

DEPARTMENT OF EDUCATION, SPORT AND CULTURE

The Hon. Member for Onchan, Ms Edge, to ask The Minister for Education, Sport and Culture:

If she will publish a) all design plans for the proposed new Castle Rushen High School building produced before 2022, b) the Castle Rushen High School Master Plan dated November 2022, and c) the AtkinsRealis concept design report.

Question W-202601-2096 published on 10/03/2026; Answer published on 24/03/2026.

The Minister for Education, Sport and Culture (Mrs Caine):

- a) The design plans for the proposed new Castle Rushen High School (CRHS) building that were produced before 2022 are appended to this answer. The attachments included are ordered as follows:

2008	Preliminary zoning study
2017	Feasibility study - zoning plan
2019	Strategic Brief - site layout plans – Option A Strategic Brief - site layout plans – Option B Strategic Brief - site layout plans – Option C
2021	Feasibility Report plans – Ground floor Feasibility Report plans – Ground floor – Main school Feasibility Report plans – Ground floor – Key Feasibility Report plans – Ground floor – Sports block Feasibility Report plans – First floor – Main school Feasibility Report plans – First floor – Key Feasibility Report plans – Roof plan Feasibility Report plans – Ground floor – Exp. Zone Feasibility Report plans – External works Feasibility Report plans – External works – access

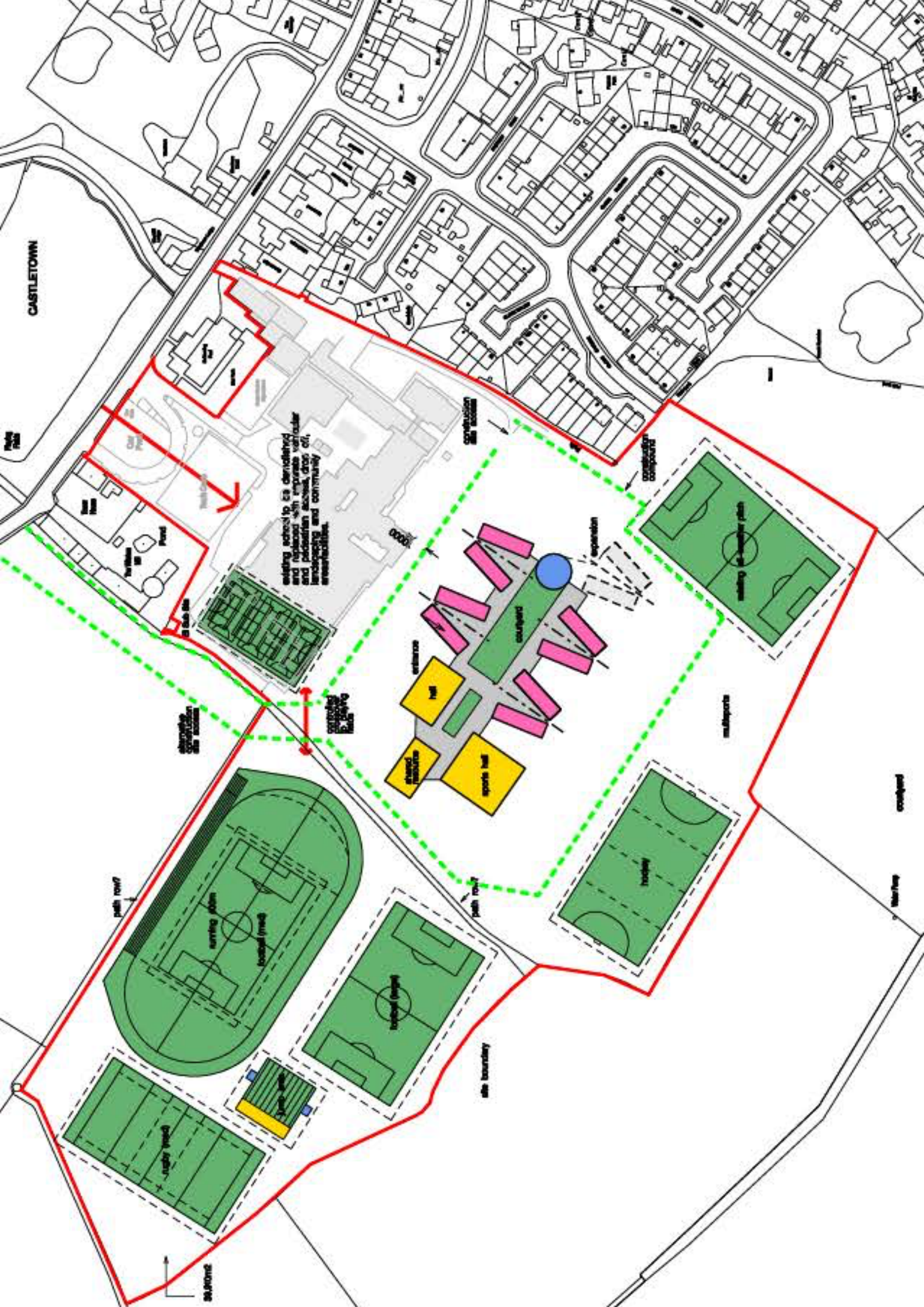
- b) The CRHS master plan, dated November 2022 and produced by the Manx Development Corporation (MDC), was circulated to Tynwald Members under parliamentary privilege in February 2023, following a Members' briefing on the CRHS business case and master plan.

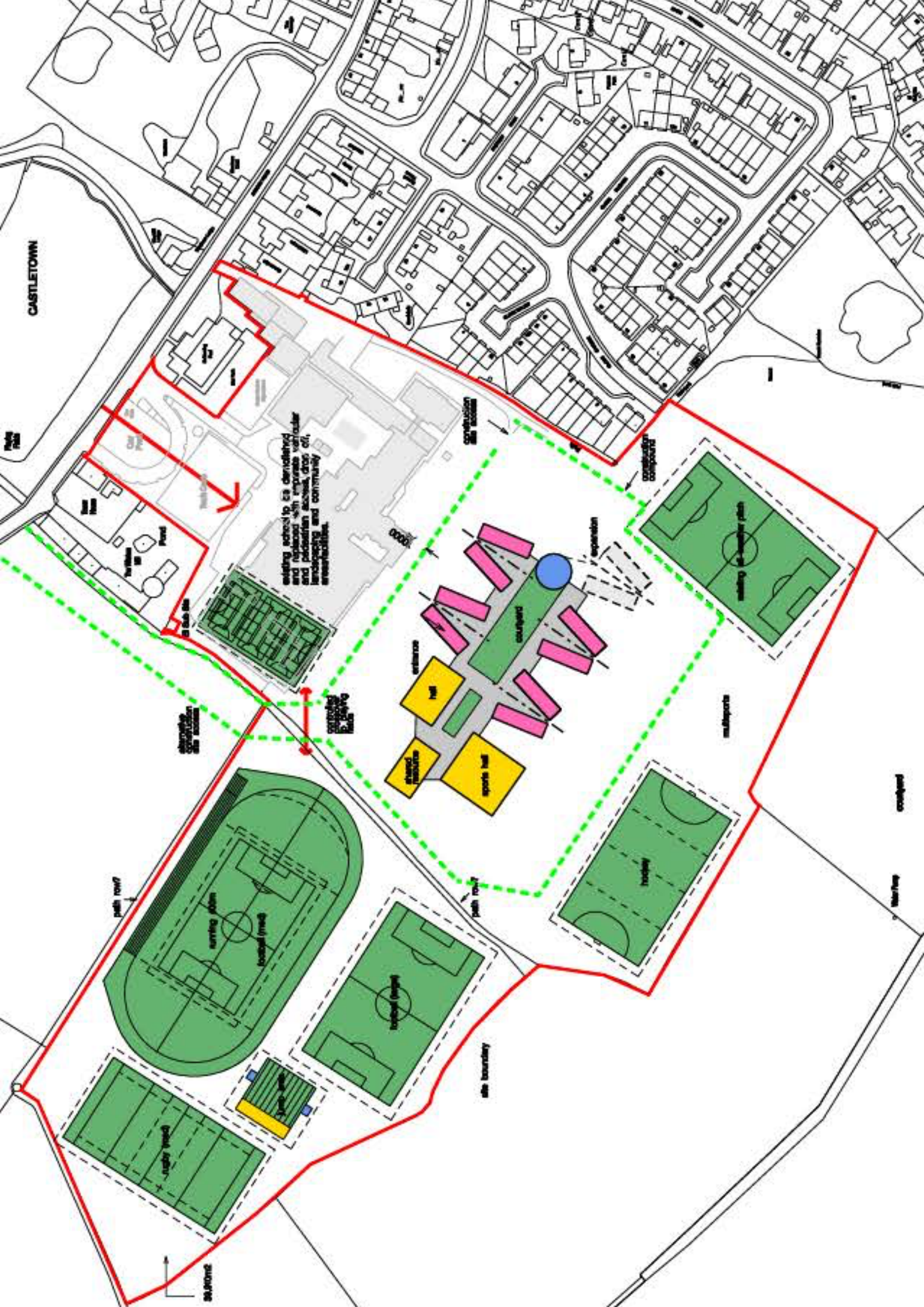
The MDC master plan sets out a high-level concept design prepared solely to enable DESC to explore the potential of the site, consistent with RIBA Stages 0–1. The drawings within the report are conceptual and were subject to further development, consultation, and stakeholder engagement. Substantial design work and site investigations were still required to fully understand the site constraints and to determine the viability of progressing to more detailed design stages. At the time of its preparation, the scheme remained in an early exploratory phase.

The document appended to this answer has, as when originally shared with Tynwald Members in February 2023, had all costings removed. Additional sensitive information has also been redacted where appropriate.

- c) The D1 (RIBA Stages 1 and 2 concept design) reports prepared by AtkinsRealis have not yet completed the required governance steps within the capital programme process.

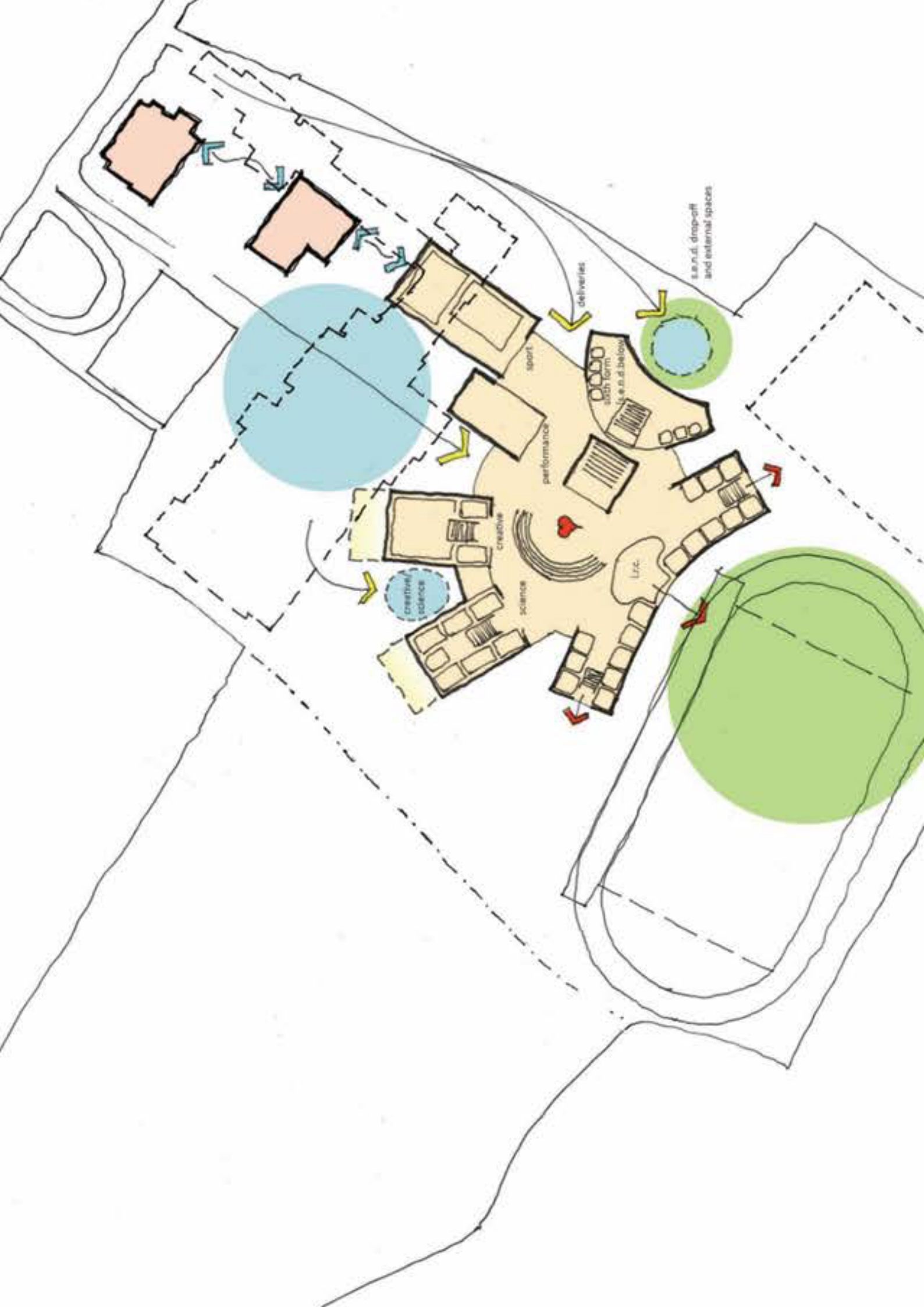
The Department has attached images that were shared publicly by AtkinsRealis at the end of February 2026, showing concept designs. However, the design is an ongoing process and has yet to complete, as such, no such report can be released.









