
SEVEN HILLS ESTATE FIELD TILE DRAINAGE SYSTEM

Location

3722 CRESWICK-NEWSTEAD ROAD, KINGSTON AND 3800 CRESWICK-NEWSTEAD ROAD ALLENDALE, HEPBURN SHIRE

Municipality

HEPBURN SHIRE

Level of significance

Heritage Inventory Site

Heritage Inventory (HI) Number

H7623-0358

Heritage Listing

Victorian Heritage Inventory

Statement of Significance

Last updated on - February 6, 2025

What is significant?

The Seven Hills Estate Field Tile Drainage System site comprises a paddock which has been used as pastoral land from 1838 during the squatting and Creswick gold-rush period, and has been subject to cultivation from 1901. The significant elements of the site are primarily the subsurface tile drainage system, which dates to the period between November 1901 and February 1924. This place represents the potential for portions of an in situ tile drainage system to be extant, as well as pastoral- and farming-related archaeological features and deposits.

How is it significant?

The Seven Hills Estate Field Tile Drainage System site is of local historical, archaeological, and representative significance.

Why is it significant?

This Seven Hills Estate Field Tile Drainage System provides a sample of a system which was increasingly installed in waterlogged paddocks across not only Victoria, but across Australia from the 1890s onwards. This evidences a clear association with the way farmers and pastoralists were transforming their land with new drainage technologies in the local area to continue the productive use of the land for farming. As the tile drainage system is primarily subsurface in nature, it has the potential to yield information about the methods utilised in the construction of such technology by Creswick farmers during the early-1900s. While it is unclear as to what

remains of the system in a subsurface context, it has the potential to provide details on the principal characteristics found in the local implementation and use of a technology imported from the Ohio flatlands of America. As such, this site is significant at a local level within the Creswick region.

Interpretation
of Site

The known features associated with the Seven Hills Estate Field Tile Drainage System site comprise a terracotta pipe tile drainage system. At least one pipe has been observed as being in situ, with the broken end of a pipe eroding out of the soil at the north side of the western fence line of the paddock. The terracotta pipe is approximately 150 mm in diameter, and is situated around 0.3 m in depth. Several sections of pipe, and broken pipe pieces, were also observed at different points along the length of the fence line of the paddock. While the paddock itself could not be inspected, as access to the property was not granted by the owner, it is likely that further portions of the tile drainage system are likely to be in situ in a subsurface context. The Seven Hills Estate Field Tile Drainage System site gives us a rare physical example of an agricultural and farming technology (tile drainage system) which is understood to have been widely utilised across North America and Europe. Despite extensive written documentary evidence describing the practice in Australia, very few physical examples of this agricultural technology have been archaeologically identified here. This site can provide evidence on how the drainage system was constructed, how it was used, and how it was repaired and modified over time. Archaeological evidence, whether intact or in a degraded state, could provide details on how the system was operated and maintained over time, and to what extent it was able to keep the paddock from being waterlogged during its operation. Modifications and patches to the system could show how the tile drainage system was adapted to best suit the local climate and environment, particularly during periods of flood or drought. The introduction of alternative pipe technologies to the system, such as smooth plastic or corrugated plastic pipes, may provide a date range for any such modifications, showing how the life of the system may have been extended over time. Degradation or damage to the tile system could indicate when the system was no longer considered as a viable technology to assist with paddock drainage. As such, this provides a rare opportunity to examine what is likely to be a partially in situ historical drainage system. According to the Policy for Determining Low Archaeological Value (Heritage Victoria 2018), for an archaeological site to have more than low archaeological value, and be approved for inclusion in the VHI, it must address both Threshold A (archaeology) and Threshold B (history). The known features associated with the Seven Hills Estate Field Tile Drainage System site comprise a terracotta pipe tile drainage system within Pennycuik's allotment D. At least one pipe has been observed as being in situ, with the broken end of a pipe eroding out of the soil at the north side of the western fence line of the paddock. The terracotta pipe is approximately 150 mm in diameter, and is situated around 0.3 m in depth. Several sections of pipe, and broken pipe pieces, were also observed at different points along the length of the fence line of the paddock. While the paddock itself could not be inspected, as access to the property was not granted by the owner, it is likely that further portions of the tile drainage system are likely to be in situ in a subsurface context. Therefore, the Seven Hills Estate Field Tile Drainage System site meets Threshold A (archaeology). The Seven Hills Estate Field Tile Drainage System site gives us a rare physical example of an agricultural and farming technology (tile drainage system) which is understood to have been widely utilised across North America and Europe. Despite extensive written documentary evidence describing the practice in Australia, very few physical examples of this agricultural technology have been archaeologically identified here. This site can provide evidence on how the drainage system was constructed, how it was used, and how it was repaired and modified over time. Archaeological evidence, whether intact or in a degraded state, could provide details on how the system was operated and maintained over time, and to what extent it was able to keep the paddock from being waterlogged during its operation. Modifications and patches to the system could show how the tile drainage system was adapted to best suit the local climate and environment, particularly during periods of flood or drought. The introduction of alternative pipe technologies to the system, such as smooth plastic or corrugated plastic pipes, may provide a date range for any such modifications, showing how the life of the system may have been extended over time. Degradation or damage to the tile system could indicate when the system was no longer considered as a viable technology to assist with paddock drainage. As such, this provides a rare opportunity to examine what is likely to be a partially in situ historical drainage system. Seven Hills Estate Field Tile Drainage System thus meets Threshold B (history).

