same height and brought to course (Fig. 6). It still has beams and sleepers crossing a span of about 1 m, and a sheet of heavy plywood has been laid down the centre for stock to walk across. Filling the gaps between the sleepers with heavy timber would look more appropriate or else a track could be formed down the bank to allow a view of the masonry. Some coping stones are have been knocked off and are lying in the water course.

TAIERI RIVER BRIDGE NO 57

This has crossed steel girder sides and no decking. Having been originally designed as a road rail bridge it was decked from 1897 to 1906 (Hamel 1994,

App 1:4). The girder work is interesting, and looking down on the tops of the piers the original wrought iron cylinders for the concrete are still visible. This system of pouring concrete into iron caissons is similar to the technique used on the 1870s Balclutha bridge. This is probably the oldest concrete work on the line still structurally important. It would be appropriate to replace the wooden decking, but if possible the sides should be filled with netting and an iron railing rather than with wood.

WAIPIATA BRIDGE NO. 58

Built in 1879 and extensively repaired in 1931, it is a "hybrid" trestle bridge with some wooden beams and some steel. Its wooden abutments have been replaced with massive concrete. It has no decking and no rails, and could be decked and railed without affecting its historic integrity. It has local interest in that a track to a commonage passed under one end of it.

Waipiata Over bridge No 59. This bridge still has standard wooden piers, set on concrete bases, with simple wooden railings along the road edge. The railings are nicely in keeping and should be maintained in this form. Presumably the local authority is responsible for their upkeep.

Bridge 60.This small masonry and beam bridge is like many others and in its original state. It still has sleepers and should be decked by filling between the sleepers. If possible heavy wooden railing should be avoided. Half a basalt coping stone is missing and there is a name painted on one wing wall which should be cleaned off or smudged out with gray paint.

Bridge 61. This bridge is similar to Bridge 60, except that it lacks any sleepers for decking. It should be treated in the same way as Bridge 60.

Bridge 62 (north of Ranfurly) is similar to Bridges 60 and 61, except that it has small composite beams which are rotting. These three are small basalt, single span bridges with the stones all brought to course, and the courses much the same height. Three lots of capstones on Bridge 62 have been damaged. It still has sleepers and some plywood has been laid down for decking.

Bridge 63 over the Eweburn is an intact trestle bridge with sleepers and centre rails. The simple three-pile wooden piers are essentially original with some replacements of piles, but the RSJs may have replaced original timber beams. The bridge was also reduced in length in 1977 by replacing the three spans at the north end with an embankment. Its concrete water troughs at each end have been toppled. The relatively shallow Eweburn would be relatively easy for horses to cross and a single railing should be sufficient along this bridge. It could be patterned on the piece of existing wooden railing or that on the Hyde township bridge.

Bridge 64 is similar in construction to Bridges 60-63. Its orange brown stone is probably basalt but this is not clear from the available photographs. It is undamaged, with a deck of sleepers which only require infilling. Horses could bypass it and only a single railing would be needed at most.

Bridge 65 over the Wetherburn is a large wooden trestle bridge with concrete abutments, on which the wooden beams have not been replaced with girders. It has been slightly modified in that one span has been filled in with an embankment and the timber sills at each end replaced with concrete abutments, one of which is obviously new. It still has its sleepers and central rails. One of the concrete water tanks has been rolled down on to the stream bed. It is the second most intact trestle bridge after the Gorge Creek bridge (No. 67). It should also be treated with respect and not modified with wooden railings.

Bridge 66, the road overbridge for State Highway 85 north of Wedderburn, is a 1966 pre-stressed concrete bridge. The abutments of the 1900 bridge are still visible, but are plain concrete foundations which probably held wooden piles. It does not require any special historic consideration. The highest point of the line (2029 feet, 612 m) is just north of this bridge.

Bridge 66a, a private concrete overbridge, is very similar to Bridge 66.

Bridge 67 over Gorge Creek is an long low trestle bridge (11 spans) of hardwood beams and piers, with its sleepers and centre rails still in place (Fig. 8). Built in 1901, this is quite the most interesting bridge on the section of line between Ranfurly and Ida Valley station and the best purely wooden trestle bridge on the line. It is only 3.6 m above the ground at the highest point and 68 m long. It should not be modified with modern railing, and alternatives such as a concrete ford for horses should be considered.

Bridge 67a is a maverick. It was built in 1919 after the main construction phase of 1901 and crosses a shallow bog beside the Ida Dam. It is an intact wooden beam and trestle bridge, described as 1.8 m above the water but with infilling of the bog the grass is almost up to the decking. The sleepers and centre rail are still in place, and this is another candidate for avoiding modern railing if possible. The road is very close by.

Bridge 68 is very similar to the many structures described as open culverts (94.64), built of large schist blocks, brought to course. It is in good condition except that its sleepers are missing and one capstone has been moved out of alignment and is likely therefore to be loose.

There is an interesting road bridge north of Ida Valley station for Klifden Road (97.42). The bridge is in the rail corridor but carries the road across a creek running beside the rail. It is built in railway style with heavy white painted posts and four rails (Fig. 4a). It has masonry abutments and is labelled on the mileage sheets as a cart bridge but has no number in the bridge files. It is a useful example of a wooden railing in railways style.

Bridges 68a-c. There should have been three cart bridges in the Ida Valley station yard but only one was identified with any certainty. Only the abutments remain and its only value is as part of the pattern of the station.

