[DRAFT: Inclusive of changes requested by RHNaturalists]

THE CORPORATION OF THE TOWN OF RICHMOND HILL

DRAFT BY-LAW **NO. 100-09**

A By-law to Authorize the Designation of
123 Hillsview Drive
& 350 16th Avenue
David Dunlap Memorial Observatory Lands under the
Ontario Heritage Act

WHEREAS Section 29 of the *Ontario Heritage Act, R.S.O. 1990, c.O.18, as amended,* authorizes the Council of a municipality to enact by-laws to designate real property to be of cultural heritage value or interest;

AND WHEREAS the Council of The Corporation of the Town of Richmond Hill has caused to be served on the owners of the lands and premises known as 123 Hillsview Drive & 350 16th Avenue, Richmond Hill, the David Dunlap Memorial Observatory Lands and upon the Ontario Heritage Trust, notice of intention to so designate the aforesaid real property and has caused such notice of intention to be published in a newspaper having general circulation in the municipality;

NOW THEREFORE THE COUNCIL OF THE CORPORATION OF THE TOWN OF RICHMOND HILL ENACTS AS FOLLOWS:

1. That the real property located at 123 Hillsview Drive & 350 16th Avenue, being Part of Lots 41, 42 and 43, Concession 1, (formerly Township of Markham), more specifically described as Parts 1, 2 and 3 on Plan 65R-29959, Town of Richmond Hill, Regional Municipality of York and is hereby designated under Part IV of the *Ontario Heritage Act*, *R.S.O. 1990., Chapter O.18, as amended,* as being of cultural heritage value or interest.

2. That the Clerk is hereby authorized to cause a copy of the By-law, together with a statement explaining the cultural heritage value or interest of the property and a description of the heritage attributes of the property to be served on the owner of the property and on the Trust, and publish a notice of the By-law in a newspaper having general circulation in the municipality.

3. That the Town Solicitor is hereby authorized to cause a copy of this By-law to be registered against the property in the Land Registry Office.

4. Schedules "A" and "B" and “C” attached to By-law No. 100-09 are declared to form a part of this By-law.

READ A FIRST AND SECOND TIME THIS 14TH DAY OF SEPTEMBER, 2009

READ A THIRD TIME AND PASSED THIS 14TH DAY OF SEPTEMBER, 2009

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Mayor

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Clerk

SCHEDULE "A" TO BY-LAW NO. 100-09

REASONS FOR DESIGNATION
DAVID DUNLAP MEMORIAL OBSERVATORY LANDS
123 Hillsview Drive
& 350 16th Avenue

1. Description of Property

The Property comprises Parts of Lots 41, 42 and 43, Concession 1, former Township of Markham, more specifically described as Parts 1, 2, and 3 on Plan 65R-29959, with the municipal addresses of 123 Hillsview Drive and 350 16th Avenue in the Town of Richmond Hill. The Property is known as The David Dunlap Memorial Observatory Lands.

The heritage designation applies to a **Cultural Heritage Landscape (CHL)** on a portion of the Property extending from Hillsview Drive in the north to the boundary of Lot 41 at 16th Avenue to the south and from the CNR tracks in the west to a surveyed line located 150 metres to the east of the easternmost plots of the University of Toronto's former research tree plantation as shown on Schedule " B" to the By-law. This area encompasses a wide range of important cultural resources. Principally these include: the Great Telescope Dome and telescope, the Administration Building; *Elms Lea* (also known as Observatory House); the Radio Equipment Shack and antennae field; the natural topographic rise and earthwork enhancements in the area of the Great Telescope Dome; the designed landscaping associated with the Administration Building, its observing lawn, ceremonial tree plantings and its north entry road, Donalda Drive; the vestigial landscape elements, plantings and Observatory Lane associated with *Elms Lea* and the University of Toronto's Department of Forestry's research tree plantations, which were a legal requirement of the donor's bequest (see land registry document, MA20384) and sheltered and supported the proper astronomical operation of the telescope and the site.