Hermes
Number

212663

History

SiteCard data copied on 06/02/2025: Early history The Surveyor-General of New South Wales, Major Thomas Livingstone Mitchell and his party, were some of the first non-Aboriginal people to explore the land in the study area, during the return leg of Mitchell's 1836 expedition through central and western Victoria (Clark 1995, p. 58; Mitchell 1838). During this expedition, Mitchell and his team crossed the Loddon River near present-day Newstead in late September 1836, on their route between Mount Cole and Mount Alexander as they were returning to Sydney (Golding 2018). Shortly thereafter, squatters began to take up land in the region for grazing, mainly sheep. Squatters were pastoralists who occupied Crown land, initially illegally and later under licence from the Colonial government. The promise of open grasslands, rich soils and unoccupied land of the Port Phillip district attracted these pastoralists, initially from Van Diemen's land who came into the district via Portland and present-day Melbourne. These were soon followed by overlanders from New South Wales who crossed the Murray River from the north. Squatting runs were largely defined by natural features such as rivers, creeks and hills with very little outlay given to infrastructure such as fencing. Sheep were generally overseen by shepherds and any structures that were built tended to be temporary and of local materials such as bark timber slabs, rammed earth and stone. The lack of land tenure dissuaded investment in more permanent structures and infrastructure. Wool was taken by dray to Portland and Melbourne for export to Europe, particularly to the United Kingdom (Ballinger and Westbrooke 2016). In a letter dated 10 August 1853, John Hepburn described occupancy of the region in early 1838: 'At the same time (February 1838) Mr. Yuille occupied Ballarat, which has lately proved to be so rich a gold-field, and within the year the station of Mr. Clarke at Bowling Forest was taken up, and those of the Messrs. Coghill, Birch, and Capt. Hepburn, and also of Mr. Bowerman on the northern side of the Maiden Hills, which latter was purchased by us in the following year' (Hepburn 1898, p. 42). Specifically, Hepburn described the location of the Seven Hills run as follows: 'Messrs. Irvine and Birch made their appearance, and sat down between Smeaton and Glendonald, and called the station Seven Hills' (Hepburn 1898, p. 54). Historical mapping, dating to around the 1840s, shows the Birches' station as being relatively long and narrow running along a north-west / south-east alignment. However, this map shows both the larger Seven Hills squatting run, and the adjacent Bullarook run in the east. Hepburn's squatting run (Smeaton Hill) is shown to have been on the north, on the west side of the Seven Hills run; FW Langdon's run (Mount Prospect) to the north, on the east side; David Coghill's run (Glendonald) to the south, on the west side; William John Turner Clarke's run (Bean Bean) to the south, in the central portion of the run; William Henry Bacchus' run (Peerewerrh) to the south, on the east side of the property; and William Campbell's run (Tourello) to the west. This is confirmed by the description of the properties bounding Seven Hills station, as described in *The Argus* (26 September 1848, p. 1). The initial owners of the Seven Hills run, the Birch family, were originally from England, and arrived in Hobart in 1837. The family had been indigo farmers in India, who migrated to Australia (Lester Tropman and Associates 1991, p. 82). According to the *Swan River Guardian* (6 April 1837, p. 100) and *The Perth Gazette and Western Australian Journal* (8 April 1837, p. 880), the Birch family arrived in Perth from Calcutta on the *Strathisla*, and were bound for Van Diemen's Land. The family was listed as C Birch (senior), A Birch, and C Birch (junior). They arrived at Hobart on 3 May 1837 (*The Tasmanian*, 5 May 1837, p. 3). It was reported that the Birch family, along with three other passengers, thanked the commander of the vessel, WS Johnston, for his service with the gift of a snuff box (*The Hobart Town Courier*, 12 May 1837, p. 3). Their father, Charles Birch who had been 'one of the most successful Indigo Planters' in Bengal, is reported to have died on 10 June 1837, at Hobart (*The Hobart Town Courier*, 23 June 1837, p. 2). Charles' two sons, Cecil and Arthur, subsequently left Hobart on 6 September 1837, sailing for Port Phillip on the *Enterprise*, along with one of their fellow passengers from Calcutta, Charles Driver (*The Hobart Town Courier*, 15 September 1837, p. 2). Within six months of arrival, Cecil and Arthur Birch settled at Seven Hills, along with the Reverend Alexander Irvine. Irvine took up the westernmost part of the run, which was situated on Birch Creek (Lester Tropman and Associates 1991, p. 82). Outside of Hepburn's letter dating the station to February 1838, there is evidence of them occupying 'Sevenhill Station' in January 1839, with the Port Phillip Gazette (12 January 1839) publishing C Birch's reward for the return of six lost bullocks. They are listed in the NSW Government Gazette (1 October 1841, p. 1328) as having obtained pasturage licenses in the Western Port District by 1841; Alexander Irvine is also named in the Western Port District pasturage licenses listing. The squatting run, Seven Hills, was named after the seven hills which surround it – Kooroocheang, Moorookyle, Birch Hill (Lord Harry), Kangaroo Hills, Springmount, Forest Hill and Bullarook (Lester Tropman and Associates 1991, p. 83). Irvine left for Two Fold Bay shortly afterwards, before overlanding approximately 1,500 cattle in 1840,