Bridge 69 is the Poolburn viaduct, the highest on the line and the one with the longest span (157 feet for one of the centre spans). It is second longest, with the first bridge over the Manuherikia being longest at 363 feet. This is the last of the big masonry bridges built on the line, and even in 1901 it was

something of an anomaly. The abutments, 36.8 m high, are made of beautifully trimmed and bolstered stone, all brought perfectly to course (Fig. 2). The decking is relatively intact with a walking plank and a hand rail on one side. (There are some missing and broken planks on the walkway.)This railing is metal pipe and standards and, if necessary for safety, should be duplicated on the other side of the bridge.

Tunnel 12 is the most eastern of the two in the Poolburn Gorge, with nicely bolstered schist slab facings at the portals, with the arches outlined in brick (Fig. 7). This is surprising considering how many arched culverts were outlined in schist. The interior of the tunnel is a simple brick arch and the floor smooth gravel. Tunnel 13 to the west has similar portals of well trimmed schist and the arch outlined in brick.

Bridge 70 (Manuherikia No 1) is the longest bridge on the rail trail and is the first of the true concrete pier bridges (Fig. 4a). The Taieri Bridge treated concrete as something to fill iron cylinders with. The foundations of Bridge 70, though, were built in the same way by sinking caissons supplied with compressed air for the men to work in. When the caissons were sunk far enough, the men were taken out and the concrete put in (J Dangerfield: pers. comm.). The piers are built with a taper, though the taper is less than for the Poolburn Viaduct piers.They are still more graceful than the sternly vertical piers of the 1960s Prices Creek bridge. One of the water troughs is missing but the sleepers and centre rail are intact. The walkway is dangerous as some planks are missing. There is an iron rail along one side only. This bridge is of sufficient historic importance that it would be worth duplicating the iron railing on the other side of the bridge.

Bridge 71 over the Lauder Creek (106.0) has similar concrete piers to Manuherikia No 1 but with large RSJs, rather than the lattice work girders. It has lost all its decking and railings, though relatively broad tops to the joists and the shallow drop of less than 3 m to the river bed make it possible for the intrepid to cross its 31 metres. This is not a bridge of great distinction and a plain decking and railings would be appropriate. Proportions and design should be based on railings, such as those on the Hyde Township bridge. One of its water troughs is missing.

Bridge 72 over Muddy Creek (107.25) is a very nice example of the trestle and RSJ bridge of the Manuherikia Valley (Fig. 8). Like several of the nearby bridges it was found that the hardwood beams did not stand up well to the extremes of climate in the valley, and were replaced in 1933 after only 29 years. Since this is a bridge across a shallow sludge channel, it would be a good candidate for historical veracity by leaving it as it is without railings and providing a track alongside the bridge. It still has its sleepers and central rail. One of the concrete water troughs is missing.

Bridge 73 is an overbridge for Muddy Creek Road which still has its old wooden beams and trestles but the latter are on concrete bases. It has an appropriate white railing, in slight disrepair, but other wise like the Waipiata overbridge it is very much as it was originally built. It should be maintained in this form. Presumably the local authority is responsible for its upkeep.

Bridge 74 is shown as crossing Spottis Creek, but definitely crosses Thomsons Creek out of Thomsons Gorge. The bridge sheets recognise it as the Thomsons Creek bridge. This is a relatively humble bridge of girders on concrete piers, which do show some innovation in their fancy corniced tops. There is some mystery about its piers which are shown on the mileage sheet as four, but there are only two freestanding piers and the two ends of the bridge are on concrete sills on solid rock outcrops. There is no indication that the bridge has been shortened. One of its water butts has gone and the other is on its side. It still has an intact decking and centre rail. Since Thomsons Creek drains a large catchment, a ford it likely to be impractical and this bridge should have appropriate railings, similar to those on the Hyde Township Bridge.

Bridge 74a is the Tiger Hill overbridge for Highway 85, a neat modern reinforced concrete bridge built in 1961. The railway was dropped into a substantial cutting to run under this bridge.

Bridge 75 is a standard single span masonry bridge for a farm access, made of carefully trimmed and brought to course stones with neat wing walls and coping stones intact. The farmer has filled and gravelled the decking for stock access. This bridge should not have railings, and a track should be formed to bypass it.

Bridge 76 north of Chatto Creek is really only an open culvert and almost buried in long grass. It has lost its decking but otherwise is intact. It should be treated with respect and not have railings put on it.

Bridge 77 is the second bridge over the Manuherikia and the third longest. All the sleepers and any railings that it had were removed, leaving the bare girders. At the time of the survey it had already been about one third redecked and edged with relatively heavy and obtrusive railings. No attempt has been made to imitate the standard railways design of railing. This is a fine example of a wooden trestle bridge with doubled piers and raker braces, but like other Manuherikia bridges its timber beams have been replaced by RSJs (Fig. 8). It is surprising that its piers were not built in concrete like the other two bridges over the Manuherikia. It is the highest of the wooden trestle bridges on the rail trail, Muttontown Gully and Hyde township coming close to it. It is an important bridge on this section of the line and should be given prominence as the highest wooden trestle bridge. It is the most difficult of the big bridges to get to from a public road.

Bridge 78 is an overbridge for farm access for Olrig . It is intact with sleepers and centre rails on a single span of RSJs set on simple concrete abutments. It is a very simple bridge only 3 rn off the ground and could be left exactly as it is.

Bridge 79 is a low bridge over Moss or Dip Creek just north of Galloway (124.5). It is another of the trestle bridges which had to have its beams replaced with triple RSJs in 1949. An extra span was added at the north end in 1916, and later it was reduced by three spans.Though it is still a respectable length, it has neither grandeur nor historic interest. It is an average sort of bridge. It has entirely lost its decking, and being only 2.6 m above the ground at most it probably does not need a railing.

