

PARKING MANAGEMENT PLAN

ST. VINCENT'S HOSPITAL FAIRVIEW REDEVELOPMENT



Consulting Engineers

NOTICE

This document has been produced by O'Connor Sutton Cronin & Associates for its client, St. Vincent's Hospital Fairview. It may not be used for any purpose other than that specified by any other person without the written permission of the authors.

DOCUMENT CONTROL & HISTORY

ocsc
Job No:
R517

Project Code	Originator	Zone Volume	Level	File Type	Role Type	Number	Status / Suitability Code	Revision
R517	ocsc	xx	ХХ	RP	С	8000	S4	P02

Rev.	Status	Authors	Checked	Authorised	Issue Date
P01	S2	W Marais	P Raggett	A Horan	13/03/2023
P02	S4	W Marais	P Raggett	A Horan	23/03/2023





TABLE OF CONTENTS

1	INTRODUCTION	1
	APPOINTMENT	1
	ADMINISTRATIVE JURISDICTION	1
	STUDY AREA	1
	DEVELOPMENT DESCRIPTION	2
2	SITE & HOSPITAL OVERVIEW	5
3	CAR PARKING STANDARDS	9
4	CAR PARKING PROVISION	.10
	CURRENT AND PROPOSED QUANTUM	. 10
	RATIONALE FOR CAR PARKING PROVISION	. 10
5	ALLOCATION OF CAR PARKING	.13
	PATIENTS/VISITORS - 73 BEDS/57 PEAK VISITORS	. 13
	NURSING/NURSING SUPPORT STAFF - 49 PEAK STAFF	
	MEDICAL CONSULTANTS/ALLIED HEALTH PROFESSIONALS - 9 PEAK STAFF/	
	PEAK STAFF	
	DOCTORS - 17 PEAK STAFF	
	CATERING - 15 PEAK STAFF	
	SUMMARY	
6	MANAGEMENT OF CAR PARKING	.17
7	SUMMARY AND CONCLUSIONS	
8	VERIFICATION	.19
LI	ST OF FIGURES	
Figu	re 1: Locality Plan	2
_	re 2: Proposed Site Plan	
_	re 3: Proposed Parking at New Facility	
_	re 4: SVHF Parking and Access	
i igu	Te 4. SVIII Tarking and Access	. 17
ıΤ	ST OF TABLES	
-	OI OI IADEES	
Tabl	e 1: SVHF Staff Numbers	8
Tabl	e 2: Bus Routes – Operating Hours	. 11
Tabl	e 3: Anticipated Peak Numbers at SVHF	. 12





1 INTRODUCTION

APPOINTMENT

O'Connor Sutton Cronin & Associates (OCSC) have been appointed by St. Vincent's Hospital Fairview to carry out the design of the civil engineering services associated with the proposed development of a site at St. Vincent's Hospital, Richmond Road and Convent Avenue, Fairview, Dublin 3.

The purpose of this report is to set out the proposed measures to manage the use of car parking relating to the St Vincent's Hospital Fairview (SVHF), set out the allocation of parking spaces between patients/visitors and staff, and provide a rationale for same.

ADMINISTRATIVE JURISDICTION

The proposed development is located primarily in the jurisdiction of the Dublin City Council (DCC).

STUDY AREA

The site fronts Richmond Road. The site is bound by the Grace Park Wood residential development to the northwest, Griffith Court and the 'Fairview Community Unit' nursing home to the north, the An Post depot on Lomond Avenue and residential properties on Inverness Road to the east, existing residential and commercial properties on Richmond Road and Convent Avenue to the south and Charthouse Business Centre, Dublin Port Stadium / Stella Maris FC and Ierne Sports and Social Club to the west of the site.