bound for his new station: Glenlogie run near Mount Cole. When Irvine left in October 1837, Arthur took up his portion of the lease. The Birches subsequently purchased the Bullarook lease from Campbell in 1842, extending their pastoral estate to the southeast (Billis and Kenyon 1932, p. 248; Lester Tropman and Associates 1991, p. 82). The c.1840s mapping, which must post-date the 1842 purchase of Bullarook, shows that the Birches' station was bounded on the north and east by a waterway, which is now called Birch's Creek; land surrounding Langdon Hill, Rocky Lead Creek, and Pinchgut Creek in the southeast; land around Adekate Creek and Fleming Creek in the southwest; land around today's Smokeytown in the south; and a tributary of Tourello Creek south of today's Lawrence in the west. The run encompassed four hills: Birch Hill, Forest Hill, Spring Hill, and Langdon Hill. Fences are shown to have been installed around the property, one in the northwest, along much of the southwest of the property, and along the southern and eastern boundaries, along with an interior fence between what is now Newlyn Reservoir and the intersection of today's Ryries and Ballarat-Daylesford Roads. The interior fence appears to mark the boundary between the Seven Hills (west) and Bullarook (east) properties. Several small features, possibly huts or small fenced-off areas, are shown across the properties: with two along waterways south of Langdon Hill; one to the northwest of a bridge across Adekate Creek near today's Dean; one north of a small hill near the intersection of present day's Sawmill and Ballarat-Daylesford Roads; one along a waterway to the east of Forest Hill, and another along a waterway to the west of Forest Hill; one to the northwest of Broomfield; one along a waterway to the east of Birch Hill; and another along a waterway to the northwest of a bridge over an unnamed tributary of Tourello Creek. There are larger structures, possibly fenced paddocks, along Birch Creek: one approximately halfway between Smeaton and Lawrence; and the home station and paddocks to the east of Smeaton. The Port Phillip Gazette (9 May 1840, p. 2) confirms that the Birches imported 12 bags of flour, 6 bags of wheat, 1 chest of tea, 1 dray, 1 plough, and 1 set of harrow mountings from Hobart on the schooner, Bandicoot. They were also reported in the Geelong Advertiser (20 September 1841, p. 2) as having taken out a Depasturing License for the District of Western Port and of Portland Bay in August 1841. This venture proved successful, as in early 1846, they were reported as exporting 65 bales of wool to London (The Port Phillip Patriot and Morning Advertiser, 17 February 1846, p. 2). The artist Charles Norton, cousin of the Birch brothers through his mother, took out a pastoral licence in 1844 for his own run, Tooralle, near Clunes. He visited his cousins at Seven Hills in the same year, where he drew several sketches of the run. The picture of the homestead shows four buildings between a fenced-off paddock and Birch Creek, and what appears to possibly be a weir or dam on the waterway. The area has been cleared, apart from several small trees growing within the paddock, which has been ploughed and planted. A sketch of the old hut, which appears to have been the central homestead in the homestead picture, is a more detailed drawing, showing a wooden building with a stone chimney on one side of the building, plastered walls, and a central door placed between two windows. The roof comprised a bark roof, secured with branches. It appears to have had a skillion roof at the rear of the building. The interior of the hut is sketched as having had exposed rafters, walls hung with pistols, muskets, a whip, a saddle, and coats. It had a couch, table and a wooden bench chair opposite the front door, and chests against the wall, along with buckets and another musket. There are also two interior doors pictured leading deeper into the building. Two men are shown in the building, one entering the hut with a musket slung over his shoulder, and the other relaxing on the couch with a pipe and a glass of alcohol. An 1850 survey plan of Bullarook (Birch Creek) Creek, which comprises land immediately adjacent to Seven Hills in the southeast which was by then also owned by the Birches, along with several sections of what was named Tullaroop Creek (and comprises parts of Creswick, Salty, Adekate and Fleming Creeks), shows the location of several features associated with the Seven Hills and Bullarook squatting runs. The details on the 1850 survey plan related to the Seven Hills property include a garden plot northeast of Birch Hill and west of today's Smeaton, near an unmapped tributary of Birch Creek. This garden plot is situated adjacent to two buildings marked as 'Birch's Old Station'. The location of their then current Seven Hills home station is the location of the later Pre-emptive Rights land, to the southeast of today's township of Smeaton. The home station then comprised a large grass paddock, with a road crossing through it adjacent to Birch Creek, with a wool shed to the southwest of the paddock, a hut to the northwest, a homestead and huts to the northeast of the paddock, and a stockyard within the northeast corner of the paddock. Additionally, the map shows the Bullarook home station, owned by the Birches, as comprising a large grass paddock between Bullarook Hill (Langdon Hill) in the east and what is now Newlyn Reservoir on Birch Creek in the west. The Bullarook cattle station buildings were to the south of the paddock, with stockyards and outbuildings situated just inside the paddock boundary. Being a survey of the two creeks, no further inland features associated with either of the Birches' squatting runs were noted on the 1850 map of the area. Langdon's Mount Prospect home station is shown to the northeast of Bullarook station, at the foot of Mount Prospect. It also describes the land around the Seven Hills home station as comprising honeysuckle and light wood in clumps along Birch Creek, with open plains to the south. Land to the north of Birch Creek was described as having clumps of honeysuckle to the northwest, and being lightly timbered with gum trees to the northeast. Around 1852, Cecil and Arthur's brothers, Edward and Oscar Birch, joined them from England. The following year, the brothers all visited England, leaving their estates to be managed by Jeremiah Coffey (or Coffee); the brothers shortly returned with some well-bred cattle and Suffolk Punch horses (Lester Tropman and Associates 1991, p. 82).