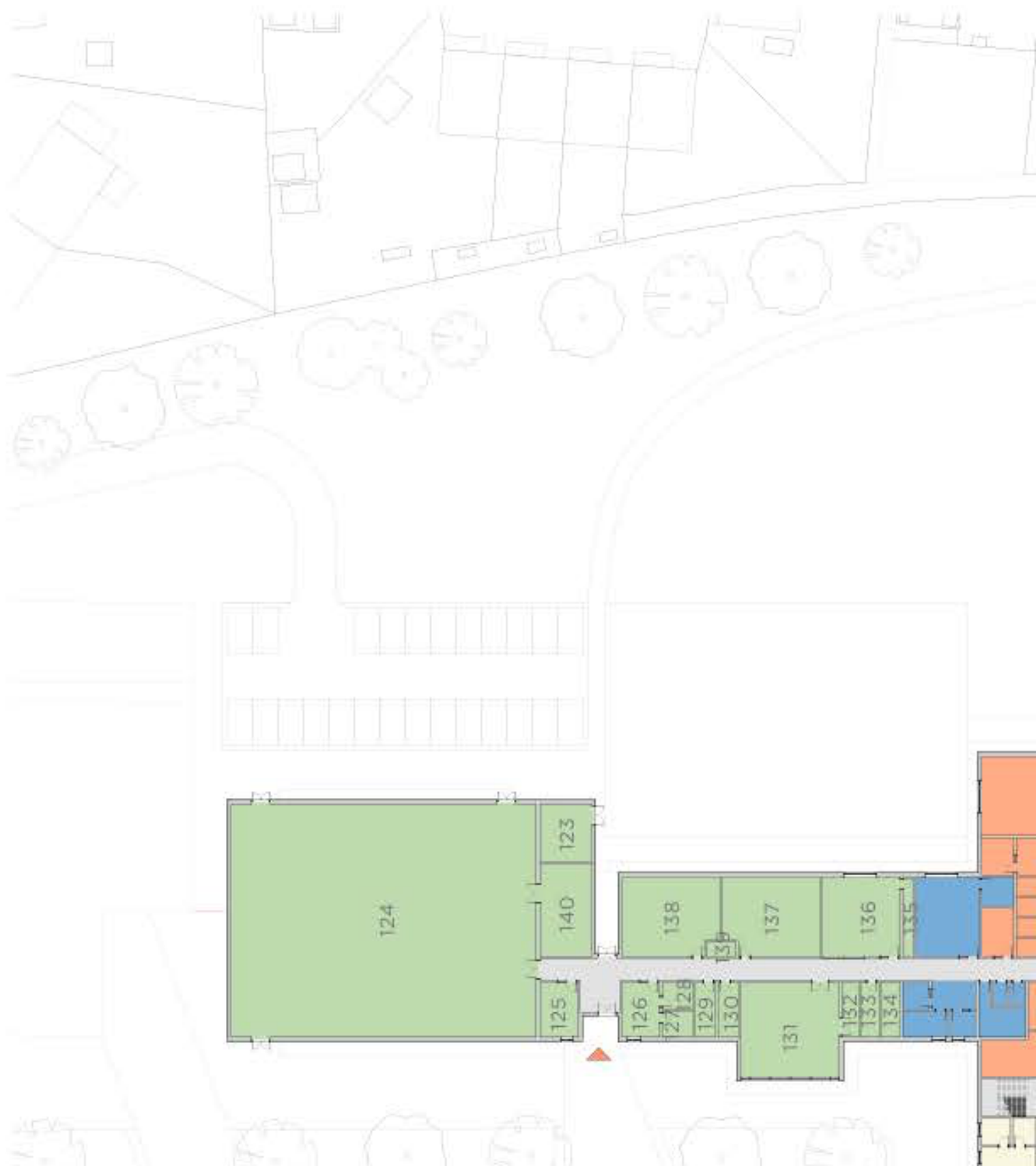


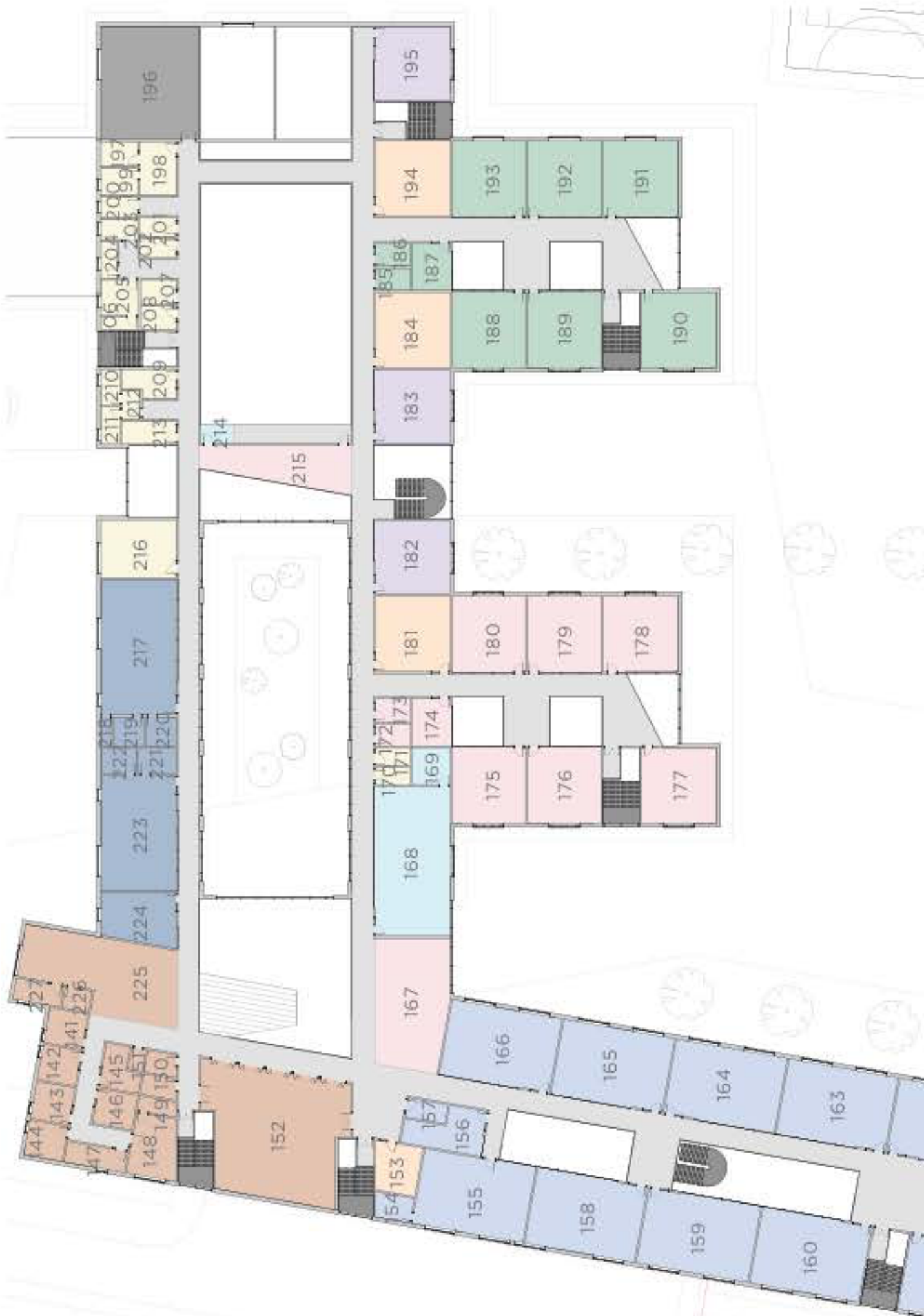




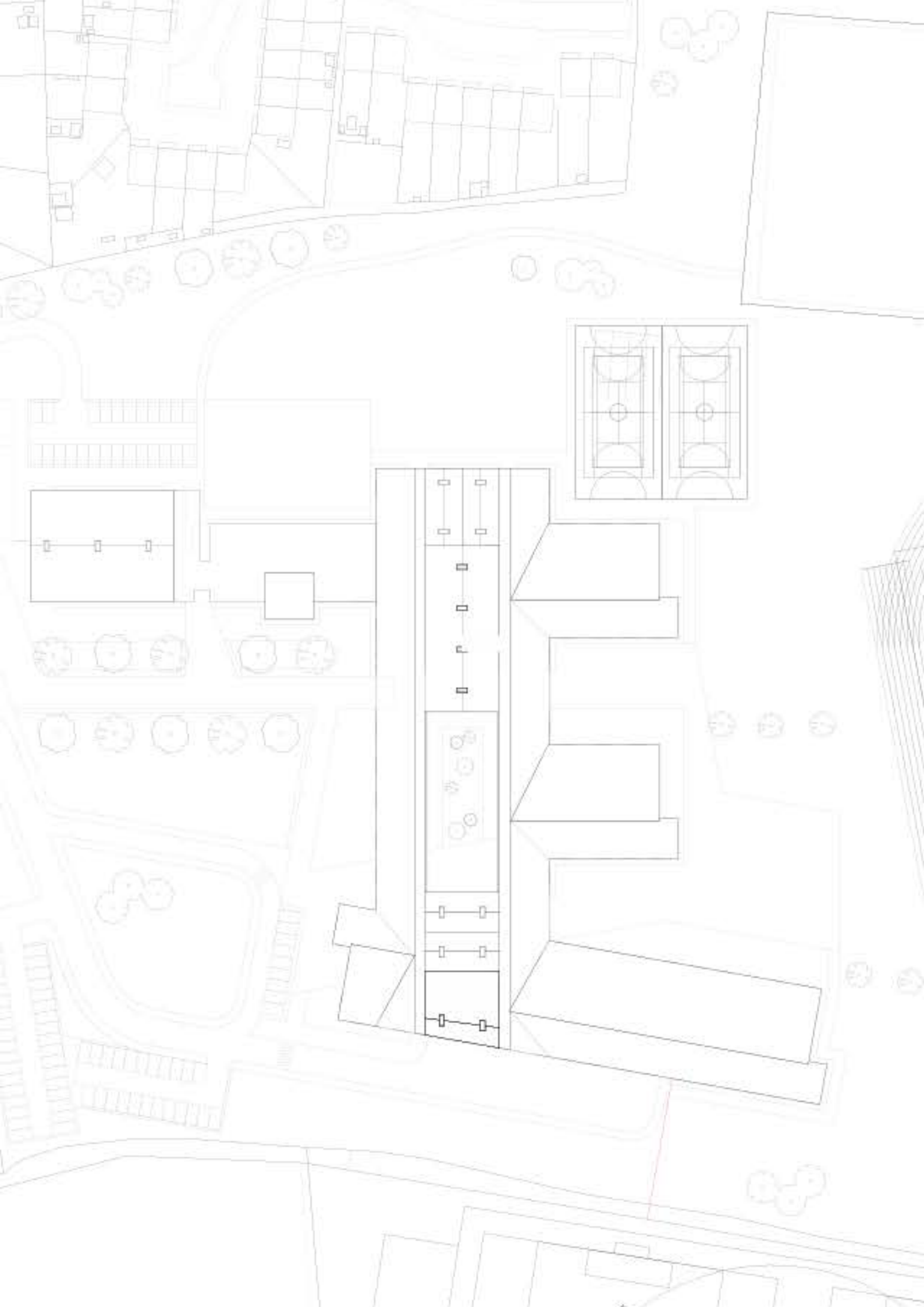
- 65 - Music practice/group rooms
- 66 - Teachers' work space/office/meeting room
- 67 - General teaching store
- 68 - SC4 classroom
- 69 - SC4 small group room
- 70 - SC4 office
- 71 - SC4 kitchenette
- 72 - SC4 small group room
- 73 - SC4 practical space/workshop
- 74 - SC4 staff wc
- 75 - SC4 pupil wc
- 76 - Music store
- 77 - Instrument store
- 78 - Chair store (main hall)
- 79 - Stage area (main hall)
- 80 - Main hall
- 81 - Retractable bleacher seating (main hall)
- 82 - Medical room
- 83 - Secure archive store
- 84 - Exam office and secure store
- 85 - General office
- 86 - Sick room
- 87 - Accessible toilet off reception
- 88 - Interview room
- 89 - Entrance/reception
- 90 - SC3 physiotherapy room
- 91 - Mobility equipment storage
- 92 - SC3 safe room
- 93 - SC3 sensory room
- 94 - Mobility equipment storage
- 95 - SC3 medical room
- 96 - SC3 formal room (classroom)
- 97 - Therapy store
- 98 - General teaching store
- 99 - SC3 informal room (classroom)
- 100,101 - SC3 small group room
- 102 - SC3 kitchen
- 103,104 - SC4 hygiene room
- 105 - Laundry
- 106-109 - SC1+2 small group room
- 110 - General teaching store
- 111 - Staff welfare room
- 112 - Staff shower/change
- 113 - Staff accessible toilet

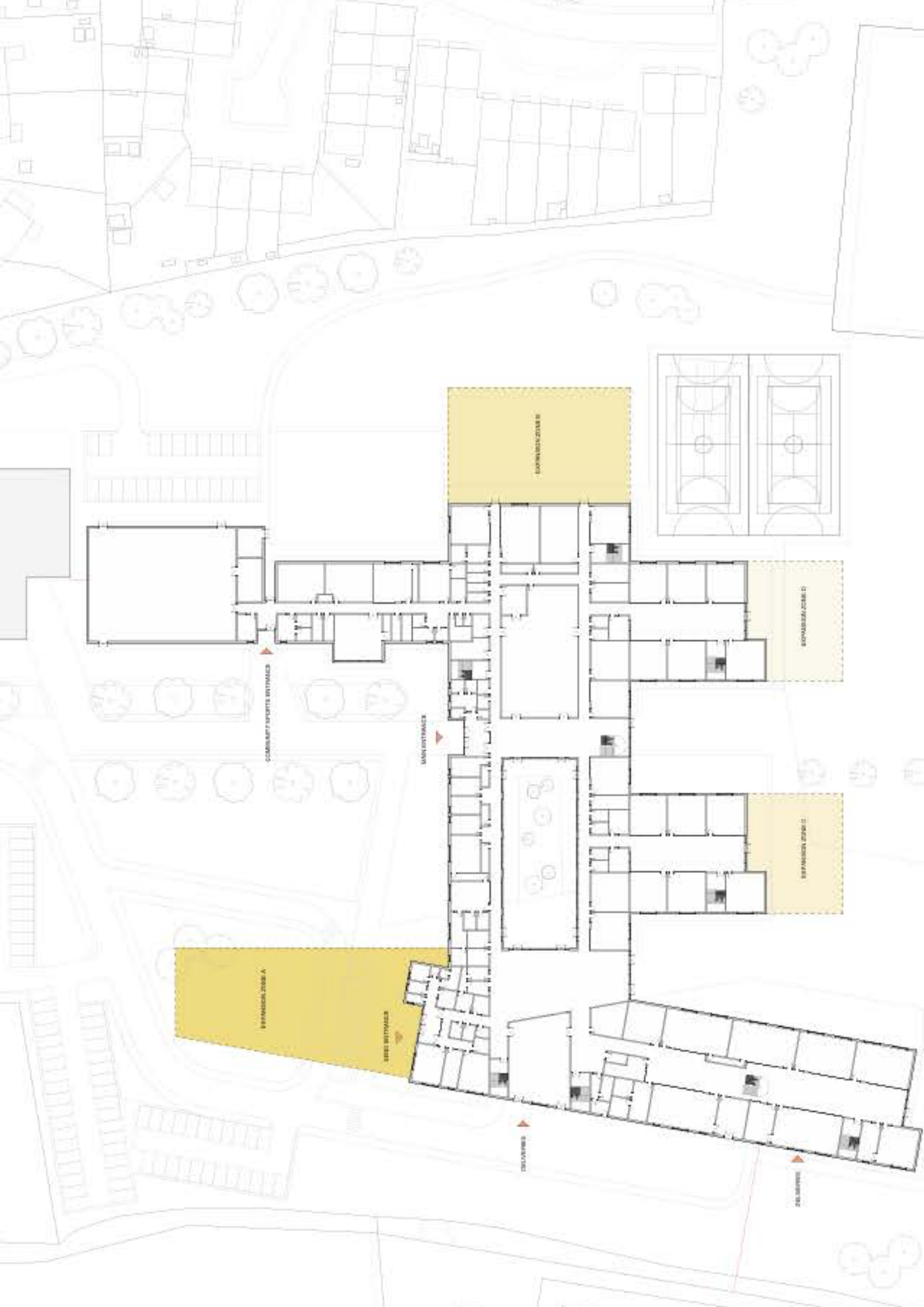
123 - PE store (e
124 - Sports hall
125 - PE receptio
126 - Teachers' v
127/128 - Staff ch
129/130 - Access
131 - Fitness/exe
132 - PE store (a
133 - Evam furn

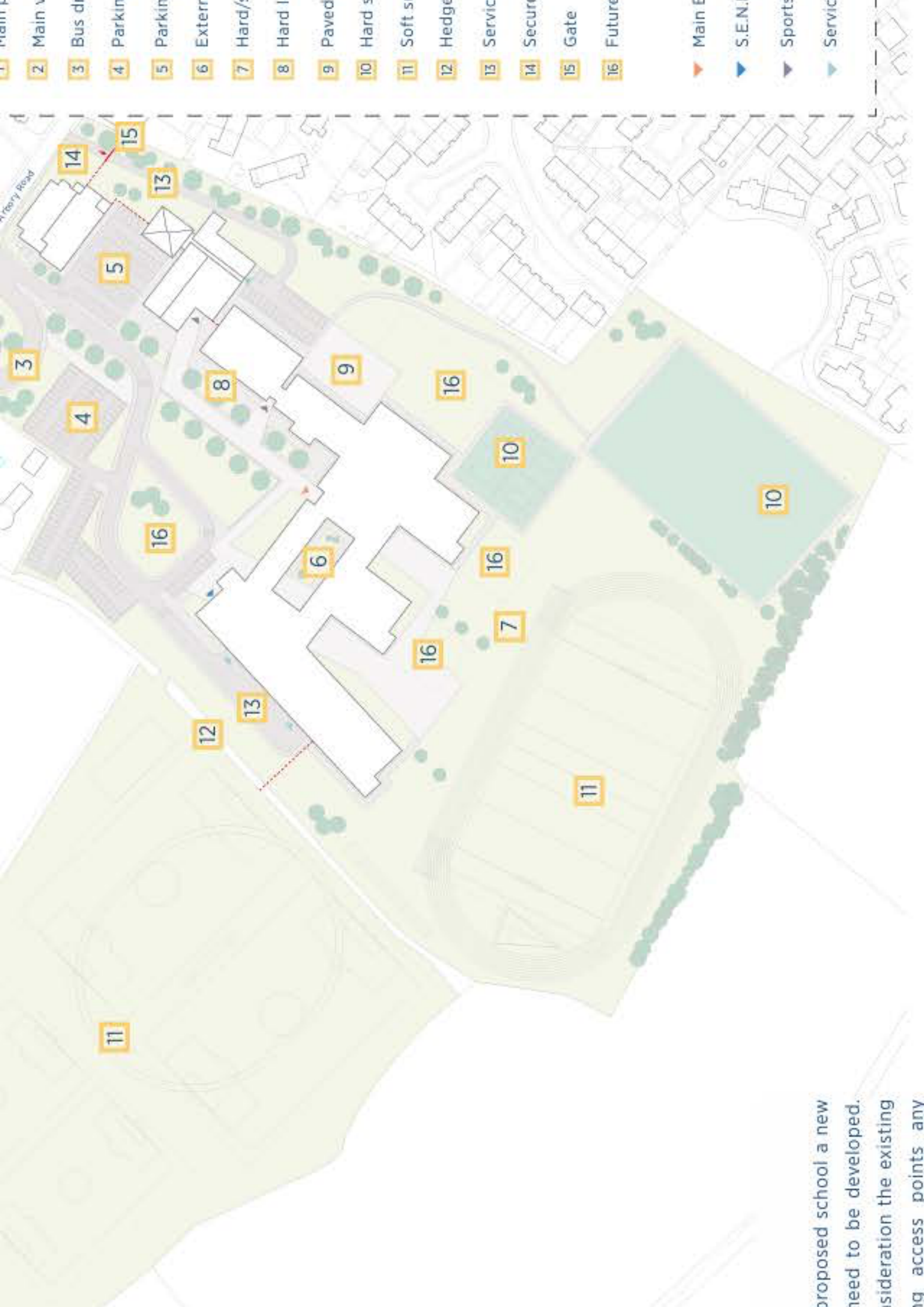




201 - SLT office - assistant head (KS4)
202 - SLT office - assistant head (KS3)
203 - KS3 pastoral office
204 - PA to head
205 - Head's office
206 - Head's wc
207 - SLT office - deputy head (teaching & learning)
208 - T&L/CPD office
209 - Conference/meeting room
210.211 - Emotional first aid office/pastoral room
212 - Emotional first aid waiting area
213 - General office
214 - Lighting/audio control room
215 - Collaborative/breakout space
216 - Staff room (teaching staff)
217 - Art room
218 - Kiln room
219-222 - Specialist store (off art room)
223 - Art room
224 - Sixth form art resource
225 - Sixth form social/study space
226 - Pastoral/parent meeting room
227 - KS5 pastoral/work area







proposed school a new
need to be developed.
consideration the existing
q access points any





Re-provision of Castle Rushen High School with Primary School & Sports Facilities

Masterplan

Appendix A	UK Department for Education Schedule of Accommodation 2FE Primary School
Appendix B	UK Department for Education Schedule of Accommodation 8FE Secondary School (with 200 sixth form places & 16-place SEND unit)
Appendix C	Landscape Strategy Report
Appendix D	Energy & Building Services Outline Report
Appendix E	Phasing Diagrams
Appendix F	Indicative Programme

derations

sis

odation : Schools Internal Area

odation : Schools External Area

odation : Sports & GP

odation : Parking

onsidered : Basic Principles

onsidered : Site Layout & Form Generation

ayout : Ground Floor

ayout : First Floor

cept : 'Commons'

Strategy

vices

e



work to explore the re-provision of the secondary school on the site.

All land has been gifted to IOM DESC to enhance the CRHS site and works have been undertaken to transform this agricultural pitches with provision for ground source heat to provide renewable energy for any new build school.

Swimming Pool is also located on Arbory Rd, sharing an access & parking with CRHS. This public facility is within a building that is therefore beyond the life expectancy of a wet-leisure facility.

On extra land, the site on Arbory Road, including the Southern Swimming Pool, is significant. The total site offers approximately 1.24 acres of land, which is far in excess of the site areas recommended by the UK Department of Education for a secondary school of Castle Rushen. Therefore, IOM DESC has commissioned MDC to produce this masterplan to determine how the site can be efficiently utilised to provide other facilities also.

that the site could be utilised to;

Castle Rushen High School (1000-place secondary school with 200 sixth form places & 15-place SEND unit) primary school (350-place primary school)

Community facilities

Advanced sports 'hub' for the south of the Isle of Man (and for use by CRHS) including;

Swimming pool (6-lane 25m swimming pool with learner pool)

Art sports hall

Dance studios for dance, spinning and gym activities

Seated & supports spaces (including dry, external & wet changing)

Range of external sports pitches & associated changing

Land available for development or other purpose (not determined by this masterplan)

The school would replace the existing Victoria Road Primary School, releasing their existing sites for residential redevelopment.

The school is a conjoined two-storey secondary school and single-storey primary school block (with shared kitchen and plant room) and is accommodating the sports hall, swimming pool, associated facilities and 'community resource' space. Further economies of scale can be achieved in the next phase of design development. The proposed buildings surround a large, shared entrance plaza, creating an 'urban campus'. This plaza connects the buildings to the shared car park and pedestrian / cycle routes. The site provides a wide range of sports pitches and the masterplan proposes the exploration of a 3G pitch on the north of the westerly field.

The report suggests a broad range of external spaces for educational & play purposes across the site as an extension of, and to create additional education spaces. The masterplan proposes 148 parking spaces to service all provisions, however, discussions will need to be held with the planning authority to ensure that this is satisfactory. Bus drop-off areas, suitable to accommodate 12 buses, have been included.

The provision is intentionally scaled for a cohort larger than the current school population to ensure that the proposed buildings can accommodate future growth. The buildings currently available on the CRHS site, to account for the lean nature of the UK DfE recommended areas and to allow for an increase in the pupil populations. Some reduction in area may be possible during the next design phase via consultation with the planning authority.

The land above can be accommodated comfortably within the site on Arbory Road, leaving approximately 5,000m² / 1.24 acres of land for other uses (key worker housing, SEND school provision or care home have all been discussed). The potential of this land and the land surrounding the school site requires more feasibility investigation.

The range of the proposed masterplan is presented by the need to construct on an occupied school site, and complex phasing is required to ensure the site is not lost. Five separate phases of construction result in a 6 year programme, however it is suggested that phases 1 & 2 are enclosed. Likewise phases 3, 4 & 5, to group new build phases with associated demolitions. There is potential opportunity to develop the site in a phased manner.

Key Assumptions

- This document describes a high-level concept design and is intended purely to test the viability of the project, reflecting RIBA stages 0 & 1. Significant design development and survey investigations are required to increase the increased viability of more detailed design decisions. The enclosed drawings are at concept level only and are for further development and stakeholder engagement as the project progresses, no construction drawings have been made using these drawings.
- The internal & external spatial areas that form the basis of the education provisions proposed are recommended areas provided by the UK Department of Education. Increases in gross internal area will impact the budget & programme of the project.
- The enclosed programme, cost & phasing information is based on a two-stage, contractor-led process. The programme anticipates the use of 'modern methods of construction' (maximum off-site techniques). Deviating from these approaches, or undertaking lengthy procurement processes, will impact the budget & programme of the project.
- The drawings that form the basis of this report were supplied by DESC and are presumed to be accurate.
- Unknown ground conditions: no ground condition surveys have been undertaken as part of the project.
- The enclosed designs have only been subject to high-level review by mechanical & electrical engineers. Assessments of the internal environments proposed by the design have been undertaken (including heat gain etc), although specific effort has been made to ensure all teaching spaces have a minimum of natural ventilation via an external wall.
- The enclosed designs have not been subject to design review by structural engineers, therefore any subsequent stages.



Development
Land

Sports Block

Secondary &
Primary
School



	A: DfE (LW) 5FF 75d secondary pupils + 200 sixth formers + 15 SEND unit places (based on 30 pupils per class)	B: DfE (LW) 6FE 90d secondary pupils + 200 sixth formers + 15 SEND unit places (based on 30 pupils per class)	C: DfE (LW) 7FE 105d secondary pupils + 200 sixth formers + 15 SEND unit places (based on 30 pupils per class)	D: DfE (LW) 8FE 120d secondary pupils + 200 sixth formers + 15 SEND unit places (based on 30 pupils per class)	
Castle Rushen	625 secondary pupils + 200 sixth formers + 15 SEND unit places (based on 25 pupils per class)	750 secondary pupils + 200 sixth formers + 15 SEND unit places (based on 25 pupils per class)	875 secondary pupils + 200 sixth formers + 15 SEND unit places (based on 25 pupils per class)	1000 secondary pupils + 200 sixth formers + 15 SEND unit places (based on 25 pupils per class)	Comparison with existing Castle Rushen
Comparison with existing Castle Rushen	7557 -2324	8473 -1408	9389 -492	10303	422
Comparison with existing Castle Rushen	47 -26	54 -19	61 -12	68	-5
Comparison with existing Castle Rushen	73				

*UK Department of Education schools are based on 30 pupils per class, therefore schedules for the primary and secondary pupils and 1200 secondary pupils. DESC aims to teach at 25 per class.

revision of UK Department for Education SoAs with the Existing Accommodation at Castle Rushen High School

DfE (UK) Proposed Areas for				DfE (UK) Proposed Areas for			
900 secondary places (6FE) [750 pupils based on 25 in class]				1200 secondary places (8FE) [1000 pupils based on 25 in class]			
200 sixth form places				200 sixth form places			
15 PD SEND Unit				15 PD SEND Unit			
Space	Space Area (m ²)	Number of Spaces	Total Area (m ²)	Space	Space Area (m ²)	Number of Spaces	Total Area (m ²)
Teaching				Teaching			
General teaching spaces				General teaching spaces			
Classrooms	29	1477		Classrooms	55	26	1430
Seminar rooms	9	234		Seminar rooms	41	3	123
SEN classrooms	1	51	2040	SEN classrooms	41	2	82
				ICT/ business studies			-60
				ICT-rich classrooms	69	4	276
				Business studies classroom	69	1	69
Practical learning spaces				Practical learning spaces			
Science				Science			
Science laboratories	7	597		Science laboratories	83	6	498
Science laboratories (specialist)				Science laboratories (specialist)	97	1	97
Art				Art			
Art rooms (general)	5	290		Art rooms (general)	83	1	83
Art rooms (3D)				Art rooms (3D)	97	2	194
Music and drama				Music and drama			
Music rooms (fitted, extensive)	2	150		Music rooms (fitted, extensive)	69	2	138
Drama studios	3	218		Drama studios	97	1	97
Design and technology				Design and technology			
DT workshops	6	446		DT workshops	111	1	111
Food rooms	2	133	729	Food rooms	97	1	97
DT studios (graphic products)				DT studios (graphic products)	83	1	83
DT studios (textiles)	2	150		DT studios (textiles)	83	1	83
PE basic teaching spaces				PE basic teaching spaces			
Fitness rooms (exercise studio)	1	81		Fitness rooms (exercise studio)	69	1	69
	1	80					-80
Total Teaching	73	4185		Total Teaching		54	3530
Total Secondary & Sixth Large Spaces				Total Secondary & Sixth Large Spaces			
		1472					1324
Total Learning Resource Areas				Total Learning Resource Areas			
		636					394
Total Staff Areas				Total Staff Areas			
	36	610				40	457
Total Storage				Total Storage			
		617					491.5
Float for SRP				Float for SRP			
							41
Total				Total			
		5493					4282



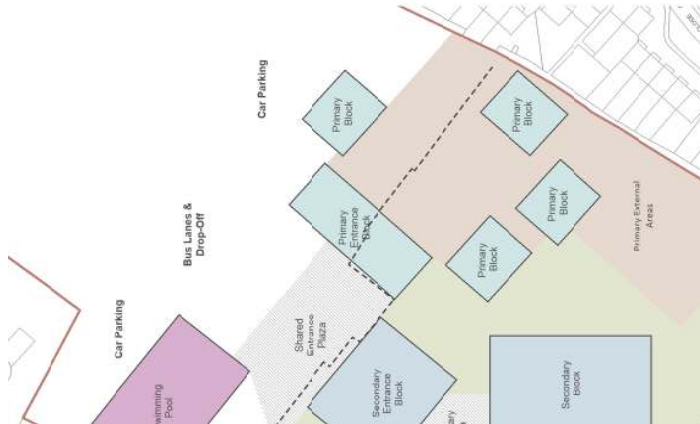
- BASIC SITE LAYOUT**
- OPTION 1: ALL FACILITIES IN REAR OF SITE**
- ADVANTAGES:**
- All provisions constructed during one phase (behind the existing building)
 - Compact layout
 - Releases large area to the front of the site for public realm and potential other development
- DISADVANTAGES:**
- Deficit in external areas for primary & secondary school compared with UK DfE recommended external areas
 - Safeguarding issues for primary pupils due to increased level of shared, as a result of reduced external areas
 - School & sports provision hold no street frontage
 - Only limited parking could be provided during demolition
- OUTCOME:**
- Disregarded mainly on educational grounds; below standard external areas would be provided.