Bridge 80 is a sorry sight - it has become a small raupo swamp across the line (126.29). Its beams have gone and its concrete abutments submerged in vegetation. Curiously the water course under it is marked on the mileage sheet as Dredge Road and curves back across the line at 126.41 where there are still two sign posts. It is difficult to know whether this is a road to a dredge on the Manorburn or a track formed by a dredge working across dry land. The problem was not sorted out during the survey.

Bridge 81 over the Manorburn is only half the bridge it was (126.58). It was built as an 18 span trestle bridge to rival the one at Muttontown, but after 40 years of Central Otago weather the ironbark beams had split. Some of the piers had been badly driven, and there is a hair-raising letter in the files from an inspector, describing how he stood under the bridge and measured the dip as an engine passed over it. The beams were replaced with RSJs and nine of the spans filled in. The bridge has been completely redecked and wooden railings put down both sides, with round tanalised posts at each end. Again this would be a suitable bridge for interpretation with a track down the easy slope of the bank to allow the public to view the impressive trestle-work underneath.

Bridge 82 is a very shallow open culvert with its beams still in place only 60 cm above the ground (126.65). It barely needs redecking as it is so easy to bypass. Its abutments appear to be a mix of masonry and concrete.

Bridge 83 was once a four-span bridge with concrete abutments (127.2). In 1936 it was partially filled in with spoil from a slip in the Cromwell Gorge (which sounds familiar), and a very plain square concrete culvert put in place. It has no frills such as a mock coping.

Bridge 84 is the familiar masonry open culvert only 3 m across and only about a metre above the ground (127.29). The masonry is as lovingly brought to course as ever, but only two cross beams remain with spikes sticking out. A well-worn track bypasses it and like Bridge 82 it could remain as it is. (My faith in the mileage sheets is somewhat shaken by this bridge being described as an open *concrete* culvert.)

Bridge 85 is the extant road-rail bridge over the Manuherikia at Alexandra (Manuherikia No 3 on the line at 128.46). The wide central span of 100 feet was to allow dredges through, but it is not the longest span on the line. Its concrete piers have a nice taper and a small coping at the top, which makes them look more like the masonry piers of the Poolburn bridge than the modern vertical piers of the 1960s Prices Bridge. The rivetted plate girders at each end and the big lattice steel girder in the middle give it a turn-of-the-century industrial look. The white wooden railing (in the 1980 photo) looks relatively modern, and with only two rails is relatively lightly built.

Bridge 86, the Muttontown viaduct, is the only bridge between Alexandra and Clyde (132.48). It is the longest trestle bridge on the rail trail, but like so many of the trestle bridges in Central Otago its hardwood beams have been replaced with RSJs. (One of them is stamped Dorman Long and Co, Middlesborough, England, an interesting contrast to the original wrought iron girders, manufactured by Andersons of Christchurch in a temporary foundry at

Wingatui.) It has raker braces but the piers are not doubled (Fig. 8). The only signal on the trail stands 200 m east of the bridge and presumably was to control movement across the bridge.There is a large pile of rails at the west end of the bridge. The deck of the bridge has been rebuilt and unpainted timber railings run down both sides with round tanalised posts at each end.

Culverts are not to be despised

The masonry culverts along the trail have been built in two basic forms. The larger ones have arched profiles and the smaller ones are square with massive lintel stones. The arches are invariably very well built, with the stones perfectly trimmed to form an even arch, and the surrounding stones brought to course, i.e. trimmed to the same height. At least two built of basalt, one arched and one square, have not been entirely built to course, which suggests that the reasons for such careful work were not solely structural (Fig. 5). Many of the grand stone buildings of the Strath Taieri, such as the Cottesbrook woolshed, are random built and not brought to course. Most retaining walls, around Dunedin, even some up to 3 m high are only partly brought to course. (Fig. 2). It is quite surprising that so much trouble was taken with such small structures as culverts and minor bridges.

Walking north from Middlemarch Station, small bridges and culverts of all sizes are well made in schist blocks all brought to course, with the courses mostly the same height and a neat row of shallow coping stones along the parapets.

A small square culvert north of Dewar Stream (41.22) is blocked at one end. The arched culvert (41.46) near a row of Lombardy poplars halfway between Dewar Stream and Camltt Creek is the first of this handsome type of culvert which visitors walking north from Middlemarch will see and is well worth interpreting. There is a small area of erosion behind one of the parapets, probably caused by stock, which needs to be filled in. The masonry culverts over this section are in good repair, though there is one coping stone missing from a wing wall of the arched culvert at 43.32. The mileage sheets do show concrete and earthenware pipes as well, some of which probably date from the time of the initial construction, but some will be modern.

The big open culvert 350 m south of Bridge 40 is a good substantial example of schist masonry (44.24). It is only 2.5 m long and will not require railings. It is intact with its wooden beams still in place and could be included in any interpretation developed at the two bridges immediately to the north (Bridges 40 and 41).

Culverts are sparse between Bridges 40 and 45. A short open culvert north of Bridge 45 has lost its beams and decking (48.51), but an arched culvert north of Bridge 46 is in perfect condition (48.78). Between Bridges 47 and 48 there is both a square and an arched masonry culvert in good condition (49.66 and 49.68). One of the larger arched masonry culverts is 320 m north of the

Boundary Creek bridge with an arch 10 feet high and 8 feet wide with a nicely cobbled channel for the creek (51.42). There are three more intact masonry culverts over the next 1.5 kilometres, the section which passes the memorial to the Hyde train disaster. Between Six Mile Creek and the Scrub Burn (about 3 k) there are seven masonry culverts, all intact except one which has its portal replaced with concrete, and another seven between the Scrub Burn and Hyde Station, all intact.