Cecil and Arthur appear to have returned by the end 1854, when they were reported in *The Argus* (27 December 1854, p. 4) as importing sherry and port from London. An 1855 map of country allotments within the Parish of Spring Hill shows that land adjacent to the main road to the west of the Seven Hills home station had been subdivided into small farms, with allotment 64 then containing 'Birch's Hut', with the Seven Hills homestead and paddocks in the east near Birch Creek. Additionally, two tracks are shown as running through the property, one of which intersects with the location of the Seven Hills Estate Field Tile Drainage System site. The two Birch brothers purchased the Pre-emptive Rights of their homesteads, both at Seven Hills and Bullarook, along with much of their original property, during the early land sales in 1856, prior to the cancellation of the Seven Hills pastoral lease in January 1862 (Billis and Kenyon 1932, p. 248; Lester Tropman and Associates 1991, p. 83). The Mount Alexander Mail (27 May 1856) reported that, as freehold squatters with Pre-emptive Rights at Birch's Hill, they were entitled to vote in an election of members for the North West Province division of Creswick Creek. While the land was owned by Cecil and Arthur, Edward Birch built himself a homestead on the bank of Birch Creek at Bullarook Station. In 1857, Arthur married a woman named Annie, who died after a long and painful illness (Lester Tropman and Associates 1991, p. 83). She died on 19 February 1859 at the age of 29 at her residence on Collins Street East in Melbourne (*The Argus*, 21 February 1859, p. 4). In 1859, the Birch brothers offered the Seven Hills Estate to let for a period of seven to 10 years in *The Argus* (21 February 1859, p. 8). The property was described as a completely fenced area covering 6,235 acres of land, through which the main road between Ballarat and Castlemaine ran. The homestead was noted as being on a block of 1,200 acres, and had been subdivided into grazing and cultivation paddocks. It had a comfortable residence with eight rooms, out-offices, kitchen, and servants' rooms; three-stalled stable with loose box, groom's room, overseers' and men's huts, store, stockyard, and 'one of the finest gardens in the district'. The advertisement noted that the owners wanted to visit England, and wished to let the entire property to one tenant who could sublet the property into farms. They also offered sale of their stock, comprising 1,000 cattle and 50 horses. By April 1860, rather than contacting A & C Birch, those interested in sublet farms should contact Edward Birch (*The Star*, 2 April 1860, p. 4). A map of the Ballarat, Dowling Forest and Creswick areas dating to 1855 shows the location of the Seven Hills homestead and associated paddocks as still being extant, with the homestead adjacent to Birch Creek. Both tracks are still evident, with the track leading to the Smeaton area cutting through a stone reserve. The township of Smeaton is not shown on the map. Several buildings are marked on the homestead allotment, with two adjacent to the main paddock in the west, with five more clustered around the fenced-off homestead. No buildings appear to be present in the adjacent allotments, bar one situated on the eastern half of allotment B, to the southeast of the homestead. The Birch family continued to offer farms at Seven Hills to let, with all vacant lots being put to auction on 5 December 1865; potential buyers were directed to speak to John Dyke (the Birches' manager) at Seven Hills Station (*Geelong Advertiser*, 25 November 1865, p. 3). *The Argus* (2 September 1871, p. 7) reported that Arthur and Cecil Birch had moved to Kensington, near London in the UK, which appears to indicate that their visit did indeed continue for 10 years as the initial advertisement for land for lease stated. Dyke continued to be the contact for the farms to let into the early 1870s (*The Ballarat Star*, 13 January 1872, p. 3; 30 January 1873, p. 3). According to the *Wagga Wagga Advertiser and Riverine Reporter* (26 March 1873, p. 2), Arthur and Cecil Birch sold the 6,200-acre Seven Hills Estate to Alexander Wilson. Despite the sale, subsequent parish mapping show the name of the original owner of the allotment, along with the locations of the two paddocks and tracks, as per the 1855 mapping (Office of Lands and Survey 1867). Mining period In 1875, 6,000 acres of the Seven Hills station was purchased from Alexander Wilson by Martin Loughlin and his friend, William Bailey, along with Robert Orr, Edward Charles Moore, David Ham, Edward Morey and William Luplau (*The Ballarat Courier*, 22 April 1875, p. 3). Loughlin was a miner, who became a mining magnate, speculator and trader on the Ballarat Exchange, while Bailey was a pastoral station manager who had turned storekeeper. In May 1881, Loughlin and Bailey, along with Moore, James Alfred Chalk, Orr, Ham, Morey and Henry Gore as shareholders, formed the Seven Hills Estate Company to exploit the rich subsurface alluvial deposits on land formerly part of the larger Seven Hills run. The company leased land for the establishment of gold mines such as Ristori, De Murska, Lewers Western Lead, the Ristori West, the Loughlin, the Berry Consols, Lone Hand, and the Madame Berry, which worked the deep Berry Lead near present day Allendale, after the 1872 gold discovery. These mines, which were all situated on land outside the Seven Hills home station block, paid the Seven Hills Estate Company over £220,000 in royalties between 1875 and 1888 (Bannear 1999; Fahey 1986, p. 7; Kicinski 2014; Lester Tropman and Associates et al. 1990, p. 15; McCallum 1974). The Seven Hills station homestead block, which includes the property subject to this assessment, was not subject to mining. This unmined land, some 5,881 acres of grassland within the Seven Hill Estate, were leased out by the Seven Hills Estate Company to sheep farmers and graziers for grazing purposes (*The Argus*, 22 January 1881, p. 10). According to *The Ballarat Courier* (6 February 1884, p. 4), the company refused to subdivide these allotments into small lots to allow the miners to live on the property. *The Ballarat Star* (28 January 1893, p. 4) shows that the company tendered the Homestead and Lone Hand paddock (the paddocks on both sides of the main road to Smeaton), totalling 1,822 acres of land, for grazing purposes with a lease term of five years. As such, it appears that this land was grazed – rather than mined – during the Creswick gold rush period. Twentieth century The Bendigo

