EDUCATIONAL FACILITIES DESIGN

COVID-19 Prevention and Management in K-12 Schools

June 2020

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EXECUTIVE SUMMARY/INTENT

Promoting safety and welfare for all stakeholders in the education realm is a long-standing goal of AFA, and the unprecedented challenges resulting from the Covid-19 crisis present unique design problems. The following set of measures offer suggestions for adapting to social distancing guildelines, beginning with site access. Guidelines for circulation, classroom distancing and miscellaneous spaces will be addressed in future issues.

SITE ACCESS

- **Health screenings**
- **Queuing**
- **Entry points**
- **Time to enter**
- **Isolation protocol**

CIRCULATION

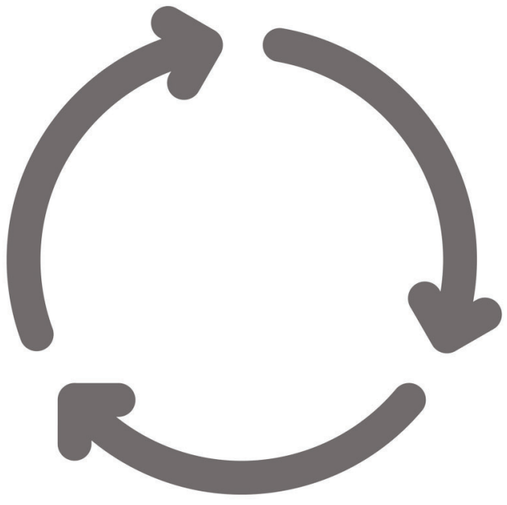
- Nodes
- Path of circulation
- Signage/wayfinding

CLASSROOMS

- Layout
- Indoor air quality
- Hygiene
- Use of space
- Entry/Exit procedures

MISCELLANEOUS SPACES

- Bathrooms
- Lunch rooms
- Distance learning spaces



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SAFETY STRATEGIES

There are a number of common sense strategies that can be implemented to reduce the transmission of illness among the school population. The measures listed below are recommended by organizations such as the Centers for Disease Control and Prevention (CDC) and World Health Organization (WHO) to help keep students and teachers healthy. While there is research that shows that individuals under 20 years of age are approximately half as susceptible to infection as those over 20 years of age, efforts to minimize transmission could still be undertaken in order to keep staff and family members healthy and to prevent outbreaks in the larger community.

HEALTH SCREENINGS
Health screenings for students and staff may consist of self-reporting travel, self-reporting contact with infected individuals, and symptom checking. Screening large volumes of people can take time and could be carefully considered as part of the arrival process.

SOCIAL DISTANCING
Social distancing is the act of staying 6' or more away from other individuals. This lowers the risk of contracting illness via large respiratory droplets. However, in situations where people are speaking, sneezing, coughing, laughing, or singing without face coverings, droplets can travel considerably further.

SANITATION
Regular sanitizing of hands and surfaces via thorough washing or anti-microbial substances prevents transmission via fomites. SARS-CoV-2 fomites can survive on surfaces for between 4 hours (copper) and 72 hours (plastic and stainless steel.) Frequent handwashing and facility cleaning is recommended.

STUDENT VOLUME
Greater density leads to greater risk. Lower density can allow for more space to social distance as well as slow the accumulation of viral particles in poorly-ventilated spaces. Where possible, schools could consider reducing student density by offering staggered schedules, part-time remote learning, etc.

FACE COVERINGS
Masks are a low-cost method of lowering risk. While cloth or surgical masks may not prevent someone from breathing in the virus, it can prevent virions from being expelled in large respiratory droplets. Since SARS-CoV-2 can be infectious in both pre-symptomatic and asymptomatic presentations, mandatory face coverings (with exceptions as necessary) play a large part in reducing transmission.

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HEALTH SCREENINGS

Conducting health screenings is critical to keeping the student and staff populations healthy. By catching potentially ill people prior to entry into the building, you lower risk of infections and can prevent the need to shutdown for cleaning. The more vigilant schools are about screening, the less likely it is that they will have to close for a period of time to sanitize their buildings. There are a number of methods by which entrants can be screened, and the decision on which of these methods to use will be based on volume of students, budget, staffing considerations, and level of acceptable risk.

AT-HOME SELF-SCREENINGS

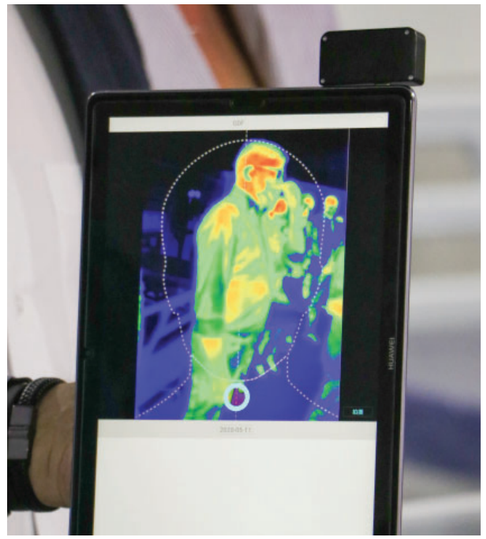
Pros:
- Very low cost
- No-contact
- No additional time on site

Cons:
- Relies on honor system
- Online methods may not be accessible for all students

INFRARED THERMOMETERS

Pros:
- Low cost ($50-$250 each)

Cons:
- Slow (10-30 seconds, avg. 20)
- Prone to operator error & false readings
- Requires one per health screener
- Puts staff in close contact with potentially ill students
- Needs to be used in conjunction with self-screenings



THERMAL IMAGING STATIONS

Pros:
- Fast (no stopping required)
- No-contact
- One per entry point, with fewer entry points required
- High accuracy

Cons:
- Harder to use - requires training on technology
- Higher cost ($5,000 - $20,000 each)
- Requires second thermal check as backup whenever a fever is detected
- Needs to be used in conjunction with self-screenings

SELF-SCREENING KIOSKS

Pros:
- No-contact
- High accuracy

Cons:
- Higher cost ($1500-$5000 each)
- Variable speed - 5-10 seconds unless paired with a questionnaire
- May also require use of a smart device for administering no-contact screening questions

