

Fiji's Vulnerable Climate Affected Heritage: The former Colonial Sugar Refining Company (CSR) & the Fiji Sugar Corporation (FSC)



Penang Sugar Mill, post Hurricane Winston
Image: Chris Richards

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1.0. Introduction

- ▶ This presentation is about the Colonial Sugar Refining Company Ltd (CSR) sugar enterprises in Fiji and the vast heritage legacies left from these operations. The presentation examines existing heritage buildings and infrastructure, its heritage significance and the major climate threats to the survival of this heritage. The presentation also briefly examines the significance of this heritage on a world scale with recommendations and conclusion.

2.0 Brief History of CSR & its Fijian Enterprises

- ▶ The Colonial Sugar Refining Company Ltd (CSR) was formed in Sydney in 1855. The company was a pioneer in the Australian and Fiji sugar industries. The company grew to become one of the largest sugar producing companies in the world.
- ▶ CSR opened six mills in Fiji between 1882 and 1902. Each sugar mill had a company town and a railway network. CSR moved Fiji from an agrarian economy to an industrial economy. CSR introduced an indentured immigration scheme for Indian's from India in the early 1880's to 1918 to work the company's cane fields of Fiji. All Fiji's major towns developed around CSR's mills.



Pyrmont Sugar Refinery - 1878 Sydney
Source: South Pacific Enterprises by CSR

2.0 Brief History of CSR & its Fijian Enterprises

- ▶ CSR sold all of its interests to the Fijian government in 1972 who established the Fiji Sugar Corporation (FSC). Four of the six mills are currently owned by FSC, three of which are still in operation. The Penang sugar mill recently closed in 2017 due to damage from hurricane Winston, leaving its significant heritage vulnerable.
- ▶ Most of CSR's original sugar mills, company towns, seaside and mountain holiday retreats, railways and infrastructure still exist. They remain on their original sites and layouts and are still performing and utilising the same work practices and technologies as to when they were built.
- ▶ Successive hurricane damage and FSC's precarious financial position threaten the survival of these mills and their heritage related buildings and infrastructure. Fiji has some heritage legislation, this legislation gives no legal protection for the protection of heritage items in Fiji.



CSR Head Office, 1 O'Connell Street, Sydney c.1915, Demolished in 1962 Source: Dancing through the lessons of life by Walter Freeman p.73

2.0 Brief History & Locations of CSR Sugar Mills

- ▶ The Penang Sugar Mill, Company Town & Railway Network is on the island of Viti Levu. Opened in 1879 by the Charmers Brothers, it was purchased in 1926 by CSR and closed by FSC in 2017.
- ▶ The Nausori Sugar Mill, Company Town & Railway Network is on the island of Viti Levu. Opened in 1882 and closed in 1959.



The Penang Sugar Mill: 1879 - 2017

Source: History of CSR



Nausori Sugar Mill: 1882 - 1959

Source: History of CSR

2.0 Brief History & Locations of CSR Sugar Mills

- ▶ The Rawari Sugar Mill, Company Town & Railway Network is on the island of Viti Levu. Opened in 1884, now owned and operated by FSC
- ▶ The Viria Sugar Mill, Company Town & Railway Network is on the island of Viti Levu. Opened in 1886 and closed in 1895.



Rawari Sugar Mill: 1884
Source: History of CSR

2.0 Brief History & Locations of CSR Sugar Mills

- ▶ The Labasa Sugar Mill, Company Town & Railway Network is on the island of Vanau Levu. Opened in 1894, now owned and operated by FSC.
- ▶ The Lautoka Sugar Mill, Company Town & Railway Network is on the island of Viti Levu. Opened in 1903, now owned and operated by FSC.



Labasa Sugar Mill: 1894
Source: History of CSR



Lautoka Sugar Mill: 1903
Source: Google Earth May 2nd 2017

3.0 The Sugar Mills

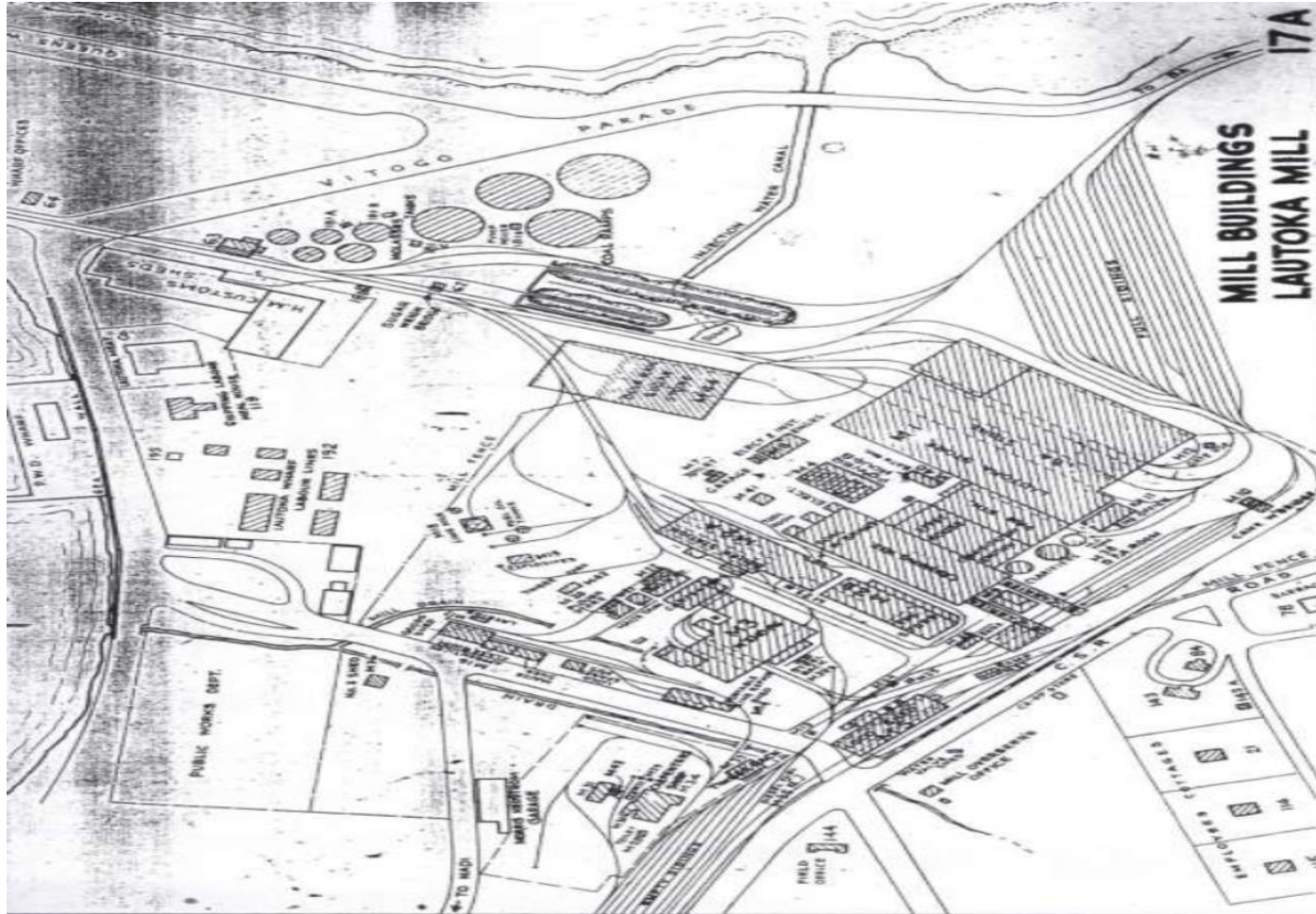
- Each sugar mill had similar layouts, building designs and plans. The mills typically comprised of a crushing mill, sugar processing plant, boiler house, electricity generating powerhouse, a sugar cane weighbridge, locomotive depot, bulk sugar storage warehouses, a sugar laboratory as well as mechanical, carpentry, blacksmith, plumbing, railway and railway-wagon repair workshops. Large freshwater dams were established near each mill to supply water to the mill's boilers, steam locomotives and to the company towns.
- The sugar mill buildings were mainly constructed with metal or timber columns with frames and roof trusses, the walls and roofs were clad in corrugated iron sheeting. The Nausori mill was the first site in Fiji to have electricity generated from the mill's powerhouse. Few brick buildings were constructed. The mills retain many original buildings, machinery & infrastructure.