An irrigation pipe crosses the line about 750 m south of the Scrub Burn bridge (53.72). It is carried on a slender wooden trestle so in keeping with other trestle work that it may be original. Certainly the evidence from the mileage sheets suggests that it was there when the line was built. The bank at the eastern end is eroding and the main beam slumping. There is an identical one north of Hyde station at 55.77.

Between Hyde railway station and Hyde the masonry culverts are in poor shape and concrete abutments have been attached to earthenware pipes. North of Hyde township the use of concrete abutments for pipes less than 40 cm in diameter is a hesitant start on the use of concrete for small water courses. The shapes imitate the masonry ones (58.20). In some cases the whole earthenware pipe and old concrete has been broken out, and new concrete pipes put in (57.75). Masonry continues to be used for larger culverts but some have been repaired or replaced with concrete (57.26). About 1 km south of Tunnel 11, a masonry culvert has been broken up (58.28) and there is a slab of masonry lying in the creek which could possibly be retrieved for repairing less damaged culverts.

On the section north of Hyde there was a lot of use of timber boxed drains which have been replaced with concrete piping, as well as numerous concrete pipes. There are almost no masonry culverts on the section from Hyde to Tiroiti, but they come into use again north of Tiroiti (three between 62.51 and 62.63). The last of these three has collapsed.

Around and north of Kokonga, schist is replaced by basalt, probably from a series of small quarries in the Waipiata volcanics, which outcrop from Hyde to Kokonga to just south of Waipiata. It is unlikely that the quarry for the Dunedin Railway Station was used, as that quarry was specifically opened by a group of engineers after a special field visit about 1903. Basalt is used from Prices Tunnel to as far north as Bridge 62 (77.55) north of Ranfurly. The stones have usually been just as neatly flaked to course as the schist of the other bridges and culverts. North of Tiroiti, though, basalt rubble was used to form what the mileage sheets call boulder drains. These probably had timber or concrete pipes which where then filled over with basalt rubble as at 61.20.

Even though basalt was being obtained from Kokonga for this stretch of line, schist was still used for the large culverts. Just south of where SH 87 crosses the line at Daisybank, there are three large arched culverts (4 x 4 feet and 4 x 4.5 feet across) at 63.20, 63.39 and 63.5, and two to the north (6 x 5 feet and 2 x 2.75 feet at 63.68 and 64.05). The first of these at 63.20 is notable for an unusuall y long wing wall, all in well-trimmed schist. North of Daisybank the line crosses a peculiar stretch of ground for about 250 metres which required about a dozen boulder drains and 12 inch diameter earthenware pipes

(64.10 -64.24). South of Kokonga there are two small intact masonry culverts, built of basalt, one arched and the other square (65.32 and 65.44). The arched one is interesting in that the stones are not all perfectly brought to course and the courses vary greatly in depth. Likewise a square culvert just north of Kokonga has irregularly shaped stones in it and various depths of course (66.57). These were the only two seen with irregular courses.

An open culvert north of Kokonga is really a small bridge with basalt abutments and wing walls (69.32). It is a handsome structure but some of the parapet stones have been knocked off and are lying on a dry creek bed below it. Another small culvert near Taieri Lake has had one or two basalt coping stones knocked off the western parapet (70.1). This is the beginning of a trail of minor vandalism, where it looks as if somebody has deliberately knocked a few stones off each bridge or culvert parapet.

Many of the culverts have neatly cobble-laid floors such as the one at 74.67, about 3.5 k south of Ranfurly, a large arched basalt culvert. There are at least two basalt open-culverts (and possibly a filled-in third) about 1.5 k south of Ranfurly, built like small bridges, with beams from which the sleepers have been removed. One of them did not seem to have any flow of water and the missing one was described as a flood opening. Two basalt coping stones have been knocked off the southern one at 75.38. These should have simple deckings and no railings, since otherwise they are in their original state.

Immediately north of Ranfurly Station (76.79), there is a nasty example of what can happen to a masonry culvert.The basalt masonry has been partly dismantled and a concrete pipe cemented in. To add insult to injury the flow through the pipe seems to be polluted with tar or coal effluent. Since this culvert is so close to Ranfurly station, there is a good argument to restore it to its original state, as well as clean up the effluent which it is to be hoped was temporary.

Another masonry culvert has been more massively replaced further north (79.17) on the south side of the crossing for the Gimmerburn-Naseby Road. Only the basalt masonry wing walls project from the concrete. It is probably not practical to restore this culvert. It is the most northern of the basalt culverts.

The first of the well-built schist culverts north of the basalt section is a handsome small domed culvert at 80.51, about 1.5 k south of where Brinsdon Road crosses the line. There is an even more attractively designed one immediately south of Wedderburn (85.7).

South of where Brinsdon Road crosses the line (81.42), another masonry culvert has been heavily modified and a very ugly concrete culvert put in place which has partly eroded. This probably needs functional repairs. Eden Creek has caused serious slumping and the masonry culvert has vanished entirely. It has been replaced by two concrete pipes with an ugly slurry of concrete spreading up the bank above them.

North of the road crossing at Wedderburn (85.36) an open masonry culvert has been replaced in concrete. South of the Wedderburn overbridge for State

Highway 85, an arched schist masonry culvert has been modified with a band of concrete one course down from the top and out along the wing walls (86.24). It appears to have been neatly done and to be less offensive than the ones to the south. It may be worth investigating this as a compromise where proper masonry repair is not feasible.