2. Statement of Cultural Value

It is recognized that the heritage attributes expressing physical/design values; cultural attributes expressing associative/historical values; and cultural attributes/relationships expressing contextual values, of the David Dunlap Memorial Observatory Lands, are considered of equal importance and weight.

(a) Summary

The David Dunlap Observatory (DDO) is a place of high cultural value manifest at all recognized local, provincial, national and international categories associated with heritage significance. Its cultural heritage landscape is comprised of a 19th century farmstead overlain with the University of Toronto's remarkable astronomical research campus, conceived as well as a memorial to the husband of the facility's donor and patron, Jessie Donalda Dunlap. The three major structures within this landscape each exhibit a particularly high quality of design and use of materials – *Elms Lea* as an builder designed 19th century farmhouse, the Great Telescope Dome manifesting leading edge functional innovation as

the envelope for the great telescope, and Administration Building – combining the ceremonial and scientific in a profoundly unique form of period Beaux-Arts architecture. The building interiors each have outstanding features, such as the 74" optical telescope, largest in the Commonwealth when installed, within the Great Telescope Dome, and the raison d'etre of the site; the first floor plan of the Administration Building with the main building axis set to the cardinal points, which intersect at the memorial at its core; and the main winder stair at *Elms Lea* which appears to be almost floating. The site has formidable historical associations ranging from the locally significant Loyalist Marsh family, to the rise of astronomical research at the University of Toronto (and Canada generally) and culminating with important contributions to the world's understanding of astronomy and astrophysics.

(b) The Cultural Heritage Landscape

The David Dunlap Memorial Observatory Site is a complex cultural heritage landscape comprised of the overlay of a 20th century state of the art astronomical observatory on a 19th century Loyalist settler farmscape. The first of these two major layers or themes of the site, is that associated with the farmstead of Alexander Marsh. Marsh, the grandson of British Loyalist settler Robert Marsh, inherited Lot 42, Concession 1, Markham Township, from his grandfather in 1852 and established a prosperous farm there (as well as on the adjacent Lot 17, Concession II, to the east), through the second half of the 19th century. His farmstead came to include some 380 acres, three houses, and seven barns and/or stables. The Marsh homestead was purchased from original land patentee Thomas Lyons in 1802. The first frame house built on site, is now believed to have been located where the Great Telescope Dome stands. Alexander Marsh replaced this structure in (circa) 1864 with a new custom-designed home for his family. This fine dichromatic brick house, which came to be known as *Elms Lea*, brought together eclectic influences in a picturesque composition. Sited on a rise deep within the property reached by a long lane from Yonge Street and screened by a stand of spruce, and hickory, later becoming the residence of Dr. C.A. Chant, and after his death in 1956, subsequent directors of the DDO.

The second layer/theme grew out of the dream of Dr. C.A. Chant, often referred to as 'the father of Canadian astronomy.' Born to a noted Markham Township family, Chant recognized in a local high point of land, just southeast of the village of Richmond Hill, the potential site for a world-class astronomical observatory. This dream was realized through the support of Jessie Donalda Dunlap, whose husband had been dedicated to Chant's vision prior to his death. Since its establishment in 1933, the David Dunlap Memorial Observatory has been the site of much important astronomical research, including several ground breaking discoveries; the cornerstone of astronomical education for generations of University of Toronto students; visits by school children and inquiring public; and the site of pioneering efforts in Radio Astronomy, spearheaded by the late Dr. Donald MacRae, also a DDO director.