3.0 The Sugar Mills



An aerial view of Lautoka Sugar Mill. Circa 1952
Source: Balloon Stacks & Sugar p10 by P. Dyer & P. Hodge

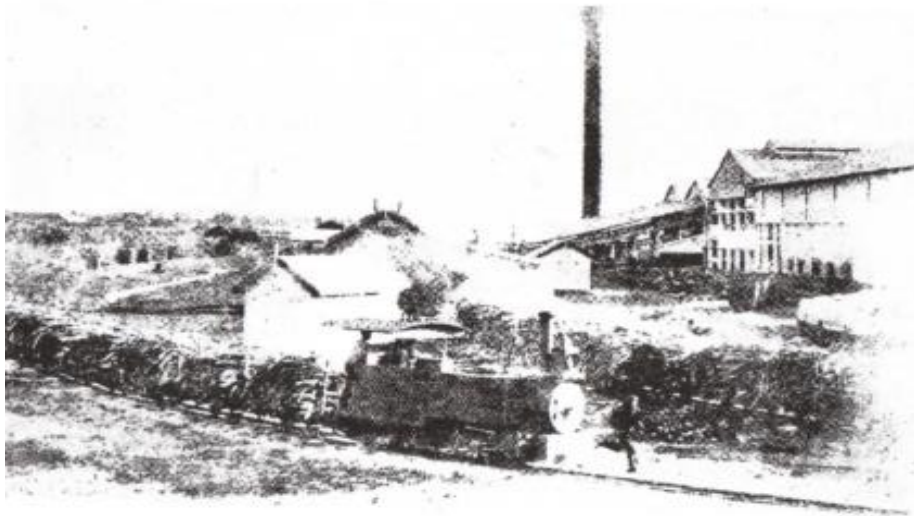
3.0 The Sugar Mills



Lautoka Mill. Circa 1950's
Source: Planning & Design Office – Lautoka Mill

3.0 The Sugar Mills

RARAWAI-KAVANANGASAU LIGHT RAILWAY



Lautoka Sugar Mill, 1908. Source: Balloon Stacks & Sugar Cane by Peter Dyer & Peter Hodge p.5



Lautoka Mill Under Construction 1903
Source: - Downsizing, An Australian Icon by Bruce Flood, p.18

4.0 The Sugar Mill's Company Towns

- ▶ CSR constructed a company town adjoining each of their sugar mills to house their Australian staff. A company town is a settlement built and operated by a single business enterprise to house its employees. The company towns were laid out on hills with pleasant vistas and wide tree lined streets. The houses had water, sewerage and electricity connected to them. They were early examples of the garden suburb.
- ▶ As a result of their isolation, the company towns were largely self-sufficient in food production and staff facilities. Each company town was similar and contained typically a hospital, dispensary, school, church, post-office, credit union, shops, library, tennis courts, bowling greens, golf course, swimming pool, social clubs, cricket pitches, parks, single men's quarters, apprentice barracks and a cemetery. Many of these original buildings exist and are still used today by FSC staff.
- ▶ The houses were constructed of timber with corrugated iron roofs and varied in size and location according to staff ranking. The mill manager and senior staff had larger houses with servants' quarters attached. They are set in large mature gardens in elevated positions with mountain or ocean vistas. The tradesmen's housing were smaller set in their own separate garden.

4.0 The Sugar Mill's Company Towns



Lautoka Sugar Mill & Company Town in foreground.
Circa 1950's.

Source: South Pacific Enterprise by CSR. p128.



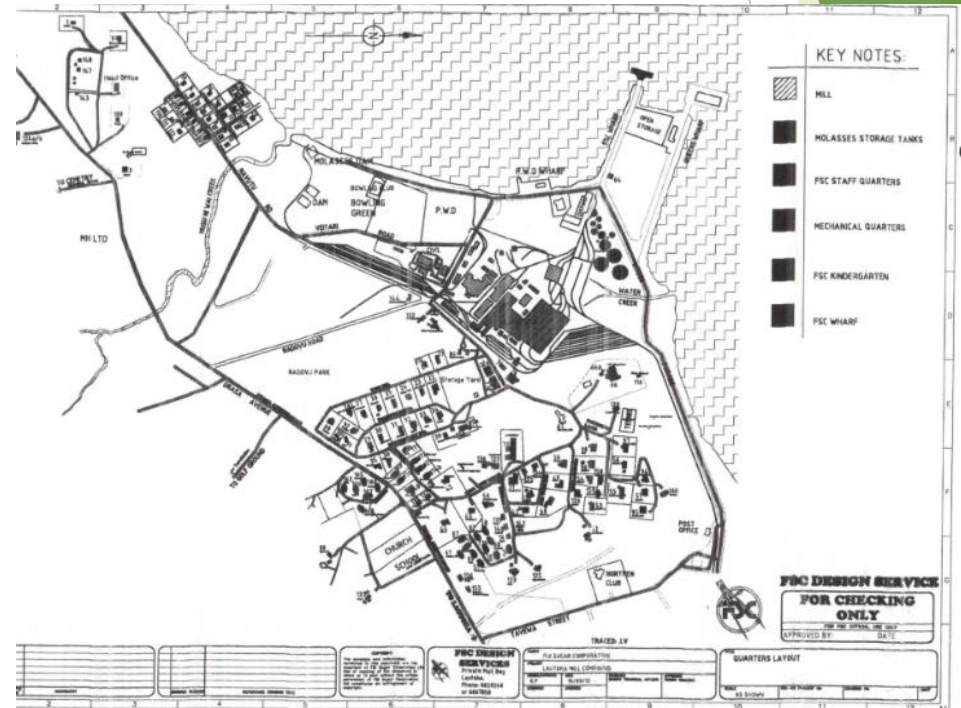
Rawari Sugar Mill Company Town Houses
for Mechanics & Fitters. Circa 1950's.