North of the Wedderburn road overbridge the schist culverts at 86.48 and 86.61 are unmodified though showing some tendency to block with fallen ballast. Immediately west of the private overbridge where the line meets the Idaburn, there is a row of three particularly nicely built schist culverts along 40 metres of line (89.26 to 89.28). They are all arched and most have short wing walls which do not flare out sideways as much as usual. These wing walls are finished with particularly large coping stones. The stone work is as meticulous as ever. 240 metres further up the line an open masonry culvert, i.e. small bridge, has lost several stones and needs repairing (89.40), as does another similar culvert at 89.48. The schist capping stones have been knocked off. 160 metres up the track there is a very small square culvert which has been so heavily modified with concrete that it may be a reasonable compromise to take the few schist slabs still lying near it to mend the other less damaged structures.

Between 89.70 and 90.38, i.e. over the next kilometre there are five masonry culverts, of which only the most eastern has been modified by inserting a concrete pipe. West of mile 92, out of three masonry culverts only one, an open culvert (92.1), is intact, the others having been infilled with concrete pipes. Scattered stones from these may be a useful source for mending other culverts. South of Oturehua the arched culvert on the north side of the Gorge Creek bridge is intact, except for a missing coping stone.

On either side of where the Ida Valley road crosses the line beside the Ida Dam, there are good examples of intact open culverts, built like small bridges with undamaged coping stones (93.63, 94.17, 94.46). West of where Agnew Road crosses in the Ida Valley, there are three masonry culverts of which only the eastern one (95.55) is intact (one cap stone missing). The other two have been badly damaged by infilling with concrete pipes and ballast (95.78 and 96.55).

South of Ida Valley Station the line runs along the edge of the hills and required numerous culverts. A different engineer compiled the mileage sheets and has drawn profiles of the culverts with the size of the opening annotated beside them. They are all arched and square culverts, none are open and almost all are in good condition without any concrete pipes or damage to copings. There are about 25 culverts spread out over four miles, and in all except one that has been reduced to rubble (100.25) the schist slabs have all been completely trimmed and brought to course. A few of this group are tending to fill with ballast and sediment, such as the ones at 99.44 and 99.52.

Though the Poolburn Viaduct is the last of the big masonry bridges, masons still trimmed stone for the portals of the two tunnels and continued building culverts along the rest of the line. Of the two culverts between the tunnels, one has been virtually demolished and replaced with a concrete pipe and the other has had a concrete channel run down the hillside from it. West of the

tunnels the culverts have suffered (at 103.59 there is a concrete pipe buried under rubble, at 103.63 the culvert is half blocked with rubbish and at 104.13 wholly blocked). There are four more intact masonry culverts over the next mile (104.20 - 104.62) and immediately east of the first freestanding concrete bridge, Manuherikia No. 1. West of this bridge there is a swampy section where a culvert seems to have been removed (105.40). Masonry culverts continued to be built near Lauder, one on either side of the bridge (105.56 and 106.31).

A change from masonry to boxed concrete culverts, made when the line was first put in, begin to appear in the Manuherikia Valley. By looking at the consistency of writing styles on the mileage sheets, it is possible to detect which concrete culverts were installed at the time of initial construction and which were put in later. Starting from Lauder station, open concrete culverts begin to appear, the first immediately south of Lauder at 106.70, 107.5 and 107.15 and just north of Muddy Creek bridge. The last of these has lost its decking.

South of Muddy Creek overbridge the overlap in technology is nicely demonstrated over a 400 metre length of the line (108.53 - 108.73). At the north end of this section a race is carried under the line in a concrete siphon with quite elaborate concrete abutments. In the middle (108.66) there is a nicely arched schist culvert, all the stones brought to course, and at the south end there is a square masonry culvert which has had its lintel stone replaced with a concrete beam. Concrete and masonry now alternate along the line to the south to Huddleston Road and beyond. An open culvert about a kilometre north of Omakau is a neat piece of masonry and still has its decking (110.24). South of Omakau there is the remains of a masonry culvert at 111.26 that has been replaced with modern concrete piping, but a drain further on (111.61) has always been in a concrete channel.

The decision whether to use concrete or masonry in the lower Manuherikia at first depended mostly on size. The large open culverts tended to be concrete. To the north of the Highway 85 overbridge, there are three masonry culverts covering the whole range from a large open culvert to a small arched one, but in among them are two large open ones in concrete (112.74 - 113.58). The open masonry one has been filled in (113.32.). Then the attitude changed back again. Masonry was the choice for all sizes over the next five miles down to Chatto Creek, including the bridges. The easy availability of stone from the numerous cuttings may have been a factor over this stretch of line. For the first time on the whole survey some badly weathered masonry was seen at a small square culvert north of Chatto Creek (116.8). Further south a masonry culvert has had concrete wing walls added to it and a concrete pipe inserted relatively neatly (116.31). This is a good example of respectful treatment of a masonry culvert if concrete has to be used to repair it.

Masonry culverts continue beyond Chatto Creek (nine between 118.68 and Manuherikia No 2 bridge), with one small one at 118.68 which has been filled with a concrete pipe and wing wall in quite a ticly manner but with an ugly result. Another close to the bridge has been filled with ballast and one of its coping stones knocked off (120.26). There is likely to be a drainage problem here.

A small culvert which seems to have been concrete all its life appears immediately south of Manuherikia No 2 bridge (12 1.11) with a neatly formed arch and a parapet edge imitating coping stones. As far as 123.24, even where the mileage sheet says masonry the culverts are concrete, from narrow drains only a foot across to small bridges, such as the one at 122.49 two kilometres north of Galloway which has been redecked by the Department of Conservation. This has only a two metre span and less than a two metre drop, and so has not required railings. Its concrete abutments have also been finished with a small coping to imitate the masonry abutments. The next one down the line is similar but has only beams and no decking as yet (123.42). Concrete culverts, nicely arched and with imitation copings, dominate the rest of the line to Alexandra, e.g. at 127.41 and 127.48, with only three masonry ones out of about a dozen. Right to the end the quality of stonework is maintained, e.g. 128.26 just north of the Manuherikia No 3 bridge.