- BASIC SITE LAYOUT**
- OPTION 2: SPORTS FACILITIES BUFFER BETWEEN PRIMARY & SECONDARY PROVISIONS**
- ADVANTAGES:**
- Partially autonomous primary school site
 - Straightforward safeguarding
 - Some level of 'campus' created around shared entrance plaza
- DISADVANTAGES:**
- Limited opportunity for sharing between primary & secondary school provisions
 - Primary school does not have access to the school field - use of playing fields would need to be managed
- OUTCOME:**
- Disregarded due to the primary schools inability to access green playing field space.



- BASIC SITE LAYOUT**
- OPTION 4: PROVISIONS SITUATED IN ENTRANCE PLAZA, CREATING A CAMPUS**
- ADVANTAGES:**
- All provisions situated in entrance plaza, creating a campus
 - Adjacency of primary & secondary school allows for high or low level of integration
 - Releases large area for other potential other development
- DISADVANTAGES:**
- Primary school a separate development
 - Single vehicular access
- OUTCOME:**
- Developed into new school



Options for all Facilities



OPTION 2A : Distinct Blocks for Secondary, Primary & Sports Provisions

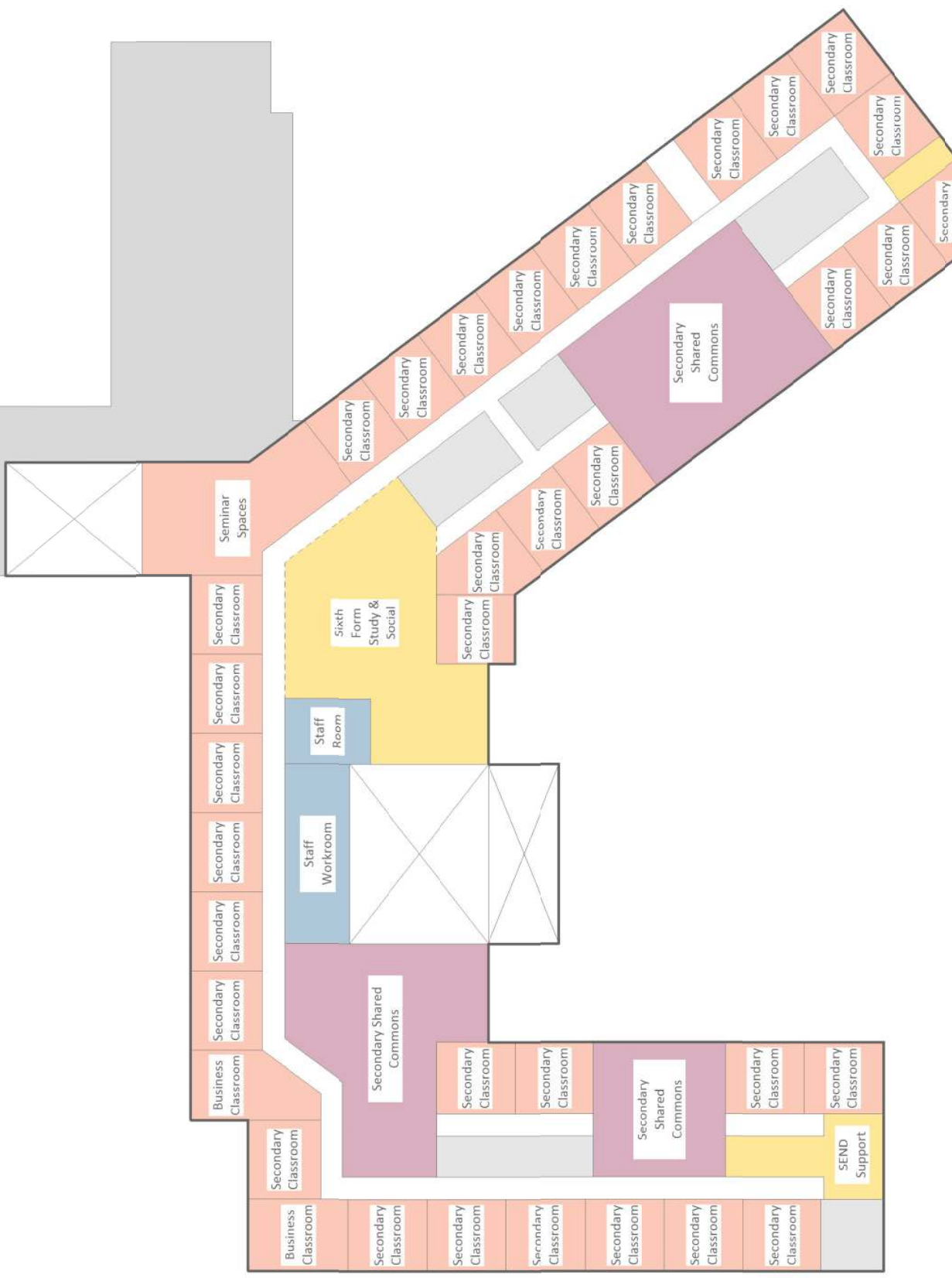
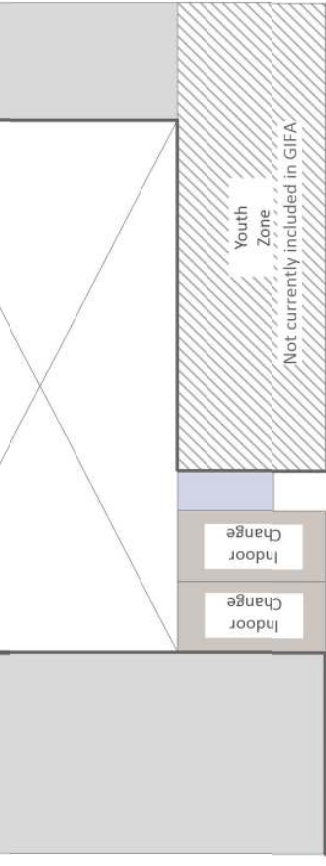


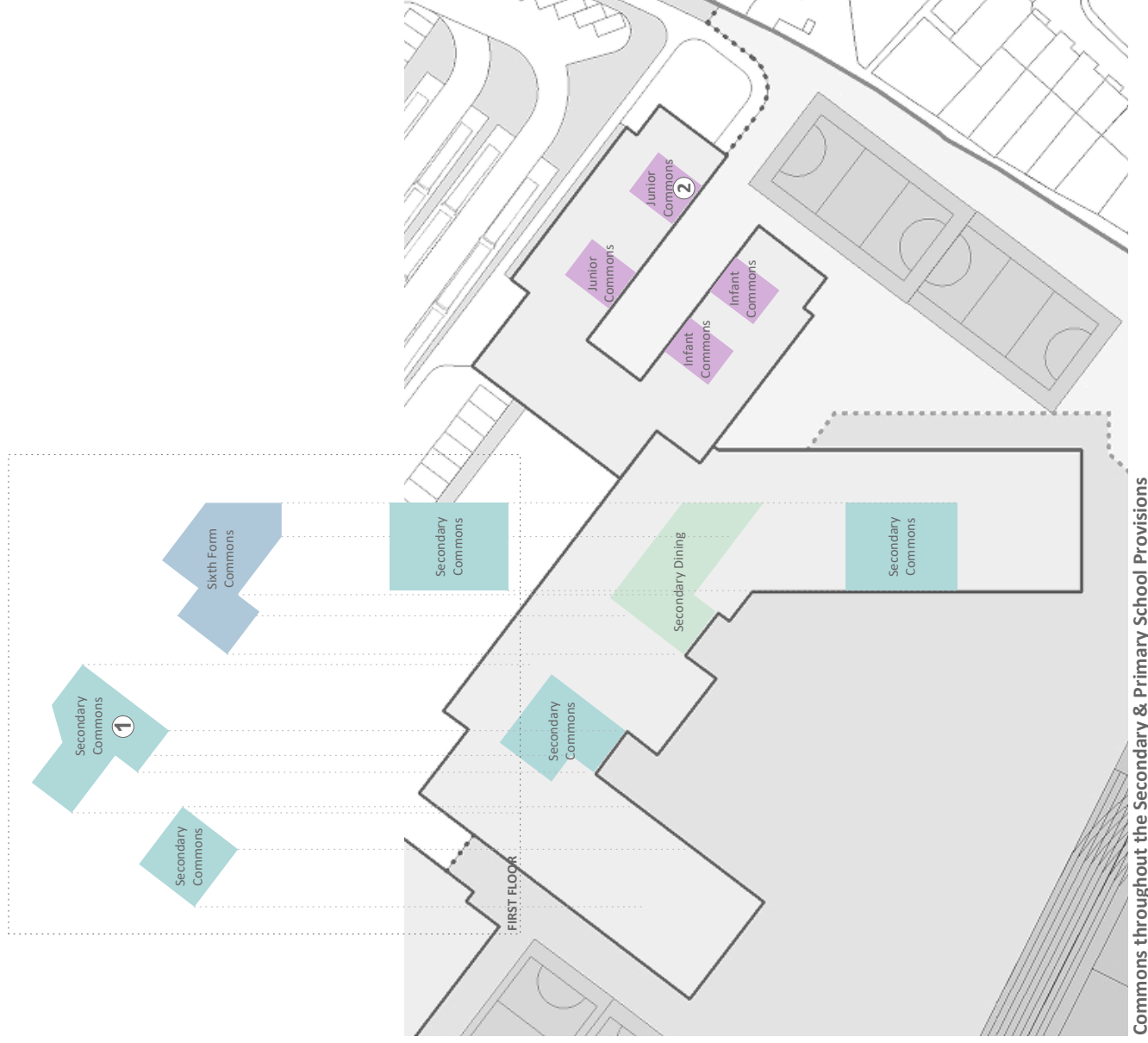
OPTION 2C : Merged Education Provisions with Separate Sports Block



OPTION 2D : Merged Education Provisions with Secondary Wing Positioned Design (East-West facing classrooms)







The proposed primary & secondary schools include a number of 'commons' spaces which operate as a mostly open area providing a multitude of social & educational environments. These spaces provide flexibility and encourage independent learning via the notion that pupils learn differently and therefore need a wide choice of spaces for a multitude of activities, learning styles and even neurodiversities.

The breath of spaces available is based on the theories & research of David Thornbury, who suggests the following types of space;

- Mountaintop - for practicing presentation skills
- Cave - sheltered spaces for concentrating
- Campfire - for smaller teams to focus on discussion, storytelling & debate
- Watering hole - a place for informal learning with peer-engagement
- Hands-on - a design principle that recognises the value of sensory learning experiences through exploring or practical prototyping.

Each principle enables and supports a learning scenario shaped by the degree of contact with other learners. Some spatial concepts direct and concentrate attention, while others harness the energy of the pupils.

Currently the design proposal includes 5 secondary 'commons' (plus dining & sixth form common room) and 4 primary 'commons'.







acent field into the school site has given opportunity to go above and beyond in terms of
ilities for different kinds of amenity, teaching and sport beyond the usual ball-related team

onal areas, closely related to indoor classroom spaces will give flexibility of use for break-out
r. These spaces can be constructed relatively cost-effectively and will add to the options for

ampus have been utilised with a trail of activity spaces around the whole campus.

for inter-generational and school/ community joint projects on the site to open up the campus
community on the back of the health and swimming uses.

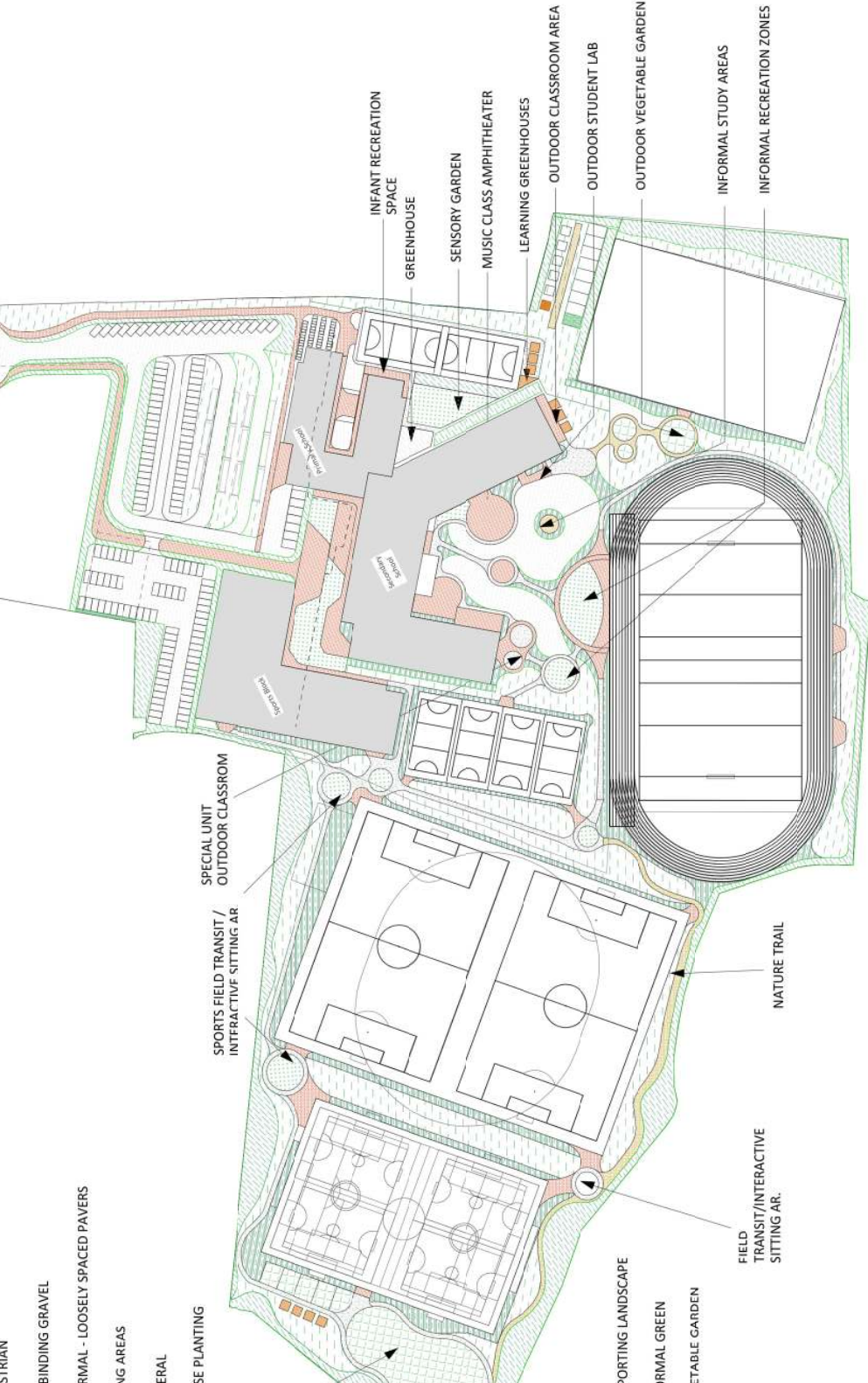




Sensory Garden



Secondary Study Area



emerging proposals to be implemented in the project, to deliver an exemplar environmental solution for demonstrating cost effectiveness.

” approach to maximise energy conservation through high performance of the buildings’ thermal envelope for passive design (natural ventilation where appropriate, passive solar heating, daylighting etc)

services that optimise and simplify Energy Efficiency & Management through low energy systems and ease

- High efficacy lighting throughout
 - Demand-led control on all energy systems
 - High Efficiency motors with variable speed drives — pump and fan selections to minimise energy consumption
 - Low pressure ventilation and hydraulic systems.
 - Consideration to pool filter technologies minimising water and energy use
 - High quality pool covers
 - Heat recovery to all mechanical ventilation systems and warm-water drainage outflows.
- ble energy technologies for *Embedded Energy* generation.
- Maximising the potential for ground-source energy solutions, utilising pipe arrays, already installed under the playing fields.

b. Solar energy following industry targets — 70% of roof area. This may be in the form of Photovoltaics, electricity generation and/or Solar thermal hot water generation (for pool system).

c. Review the pros/cons of other LZC technologies including the use of wind and biomass for the site, in conjunction with wider IoM energy reviews, considering fuel supply, available skills energy security and planning.

d. Options for energy storage in conjunction to the inter-connection of the three buildings to maximise the on-site usage of embedded energy.

6.9 Phasing & Programme

The full 'Phasing Diagrams' are included as Appendix E.
A indicative Programme is included as Appendix F.

The most significant challenge of the proposed masterplan is presented by the need to construct on an complex phasing is required. Five separate phases of construction result in a 6 year programme (alth proposed facilities could be in operation with 4 years). There is potential opportunity to compress this prop the existing school facilities during certain stages of construction (the programme & phasing presented existing school as little as possible), this potential would need to be explored with the school & DESC during development.

The proposed five phases of construction cover;

Phase 1 - construction of proposed secondary school behind existing facilities

Phase 2 - demolition of existing secondary school (leaving existing sports facilities & swimming pool)

Phase 3 - construction of proposed primary & sports facilities

Phase 4 - demolition of existing sports facilities & swimming pool

Phase 5 - clear development land on Arbory Road

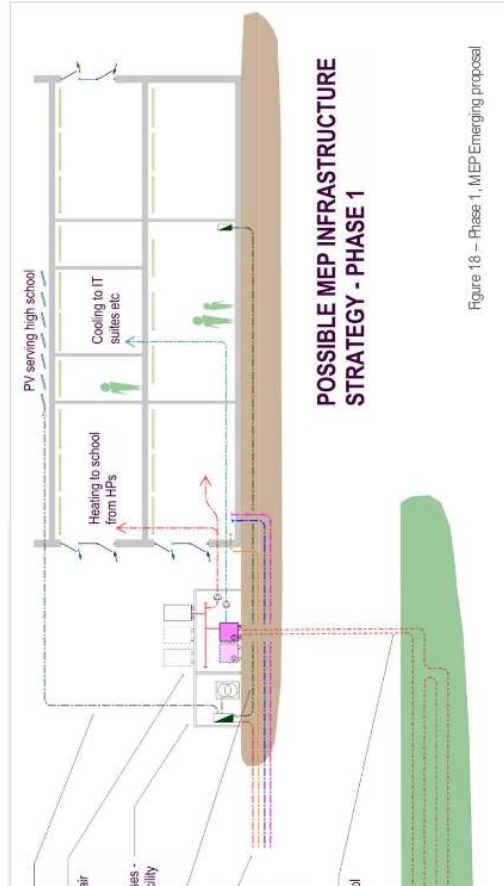
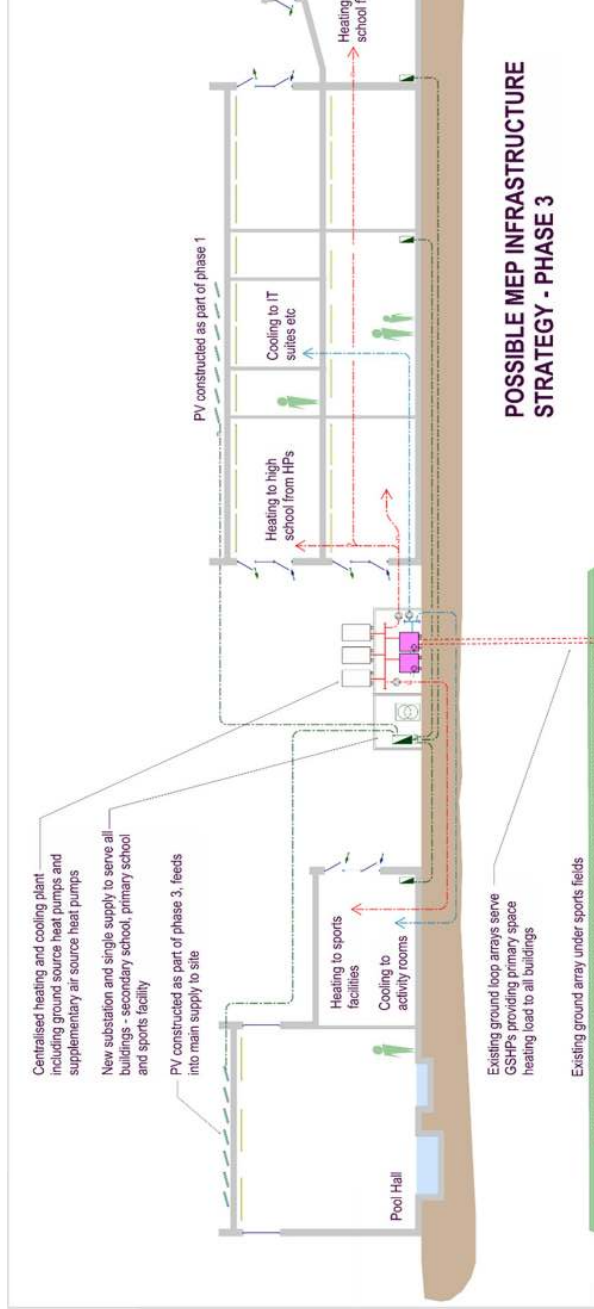