Source: The Fijian Islands by R.A Derrick. P130, plate 50.

4.0 The Sugar Mill's Company Towns



Lautoka Sugar Mill Company Town
- Tennis Pavilion
Image: C.Richards 2016

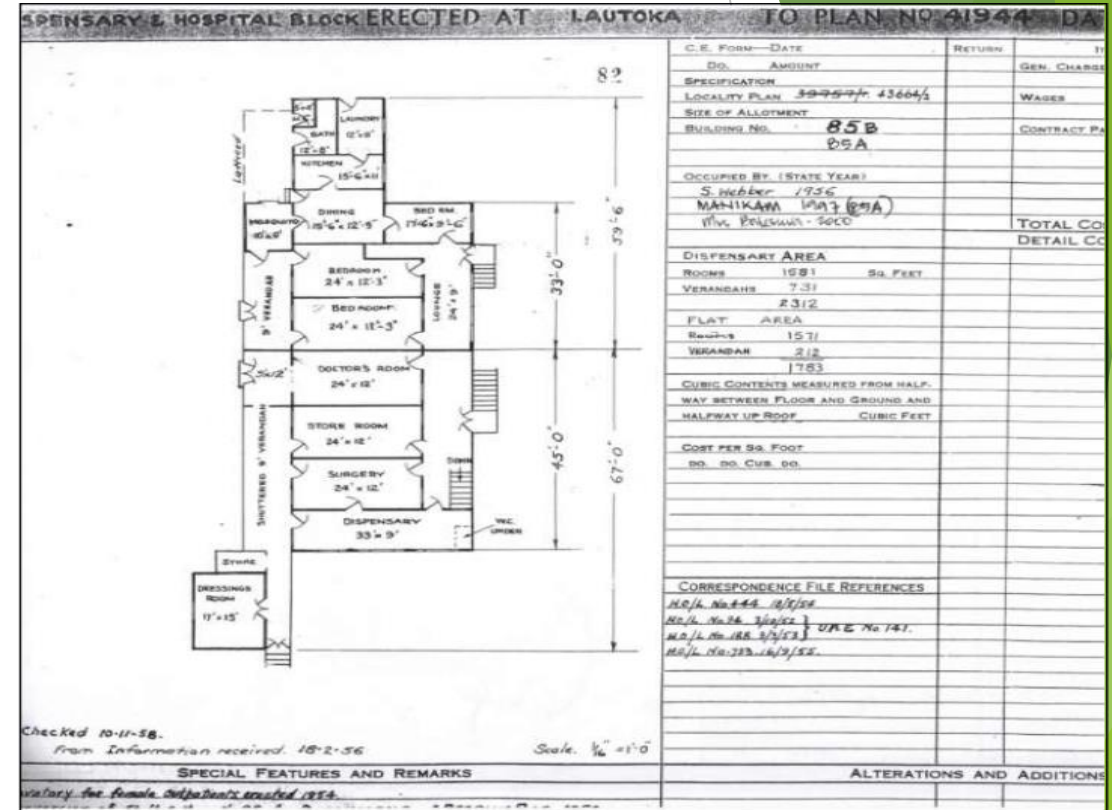


Plan of Lautoka Sugar Mill Company Town
Source: Drawing Office - Lautoka Mill

4.0 The Sugar Mill's Company Towns



Lautoka Sugar Mill Company Town - Dispensary
Image: C.Richards 2016



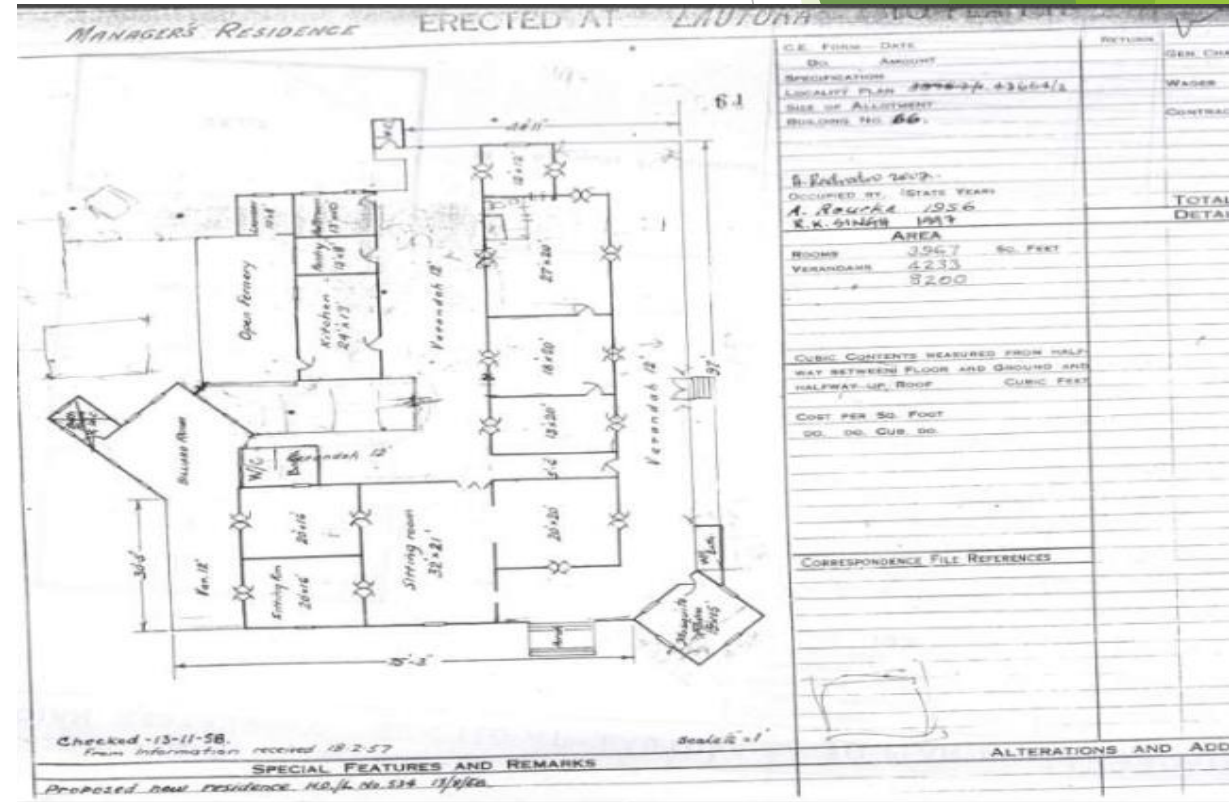
Hospital & Dispensary, Lautoka Mill Company Town,
circa 1905