The exact location of the development can be seen in the figure overleaf:





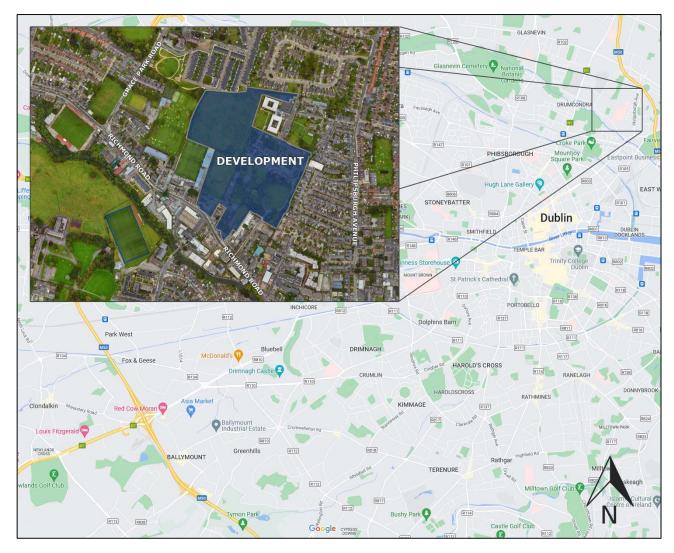


Figure 1: Locality Plan

DEVELOPMENT DESCRIPTION

A <u>ten-year planning permission</u> is sought for the proposed development comprising of the following (see public notices for the detailed description):

- Provision of a new part two and part three storey hospital building, providing mental health services, accommodating 73 no. beds, associated facilities, a single storey facilities management building, plant rooms and service areas, associated car and cycle parking, access roads, and open space, all on a proposed hospital site of c. 2.67 ha.
- Refurbishment and repurposing of existing buildings on site including Brooklawn (RPS Ref.: 8789), Richmond House, including chapel and outbuildings (RPS Ref.: 8788), the Laundry building and Rose Cottage for ancillary uses associated with the new hospital. The existing





- gate lodge building will remain in residential use and used by visiting members of staff to the new hospital.
- Change of use, refurbishment, alterations and extensions, to the existing hospital building (part protected structure under RPS Ref.: 2032), to provide residential amenity areas, a gym, a café, co-working space, a library, a childcare facility, and a community hall (referred to as Block K).
- The proposal includes the demolition of existing structures on site with a GFA of 5,872 sq.m, including the (1) westernmost range of the hospital building, which includes St. Teresa's and the Freeman Wing, (2) extensions to the south and north of the main hospital building, including the conservatory extension, toilet block extension, an external corridor, toilet core, lift core, and stair core (which are all part of / within the curtilage of RPS Ref.: 2032), (3) hospital buildings and outbuildings located to the north of the existing main hospital building, (4) St. Joseph's Adolescent School located in the southeast of the site, (5) Crannog Day Hospital located in the southwest of the site, and (6) extensions to the Old Laundry Building and Rose Cottage.
- Provision of 9 no. residential buildings (Blocks A, B, C, D-E, F, G, H, J, and L) providing a total of 811 no. residential units, including 494 no. standard designed apartments (in Blocks A, B, C, G, H, J, and L) and 317 no. Build to Rent apartments (in Blocks D-E and F). Residential amenities and facilities are proposed in Block C, D-E, J and K. A retail unit is proposed in Block A and a café in Block F. Block J is proposed as an extension of the existing hospital buildings (protected structure RPS Ref.: 2032- referred to as Block K).
- The building heights of the proposed residential blocks range from part 2 to part 13 storeys. A proposed basement / lower ground level, containing car and cycle parking and plant areas, is located below and accessed via Blocks C, D-E and F.
- Access to the new hospital and associated grounds is provided from Richmond Road and
 Convent Avenue, with separate internal access points. A separate vehicular access to the
 residential development is provided from Richmond Road. The development includes a
 proposed pedestrian / cycle connection to Griffith Court, requiring alterations to the service
 yard of the Fairview Community Unit, pedestrian / cycle connections to the Fairview
 Community Unit campus to the north (providing an onward connection to Griffith Court), a
 pedestrian / cycle connection to Grace Park Wood, and makes provision internally within the
 site for a potential future connection to Lomond Avenue / Inverness Road.
- The proposal includes public open space, including allotments, children's play areas, a central park, a linear park and an entrance plaza, with a set down area at Richmond Road, and communal open space at surface level. The proposal includes communal roof terraces on Block C and Blocks D-E and private balconies / terraces for the apartments.





• The proposal also includes provision of internal access roads, car and cycle parking, pedestrian and cycle infrastructure, associated set down areas, alterations to existing landscape features, landscaping, boundary treatments, lighting, telecommunications infrastructure at roof level of Block B, green roofs, lift overruns and plant at roof level, site services, including a watermain connection / upgrade via Griffith Court, Philipsburgh Avenue and Griffith Avenue, site clearance, and all associated site works.