The initial purchase of property, encompassing part Lot 42 and the south half of Lot 43, was originally selected as the Observatory site for its topography – a pronounced rise relative to the surrounding area, rural dark skies and relative accessibility to the University. Major earthwork further enhanced the natural knoll selected for the Observatory creating a podium-like plateau. The circular observatory structure was designed and prefabricated in Great Britain by leading scientific instrument maker, Sir Howard Grubb, Parsons & Co., to house the 74" optical telescope, largest in the British Empire at that time. The telescope, with its 5,000 pound mirror,

is supported by the great pier, the concrete core of the building, constructed prior to the arrival and erection of the building shell in 1933. The large copper dome is built to rotate 360 degrees, and there is a 15' section of main observing shutters which retracts for siting and use of the telescope. The Administration Building, designed by Mathers & Haldenby, is a particularly fine example of Beaux-Arts classicism, which also incorporates three copper observatory domes. The siting of the two structures, was driven by the required positioning of the telescope, in direct alignment with the star Polaris, the true celestial north. The formal placement of the buildings on this north-south axis, or in sympathy next to it, compliments the directional theme of cardinal compass points. This formalized design, along with ornamental landscaping originally intended for the site, served to heighten the key approach to the Observatory from the south. The realization of this concept was only achieved in a modified form, with the landscape improvements of 1959 which featured an elliptical island within the new driveway, designed such that symbols within the paving, the bronze sundial and the pedestrian path through the island expressed Johannes Kepler's Second Law of (planetary) Motion. Also in the 1950s, the Radio Astronomy program was established with re-use of a National Defense wartime test building, modified to serve as a Radio Equipment Shack, the world's first radio observatory with a metal pyramidal horn, zig-zag parabolic, cylindrical-parabolic antennae and mutil-element arrays, directly east of the Administration Building.

Although part Lots 42 (1928) and 43 (1932) were originally purchased for the Observatory, the donor, astronomer Chant and the University, were concerned with the improved safety and greater security a private southern entrance would afford the site. In 1932, Dr. Chant attempted to secure Part Lot 41, as such an entrance off 16th Avenue, and it took 18 years before this 1950 purchase of a 'Panhandle' of 12.129 acres was made completing the original conception of the Observatory site (see description in MA28751). However, this southern entrance was never constructed, in favour of the less costly maintenance of a private entrance off Hillsview Drive.

In the early 1960s a new approach road from Hillsview Drive was established, its curvilinear form intended to ensure that the Observatory not be affected by the headlights of approaching cars. The new road was named Donalda Drive, the middle name of the site's great patron. In this period too the University of Toronto Forestry Department undertook a series of research tree plantings featuring both native and exotic species. Planted in rows formed of approximately square individual plots, their general alignment again followed the north-south axis orientation fundamental to all aspects of the layout of this property.

At its opening in May 1935, attended by (future and fourth term) Prime Minister Mackenzie King, the David Dunlap Memorial Observatory was proclaimed "a gift to science all over the world" and the Royal Train carrying King George VI and consort Queen Elizabeth (Bowes-Lyon) stopped in acknowledgement of the importance of the site during their visit of 1939.

Achievements directly associated with the Observatory, such as Dr. Helen Hogg's work on variable stars in globular clusters and Dr. C.T. Bolton's investigation and confirmation of the first stellar mass black hole, known as Cygnus X-1, as well as the determination of the absolute flux density of Cas A at 320 MHz through radio astronomy, (the first-time measurement of a radio signal from a point in deep space – Cas A– emitting a radio frequency at 320 MHz), have indeed significantly contributed to our understanding of the Universe.

Important internationally for the research it has produced it is also a local landmark to the suburban community, which grew up around it.

(3) *Description of Heritage Attributes*

The following are the heritage attributes, which express the physical/design value of the Property. The importance and complexity of a number of these elements, particularly the three main buildings (each worthy of Section 29 Designation in their own right) has dictated a form whereby they are included at the 'macro' level as attributes of the general site but then the features which define the heritage character of each of these main elements is also further broken down, forming, in essence, a subset of heritage attributes:

(a) the siting of the Great Telescope Dome and Administration Building at the highest local elevation, enhanced and modified to a 'podium' form by significant earthworks for the placement of the buildings.

(b) the laying out of the site to follow the north-south axis with the Great Telescope Dome as due north and the Administration Building due east. This directional emphasis of remained an essential design determinant for site layout from the conception of the Observatory, [1] and extended throughout most major elements of the site. These directional compass values are carried into the interior plan of the Administration Building *(see below),* the siting of the Radio Equipment Shack, the location of the elliptical driveway and island with north-south pedestrian walkway through its centre and sundial its southern end, the placement of the flag pole, the orientation of the rows of the University's Department of Forestry's research tree plantations.