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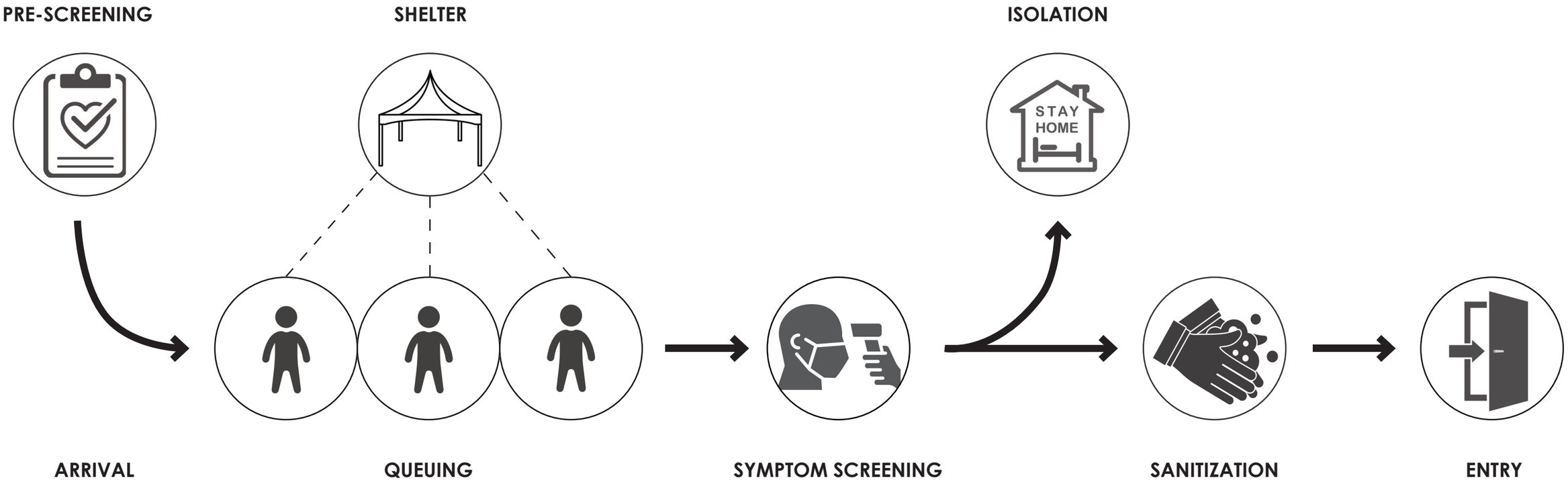
ENTRY PROCESS

Developing an entry process that incorporates pre-screening, social distancing, sheltering, temperature checks, isolation of potential cases and hand sanitizing can provide adequate preventive measures and efficient means of entering and exiting the building.



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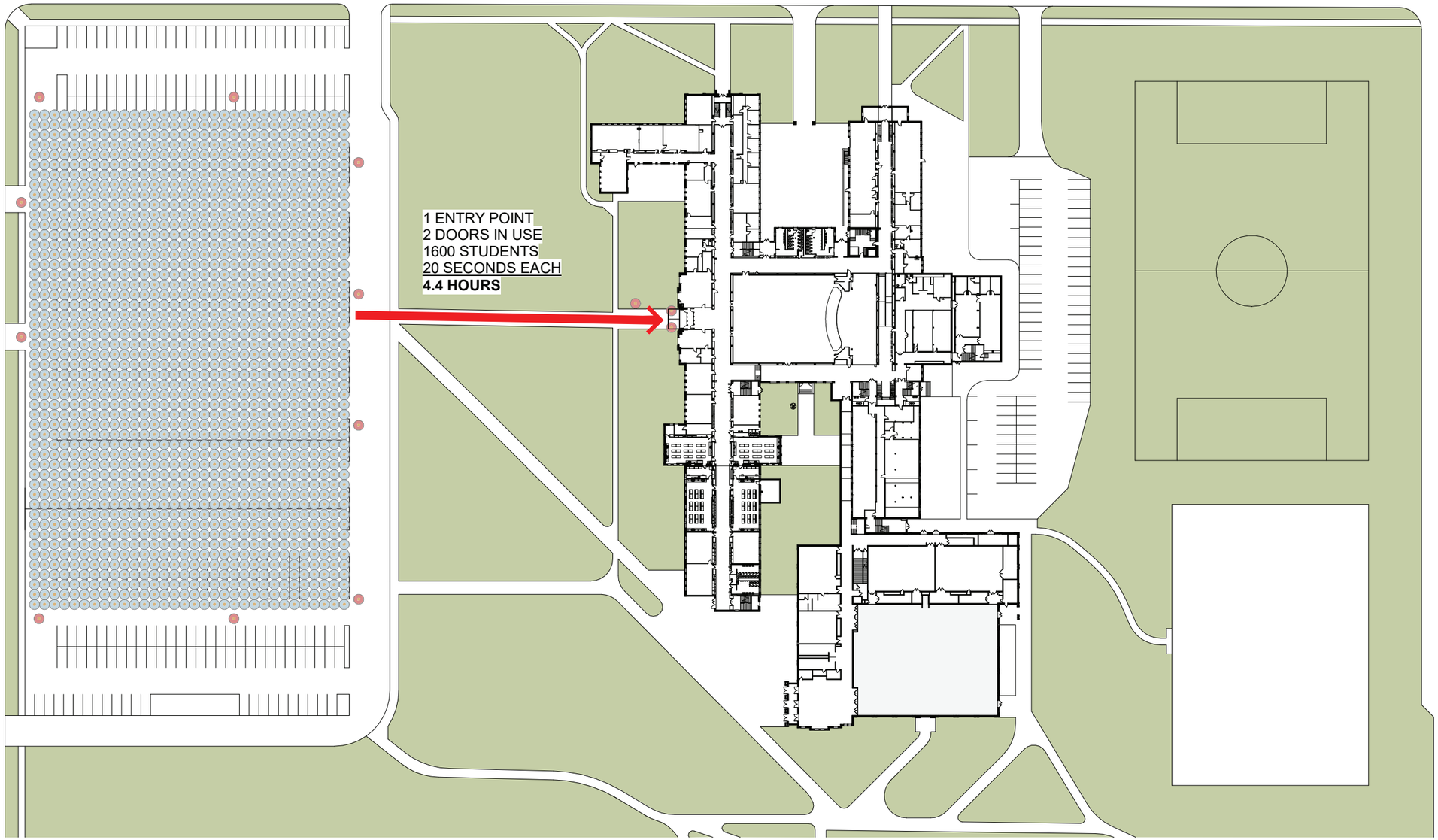
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #1

Single entry point w/ 2 doors in use

Full student body (1,600)