2 SITE & HOSPITAL OVERVIEW

St. Vincent's Hospital is seeking to provide a new Mental Health Facility on the subject site to replace the ageing and unsuitable current hospital buildings as they are no longer fit for purpose.

The main institutional and community uses on the subject lands, including space for any necessary expansion of such uses, will be maintained, and improved in the future. The Board of St. Vincent's Hospital has made a strategic partnership agreement with the Royalton Group, to design and construct a new and much-needed state-of-the-art Mental Health Facility for acute patients on the existing Fairview campus. The unique partnership will ensure continuing support for the future of mental health services in Dublin, provide new residential accommodation and enhance the amenities available to the surrounding communities.

Because of the age and condition of the buildings the facilities are simply no longer consistent with current requirements and modern healthcare standards. It is increasingly difficult to eliminate risks of self-harm or dangers to the health and welfare of patients and staff in such unsuitable and deteriorating conditions. Latterly, Covid demonstrated difficulty in the management of infectious diseases. This poses a disproportionate drain on the human and financial resources of the Hospital.

To fund the new facility, the Board of St. Vincent's Fairview has agreed to provide a high-quality residential development on undeveloped land, which will include a new public park

The 9.46 ha development consists of the following:

- 811 no. residential units (including 494 no. standard designed apartments and 317 no. BRT units);
- Proposed mental health facility building to house existing operations on-site providing up to 73 beds;
- Several facilities which are considered ancillary to the hospital and residential developments and will not generate separate trips:
 - 406 sqm community facilities;
 - 4 064 sqm gym, café, co-working space, childcare facilities and retail;
 - 1264,4 sqm dedicated BTR amenity areas; and
 - 3713.35 sqm total resident support facilities.

The proposed site plan can be seen in the figure overleaf:





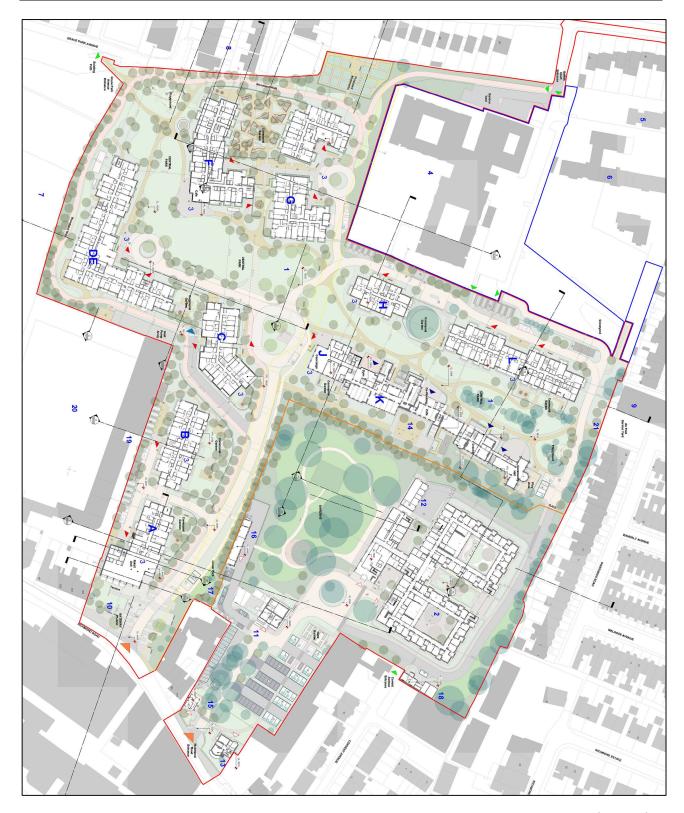


Figure 2: Proposed Site Plan

The proposed parking arrangement at the new facility is shown in the figure overleaf.







Figure 3: Proposed Parking at New Facility

Access to the hospital is provided from Richmond Road and Convent Avenue, with separate internal access points.

The SVHF itself offers a wide variety of services which requires an extensive workforce to meet the varying medical and care needs on a continual and 24-hour basis. The Hospital provides inpatient facilities for adults, including Acute Mental Illness and Psychiatry of Old Age and adolescent patients. Typical conditions treated include:

- Personality and Behavioural Disorders;
- Schizophrenia and Delusional Disorders;
- Depressive Disorders;
- · Drug and Alcohol Addiction;
- Eating Disorders;
- Neuroses;
- Mania; and
- Neuroses.