Advertiser (26 November 1901, p. 2) stated that all allotments of the Seven Hills freehold land were purchased by multiple buyers, with the 5,940 acres sold for £55,000. An advertisement describes the land as follows: 'The LAND is practically virgin soil, scarcely any cultivation having been done on it for the past 25 years. The DRAINAGE is naturally very good, as the country is of such a delightful undulating character. The WATER SUPPLY is simply perfection, as the property commands miles of frontage to that never-failing stream so well-known as the Bullarook (or Birch's Creek), from which the Clunes water supply is obtained' (Weekly Times, 16 November 1901, p. 28). The 1901 subdivision plan of the Seven Hills Estate shows the estate land in red, with other land, including the township of Smeaton and adjacent Shire Pound to the north of the homestead block, in yellow. The main homestead block was subdivided into four allotments, but otherwise the other allotment boundaries remain primarily unchanged. The purchaser of the allotment associated with the Seven Hills Estate Field Tile Drainage System site, allotment D, was A Pennycook. Pennycook is shown to also own the non-estate land (allotment 64) to the northwest of allotment D. According to The Ballarat Star (27 May 1878, p. 4; 3 June 1880, p. 4), Alexander Pennycook (Pennycuick) appears to have been a pound keeper for the Shire of Creswick between 1878 and 1880, where he dealt with cattle and other livestock. He was likely stationed at the pound to the south of Smeaton. His two purchases from the Seven Hills Estate Company comprise approximately 247 acres of land. Pennycuick, which appears to have been his legal surname, farmed the land until his death in 1914 (The Argus, 25 August 1914, p. 9). His son, David Little Pennycuick was also a farmer, and was named as the sole executor of his will (The Argus, 25 August 1914, p. 9; 5 September 1914). Pennycuick's grant of probate describes his real estate as comprising the 105-acre Section 64 of the Parish of Spring Hill, along with Portions D and E of the Parish of Spring Hill. Portions D and E were part of the Seven Hills homestead block. He also had 130 acres of crops, including wheat, oats and peas, livestock, farming implements, and other equipment (Long 1914a). In his will, he bequeathed all of his real estate and personal estate to his daughter, Alexandra Pennycuick, and his son, David Pennycuick, in equal shares as tenants in common; his son was also to act as trustee (Long 1914b). He was buried at Smeaton Cemetery (Creswick Advertiser, 1 September 1914, p. 3). His other daughter, Mrs D McKenzie, was not noted in the will (Long 1914b). Much of the property, including that which fronted Birch Creek, ended up with David Pennycuick, who died at Melbourne General Hospital on 1 October 1923 (The Ballarat Star, 2 October 1923, p. 4). On David's death, his daughter, Alexandra Jane Pennycuick, was made sole executrix of his will (The Argus, 15 October 1923, p. 3). Alexandra Jane determined to sell 360 acres of her father's property between Smeaton and Kingston, which appears to have included the Seven Hills Estate land (The Ballarat Star, 23 February 1924, p. 2; 29 February 1924, p. 3). The land, prior to the sale, was described as being conveniently subdivided into seven paddocks by sheep proof fencing, practically free of any noxious weeds, with buildings including a substantial 8-roomed brick dwelling, woolshed, stable and chaff-house, wagon shed, implement shed, blacksmith's shop, and motor garage. The water supply was 'laid on to yard and tanks from a reservoir in the paddock and forced by a large windmill to tanks at the house, besides which Birch's Creek supplies the northern end of the property, and four large tanks catch rainwater from the buildings' (The Ballarat Star, 16 February 1924, p. 5).

Underground drainage The subsurface pipe drainage system used on the Seven Hills Estate Field Tile Drainage System site is of a type originally called 'tile drainage' due to the short clay pipes used for draining excess subsurface water from the soil. However, the clay pipes for such a system were expensive and difficult to lay (Agriculture Victoria 2020). The first types of subsurface drain materials used were probably bundles of brush which were tied together and placed at the bottom of a trench. However, clay tiles have been used in Europe since the medieval period, with French farmers first using modified clay roof tiles for field drainage purposes. Glazed, funnel and cone-shaped tile drainage pipes were found in the garden of a convent in Maubeuge, France, and were dated to 1620 AD. These tiles had been laid in the soil to form a drain system at a depth of approximately 1.22 m. However, the earliest form of drainage tiles specifically introduced for drainage purposes were horseshoe shaped. They were placed adjacent to each other, with the open side facing downwards, along the bottom of a trench or on a clay palette (Yannopoulos et al. 2020, pp. 3-7). In the United Kingdom, the first clay drainpipes were used on the estate of Sir James Graham in Northumberland, England, in 1810. Cylindrical drainage pipes were first manufactured by John Reade, a gardener in the village of Horsemonden, England, in 1810. The cylindrical pipe proved more popular than the horseshoe tile, particularly after Reade exhibited them at the Royal Agricultural Society's Show in Derby, England, in 1843. In 1845, Thomas Scragg invented an extruding machine that produced round clay pipes quickly, significantly reducing their cost of their production. This spurred on the uptake of tile drainage systems not only in the UK, but internationally. Ceramic pipes soon became the basic means of subsurface drainage in irrigated areas in several countries, including Jordan, Spain, and Pakistan. In the 1940s, smooth, rigid plastic and bituminous fibre pipes were introduced, followed by corrugated plastic drainpipes in 1963. Plastic pipes, particularly corrugated pipes, gradually began to replace the older tile pipes. Since the 1980s, corrugated drainage pipes are typically made from polyvinyl chloride, high density polyethylene, or polypropylene (Yannopoulos et al. 2020, pp. 3-7). Tile drainage in Victoria has been mentioned in newspapers as far back as 1854, where The Argus (27 October 1854, p. 5) reported that a Mr Stevenson exhibited a 'machine for the manufacture of pipe tiles for drainage' at the Port Phillip Farmers' Society; one individual was recorded as ordering enough tile pipe to drain 4,000 acres of land.