(c) *Elms Lea* c.1864, the picturesque dichromatic brick farmhouse originally designed for Alexander Marsh. While subject to several renovations including those of Mathers & Haldenby in 1933, and minor additions associated with its use within the DDO complex, which included construction of a garage, the original exterior appearance is largely intact and the interior plan remains legible. It is an eclectic expression combining elements of Classical, Gothic Revival and Italianate derivation in a well-integrated composition of 1933.

(d) the Great Telescope Dome, 61' in diameter, designed by Sir Howard Grubb, Parsons & Co., England and built to house the 74" telescope, second largest in the world in 1935 and first use of pyrex glass produced by Corning Glass Works, New York for the 5,000 pound primary mirror, with rotation copper dome incorporating retractable shutters for astronomical viewing. The building expresses the Machine Age aesthetic of the period, the building being an 'envelope' for the instrument and its function. The DDO 74" reflecting telescope, still the largest optical telescope in the country, is one of Canada's most

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[1] The north-south axial emphasis continued into the 1980s reflected in the last component added to the property, the Town designed David Dunlap Observatory Park and Elvis Stojko Arena (originally called Observatory Arena) on what has become known as the 'Panhandle' (described as Parts 2 and 3 on Plan 65R-29959).

significant scientific artifacts, as well as continuing to be a viable instrument for astronomical research and observation. A leading edge technical achievement at the global level upon its fabrication, much innovative design went into its housing and support allowing for its rotation and the cleaning and re-aluminizing of its primary mirror. Most of the apparatus and associated electrical system for these operations remains original (with some replacement parts) and these are representative of the high level of significance of the telescope itself.

Key heritage attributes of the exterior of the Great Telescope Dome include:

- the circular form broken only by the entrance vestibule and observers door, both facing due south;
- the hemispherical dome clad in flat seam copper panels;
- the galvanized metal cladding of the walls and the 'rhythm' created by the regular spacing of pilasters and louvered shutters;
- the symmetry of the façade;
- the beveled base into which the pilasters terminate;
- the network of steel stairs and 'catwalks';
- the double leaved metal clad paneled entrance doors with molded surround and transom with tripartite geometric pattern;
- the retractable main observing shutters.

Within this structure form, material and function are virtually indivisible. Thus all aspects of the interior are included, highlighted by, but not restricted to:

- the semi-circular corridor formed around the service core at the first floor with galvanized metal wall cladding;
- the multi-pane steel sash (louvered shutters on exterior);
- the terrazzo entrance and observing floors;
- the interior stair and 'catwalk' system';
- the movable wooden and metal observer's ladders and step-stools;
- the early 19th century wooden desk, press-back chair and metal lamp on the observing floor;
- the apparatus associated with the operation and/or rotation of the dome and opening of the main observing shutters including the cable pulley system;
- the carriage/elevator and all associated components such as the vacuum chamber, floor hatch and pulley system associated with the mirror cleaning/re-aluminizing process;
- the original fire suppression system;
- the electrical system with predominate original wiring;

As the main scientific and cultural artifact of the DDO site, the 74" optical telescope includes the following components as heritage attributes, but are not restricted to:

- the concrete support piers (formed independently from the building itself);
- English-style polar mounting on permanent piers;
- the main metal telescope tube & truss;
- the right-ascension and declination setting circle apparatus associated with the operation of the telescope;
- paraboloid 76" primary mirror;