To put this in context, below is a summary of the key staff numbers at the SVHF:

Staff Type	Paid Employees	Students	HSE	Agency			
Doctors	5	-	10	-			
Nursing	75	17	-	16			
Nursing Support Staff	5	-	-	-			
Catering	31	-	-	3			
Admin	31	-	-	-			
Tech & Support	4	-	-	-			
Security	-	-	-	4			
Other	9	-	-	-			
Sub-Total	160	17	10	23			
Total	210						

Table 1: SVHF Staff Numbers

Additionally, during early weekday visiting hours up to 109 no. additional personnel can be onsite. In addition to Hospital Staff, additional specialist services are provided by external medical personnel, various Therapists, Dieticians etc. Support services are augmented by contractors, as required.

In terms of patients and associated visitors, the hospital provides mental healthcare (inpatient, outpatient, and day patient) to the local population of Dublin North City and surrounding areas (including Counties Louth, Meath, Cavan, and Monaghan). The catchment area includes large areas of the north inner city with attendant psychosocial challenges of high levels of unemployment, homelessness, substance abuse and reported crime.



3 CAR PARKING STANDARDS

According to the Dublin City Development Plan 2022 - 2028, car parking is based in three zones within Dublin City. These are:

- Parking Zone 1: Generally within the Canal Cordon and within North Circular Road in recognition of active travel infrastructure and opportunities and where major public transport corridors intersect;
- Parking Zone 2: Occurs alongside key public transport corridors and;
- Parking Zone 3: The remainder of the City.

The parking zones are shown on Map J, which is included as part of the Development Plan. As per this map, the proposed development is located within Parking Zone 2. The following **maximum car parking** standards apply to the development based on this:

· Hospital: 1 space per 100 sqm GFA.

Based on the above, the **maximum car parking** standard as set out in the development plan is:

Hospital: 84 no. spaces (8 411 sqm / 100 sqm)





4 CAR PARKING PROVISION

CURRENT AND PROPOSED QUANTUM

The current site provides over 100 no. car parking spaces over several locations to meet the needs of staff, visitors, service personnel, contractors etc.

For the new facility, it is proposed to provide a total of 72 no. car parking spaces, with an additional 4 no. mobility impaired spaces, for a total of 76 no. spaces. This is **below the maximum** number of 84 spaces allowable as per the Dublin City Development Plan standards. The motivation for this quantum of spaces is provided below.

RATIONALE FOR CAR PARKING PROVISION

The allocation of the 76 no. car parking spaces have been specifically based on a first principles assessment of demand taking into account critical factors including:

- The need for patients to drive/be driven due to the nature of their illness;
- The potential for overlap of use of spaces between day patients and visitors as these activities generally occur at different times;
- Staff who work anti-social hours where public transport and alternative modes are less viable;
- Staff who work long shifts that do not coincide with peak traffic times; and
- Staff who require a vehicle for work purposes.

The hospital operates on a 24/7 basis. Medical, nursing and related support staff operate on a shift basis. Typical shifts are:

```
 07:30 - 20:30;
```

08:00 - 20:00;

20:15 - 08:00;

07:00 – 15:00 (Catering);

09:00 – 18:00 (Catering);

08:00 - 16:00 (Admin);

09:00 – 17:00 (Day reception); and

17:00 – 21:00 (Night reception).





The 24/7 operating nature of a hospital creates the need for staff to commute to work since shift patterns require staff to start or finish work at times when public transport is not feasible or unavailable. Nursing staff in particular need to drive to work since in general they cannot afford accommodation within Dublin, close to the SVHF, which means they need to commute to and from surrounding counties. Recruitment of nursing staff is a major challenge for all Dublin Hospitals and the inability to park on-site would be a major deterrent to the facility. To put this into context, the available bus routes in the vicinity of the development with their associated operating hours are shown in the table below.