Source: Design & Planning Office-Lautoka Mill

4.0 The Sugar Mill's Company Towns



Lautoka Sugar Mill Manager's House
Image: C.Richards 2016



Lautoka Sugar Mill, Manager's House, circa 1900 Source:
Design & Planning Office-Lautoka Mill

4.0 The Sugar Mill's Company Towns



Lautoka Sugar Mill Company Town
Senior Staff Bungalow
Source: History of CSR



Staff & Tradesman's Dwelling, Lautoka Mill Company Town,
circa 1913
Image: C. Richards, 3rd February 2016

4.0 CSR Holiday Retreats

- CSR built holiday retreats for its senior staff. A beachside holiday retreat was constructed at Cuvu in 1902 on the island of Viti Levu. CSR also constructed a cooler mountain holiday retreat at Nadarivatu in 1890 on the island of Viti Levu. CSR owned many beaches that were used by the tradesmen and their families for holidays and recreation.

4.0 CSR Holiday Retreats



Beachside Holiday Retreat at Cuvu
Source: Google Earth 2016



Beachside Holiday Cottage, Cuvu Beach
C. Richards, 3rd February 2016

4.0 CSR Holiday Retreats

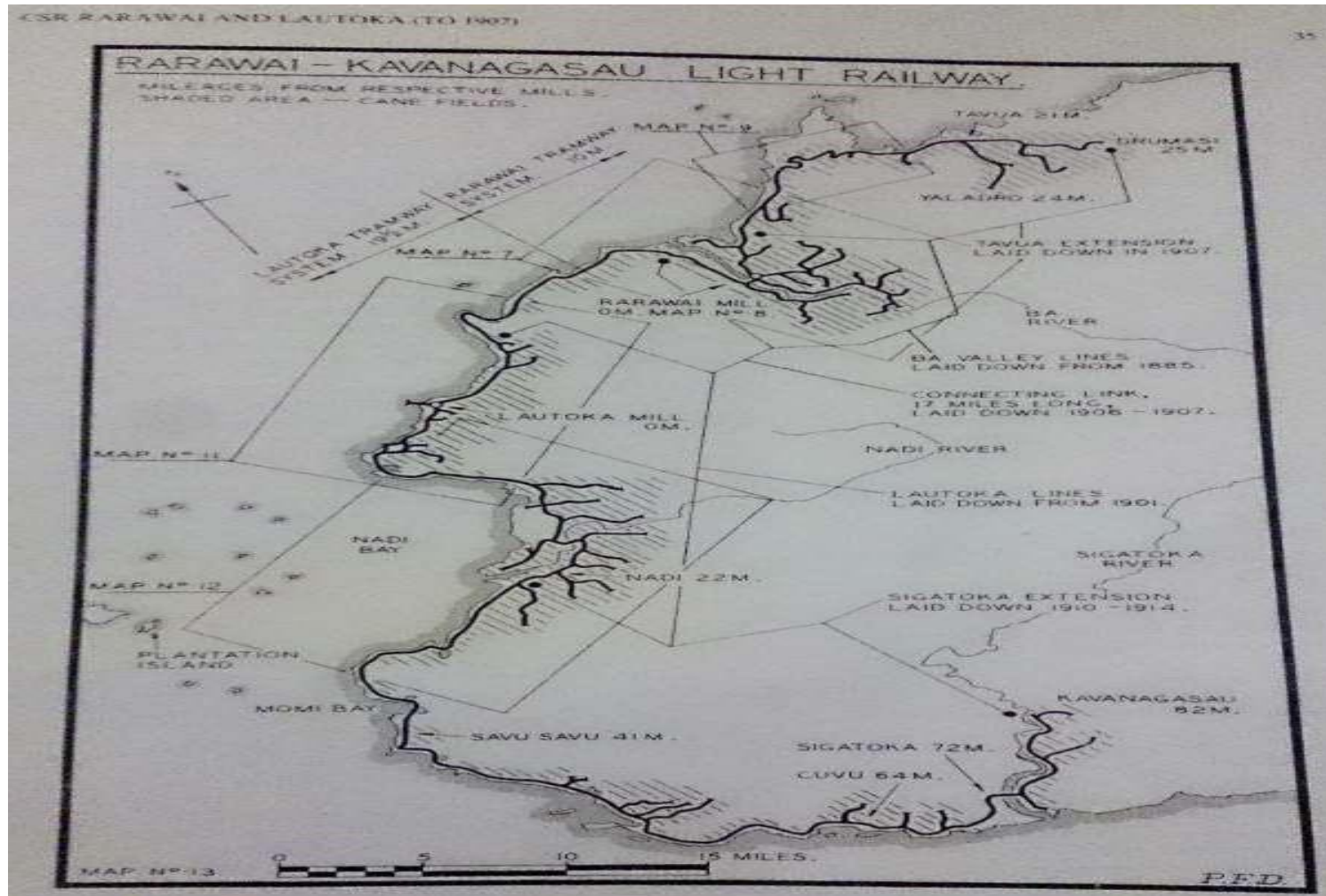


Mountain Retreat at Nadarivatu
Source: South Pacific Enterprises by CSR

5.0 The Sugar Mill's Railway Networks

- ▶ The investment in Fiji by CSR was considerable, not only in its mills and company towns but also in the railway networks and infrastructure associated with the mills. The company laid out over 490 miles of two-foot gauge railway, which is currently the longest existing two-foot gauge railway in the world.
- ▶ The principal use of CSR's railway network was the cartage of sugar cane, raw sugar and molasses. Steam locomotives were originally used together with horses and oxen to transport the sugar cane from the fields to the mills.
- ▶ The railway network's significance extended beyond CSR's transport operations. The railways were the first major land transport system in Fiji and were also used for passengers, military and the transport of other goods. The railway opened the nation for development; many towns and ports developed along its routes. The company offered free passenger services. Each CSR mill developed and operated its own separate railway network and each had extensive railway mill yard layouts.