- hyperboloid secondary mirror;
- flat inclined secondary mirror;
- clock drive with AC motor and DC motors;
- electronic encoders;
- computer-controlled optical rack;
- telescopes attached to reflector telescope:
    - two 4-inch finder telescopes;
    - one 6-inch finder telescope with electronic camera;
- one 10-inch auxiliary telescope;
- Dall-Kirkham heirloom optics;
- instrumentation attached to reflector telescope:
    - laser and attachments for collimation;
    - Hartmann mask for primary mirror;
    - Cassegrain-focus grating spectrograph, with liquid-nitrogen dewar,
    - Horiba (Jobin-Yvon) charge-coupled-device (CCD) camera
    - echelle spectrograph, with CCD camera, and associated slit-inspecting guide camera
    - guide camera
    - diffraction gratings
    - spectroscopy slits
    - visitors' eyepieces
- instrumentation not attached to reflector telescope;
    - original prism spectrograph (c. 1935)

(e) the Administration Building, a prototypical example of Beaux-Arts classicism rendered masterfully in stone and incorporating three copper observatory domes. The Administration Building is a major architectural achievement. Architects Mathers & Haldenby successfully combined an eloquent memorial to the patron's husband, David Dunlap, with a functional administrative and research facility supporting the astronomical observatory. Literally at its core, the building integrates the sacred and the scientific, bringing the north-south axis orientation of the site into the interior where, directly in line with the main entrance, at the termination of the building's eastern axis, accessed across the floor inlaid compass rose of cardinal points, through a monumental, temple-like double height space and then through a pilastered arch, resides the memorial to David Dunlap. The memorial incised and gold-leafed into a panel at the marble wall, bench and up-lighting is at the centre of the cross hall. At the cross halls the ceremonial space is further defined by fluted pilasters. Throughout this area both wall and floor finishes are marble and the ceilings arched. Around this sacred core and the highly articulated library, a functional lay-out of offices, walk-in vault, kitchen, glass plate library, laboratories (photographic, electronic) and support services (metal shop, wood shop) was arranged. Use of space is also further defined in first floor offices by interoffice doors in which separate public and work areas.

Key heritage attributes of the exterior of the Administration Building include:

- the classical Beaux-Arts symmetrical form and footprint;
- the five bay main block with projecting central pavilion and angled side pavilions;
- the focal treatment of the centre bay incorporating semi-circular main entrance portico with Corinthian columns and Tuscan pilasters, approached via stone steps, Palladian window (with molded architrave and keystone), balcony with wrought iron railing, stepped (up) and splayed section of stone parapet incorporating stone balustrade and urns surmounted by the largest

dome placed in symmetrical relationship with the smaller domes of the side pavilions;
- the wall treatment combining sandstone and limestone and contrasting the texture of the rock faced general coursing with cut stone accents (including quoins, stringcourses, parapet copings, window and door surrounds) and carved elements (including panels with swag and floral patera at the stone parapets, freestanding urns surmounting the central dome parapet, balusters at the central dome parapet;
- Corinthian columns at the front portico including circular dentillated entablature with fluted frieze and floral patera above each of the column capitals;
- the main entrance treatment consisting of a wide door of six fielded panels (with original hardware), with both wood and stone surrounds. The wood surround includes fluted pilasters and architrave featuring 'the lamp of knowledge' in relief as its central motif and floral emblem at its raised corners. The stone surround is in the form of a molded architrave;
- concrete accent planters at entrance;
- low level cowled lighting;
- The window treatment typically incorporating a stone apron panel with bas relief floral patera at second storey. The multi-pane window sash typically 12/8 at second storey and 12/12 at ground storey. Oculus windows with broached stone voussoirs at side pavilions and centre bay of rear elevation;
- the domes clad in flat seam copper panels;
- the symmetrical nine bay rear elevation;
- the side entrances each featuring a door with six fielded panels (with original hardware and paint), stone sill and molded architrave, with semi-circular fanlight above, approached via stone steps and landing with curved wrought iron rail with newel set into 'return' of first step.