There are only seven culverts marked between Clyde and Alexandra, most of which have been filled in, and the remainder are concrete.

Though very repetitive, I hope that this description of the culverts provides an impression of the dozens of beautifully made small stone structures along the line and the threats to their continued existence. The details on location should enable people to find particular culverts by using the mileage maps (Fig. 1).

Less common items along the line

The position of each item is given relative to some geographic feature and its mileage position.

LINESMEN'S HUTS

A corrugated iron but 300 m south of Wandle Creek is in good condition except that the whole chimney has gone (45.55). Unlike many huts it still has its door with a small window in it, tongue and groove flooring and ceiling, a wooden beading around the square of tin where there was probably a pot-belly stove, the remains of oiled paper lining on the walls and a wooden seat against one wall. This would be a useful prototype for restoring shelter huts on other sections of the line.

A weatherboard but with an intact door still stands at the junction of the old and new pieces of line south of Prices Creek bridge (59.51). It also has an intact door with a small window. Eroding ground around it is pressing against its walls on two sides. This may be the only wooden but on the line and should be kept well painted.

There are two crumpled tin chimneys near Taieri Lake (69.38). A corrugated iron but north of Taieri River Bridge 57 is intact except for the top of the chimney (71.60). A corrugated iron hilt 3 kilometres south of Ranfurly at 75.1, has been shifted on to the formation and is about to lose its roof. Its chimney is lying beside it but it could be readily restored.

A corrugated iron hut, about 2 km south of where the line crosses the Ida Valley Road, is in better condition that the previous huts (95.20). Its chimney is intact, though the door is missing.

A corrugated iron but further south appears to be in good condition with a chimney made of stone and a concrete pipe (103.70).

A corrugated iron but at the east end of the Manuherikia No 1 Bridge has collapsed entirely (105.10). Its iron could be used to repair other more intact huts, such as the one south of Wandle Creek, and only its site marked.

About 1.5 km south of Omakau, the mileage sheets mark Corrigall's House off to the west of the line.There is still a stone ruin among poplars on the site. Corrigal Road crosses the line 3 km to the south of here. James Corrigal was a local farmer in the 1890s and may have housed work gangs at his farm buildings.

There is another collapsed corrugated iron hilt south of Omakau against a bluff (113.1). It also could be used to repair more intact huts and only its site marked.

In the loop north of Chatto Creek there is a large flattened area that looks like a small siding, but has only the remains of a tin chimney and some foundation stones of a hilt (115.27). The site should be left as it is until more is known about it.

About a kilometre north of Galloway there is a relatively intact corrugated iron hilt which lacks only the top of its chimney which is lying nearby (122.77). It has an earth floor and some broken benches inside. It looks as if it could readily be restored to provide a good example of the working conditions of the men who maintained the line.

RETAINING WALLS

Near Kokonga several cuttings have low retaining walls of basalt built along the base, as at 64.47 and 66.38. South of Ida Valley station (100.2) there is a low wall of sleepers held in place by lengths of rail hammered into the ground, and similarly north of Chatto Creek pegged sleepers have been used to hold the ballast on the outside of a curve (116.2).

There are other modest retaining walls here and there along the line, but they are not a distinctive feature of the line.

RAILWAY GATES

These are very distinctive wooden gates, painted white and hung from heavy squared posts which may be stayed with bent rails. Not all were not described during the survey, but the following were noted.

One was seen in a neighbouring farmer's fence at 45.10 (north of where Ngapuna Station is marked on the topographic maps), and there also is a pedestrian turnstile on the north side of Rock and Pillar Station site. There is a pair of gates with bent rails for stays north of Last Creek at 48.36 for a private level crossing. There is a similar pair immediately north of Bridge 46 over House Creek. This section seems to be a good place to see ballast stores made of old sleepers and a wide range of mileage posts. During the working life of the line, the posts changed in style from wooden to concrete, and even after the line was metricated the old familiar mileage posts were retained because the linemen were more used to them. Bridge 47 can be photographed with a typical railway gate in the foreground. There is a pair of gates for a private level crossing south of Gills Creek (50.35) and another pair south of Boundary Creek (50.13). Many of these gates are relatively new. Immediately north of the Six Mile Creek bridge a railway gate has a well-worn "Trespassers will be prosecuted" sign.

A gate is still in place south of the Ida Dam at 94.11, and another one east of Ida Valley Station (97.1). Another had been shifted into a farmer's fence south of Omakau (112.66).There is a good pair still in place for a private road south of the Tiger Hill overbridge (114.40) and two sets north of Chatto Creek at 115.64. Another set where SH85 crosses the line 2 km north of Chatto Creek have iron uprights and four wooden rails.

These gates are very distinctive and an integral part of the "railway look". Farmers should be discouraged from removing them and they should be included in a maintenance schedule for repair and painting.

Discussion

Without doubt the bridges and the numerous masonry culverts are the most interesting historic features on the rail trail. Nowhere else in New Zealand can one see such lovely stone work on a railway. It is likely that the culverts and bridge abutments represent the largest single project in Otago (and possibly in New Zealand) in which perfectly brought-to-course masonry was used. (The bridge abutments of the first section of the line in the Taieri Gorge are similar.)The only brought-to-course masonry of stone that is chipped to shape, rather than sawn, seen around to Dunedin is in the massive foundations of some buildings which are made of Port Chalmers breccia. In Central Otago there are other bridge abutments and buildings in schist which are also brought to course, such as the Ophir post office, the old Alexandra bridge piers and the Kawarau suspension bridge. These are all schist structures, and I have not yet located a basalt structure brought to course.