Screening procedure: infrared forehead scanner, ~20s per student

Hand sanitizer prior to entry

Min. 13 staff for screening & queue management

Min. 2 infrared temperature guns

4.4 hours to ingress

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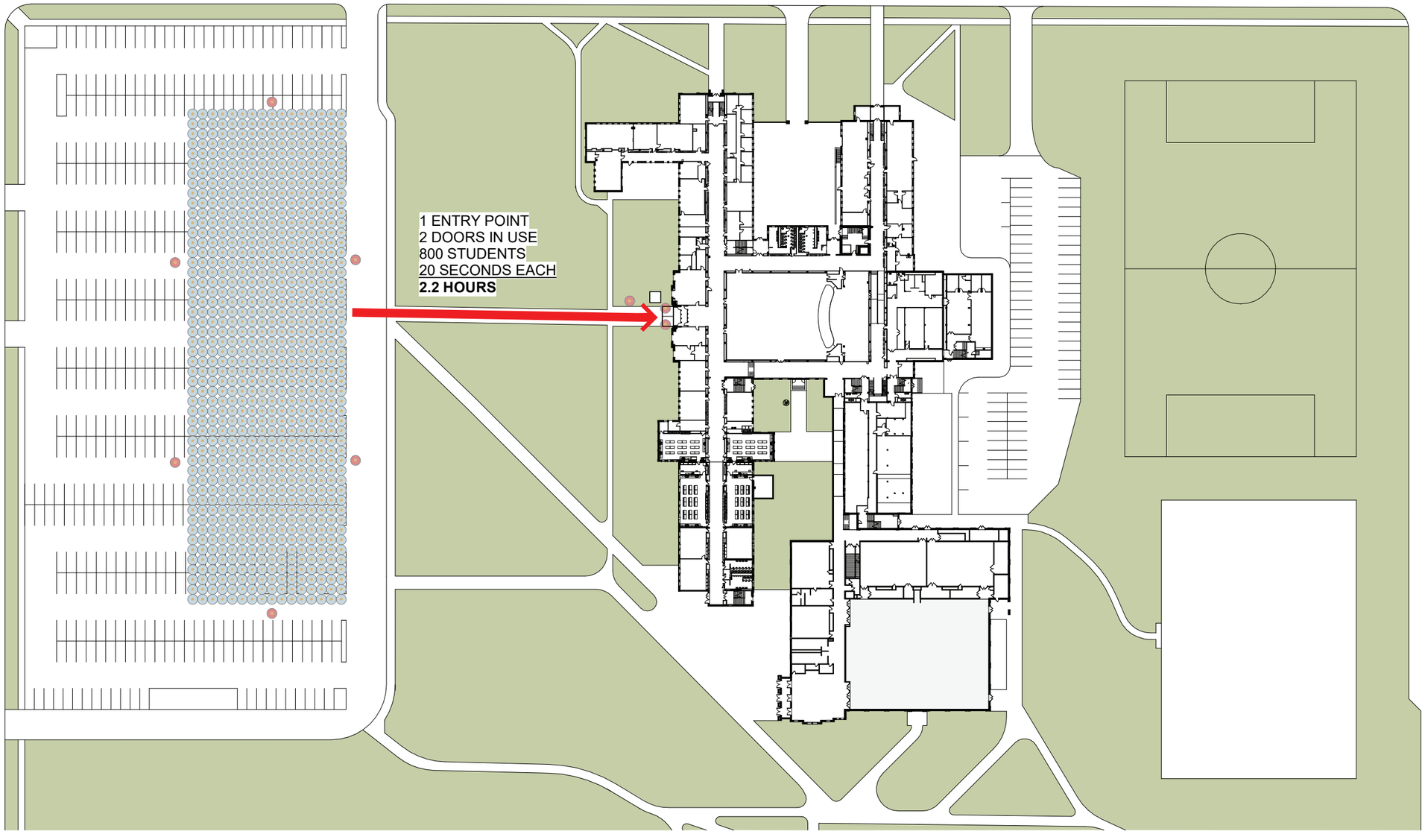
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #2

Single entry point w/ 2 doors in use

Half student body (800)

Screening procedure: infrared forehead scanner, ~20s per student

Hand sanitizer prior to entry

Min. 9 staff for screening & queue management

Min. 2 infrared temperature guns

2.2 hours to ingress

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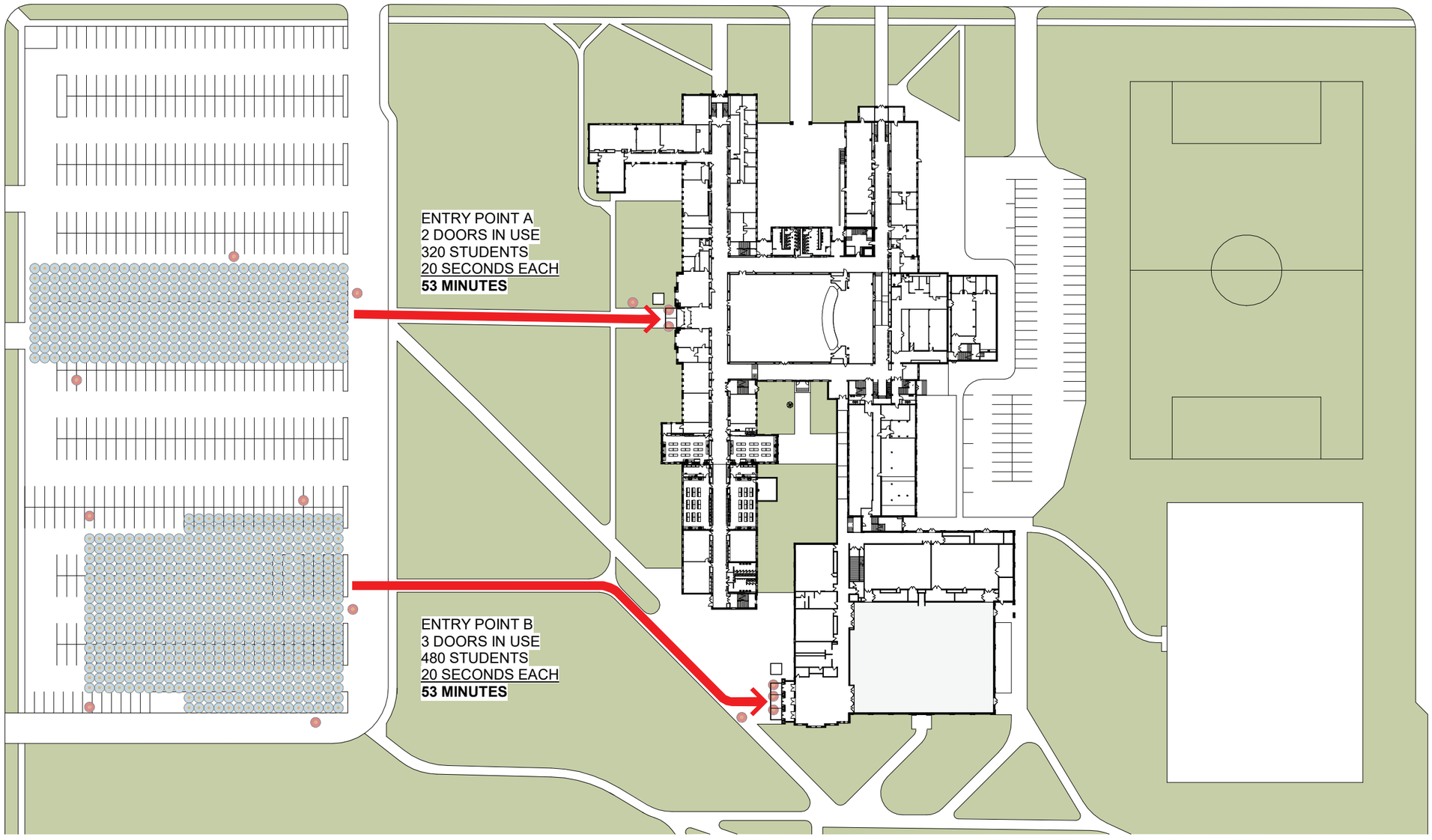
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #3