Figure 18 – Phase 1, MEP Emerging proposal



ent for Education Schedule of Accommodation 2FE Primary School

ent for Education Schedule of Accommodation 8FE Secondary School (with
-place SEND unit)

strategy Report

uilding Services Outline Report

grams

rogramme

[illegible]

SCHEDULE OF ACCOMMODATION FOR ANY MAINSTREAM SECONDARY SCHOOL										Version 8.2 April 2022					
		age range		11-16		school name		Castle Rushen Secondary School		date		as a check, if new:			
		check age range and places		years											
1200 0 0.0%		8 FE classes of 30		11 to 16 places 16 to 19 places		1200 200		5		net capacity for SoA below = 1400 within a potential range of: 1374 to 1527		site: area (m ²) type ample site number of storeys: 2-storey existing buildings to be: none (all new)		net capacity for recommended SoA below: 1400 1374 tc 1527	
		Total Mainstream Places		1400											
		Additionally resourced places for: designated unit for PD		15 SEN						curriculum B: music/ sports					
		curriculum analysis data		manual											
Parent ADS code	Final ADS code	Space type	existing or new (rev if blank)	max. group size	average area of space (m ²)	TOTAL no. of spaces	TOTAL AREA (m ²)	NON-NET AREA (m ²)	SUPP AREA (m ²)	AREA OF RE-TAINED SPACES	area of space (m ²)	no. of spaces			
		Basic Teaching Area													
		General teaching spaces													
		Classrooms	0			(39)						(39)			
CLA02	CLA02	Seminar rooms		22	41	3	123				41	3			
CLA12	CLA12	Classrooms (general)		30	55	34	1870				55	34			
-	-	-													
CLA60	CLA60	Secondary SEN classrooms (ambulant)		10	41	2			82		39	2			
		ICT/ business studies	0			(6)						(6)			
CLA32	CLA32	ICT-rich classrooms		33	69	5	345				62	5			
CLA32	CLA42	ICT-rich classrooms (business studies)		33	69	1	69				62	1			
-	-	-													
		Practical learning spaces													
		Science	0			(9)						(9)			
SCIO2	SCIO2	Science studios		30	69						69				
SCIO5	SCIO5	Science laboratories		30	83	8	664				83	8			
SCIO5	SCI15	Science laboratories (specialist)		32	97	1	97				90	1			
-	-	-													
		Art	0			(4)						(4)			
DAT02	DAT02	Art rooms (general)		30	83	2	166				83	2			
DAT02	DAT03	Art rooms (3D)		30	97	2	194				97	2			
-	-	-													
		Music and drama	0			(4)						(4)			
PER02	PER03	Music rooms (fitted, extensive)		33	69	2	138				69	2			
PER05	PER05	Music and drama classrooms		30	83	1	83				83	1			
PER15	PER15	Drama studios		35	97	1	97				90	1			
-	-	-													
		Design and technology	0			(5)						(5)			
DAT43	DAT43	DT workshops		28	111	1	111				104	1			
DAT43	DAT44	DT workshops (2 of 2)		24	97	1	97				96	1			
DAT35	DAT35	Food rooms		24	97	1	97				96	1			
-	-	-													
DAT12	DAT22	DT studios (graphic products)		25	83	1	83				83	1			
DAT20	DAT25	DT studios (textiles)		25	83	1	83				83	1			
-	-	-													
		PE basic teaching spaces	0	All PE Spaces		(4)									

SoA FOR MAINSTREAM SECONDARY (cont.)				average area of space (m ²)	TOTAL no. of spaces	TOTAL AREA (m ²)	SUPP AREA (m ²)	AREA OF RE- TAINED SPACES	recommended area of space (m ²)	no. of spaces
Castle Rushen Secondary School										
Staff and Administration Areas										
OFF33	OFF33	Staff workrooms (teaching staff)	9	23	5	115			23	5
OFF33	OFF32	Staff workrooms (smaller teaching team)	6	17	3	51			17	3
OFF50	OFF52	Staff rooms (social)	33	55	1	55		including kitchenette and pigeon holes	55	1
OFF40	OFF40	Meeting rooms (conference)	11	23	1	23			23	1
ADM32	ADM32	Reception areas, community (50% circulation)	-	8	1	4	4		4	4
ADM22	ADM22	Kitchenettes, bay	1	3	5	15		for community use outside core hours	3	5
OFF33	OFF34	Staff workrooms (specially resourced)	3	10	1		10	off each Staff workroom (teaching staff)	10	1
Admin suite								reception desk options office with 2 recep desks		
ADM11	ADM11	Enclosed offices, admin (head)	6	16	1	16			16	1
ADM11	ADM13	Enclosed offices, admin (PA)	1	8	1	8			8	1
ADM08	ADM08	Reprographics rooms	4	20	1	20			20	1
ADM05	ADM07	Enclosed offices, with recep desk (and window)	12	48	1	48		to match option above	48	1
-	-	-	-	-	-	-	-		0	0
ADM31	ADM31	Reception areas, entrance (50% circulation)	-	16	1	8	8	net area of this space only	8	8
ADM02	ADM02	Confidential meetings rooms (interview)	4	6	1	6		adjacent to entrance/reception	6	1
ADM03	ADM03	First aid posts (sick bay)	4	9	1	9		adjacent to entrance/reception	9	1
Offices								19)		
OFF00	OFF01	Offices (1-person)	1	7	6	42		e.g. assistant head or pastoral head	7	6
OFF00	OFF11	Offices (with meeting area, 1-person)	3	9	8	72			9	8
OFF00	OFF02	Offices (2-person)	2	9					9	
OFF00	OFF12	Offices (with meeting area, 2-person)	4	11					13	
OFF00	OFF23	Offices (SENco, learning support)	4	11	1	11		e.g. SENco and learning support	11	1
OFF33	OFF37	Staff workrooms (ICT technicians)	2	11	1	11			11	1
OFF33	OFF38	Staff workrooms (premises)	2	11	1	11			11	1
TOTAL AREA BB103 range 380 to 680						525	12	10	OK: area within recommended range	525 (10)
Storage: teaching storage										
STT10	STT13	Teaching resources stores (IT/ GT off corridor)		5	8	40		42 m ² total recommended	5	8
STT20	STT21	Science prep rooms (central)		97	1	97		97 m ² minimum recom'd	97	1
STT23	STT23	Chemicals stores, science		10	1	10		10 m ² minimum recom'd	10	1
STT20	STT22	Science prep rooms (satellite)								
STT10	STT16	Teaching resources stores (off art room)		5	8	40		minimum 2 stores off each art space	5	8
STT32	STT32	DT prep rooms		34	1	34		34 m ² min recom'd for 1 workshop	34	1
STT34	STT34	Food prep rooms		10	1	10		10 m ² minimum recom'd	10	1
STT10	STT18	Teaching resources stores (off DT studio)		5	6	30		2 stores off each light practical space	5	6
STT10	STT17	Teaching resources stores (music)		5	2	10		shared stores for music suite	5	2
STT08	STT08	Equipment stores, drama		10	1	10		1 store off any drama space	10	1
STT35	STT35	Food stores, off food room		5				music instrument store recommended	5	
STT10	STT41	Teaching resources stores, room (off LRC)		3	1	3			3	1
STT00	STT42	Classroom stores, room (off SEN room)		5	3	5	10		5	3
-	-	-								
STH00	STH01	Sports equipment stores, internal (sports hall)		60	1	60		60 m ² minimum recom'd	60	1
STH00	STH02	Sports equipment stores, internal (community)		4	1	4		may be locked cage in main PE store	4	1
STH00	STH03	Sports equipment stores, internal (activity studio)		15	1	15		15 m ² minimum recom'd	15	1
STH05	STH05	Sports equipment stores, external		8	1	8			8	1
Non-teaching storage										
STH10	STH11	Furniture stores (chair/ table, off hall)		23	1	23		23 m ² recom'd for chairs and tables	23	1
STN20	STN22	General storerooms (central stock)		7	2	14			7	2
STN50	STN50	Secure storerooms		8	2	16			8	2
CIR06	CIR06	Equipment stores, appliance bay		1.5	7	9.0	1.5	as 'bays' off circulation areas	1.5	7
STH20	STH20	Retractable seating storage (off hall)		16	1	16			16	1
-	-	-								
STN00	STN02	Coats and bags stores (lockers)		12	6	72		89% of pupils can have locker if 4 tiers	12	6
STN00	STN03	Coats and bags stores (community lockers)		3	2	3	3	for community use outside core hours	3	2
STN31	STN31	Cleaners' stores		1.5	10	15.0			1.5	10
STN32	STN32	Equipment stores, maintenance		8	1	8		1 of 8m2 minimum recommended	8	1
TOTAL AREA BB103 range 510 to 810						552.0		14.5	OK: area within recommended range	552 (15)
Float 0 to 790								41	no float available but supp float	0 (41)
Total Net Area BB103 range 7400 to 8135				188	220	7400	12	188	OK	7400 (188)
Non-net Area										
KIT00	KIT01	Food prep areas, kitchen (servery & wash-up)		115	1	114	1	108 m ² min recom'd for full service	115	1
KIT11	KIT11	Offices, kitchen		4.5	1	4.5			4.5	1
KIT20	KIT21	Food stores, kitchen (dry)		5.5	1	5.5			5.5	1
KIT25	KIT25	Cold stores, kitchen		5.5	1	5.5			5.5	1
KIT25	KIT26	Cold stores, kitchen (freezer)		4	1	4			4	1
KIT40	KIT40	Toilets, kitchen (with changing area)	4	7	1	7		143 m ² min recom'd for total kitchen area	7	1
Toilets (and personal care)								(pupil toilets: 72 recom'd 76 provided)		
TOC01	TOC01	Changing rooms, with showers (pupils)	71	80	2	160		160 m ² for 140 incl shower cubicles	80	2
TOC02	TOC02	Accessible (and staff) changing rooms	1	6	2	12		6 m ² minimum including shower	6	2
TOC04	TOC04	Hygiene rooms	1	12	2	12	12	12 m ² minimum if ceiling-mounted hoist	12	2
TOC10	TOC13	Toilets, suite (pupils)	10	32.5	6	195			32.5	6
TOC10	TOC14	Toilets, suite (pupils, other)	2	6	6	30	6.0		6	6
TOC15	TOC15	Toilets, individual (pupil)	1	2	2	4			2	2
TOC10	TOC12	Toilets, suite (staff)	2	6	2	12			6	2
-	-	-		0		0				
TOC21	TOC21	Accessible (and staff) toilets		3.75	4	11.25	3.8	also for visitors and staff	3.75	4
Plant indicative % of net area: for new: 1.7% incl ICT hubs and risers								1.6% for supp		1.7%
PLA20	PLA21	Plant rooms (heat source)		37	1	36	1	37 m ² minimum recom'd in new build	37	1
PLA20	PLA23	Plant rooms (cold water tanks)		33	1	32	1	33 m ² minimum recom'd in new build	33	1
PLA20	PLA25	Plant rooms (electrical intake)		33	1	32	1	33 m ² minimum recom'd in new build	33	1
PLA20	PLA22	Plant rooms (ventilation)	CTS	0.1	1	0.1		Contractor to add if provided		
PLA20	PLA07	Stairways, plant	CTS	0.1	1	0		Contractor to add if provided		
-	-	-								
PLA05	PLA05	Switch rooms, distribution boards		1	16	16		including electrical risers	1	16
PLA06	PLA06	Services shafts (risers, flues and ducts)	CTS	0	1	0		Contractor to add if provided		
PLA30	PLA30	Light wells	CTS	0	1	0		Contractor to add if provided		
PLA10	PLA15	Server rooms (5-cabinet)		18.4	1	18.4			18.4	1
PLA10	PLA18	Server rooms (ICT hub)		7.5					7.5	0
Circulation indicative % of net area: for new: 26.1% incl circ noted above (12)								29.9% for supp	(12)	25.9%
CIR12	CIR12	Stairways (area per floor)		27	10	270		25.0% of net min circulation for 2 storeys	27	10
CIR13	CIR13	Lifts (area per floor, incl space to wait)		4	4	16		26.0% of new build net area recommended	4	4
CIR03	CIR03	Lobbies		4	2	8			4	2
-	-	-								
CIR00	CIR00	Circulation spaces (horizontal) remaining		1672		1616	56	incl corridors and horizontal circulation	1611	
Partitions indicative % of net area 4.4% for new build						326	8	4.3% for supp	326	4.4%
TOTAL AREA BB103 range 2960 to 3330						2959.6	89.8	OK: area within recommended range	2960.15	(90)
Total Gross Area BB103 range 10360 to 11790				278	323	10360	277	OK	10360.2	(277)
Total Gross Area (including supplementary area)						10637		of which retained, so: gross area to be built*	10637	m ²
Gross area as proportion of net						140%		148%		

CASTLE RUSHEN SCHOOL

LANDSCAPE PROPOSALS
OCTOBER 2022

All dimensions to be checked on site.
Figured dimensions to be read in preference to scaled.
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Revision	Description	By	On
1	12.3 Masterplan mark-ups	abc	24/10/22



DRAFT

LANDSCAPE MASTERPLAN

Client	Scale	Created by	Last edited by	Date
Job title	1:2000 @ A3	[name]	SAKSHI	October 2022
Drawing title	Project number	Drawing number	Issue	Checked
	22.533-S1	A3	D 12.3	(BLANK)

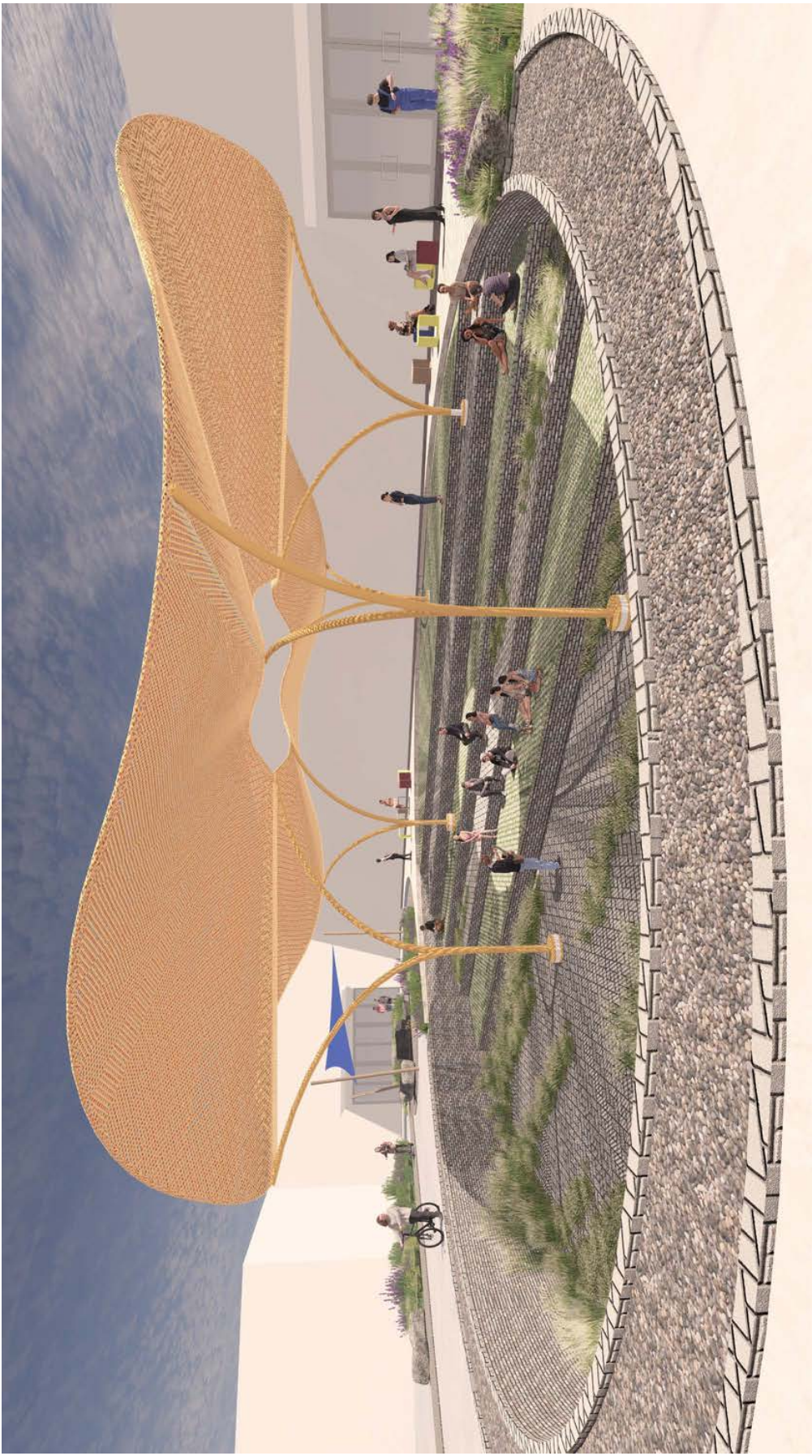
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AERIAL VIEW



AXONOMETRIC VIEW





MUSIC / PERFORMANCE AMPHITHEATRE



SENSORY / QUIET GARDEN



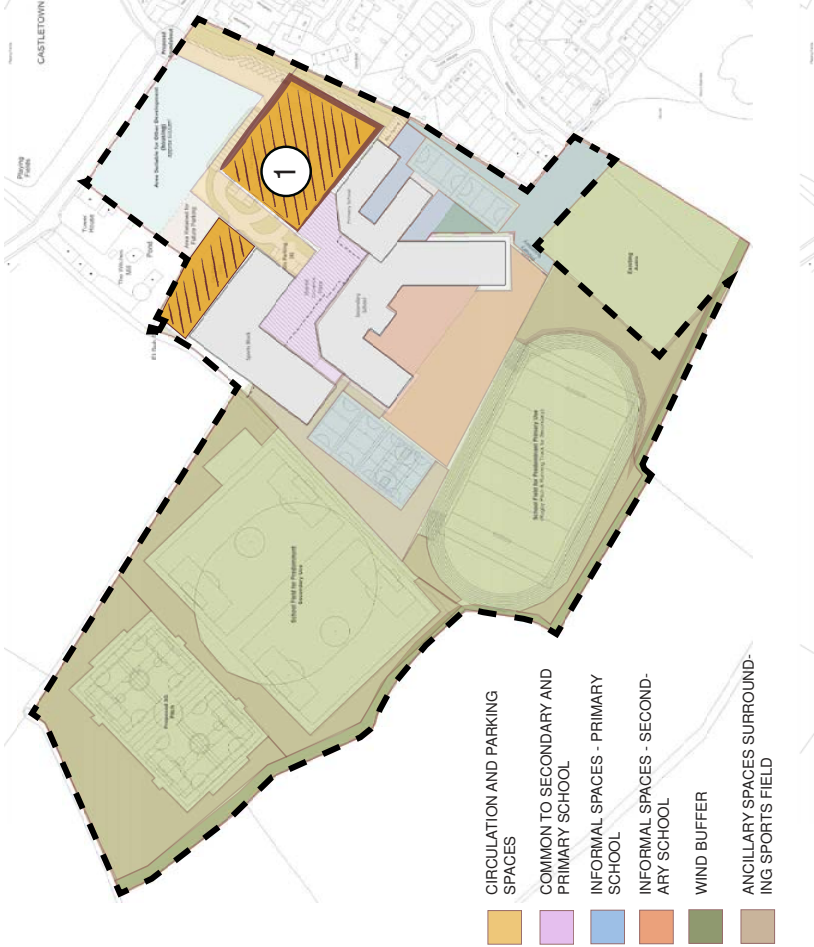
OUTDOOR STUDY AREA



OUTDOOR STUDY AREA

PRECEDENT STUDIES FOR EACH OF THE KEY ZONES:

1. CAR PARK



The parking zones flank the entrance pathway to the school, with pedestrian and bicycle access having priority and segregated from vehicles, making arrival and sometimes a safer more pleasant experience.



Adding colour to the parking zone allows the entrance zone to be a more inviting space, not visually dominated by vehicles and allowing for other uses 'out-of-hours'.





Permeable surfaces and addition of green elements will soften the impact.



A canopy of trees to parking areas and climbers over pedestrian routes will provide shade sand shelter.