5.0 The Sugar Mill's Railway Networks



Construction dates for CSR's Rawari and Lautoka mill's railway networks.
Source: Balloon Stacks and Sugar Cane by P. Hodge & P Dyer p. 7

5.0 The Sugar Mill's Railway Networks

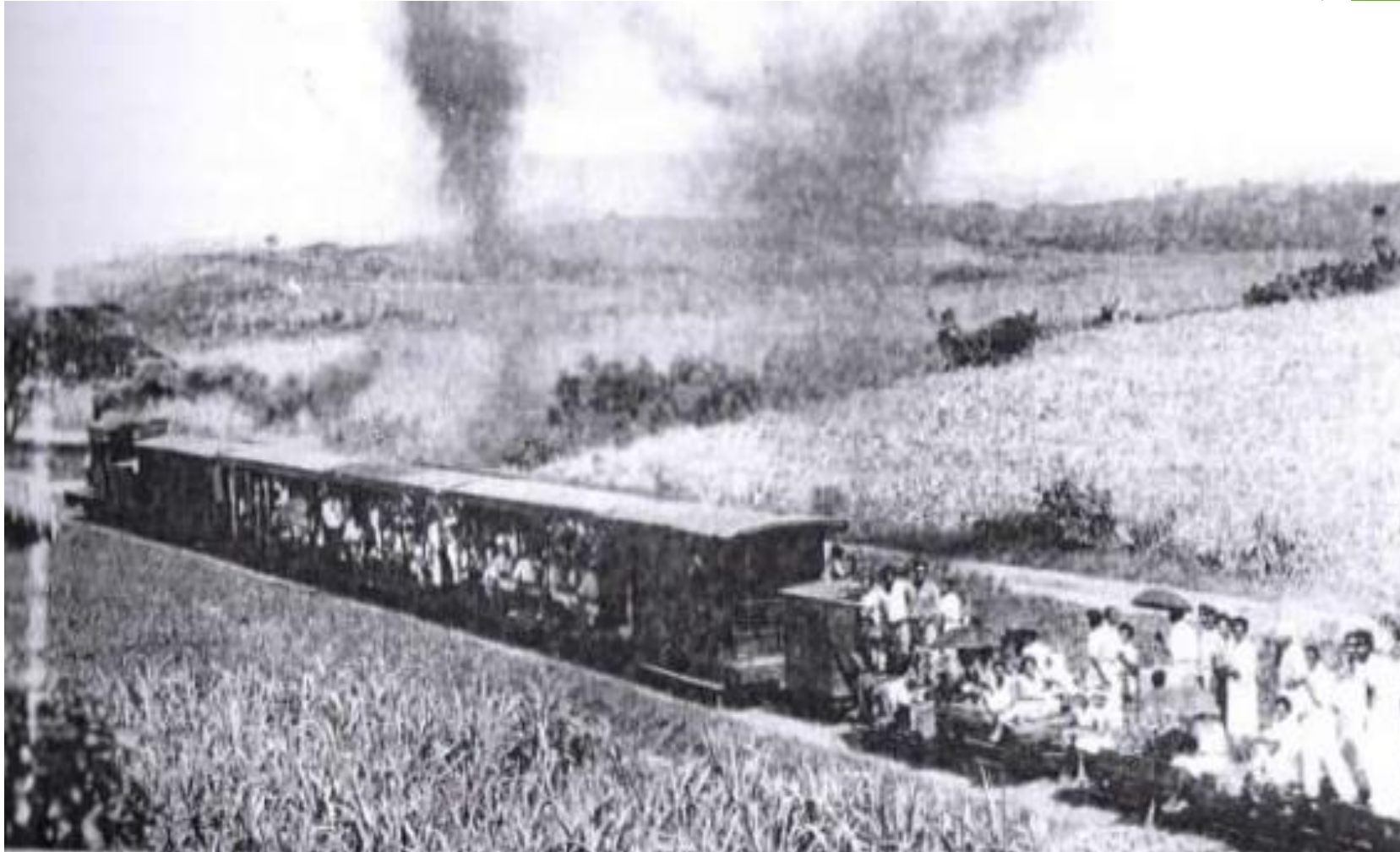


Fully Laden Cane Train arriving at Lautoka Mill
Source: Cane Train – Peter Dyer & Peter Hodge



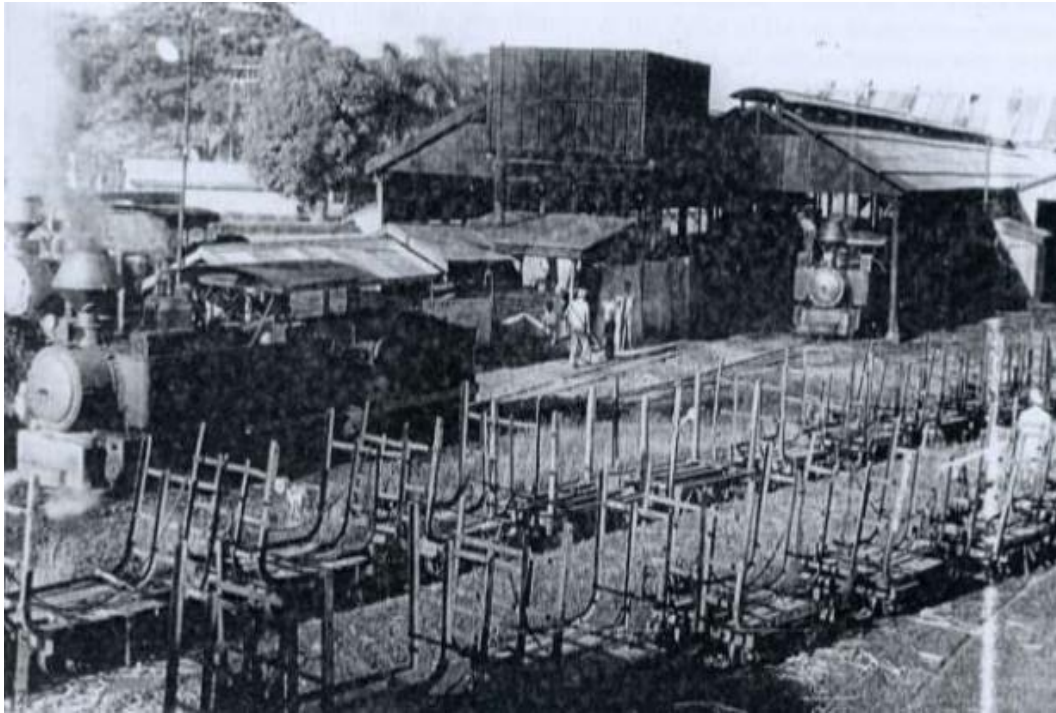
Horse Drawn Railway Cane Haulage
Source: Balloon Stacks and Sugar Cane- Peter Dyer & Peter Hodge p. 49