Two points of entry w/ 5 doors in use

Half student body (800)

Screening procedure: infrared forehead scanner, ~20s per student

Hand sanitizer prior to entry

Min. 15 staff for screening & queue management

Min. 5 infrared temperature guns

53 minutes to ingress

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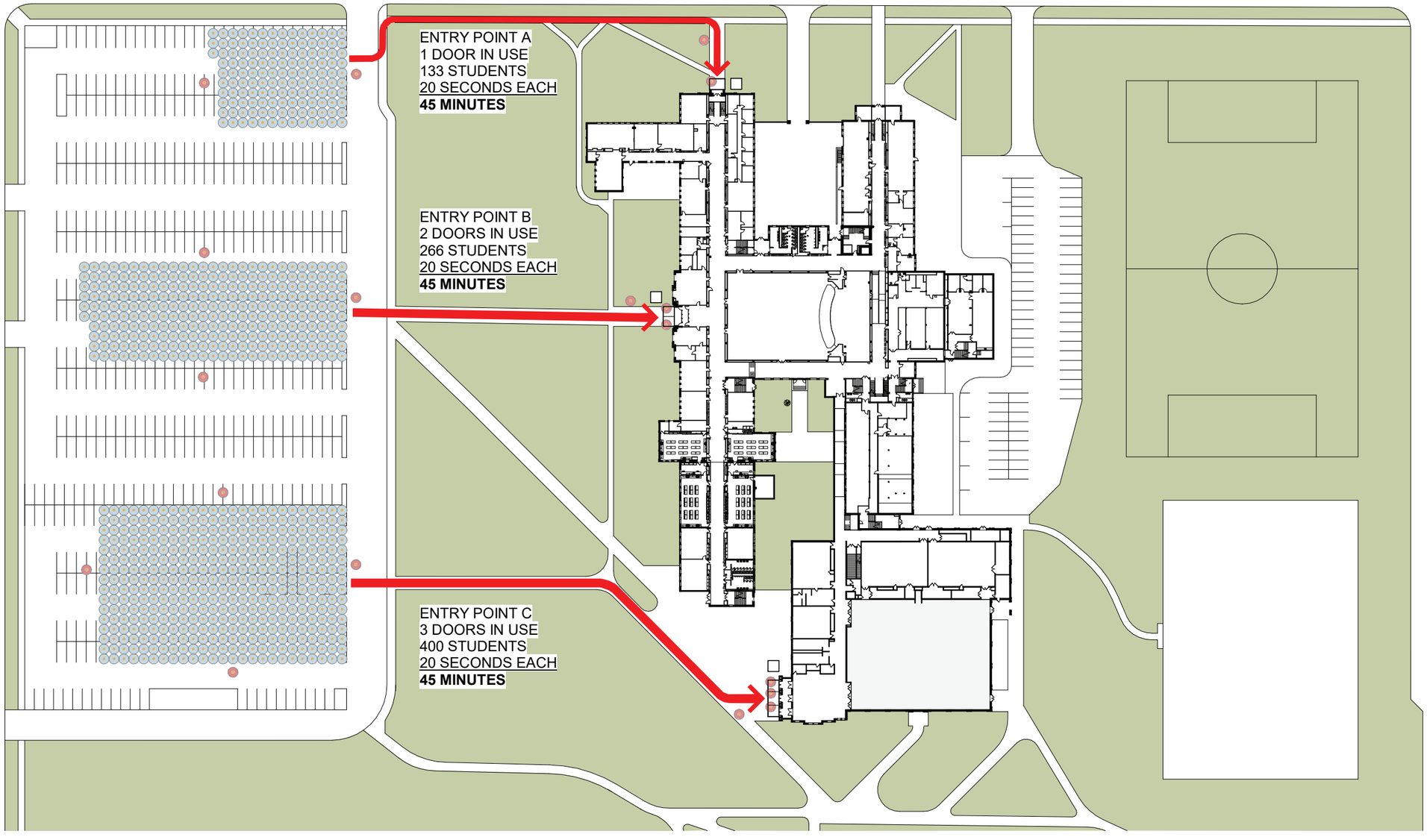
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #4

Three entry points with 6 doors total in use

Half student body (800)