Key heritage attributes of the interior of the Administration Building include:

- the symmetrical Beaux-Arts footprint and floor plan;
- the true cardinal point orientation of the halls and straight-line relationship between the main entrance and the memorial wall;
- the open two storey volume of the main hall and mezzanine with groin vaulted ceiling featuring the marble stair with swan necked bronze rail, tapered newels and alternating baluster types accented with floral motifs at every second baluster;
- the relationship of the main stair landing to the Palladian window with fluted marble colonnade surround;
- the chamfered marble cladding and flooring of the hall;
- the compass rose of cardinal points in coloured marble inlaid in the marble floor;
- the lantern-type light fixture suspended from the apex of the cross vault;
- the patterned cast bronze vent covers;
- the Greek key pattern in marble carried around the Hall at second storey floor level;
- the unifying use of decoration in marble, wood and bronze including the patera (spiral disc) and the stylized floral patera carried from the exterior;
- the pilastered entry to the memorial space at the centre of the cross hall from the north, south and west;
- the fine jointed marble wall cladding and marble flooring of the dedication area;
- the marble memorial bench and sub-floor up lights;

- the incised and gold-leafed dedication panel with red marble border;
- the terrazzo flooring and brick wall finish at the remaining sections of the cross hall;
- the barrel vaulted ceiling of the cross hall;
- the original entrances to the rooms off the cross hall with transoms above the door openings;
- the bronze framed panels along the walls of the cross hall designed to display astronomical photos illuminated with back-lighting;
- the acorn light fixtures in the cross halls and Lecture Room;
- all the finishes and features of the library including: the plastered cornice, frieze with dentillation and fluting accented by a raised floral motif, pilastered fireplace surround with dentillated mantel and black marble at the firebox face and hearth, the andirons, the paneled walls, built-in book shelves and display cabinet, the doors composed of three major panels with the top and bottom panels decorated with a patera (spiral disc motif) and architraves with gold leafed urn motif accenting the corners, the two original suspended bronze chandeliers;
- the movable wooden and library ladders;
- the movable ladders attached to the wooden book cabinets;
- the original raised dais, slate chalkboard in the Lecture Room;
- the typical door type of six 'frosted' lights above two panels, simple wood entablature (from office side), patera centred on the lower panel and original bronze hardware;
- the parquet flooring of the offices and library (which matches the main hall flooring of Elms Lea, as designed by architects, Mathers & Haldenby);
- the colonnade treatment which defines the mezzanine area with plaster wall finish between;
- the doors with two large panels, each with patera at the bathroom entry;
- marble stalls and terrazzo floors in the bathrooms;
- the Donor's Room, originally the office/reception space of Jessie Dunlap, finished with a marble fireplace with molded and dentillated wood surround, molded chair rail, base plaster cornice and parquet floors;
- the original built-in wood cabinets at the technical and shop areas including the photo laboratory, the metal shop and kitchen;
- the observatory domes including: their pulley rotation and shutter retraction systems; the 24" c. 1960 telescope in the center dome and most particularly the 19" telescope built in 1929 by C. A. Chant's astronomical colleague at University of Toronto, Dr. Reynold K. Young, later the first Director of the DDO.

(f) *Elms Lea,* the 19th century farmhouse,

Key heritage attributes of the exterior of *Elms Lea* include:

- the three bay symmetrical façade;
- the 'T' plan with original kitchen 'tail';
- the side gabled roof with relatively steeply pitched centre gable;
- the bracketed eave at the façade, eave returns and verges with distinctive pendant bracket;
- the dichromatic brick chimneys;
- the dichromatic brickwork with buff brick accent detailing which include: quoins; stringcourses; arches; decorative reflecting of brackets in brickwork and cross pattern with margins at gables;

- the Flemish bond coursing pattern at the façade and the complex cambered (flat) arches in red brick;
- the original doors with hardware;
- the front door balcony;
- the treatment of openings including: the quarter round windows with quarter fanlights at the gables; the 6/6 small pane wood sash; the French doors flanking the center bay of the façade; the prominence given to the openings of the centre bay including the main entrance with transom (with distinctive lancet light divisions) and sidelights and the semi-circularly arched opening containing French doors at the balcony which breaks the eaves at the centre gable;
- original porches and sunroom;
- the rear two storey gable roofed 'tail' with dichromatic brickwork and voussoired cambered (flat) arches at the window openings;