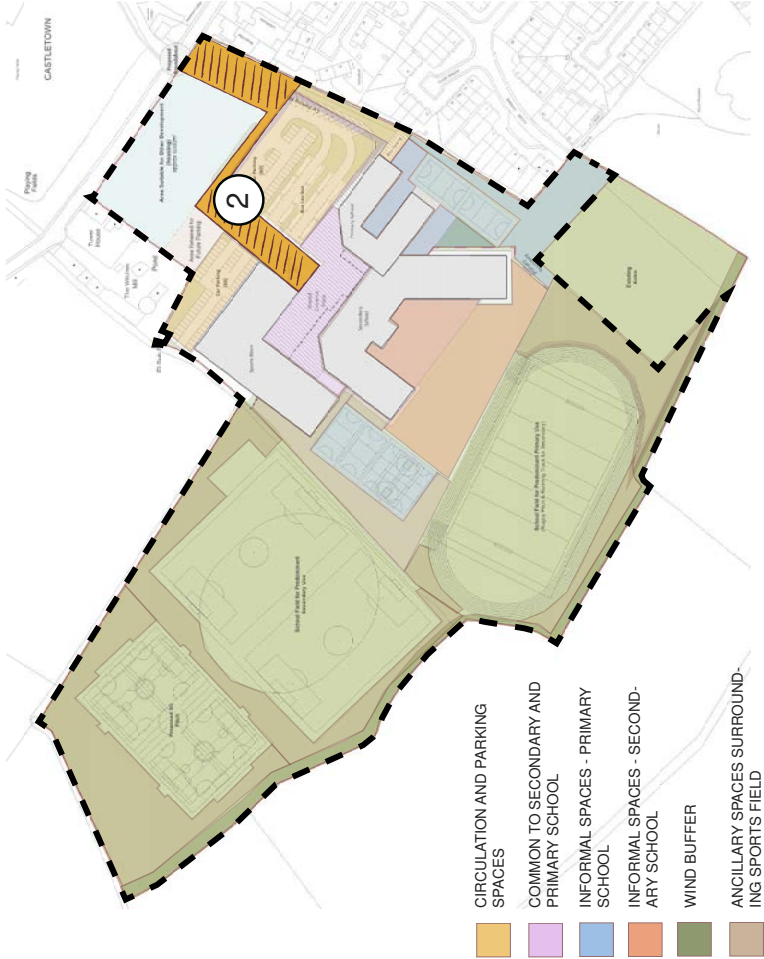
Bike parking in green enclosures



Art installations (that could be designed by staff and students) could enhance the 'processionary' entrance path



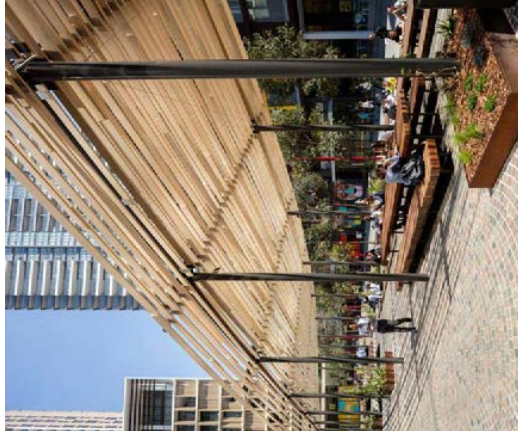
2. ARRIVAL ZONE



The entrance /exit pathway acts as a 'processionary' route, opening up into the entrance plaza. Protected from vehicles, this zone is an opportunity for celebration of the school's ethos, ambience, alumni etc- a 'front of house' space to the wider world.



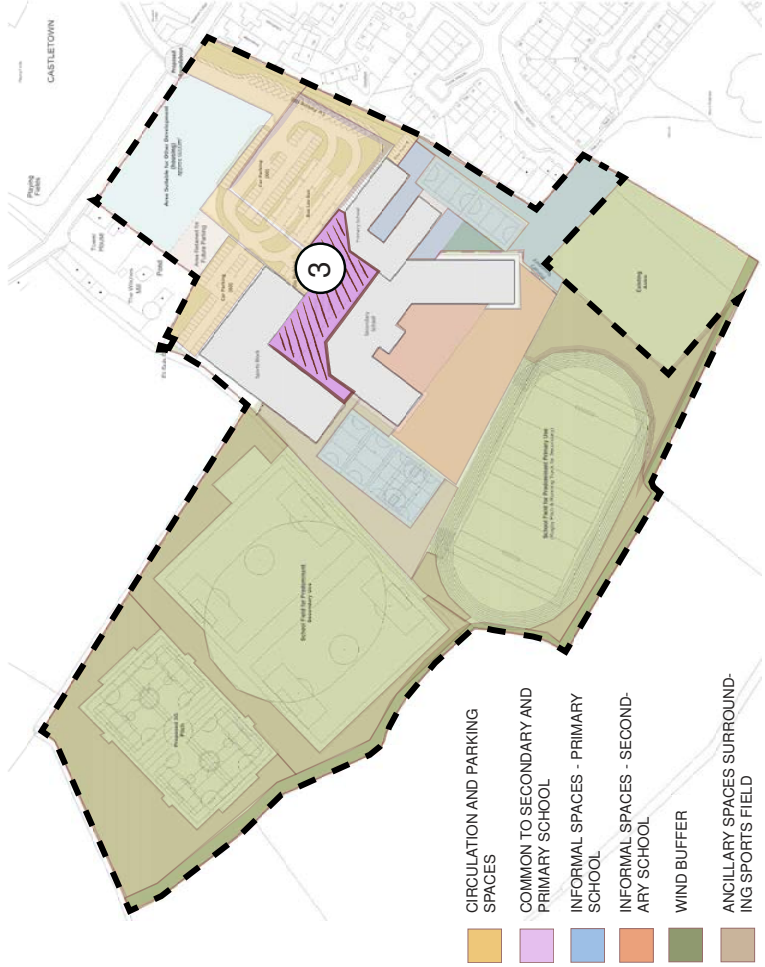
Surface treatment with different patterns and textures of locally sourced stone and brick reflecting the



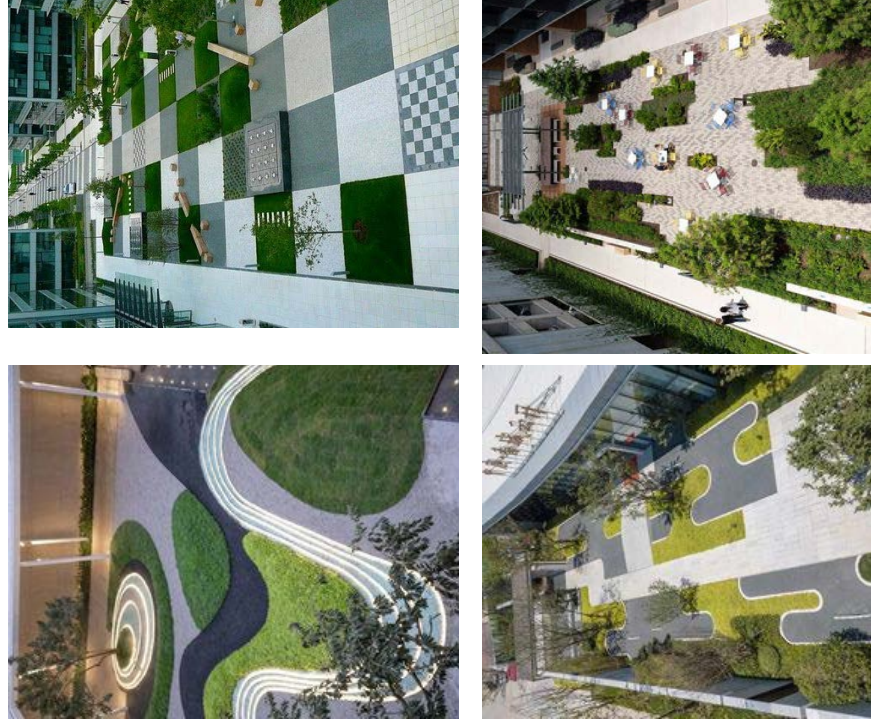
Incorporating permeable surface treatments such as planting and gravels to soften the hard landscape and help with attenuation of rainwater run-off.

Possible use of canopies to shelter the waiting /pick-up locations and across the campus generally.

3.ENTRANCE PLAZA



The entrance path opens into the plaza flanked by the primary, secondary and sports hall on all sides.



Plaza surface paving treatment could be strong and bold with carefully placed planting to define routes.



Colourful seating and site furniture could create attractive social spaces in the plaza, arranged for all kinds of interaction- and none.



The plaza serves as a place of transit/ reconvening between classes, having scope to be used for local events and gatherings.

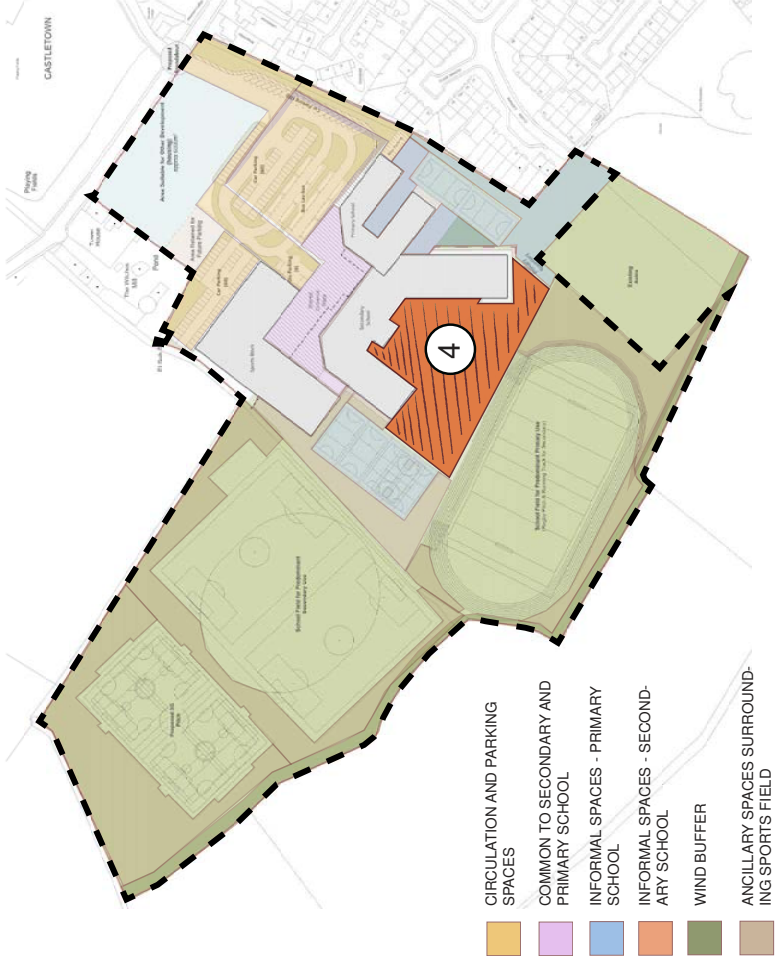


Canopies over seating or communal teaching spaces.



Site furniture and seating with green roofs.

4.INFORMAL SPACE - SECONDARY SCHOOL USE



Creative and science classes open into the secondary informal space which eventually spills into the rugby field.



Creating a multi-faceted area with ample space for recreation, outdoor lessons, exhibition/performances.

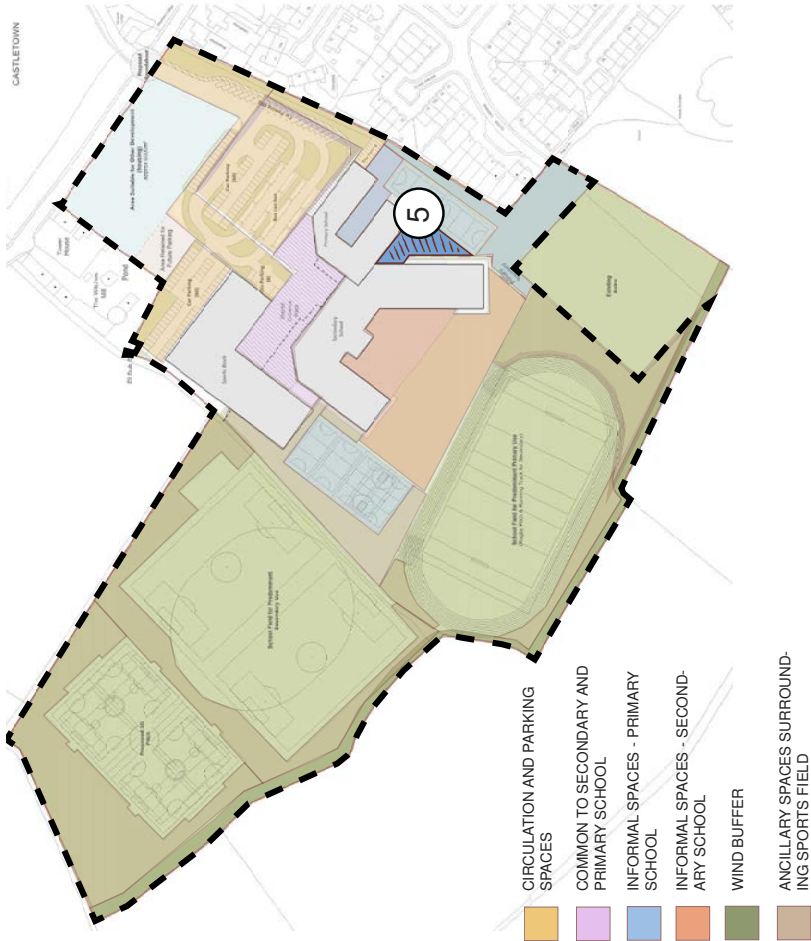




A series of 'pods' of various sizes associated with various classrooms could facilitate outdoor lessons, experiments, measurements etc can be done linking into many areas of the curriculum including agricultural / market gardening / foraging etc.



5. INTIMATE CORNER - PRIMARY SCHOOL USE



Opening up from the reception the intimate corner is flanked and sheltered by the primary school and secondary school blocks on either side.



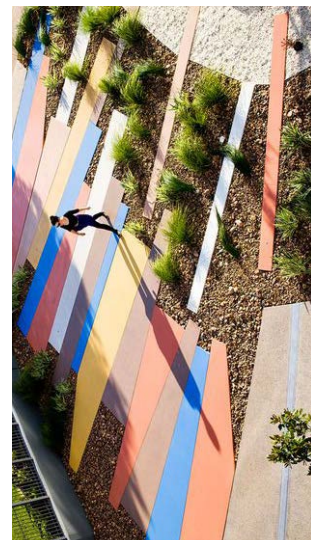
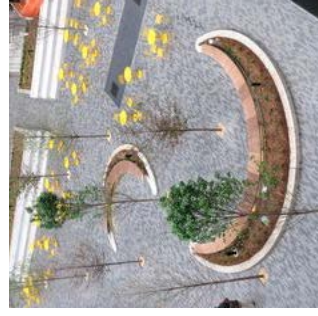
Creating a five senses garden that promotes sensory learning and offers a quiet break from the bustling school yard.



Green buffer from the hard P.E areas offer a 'safe-haven' where trails, organic gardening, textured floor beds promote solitary play and learning in a calmer setting.



Use of varying colours, shapes and textures add a sense of fun and frolic into the school routine between classes and could co-ordinate with the interior design



Canopies leading from the entrance path could become more vivid in colour as they approach the primary school yard.

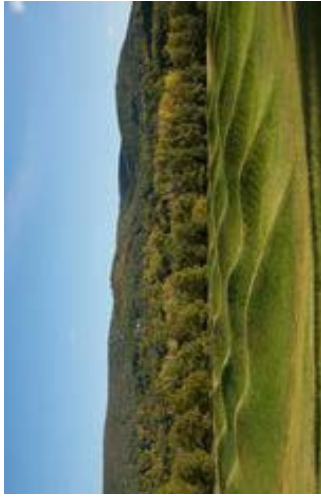


Canopies spanning across the courtyard with interplay of hardscape and softscape are a cost effective way of providing further teaching space- making appropriate allowance for Manx weather.

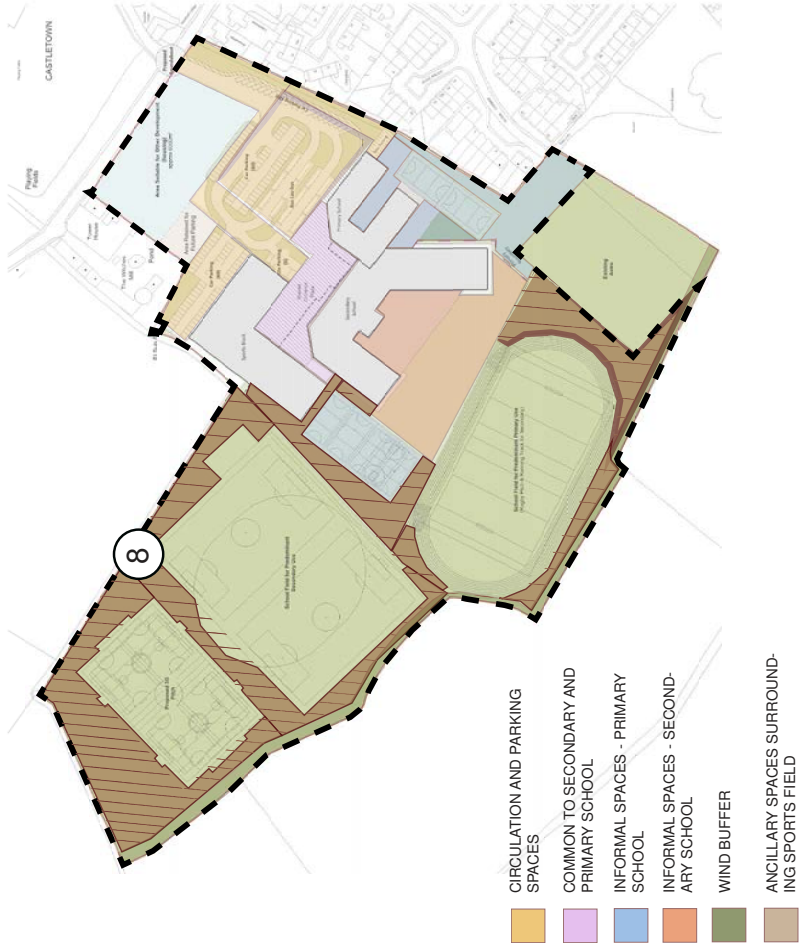


Wind buffer greenery planted over artificially created mounds offer an organic meandering pathway to connect nodes around soft P.E grounds.

These mounds could utilise surplus excavated material to prevent this being taken off site, and the additional height created will make the shelter belt planting more effective more quickly.



8. 'NODES' SURROUNDING SPORTS FIELDS



Nodes between soft P.E. fields can be used to educate students on the region's biodiversity, organic farming, foraging etc.

The site offers ample opportunity for creation of organic informal nodes that can be used alternatively by primary and secondary students with scope for local usage on weekends.

Planter-clad pathways and nodes can offer interesting transit and sitting spaces while supporting organic produce.



Intersection between transit routes around fields can be utilized for organic farming by locals grounds.



8. 'NODES' SURROUNDING SPORTS FIELDS

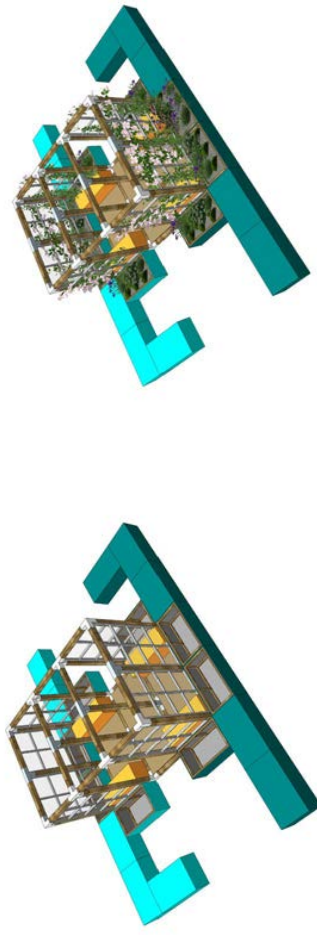


Nodes offer opportunities for primary and secondary students and locals to interact through growing oriented activities, which could tie into the school kitchen or other local food -related ventures.

Children could be enabled to plant and tend for food that they then harvest, cook and eat themselves in school as part of the curriculum.



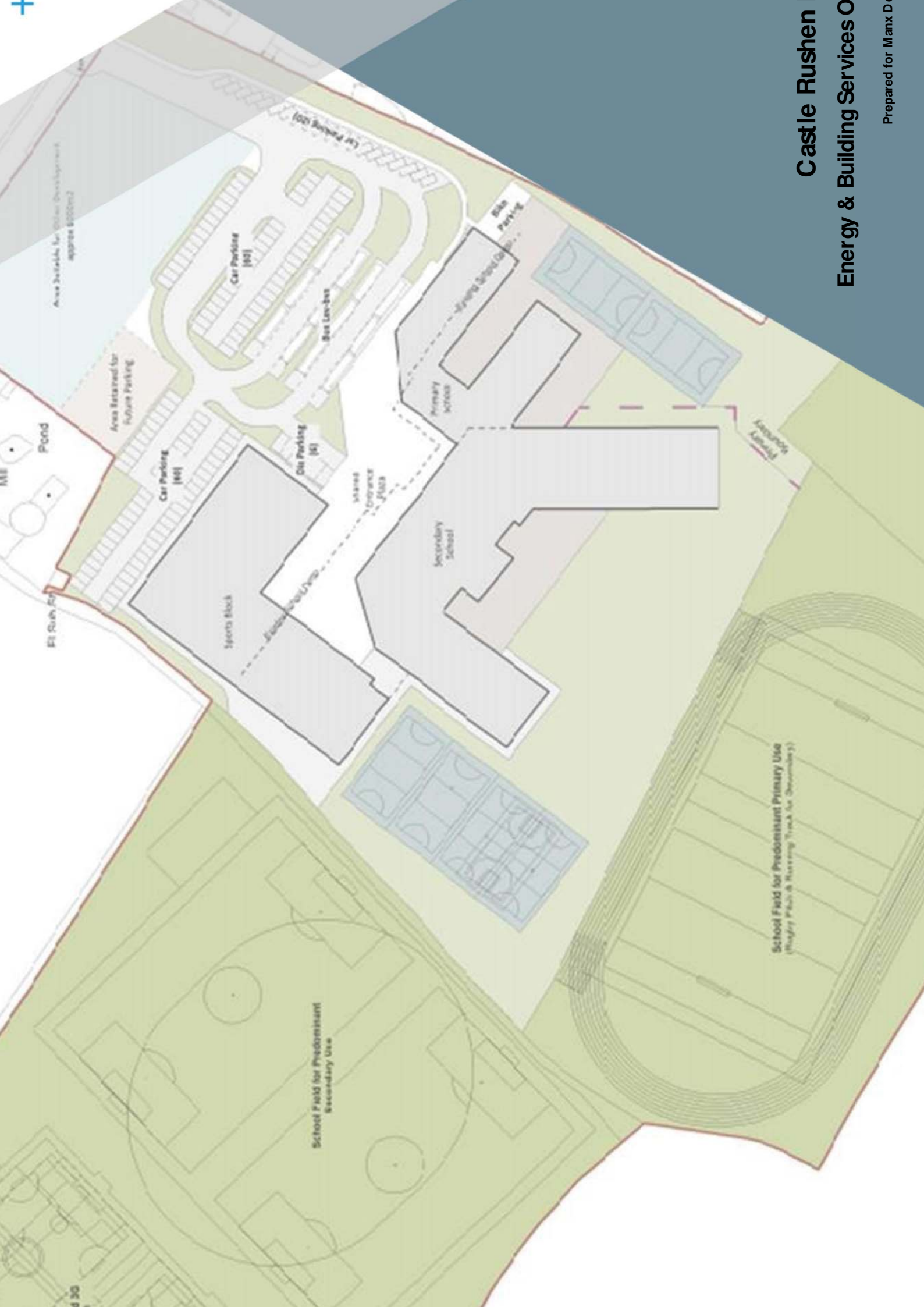
Modular green-houses with variable fit-outs serve for ample organic farming opportunities throughout the site for students and local citizens alike. Simple structures like the modular ones illustrated here could be formed from simple off-the-shelf brackets and reclaimed timber. They could form the basis of an inter-generational project involving parents, grandparents, local businesses as well as staff and students.