5.0 The Sugar Mill's Railway Networks



General Passenger Train Passing Through Nandi
Source: Cane Train – Peter Dyer & Peter Hodge p46

5.0 The Sugar Mill's Railway Networks



Lautoka Mill, Steam Locomotive Depot
Source: Cane Train by Peter Dyer & Peter Hodge p. 61



Rail Bridge number 29 over the Nadi River
Source: Chris Richards 12th February 2016

5.0 The Sugar Mill's Railway Networks

- ▶ CSR's railway networks required considerable infrastructure. At each mill, there was a steam locomotive depot, a locomotive workshop, a wagon repair workshop, a track workshop and a railway weighbridge for weighing loaded cane wagons. Extensive railway yards were laid at each mill for receiving loaded cane trains and the dispatching of empty cane trains. The railway networks included railway bridges, some of considerable length. Bridges were constructed using imported riveted iron girders on either timber, brick or concrete piers. Many of these bridges are still in use today.
- ▶ At Cuvu, there was a locomotive exchange depot (the only two-foot gauge locomotive exchange railway depot left in the world). The purpose of this depot was to exchange refuelled locomotives to complete the long-distance journeys from the mills to the cane fields and their return journeys from the cane fields to the mills.

5.0 The Sugar Mill's Railway Networks



Cuvu Depot Locomotive Running Shed, circa 1955
Source: Salute to the Hudswells p.22 By Ian Stokes,
David Mewes & John Browning

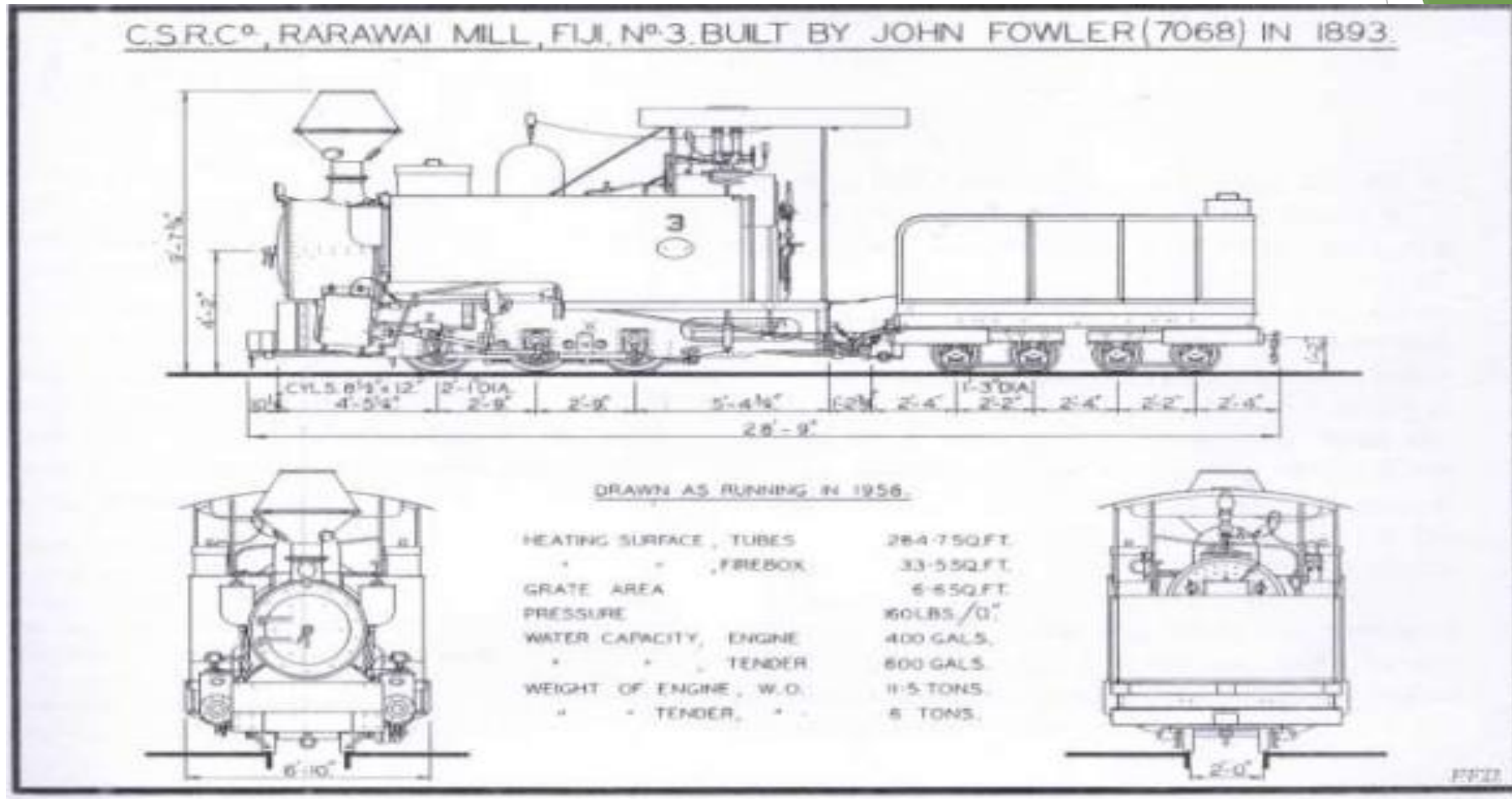


Cuvu Locomotive Depot, circa 2016
Source: Cane Train, Dyer, Hodge p.53

6.0 The Steam Locomotive Era

- CSR operated a range of two-foot gauge steam locomotives between 1882 and 1955 when diesel locomotives were introduced.
- CSR used two main British companies to supply steam locomotives for their Fijian railway network: -
- John Fowler & Co. UK, manufactured a total of 28 steam locomotives for CSR, between 1882 until 1911.
- Hudswell Clarke UK, manufactured a total of 25 steam locomotives for CSR between 1912 until 1950.
- Five steam locomotives from the CSR era survive.