Route	Description	Weekday Operating Hours
H1	Abbey Street – Balydoyle	5:06 AM - 11:39 PM
H2	Abbey Street – Malahide	5:15 AM - 11:15 PM
Н3	Abbey Street – Howth Summit	4:48 AM - 11:20 PM
1	Santry Rd – Pearse Street	6:30 AM - 11:30 PM
6	Abbey Street – Howth Station	12:10 AM - 11:10 PM
11	Wadelai Park – Sandyford Business District	6:30 AM - 11:30 PM
13	Harristown – Grange Castle	6:00 AM - 11:30 PM
14	Beaumont – Dundrum Luas	6:15 AM - 11:30 PM
15	Clongriffin – Ballycullen (24 hr)	24 Hours
16	Dublin Airport – Ballinteer	6:00 AM - 11:30 PM
27	Clare Hall – Jobstown	5:15 AM - 11:30 PM
27A	Eden Quay – Blunden Drive	6:40 AM - 11:15 PM
27B	Eden Quay – Harristown	6:30 AM - 11:10 PM
33	Abbey Street - Balbriggan	5:54 AM - 11:30 PM
41	Abbey Street – Swords Manor (24 hr)	24 Hours
41B	Abbey Street - Rolestown	6:20 AM - 11:15 PM
41C	Abbey Street – Swords Manor	6:05 AM - 11:15 PM
41D	Abbey Street – Swords Business Park	7:30 AM - 7:40 AM
42	Talbot Street – Portmarnock	6:45 AM - 11:30 PM
43	Talbot Street – Swords Business Park	6:20 AM - 11:00 PM
44	DCU – Enniskerry	6:35 AM - 11:30 PM
123	Walkinstown – Marino	6:10 AM - 11:30 PM
130	Talbot Street – Castle Avenue	6:00 AM - 11:30 PM

Table 2: Bus Routes - Operating Hours





From the previous table, it is evident that the majority of routes operate between the hours of 6:00 AM and 11:30 PM. This means that the hospital staff working outside of those hours will not be able to make use of public transport to travel to and from work.

The anticipated peak number of staff and visitors are SVHF is shown in the table below.

Facility	Visitors	Nursing	Other	Medical	Cleaners	Admin	Security	Total
St Louise's	30	9 Student Nurses		6 Consultants	5	2	1	70
St Marys	9	5 Students 2 Student Nurses 1 Health Care Assistant 2 Students		12 Doctors	1			15
		2 Student Nurses		1 Consultant				
Psychiatry of Old Age	6	1 Health Care Assistant 2 Students		2 Doctors	1			15
Allied Health Professionals - Adult		2 0.000.00	1 Social Worker 1 Occupational Therapist 2 Psychiatrist 1 Dietician					5
Tribunal			3					3
Nurse Management & Admin		5 Management 2 Admin						7
School of Nursing		6 Staff	20 Training					26
Adolescents	12	8 Student Nurses 4 Students		2 Consultants 3 Doctors	2			31
Allied Health Professionals - AIU		Julia	1 Social Worker 1 Occupational Therapist 1 Psychiatrist 1 Speech and Language Therapist 1 Dietitian 6 School	3 3 3 3 3 3 3				11
Main block Admin & Medical Records			19		2			21
Porters			3					3
Tech services			3					3
Pharmacy Library			3 1					3 1
Catering			15					15
Total	57	49	83	26	11	2	1	229

Table 3: Anticipated Peak Numbers at SVHF

In this context, the provision of 76 no. car parking spaces is conservative and will motivate a positive modal shift and the use of sustainable travel options, where possible. However, as detailed previously and in the next chapter, a portion of visitors and staff are reliant on private transport and as such, would require access to car parking.

The various categories in the context of the above table are discussed in the next section.





5 ALLOCATION OF CAR PARKING

The proposed car parking caters to the visitors and staff categories mentioned previously. The rationale for providing car parking for each of these categories is set out below. The expected peak number for each category is also included as part of the rationale.

PATIENTS/VISITORS - 73 BEDS/57 PEAK VISITORS

As set out previously, the hospital offers a wide range of services which have different requirements for car parking to facilitate guests and visitors. For example, patients at the day hospital typically occur during the day and don't generate visitors. Conversely, the respite and residential care services typically do not create a demand for patient parking but do generate visitors, with the latter generally occurring in the evenings and at weekends.

On that basis, the provision of car parking for patients and visitors and the overlap of uses between patients and visitors are based on the demand experienced at the hospital through its extensive operation. The hospital provides for 73 no. beds, which means it can accommodate a maximum of 73 no. patients. The anticipated peak visitor number as per Table 3 is 57. The provision of 76 no. car parking proposed is therefore considered to be sufficient to prevent any overspill parking in the local area but will limit the available spaces for visitors to promote sustainable travel.