Screening procedure: infrared forehead scanner, ~20s per student

Hand sanitizer prior to entry

Min. 18 staff for screening & queue management

Min. 6 infrared temperature guns

45 minutes to ingress

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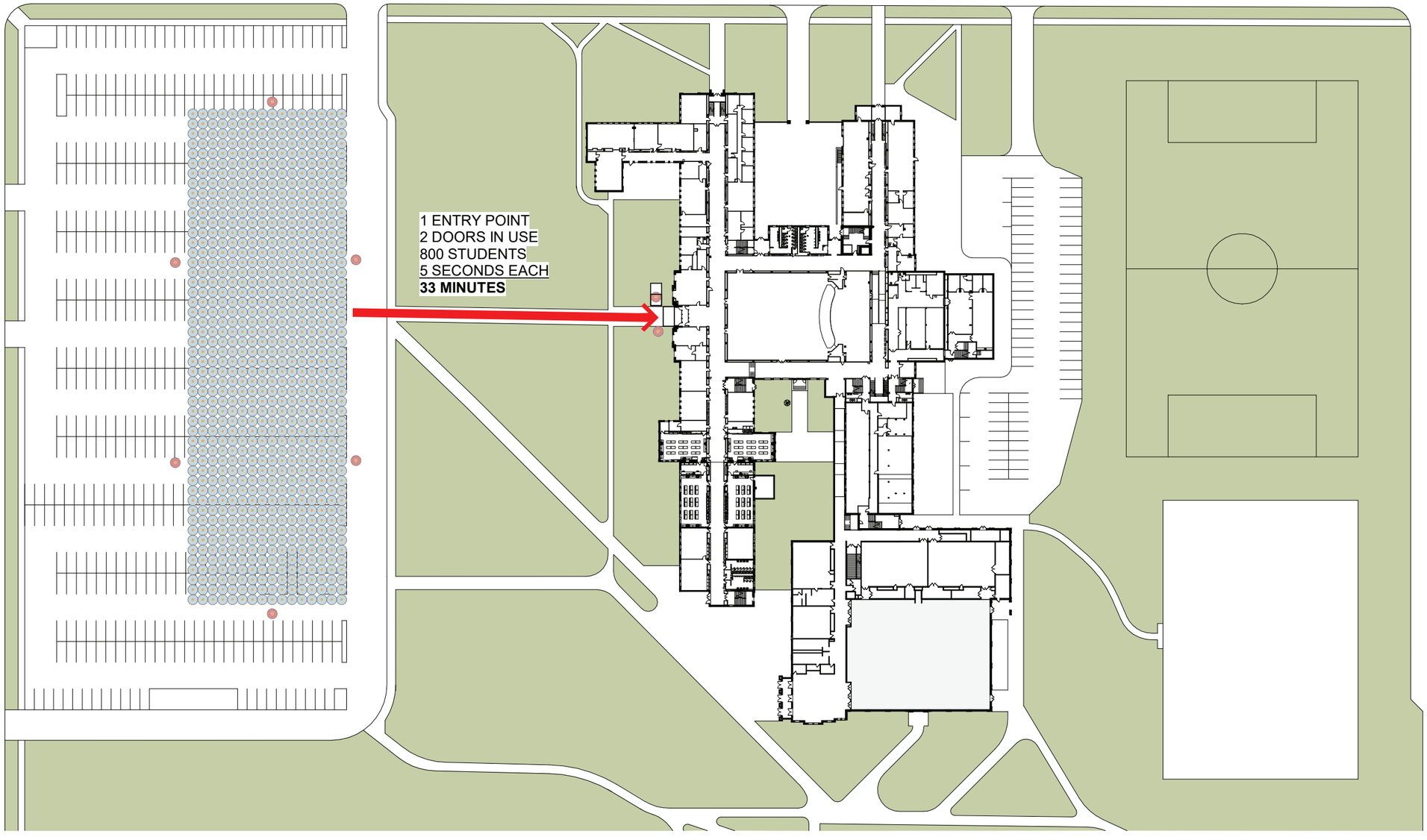
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #5

Single entry point w/ 2 doors in use

Half student body (800)

Screening procedure: thermal imaging, ~5s per student

Hand sanitizer prior to entry

Min. 8 staff for screening & queue management

1 thermal imaging camera and monitoring station

33 minutes to ingress

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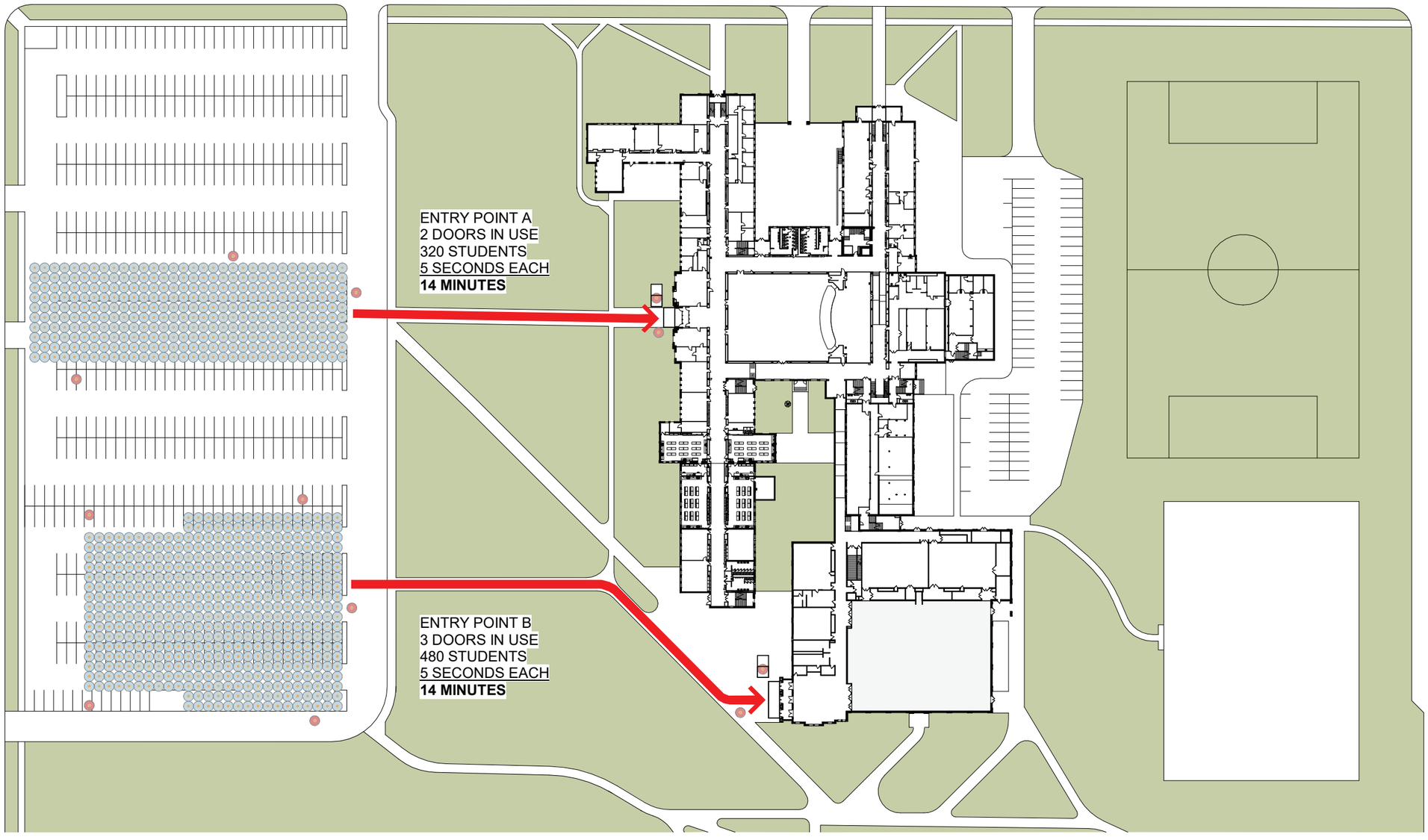
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #6

2 entry points w/ 5 doors in use

Half student body (800)