On the rail trail, there is the added bonus that both basalt and schist work is represented. As far as we know the builders were Polish, German and Italian stonemasons who had emigrated to the gold fields. After the easily won gold ran out in the 1880s, they reverted to their old trade and were employed on the line (J Dangerfield: pers. comm.). Much of the line was built under a system of work gangs appointing their own foreman who received instructions from the Railways engineer. One must assume that it was the engineer who decided that the stone masonry should be brought to course for reasons of strength.

STATIONS

The stations and sidings were more socially important, linking the community to its lifeline. The groups of structures which were built at each station varied widely, from a solitary loading platform to a small village of houses and sheds. Most buildings have been sold and relocated, and those that are left are all the more important. Only Hyde, Ranfurly and Clyde still have their station buildings, though the Wedderburn one is still visible in the back garden of the local hotel. Goods sheds are still in place at Ranfurly and Omakau, and the one at Waipiata is still close to the line. (The Wedderburn one has gone to a local coal pit.) There are several railway houses still in their original paint work beside the corridor, as at Waipiata, Oturehua, Chatto Creek and Alexandra. The railway hotel at Ida Valley Station is an impressive isolated building. Loading ramps and station platforms are the commonest remaining structures, and there are some point levers, road crossing signs, and one signal light (Muttontown Bridge). The mileage sheets provide a means of reconstructing the pattern of any given station where this might be wanted. (An interesting variation recorded on the sheets is the function of the small building near the station. Why did Tiroiti, Kokonga, Waipiata, Ranfurly, Lauder and Omakau have urinals only, Wedderburn had urinals and privies (plural), Ida Valley and Oturehua had privies only and Chatto Creek had a urinal and a WC? Unfortunately none of these remain.)

It could be worth entering into arrangements, formal or informal, with owners of buildings which were once part of the railway system, in order to maintain their visual integrity as seen from the trail. These might include paying for a qualified sign writer to repaint the name on the Waipiata goods shed, paying for the repair of old sash windows on ex-railway houses in preference to their replacement with aluminium windows, and advice on paint schemes. This level of community involvement could have other good effects. Where land is sold off from around stations, any remnants such as the posts surrounding the house sites at Kokonga and the concrete path and trees should be covenanted and right of access retained. Railway gates leading into neighbour's properties should be included such arrangements.

In considering the preservation of the line, the classificatory approach of this report should be used cautiously. The positions of all stations should be marked to indicate the importance of the line to the local communities, but only the best remaining structures should be preserved. The Taieri Lake siding in particular should be marked and its link to the Dunedin railway station building commented on somewhere in the interpretive material.

BRIDGES

Some of the reasons for choosing different materials for the bridges had to do with technological change, such as increasing use of concrete instead of masonry and the use of RSJs instead of wrought iron for plate and lattice girders. The two years and five kilometres between the Poolburn bridge and Manuherikia No 1 bridge marked a major change in technology. Masonry after this was used only for culverts and single span bridges. The big bridges from now on were concrete, metal girders and massive timbers. The replacement of wooden beams by RSJs in the Manuherikia was an effect of climate, rather than a change in technology.

The reason for the difference in pier construction of the wooden bridges lying between Six Mile Creek and Wether Burn is not so obvious. The Heeneys Creek, Waipiata and Ewe Burn bridges have simple piers of three piles, but Coal Creek, Hyde township and the old Prices Creek bridge in between have doubled-up piles and raker braces.This strengthening was used where there were longer spans or likely to be damage from large boulders during floods (Robert Storm: pers. comm.). Heeneys Creek,Waipiata and Ewe Burn bridges have spans of about 14 feet, 21 and 21 feet respectively, whereas Coal Creek, Hyde Township and old Prices Creek bridges have spans of about 30 feet. Judging by the topographic map, it looks as if both Heeneys and Coal Creek coming down off the steep slopes of the Rock and Pillar Range could throw boulders at the bridges with equal viciousness, but Coal Creek flows through unstable Tertiary sediments. It and Prices Creek probably have a better supply of boulders than Heeneys Creek, and hence the greater strength in the bridge piers. The Waipiata and Eweburn bridges are out on the gentler gradients of the Maniototo Plain. In the Manuherikia Valley it is only the two long spans of Muttontown and Manuherikia No 2 bridges which have doubled up piers and/or raker braces.

The two things that the public are most likely to want to know when they visit the trail are distances/times and what there is to see. Bridges and tunnels fascinate most people, and the larger bridges are likely to attract the first-time visitor. The Prices Creek tunnel could be used to explain about the use of Waipiata basalt. A major bridge on each section of the trail should be chosen for general interpretation, as well as the obvious sites at Middlemarch and Clyde. (There is so little to see at Alexandra station that the DoC office would be a better display site for the trail.)

The bridges could be interpreted in groups along each section of the line. On the Strath Taieri section Bridges 37 to 46 have good masonry, especially Nos 40 and 41. At Hyde the township bridge is the obvious site for a panel about trestle bridges with double piles and raker braces. In the Maniototo interpretation should focus on the Wetherburn bridge as an intact example of a wooden trestle. In the Ida Valley the Poolburn viaduct will attract most interest, and the importance of the perfect masonry along the line could be discussed here. At Manuherikia No 1 the focus could be on the evolution of the use of concrete for piers. To complete the series, it would be appropriate to have a good photograph of the Leaning Rock Creek Bridge placed on an interpretive panel at Alexandra or Clyde (Dangerfield and Emerson 1965:42). Built about 1916, it was one of the first concrete arch bridges in the South Island, but was demolished by the Clyde Dam works.