NURSING/NURSING SUPPORT STAFF - 49 PEAK STAFF

The nursing and nursing support staff comprise the largest portion of the overall SVHF staff. They typically work a 12-hour shift which requires them to be on-site for handover between shifts before 8 am. These staff also work weekends as well as during the week.

The nature of the nurse/nursing support staff shifts means that they are travelling to and from the SVHF outside of traditional commuting times and associated peak traffic periods. As a result, any associated traffic impact is considered to be negligible.

It is also considered appropriate to maximise the provision for this portion of the staff due to the long nature of their shift which can limit the availability and frequency of public transport options to serve them, particularly at weekends. Furthermore, the quality of life of these staff must be





considered. While some staff may live within a reasonable distance of the site or have access to high-frequency public transport services near their homes, many do not. Requiring travel of long distances home by foot, bicycle or public transport after a 12-hour shift would significantly increase their respective travel times and have a disproportionately negative impact on their quality of life.

Thus, considering the limited traffic impact on peak commuting times, the anti-social and long nature of shift times and the fact that the proposed provision would still result in a relatively low modal share for this portion of the staff, the provision of an appropriate number of car parking spaces for the anticipated peak number of 49 no. nursing staff members (as per Table 3) is considered reasonable.

MEDICAL CONSULTANTS/ALLIED HEALTH PROFESSIONALS - 9 PEAK STAFF/10 PEAK STAFF

Various medical consultants working at SVHF operate under shared contracts. This requires them to attend locations other than SVHF. These locations include but are not limited to, the Mater Misericordiae Hospital, HSE Day Facilities in Summerhill, and other locations in the North Inner City and the HSE CH09 Region.

In addition to directly employed and agency staff, certain services are provided to patients by specialists on a part-time basis. These services include Occupational Therapy, Speech Therapy, Dietetics, Locum Medical Staff, etc. Additional service providers include music and dog therapists who would not be able to make use of public transport due to their unique nature, and as such would require car parking.

All of these services require on-site parking at SVHF to facilitate travel between the various workplaces. As per Table 3, the anticipated peak number associated with these two categories is 9 no. Medical Consultants and 10 no. Allied Health Professionals.

DOCTORS - 17 PEAK STAFF

As noted earlier there are a total of 15 doctors at the SVHF. Including HSE and rotational doctors, it is anticipated that a peak of 17 doctors can be expected as per Table 3. Associated shift times are typically between 8 am - 8 pm although these can stretch on a given day depending on the





medical needs in question. Again, these shift patterns do not align with traditional commuting times and peak traffic hours.

Notwithstanding the above, it should be stressed that a number of these doctors rotate between different hospitals and travel between in-between them regularly as a result. Such activity necessitates the use of a vehicle for work purposes meaning parking provision is critical as travel by public transport, foot or bicycle would be both time inefficient and, in the context of the sensitive medical services in question, be to the ultimate detriment to patients at all facilities. Furthermore, it is noted that doctors also operate on-call meaning they can be required to attend the site at any time of the night to attend to a medical emergency.

On this basis, the provision of car parking proposed is considered reasonable and appropriate based on a demonstrated need to access a vehicle for work purposes and associated travel patterns occurring outside of traditional commuting times and during anti-social hours when on-call.

CATERING - 15 PEAK STAFF

As noted, a significant portion of the hospital activity relates to patients which are effectively residents at the site. As a result, there are continual catering requirements to serve these patients.

The associated shift times for catering staff vary but due to the nature of the service, some catering staff are required to be on-site at 4 am to begin preparation. Similarly, some staff will not finish until after 10 pm. These times are not conducive to public transport and other alternative modes meaning travel by car can be unavoidable in such instances. Again, it is noted that the travel patterns associated with these spaces will be outside of normal commuting times and associated peak traffic periods.

Furthermore, SVHF provides catering services to the Fairview Community Unit (a 100-bed Community Nursing unit located on the main St Vincent's campus, to the north of the Hospital). As such it is considered appropriate to provide some spaces to accommodate the circumstances detailed previously.