Screening procedure: thermal imaging, ~5s per student

Hand sanitizer prior to entry

Min. 12 staff for screening & queue management

2 thermal imaging camera and monitoring stations

14 minutes to ingress

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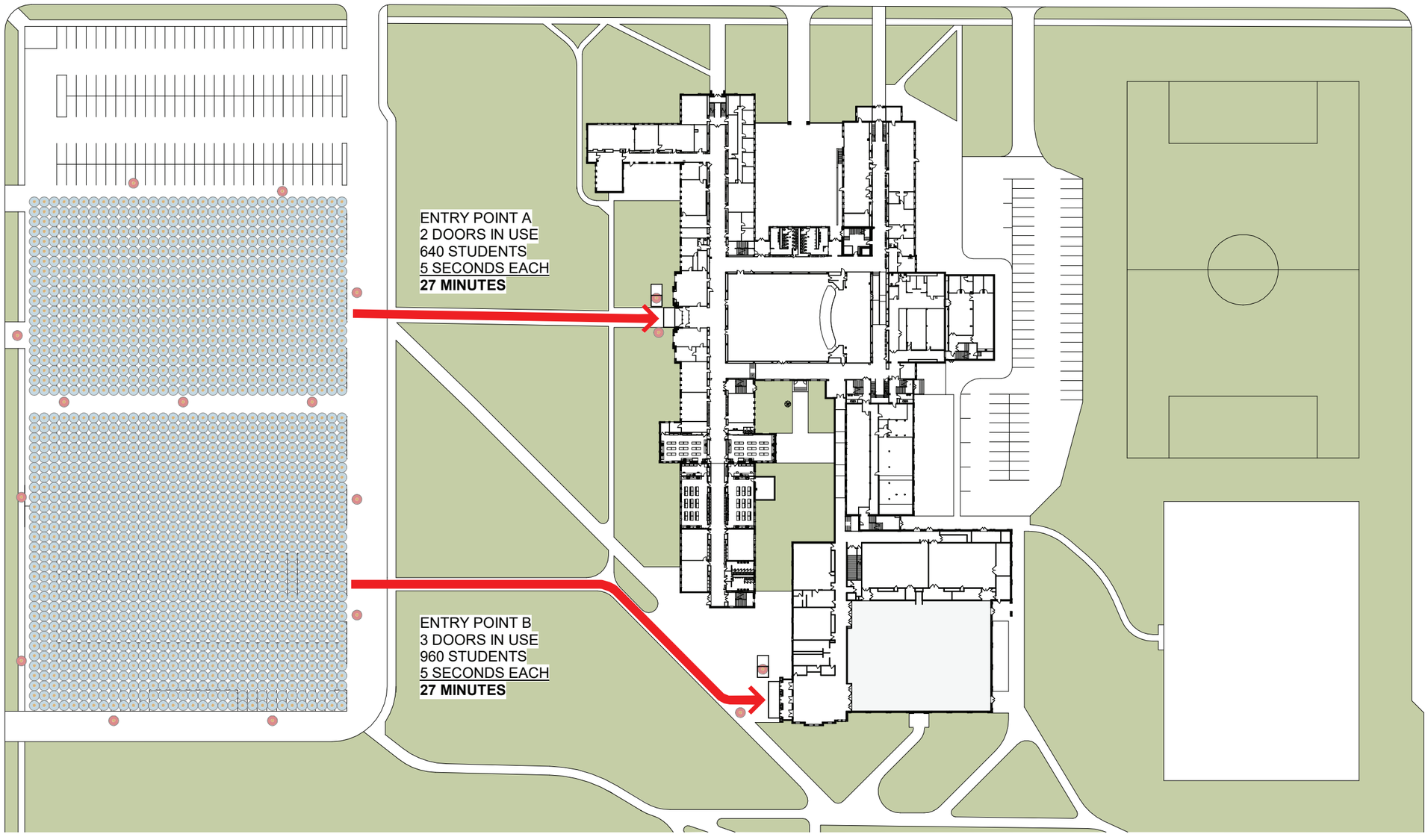
SITE ACCESS AND ENTRY

The following analysis is based on an urban high school, enrollment of 1,600 students, without staggered entry times.



SCENARIO #7

2 entry points w/ 5 doors in use

Full student body (1,600)

Screening procedure: thermal imaging, ~5s per student

Hand sanitizer prior to entry

Min. 17 staff for screening & queue management

2 thermal imaging camera and monitoring stations

27 minutes to ingress

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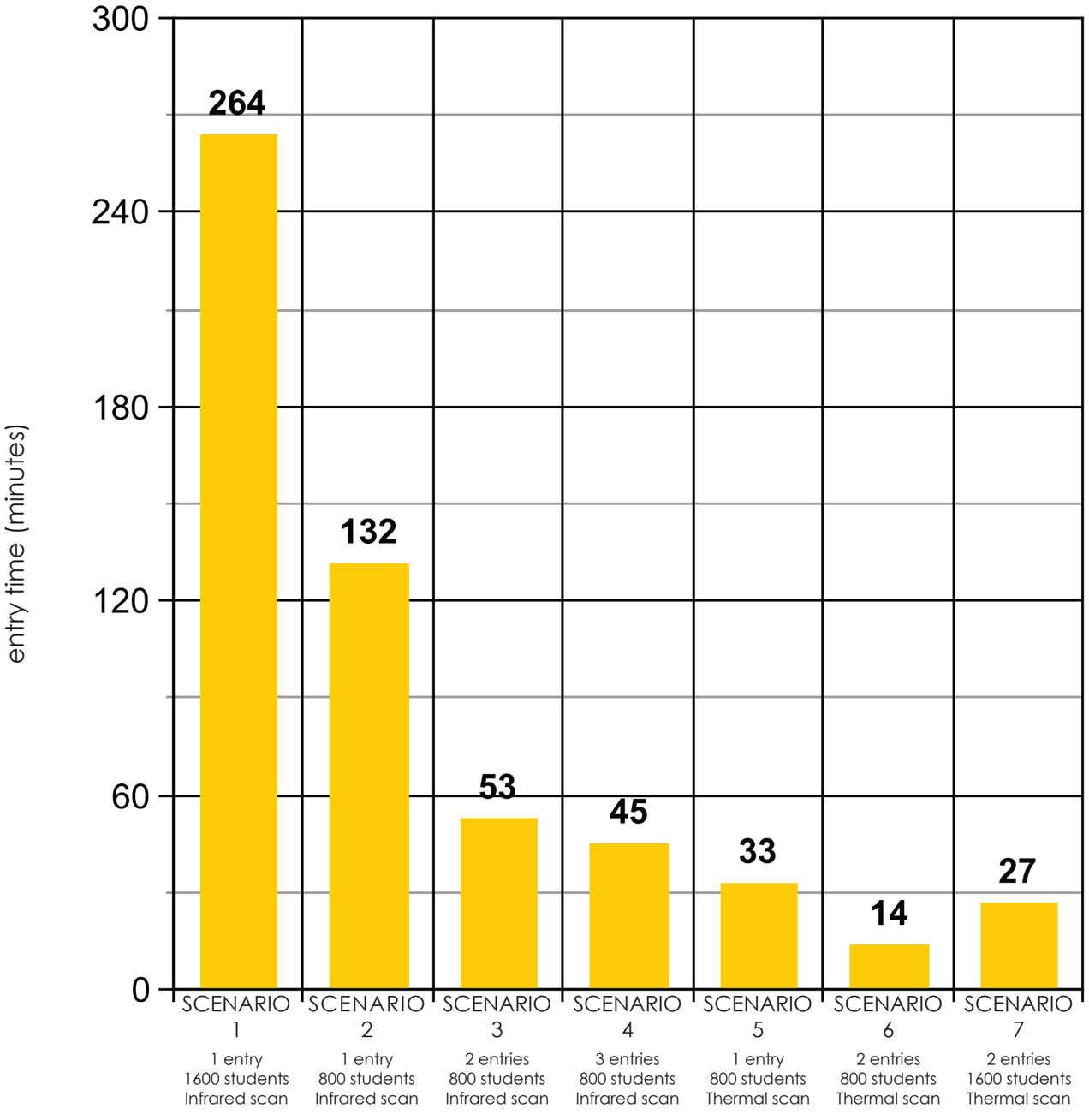
SITE ACCESS AND ENTRY