Further displays of tile making machines occurred, including a display at the Ballarat Agricultural Show in 1859 (The Star, 28 October 1859, p. 2), and a ploughing match as part of the Ballarat Agricultural Show in 1864. Messrs McDowall and Gray of Ballarat provided the tile pipe for the display, which included the laying of the drainage system, aiming to prove that a 'proper system of drainage in the majority of farms is very much required' (The Star, 9 June 1864, p. 2). The tile pipes were reported as being 7-8 inches (approximately 178-203 mm) in diameter, with the pipes being laid at a depth of approximately 3 feet (0.91 m). In 1875, Thomas McCormack's farm at Dean won first prize in the tenant class in the Smeaton, Spring-hill, and Bullarook Agricultural Association's farms competition; it was noted that he had cut 12 chains (241.4 m) of covered drains, in which he had inserted 4-inch (101 mm) diameter pipe tiles, on his farm (The Australasian, 18 December 1875, p. 25). As the use of tile became more common from the 1890s, newspapers ran articles about the installation and use of tile drainage systems. For example, the Euroa Advertiser (2 November 1894, p. 4) recommended the best tile for use in farming, based on that used on flatlands in Ohio. It suggested that the tile be 3-5 inches, laid in angles across the land, with the smaller tile lining the sides of fields while the larger tiles should be reserved for the ends. The Australasian (16 February 1895, p. 8) advised how tile pipes are laid out in America, depending on the size of the tile and the slope or descent of the land, and the stratigraphy of the soil. The Albury Banner and Wodonga Express (22 October 1897, p. 13) shared advice from an Ohio farmer, who gave 12 reasons as to why land should be tile drained, encouraging its use in Australia. The Darling Downs Gazette (9 July 1898, p. 3), likewise, extolled the virtue of tile drainage on farmland; primarily the advantage this system gives to Australian farmers by ensuring that the land is neither excessively wet, nor excessively dry. The Benalla Standard (19 May 1903, p. 4) shared the virtues of having a good main or outlet for the tile draining system, again using examples from Ohio. The amount of newspaper articles reflects the uptake of tile drainage systems by farmers across Australia. As the Weekly Times (16 November 1901, p. 28) advertised prior to the sale of the 6,000 acres of the Seven Hills Estate, that the drainage was 'naturally very good', suggesting that it was unlikely that tile drainage had been introduced prior to 1901. One of the first specific mentions of underground drains at Seven Hills is of a land sale in 1911 for the property adjoining the Seven Hills Estate Field Tile Drainage System site, in the southeast. The land was being sold after the death of its owner, David Taylor. The property adjoined Pennycuick's and Thomas' properties, and was described as having good drainage due to its underground drains (The Ballarat Star, 22 July 1911, p. 5). To the south of the Seven Hills Pre-emptive Rights allotments, allotments 14, 15 and part of 11 of the Parish of Spring Hill were described as having been much improved by the installation of an extensive underground tile drainage system (Creswick Advertiser, 19 March 1918, p. 3). Additionally, the Seven Hill allotments owned by the Morrish Brothers, who owned the property adjacent to Thomas, was described as comprising 12 paddocks, most of which had 'effective underground drains' (Weekly Times, 6 January 1936, p. 38). While there is no direct documentary evidence as to when the tile drainage was installed within the proposed VHI boundary, this suggests that the allotment in question may have been subject to the installation of a similarly extensive system of tile drainage during the 1910s. The Seven Hills Estate Field Tile Drainage System site itself, being part of the Pennycuick's property, was sold at the end of February 1924. The advertisement in the Ballarat Star (23 February 1924, p. 5), states that 'The whole of the property has been closely drained by underground tile drains, which ensures good crops in the wettest seasons'. As the drainage was described as 'naturally very good' in 1901 (Weekly Times, 16 November 1901, p. 28), it appears that the underground tile drains date to between November 1901 and February 1924, while the Pennycuick family owned the allotment. The 1945 aerial imagery shows that the land comprised a cleared paddock, with several trees dotting the area. There is little difference between the 1945 imagery and recent aerial imagery dating from 2003 to 2021, as seen in Google Earth Pro. As such, it appears that the paddock continued to be farmed throughout the mid-20th Century, with no sign of any buildings having been constructed on the site. Since the 1970s, the Seven Hills Estate Field Tile Drainage System site land, along with some of the nearby allotments on the west side of Creswick-Newstead Road, has been owned by Unigrain (Unigrain 2023). The land is still farmed today, and the tile drainage system appears to be at least partially extant. 'Stone Drains' Additionally, two sites, 'Stone drains constructed by Chinese workers from the nearby Goldfields whilst desperate for work as their prospecting proved unsuccessful' and 'Stone drains constructed by Chinese workers from the goldfields' (these tags being referred to as 'Stone Drains' in this report) were identified from social pinpoint data, and have not been verified through field survey due to land access constraints. There is no description provided in that dataset, other than the aforementioned tags provided by the social pinpoints. These two locations noted in the database are located at Creswick-Newstead Road, Allendale, and 3800 Creswick-Newstead Road, Allendale. The purported locations of the Stone Drains are situated on what was once the Seven Hills station, originally owned by Cecil and Arthur Birch. Leishman's allotment 64 Allotment 64 contains a heritage homestead, Kingston Grange (HO46 / ID 54), which is listed on the Heritage Overlay (HO). John Michael Leishman was a miner and investor, who was one of the shareholders of the Seven Hills Estate (The Argus, 30 September 1901, p. 8). Alfred Thompson Leishman, his brother, purchased at least some of this property from him on 12 October 1909 (Harwood and Pincott 1910); however, the Certificate of Title for the Seven Hills Estate Freehold Company land (volume 2960 folio 91881) shows that Alfred Thompson Leishman became proprietor of allotment 64 on 15 March 1906. John Michael died on 23 November 1909, leaving a