THANK YOU

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Liverpool L3 9JQ

— www.bcalandscape.co.uk



Castle Rushen Energy & Building Services O

ing Services Outline Report

ment Corporation

ER (if applicable)

RPT-001 (Rev01)

ussion

authorised by:

.....

This report is hereby prepared for & signed off by: -

Company	Manx Development Corporation
Name	
Role	
Date	
Signature	

Company	
Name	
Role	
Date	
Signature	

No.	Comments	Date	Author	Checked
	Initial issue for discussion	O ct 22	BD / FC	
	Revised to comments raised; issue for discussion	O ct 22	BD / FC	

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ive Summary

Energy and Building Services concepts for the redevelopment of Castle Rushen High School, and co-located Primary School and new Sports Facility.

looks to carry out the development in a phased manner, ie the new high school whilst the existing premises remain operational until from existing to the new high school, demolish the existing school building the new primary school and new sports facilities on the site. Existing sports facilities and gym. (school's existing carpark) to facilitate future possible developments. Therefore affords significantly positive opportunities in providing tailored facilities for and fully embracing the global energy and carbon targets and the targets being set through the Act.

Environmental Recommendations for the project.

ises emerging proposals to be implemented in the project, to deliver an exemplar n for all three premises, whilst demonstrating cost effectiveness approach to maximise energy conservation through high performance of the buildings' and the strategy for passive design (natural ventilation where appropriate, passive solar g etc)

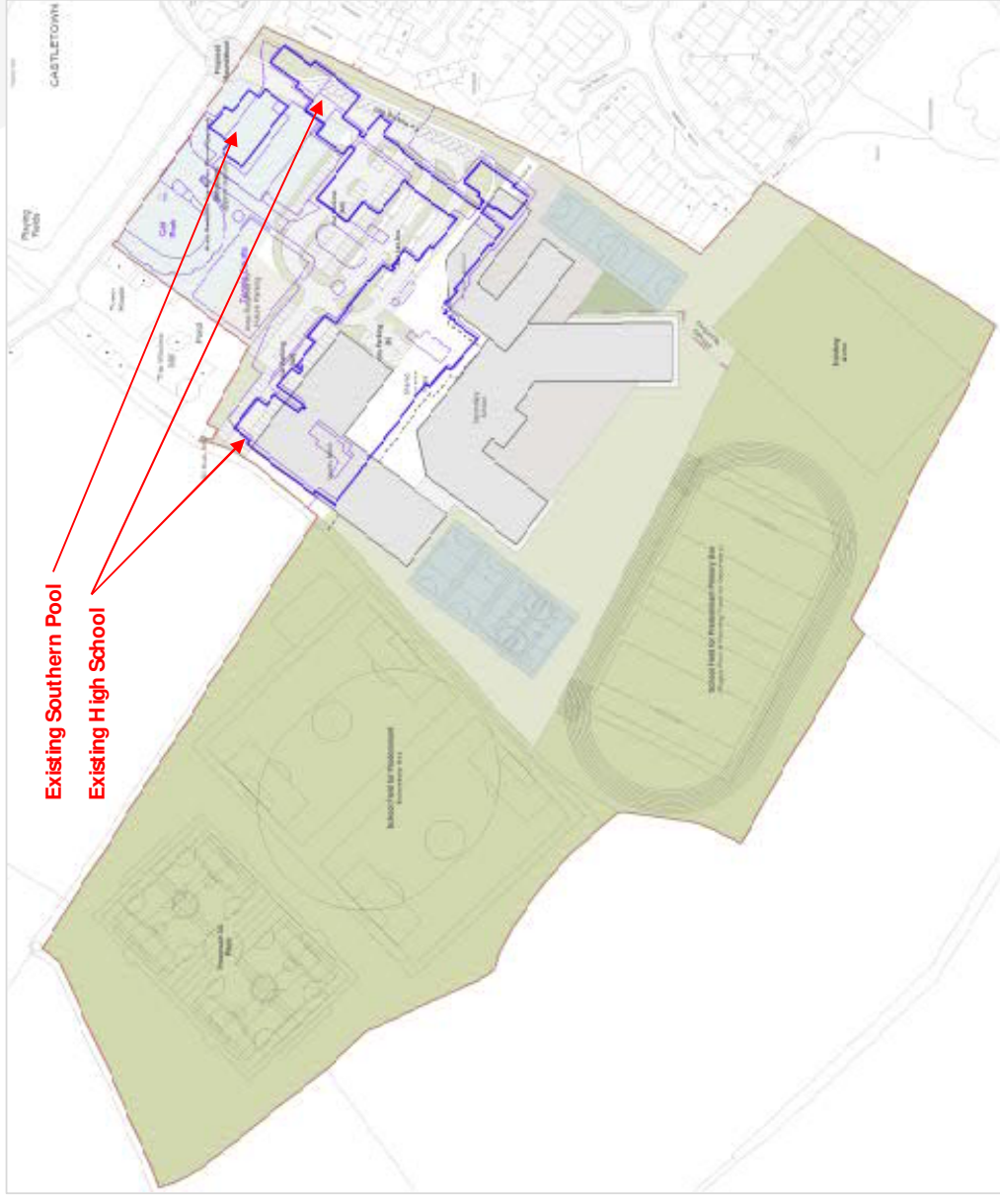
ices that optimise and simplify **Energy Efficiency & Management** through low energy of operation:

- ecacy lighting throughout
 - l-led control on all energy systems
 - iciency motors with variable speed drives – pump and fan selections to minimise energy option
 - essure ventilation and hydraulic systems.
 - eration to pool filter technologies minimising water and energy use
 - ality pool covers
 - covery to all mechanical ventilation systems and warm-water drainage outflows.
 - e energy technologies for Embedded Energy generation.
- ing the potential for ground-source energy solutions, utilising pipe arrays, already installed ne playing fields
- ergy following industry targets – 70% of roof area. This may be in the form of Photovoltaics, y generation and/or Solar thermal hot water generation (for pool system).
- the pros/cons of other LZC technologies including the use of wind and biomass for the site, nction with wider IoM energy reviews, considering fuel supply, available skills energy security nning.

for energy storage in conjunction to the inter-connection of the three buildings to maximise

Next Steps for the Project

- Develop strategy for facilities to meet the needs of the co-located premises, -eg
 - The High School and Primary School - co-located, shared facilities but with separate identity.
 - Sports Facilities that serve both schools and community requirements.
 - Plans for the “further possible development opportunities” on the site.
- Planning utility services to accommodate the phasing of the project and simultaneous connections.
- Review drainage strategy and its phasing, for the buildings
- Agreeing centralised versus decentralised energy options for the co-located premises and agreeing plant spatial requirements.
- Clearly defining the environmental aspirations for the project(s) and setting energy targets



ders (TB+ A) have been appointed as part of the professional team, to develop initial r the redevelopment of the Castle Rushen High School site.

Arbory Road Castletown Isle of Man, IM9 1RE

ngitude: Latitude: 54.0642 / -4.623

ound, by

Arbory Road to the north
idential dwelling (Witches Mill) to the northern edge of the site.
idential dwelling to the east.
gricultural land to the south and west.

development

chool is a state school serving Approx 1000 boys and girls. from 11 to 18 years old. The
e a new high school premises, replacing the existing old buildings and facilitating a growing

it is proposed to utilise the school site to develop a new two-form entry primary school. The
schools will retain their autonomy, whilst benefiting from shared facilities and providing
ere appropriate.

Southern Swimming Pool" is located on Arbory Rd, adjacent to the High School's site. This
s within a building that dates from the 1970's and is beyond the life expectancy for a wet-
posed therefore that the existing pool be replaced with new premises incorporating "wet"
ies.

f the Southern Swimming Pool, in conjunction with the wider plans for the new Castle
s therefore deemed the appropriate strategy, offering the opportunities to develop a



Figure 2 - Existing Castle Rushen School from playing fields

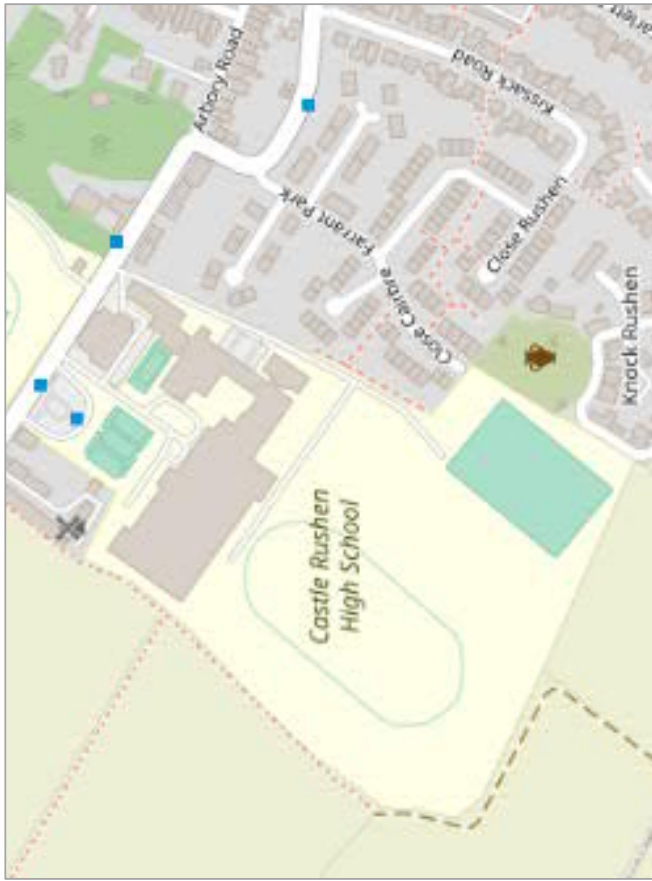


Figure 3 - Existing Castle Rushen High School site.

ing Utilities to the site

currently fed from a 500kVA Utility owned, substation (Red Gap substation, GM/305AF), school boundary near the northern corner of the existing school building.

from below ground HV cables that run through the site in a NE direction to the substation. new Schools and Sports Facility, this substation would need to be reinforced (ie the ability to increase in size as the heating solutions change from gas to heat pumps). Dialogue with Mill need to take place to define the implications of these requirements

icipated electrical infrastructure works during each phase.

tion	Electrical Utility Requirements
ct the new high school e existing premises operational	Maintain existing substation Construct new substation within the boundary of the phase 1 works to suit new school.
ancing from existing to high school, demolish ing premises	Disconnect existing school from existing substation. Agree with MU whether existing substation should be retained for future developments.
ct the new primary and new sports facilities site.	New primary school to be fed from new substation (constructed under phase 1). New sports building may be served from new or existing substation (TBC with MU)
h existing sports facilities	Disconnect existing premises from utility supplies. from existing substation.
e site to facilitate future developments.	Agree with MU whether existing substation should be retained for future developments.

table above, the phasing is likely to demand that a new substation be required, constructed ; for a period, the new and existing substations would both be operational. The phasing of acceptance of the site being served from two supplies will need to be reviewed with MU.

ming water main must be confirmed but from available information it is likely to emanate be routed to the school building, via its existing car park.
ould retain this supply and make a connection within the boundary of the existing school, to the NW boundary of the site, to serve the new high school building.
hool's existing incoming water main may need to be repositioned on Arbory Rd, and ains on the site, to avoid the future development site.

Drainage

Exact details of below ground drainage to be confirmed. At present we assume it drains to Arbory Rd. The phasing strategy for drainage requires development.

Gas

Exact details of the incoming gas main need be confirmed but from available information it may be routed to th school, via the pathway outside the NW boundary of the Witches Mill. The school's gas meter enclosure is adjacent to the substation, near the NW corner of the existing school.

W ithin phase 1 works, this service would be maintained to the existing school. Ultimately it is likely that the new building will not rely on mains gas for heating, but at present we assume that the new school's science rooms, would use mains gas for bursen burners/laboratory appliances

Therefore, within phase 1, a new branch would be extended from the existing school's supply to extend the gas, via the NW boundary of the site, to serve the new high school building.

In subsequent phases, the existing gas supplies to existing buildings/wings would be disconnected as required.

Telecoms

Full details of the telecoms must be confirmed but from available information it is likely to emanate from Arbory Rd and be routed to the school building, via the existing car park, adjacent to the SE boundary of Tower House/Witches Mill.

W ithin phase 1 this service's duct network would be retained and extended within the boundary of the School, via the NW boundary of the site, to serve the new high school building.

W ithin phase 4, this incoming service to the site may be repositioned on Arbory Rd to avoid the future development site.



under the sports pitches, consist of horizontal pipes laid linearly (ie not a slinky depth and 1m centres. We believe these to be 40mm (nominal bore) loops (to be verified on arrays and setting out arrangement, it would appear that approx 14,000m of ground loops based on rules of thumb (eg approx 40m of pipe per kW of heat exchange), this may 100kW of heat pumps.

the opportunity to validate this, with the ground loop designer's assessment of their ground



Figure 7 - Existing ground loop array under recently constructed sports pitches at CHS - Part copy of ECS drawing 22/001ME/001

Possible route of gas service to existing school - to be confirmed.

Route of incoming telecoms retained to serve existing school. New location provided in phase 5 to remove from further development plot.

Existing incoming water main retained to serve existing school (route as indicated is only indicative). New location provided in phase 5 to remove from further development plot.

Existing Manx Utilities substation serving the school (and other facilities). Substation may be retained

Existing gas meter housing, retained to serve existing school until demolition and feed new school's labs

g below ground HV through school site to existing

m existing school supply, to serve new school

lecoms extended from existing school's incoming new school

extended from existing school's incoming service school

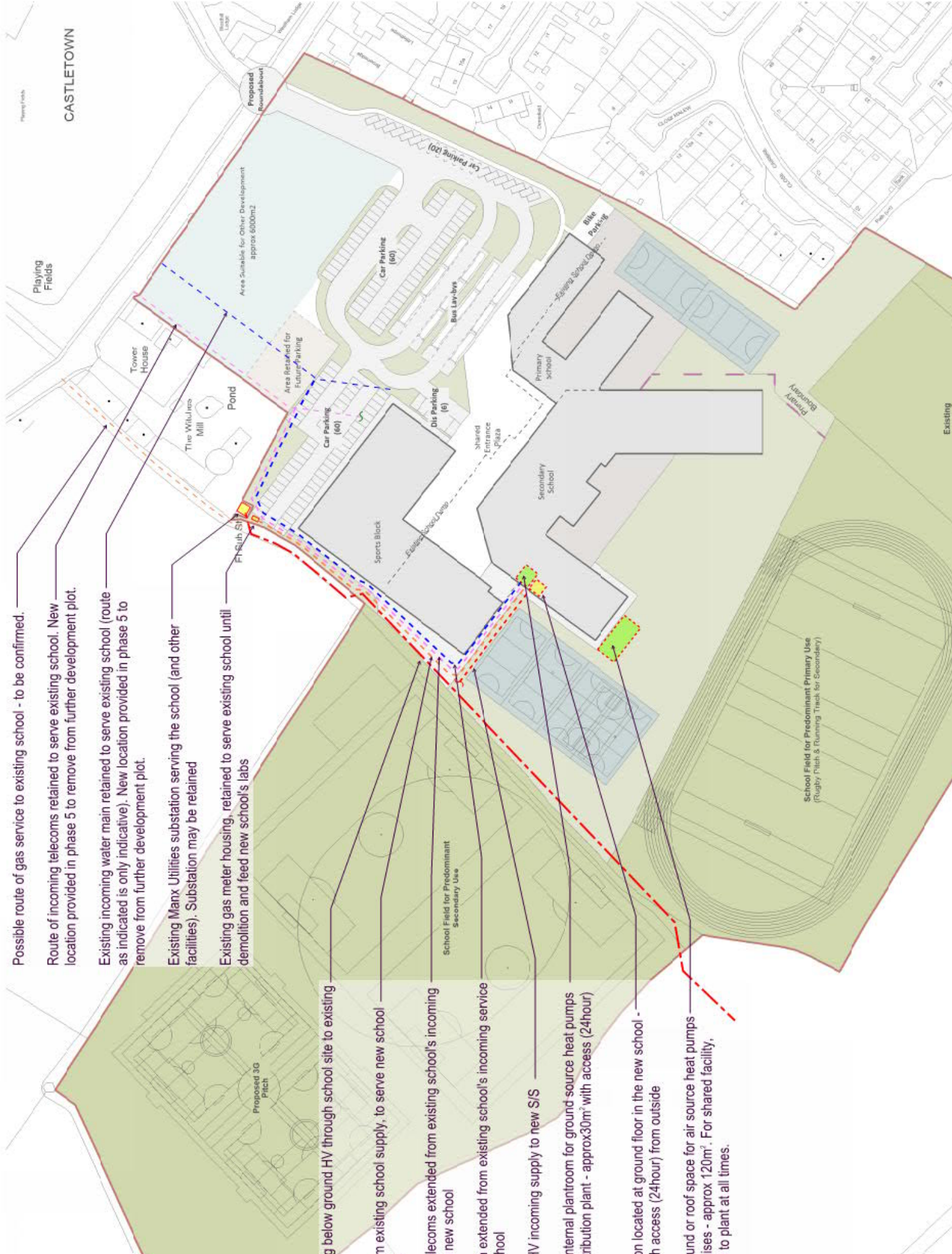
WV incoming supply to new S/S

internal plantroom for ground source heat pumps distribution plant - approx 30m² with access (24hour)

on located at ground floor in the new school - h access (24hour) from outside

und or roof space for air source heat pumps ises - approx 120m². For shared facility, to plant at all times.

CASTLETOWN



Solutions for the development

Carbon – Legislative context

What is now, a clear focus on climate change and fuel costs, has provided a significant driver to robustly address energy consumption.

Act 2021

sets out the mechanism for Carbon targets, committing the Isle of Man to achieve a net zero 50.

framework for planning, monitoring and reporting the reduction of greenhouse gas each net zero. Therefore, it now drives policy to meet these goals, including requirements ity, low-carbon heating, electric vehicles etc.

prim targets, are to be set for the pathway to 2050 carbon neutrality. The Isle of Man a legally binding goal of a 45% reduction by 2035, with the Council of Ministers reviewing a targets

the Act prohibits the installation of fossil fuel heating systems, in/for new buildings, with y relating to existing premises/systems.

ns – “Part L” - Conservation of fuel and Power

2014 [with Building (Amendment) Regulations 2019 and 2020] apply as secondary legislation l Act 1991 and Local Government and Building Control (Amendment) Act 2016.

ments, (approved by Department for Environment Food & Rural Affairs) provide the Regulations compliance. Under the *Building Control (Approved Documents) Order 2019* specific s (England) are applicable to projects on the Island.

understand, formally adopted on the Island, the UK Building Regulations in relation to energy, issues have been updated with significant improvements in 2022 (tightening of energy nents).

ding Regulations’, Approved Document L (AD L; Conservation of fuel and power) and F (ADF; ventilation), provide standards for domestic & non-domestic buildings to serve the ard 2025, that will set out the requirements for net zero carbon buildings.

ulations include Approved Document L - Conservation of fuel and power,

ume 1: Dwellings

ume 2: Buildings other than dwellings

dards, the interim 2021 document acts as a “stepping-stone” from the existing (AD L 2013 ts). This approved document took effect on 15 June 2022 for use in England and we believe in early 20223 on the Island.

2021 is likely apply to the project, although the decarbonisation strategy for these public more demanding standards

Industry Design Standards.

Various design standards exist within the industry (some providing a path to accreditation) regarding the design of energy conservation and path to net zero carbon. These include

- + **UK Green Building Council (UKGBC)** The UKGBC provides a framework and action plans for NZC buildings for both construction and buildings-in-use. The UKGBC identifies a “Par is Proof” methodology to set targets to incrementally reduce carbon in an existing building.
- + **Passivhaus** is an internationally recognised building energy performance standard with its primary focus on heating and cooling energy, primarily achieved through a fabric first approach. Building design can be developed in line with Passivhaus requirements and certification would be provided by an independent certifier.
- + **Association of the Energy Conscious Building (AECB)** who provide a self-certification methodology, focused on low carbon / low energy buildings. It aligns with Passivhaus standards
- + **London energy transformation Initiative (LETI)** have published guidance for new build and refurbishment projects, that are commonly referenced within the industry as it provides a straightforward rule-of-thumb guide for project’.

Energy Strategy for the development

considers the measures that should be considered for implementation in the project, to deliver an initial solution for all three premises whilst demonstrating cost effectiveness.