Comparing the seven scenarios described above, we find that increasing points of entry has an inverse correlation with the total time of entry. Scenarios 3 and 4 highlight the considerable increase in efficiency by adding these entry points. Additionally, implementing staggered arrival times significantly improves efficiency of entry time.

Scenarios 5, 6 and 7 illustrate the increased efficiency by using thermal imaging devices. These devices take significant economic investment, but provide a more manageable timeframe for entry.

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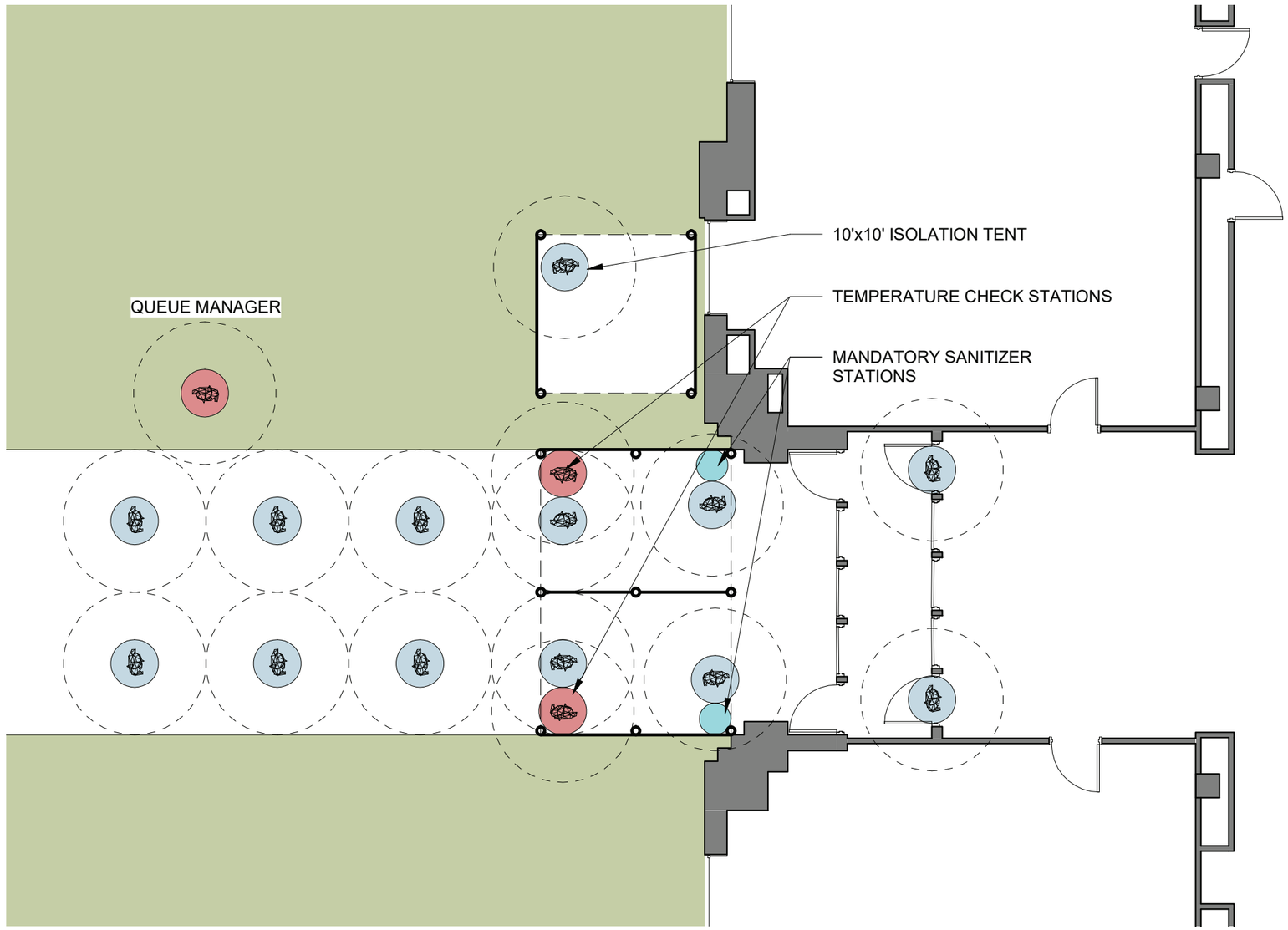
SITE ACCESS AND ENTRY



A typical layout for forehead scanning with one queue manager and two temperature check stations.