property known as 'Forest Hill' farm to his family, including to his father John Leishman. After John Michael's death, the estate on allotment 64 became known as the 'Lone Hand Estate' (The Ballarat Star, 26 January 1910, p. 1; The Sun News-Pictorial, 7 November 1933, p. 30; Camperdown Chronicle, 20 March 1945, p. 6). After the death of John Leishman in October 1925 (Weekly Times, 10 October 1925, p. 8), the 735 acre Lone Hand property was then passed on to his son (and John Michael's brother), Alfred (Alf) Thompson Leishman (Supreme Court of Victoria 1926). Alfred is believed to have built the late Victorian villa-style farmhouse (Kingston Grange (HO46)), which is extant on the site, during the Leishman family's occupation (Lester Tropman and Associates et al. 1990). The Leishman family used the Lone Hand property primarily for sheep grazing, although 70 to 130 acres of rapeseed were cultivated there annually (Weekly Times, 3 February 1934, p. 46). Alfred died on 19 July 1967 (Find a Grave 2017). A review of the Certificate of Title for allotment 65 and part of allotment 64 of the Parish of Spring Hill (volume 3117 folio 623249) shows that Alfred James Leishman, who was a farmer in Kingston, became proprietor of the property on 12 November 1969. After Alfred James' death on 6 February 1977, his wife, Lindsey Olive Leishman, became proprietor on 29 August 1978. After she died on 14 October 1982, the Certificate of Title details that letters of administration of her estate were granted to James Norman Leishman of Barooga, who was also a farmer of Kingston. The Certificate of Title was cancelled on 16 February 1984, and the land subdivided and part of the land appropriated for drainage easements. While there are no available land records describing property, or the drainage systems found within it, the 1870s mining map shows that this property would likely have been affected by water during wet seasons, requiring drainage. The Leishman family were aware of the use of underground drains for such purposes, John Leishman having been one of the judges who awarded best managed farms under 100 acres to three farmers in 1875. This included James Talent who drained stagnant water from his farm through the construction of underground drains; the drains were described as being between 3-4 foot in depth, with an open channel below the drains, filled with rubble to 14 inches of the surface (The Australasian, 9 January 1875, p. 24). As such, the Leishman family would have been aware of the use of tile drainage technology in draining fields prone to being waterlogged. The 1945 aerial imagery shows that Leishman's Lone Hand Estate property was comprised of generally flat, cleared land to the east of a small offshoot of Birch Creek, with the extant homestead in the southeast corner of the property within a small section of land surrounded by windrows. There are two east/west aligned features visible, which may be ditches, running adjacent to the road corridor in the south, and along the middle of the property from the northern windrow, towards the small waterway. The nature of these possible ditches is not clear from the historical aerial imagery. There is little difference between the 1945 imagery and recent aerial imagery dating from 2003 to 2021, as seen in Google Earth Pro, although two additional smaller buildings are present within the property, one to the north of the homestead building and one to the south. The southern building comprises a cottage, while the northern one is a pavilion for a cricket ground, which is also visible in the 2003 aerial imagery. The fence lines of animal pens are also visible, southwest of the homestead. A new building was built to the northeast of the pens by 2009, but otherwise the property remains relatively unchanged. The ditch features from the 1945 aerial imagery are difficult to identify, but a dam is present by 2003 immediately adjacent to the northern ditch alignment. The property was described during a 2020 sale as having 'a beautiful homestead circa 1890 of the gold mining era on approx. 20 acres with fenced paddocks and dam included' with 'its own underground spring water supply'. However, there was no mention of any water drainage features (Buxton 2019). Pennycuick's allotment E According to The Ballarat Star (27 May 1878, p. 4; 3 June 1880, p. 4), Alexander Pennycuick (Pennycuick) appears to have been a pound keeper for the Shire of Creswick between 1878 and 1880, where he dealt with cattle and other livestock. He was likely stationed at the pound to the south of Smeaton. His two purchases from the Seven Hills Estate Company comprised approximately 247 acres of land. Pennycuick farmed the land until his death in 1914 (The Argus, 25 August 1914, p. 9). A review of the Certificate of Title for allotment D of the Parish of Spring Hill (volume 3223 folio 644470) shows that Alexander and David Little Pennycuick, became proprietors of allotments D and E on 8 July 1907. David, Alexander's son, was also a farmer, and was named as the sole executor of his will (The Argus, 25 August 1914, p. 9; 5 September 1914). Pennycuick's grant of probate describes his real estate as comprising the 105-acre Section 64 of the Parish of Spring Hill, along with Portions D and E of the Parish of Spring Hill. Portions D and E were part of the Seven Hills homestead block. He also had 130 acres of crops, including wheat, oats and peas, livestock, farming implements, and other equipment (Long 1914a). In his will, he bequeathed all of his real estate and personal estate to his daughter, Alexandra, and his son, David, in equal shares as tenants in common; his son was also to act as trustee (Long 1914b). He was buried at Smeaton Cemetery (Creswick Advertiser, 1 September 1914, p. 3). His other daughter, Mrs D McKenzie, was not noted in the will (Long 1914b). The Certificates of Title for allotment D and E (volume 3223 folio 644470) confirms that the two allotments were transferred together to David and Alexandra Pennycuick on 29 June 1915. David Pennycuick, who died at Melbourne General Hospital on 1 October 1923 (The Ballarat Star, 2 October 1923, p. 4). On David's death, his daughter, Alexandra Jane Pennycuick, was made sole executrix of his will (The Argus, 15 October 1923, p. 3). The Certificate of Title for allotment D and E (volume 3909 folio 781705) show that the properties were transferred to Alexandra as executrix of his will on 21 June 1924. Alexandra Jane determined to sell 360 acres of her father's property between Smeaton and Kingston, which