6.0 The Steam Locomotive Era



CSRC, Rarawai Mill, Fiji No. 3 Built by John Fowler (7068) in 1893 Source: Planning & Drawing Office-Lautoka Mill

6.0 The Steam Locomotive Era



Former CSR Steam Locomotive located at Labasa Mill
Image; DSC01400 Chris Richards, 18th February 2016



CSR Steam Locomotive located at Penang Sugar Mill
Image; DSC01031 Chris Richards, 10th February 2016

7.0 The Diesel Locomotive Era

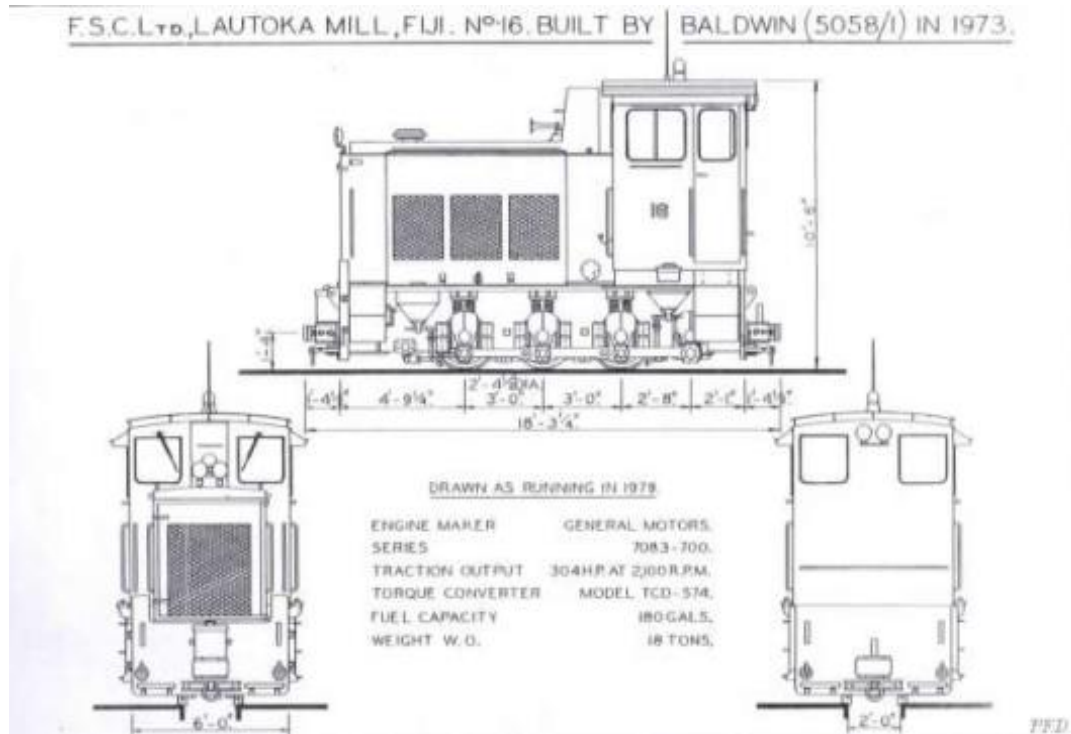
- The diesel locomotive era commenced in 1955. CSR used two Australian companies to supply diesel locomotives:
 - Clyde Engineering Australia manufactured 38 diesel locomotives for CSR from 1955 until 1969.
 - E.D.M. Baldwin and Sons Pty Ltd of Australia manufactured 9 locomotives for CSR between 1972 and 1975.
- Many original diesel locomotives from the CSR era are still in service on FSC's railway networks.

7.0 The Diesel Locomotive Era



Diesel Locomotive, Lautoka N. 12 Built by Clyde Engineering
c.1965 Source: Clydes Among the Cane, Ian A. Dunn p.31

7.0 The Diesel Locomotive Era



Lautoka Mill Diesel Locomotive N.16 Built by Baldwin (5058/1) in 1973
Source: Cane Train – Peter Dyer & Peter Hodge p. 118



Preserved Diesel Locomotive in a park located at Ba Image: DSC00966 Chris Richards, 10th February 2016

8.0 Railway Rolling Stock

- ▶ In addition to locomotives, FSC has over 7,888 units of various types of railway rolling stock, both in service and out of service. Many items of FSC's rolling stock date from the CSR era. Examples of CSR's and FSC's rolling stock include standard cane trucks, long trucks, bogie flat cars, ballast trucks, camping vans, inspection trolleys, passenger cars, ice box wagons and simplex tractors and weighbridge counter-weights.

8.0 Railway Rolling Stock



Ash Hopper Wagon, Ex Coal Wagons Rarawai Mill
Image: DSC00735 Chris Richards, 12th February 2016



Weigh Bridge Counterweight Rarawai Mill
Image: DSC00780 Chris Richards, 12th February 2016

8.0 Railway Rolling Stock



Ballast Wagon – Penang Sugar Mill
Image: Chris Richards 2016



Typical Sugar Cane Rail Wagon – Rawari Mill
Image: Chris Richards 2016

9.0 Machinery

- ▶ There are a large number of machines and other equipment within the mills and railways, both in current service and out of service. Each mill has a number of maintenance sections, such as a carpentry shop, joiners' shop, a blacksmith's shop, a metal shop (fitting, turning), a boiler house, a machinery shop, laboratories and a railway wagon truck shop. Machinery includes: steam hammers, blacksmith's equipment, metal pressers, laths and large drilling machines. Some machinery is driven by overhead belt systems.

9.0 Machinery



Steam Hammer – Rarawai Mill

Image: DSC00707 Chris Richards, 12th February 2016



Blacksmiths shop - Lautoka Sugar Mill

Image: Chris Richards 2016

10.0 Scenic Vistas

- ▶ Some potential heritage assets of FSC include scenic vistas. The company towns were all built on hills with grand vistas of the ocean, mountains and/or sugar cane fields. The railway network closely follows the coast. Some parts of the railways are elevated. Much of the land surrounding the railway is under developed and, in many cases, in a natural state. There are many beautiful beaches and rivers and areas of rainforest along the railway networks.
- ▶ The railways have large easements and curtilages that protect the natural rainforests, beaches and rivers from farming and development.

10.0 Scenic Vistas



Cuvu Beach

Image: DSC01214 Chris Richards, 3 / 2 / 16



Natadola Beach

Image: DSC01254 Chris Richards, 16 / 2 / 16

11.0 CSR & FSC Heritage Asset Assessment

- ▶ I have assessed all of CSR and FSC's buildings, houses, machinery, railways and infrastructure and established that a large amount of heritage items have survived. I have created individual listing sheets for all former CSR & FSC's assets that have heritage significance. There was over 1200 items of heritage significance identified.