Some of the bridges should be chosen as places for short walks and a casual picnic site by the river. The largest tend to be high above the river and not so suitable for picnicking. Long low bridges would be a better choice. On the Strath Taieri, the modest but interesting trestle bridge over Heeneys Creek (No 47) would be a suitable site if planted with a few willows for shelter. Six Mile Bridge No. 50, with its masonry abutments and lattice girder, forms an interesting pair with Heeneys Creek (Fig. 4). Bridge 67 about a kilometre south of Oturehua is important as the best preserved long trestle bridge on the line, and crosses a shallow creek. It is opposite the gate to the historic buildings of Hayes Engineering, owned by the Historic Places Trust, and could form a useful group with them for visitors interested in historic sites. The Wether Burn Bridge is similar, a low trestle bridge over a shallow creek close to access from Wedderburn township.

The presence of so much perfectly brought to course masonry on the bridges and culverts warrants very careful treatment. Many bridges should not be modified with wooden railings. A system of bypasses, using fords and wooden foot bridges, which encourage walkers to look at the masonry would be desirable. This would also overcome many safety problems.

Under the draft CMS, designs for bridge decking and hand rails should have regard to the intended use, safety and historical integrity. When considering historic integrity, bridge repairs and modifications should be according to ICOMOS charter principles. Where the larger bridges must be provided with decking and railings for safety and as the only feasible way of getting across a river, short access tracks should be provided to an interpretation panel.The track should lead people to a safe vantage point where they can see the original lower part of the bridge, and the panel should identify the deck and railing as modern, as well as provide a brief history.

There are several bridges with railings installed by the Railways Department. The pipe and metal stanchion railing on the Six Mile Bridge has a good Victorian appearance, but the one on the Hyde Township looks to be more recent. The new bridge over Prices Creek has a wooden top rail, wire mesh sides with metal stanchions which could be an economic alternative to the solid Victorian design on the Six Mile Bridge. A simple wooden railing with square and notched posts at each end is still in place on a road bridge with no number north of Ida Valley station for Klifden Road (97.42). (The road has to cross a creek which runs in the rail corridor parallel to the line.) It would be a much more appropriate style than those built by Task Force Green with round unpainted tanalised posts at each end. White paint for railings and dark red for the tin sheds would give them an authentic railways look. The bare wooden railings on Muttontown, Manorburn and Manuherikia No 2 bridges would all look much more in keeping if painted, and if the round tanalised posts were replaced with squared and notched wooden ones.

One interesting side line of research could be to compare the original heights of bridges and culverts with the present heights above the water or ground. Photographs of some of the smaller bridges and larger open culverts show dramatic changes. These may also have safety implications.

CULVERTS

Two good sections of line for viewing masonry culverts are south of Hyde station to bridge 45, over Last Creek and south of Ida Valley station to Poolburn bridge. These are schist culverts. The basalt ones are best seen between Kokonga and Ranfurly.

Some careful policy decisions need to be made on masonry culverts. Firstly, they must be maintained as effective drains, but secondly the original stone work or early concrete should be preserved wherever possible. Criteria should be established to decide how to treat damaged culverts, based on the ICOMOS charter principles. For example, no new stone should be added to broken culverts. Where stones from breaks have disappeared and no suitable stone can be obtained by 'cannibalising' other badly broken culverts, the break should be stabilised but not `tidied up' with a layer of concrete, unless there are safety reasons involved. There should be clear distinctions between old and new work. Non-weight bearing damage should be repaired with stone wherever possible. Coping stones should be replaced and the stonework made to look neat and firm to deter further vandalism. (A recipe for an appropriate mortar could be obtained from Ian Bowman.)

Where a culvert has to be repaired with concrete, the two or three neat examples described above should be used as models, e.g. one south of the Wedderburn overbridge (86.24). If there is an opportunity to repair a culvert that has already been partly concreted, as many stones as possible should be retrieved and the whole culvert concreted, so as to remove the hybrid appearance. It is desirable that the public should think that stone culverts are mostly maintained in stone. A sense of respect for the stone work should be conveyed by the work done on the culverts. The culverts with concrete spread in a formless mass on the surface, as at Eden Creek, should be scheduled for remedial work when money is available. The concrete should be actually broken up and replaced with neatly boxed work which imitates the stone culverts. My impression is that there are very few culverts that need this type of work done to them.

Priorities should be established that combine maintaining the drainage capability of the culverts and the integrity of their historic stonework. Where two culverts are equally clear of debris but need some remedial maintenance, the one with the best stonework should be dealt with first. Keeping drains clear of vegetation and debris requires regular maintenance, and it is surprising how effective a man with a shovel can be at the right moment. If any neighbouring farmer offers to keep an eye on his stretch of line, he should be encouraged with whatever perks the Department can provide (free hut passes?). The linesman who knew which drains would give trouble after a particular level of rainfall was a valuable asset which the Department cannot replace.

The smaller items along the trail should be given their place. The linesmen's huts should be sufficiently repaired and painted dark red to extend their life, and provide shelter for the trail users. They should be left though in their simple state, as they were when used by the linemen. The one south of Wandle Creek is probably the most intact and could be used as a prototype. The typical white gates and bent railway line stays should be kept painted and

repaired as required. Since the gates usually give access into neighbouring farmers' paddocks, agreement over their maintenance is an opportunity for contact with neighbours. Marker posts should be discretely concreted into place to preserve them from theft.

The main reason for setting up the rail trail was recreational-to provide a low altitude walking, cycling and horse riding track..The scenery over much of the trail is grand in scale and tends to lack detail to arrest the eye. There is a good opportunity here to encourage an interest in the historic details of the trail and to tell its users about the unique nature of the brought-to-course masonry of the bridges and culverts.

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