Safe social distancing
9' diameter

Student personal space
3' diameter

Staff personal space
3' diameter

1 **MAIN ENTRY - FOREHEAD SCAN**

1/8" = 1'-0"

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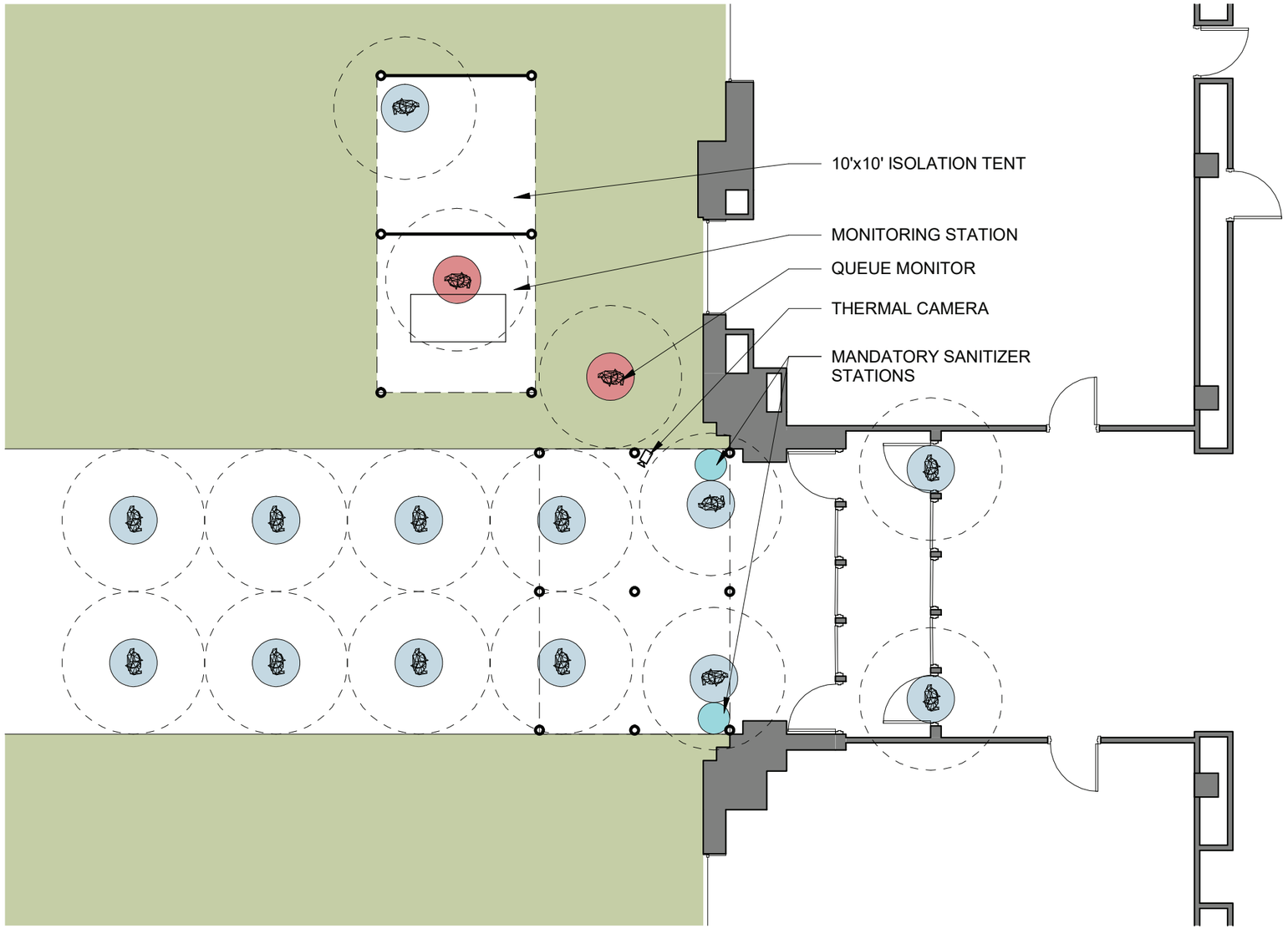
SITE ACCESS AND ENTRY



A typical layout for thermal imaging scanning with one queue manager and one thermal camera station.

Safe social distancing
9' diameter

Student personal space
3' diameter

Staff personal space
3' diameter

1 **MAIN ENTRY - THERMAL IMAGER**

1/8" = 1'-0"

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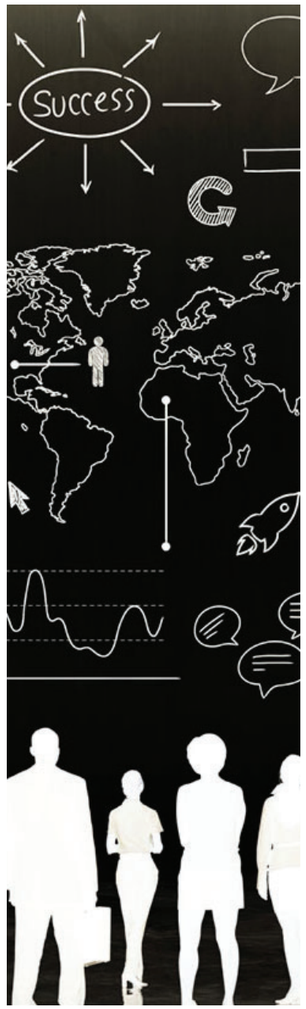
ABOUT AFA

40 YEARS OF LEARNING ENVIRONMENT EXPERTISE

The AFA team has cultivated a vast body of knowledge working on environments that support learning at every age level from early education to collegiate. Each project and client contributes to our unique perspective and methods on designing for education. This report was created to promote the safety and welfare of all stakeholders during these unprecedented times. The challenges resulting from the COVID-19 crisis present unique design problems and the following set of measures offer suggestions for adapting to social distancing guildelines and preventing the spread of disease in educational settings.



WE FOCUS ON...

EVIDENCE BASED DESIGN

Alan Ford Architects has shown leadership in advancing best practices in educational facility design through authoring books, magazine articles, peer reviewing scientific papers, and organizing conferences. The AFA team is passionate about keeping up to date with the latest research in brain based, whole child, movement and other 21st century learning principles. In doing so, AFA provides clients with the most informed design strategies. We are taking the same approach now to the ongoing scientific research relating to SARS-CoV-2 in order to interpret how schools will be impacted.

SAFETY AND SECURITY

AFA is committed to creating a safe learning environment which is fundamental to fostering learning. As an expert in safety and security, Alan Ford has been quoted in national publications, spoken at international and local conferences on school safety, and testified to the legislature to promote better safety and security standards. Alan is currently a member of the legislative advisory committee on school safety and security. In the current climate, we conceptualize "safety and security" to also encompass the safeguarding of the health of students and teachers, and by extension, their families and the community at large.

CONTEXT CENTRIC SOLUTIONS

The AFA team has an intimate understanding of Colorado's climate, environment, and historic precedents. AFA believes in creating efficient and innovative buildings that fit within Colorado's context while meeting each clients' unique requirements and expectations.

SUSTAINABILITY

AFA champions sustainability in all projects and implementing this approach is more important than ever due to the pandemic. Designing for resiliency and efficiency ensures the built environment is doing its part to preserve the health and well-being of both the occupants and our environment.

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