Key heritage attributes of the interior of *Elms Lea* include:

- the centre hall plan;
- the grand winder stair and balustrade at main hall. The curved rail and soffit of the main stair create a spiraling, floating effect within the space;
- the plaster paterae featuring acanthus leaves in main hall and north reception room;
- the original chandelier in main floor hall way;
- the original, electrified 1860s wall sconce;
- the bracketed second floor door arch and decorative plaster scroll supports;
- the high wood base boards throughout;
- the molded doors and window architraves;
- the remaining four panel doors;
- the original wood fireplace surrounds at the north reception room and 'tail' with c. 1935 fireboxes and hearths;
- the original building envelope and fireplace constructed of bricks taken from German Mills Creek banks;
- the tile floor, tiled dado and molded tile dado cap at 'master bathroom';
- the original maple flooring cut from trees on the property, and parquet flooring in the main first floor hall installed by Mathers & Haldenby to match those of offices and library in the Administration Building;
- the built-in basement cabinets;
- the king post truss roof structure of the main roof, cut from trees existent on the property.

(g) The garage of *Elms Lea,* constructed in 1933, replicating the 19th century architectural style of *Elms Lea*,

Key heritage attributes of the exterior of the garage include:

- the dichromatic brickwork;
- the high pitched roof line;
- the brick chimney;
- the triple bay entry doors;
- the original entry door and wood nine pane casement windows.

(h) the Radio Observatory, the Radio Equipment Shack and antennae field.

Key heritage attributes of the exterior of the Radio Equipment Shack include:

- the original pre-formed corrugated asbestos siding and roof shingles;
- the original decorative roof ridge line;
- the up-turned eaves;
- the original projecting entrance and lighting;
- the original doors;
- the original windows.

Key heritage attributes of the exterior of the Radio Equipment Shack include:

- the original paneled walls;
- the original cabinetry and work benches.

Key heritage attributes of the antenna field include:

- the original blue metal radio tower and antenna;
- the original concrete and metal antenna footings.

(i) the Water Pump House,

Key heritage attributes of the exterior of the Pump House include:

- the compact utilitarian brick form;
- the staggered roof line;
- the original entrance door and lintel;
- the original window;
- dedicated service driveway;
- the safety fence line.

Key heritage attributes of the interior of the Pump House include:

- the workings of the pump and water well head.

(j) the Observing Lawn with adjacent to the Administration Building and Great Telescope Dome, the concrete telescope piers and aluminum lock plates, the ceremonial plantings of Mulock Oaks, the arboretum sheltering the Observing Lawn, Great Telescope Dome and the Administration Building.

(k) the elliptical island within the driveway with paving designed to represent Kepler's Second Law of Motion and the astronomer's walkway following the north-south axis through the sundial (designed by Dr. Chant in 1928) to Great Telescope Dome. The island along with the curved hedge, flagpole, cowled lighting, concrete planters, and plantings around the Administration Building represent a 1950s attempt to realize something of the grand scheme originally envisaged for the site and continued the north-south orientation established from the outset.

The following are the cultural attributes which express the associative/historical values of the Property:

(a) landscape features such as the former lane to Yonge street (formerly known as Observatory Lane), the line of mature larch and spruce which screen *Elms Lea*, the vestigial orchard to the southeast of the house, the row of hickories between the house yard and the field, the line of maples to the north of the lane and the old field pattern with internal hedgerows which, along with *Elms Lea* and below ground archeological resources, represent the 19th century Marsh farmstead era of the property;

(b) the whole of the property itself, its purchase and the 8-year collaborative planning process between Jessie Dunlap and Dr. Chant which transitioned the bequest of a 19th century farmscape into a memorial and 20th century astronomy campus;

(c) *Elms Lea*, c. 1864, the Alexander Marsh family residence throughout the latter half of the 19th century, which, with the transformation of the site into the DDO in 1935, became Observatory House, the former home of Dr. C.A. Chant, 'the father of Canadian Astronomy' and the visionary behind the creation of the DDO;