appears to have included the Seven Hills Estate land (The Ballarat Star, 23 February 1924, p. 2; 29 February 1924, p. 3). The land, prior to the sale, was described as being conveniently subdivided into seven paddocks by sheep proof fencing, practically free of any noxious weeds, with buildings including a substantial 8-roomed brick dwelling, woolshed, stable and chaff-house, wagon shed, implement shed, blacksmith's shop, and motor garage. The water supply was 'laid on to yard and tanks from a reservoir in the paddock and forced by a large windmill to tanks at the house, besides which Birch's Creek supplies the northern end of the property, and four large tanks catch rainwater from the buildings' (The Ballarat Star, 16 February 1924, p. 5). The Certificate of Title for allotment D and E (volume 4871 folio 144) shows that the two allotments were transferred from Alexandra Pennycuick to William Henry May on 13 March 1925. After his death on 12 November 1949, it was eventually transferred on 12 December 1951 to Andrew Charles May of Grassmere, Smeaton, who was noted as being a farmer and grazier. After Andrew Charles' death on 29 December 1966, the properties were transferred to Ada Annie May of Grassmere, his widow, and Alexander Frederick Toose, who was a farmer and grazier from Smeaton, on 21 May 1968. Subsequently, Brian William May, also of Grassmere, became proprietor of both properties on 28 February 2001. Pennycuick's properties were sold at the end of February 1924. The advertisement in the Ballarat Star (23 February 1924, p. 5), states that 'The whole of the property has been closely drained by underground tile drains, which ensures good crops in the wettest seasons'. As the drainage was described as 'naturally very good' in 1901 (Weekly Times, 16 November 1901, p. 28), it appears that the underground tile drains date to between November 1901 and February 1924, while the Pennycuick family owned the allotment. The 1945 aerial imagery shows that Pennycuick's land comprised several cleared paddocks, with windrows around the edge of the paddocks on the west side of allotment E, and several trees dotting the remaining area. There is no evidence of any surface drains within this property. There is little difference between the 1945 imagery and recent aerial imagery dating from 2003 to 2021, as seen in Google Earth Pro, although some of the windrows have died or been removed along the north and east boundaries of the paddocks. As such, it appears that the land continued to be farmed throughout the mid-20th Century, with no sign of any buildings having been constructed on the site. Since the 1970s, this property, along with some of the nearby allotments on the west side of Creswick-Newstead Road, has been owned by Unigrain (Unigrain 2023). The land is still farmed today, and the tile drainage system appears to be at least partially extant to the south of allotment E (on allotment D). Although it may be possible that Chinese labourers could have been hired to build stone drains, there is evidence of an alternative drainage system in paddocks adjacent to the Stone Drains sites. Based on the comprehensive historical research presented, the Stone Drains cannot be linked to any known instances of Chinese workers constructing them during, or after, the Creswick goldrush period. Therefore, these two Stone Drains sites are most likely associated with the Seven Hills Estate Field Tile Drainage System site on allotment D of the Parish of Spring Hill, which is on the allotment immediately south of allotment E and directly across the road from allotment 64 in the east. While the presence of tile drainage cannot be confirmed on Leishman's allotment, the presence of the subsurface drainage system on Pennycuick's property most likely would have been applied to all of his holdings where the land was waterlogged. This is also a strong probability for the Leishman property, given the close proximity to the Pennycuick allotment, and the knowledge that Leishman would have had about the technology. As such, the Stone Drains sites should be included as part of the Seven Hills Estate Field Tile Drainage System site VHI archaeological assessment. The Seven Hills Estate Field Tile Drainage System, assessed as part of the Historical Heritage Impact Assessment for the current project, has now been updated to include reference to the features initially identified as 'Stone Drains Constructed by Chinese Workers from the Goldfields, Allendale', but assessed here as being later underground drainage.

This place/object may be included in the Victorian Heritage Register pursuant to the Heritage Act 2017. Check the Victorian Heritage Database, selecting 'Heritage Victoria' as the place source.

For further details about Heritage Overlay places, contact the relevant local council or go to Planning Schemes Online <http://planningschemes.dpcd.vic.gov.au/>