BUILDING FORM

- Minimise unwanted solar gains/solar shading
- Optimising day-lighting
- Enhance passive solar heating
- Views for occupants.
- Natural crossflow ventilation

2. BUILDING FABRIC

- Maximise U values
- Minimise building air leakage
- Passive Vent - façade openings
- Thermal mass to suit night-time cooling.
- MEP space to afford low pressure systems

Energy Efficiency

- High efficacy lighting throughout
- High Efficiency motors (IE5)
- High Efficiency pump / fan systems
- low pressure technologies
- pool filter technologies
- Heat recovery - vent & drainage
- Low water demand appliances

Energy Management Solutions

- Demand-led control to energy systems
- High quality pool covers
- Building energy management systems
- Building procurement - Soft landing
- Variable speed drives

5. Renewable Energy Technology

- Photovoltaics
- Ground source heat-pumps
- Heat-pumps

1 Building form

A *Fabric First* approach will initially examine the buildings' form to optimise its energy performance. The geometry and orientation of the building will affect its annual heating, cooling loads and daylighting. These issues will be evaluated within the context of the site, its constraints and phasing.

The evaluation of building form should include the analysis of the proportion of glazing on each elevation, to optimise energy performance.

2 Building fabric performance

Further sections of this report provide initial target U values and air-tightness values for each building type.

Exemplar U values and air tightness standards should be targeted to minimise energy losses, a consideration of particularly importance for the Sports Building where elevated ambient internal conditions occur. High levels of building fabric insulation must include the pool basins.

Window / façade openings must be designed to optimise natural ventilation accommodating large volumes of air movement for summertime passive cooling. Typically, this would include high & low level openings and/or crossflow ventilation, in all occupied rooms

Optimising the use of thermal mass in the schools should be considered to aid the control of peak summertime internal temperatures, in conjunction with night-time ventilation/cooling.

3 Energy efficiency measures.

In relation to the Building Services in each building, the MEP systems should be designed to achieve the lowest possible energy consumption, evaluated on a lifecycle basis.

LED lighting is now ubiquitous to provide reduced energy consumption, but different LED solutions can provide very different efficacies and care should be taken to select the optimum solutions.

Pump and fan selections should similarly be based on annual energy consumption assessments including the use of high efficiency motors (IE5)

All mechanical ventilation systems should utilise heat recovery. Heat recovery systems to pool backwash water and waste from showers should also be considered and assessed for viability.

Both ventilation and vent systems should be designed to minimise system pressure drops, including;

- Larger duct/pipe sizes to minimise pressure drops
- Consideration to components within the hydraulic systems – use of long radius bends, avoidance of frost coils, filter selection, valve types, low velocity through coils

Alternative pool filtration & treatment should be evaluated to examine their relative merits and identify the most appropriate, for the new Southern Swimming Pool (see section 6.11).

Within each building, low water-demand appliances should be utilised to minimise water usage including low flow-rate appliance and non-concussive/self-closing brass-ware.

4 Energy management measures.

The design of the automatic controls, that operate all energy-consuming systems, should be based on a demand-led strategy to function only when required by occupants etc. This would also include the automatic systems to monitor the energy consumption and support a thorough Monitoring & Targeting (M&T) regime.

Energy technologies - embedded-energy generation.

Low & zero carbon" energy technologies², primarily considered appropriate for the Castle

source Heat Pumps. The site would maximise the opportunity for GSHP energy, utilising pipe arrays installed under the playing fields. This would allow the coefficient of performance (COP) to be significantly improved (compared to air source heat pumps) in winter, serving the heating needs of the sports facilities.

Air source heat pumps would be utilised to supplement the GSHPs. There are periods when the playing fields are not in use, and the ASHPs can provide insufficient heat on their own or periods when the ASHPs can be utilised to provide pre-heating for the sports facilities.

A ventilation system, used within the pool ventilation system to recover energy from exhaust air and provide humidification. These would be utilised to serve the pool hall.

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Figure 9 - Typical ground source heat pump of circa 60kW

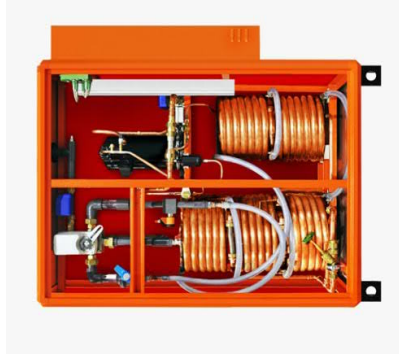


Figure 11 - Packaged heat recuperator and heat-pump for waste heat recovery.



Figure 13 - PV installation on flat roof installation

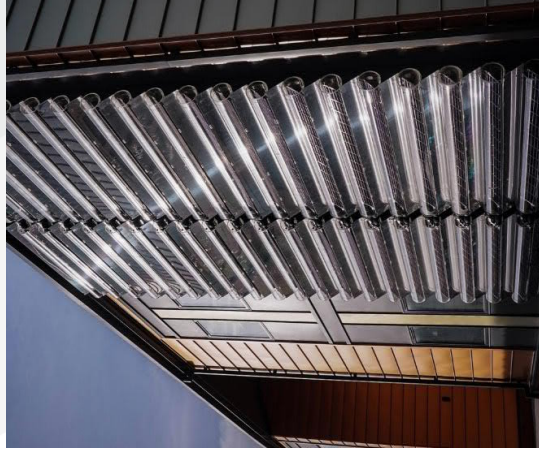


Figure 10 - Solar thermal array on vertical wall of building (courtesy of Naked Energy)



Figure 12 - Solar thermal array on flat roof

Carbon targets for the new Schools

In addition, the following provides an initial guide for the new schools' design standards

Energy

Carbon target should be < 65 kW h/m² per annum. This Energy Use Intensity (EUI) in GIA, energy contribution

Carbon consumption target should be < 15 kW h/m² per annum

Standards

1 to 3

Heating (W /m²·K)

- 0.13 - 0.15
- 0.09 - 0.12
- 0.10 - 0.12
- 1.0 (triple glazing)
- 1.2

Energy measures

U-value: < 1 (m²/h/m²@50Pa)

U-value: 0.04 (y-value)

U-value: 0.5 - 0.4

(% of wall area)

15-25%

15-25%

15-25%

Openings

- Double windows and cross ventilation
- Room high and low level openings
- Free area of openings ≈ 5% floor area
- Flows > 30% angle of opening
- Light and overheating
- External shading

Standards

Measures

- 4.5 (W /m² peak NIA)
- 0.5 (W /m² peak NIA)
- 2 (W /m² peak NIA)

System efficiency measures

- + Mech Vent Heat Recovery 90% (efficiency)
- + Heat pump SCOP ≥ 2.8
- + Central Air handling units 1.5 - 1.2 W /l/s (specific fan power, SFP)

Renewable / Embedded Energy Generation

- + Maximise renewables so that 70% of the roof is covered

Embodied carbon

- + Reduce embodied carbon by 40% or to < 600 kgCO₂/m² (GIA)

Average split of embodied carbon per building element:

- + 21% - Internal finishes
- + 30% - Superstructure
- + 16% - Substructure
- + 16% - Façade
- + 13% - MEP



Figure 14 - Breakdown of whole life carbon for development over 60 years – Building Regulations and Ultra-low energy building comparison

Carbon targets for the new Sports Facility.

Guidance and Passivhaus examples, the following provides an initial guide for the new sports

by

tion target should be < 400kW h/m² per annum (typical standard for new pool to minimum 600kW h/m² per annum)

nsumption target should be 75+ 60 kW h/m² per annum (pool and building heating

standards

1 to 2

ies (W /m² K)

0.13

0.09

0.09

0.10

1.0 (triple glazing)

1.2

ncy measures

< 0.2 (m³/h/m²@50Pa)

ing: 0.04 (y-value)

ue: 0.5 - 0.4

thes to accommodate adjusted humidity conditions.

(% of wall area)

15-25%

15-25%

15-25%

Standards.

ures

atures and pool hall humidity considerations
aste heat recovery.

asures

4.5 (W /m² peak NIA)

0.5 (W /m² peak NIA)

2 (W /m² peak NIA)

asures

Renewable / Embedded Energy Generation

- + Maximise renewables so that 70% of the roof is covered

Embodied carbon

- + Reduce embodied carbon by 40% or to < 600 kgCO₂/m² (GIA)

Average split of embodied carbon per building element:

- + 21% - Internal finishes
- + 30% - Superstructure
- + 16% - Substructure
- + 16% - Façade
- + 13% - MEP

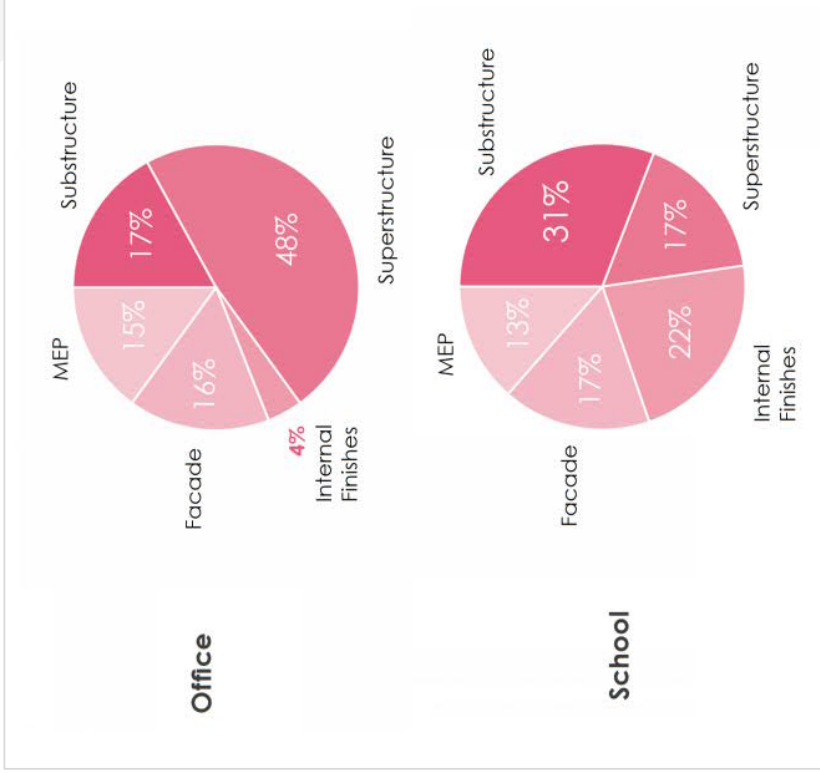


Figure 15 – Typical Embodied Carbon breakdown per element (Cradle to Gate) (courtesy LETI)

Energy Services Strategy for the new plant.

Multiple public buildings, on a common site, provides significant opportunities to achieve energy economies of scale" in relation to the energy and building services systems.

include.

ies, such as catering, within the two schools avoiding duplicate plant operation.

efficiencies through shared central plant (eg heat generation or domestic cold water storage

and electrical network with combined long period of demand and to allow embedded electricity to be used on site.

y from rooms with heat abstraction (mechanical cooling from activity studios, IT suites etc)

-round heat loads (eg domestic hot water demands).

Plant and metering strategy to suit how buildings are managed.

systems (electricity, gas, water, heat generation, mechanical cooling etc) would be metered and monitored, and costs are correctly apportioned to each building or end-use.

is report, the design strategy could assume that all three premises (primary school, sports facility) remain in public ownership, with, in effect, a single "owner". Therefore, a even the optimum arrangements for the MEP strategy, could be explored.

ple, the management arrangements of the sports facility were to alter in the future, separate of and sports may need to be necessary.

entralised plant/utility strategy provides benefits, consideration will need to be given to the maintenance of plant; ie typically shared services might be located in a standalone energy generation and access maintenance.

ply to the site.

nce on fossil fuels, electricity is likely to be the primary energy source, including the supply of ation, via photovoltaics is also likely to be a significant factor in the reduction of carbon e.

the site is likely to require reinforcement to meet heating demands, despite the significant measures that the new buildings would provide.

critical supply was considered appropriate (ie one MU connection and utility meter serving site would benefit, given the varying load profiles of the buildings, such as

y open for long hours and likely to be busiest outside of school hours

open at weekends and holiday periods.

ed PV generation will supply electricity during all daylight hours – when school is not open s consumed by the sports building.

demands likely for extended periods including during school day (teaching staff) and hours ility's operation.

ll have a constant heating demand with associated heat pump electricity demands.

o the site, the PV would therefore contribute centrally to the statewide electricity demands t to offset the need for importing onto the site, and electricity

6.2 Domestic water services

Similar to the other incoming services, a strategy could be adopted to provide centralised cold-water storage on site within one plant area, to serve all three premises. Alternatively separate cold-water storage for the Sports Facility and Schools, respectively, may be considered more spatially beneficial.

In either case it is likely that a solution reutilising the existing incoming school supply to feed plant located in the phase 1 building, is feasible.

6.3 Providing heating to all buildings.

The existing ground loop array, installed under the football pitches would provide the primary wintertime space-heating solution to serve all buildings, from a centralised heat generation solution.

Ground source heat pump solutions provide a significantly better *coefficient of performance* (COP) than air-source, for space heating in winter (ie greater energy is required to draw heating energy from cold outside air compared to the relatively higher temperature of the ground).

Conversely there are significant periods when heating is required and the air source heat pumps may provide better COPs, for example when the pools require heating and warm ambient external conditions suit the air-source heat pumps.

Utilising a centralised heating scheme will allow plant optimisation to prioritise the operation of the air/ground source heat pumps to suit the demand required across all three buildings. Furthermore, as the ground loop array has a limited heating capacity, the centralised solution allows efficiency across all three premises.

6.4 Cooling to the site.

Mechanical cooling demands in the new buildings should be quite small due to the energy conservation standards to be adopted. Mechanical cooling may be limited to

- + Phase 1, high school IT suites and computer rooms
- + Phase 3, sports facility, gym and activity studios.

O ther mechanical cooling requirements should be avoided through passive measures to control excessive internal summer-time temperatures. Passive measures for controlling heat gains and providing passive cooling include,

- + Large facade opening areas to suit natural ventilation.
- + Limiting the size of glazing.
- + Solar shading.
- + Utilising the building thermal mass.
- + Building fabric thermal properties
- + Solar shading.

W here required mechanical cooling will be provided with heat recovery, utilising the heat pump technologies. HPs will be employed to allow heat from the cooling systems to be used for heating loads.

6.5 Ventilation strategy for the buildings.

W e envisage that the school buildings would be primarily naturally ventilated. Internal rooms would be provided with mechanical ventilation with heat recovery.

Mechanical ventilation with heat recovery would be utilised to most areas of the Sports Facility including

on should be considered in activity studios and sports hall, to allow passive ventilation in mid- in the availability of heat recovery when advantageous in the heating season. ion plant would be demand-led, variable speed controlled.

t of the existing below ground drainage asset- information to identify existing outflow and the phasing of the site, providing new drainage from the new high school, whilst the existing lished. These strategies are to be developed.

and alarm systems.

oment of the phasing solutions of the site, design strategies for the safety and security eloped.

expect that the new schools (co-located high and primary schools) and the sports facility will arm systems respectively, each providing L1 (BS5839, Pt1) coverage. If there is dependency e between the separate buildings, then signal interfaces between the systems may be

on systems.

, Building Control Act 1991, Building Regulations 2014 sprinkler fire suppression is required [37]. Reasonable provision must be made for installation of sprinklers to the building appropriate for hich the building is to be put, to facilitate escape from the building in case of fire.

B7 applies only to —
house or flat in multiple occupation
buildings containing flats
buildings to be used for sheltered housing
ist premises
itals and institutions
ools;
n-plan dwellings and
ar buildings with compartments over 5,000m³.

sprinklers within the new schools is to be reviewed. The standard for property protection tin 100 Design for fire safety in schools) or life safety, must also be clarified within the

erty protection, typically a stand-alone water storage tank (30m³) and adjacent pump plant could be required.

strategy and provision of new domestic water services to the new buildings, the availability hydrants will be reviewed on site and planned to comply with BS9999.

6.10 Safety and Security systems.

As part of the development and phasing solutions of the site, design strategies for the security systems are to be developed, including access control, CCTV, intruder detection, lightning protection.

6.11 Pool Services.

The energy demands of the pool and associated plant will be minimised, by employing the most appropriate systems, developed in line with the sports facility stakeholders. Key issues include:

- Pool covers, to be used on all pools, when not in use. Covers would minimise evaporation and therefore reduce pool hall ventilation, water consumption, and associated heating and treatment demands.
- D ifferent pool water filtration systems could be employed and each have relative merits. Traditionally sand bed filtration systems have been used, due to their comparatively low capital cost and maintenance simplicity. However lower energy running costs can be achieved from alternative filtration solutions including Regenerative-Media Filters (RMF) or Silicon Carbide / Ceramic Filters.

Both RMF filters (which utilise a replaceable filter with a pre-coated material such as perlite) or ceramic filters, offer significantly lower system pressure drops and smaller backwash demands, which significantly reduce the energy consumption of the pool. These systems can also offer better filtration standards, lower chemical treatment needs and smaller plant space requirements, compared to bed filters.

As part of the design development, a pool specialist should define the relative merits of the alternative filtration solutions to evaluate the carbon savings against other issues including maintenance complexity, CAPEX, overall operational life and compatibility with water/energy recovery solutions.

- Pool water and hall conditions will be examined to assess the balance between comfort and operating cost. Lower pool hall conditions (compared to pool water temperature) will reduce evaporation and lower running costs.

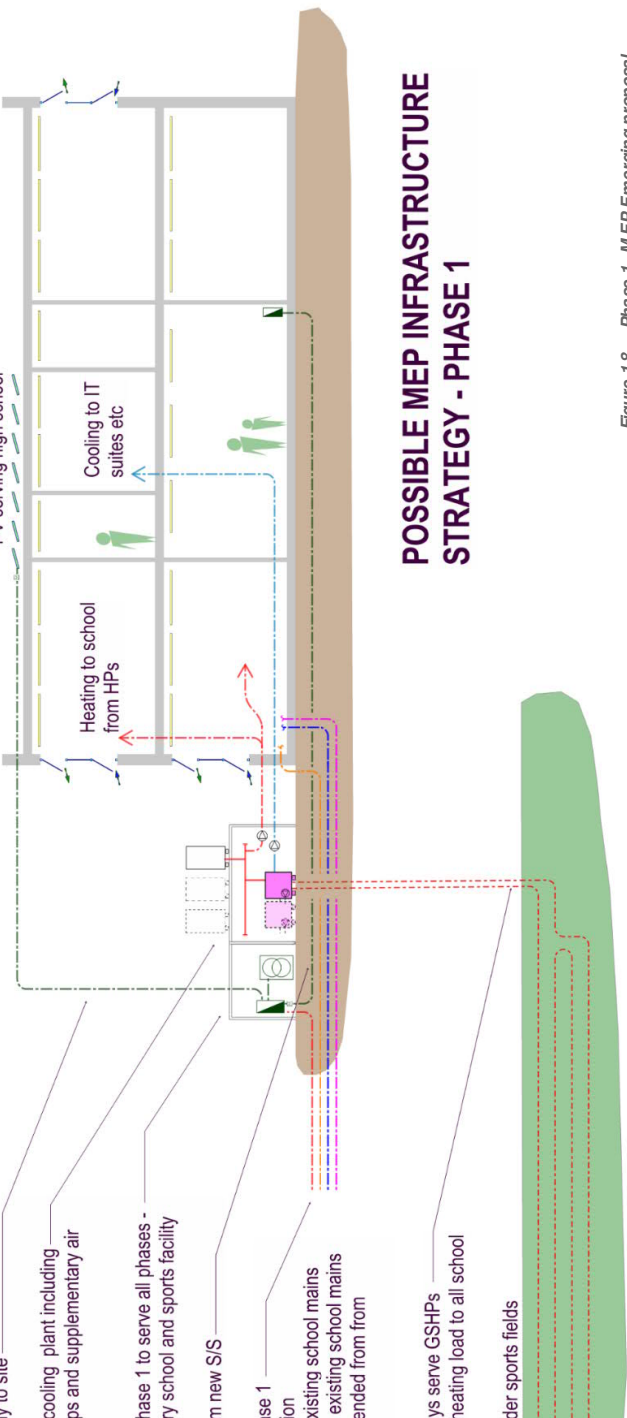
- Pool water circulation pumps. As part of the pool design, low pressure pipe systems and high efficiency pumps, will be specified to minimise pumping costs. These systems will be operated with variable speed control, controlled from filtration demand.