SUMMARY

In summary, it is noted that the vast majority of staff spaces are allocated to those who require the use of a vehicle as part of their essential medical work practice and/or who work long shift times with anti-social hours meaning their commuting patterns do not align with peak traffic periods. There are an extensive number of employee groups such as management and admin staff, cleaners, security, porters, tech services, pharmacy staff and library staff, which will not be allocated any parking in line with local and national objectives to encourage travel sustainable means and limit the potential of commuting during peak traffic periods.

In the context of this chapter, the hospital will only provide 76 no. car parking spaces. These spaces will accommodate the peak numbers for staff categories which have been identified as having a need for car parking. These include:

- 49 Peak Nursing Staff
- 9 Peak Medical Consultants
- 10 Peak Allied Health Professionals
- 17 Peak Doctors
- 85 Peak Critical Staff

In addition to the above, a portion of the following also need to be accommodated:

- 57 Peak Visitors
- 15 Peak Catering Staff
- 72 Peak Other Staff

In the context of the above, the provision of 76 no. car parking spaces is considered wholly conservative and appropriate and will provide a balance of fulfilling the requirements of the hospital while also promoting the use of sustainable travel in line with local and national objectives.





6 MANAGEMENT OF CAR PARKING

The management of SVHF car parking is to be based on a system of signage & delineation, and ongoing enforcement as outlined following.

The access to the hospital facility will be via Richmond Road as shown in the figure below. Access control will be enforced by means of a barrier, which will be manned by security personnel.

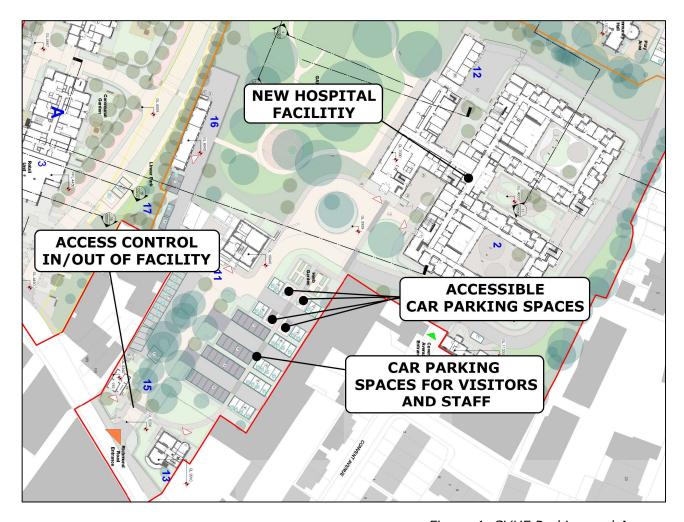


Figure 4: SVHF Parking and Access

It is intended for parking to be managed by means of an app, where staff can book a space for the day. There will be a restriction on the type of staff members who are able to access this app. This parking allocation, as well as visitor access, will be managed by means of the aforementioned barrier. This will ensure critical staff have car parking access, while also preventing the demand for car parking from exceeding the supply, resulting in an overspill onto the local road network.





7 SUMMARY AND CONCLUSIONS

This Parking Management Plan has been prepared to clearly set out the proposed allocation of parking associated with the SVHF development, the rationale for same and the measures to be put in place to control its use.

The proposed quantum of 72 no. regular car parking spaces and 4 no. accessible spaces are considered to be wholly appropriate and crucial for the successful operations of the hospital. This is a significant reduction in the parking provision at the existing facility, which is in excess of 100 no. spaces. This reduction will lead to a positive modal shift.

The parking is to be dedicated to visitors and staff, but the vast majority will be allocated to those who:

- Require a vehicle for essential work purposes;
- Work long shift times that are not conducive to travel by foot, bicycle, or public transport;
 and
- Work anti-social shift times that are not conducive to travel by foot, bicycle, or public transport.

On this basis, the proposed parking allocation is considered to be appropriate based on the specific needs of the existing SVHF. This should also be considered in the context of the peak critical staff and visitor numbers identified, which is significantly more than the proposed 76 no. spaces. Furthermore, the proposed number of spaces is in line with local and national objectives to encourage travel by sustainable means and limit the potential of commuting during peak traffic periods.





8 VERIFICATION

This report was compiled and verified by:

Wian Marais BE (US), BE (Hons) (UP), Professional Engineer (ECSA)

Civil Engineer

O'Connor Sutton Cronin & Associates