11.0 CSR & FSC Heritage Listing Sheet

Rawari Sugar Mill, Railway Network – Precinct C – Heritage Item Listing Sheet

Item Information Code: RSMRNPC – DSC00688

Item name: Locomotive and Wagon Workshop

Location/address: Rarawai Sugar Mill

Suburb/nearest town/description: Ba

Local govt area: Ba Town Council

Country/state: Fiji Viti Levu

Owner: Fiji Sugar Corporation (FSC)

Other/former names: Colonial Sugar Refining (CSR)

Area/group/complex: Rarawai Sugar Mill Railway Network Precinct C

Title details: Refer FSC

Curtilage/boundary: Precinct C

Item type/group/category: Railway Network

Current use: Railway, Locomotive & Wagon Workshop

Former uses: Railway, Locomotive & Wagon Workshop

Item Description: Railway, Locomotive & Wagon Workshop

Designer: CSR

Maker/builder: CSR

Circa: 1900 - 1910

Physical Description: Metal framed, corrugated iron clad building

Physical Condition/good/medium/poor: Medium

References/plans/archives: Possible plan location, Engineers Office Rarawai Mill or Design Office Lautoka Sugar Mill

Proponent & Photographic Source: Chris Richards richardsca@iinet.net.au

Item assessment date: Wednesday 3rd Feb. 2016

Recommendations: Retail building as part of original CSR complex

11.0 CSR & FSC Heritage Asset Assessment

- ▶ In addition to the fabric of the Heritage Mills, Company Towns, and Railways, CSR and FSC retain an extensive archive. Many of CSR and FSC's historic plans and other records, together with current working plans, are housed in the Design & Planning Office at the Lautoka Sugar Mill and in Australia.

12.0 THE IMPORTANCE OF CSR & FSC'S HERITAGE ASSETS TO FIJI AND WORLD HERITAGE

- ▶ I have assessed and undertaken extensive local assessment and world comparative analysis of CSR and FSC heritage assets. It was found that these heritage assets, practices and operations are unique to Fiji and are rare on a world scale and meet the following ICOMOS Listing Criteria:
- ▶ *Criterion (ii)* - exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology monumental arts, town planning or landscape design.
- ▶ *Criterion (iv)* - be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

13.0 Threats to CSR & FSC's Heritage Assets

- ▶ Some of the threats affecting CSR & FSC's heritage assets are hurricanes causing closure of some sections of the railway network, leading to abandonment of thousands of acres of productive cane producing land, thus crippling FSC financially.
- ▶ Fiji is located in a hurricane region. The hurricanes affecting Fiji are becoming stronger and more frequent, possibly being influenced by climate change, CSR & FSC have been badly damaged by hurricanes and recently in 2016 by Hurricane Winston. Hurricane Winston was the strongest hurricane recorded in Fiji's history. Winston severely damaged and destroyed many CSR and FSC buildings and railway infrastructure.
- ▶ Over the past 40 years, successive hurricanes have destroyed vital infrastructure on the railway networks. A significant railway bridge at Sigatoka was destroyed in 2009 by heavy hurricane flooding. Following the destruction of the Sigatoka railway bridge, the railway network connecting the cane fields of the Kavanagasau Region was abandoned. The land now lays fallow. The railway infrastructure in this section however, remains intact.
- ▶ The railway bridge at Natadola was hurricane destroyed in 2012 further closing parts of the railway network including the Cuvu locomotive exchange depot. The closure of these sections of railways causes the abandonment of many thousands of acres of cane land, early CSR sector buildings and the homes of Indian cane farmers and their local communities.

13.0 Threats to CSR & FSC's Heritage Assets



Red section showing closed railways due to hurricane damage

Source: Cane trains. P Dyer & P Hodge



Hurricane Damaged Sigatoka Railway Bridge
Image: Chris Richards 2016

13.0 Threats to CSR & FSC's Heritage Assets



Hurricane Destroyed Railway Bridge
Natadola
Image: Chris Richards 2016



Hurricane Winston Damaged Penang
Sugar Mill
Image: Chris Richards 2016

13.0 Threats to CSR & FSC's Heritage Assets



Hurricane Winston Damage Penang
Sugar Mill
Image: Chris Richards 2016



Hurricane Winston Damaged Railbridge
Penang Sugar Mill
Image: Chris Richards 2016

13.0 Threats to CSR & FSC's Heritage Assets



Hurricane Winston Damaged Railbridge
Penang Sugar Mill
Image: Chris Richards 2016



Hurricane Winston Damaged Single
Officers Quarters Lautoka Sugar Mill
Image: Chris Richards 2016

14.0 Recommendations for the Management of CSR & FSC's Heritage

- ▶ The following advisory recommendations are proposed for the assistance in the management of CSR and FSC's heritage assets.
- ▶ **Recommendation 1:** It is recommended that CSR & FSC's heritage assets, as a collective group, should be listed with the National Trust of Fiji and UNESCO as a world heritage site. It is further recommended that protective heritage legislation should be introduced by the Fijian Government for CSR and FSC's heritage assets.
- ▶ **Recommendation 2:** It is recommended that formal heritage asset inventories be prepared from this paper's findings for all former and current CSR & FSC's heritage assets and be distributed to FSC Staff, The National Trust of Fiji and UNESCO.
- ▶ **Recommendation 3:** It is recommended that heritage curtilages be established for the sugar mills, the sugar mill's company towns, holiday retreats and the sugar mill's railway networks for each mill.
- ▶ **Recommendation 4:** It is recommended that former CSR and FSC's items heritage identified by this paper not be demolished or substantially altered without a heritage impact statement being prepared by a qualified heritage practitioner.

14.0 Recommendations for the Management of CSR & FSC's Heritage

- ▶ **Recommendation 5:** It is recommended that heritage moveable objects, including locomotives, rolling stock, machinery and tools be identified and should be set aside for preservation when surplus to FSC's requirements. These items should be labelled and stored under cover in a secure area.
- ▶ **Recommendation 6:** It is recommended that the steam and diesel locomotives that are currently exposed to the weather on display at various mills and parks should be immediately labelled and stored where they are protected in secure under cover areas.
- ▶ **Recommendation 7:** It is recommended that all archives and records, surplus to the company's requirements be catalogued and housed at the Lautoka Sugar Mill's design and planning office.
- ▶ **Recommendation 8:** It is recommended that FSC develop short and long-term management, reuse and redevelopment strategies for its heritage items, land holdings, railways and scenic vistas. A conservation management plan should be produced for all FSC's heritage assets.

15.0 Conclusion

- ▶ CSR and FSC has significant surviving heritage. This heritage represents a unique intact operating example of a late 19th century sugar industry. CSR shaped and developed the nation of Fiji. It is rare on a world scale that the activities of one single enterprise could dominate the development, culture and destiny of a nation.
- ▶ Many heritage assets are under severe threat including the recent closure of the Penang Mill, continuing hurricane damage causing crippling debts to FSC and its viability. An assessment of these heritage assets and practices meet some criteria of UNESCO Listing Criteria for a world listing.
- ▶ This heritage is of great value to the Nation of Fiji and the world. These heritage assets could be redeveloped for tourism, housing and hotels should FSC close. The sugar industry is declining and tourism is emerging as Fiji's main income earner.