(d) the Great Telescope Dome from which major astrophysical discoveries of international importance were made including Dr. Helen Hogg's work on variable stars in globular clusters, and Dr. C.T. Bolton's investigation and confirmation of Cygnus X-1, as a stellar mass black hole. The Great Telescope Dome and especially the telescope, also represents an important period in the development of astronomy in Canada and particularly at the University of Toronto – a period in which astronomy grew from its infancy as a faculty to where major world class discoveries were being made, the best known of which being
Cygnus X-1;

(e) the Radio Equipment Shack (and antennae), previously a Canadian WWII defense research site testing mine sweeping, and subsequently, the world's first radio astronomy observatory, where Dr. Donald McRae, discovered and determined the absolute flux density Cas A at 320 MHz;

(f) the original components which comprised the DDO at its initiation/dedication in 1935 – known as Great Telescope Dome, Administration Building and Observatory House *(Elms Lea).* This event was considered of national importance and indeed throughout the British Empire, (attended by the future fourth term Prime Minister, heard via real-time radio broadcasting, and internationally via re-broadcast and talking movie news reels);

(g) the complex overall land pattern within the indentified area (see map overlay on photo, Schedule "C". Comprised of the original survey grid field pattern overlain with the formal geometry of the Beaux Arts observatory core and the curvilinear road network containing all fields, lawns and plantings;

(h) the bequest and purchase of the 12.129-acre 'Panhandle' of land by Dr. Chant in 1950, to complete Jessie Donalda Dunlap's vision of the Observatory with a private south entrance;

(i) Donalda Drive, the curvilinear 'new' approach road named to commemorate the Observatory's patron Jessie Donalda Dunlap;

(j) the 1959 installation of the elliptical driveway, sundial, parking lot, landscaping and purchase of new trees for the arboretum from the 1956 bequest of Dr. Chant;

(k) the research tree plantations – the David Dunlap Arboretum – designed by University of Toronto's Department of Forestry and physically planted by forestry students, Observatory staff, local residents and service groups, in accordance with the legal requirements of the donation and support of proper operations of the telescope and shelter the site;

(l) the Pump House, the building ensuring the self-sufficient operation of the Observatory with water and fire prevention, prior to provision of municipal services.

The following are the cultural attributes/relationships which express the contextual values of the Property:

(a) as a result of the Observatory's early insertion into the then rural landscape, the manner in which the Town altered its urban plan, subdivisions and public lighting, its unique function and associated architecture, as well as its international reputation, the site is a landmark;

(b) the traditional views to the west (towards Yonge Street) from *Elms Lea* and the Administration Building and the views to the Great Telescope Dome and the Administration Building from the west (through now partially obscured by mature trees) reflecting the visual prominence of the structures sited at (the Great Telescope Dome, the Administration Building) on the top of this knoll or near *Elms Lea*;

(c) the views from the south to the Great Telescope Dome, particularly along the direct north-south axis (see description in MA28751 and MA42509), which was carried into the Town's design of David Dunlap Observatory Park on the leased 'Panhandle' lands (see description in R401645), reflecting its visual prominence having been sited at the top of the knoll;

(d) the research tree plantations (David Dunlap Arboretum), planted to replicate the north-south axis orientation of the site;

(e) the Water Pump House, and the traditional relationship of the Observatory to Bayview Avenue;

(f) the form of the Town designed David Dunlap Observatory Park, sub-divisions and adjacent arena and school buildings to the south reflecting the influence of the Observatory and its site design principles (the lands originally having been surveyed to provide an approach to the Observatory from the south);

(g) the traditional relationship of the Observatory to its first public entrance, Observatory Lane, (also formerly known as Marsh Lane);

(h) the traditional relationship of the Observatory to Hillsview Drive, formerly the 'narrow lane' (of the Vanderburgh Farm and, still later, known as Hunt Lane), which divided Lot 43 into north and south halves; and

(i) the traditional relationship of the Observatory to the CNR line;

(j) the traditional relationship of the large open, natural space of the Observatory to the south end of Richmond Hill.