Figure 16 - Pool cover to be utilised on all pools to reduce evaporation and correspondingly save significant amounts of energy (courtesy of covers4pools)

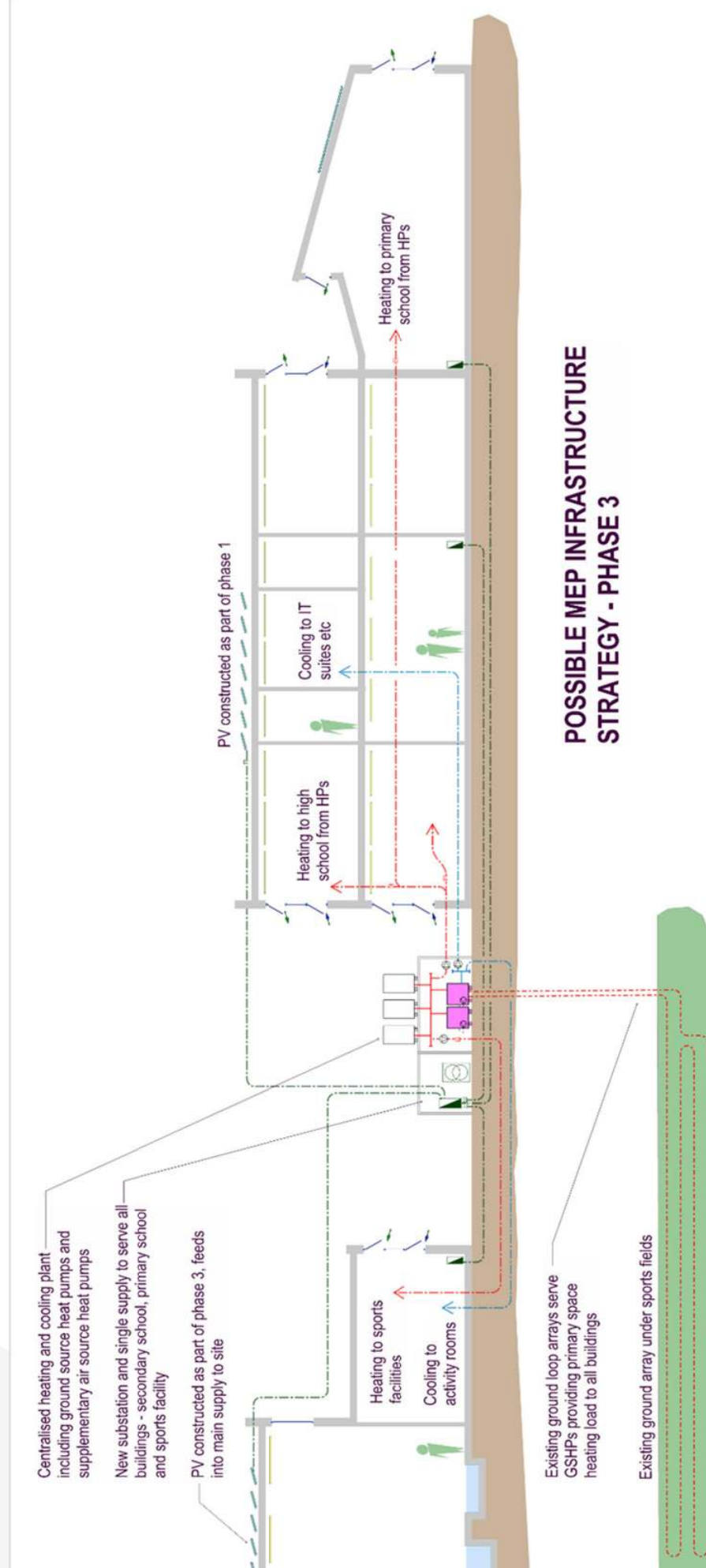


Figure 17 - Ceramic Silicon Carbide Pool Filtration system (courtesy of LiqTech)



POSSIBLE MEP INFRASTRUCTURE STRATEGY - PHASE 1

Figure 18 – Phase 1, MEP Emerging proposal



POSSIBLE MEP INFRASTRUCTURE STRATEGY - PHASE 3

Issues

Issues (MEP) & Next Steps

issues require consideration within the next stage of the project

S

ing drainage asset information for review.

ing strategy for the drainage.

ne site as one “campus”

one electrical supply and shared embedded electricity generation is a suitable strategy for Sports Facility.

ired use of ground loop array for School and Sports Facility, is a suitable solution for heating. ability of using a centralised heating plant solution and agreeing where plant would be low unrestricted access for maintenance at any time (eg does location of plant need to be of the individual buildings.

es on site to clarify the proposals of the development and its phasing.

existing buildings to identify implications of proposed phasing including phased demolition.

determine viability of increasing site load and utilising two substations on site.

rm exact routing of water mains onto the school site.

ow existing and feasible future hydrant requirements

n route for incoming gas to the site.

ements for sprinklers in the proposed schools

ow low do we go” for carbon emissions balanced with CAPEX.



Glossary of terms

Air conditioning	
Approved Document (Building Regulations)	
Approved Document F (Ventilation)	
Approved Document L (conservation of fuel and power)	
Association for the Energy Conscious Building	
Air handling unit	
Air source heat pump	
Building Management (Controls) System / Building Energy Management (Controls) System	
Building Research establishment Environmental Assessment Method.	
Building Services Research and Information Association	
Builderswork in connection (with the MEP services)	
Capital Expenditure	
Chartered Institute of Building Services Engineers	
Coefficient of Performance (defined as the heat output of a heat pump divided by its electrical input)	
Department for Education	
Energy Performance certificate	
Gross internal area	
Ground source heat pump	
Heat Pump	
High Voltage	
Heating Ventilation and Air Conditioning (term to apply generically to the systems providing internal comfort).	
Domestic Hot Water Services	
Lifecycle analysis / Lifecycle costing	
London energy Transformation initiative	
Low and Zero Carbon Technologies (renewable energy)	
Mechanical and Electrical Services	
Mechanical Electrical and Plumbing (Public Health) Services	
Manx Utilities	
Operating cost	
Photovoltaics (solar panels generating electricity)	
Regenerative-Media Filters	
Rainwater	
Specific Fan Power	
Solar Thermal (Heating)	
Group Buywaters and Anders	



@troupywaters



@TroupBywaters



Troup Bywaters + Anders

tbanda.com

Legend – School / Public

Pedestrian Route

Bus Route

Staff / Service Vehicle's

Legend – Construction

Secure Site Boundary

Vehicle Access Gates

Pedestrian Access Gates

Primary Vehicle Route

Site Compound

Site Offices & Welfare

Construction Zone

Building Outline

Staff & Visitor Parking

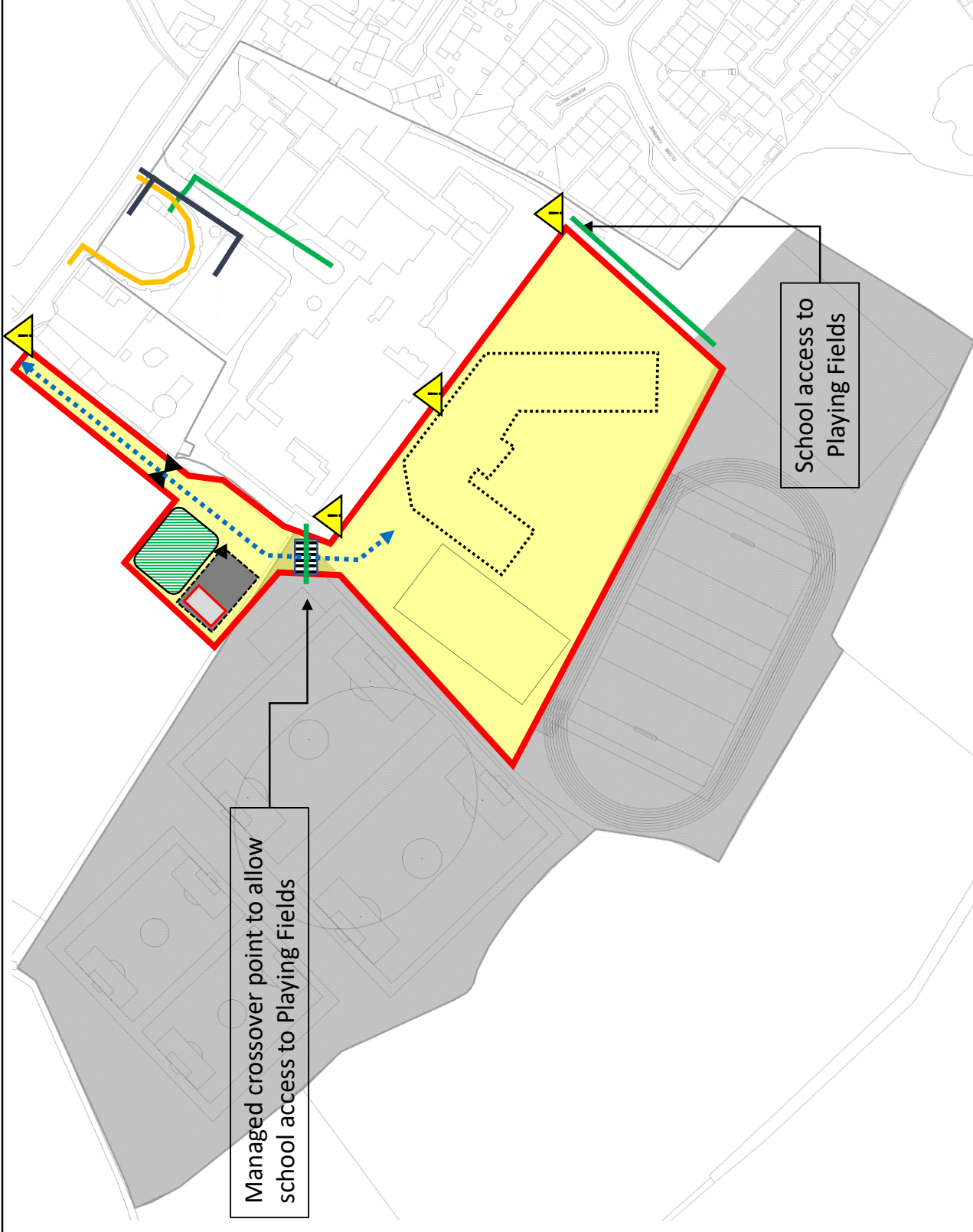
Public / Safety Interface

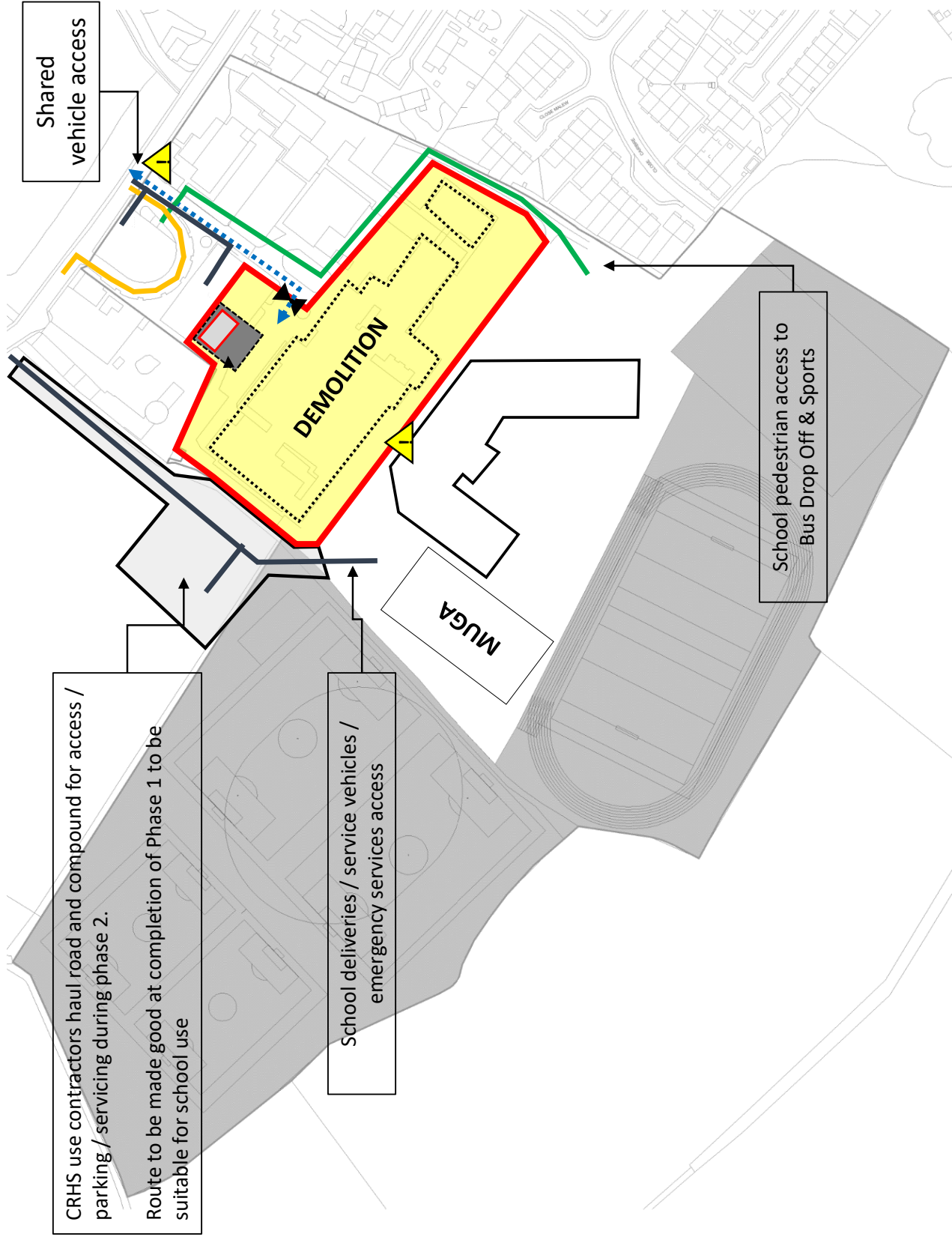
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CASTLE RUSHEN HIGH SCHOOL

SITE LOGISTICS – PHASE 1

Drg Ref: MDC-CRHS-LOG-001 Rev: 0





Legend – School / Public

- Pedestrian Route
- Bus Route
- Staff / Service Vehicle's

Legend – Construction

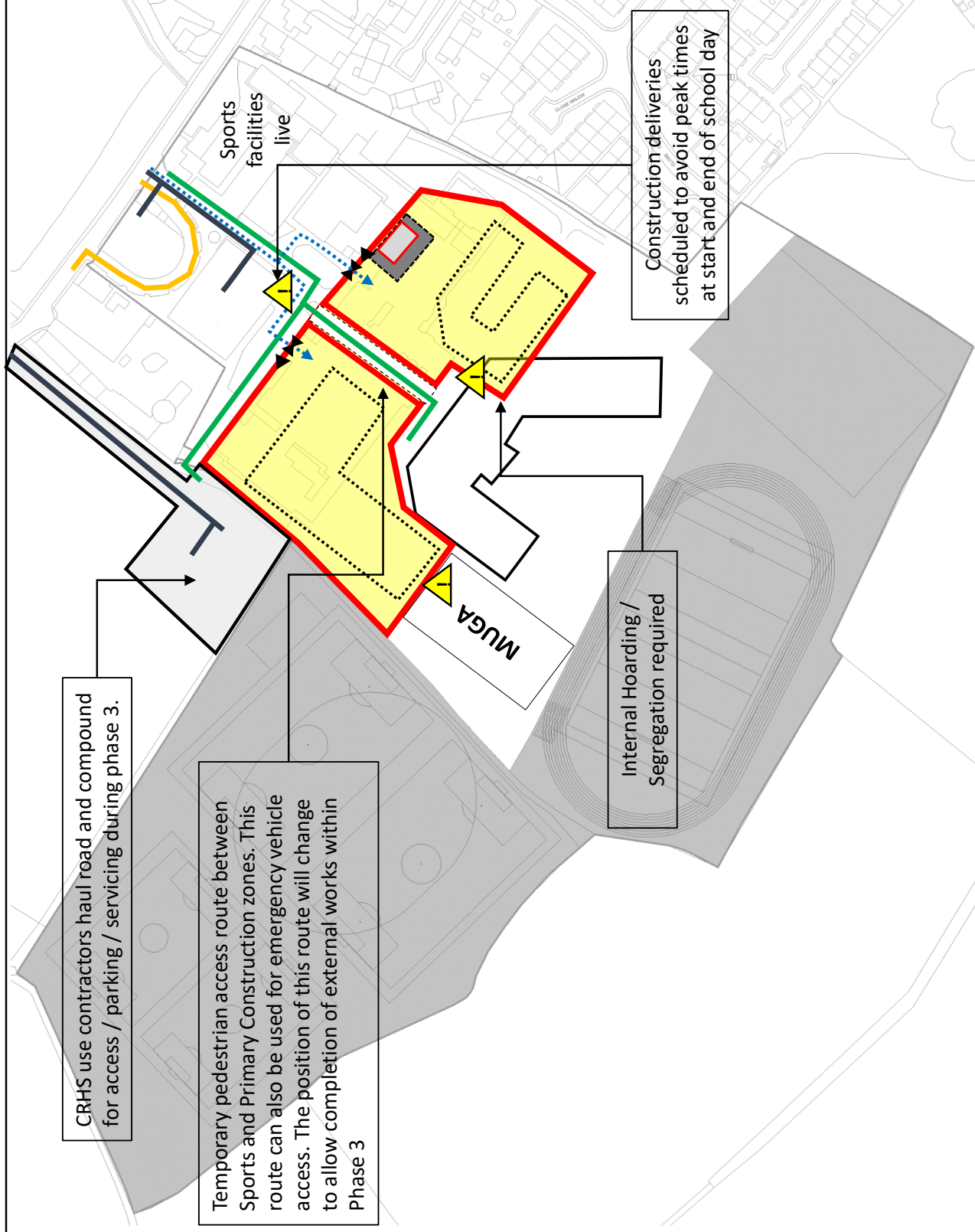
- Secure Site Boundary
- ✕ Vehicle Access Gates
- ▲ Pedestrian Access Gates
- ⋯ Primary Vehicle Route
- Site Compound
- Site Offices & Welfare
- Construction Zone
- Building Outline
- Staff & Visitor Parking
- ⚠ Public / Safety Interface

IOM

CASTLE RUSHEN HIGH SCHOOL
SITE LOGISTICS – PHASE 2

Drg Ref: MDC-CRHS-LOG-002 Rev: 0





Legend – School / Public

- Pedestrian Route
- Bus Route
- Staff / Service Vehicle's

Legend – Construction

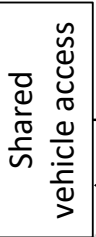
- Secure Site Boundary
- ✕ Vehicle Access Gates
- ▲ Pedestrian Access Gates
- ⋯ Primary Vehicle Route
- Site Compound
- Site Offices & Welfare
- Construction Zone
- Building Outline
- Staff & Visitor Parking
- ⚠ Public / Safety Interface

IOM

CASTLE RUSHEN HIGH SCHOOL
SITE LOGISTICS – PHASE 3

Drg Ref: MDC-CRHS-LOG-003 Rev: 0




Public / Safety Interface

Drg Ref: MDC-CRHS-LOG-004 Rev: 0



Legend – School / Public

- Pedestrian Route
- Bus Route
- Staff / Service Vehicle's

Legend – Construction

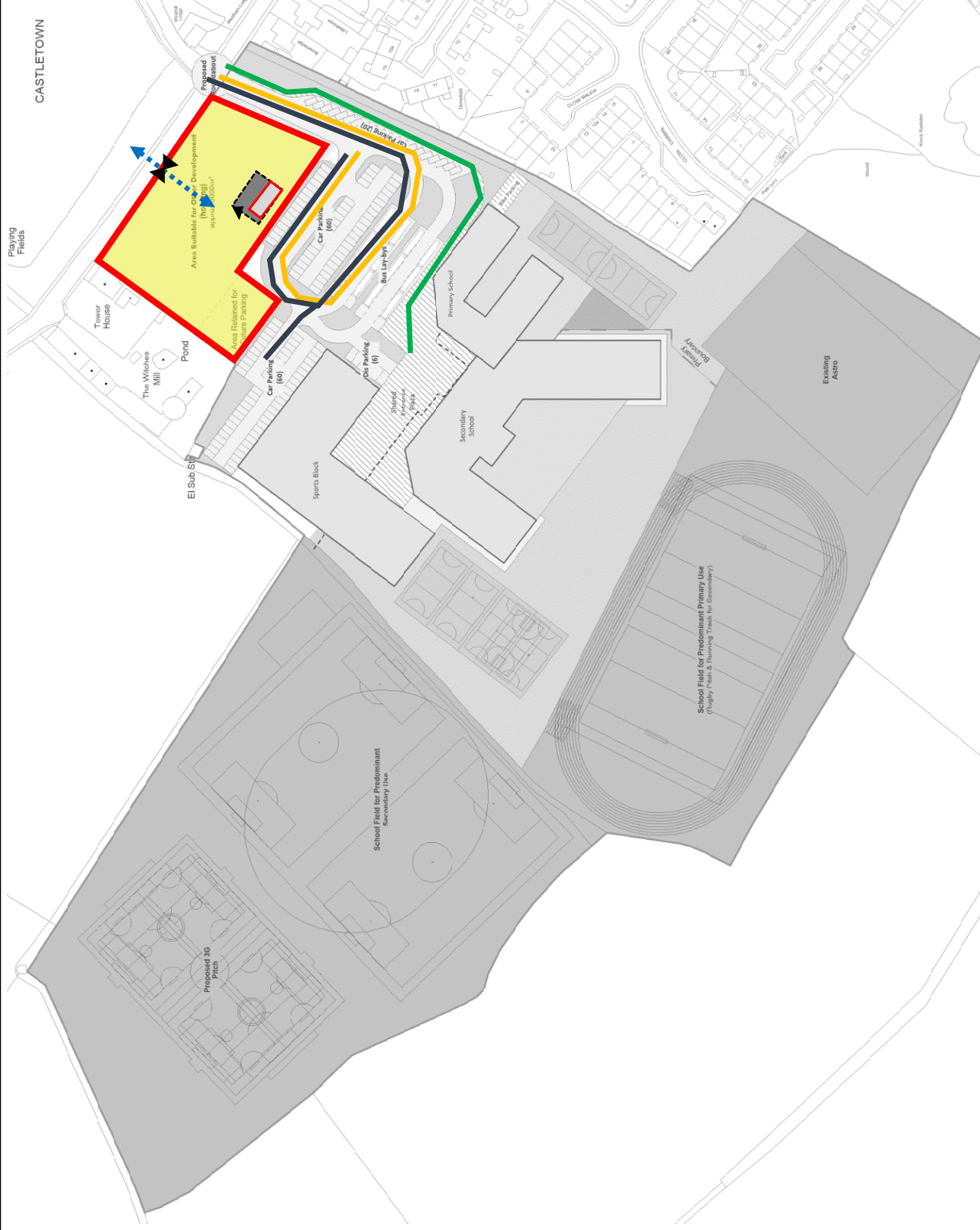
- Secure Site Boundary
- Vehicle Access Gates
- Pedestrian Access Gates
- Primary Vehicle Route
- Site Compound
- Site Offices & Welfare
- Construction Zone
- Building Outline
- Staff & Visitor Parking
- Public / Safety Interface

IOM

CASTLE RUSHEN HIGH SCHOOL

SITE LOGISTICS – PHASE 5

Drg Ref: MDC-CRHS-LOG-005 Rev: 0





Castle Rushen High School
MDC

OUTLINE PROGRAMME

